PressAcademia

JMML

Journal of Management, Marketing & Logistics

PressAcademia publishes journals, books, case studies, conference proceedings and organizes international conferences.

jmml@pressacademia.org

ISSN 2148-6670

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

ABOUT THE JOURNAL

Journal of Management, Marketing and Logistics (JMML) is a scientific, academic, peer-reviewed, quarterly and open-access online journal. The journal publishes four issues a year. The issuing months are March, June, September and December. The publication languages of the Journal are English and Turkish. JMML aims to provide a research source for all practitioners, policy makers, professionals and researchers working in the area of economics, finance, accounting and auditing. The editor in chief of JMML invites all manuscripts that cover theoretical and/or applied researches on topics related to the interest areas of the Journal.

JMML is currently indexed by

Ulrich's Directiroy, ProQuest, Open J-Gate,
International Scientific Indexing (ISI), Directory of Research Journals Indexing (DRJI), International Society for Research Activity (ISRA), InfoBaseIndex, Scientific Indexing Services (SIS), International Institute of Organized Research (I2OR), SOBIAD.

Ethics Policy

JMML applies the standards of Committee on Publication Ethics (COPE). JMML is committed to the academic community ensuring ethics and quality of manuscripts in publications. Plagiarism is strictly forbidden and the manuscripts found to be plagiarised will not be accepted or if published will be removed from the publication.

Author Guidelines

All manuscripts must use the journal format for submissions.
Visit www.pressacademia.org/journals/jmml/guidelines for details.

CALL FOR PAPERS

The next issue of JMML will be published in September 2021.
Submit manuscripts to
jmml@pressacademia.org or
http://www.pressacademia.org/submit-manuscript/
Web: www.pressacademia.org/journals/jmml

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

EDITORIAL BOARD

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

CONTENT

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

THE COVID-19 OUTBREAK`S EFFECTS AND NEW INCLINATIONS IN TERMS OF LOGISTICS AND SUPPLY CHAIN ACTIVITIES: A CONCEPTUAL FRAMEWORK

DOI: 10.17261/Pressacademia.2021.1408
JMML- V.8-ISS.2-2021(1)-p.76-88

Ozden Ozkanlisoy
Istanbul Aydin University, Department of Aviation Management, Florya, Istanbul, Turkey.
ozdenozkanlisoy@aydin.edu.tr , ORCID: 0000-0001-7879-0733

Date Received: January 5, 2020 **Date Accepted:** May 29, 2021

To cite this document
Ozkanlisoy, O. (2021). The COVID-19 outbreak`s effects and new inclinations in terms of logistics and supply chain activities: A Conceptual Framework. Journal of Management, Marketing and Logistics (JMML), 8(2), 76-88.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2021.1408

ABSTRACT

Purpose – The global pandemic called COVID-19 has also affected many economic sectors and activities, including manufacturing, supply chain and logistics. Undoubtedly, logistics and supply chain activities are the most crucial of them. There are not enough studies yet on the effect of COVID-19 on the logistics and supply chain. In this study, it is aimed to designate the effects of the pandemic on the logistics and supply chain activities, take measures against future crises and assist companies in risk management activities.

Methodology - The study is based on a literature review. The secondary data, published reports and academic studies on the field of supply chain and logistics during the COVID-19 pandemic period were examined and the findings were reported.

Findings- The COVID-19 pandemic has some negative effects on logistics and supply chain activities such as bullwhip effect, the decrease in the carrying capacity, the contraction of the international trade volume, which is an indispensable part of logistics, and the increase in logistics costs. Furthermore, pandemic has shown that many of the pre-pandemic approaches to supply chains were wrong. New approaches and strategies, which can be called new inclinations in the supply chain during the pandemic period, the understanding of localization in purchasing and the transition to new production areas, acceleration in digital transformation, increasing supply chain flexibility are the most significant ones.

Conclusion- When supply chains are faced with the risk of a natural disaster such as a pandemic, they must proactively conduct risk management efforts to mitigate this risk with minimal damage. Supply chain resistance should be increased. Moreover, companies must increase their investments in digital transformation and transform their supply chains into interconnected and autonomous ecosystems. These supply chains will be the winning supply chains of tomorrow.

Keywords: The effect of COVID-19, new inclinations in logistics and supply chains, risk management
JEL Codes: M10, M20, G32

1. INTRODUCTION

"Logistics" is a concept that emerged with military organizations and was first introduced in XIV. Used in Louis France. Even then, the effectiveness of the organization did not depend solely on weapons and soldiers' strength and fighting enthusiasm. The effectiveness of the organization at that time also depended on transport facilities and efficient supply of ammunition and food items. At that time, the supply and transportation of materials, food, and ammunition was rationally considered, and this is logistics. The significance given to logistics played a crucial role in the French military success (Weele, 2014: 253).

Logistics is liable for the transportation and storage of materials moving along the supply chain (SC). By following the materials transported in a business, the activities included in logistics can be seen (Waters, 2003: 12). Logistics is not only an important concept for the efficiency of organizations for businesses. Since it contains the "movement" element that enables logistics organizations to move forward, operations related to the movement of goods and services cannot be carried out in businesses without logistics. (Shapiro, 1984: 119).

International SCs are more significant than ever for global trade. The key factor in a country's ability to affiliate with SCs is the local trade facilitation and the efficiency of its logistics activities (Freund and Rocha, 2011: 361). Even so the tariffs in export

markets are zero, if companies in a country are faced with high costs and inefficient logistics, they will not be able to rival companies that capitalize on an efficient logistics environment (Hoekman, 2020). Therefore, logistics activities within the SC are a significant issue for the competition of both companies and countries.

In the 21st century, a new epidemic named COVID-19 was added to the list of global epidemics in 2019. The number of casualties caused by this pandemic is increasing day by day. The coronavirus pandemic, which is known to originate in Wuhan, China and has spread to all countries of the world in 2020, continues to affect many people worldwide by continuing its contagiousness (Kraemer et al., 2020: 493). The pandemic does not only affect human health. Natural disasters and crises are among the events that lead to disruptions in the SC. The pandemic also affected economic sectors and activities, including manufacturing, supply chain, and logistics (WHO, 2020).

The expected damage of the COVID-19 pandemic is difficult to predict. The global health crisis has turned into an economic crisis. Analyzes suggest that the economic effects of the coronavirus pandemic will be more advanced than the Great Depression that started in 1929 due to the USA (Gopinath, 2020). Changes in prevention policies and plans has occurred due to uncertain data on incidence rate, mortality, and other statistics. There are different applications in different parts of the World (Prichep, 2020; Singh et al., 2020: 3). However, while the damage at the end of the pandemic is difficult to predict, it is possible to examine the damage so far and set a roadmap for the rest of the pandemic. There are not enough studies yet on the impact of COVID-19 on the logistics and supply chain activities. In this study, it is aimed to designate the impacts of the pandemic on the logistics and supply activities, to take measures against future crises and to assist companies in risk management activities. For this purpose, the secondary data, published reports and academic studies on the field of supply chain and logistics during the COVID-19 pandemic period were examined and the findings were reported. The study ends with an evaluation of the findings and recommendations to supply chains and businesses regarding future risks.

2. GLOBAL SUPPLY CHAIN RISKS

Many major risks, both natural and anthropogenic, are increasing the interest of both academia and policy makers in global supply chain risks. Supply chain risks have many causes or drivers. These risks have become more diverse over time because of the increasing importance, length and complexity of global value chains (Saenz and Revilla, 2014). In a recent study of corporate executives (World Economic Forum, 2017), the risks, along with their degree of impact, are shown in Table 1 below (Anbumozhi et al., 2020: 5; World Economic Forum, 2017):

Table 1: Drivers of Global Supply Chain Risks

Type of Risk	Risk	%	
Environmental	Natural disasters	59	Uncontrollable
	Extreme weather	30	Uncontrollable
	Pandemic	11	Influenceable
Geopolitical	Conflicts and war	46	Influenceable
	Export/Import restrictions	33	Controllable
	Terrorism	32	Influenceable
	Corruption	17	Influenceable
	Organized crime	15	Influenceable
	Maritime piracy	9	Influenceable
	Nuclear/biological weapons	6	Influenceable
Economic	Sudden demand shocks	44	Influenceable
	Volatility in commodity prices	30	Influenceable
	Border delays	26	Influenceable
	Currency fluctuation	26	Controllable
	Global energy shortage	19	Influenceable
	Investment restrictions	17	Controllable
	Shortage of labor	17	Influenceable
Technical	Information and communication disruptions	30	Controllable
	Transport infrastructure	6	Controllable

Reproduced from Source: Anbumozhi, V., Kimura, F., & Thangavelu, S. M. (2020). Global supply chain resilience: vulnerability and shifting risk management strategies. In Supply Chain Resilience (pp. 3-14)., Singapore: Springer, p. 5.

According to the results of the research on risk factors in global supply chains in Table 1 above, it is possible to say that the risks that have the most significant impact on supply chains are external risks such as natural disasters, sudden demand shocks and information interruptions. By distinguishing environmental, geopolitical, economic, and technological factors, the close relationships between global supply chain risks and other systemic risk categories can be better understood (Anbumozhi et al., 2020: 5).

The interest in supply chain vulnerability and its managerial counterpart, supply chain risk management, has attracted great interest from practitioners as well as academics over the past two decades (Rao and Goldsby, 2009). Supply chain risk management is defined as identifying potential risk sources and implementing appropriate strategies with a coordinated approach among supply chain risk members to reduce supply chain vulnerability. (Juttner, 2005: 120). The main purpose of supply chain risk management is to reduce supply chain vulnerability.

The COVID-19 pandemic has affected supply chains to a greater extent than the pandemic risk seen in the 2017 study. It is predicted that there will be more such epidemics in the globalizing world from now on. Moreover, these diseases are predicted to affect all societies indiscriminately. However, it cannot be predicted from which source, when or in what form the outbreaks will occur (Budak and Korkmaz, 2020: 75; Taşkın, 2020: 126). Some companies were better prepared during this period to reduce the impact of the supply chain disruption caused by COVID-19. These are companies that have developed and implemented supply chain risk management and business continuity strategies (Kilpatrick and Barter, 2020: 4).

3. NEGATIVE IMPACTS ON LOGISTICS AND SUPPLY CHAIN MANAGEMENT

The impact of COVID-19 is an interdisciplinary issue under discussion in social sciences. Supply chain and logistics are one of these disciplines (Ivanov, 2020: 2). With the impact of the pandemic, a two-way break occurred in the SCs. This break has affected both the overall economic situation and the supply chains and logistics activities as a whole. In addition, this pandemic has led to a review of many approaches and practices in supply chain and logistics. The negative impacts of coronavirus on the supply chain and logistics are explained in detail below:

3.1. The Bullwhip Effect in SCs

The forward growth of inventory and demand in a SC has been well known to SC managers for decades. This phenomenon is called the bullwhip effect, in which fluctuations in orders increase as they ascend the SC from retailer to wholesaler, producers and suppliers (Behzad et al., 2011: 556). The bullwhip effect is a major issue in supply chains that affects forecast quality and therefore increases demand fluctuations upstream of the supply chain (Lee et al.,1997: 546). Demand fluctuations bring about extra costs and affect delivery times (Hassan and Soh, 2005: 567; Disney et al., 2006: 151; Li and Gao, 2010: 1). The bullwhip effect causes inefficiency and is seen as one of the most significant performance indicators for supply chains. (Lichun and Jiayu, 2011: 2).

In pandemic situations such as COVID-19 (coronavirus), which have great effects by all countries of the world, the importance of the bullwhip effect in SCs has been better understood. During this pandemic, while the demand for many products and services increased, the demand for some decreased. The demand for many food and health products increased, market shelves were emptied, and prices increased. During the quarantine period, there was an increase in internet and home service services. Many businesses had to stop their production. This process is clearly demonstrating how the bullwhip effect occurs in the SC (Akbal, 2020: 182).

Strategies for the bullwhip effect in the supply chain are divided into two as demand management and capacity management. The demand management strategy is aimed at preventing the bullwhip effect, while the capacity management strategy is aimed at reducing the bullwhip effect. Therefore, while external factors are also effective in demand management, capacity management is only under the control of the organization. Since companies cannot affect the pandemic, which is an external factor, during the COVID-19 period, they should implement the capacity management strategy by taking their own companies under control. In this way, the bullwhip effect can be minimized. (Akkermans and Voss, 2013: 765). In addition, practices aimed at reducing the bullwhip effect in the supply chain include increasing the sharing and communication of supply information, reducing variability in demand, shortening the lead times, establishing strategic partnerships, reducing order sizes, allowing other organizations to manage the stocks of their suppliers (Hassan and Soh, 2005: 567). Forward and feedback mechanisms should be established to increase cooperation, integration and knowledge sharing in supply chains. Thus, the bullwhip effect can be reduced. (Viswanadham et al., 2005: 2994).

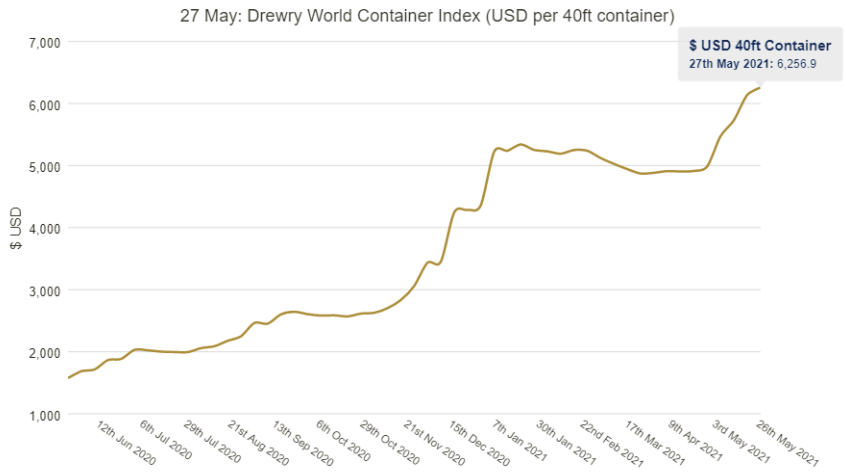
3.2. Transportion Capacity

With the COVID-19 pandemic, restrictions have been imposed on drivers in freight transport on the road (Barua, 2020: 7). During the pandemic period, some of the road loads were transferred to the railway due to reasons such as the lack of driver supply to meet demand. In the first quarter of 2020, the number of freight trains serving between China and Europe increased by 15% to 1,941. In the same period, the number of containers transported increased by 18% to 174,000 (UNESCAP, 2020).

According to the estimates announced by the International Road Transport Union (IRU), the revenues of road freight transport companies will decrease by USD 679 billion in 2020. This amount will correspond to an 18% decrease in revenues compared to 2019 (IRU, 2020a: 4). While this loss of income is estimated to be 125 billion US dollars in Europe, 1 billion US dollars in Saudi Arabia, 63 billion US dollars in the USA and 131 billion US dollars in China are predicted (IRU, 2020b).

Transport activities have also been affected by the bullwhip effect caused by COVID-19. In maritime transport, import containers could not be emptied on time. This situation has increased the need for empty containers at export ports. This caused a significant increase in prices (LODER, 2020: 1). According to the data of the Drewry, the composite index increased 2% or $121 on May 28, 2021, and remains 292.8% higher than a year ago. The average composite index of the World Container Index (WCI), assessed by Drewry for year-to-date, is $5,243 per 40ft container, which is $3,348 higher than the five-year average of $1,895 per 40ft container. The change in the World Container Index (WCI) from May 2020 to May 2021 in the post-COVID-19 period is shown in Figure 1 below (Drewry, 2021):

Figure 1: The Change in Drewry World Container Index (WCI)- May 2020-May 2021



Source: Drewry, (2021). https://www.drewry.co.uk/supply-chain-advisors/supply-chain-expertise/world-container-index-assessed-by-drewry Accessed date: 28.05.2021.

From the point of view of air transport, this mode of transport has a large share in the rapid spread of the coronavirus (European Commission, 2020a: 1). Therefore, travel bans have been imposed around the world. During this period, air traffic fell rapidly and came to a standstill, with a decrease in airline passenger traffic and passenger revenues in all continents of the World (ICAO, 2020: 6- 10; ACI, 2020: 2). The closure of airports to transportation has caused a significant impact on cargo transportation, although not as much as passenger transportation (Li, 2020: 1-6). In consequence of the developments with the COVID-19, airlines have suffered great financial losses and some of them have gone bankrupt. This situation forces airlines to make radical changes in their transportation strategies or to develop new strategies to minimize and compensate their financial losses (Albers and Rundshagen, 2020).

According to the data of the International Air Transport Association (IATA), although airlines have reduced their expenses by approximately 46%, their losses in 2020 are USD 118 billion and the rate of decrease in demand compared to 2019 is 61%. The loss in 2021 is estimated to be US $ 38.7 billion (IATA, 2020a). When the 5-year development of the flight frequency across Europe is examined under three different scenarios, it is expected that the return to 2019 levels will be achieved in 2024 with the most

optimistic scenario. If the coronavirus vaccine is not effective, that is, if the epidemic continues to be effective, it is predicted that the flight frequency will return to the levels of 2019 in 2029 (EUROCONTROL, 2020).

In terms of air cargo transportation, the unavailability of the cargo capacity of the passenger plane fleet puts pressure on the total air cargo capacity. Especially in April 2020, it was observed that the cargo plane capacity increased, while the passenger plane cargo capacity decreased due to the flight bans put into effect within the scope of the measures. The increase in cargo aircraft capacity was not sufficient to compensate for the loss of cargo capacity of passenger aircraft (IATA, 2020b: 2).

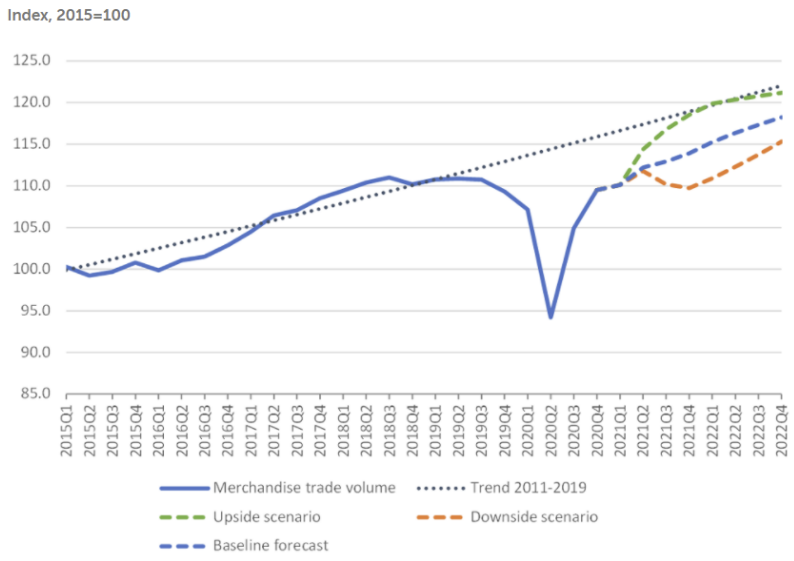
Due to the increasing freight prices and transit times in air and seaways, rail freight transportation has increased its competitive power due to the coronavirus pandemic. Furthermore, rail freight transport has emerged as a type of transport where international freight transport can be continued without interruption, since it is relatively exempt from the restrictions imposed on all other transport types (UIC, 2020: 30).

3.3. Contraction in Trade Volume

According to the general trade system, the exports of Turkey in January-December 2020 decreased by 6.3% according to the same period of the previous year, 169 billion 482 million dollars, imports increased by 4.3% was realized as 219 billion 397 million dollars. In the same period, the foreign trade deficit increased by 69.1% (TUIK, 2020).

When analyzed globally, the SC of countries connected to the global trade network such as China, South Korea, Italy, Japan, USA, and Germany has been interrupted due to the pandemic. The total trade intensity of these countries decreased from 0.833 to 0.429 in the period of 2018-2020 (1st Quarter) (Vidya and Prabheesh, 2020: 2410-2414). In the pre-COVID-19 era, global merchandise trade had grown for two consecutive years since 2016. In 2019, it was approximately 3% smaller than the previous year. When the impact of the coronavirus is examined, it is estimated that at the end of the first three quarters of 2020, there was a contraction of 11.9% according to the previous year (UNCTAD, 2020: 16). In addition, due to the contraction in the world economy and international trade, it was estimated that the world import volume will decrease by about 10% in 2020 (European Commission, 2020b: 3). Actual values for the world trade volume starting from first quarter of 2015 to the second quarter of 2020 and the estimates for the world trade volume from the third quarter of 2020 are shown in Figure 2 below (WTO, 2021):

Figure 2: World Merchandise Trade Volume- 2015 First Quarter (Q1)-2022 Fourth Quarter (Q4)



Source: WTO, (2021). World trade primed for strong but uneven recovery after COVID-19 pandemic shock. Retrieved from https://www.wto.org/english/news_e/pres21_e/pr876_e.htm. 29 May 2021

World trade has rebounded strongly after the shock of the COVID-19 pandemic, but there are two different scenarios for this recovery. The level of recovery will vary according to the rate of vaccination against COVID-19 disease. In this context, there are two different forecasts for 2021 and 2022. In the upside scenario, vaccine production and distribution are accelerated, and

containment measures are relaxed earlier. According to this scenario, it is expected to add about 1 percent to world GDP growth and about 2.5 percent to world goods trade volume growth in 2021. Trade will have returned to its pre-pandemic trend by the fourth quarter of 2021 (2021Q4). The downside scenario is that vaccine production does not meet the demand for vaccines or new variants of the virus appear where vaccines are less effective. According to the forecasts for this scenario, it could decrease by 1 percentage point from global GDP growth in 2021 and reduce trade growth by about 2 percentage points (WTO, 2021). The current situation so far and the forecasts for the future are shown in Figure 2 above.

3.4. Increase in Logistics Costs

Logistics costs have increased significantly during the COVID-19 period. One of the reasons for this is that the delay in the return of drivers to work as a result of the restriction of human mobility causes labor shortages and thus increases labor costs. Another reason is that logistics businesses bear the long-term costs of epidemic prevention and control (eg cost of disinfection of packages, cost of building non-contact delivery facilities) accomplishing enhanced operating costs. Other reason is the uncertainty in traffic restrictions. This situation hampers it to plan transportation routes and caused transportation costs to increase. The increase in China's logistics costs can be given as an example to this. According to a research conducted in China, it was determined that 51.7% of the logistics companies in China were damaged in the first quarter of 2020 (CFLP, 2020).

4. NEW INCLINATIONS ON LOGISTICS AND SUPPLY CHAIN MANAGEMENT

4.1. Localization in Purchasing and Slippage in Production Zones

With the transition of the first global impacts of the COVID-19 pandemic and the controlled normalization process, it is thought that there will be significant changes in supply chains and logistics activities. The biggest changes expected can be listed as localization in procurement, being easily accessible to suppliers and customers, flexible approaches regarding product diversity and stocks, dynamism, and digitalization, and determining alternative suppliers, logistics service providers and distribution channels. Furthermore, companies in many sectors are expected to diversify sources in supply and to engage in efforts to create local alternatives when it is appropriate (SAM, 2020).

When it comes to shifting production areas, before the pandemic, China accounted for 30% of world production. This rate has decreased after the pandemic. When the future forecasts are examined, the search for alternative production areas has begun. the manufacturers and the logistics sector in Turkey are expected to benefit (Şeker et al., 2020: 635).

4.2. Accelerating Digital Transformation

The logistics industry has challenges related to high efficiency, flexibility, fast action, and decision making in response to customer needs. The ability of businesses to overcome these challenges depends on the way they use and manage modern technologies. This represents a transformation. This transformation, called Logistics 4.0; It includes the use of high technology sensors and advanced robotics in logistics operations, and the connection of the entire SC with information technologies (Jahn et al., 2018). Cooperation, coordination and communication between suppliers, manufacturers, retailers, and customers within a SC can be achieved through digital transformation and process automation (Tjahjono et al., 2017: 1175). Logistics 4.0 will be the transformation process that makes a big difference for businesses in our world where SCs are competing, not companies.

Due to COVID-19, companies' transition to remote working system has once again demonstrated the significance of digital transformation in supply chain and logistics. More data-driven decision making, and data-driven logistics operations are expected to emerge from now on (Choi, 2020: 5). Digital transformation is of great importance as the smart and correct use of information accelerates decision-making processes (Choi et al., 2006: 789; Li et al., 2020: 961). It is anticipated that after the pandemic, automation and artificial intelligence investments will increase in the SCs, the use of more intensive information communication technologies and technological capabilities will be increased in this context. However, cyber security investments are expected to increase as cyber risks will increase with digital transformation (UTIKAD, 2020: 16).

New technologies that enable digital transformation increase supply chain visibility. Furthermore, these technologies provide an increase in supply chain agility and flexibility. It is also advantageous for these technologies to provide this without the "overhead" in terms of supply chain risk management (Kilpatrick and Barter, 2020: 14). In Deloitte's research titled Winners and Losers in the Supply Chain After Covid-19, efforts to increase operational visibility among the prominent focal points have come to the fore in almost all sectors, alternative ways of doing business and automation have taken their place among other significant focal points. (Deloitte, 2020: 7). This will be possible with the acceleration of digital transformation. The impact of COVID-19 on supply chain flexibility is detailed below.

4.3. Transition to Flexible SCs

Just in time systems are designed to produce and deliver the needed goods or services by using the lowest level of stock. These systems are a logistics philosophy designed to reduce ineffective situations and non-production time in the production process and are used by many production enterprises (Lai et al., 2003: 265). Lean implementations are a logistics strategy focused on eliminating redundancies, reducing stocks, and increasing profitability. The main purpose of lean logistics is to perform all logistics operations with the least use of resources (labor, stock, equipment, time, etc.) and with the lowest cost (Nebol, 2017: 22-23).

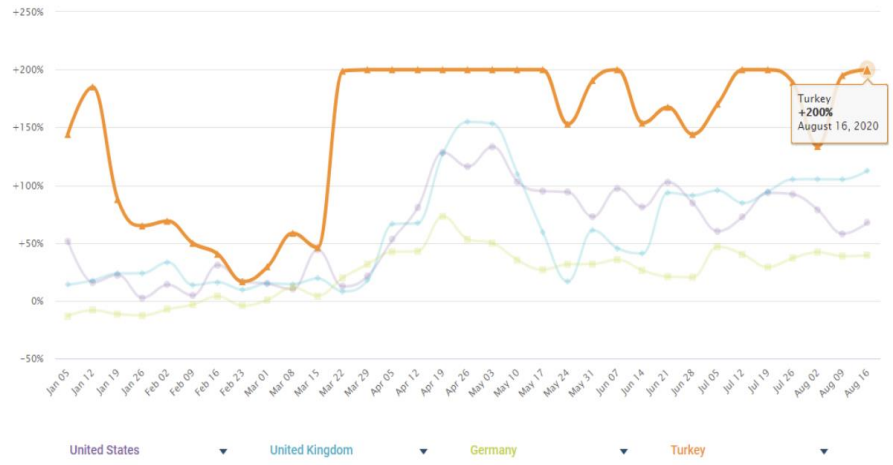
Before the COVID-19 pandemic, especially in the last two decades, SCs were planned with just-in-time production approaches, where stocks were minimal or even zero stocks worldwide. With this approach, it was aimed to minimize inventory costs throughout the SC. However, with the pandemic, it has been understood that this approach has greatly reduced the flexibility of companies. Therefore, another prediction is that after the pandemic, it will be almost impossible for companies to implement managerial approaches that require working with minimum stock, such as lean SC, just-in-time production system (Brakman et al., 2020).

Flexible SC is among new applications in supply chain and logistics. The two main views on this issue are the number of product types that can be produced in each production unit and the process flexibility of the SC. Furthermore, product, process, route, and capacity flexible SC applications are also available (Sanchez and Perez, 2005: 683). As the disruptions in the SC during the pandemic process indicate the need for shorter and flexible SCs, the importance of them will increase in the future (Sanders, 2020).

4.4. New Trends in Consumption

The increase in the utilization of digital media by consumers with the pandemic caused an increase in e-commerce volumes (UTIKAD, 2020: 16). In addition to some sectors such as ready-to-wear, electronic goods, personal care and cosmetics, the food sector has started to gain a place in the e-commerce market with the pandemic. During the pandemic period, interest in e-commerce has increased. Even the middle-aged and older consumers, who seem the most distant, have changed their consumption habits in this period and have started to use e-commerce channels. According to the data of COVID-19 Commerce Insight, it is seen that retail consumption revived through e-commerce in the April-May 2020 period, when the pandemic peaked in the world, and retail consumption returned to its old level with the return to normal. Looking at Turkey's data, it is clearly seen that this upward trend became both more and more permanent in the same period. Compared to March 15, the increase in retail trade through e-commerce reached 200 percent in Turkey. As of mid-August 2020, this level continues with fluctuations. It is seen that the product groups most affected by the increase in e-commerce are cleaning, health, and food products. The change in e-commerce for the United Nations, United Kingdom, Germany, and Turkey is shown in Figure 3 below (COVID-19 Commerce Insight, 2020):

Figure 3: The Change in E-Commerce- Jan 2020-Aug 2020



Source: COVID-19 Commerce Insight, (2020). Retrieved from www.ccinsight.com Access date 29 May 2021.

As seen above, in the period including the first eight months of 2020, there has been a significant increase in e-commerce, especially between March and May. Moreover, it seems that e-commerce has not returned to its pre-COVID-19 level. In addition to the change in e-commerce, there has been a change in individual purchasing behavior with the impact of COVID-19. Panic buying and the tendency towards home consumption products has increased (Loske, 2020: 6). The first goods that consumers turn to during the pandemic are toilet paper, canned food, and other household cleaning products. One of the categories with the fastest rise in demand was disposable gloves with 670%, bread making machines with a 652% rise, and cough and cold product groups ranked third. However, suitcases and briefcases are ranked as e-commerce products that have experienced the biggest decrease in sales by 77% since March last year. In addition, the demand for cameras and swimsuits fell by 64% and the demand for wedding dresses by 63% (Styrk, 2020).

4.5. A New Concept Highlighted: Co-opetition

For global SCs, they will spread the procurement, production, storage, and sales activities of companies as much as possible to different regions and even continents of the world. In this way, they will be able to protect their SCs against unexpected risk situations such as disasters and epidemics that may occur in the future. Companies will begin to implement new SC strategies. Co-opetition, also known as cooperation with competitors, will be one of them (Sanders, 2020). Nowadays, companies living together is the only way to stay up to date in the ever-changing business world. Companies in the same industry should partner with each other. For instance, there is a growing problem between online and offline retailers in India. In such a situation, the competition between the two companies must be shifted towards cooperation that will benefit customers (Dinesh and Muniraju: 2021: 125).

4.6. Mitigating the Effects of the Crisis: Crisis Management

Crisis management is about control and "getting the job done". The goal of crisis management is to organize, manage, implement actions that minimize the effect of a threat and return to the pre-crisis period with minimal damage and loss (Boin and ’t Hart, 2003: 544; Boin et al., 2013: 79). With the COVID-19, the significance of crisis management in supply chain and logistics management has been understood once again.

There are three important issues to reduce or eliminate the impacts of COVID-19 on the SC. These consist of crisis management, short term plans and medium-term plans. For crisis management, it is necessary to update the SC priorities, ensure the continuity of SC operations and manage customer and supplier relations. For mitigating the effect of the pandemic, short-term plans should be measuring supply and demand impacts, determining alternative supply strategies, evaluating operational risks, and planning scenarios. Medium-term plans require visibility throughout the SC, model and manage risk, and design and manage resilient SCs (PWC, 2020).

4.7. Resilient SCs

Resilience is the system's rapid adaptation and return to its original state after disruptions. It shows the high level of adaptation power of the system by returning to its previous state or approaching after the deterioration (Christopher and Peck, 2004: 2). The concept of resilience is confused with the concept of robustness. There are some differences between these two concepts. The most important difference between these two concepts; While robustness is the ability of the supply chain to continue in the same way against disruptions, resilience is how quickly the supply chain structure can recover despite disruptions (Karli and Tanyaş, 2020: 178).

In the COVID-19 era, companies have better understood that they need to increase the resilience of global supply chains to face disruptions triggered by serious disasters. Supply chain resilience (SCR) is an organization's ability to recover from supply chain disruptions and adapt quickly to adversity or disruption (Kumar and Singh, 2019). During the current crisis period, some important actions that need to be implemented in order to ensure resilience in enterprises have been emphasized. These are important actions based on business continuity and emergency management practices and are detailed below (Büyüközkan, 2020: 20):

- Establishing and maintaining a crisis command center,
- Supporting employees and company strategy,
- Ensuring business continuity and financing,
- Being in regular (continuous) communication with customers,
- Strengthening digital capabilities,
- Interacting with the business ecosystem and preparing for the “new normal”.
- Focus and strengthen the supply chain.

Companies and their supply chains should pay attention to the above actions to overcome possible future supply chains such as this pandemic with the least negative impact. A resilient supply chain can quickly revert to their original state or even more so to a new and more desirable state after being interrupted (Behzadi et al., 2020: 145; Behzadi et al., 2018: 21; Christopher and Beck, 2004: 1).

4.7. Humanitarian Logistics

Disasters, migration, epidemics such as COVID-19 and similar humanitarian crises across the world are factors that increase the need for aid activities. Disasters and global crises are causing devastating effects on people. These are increasing the importance of studies on improving logistics activities before and after disasters day by day. Especially in recent years, the significance of effective management of humanitarian logistics has increased (Senir, 2021: 296). In humanitarian aid logistics, it is aimed to provide humanitarian support by meeting needs such as medical supplies, water, food, and shelter. In humanitarian crises, logistics is vital as it acts as a bridge between disaster preparedness and response, supply, and distribution, as it is the center of all mobilization activities (Daud et al.,2016: 107-108).

Due to the pandemic, China provided medical supplies and cash aid to many countries. Some of these include Turkey, United Arab Emirates, Germany, France, England, Japan, Qatar, Azerbaijan, Russia, and Iran. Turkey is among the countries in this process also help to other countries. Turkey, mainly overalls, N95 and surgical masks, shields and protective gear such as goggles, gloves, was found in medical material aid consisting of antiseptics and test kits (T.R. Ministry of Health, 2020).

In the COVID-19 outbreak, protecting the most vulnerable has become not only a moral imperative but an urgent public health goal; The philosophy of "one's health is everyone's health" has gained importance (San Lau et al., 2020). In many countries, the most common type of aid sent is the distribution of supplies. However, the COVID-19 outbreak of processes, training of health care workers in Yemen, mosques cleaning in Indonesia and pesticide, and health center renovation in Romania, 3D printers donation and Gaza hospital grants to the Sudan, Turkey within the scope of the service benefits countable (TİKA, 2020).

5. CONCLUSION

The COVID-19 pandemic has a very significant global impact on supply chains by causing a disruption in the supply chain. The significance of supply chain risk management was better understood in this period, and the effects of the pandemic negatively affected supply chains and logistics. However, these negativities have drawn a new path for supply chains by showing that many understandings, strategies, and approaches that were in practice before the pandemic were wrong.

When the negative effects of the pandemic are examined, it can be counted that it causes a bullwhip effect in the supply chains, the decrease in the carrying capacity, the contraction of the international trade volume, which is an indispensable part of logistics, and the increase in logistics costs. Considering the new approaches and strategies that can be called new inclinations in the supply chain during the pandemic period, the understanding of localization in purchasing and shifting to new production regions is a significant part of the new inclinations. The significance of digital transformation has been better understood in this process and it is now seen as a compulsion rather than a necessity by companies. Furthermore, the significance of supply chain visibility was emphasized once again. It has once again emerged that the visibility and flexibility of digital transformation in supply chains has increased. The importance of crisis management has increased with the pandemic. Moreover, the fact that supply chain flexibility serves to provide the least damage from the crisis has increased the importance of supply chain flexibility exponentially. In this era, the importance of the concept of co-opetition, which existed before but unknown during the pandemic era, was understood. With the change in the consumption habits of consumers, the share and significance of new trade channels in consumption has changed. The value of humanitarian aid logistics was also emphasized during the pandemic.

When the effects of the pandemic on supply chains and new inclinations in supply chains are examined during the COVID-19 pandemic period, it has become important for supply chains to proactively carry out risk management studies to overcome an environmental risk such as a pandemic with the least damage. It has been revealed that the companies and supply chains that have felt the effects of the pandemic the least are those who perform risk management proactively. Considering that such pandemics will recur, companies need to increase their supply chain resilience to cope with these risks, whether there is a pandemic risk or different risks that may arise. Firms must take the necessary actions to create resilient supply chains. These are the two best recommendations for future risks. In addition to these recommendations, companies should increase their investments in digital transformation and transform their supply chains into interconnected and autonomous ecosystems. Supply chains transformed into interconnected and autonomous ecosystems will be the winning supply chains of tomorrow.

REFERENCES

Airports Council International (ACI), (2020). Advisory bulletin 01. COVID-19: relief measures to ensure the survival of the airport industry. Retrieved from https://asianaviation.com/wpcontent/uploads/Policy_Brief_COVID19_Relief_Measures_to_Ensure_the_Survival_of_the_Airport_Industry_2020.pdf. 05.06.2020

Akkermans, H. and Voss, C. (2013). The service bullwhip effect. *International Journal of Operations & Production Management*, 33(6), 765- 788.

Akbal, H. (2020). COVID-19 Pandemisinin sağlık tedarik zincirine kamçı etkisi. *Kesit Akademi Dergisi*, 6(25), 181-192. http://dx.doi.org/10.29228/kesit.46950

Albers, S. and Rundshagen, V. (2020). European airlines strategic responses to the covid-19 pandemic (January-May, 2020). *Journal of Air Transport Management*. 87(2020), 1-6. https://doi.org/10.1016/j.jairtraman.2020.101863

Anbumozhi, V., Kimura, F. and Thangavelu, S. M. (2020). Global supply chain resilience: vulnerability and shifting risk management strategies. In *Supply Chain Resilience.* Singapore: Springer, 3-14.

Barua, S. (2020). Understanding coronanomics: The economic implications of the coronavirus (COVID-19) pandemic. *SSRN Electronic Journal,* doi:10.2139/ssrn.3566477, 7, 15-16.

Behzadi, G., O'Sullivan, M. J. and Olsen, T. L. (2020). On metrics for supply chain resilience. *European Journal of Operational Research,* 287(1), 145-158.

Behzadi, G., O'Sullivan, M. J., Olsen, T. L. and Zhang, A. (2018). Agribusiness supply chain risk management: A review of quantitative decision models. *Omega,* 79, 21-42.

Behzad. B., Moraga, R. J. and Chen, S. J. (2011). Modelling healthcare internal service supply chains for the analysis of medication delivery errors and amplification effects. *Journal of Industrial Engineering and Management*, 4(4), 554-576.

Boin, A., Kuipers, S. and Overdijk, W. (2013). Leadership in times of crisis: A framework for assessment. *International Review of Public Administration*, 18(1), 79–91.

Boin, A. and t'Hart, P. (2003). Public leadership in times of crisis: mission impossible? *Public Administration Review*, 63(5), 544–553.

Budak, F. and Korkmaz Ş. (2020). COVID-19 pandemi sürecine yönelik genel bir değerlendirme: Türkiye örneği. *Sosyal Araştırmalar ve Yönetim Dergisi*, 1, 62-79.

Büyüközkan, G. (2020). COVID-19 salgını ile mücadelede dirençli tedarik zincirleri. *LODER Bülteni 2020-1,* 18-23.

CFLP, (2020). Investigation report on the environment for logistics and supply chain enterprises to resume production in 2020. Retrieved from http://www.chinawuliu.com.cn/lhhzq/202005/20/504479.shtml (In Chinese). 29.05.2021.

Christopher, M. and Peck, H. (2004). Building the resilient supply chain. *The International Journal of Logistics Management*, 15(2), 1-14. https://doi.org/10.1108/09574090410700275

Choi, T. M. (2020). Risk analysis in logistics systems: a research agenda during and after the COVID-19 pandemic. *Transportation Research Part E: Logistics and Transportation Review*, 145, 1-8.

Choi, T. M. J., Li, D. and Yan, H. (2006). Quick response policy with Bayesian information updates. *European journal of operational research*, 170(3), 788-808.

COVID-19 Commerce Insight, (2020). Retrieved from www.ccinsight.com. 29.05.2021.

Daud, M. S. M., Hussein, M. Z. S. M., Nasir, M. E., Abdullah, R., Kassim, R., Suliman, M. S. and Salu-Din, M. R. (2016). humanitarian logistics and its challenges: The literature review. *International Journal of Supply Chain Management*, 5(3), 107-110.

Deloitte, (2020). COVID-19 sonrası "yeni"den tedarik zinciri. Retrieved from https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/consulting/COVID-19-sonrasi-yeniden-tedarik-zinciri.pdf 4.06.2021.

Dinesh, S. and MuniRaju, Y. (2021). Scalability of e-commerce in the COVID-19 era. *International Journal of Research-GRANTHAALAYAH*, 9(1), 123-128.

Disney, S.M., Farasyn, I., Lambrecht, M., Towill, D.R. and Van de Velde, W. (2006). Taming the bullwhip effect whilst watching customer service in a single supply chain echelon. *European Journal of Operational Research*, 173, 151- 172.

Drewry World Container Index, (2021). Retrieved from https://www.drewry.co.uk/supply-chain-advisors/supply-chain-expertise/world-container-index-assessed-by-drewry 04.05.2021.

EUROCONTROL. (2020). Five-Year forecast 2020-2024. European flight movements and service units three scenarios for recovery from COVID-19. Retrieved from https://www.eurocontrol.int/sites/default/files/2020- 11/eurocontrol-five-year-forecast-europe-2020-2024.pdf 04.05.2021.

European Commission (2020a). COVID-19: Temporary restriction on non-essential travel to the EU. Retrieved from https://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:52020DC0115&from=EN. 29.04.2020

European Commission, (2020b). European economic forecast. Spring 2020, Institutional Paper 125, 27.06.2020.

Freund, C. and N. Rocha. (2011). What constrains Africa's exports? *World Bank Economic Review,* 25(3), 361-86.

Gopinath, G. (2020). The great lockdown: Worst economic downturn since the great depression, IMF Blog. Retrieved from https://blogs.imf.org/2020/04/14/the-great-lockdown-worst-economic-downturn-since-the-greatdepression/ 29.05. 2021.

Hassan, U. and Soh, B. (2005). Using adaptive web service multi agents for collaborative forecasting and countering bullwhip effect in SCM. In *International Conference on Integration of Knowledge Intensive Multi-Agent Systems,* 567-572. IEEE.

Hoekman, B. (2020). A 21st century trade agenda: global supply chains and logistics services. Retrieved from https://www.wto.org/english/forums_e/public_forum12_e/art_pf12_e/art5.htm 06.05.2021.

International Air Transport Association IATA, (2020a). Deep losses continue into 2021. Retrieved from https://www.iata.org/en/pressroom/pr/2020-11-24-01/ 13.05.2021.

International Air Transport Association IATA, (2020b). Air cargo market analysis, October 2020. Retrieved from https://www.iata.org/en/iatarepository/publications/economic-reports/air-freight-monthly-analysis---october-2020/ 06.05.2021.

International Civil Aviation Organization ICAO, (2020). Effects of novel coronavirus (COVID-19) on civil aviation: Economic impact analysis. Retrieved from https://www.icao.int/sustainability/Documents/COVID19/ICAO%20COVID%202020%2005%2026%20Economic%20Impact.pdf. 21.06.2020

International Union of Railways UIC, (2020). Railsilience: How the rail sector fought COVID-19 during lockdowns. Retrieved from https://uic.org/IMG/pdf/railsilience__how_the_rail_sector_fought_covid-19_during_lockdowns.pdf May 2020.

International Road Transport Union IRU, (2020a). COVID-19 Impact on the Road Transport Industry Update: November 2020. Retrieved from https://www.iru.org/resources/iru-library/covid-19-impact-road-transport-industry-update-november-2020 06.05.2021.

International Road Transport Union IRU, (2020b). COVID-19: how some countries around the world are supporting road transport. Retrieved from https://www.iru.org/resources/newsroom/covid-19-how-some-countries-around-world-are-supporting-road-transport 06.05.2021.

Jahn, C., Kersten, W. and Ringle, C. M. (2018). Logistics 4.0 and sustainable supply chain management: innovative solutions for logistics and sustainable supply chain management in the context of industry 4.0. *Proceedings of the Hamburg International Conference of Logistics (HICL)*. Berlin: epubli GmbH.

Juttner, U. (2005). Supply chain risk management—understanding the business requirements from a practitioner perspective*. International Journal Logistics Management*, 16(1), 120–141.

Karli, H. and Tanyaş, M. (2020). Pandemi durumunda tedarik zinciri risk yönetimine ilişkin öneriler. *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi*, 19(37), 174-190.

Kilpatrick, J. and Barter, L. (2020). COVID-19: managing supply chain risk and disruption*.* Canada: Deloitte.

Kraemer, M. U., Yang, C. H., Gutierrez, B., Wu, C. H., Klein, B., Pigott, D. M., ... and Scarpino, S. V. (2020). The effect of human mobility and control measures on the COVID-19 epidemic in China. *Science*, 368(6490), 493-497.

Kumar, P. and Singh, A.P. (2019). Flexibility in service operations: review, synthesis and research agenda. *Benchmarking: An International Journal,* 27 (7), 2108-2129.

Lai, C. L., Lee, W. B., and Ip, W. H., (2003). A study of system dynamics in just-in-time logistics. *Journal of Materials Processing Technology.* 138(1-3), p. 265.

Lee, H. L., Padmanabhan, V. and Wang, S. (1997). Information Distortion in a Supply Chain: The Bullwhip Effect. *Management Science*, 43(4), 546–558.

LODER Lojistik Derneği (2020). Koronavirüs tedarik zincirlerini kırdı, Yazar: Tanyaş Mehmet. pp. 1-3. Retrieved from https://mcusercontent.com/833f5af578ece3a8381433fe4/files/34ca29b5-c471-45f1-ae64-2ada1c980a98/Koronaviru_s_LODER_Gorusu_24_03_2020_1_.pdf 08.05.2021.

Loske, D. (2020). The impact of COVID-19 on transport volume and freight capacity dynamics: An empirical analysis in German food retail logistics. *Transportation Research Interdisciplinary Perspectives*, 6, 100165.

Li, G., Li, L., Choi, T. M. and Sethi, S. P. (2020). Green supply chain management in Chinese firms: Innovative measures and the moderating role of quick response technology. *Journal of Operations Management*, 66(7-8), 958-988.

Li, Q. and Gao, Y. (2010). Service Supply Chain and Its Bullwhip Effect. IEEE International Conference on Management and Service Science, Wuhan, China, pp. 1-3.

Li, T. (2020). A SWOT Analysis of China's air cargo sector in the context of COVID-19 Pandemic. *Journal of Air Transport Management*. 88(2020), 1-6.

Lichun, T. and Jiayu, L. (2011). Simulation analysis of bullwhip effect in logistics service supply chain based on vensim. *IEEE International Conference on Management and Service Science*, Wuhan, China, pp. 1- 4.

Nebol E. (2016). *Tedarik Zinciri ve Lojistik Yönetimi.* Ankara: Nobel Akademik Yayıncılık.

PWC, (2020). COVID-19: Operasyonlar ve tedarik zinciri etkisi. Retrieved from https://www.pwc.com.tr/tr/Hizmetlerimiz/danismanlik/tedarik-zinciri-yonetimi/covid-19-operasyonlar-ve-tedarik-zinciri-etkisi.pdf 28.05.2021

Republic of Turkey Ministry of Foreign Affairs, Center for Strategic Studies SAM (2020). COVID-19 sonrası küresel sistem: Eski sorunlar, yeni trendler. Retrieved from http://sam.gov.tr/tr/wp-content/uploads/2020/04/sam-covid-kitap.pdf 06.05.2021.

Prichep, E. (2020). Why a coronavirus vaccine takes over a year to produce–and why that is incredibly fast. In *World Economic Forum.* April (Vol. 3).

Saenz M. J. and Revilla, E. (2014). Creating more resilient supply-chains. MIT Sloan Management Review. Retrieved from https://sloanreview.mit.edu/article/creating-more-resilient-supply-chains/ 13.10.2019.

Sanchez M. A., and Perez P. M. (2005). Supply chain flexibility and firm performance: A conceptual model and empirical study in the automotive industry. *International Journal of Operations & Production Management*, 25(7), 681-700.

Sanders N. R. (2020). COVID-19 Supply-chain disruption, treasury & risk, Retrieved from https://www.treasuryandrisk.com/2020/03/19/covid-19-supply-chain disruption/?slreturn=20200428142138 06.05.2021.

San Lau, L., Samari, G., Moresky, R. T., Casey, S. E., Kachur, S. P., Roberts, L. F. and Zard, M. (2020). COVID-19 in humanitarian settings and lessons learned from past epidemics. *Nature Medicine*, 26(5), 647-648.

Styrk, J. (2020). Top 100 Fastest growing & declining categories in ecommerce. Retrieved from https://www.stackline.com/news/top-100-gainingtop-100-declining-e-commerce-categories-march-2020 22.04.2020.

Shapiro, R. D. (1984). Get leverage from logistics. *Harvard Business Review*. 62(3), 119-126.

Singh, S., Kumar, R., Panchal, R. and Tiwari, M. K. (2020). Impact of COVID-19 on logistics systems and disruptions in food supply chain. *International Journal of Production Research*, 1-16.

Senir, G. (2021). COVID-19 salgınında insani yardım lojistiğinin ve tedarik zinciri yönetiminin önemi. *Fiscaoeconomia*, 5(1), 296-308.

Şeker, M., Özer, A. and Korkut, C. (Eds.). (2020). *Küresel salgının anatomisi: İnsan ve toplumun geleceği.* Ankara: Türkiye Bilimler Akademisi.

Taşkın, B. K. (2020). Tedarik zinciri risk ve belirsizlikleri: Koronavirüs pandemisi ve ortamında ilaç sektöründe risk yönetimi ve halkla ilişkiler. *İstanbul Arel Üniversitesi İletişim Çalışmaları Dergisi*, 8(17), 107-130.

Tjahjono, B., Esplugues, C., Ares, E. and Pelaez, G. (2017). What does Industry 4.0 mean to supply chain? *Procedia Manufacturing*, 13, 1175–1182.

Turkish Statistical Institute TUIK, (2020). Retrieved from https://data.tuik.gov.tr/Bulten/Index?p=Dis-Ticaret-Istatistikleri-Aralik-2020-37412 22.04.2021.

T.R. Ministry of Health, (2020). Retrieved from https://www.saglik.gov.tr/ 28.04.2021.

Turkish Cooperation and Coordination Agency Directorate TİKA, (2020). Retrieved from https://www.tika.gov.tr/ 30.04.2021.

UNESCAP, (2020). COVID-19 pandemic: International freight trains lead the way into future. Retrieved from https://www.unescap.org/blog/covid-19-pandemic-international-freight-trains-lead-way-future 30.04.2021.

UNCTAD. (2020). Handbook Of statistics. Retrieved from https://unctad.org/system/files/officialdocument/tdstat45_en.pdf 28.04.2021.

Waters, C. D. J. (2003). *Logistics: An introduction to supply chain management.* Basingstoke: Palgrave Macmillan.

Weele, van, A. J. (2014). *Purchasing and supply chain management: Analysis, strategy, planning and practice*. (6th ed.) Boston: Cengage Learning.

World Economic Forum (2017). New models for addressing supply chain and transport risk, Geneva. Retrieved from http://www3.weforum.org/docs/WEF_SCT_RRN_NewModelsAddressingSupplyChainTransportRisk_IndustryAgenda_2012.pdf. 13.10.2019

World Health Organization WHO, (2020). Retrieved from https://www.who.int/dg/speeches/detail/who-director-general-sopening-remarks-at-the-media-briefing-on-covid-19-11-march-2020. 20.04.2021.

World Trade Organization WTO, (2021). World trade primed for strong but uneven recovery after COVID-19 pandemic shock. Retrieved from https://www.wto.org/english/news_e/pres21_e/pr876_e.htm 29.05.2021.

Vidya, C. T. and Prabheesh K.P. (2020). Implications of COVID-19 pandemic on the global trade networks. *Emerging Markets Finance and Trade*, 56(10). 2409-2414.

Viswanadham, N., Desai, V. and Gaonkar, R. (2005). Bullwhip effect in integrated manufacturing and service networks. *IEEE International Conference on Robotics and Automation*, Barselona, Spain, April, pp. 2994- 2999.

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

DETERMINING CUSTOMER SEGMENTATION AND BEHAVIOR MODELS WITH DATABASE MARKETING AND MACHINE LEARNING

DOI: 10.17261/Pressacademia.2021.1409
JMML- V.8-ISS.2-2021(2)-p.89-111

Orkun Berk Koca
Beykent University, Graduate School, Beyoglu, Istanbul, Turkey.
orkunkocaa@gmail.com, ORCID: 0000-0002-2862-1226

Date Received: February 20, 2020 **Date Accepted:** May 5, 2021

To cite this document
Koca, B.O. (2021). Determining customer segmentation and behaviour models with database marketing and machine learning. Journal of Management, Marketing and Logistics (JMML), 8(2), 89 -111.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2021.1409

ABSTRACT

Purpose- The study investigates the effect of data-based marketing, which is of great importance for today's businesses, on the creation of customer segments and on the development of marketing strategies for those segments. The big data study, which consists of real customer data analyzed in this direction, aims to identify consumer behaviors that are not similar enough to develop different strategies and to determine how the strategy development processes for customer segments can be done analytically.

Methodology- It was studied according to the 2018 order data, which is a data set of 24 million lines in total from an international pizza brand operating in the home delivery service field across the Turkey. In the study, K Means, Gaussian Mixture and DBSCAN algorithms are used for customer segmentation. The clustering and multiple regression analyzes were applied with the Phyton program.

Findings- In this study, in which the most used clustering algorithms in the literature were tested, due to the fact that the DBSCAN algorithm is not suitable for the data set used in the application, 91% of all data is assigned to a cluster in the cluster analysis and the remaining data are classified outlier. Accordingly, it has been observed that algorithms such as K Means or Gaussian Mixture give better results in studies where there is no demographic data and behavioral characteristics form the main mass of the data. In addition, clusters exhibiting similar behavior were identified in multiple regression analyzes, in which the forward-looking behaviors of the formed clusters were analyzed, and valuable clusters in the sub-clusters were discovered.

Conclusion- While this study covers the steps of big data and data mining, it also covers all end to end processes with multiple regression analyzes to create customer clusters and determine the future behavior models of the determined clusters. In this direction, it offers practitioners an exemplary model and strategy determination methodology.

Keywords: Database marketing, machine learning, customer clusters, segmentation, k-means
JEL Codes: M30, M31, C38

VERİ TABANLI PAZARLAMA VE MAKİNE ÖĞRENMESİ İLE MÜŞTERİ BÖLÜMLEME VE DAVRANIŞ MODELLERİNİN BELİRLENMESİ

ÖZET

Amaç - Çalışma, günümüz işletmeleri açısından önemi son derece artan veri tabanlı pazarlamanın, müşteri bölümleri oluşturulmasına ve oluşan bölümlere yönelik pazarlama stratejilerinin geliştirilmesine etkisini araştırmaktadır. Bu doğrultuda analiz edilen gerçek müşteri verilerinden oluşan büyük veri çalışması, birbirinden farklı stratejiler geliştirebilecek kadar benzer olmayan tüketici davranışlarını belirlemesi ve müşteri bölümlerine yönelik strateji geliştirme süreçlerinin nasıl analitik olarak yapılabileceğini tespit etme amacını taşımaktadır.

Yöntem - Türkiye genelinde evlere servis alanında faaliyet gösteren uluslararası bir pizza markasının 2018 yılına ait sipariş verileri baz alınarak, toplam 24 milyon satır uzunluğunda veri seti ile çalışılmıştır. Çalışmada müşteri bölümlendirmesi için K Means, Gaussian Mixture ve DBSCAN algoritmaları kullanılmıştır. Söz konusu kümeleme ve çoklu regresyon analizleri Phyton programı ile uygulanmıştır.

Bulgular - Literatürde en çok kullanılan kümeleme algoritmalarının test edildiği bu çalışmada, DBSCAN algoritmasının, uygulamada kullanılan veri setine uygun olmaması nedeniyle tüm verinin %91'ini bir kümeye atarak geri kalan verileri, outlier farklı bir ifade ile aykırı olarak sınıflandırmıştır. Bu doğrultuda içerisinde demografik verinin bulunmadığı, davranışsal özelliklerin verinin anakütlesini oluşturduğu çalışmalarda K Means veya Gaussian Mixture gibi algoritmaların daha iyi sonuç verdiği gözlenmiştir. Bununla birlikte oluşturulan kümelerin ileriye yönelik davranışlarının analiz edildiği çoklu regresyon analizlerinde, benzer davranış sergileyen kümelerin tespiti ile alt kümelerde bulunan değerli kümelerin keşfi sağlanmıştır.

Sonuç - Bu çalışma, büyük veri ve veri madenciliği adımlarını kapsarken, bununla birlikte müşteri kümelerinin oluşturulması, belirlenen kümelerin ileriye yönelik davranış modellerinin belirlenmesi için yapılan çoklu regresyon analizleri ile uçtan uça tüm süreçleri kapsamaktadır. Bu doğrultuda uygulayıcılara örnek bir model ve strateji belirleme metodolojisi sunmaktadır.

Anahtar Kelimeler: Veri tabanlı pazarlama, makine öğrenmesi, müşteri kümeleri, bölümlendirme, k-ortalamalar
JEL Kodları: M30, M31, C38

1. GİRİŞ

İşletmeler bilginin ulaşılabilir olması, maliyetinin azalması ve dolayısıyla değerinin artması ve müşteri odaklı pazarlama anlayışının gelişmesiyle birlikte, ilişkide bulundukları müşteriler hakkındaki çeşitli verileri toplamak, depolamak ve bu verileri yararlı bir şekilde bilgiye dönüştürerek kullanmak amacıyla birtakım çalışmalara yönelmişlerdir. Bu çalışmaları inceleyen veri tabanlı pazarlama sayesinde işletmeler, hedef müşterilerine ait verilerden yola çıkarak etkili stratejiler geliştirmektedirler.

Günümüzde bilgisayar teknolojisindeki hızlı değişim ve ilerlemelerle birlikte yüksek miktarda verinin güvenilir bir şekilde depolanma imkanı elde edilmiştir. Dünya üzerinde katlanarak artan bu verinin, fayda sağlayan, anlamlı bir bilgiye dönüşmesi için artık disiplinler arası çalışmalar hızla artmaktadır. Pazarlama alanında ise bu yeni bilgi çağının gerekliliği olarak bilgi teknolojileri ile yakından çalıştığı gözlenmektedir. Makine öğrenmesi algoritmaları, müşteri davranışlarından yola çıkarak müşterilerin kümelere ayrılması, öneri programlarının oluşturulması, yeni ürün geliştirilmesi, fiyatlama ve kayıp müşteri analizi gibi birçok konuda yeni stratejilerin oluşturulmasına katkı sağlamaktadır.

Makine öğrenmesinin pazarlama alanında son dönemde kullanımı hızla artmaya başlamıştır. Özellikle pazarlamanın en yaygın uygulama alanı olan perakende sektöründe perakendecilerin topladıkları veri, günümüzde büyük boyutlarla ifade edilmektedir. Üreticilerin akıllı sistemlerle stok uygulamaları ve lojistik çözümleri gibi faaliyetlerle perakendeci ile birebir ilişki kurması da verinin boyutlarını daha çok arttırmaktadır. Rekabete ayak uydurmak ve müşterilerine daha iyi hizmet sunmak amacı ile hareket eden perakende sektörü, POS (Point of Sales) sistemleri dışında, akıllı sensörler, kablosuz ağlar, vb. sistemler ile veri toplayarak kendi bulut sistemlerini oluşturmaya başlamıştır. Ayrıca firmalar, sosyal medya ve tüketici bloglarında bulunan tüketici yorumları, firma web sitelerini ziyaret verileri, müşterilerin konum tabanlı kullanıcı bilgilerine ilişkin dış kaynaklı verileri de elde edebilmekte, müşterilerini sürekli gözetim altında tutmakta ve bu verilerden faydalı çıkarsamalarda bulunmak amacıyla çeşitli analizler yapmaktadır.

2. LİTERATÜR TARAMASI

Veri tabanlı pazarlama, tüketicilere ait yaş, meslek, cinsiyet, eğitim durumu, kültürel, ekonomik vb. verileriyle, alışveriş eğilimlerine yönelik verilerin, bilgi teknolojileri aracılığı ile izlenmesi, işlenmesi ve çözümlenmesi sonucunda geliştirilen pazarlama faaliyetleridir (Verhoef, Spring, Hoekstra, Leeflang, 2003). Kotler ve Armstrong'a (1999) göre müşteri veri tabanları; "organize edilmiş, kapsamlı, içinde coğrafik, demografik, psikolojik ve davranışsal bilgilerin bulunduğu verilerdir. Veri tabanlı pazarlama ise, müşteri veri tabanlarının ya da diğer veri tabanlarının kullanılmasına dayanan pazarlama uygulamalarıdır". Müşteriler ile ilgili verilerin toplandığı müşteri veri tabanları, bu verilerin çalıştırıldığı ve bilgiye dönüştürüldüğü yer olarak tarif edilebilmektedir. Esas olarak bilgiye ve uzun dönemli müşteri ilişkilerine yoğunlaşan veri tabanlı pazarlama, tüm bu faaliyetleri gerçekleştirmek üzere oluşturulan pazarlama çabaları olarak belirtilmektedir. (Jackson, Wang, 1996).

Veri tabanlı pazarlamanın farklı bir tanımına göre, müşteri odaklı, mevcut ve potansiyel müşteriler için uzun vadeli bire bir pazarlama stratejilerinin uygulanmasına imkan veren, sadık müşteriler yaratan ve sağlayan pazarlamadaki, bilgi teknolojisi uygulaması olarak özetlenmektedir (Gülcan, 2000). Başka bir anlatım ile veri tabanlı pazarlama, arzulanan hedef müşteriler ile ilgili devamlı veri toplanması ve sınıflandırılması yoluyla öğrenilen yeni bilgilerin müşterilere yönelik iletişimlerde, uzun vadeli müşteri sadakati yaratması amacıyla kullanılmasıdır.

Veri tabanlı pazarlama, müşterilerin geçmişteki ve şu andaki bilgilerinin araştırılması yolu ile müşterilerle uzun süreli ilişkiler kurulması için oluşturulan pazarlama stratejilerinin geliştirilmesine ve uygulanmasına yardımcı olan sistemdir (Hoda ve Jocumens 2003). Haşıloğlu ve arkadaşlarına göre, "veri tabanlı pazarlamayı uygulamak için verilerin, enformasyona, bir sonraki aşamada da yararlı bilgiye dönüştürülmesi gerekmektedir. Böylelikle, verileri stratejik olarak değerlendirerek potansiyel müşterilerin tespit edilmesine, müşteri memnuniyetinin sağlanmasına ve sürekli müşteri olmalarına destek olur" (Haşıloğlu, Sezgin, Bardakçı, 2008). Veri tabanlı pazarlama genel olarak üç amaçla kullanılmaktadır. Birinci olarak potansiyel müşteri ile ilgili ve pazarlama faaliyetleri için ihtiyaç duyulan verileri elde etmektir. İkinci olarak, verilerinden çıkartılan bilgilerle, farklı müşteri kümeleri için stratejiler oluşturmaktır. Üçüncü ise müşteri bağlılığı oluşturarak, satın alma faaliyetlerinin devamlı hale gelmesini sağlamaktır (Haşıloğlu, Sezgin, Bardakçı, 2008).

Veri tabanlı pazarlamanın pazarlama stratejileri geliştirme ve uygulama imkanı sağlaması, veri tabanlı pazarlama kullanan işletmelere kolaylıklar sağlamaktadır. Veri tabanlı pazarlamayı kullanan işletmeler amaçları, politikaları ve gördükleri işlevler doğrultusunda kendilerine özgü bir yol seçerler. Bu nedenle veri tabanlı pazarlamanın tüm özelliklerini, onu kullanan işletmelerin hepsinde görmek mümkün değildir. Ancak genel olarak potansiyel müşteri harcamalarının tespiti (potential), çapraz satışların değerlenmesi (cross sell), yaşam boyu değerin belirlenmesi (lifetime value), cüzdan paylaşımı (share of wallet), müşteri alışveriş sıklığının korunması (attrition) alanlarında stratejiler geliştirmek üzere kullanılmaktadır (Koslowsky, 1999).

Makine öğrenmesi ve yapay zeka terimi ilk olarak 1950 yılında Turing'in (1950) "Computing Machinery and Intelligence" adlı makalesinde, makineler düşünebilir mi sorusunu ortaya atması ile çıkmıştır. Birçok araştırmacı ve akademisyen bu sorunun çevresinde makinelere farklı öğrenimler kazandırabilecek alanları geliştirmiştir. Alpaydın'a göre (2013): "Günümüzde bilgisayar

teknolojisindeki hızlı değişim ve ilerlemelerle birlikte yüksek miktarda verinin güvenilir bir şekilde depolanma imkanı elde edilmiştir. Dünya üzerinde üretilen veri katlanarak artmakta ve gözlemlenen verinin altında yatan bir süreç bulunmaktadır. Bu sürecin tamamen ortaya çıkarılması mümkün olamamakla birlikte, süreci anlamaya yaklaşacak bir model inşası hedeflenmektedir. Söz konusu sürece dair yakınsamalar, veri içerisindeki modelleri ve düzenleri anlayabilmek için önem arz etmektedir. Verinin akış düzenini sağlayan yapıya ait bu model ve düzenlere dair edinilen fikirler, yakınsamalar geleceğe dair öngörüde bulunulmasına imkan sağlamaktadır. Ayrıca, gelecek için tutarlı tahminler yapabileceği gibi geçmişe yönelik anlamlı sonuçlar da çıkartabilmektedir".

Makine öğrenmesi, örnek veri seti ya da geçmiş veriler üzerinden bir performans kriterinin optimize edilmesi için bilgisayarları programlamaktadır (Alpaydın, 2013). Başka bir deyişle, verinin anlaşılabilir aksiyonlara dönüştürülmesini sağlayan, bilgisayar algoritmalarının geliştirilmesine dayalı çalışma alanı olarak tanımlanmaktadır (Cui, Wong, Lui, 2006). Söz konusu çalışma alanı; ulaşılabilir veri, istatistiksel metodlar ve gelişen hızlı hesaplama gücü olmak üzere bu üç temel sac ayağı üzerinde yükselmektedir (Lantz, 2013). Söz konusu üç temel dayanak, birbirinin gelişimine bağlı olarak beraber büyümektedir.

Literatürde pek çok makine öğrenmesi algoritması bulunmaktadır. Bunlardan bazıları; basit (naive) bayes sınıflandırıcı, karar ağaçları, yapay sinir ağları, k-en yakın komşu algoritması, lojistik regresyon analizi, k-ortalamalar (k-means) algoritmasıdır. Bu algoritmaların bir kısmı kümeleme ve sınıflandırma yaparken bir kısmı ise ileriye yönelik tahminlerde bulunmak için kullanılmaktadır. Makine öğrenmesi çeşitleri, eğitim verilerinin türleri, eğitim verilerinin elde edilmesi ve öğrenme algoritmasını değerlemek için kullanılan test verileri bakımından farklılık gösterir (Mohri, Rostamizadeh, Talwalkar, 2012). Makine öğrenmesi algoritmaları öğrenim özellikleri bakımından üçe ayrılır; gözetimli öğrenme, gözetimsiz öğrenme ve pekiştirmeli öğrenme (Canepa, 2016). Bu üç öğrenim literatürde sıklıkla kullanılmakla birlikte diğer öğrenme yöntemleri ise yarı gözetimli öğrenme, transdüktif akıl yürütme, çevrimiçi öğrenme ve aktif öğrenmedir (Mohri, Rostamizadeh, Talwalkar, 2012).

Kümeleme, bir gözetimsiz öğrenme (unsupervised learning) yöntemidir (Yılmaz, Patır, 2011). Amaç, elemanların birbirlerine çok benzediği, ancak özellikleri birbirlerinden çok farklı olan kümelerin bulunması ve veri tabanındaki kayıtların bu farklı kümelere (gruplara) bölünmesidir (Durmuş, İplikçi, 2007). Sınıflamaları hakkında açık bilgi bulunmayan durumlarda, topluluğa ilişkin tahminlerin yapılmasında yararlanılan bir yöntemler grubu olarak tanımlanan kümeleme analizi, araştırmacıya, üzerinde çalışılan herhangi bir veri setindeki benzer (homojen) birey gruplarını bulma, kendi içinde türdeş fakat diğerlerinden farklı olacak biçimde kümelere ayırma olanağı tanıyan birçok değişkenli istatistiksel analiz tekniğidir. Segment analizi ve taksonomi analizi olarak da adlandırılan kümeleme analizinin genel amacı, gruplanmamış verileri benzerliklerine göre sınıflandırmak ve araştırmacıya uygun, işe yarar ve özetleyici bilgiler elde etmede yardımcı olmaktır (Harrigan, 1985; Sambamoorthi, 1999; Ketchen, Shook, 1996).

Makine öğrenmesinin pazarlama alanında son dönemde kullanımı hızla artmaya başlamıştır. Özellikle pazarlamanın en yaygın uygulama alanı olan perakende sektöründe perakendecilerin topladıkları veri, günümüzde büyük boyutlarla ifade edilmektedir. Üreticilerin akıllı sistemlerle stok uygulamaları ve lojistik çözümleri gibi faaliyetlerle perakendeci ile birebir ilişki kurması da verinin boyutlarını daha çok arttırmaktadır. Rekabete ayak uydurmak ve müşterilerine daha iyi hizmet sunmak amacı ile hareket eden perakende sektörü, POS (Point of Sales) sistemleri dışında, akıllı sensörler, kablosuz ağlar, vb. sistemler ile veri toplayarak kendi bulut sistemlerini oluşturmaya başlamıştır. Ayrıca firmalar, sosyal medya ve tüketici bloglarında bulunan tüketici yorumları, firma web sitelerini ziyaret verileri, müşterilerin konum tabanlı kullanıcı bilgilerine ilişkin dış kaynaklı verileri de elde edebilmekte, müşterilerini sürekli gözetim altında tutmakta ve bu verilerden faydalı çıkarsamalarda bulunmak amacıyla çeşitli analizler yapmaktadır.

3. VERİ VE METODOLOJİ

Uygulama, günümüz işletmeleri açısından önemi son derece artan veri tabanlı pazarlamanın, müşteri bölümleri oluşturulmasına ve oluşan bölümlere yönelik pazarlama stratejilerinin geliştirilmesine etkisini araştırmaktadır. Literatürdeki araştırmalar incelendiğinde veri tabanlı pazarlamanın müşteri bölümleme ve pazarlama stratejilerinin geliştirmesindeki önemi vurgulanmaktadır (Verhoef, Spring, Hoekstra, Leeflang, 2003; Dibb, Meadows, 2004; Chaffey, 2009). Ayrıca müşteri tatmini ve müşteri bağlılığını yükselterek sadık müşteriler yarattığı ve farklı müşteri bölümleri için stratejiler geliştirilmesine imkan tanıdığı tespit edilmiştir (Gülcan, 2000; Haşıloğlu, Sezgin ve Bardakçı, 2008).

Bu çerçevede uygulamada şu temel sorunsala odaklanılmıştır: Büyük veriden yararlanarak pazarlama bölümleri nasıl daha etkin ve daha hassas şekilde bölümlenebilir? Literatürde yer alan pazar bölümleme kriterleri nasıl kullanılabilir? Tüketim davranışları birbirinden farklı olan kendi içinde nispeten homojen pazar bölümleri için pazarlama stratejileri ayrı ayrı nasıl geliştirilebilir?

Türkiye genelinde evlere servis alanında faaliyet gösteren uluslararası bir pizza markasının 2018 yılına ait sipariş verileri baz alınarak, hangi ürün ve ürün gruplarının, ne sıklıkta, hangi saat aralıklarında ve hangi sipariş kanalından vb. sorulara yanıt bulacak şekilde araştırılmasıyla müşteri kümeleri ve davranış modelleri tespit edilmiştir. Toplam 24 milyon satır uzunluğunda veri seti ile çalışılmıştır. Bu veri setindeki özellikler çeşitli işlemlerden geçtikten sonra 52 adet özellik ile başlanarak analizler yapılmıştır.

Bu doğrultuda literatürde en çok tercih edilen üç farklı kümeleme algoritması test edilmiştir. Bunlar; K-Means, Gaussian Mixture ve DBSCAN algoritmalarıdır. K means kümeleme yöntemi literatürde katı c ortalamalar olarak da bilinen bir yöntemdir. Bu açıdan yöntem tekrar ifade edilecek olursa; bu yöntem n adet vektör grubunu c adet gruba ayırmaya çalışan bir yöntemdir. MacQuenn (1967), en yakın değerlere sahip her elemanı, kümelere ayırabilecek algoritmayı tanımlamak için k means (ortalamalar) terimini ortaya atmıştır. K-means algoritmasında uzaklık ölçütü olarak genellikle öklit uzaklığı kullanılırken, algoritmanın değerlenmesinde en yaygın olarak, karesel hata kriteri SSE (sum of squared error) kullanılmaktadır. En düşük SSE değerine sahip kümeleme sonucu, en iyi sonucu verir. Nesnelerin bulundukları kümenin merkez noktalarına olan uzaklıklarının karelerinin toplamıdır.

$$\mu_i = \frac{1}{|S_j|} \sum_{x_i \in S_j} x_i \qquad \arg\min_{\mathbf{S}} \sum_{j=1}^{K} \sum_{\mathbf{x}_i \in S_j} \left\| \mathbf{x}_i - \boldsymbol{\mu}_j \right\|^2$$

Bu kriterler sonucu k tane kümenin olabildiğince yoğun ve birbirinden ayrı sonuçlanması hedeflenmektedir. Algoritma, karesel hata fonksiyonunu azaltacak k parçayı belirlemektedir (Kantardzic, 2011). Bu kümeleme algoritmalarından yola çıkarak anlamlı kümlerin tespiti için ise Sillhoute, Davies Bouldin ve Calinski Harabasz indeksleri test edilmiştir. Sillhoutte, veri kümeleri içerisindeki tutarlılığın yorumlanması ve doğrulanması yöntemidir. Yöntem her bir nesnenin ne kadar iyi bölümlendirildiğine dair kısa ve açık grafik gösterimi sağlar. Sillhoute katsayısı, bir nesnenin diğer kümelere kıyasla kendi kümesine ne kadar benzediğinin bir ölçütüdür (Rousseeuw, 1987). Bu değer -1 ile +1 arasındadır. Değer 1'e ne kadar yakın olursa kendi kümesiyle iyi eşleştiğini ve komşu kümelerle eşleşmediğini gösterir. Bu anlamda komşu kümelerle eşleşmemesi, kümenin iyi bir şekilde ayrıştığını gösterir. Değer düşük veya negatifse, kümeleme yapılandırmasında çok fazla veya çok az küme kullanıldığı düşünülebilir. Calinski Harabasz ve Davies Bouldin indeksleri de aynı amaca hizmet etmektedir. Calinski yönteminde sonuç ne kadar yüksek çıkarsa, kümelerin o kadar iyi belirlendiği söylenebilir. Davies Bouldin yönteminde ise, düşük değerler, kümelerin daha iyi ayrıldığını göstermektedir. Bu yöntemde alınabilecek en düşük değer sıfırdır.

Bu çerçeve kapsamında büyük veri ile tüketici ve müşterilere hitap etmek için daha rasyonel sonuçlar elde edilmektedir. Elde edilen bu sonuçlar ışığında müşteri bölümlerine yönelik çoklu regresyon analizleri ile ileriye yönelik davranış modelleri tespit edilmeye çalışılmıştır. Söz konusu kümeleme ve çoklu regresyon analizleri Phyton programı ile uygulanmıştır.

4. BULGULAR

4.1. Verilere Yönelik Bulgular

Her veri tabanı kendine has birtakım veri depolama ve depolama işlemi sırasında da ayrıştırma işlemi eş zamanlı olarak düzenlenmektedir. Bu çalışmaya ait veri tabanı dört bölümden oluşmaktadır. Bu bölümlere şu şekildedir; siparişe ilişkin veriler (order base data), siparişe ilişkin detaylı veriler (order detail data), ürüne ilişkin veriler (product base data), iletişim ile ilgili veriler (contact base data).

Bu çalışmada bahsedilen veriler "Text" formatında Phyton programına analiz edilmek üzere aktarılmıştır. Bu sayede veri boyutu yaklaşık 300 GB'a düşürülmüştür. Bununla birlikte verilerin ilgili bölümlerde birbirlerini bağlayan otomatik atanmış numaralar bulunmaktadır. Bu numaralar sayesinde ürün ile ilgili bölümde siparişe ait ürün bilgilerini görebilirken, siparişe ait diğer bilgiler (sipariş zamanı, sipariş tutarı, sipariş kanalı vb.) sipariş detayı bölümünde bulunabilmektedir. Bu farklı bölümler arasında geçişler de bu siparişleri birbirine bağlayan numaralar sayesinde yapılabilmektedir. Veri tabanında örnek sipariş verilerinin nasıl gözüktüğü ile ilgili ekran görüntüsü aşağıda paylaşılmıştır.

Şekil 1: Veri Tabanı Üzerindeki Örnek Sipariş Verileri

new_storeno	store_city	store_region	new_productid	drink_type	new_netamt	new_cusamt	new_orddt	new_ordersource
40644	İstanbul	MARMARA	045BAE60-C8F8-4E7B-99BF-6E8A1A3AB228	"10"" Orta"	49,89	53,89	2018-10-07 00:00:00.000	Web
42800	İstanbul	MARMARA	045BAE60-C8F8-4E7B-99BF-6E8A1A3AB228	"10"" Orta"	44,44	47,99	2018-10-02 00:00:00.000	Web
40636	Adana	AKDENIZ	191371AD-5D42-4D29-A444-2D29EF0243DA	Adet	70,45	76,09	2018-10-15 00:00:00.000	Phone
42873	İstanbul	MARMARA	191371AD-5D42-4D29-A444-2D29EF0243DA	Adet	53,61	57,89	2018-10-21 00:00:00.000	Web
40549	Antalya	AKDENIZ	03589A77-7394-4B44-ACF1-4B7058E8CD4A	"13"" Buyuk"	80,90	87,40	2018-10-09 00:00:00.000	Web

Bu tarz büyük veri çalışmalarında tekrar eden numaralar, bu numaraların uzunluğu, kullanılmayacak birtakım veriler çalışmanın boyutunu arttırmaktadır. Bu nedenle öncelikle otomatik olarak atanmış hücre uzunlukları ve kod numaraları yeniden yapılandırılmıştır. Şekil 1'de, ürün numarası ve sipariş tarihi gibi hücrelerin otomatik olarak uzunlukları ve içlerini doldurmak için atanmış harf ve rakamlar yeniden düzenlenmiştir. Bazı veriler aynı tablo içerisinde birden fazla kez tekrar etmiştir. Bu tekrar eden hücreler, ilgili veri setinden silinmiştir.

Esas olarak bu bölümde hedef, veriyi kullanılacak programın anlayabileceği hale getirmektir. Makine öğrenme algoritmaları doğrudan kategorik veriler üzerinde çalışmamaktadır. Bu yüzden verilerin sayısal verilere dönüştürülmesi gerekmektedir. Bununla ilgili örnek olarak siparişlerin geldiği gün incelenebilir. Matematiksel bir fonksiyon için "Üç Ocak Çarşamba" gününün bir anlamı yoktur. Bununla birlikte o günü, hafta sonu mu değil mi ya da haftanın üçüncü günü mü şeklinde ifade edebiliriz. Şekil 2'de gösterilen örnekte "one hot encoding" metodu kullanılarak haftanın günleri birer kolona çevrilmiştir. Bu metod, kategorik değişkenlerin ikili (binary) olarak temsil edilmesi anlamına gelmektedir. Örneğimizde ise haftanın ilgili gününde sipariş verilip verilmediğini belirtmek için de 1 ve 0 kullanılmıştır.

Şekil 2: Günlere Göre Sipariş Durum Örneği

Contactid	Newcusamt	cus_amt_mean	cus_amt_count	weekday_0	weekday_1	weekday_2	weekday_3	weekday_4	weekday_5	weekday_6
1	119.97	39.99	3	0	1	0	0	0	0	0
2	55.98	27.99	2	0	0	0	0	0	1	0
3	47.98	23.99	2	0	1	0	0	0	0	0
4	30.00	30.00	1	0	0	0	0	0	0	1
5	144.96	36.24	4	0	0	0	0	0	1	0

Veri işlenmesi aynı zamanda verinin dönüştürülmesi işlemidir. Şekil 2'de olduğu gibi tarih özelliği ile yapılmak istenen analizler belli olduktan sonra mevcut özelliğin anlamlandırılması için veri setine ilave hafta içi ve hafta sonu eklemeleri yapılmıştır. Buna benzer diğer bir çalışma sipariş zamanı özelliğinde kullanılmıştır. Bu noktada sipariş saatinin öğle-akşam-gece olarak anlamlandırılması için veri setine ilave sütunlar eklenmiştir.

Veri tabanında özelliklere ait alt kategorilerin doğru yapılmadığı fark edilmiştir. Örnek olarak ürün kategorileri bölümünde, yan ürün ve tavuk ürünü bir arada kullanılmıştır. Oysa tavuk ürünü yan ürüne ait bir alt sınıftır. Bunun dışında hamur tipleri ve boyları ile yan ürünlere ait parça sayıları aynı özellik altında toplanmıştır. Bu nedenle hamur tipleri ve hamur boyları ayrı bir özellik olarak ayrıştırılmıştır.

Bir diğer önemli temizlik ise veri seti içerisinde özellik olarak bulunan, ancak ilgili veri kaynağında bu veri tutulmadığı için boş olarak gelen hücrelerin temizlenmesidir. Tablo 1'de gösterilen örnekte olduğu gibi, verinin boş olduğunu dört harften oluşan NULL kelimesiyle belirtmesi bile verinin boyutunu ciddi oranda arttırdığı için bu tarz kullanılmayan veriler, veri setinden çıkartılmıştır.

Tablo 1: Boş Hücrelerin Örnek Görüntüsü

new_orderdateandnumber	new_campaigncategory	new_campaignname	new_daytimes	new_flavorscore
2018-05-22#59	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL
NULL	NULL	NULL	NULL	NULL

Veriyi incelemek, verinin doğruluğundan emin olmak ve kullanılacak algoritmaları seçmeden önce fikir sahip olmak için önemlidir. Ayrıca veri içerisindeki "outlier" başka bir ifadeyle aykırı alanları bulmak için de önemli bir yöntemdir. Şekil 3'de gösterilen örnek veri setinde "Elliptic Envelope" yönteminin "outlier" aykırı olarak işaretlediği örnekler bulunmaktadır. Buradaki müşterilerin veri setinde diğer müşterilere göre azınlık durumda olduğu gösterilmektedir.

Şekil 3: Elliptic Envelope Yöntemi

	TotalOrderTyp	TotalWeb	otalNetAm	AvgNetAmt	CountOrde	mentMethc	TotalPizza	TotalIcecek	TotalSides	otalVegiPiz	Recency	isOutlier
count	94895	94895	94895	94895	94895	94895	94895	94895	94895	94895	94895	94895
mean	0,382686	1,723421	103,2517	35,46422	3,022456	1,391823	4,138911	1,213425	1,423289	0,234659	148,7277	0,799989
std	2,286081	4,081807	182,1432	17,67702	4,826751	3,033818	6,622295	10,4978	4,05024	1,229989	107,9499	0,600017
min	0	0	0,31	0,062	1	0	0	0	0	0	1	-1
25%	0	0	31,3	25,18146	1	0	1	0	0	0	51	1
50%	0	1	50,47	32,36857	1	1	2	1	0	0	133	1
75%	0	2	107,685	41,56513	3	1	4	1	1	0	238	1
max	270	271	24913,32	1111,11	293	157	364	3126	369	67	365	1

Örneğin, "OrderTypeC" gel al ve masaya servis kolonunda %25 - %50 - %75 değerleri için sıfır yazmaktadır. Bir başka ifade ile, ilgili kolon içerisindeki değerlerin kalan %25'lik kısımda arttığını görmekteyiz. "TotalVegiPizza" için aynı kontrol yapıldığında, ürünün ortalama 0,2 adet satın alındığı ve standart sapma değerinin 1,2 olduğu görülmektedir. Müşteriler tarafında çok fazla tercih edilmeyen bu ürünün %25-%50-%75 değerleri sıfırdır. Sadece kalan %25'lik dilimde tercih edildiğini göstermektedir. Müşterilere ait sipariş adetleri incelendiğinde, ortalama 1,3 adet sipariş ve %75'lik dilime kadar 1 sipariş verildiği görülmektedir. Bir başka ifade ile, müşterilerin en az yarısının sadece bir kez sipariş vermiş oldukları söylenebilir.

Bu yöntem ayrıca "outlier" aykırı olarak aynı işlemi tekrar etmiştir. Bunun neticesinde ortalama %8 civarında aykırılıkların olduğunu tespit etmiştir. Bunu şu şekilde inceleyebiliriz: Örneğin; ortalama sepet tutarının 35,46 TL olduğu bir ürüne en fazla 1.111 TL ödemenin yapılması algoritma tarafından aykırı olarak belirlenmiştir. Benzer şekilde yapılan alışverişlerin toplam tutarı ortalama 103 TL olan bir örneklem grubunda, Tablo 2'de gösterildiği gibi en fazla toplam 24.913 TL ödeme yapıldığı tespit edilmiştir. Bu ve benzer sonuçlar, azınlık olarak belirlendikten sonra aykırı siparişler daha detaylı incelenmiştir.

Tablo 2: Aykırılıklara Ait Örnekler

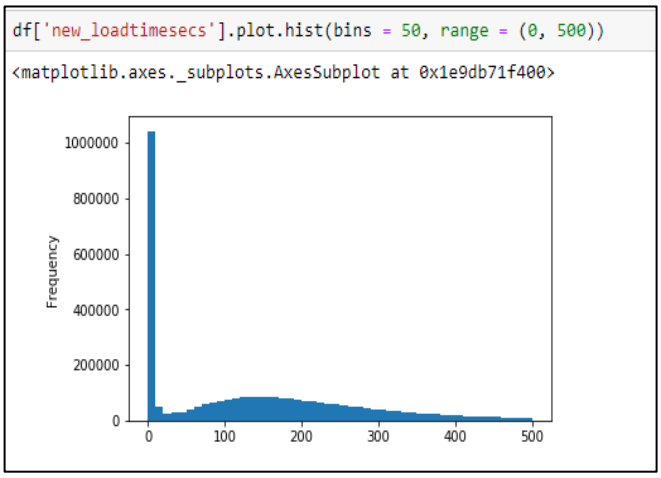
CustomerID	TotalOrderTypeC	TotalWeb	TotalNetAmt	AvgNetAmt	CountOrder	Recency	isOutlier
37050	144	51	24913,32	154,7411	161	27	-1
3770300	6	17	9426,75	428,4886	22	48	-1
3817900	195	226	6656,18	29,06629	229	6	-1
1717200	1	0	6434,49	40,98401	157	1	-1
2045250	270	271	5565,98	18,99652	293	38	-1
1886900	150	71	5256,65	31,85848	165	1	-1
14750	197	198	4502,4	22,07059	204	4	-1

Bu siparişlerin ortalamanın çok üzerinde olması, bunun gerçek bir müşteri davranışı olmayacağı anlamına gelmemektedir. Bu nedenle, yanlış karar vermemek adına ilgili siparişlerin verildiği şubeler rastgele aranmış ve kontrol edilmiştir. Alınan geri

bildirimler sonucunda bu ve benzeri siparişlerin genelde anlaşmalı okul, iş yeri veya markanın bağış şeklinde yaptığı toplu gönderimler olduğu tespit edilmiştir.

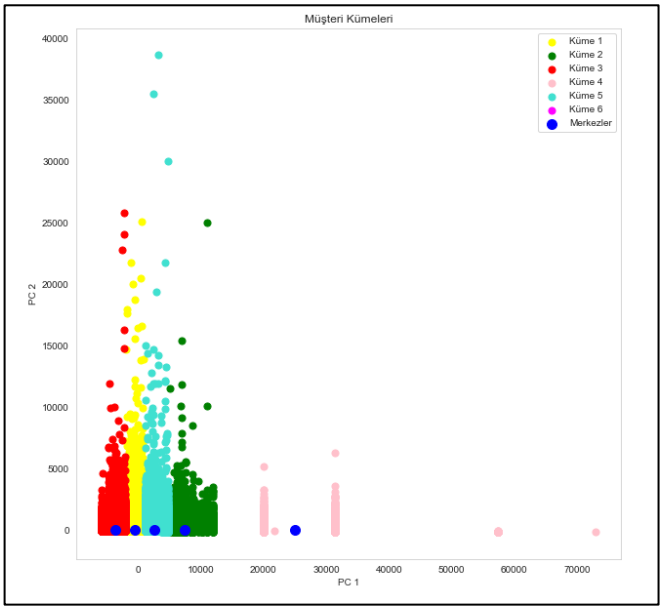
Şekil 4'de gösterilen diğer bir örnekte ise "Loadtimesecs" ürün yükleme süreleri kolonunun veri içerisinde ne kadar olduğuna bakarak, bu özelliği algoritma içerisinde kullanılmaması gerektiği tespit edilmiştir. Çünkü içerisindeki verilerin büyük bir çoğunluğu sıfır ya da sıfıra yakın bir değer girildiği ya da bu şekilde işlendiği için bu durum gerçek değerlerin azınlıkta kalmasına sebep olmuştur. Sonuç olarak, bu verinin doğru bir şekilde tutulmadığını ya da hesaplanmadığını göstermektedir.

Şekil 4: Loadtimesecs Özelliğinin Veri Tabanındaki Dağılımı



Verileri incelerken bir diğer yöntem de görselleştirmedir. Genel olarak PCA metodu kullanılır. Örneğin, veri setindeki özellikleri PCA ile iki boyuta indirgedikten sonra algoritma aracılığı ile ayrılan kümeleri Şekil 5'de olduğu gibi görselleştirilebilir. PCA metodu verideki özelliklerin iki boyuta indirgenmesine yardımcı olur. İki boyuta indirgenen verileri incelemek ve görselleştirmek, çok daha kolaydır.

Şekil 5: PCA Analiz Örneği



4.2. Kümeleme Analizine Yönelik Bulgular

Model oluşturulurken dikkat edilmesi gereken birçok faktör vardır. Bunlar çoğu zaman makinanın kendi kendine belirleyemediği parametrelerdir. Gözlemlere ve sonuçlara dayanarak bunlar üzerinde oynamalar yapılabilir. İlk yapılması gereken, hangi algoritmanın kullanılacağına karar verilmesidir. Bu amaçla en yaygın olarak kullanılan yöntem, Sillhoute (Rousseeuw, 1987)

katsayısıdır. Bunun dışında Calinski Harabasz (Calinski, Harabasz, 1974) indeksi ve Davies Bouldin (Davies, Bouldin, 1979) indeksi de kullanılmaktadır.

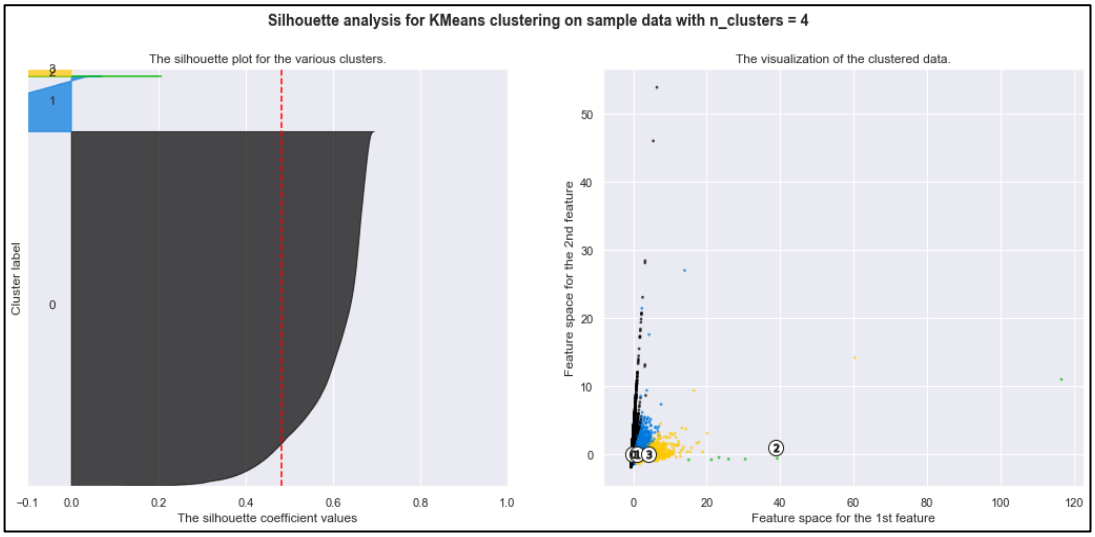
Şekil 6'da iki farklı kümeleme algoritması ile üç farklı küme sayısına bölünmüş kümeler karşılaştırılmıştır.

Şekil 6: Karşılaştırmalı Kümeleme Algoritmaları

4 Küme	6 Küme	8 Küme
Counter({0: 68452, 1: 10666, 3: 1405, 2: 7})	Counter({2: 62829, 0: 13640, 5: 3508, 1: 546, 3: 5, 4: 2})	Counter({1: 62156, 4: 13635, 2: 3012, 7: 722, 0: 537, 5: 462, 3: 5, 6:1})
Silhoutte K Means:	**Silhoutte K Means:**	**Silhoutte K Means:**
0.4829907771272668	0.36055848530667245	0.3392441652448518
Calinski	**Calinski**	**Calinski**
9.204.889.633.914.360	7.572.199.399.825.330	6.180.182.980.254.140
Davies_Bouldin	**Davies_Bouldin**	**Davies_Bouldin**
19.768.011.575.979.600	20.917.696.527.922.100	19.572.664.328.115.700
Silhoutte Gaussian:	**Silhoutte Gaussian:**	**Silhoutte Gaussian:**
0.37198886912729395	-0.02650809286035061	0.07850418466811937
Calinski Gaussian	**Calinski Gaussian**	**Calinski Gaussian**
7.148.471.931.445.330	4.868.359.182.836.330	43.786.746.745.761.300
Davies_Bouldin Gaussian	**Davies_Bouldin Gaussian**	**Davies_Bouldin Gaussian**
24.475.118.148.340.400	35.534.791.471.526.600	27.859.234.809.572.800

Sillhoute, Calinsky ve Davies Bouldin değerleri şekil üzerinde gösterilmiştir. Öncelikle K Means algoritması, sekizli kümede Calinski değeri hariç tüm incelemelerde daha iyi sonuç vermiştir. Her üç değerin de en optimum seviyeye ulaştığı küme sayısı ise dörtlü kümedir. Bu kümede, Sillhoute değeri diğer altılı ve sekizli kümelere kıyasla en yüksek değere ulaşmıştır. Aynı durum Calinski ve Davies değerleri için de geçerlidir. Bu doğrultuda çalışmada seçilen K Means dörtlü kümesinin Sillhoute görseli Resim 1'de paylaşılmıştır.

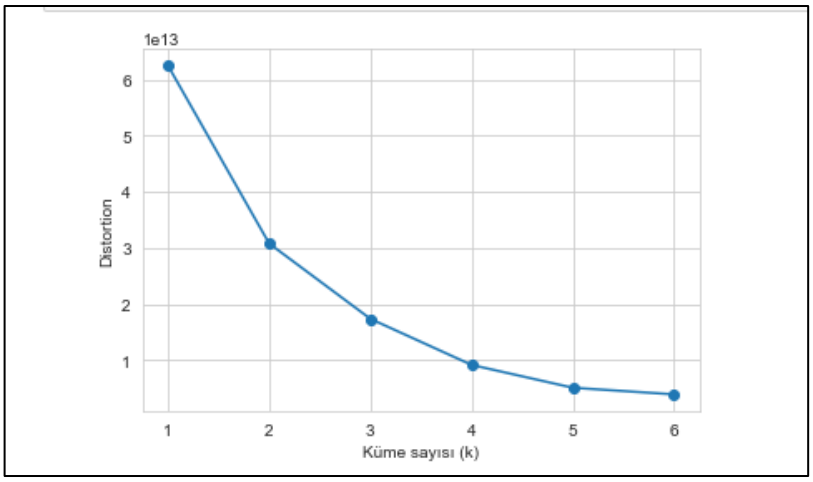
Resim 1: K Means 4'lü Kümeleme Silhoutte Analizi



Resim 1'de soldaki görselde kırmızı kesik çizgi Sillhoute katsayısını göstermektedir. Bu değer 0,48 olarak çıkmıştır. Sağ taraftaki görselde ise kümelerin nasıl dağıldığı görselleştirilmiştir. Yeşil renkli kümenin aykırı olduğu, tek eksende ince bir çizgi halinde seyir etmesiyle de belli olmaktadır.

Yapılan analizler sonucunda K Means 4'lü küme sonucu en optimum sonucu verse de küme sayının belirlenmesinde bir diğer önemli metod ise Elbow'dur (Kordinariya ve Makwana, 2013). Elbow metodunda grafiğin eğiminin büyük ölçüde değiştiği nokta küme sayısı için baz alınır. Şekil 7'de Elbow metodu ile veri setimizde oluşan grafik çıktısı gösterilmiştir.

Şekil 7: Elbow Yöntemine Ait Grafik



Bu metoda göre küme sayısı dört olarak seçilebilir. Bu yöntemde bir kesinlik yoktur ve yoruma açıktır. Modelin kırılma noktası, kesin olarak dört olarak belirtilemese de sonuçları gözlemleyerek ve yorumlayarak ilerlemek gerektiği söylenebilir. Neden böyle olduğunu örnekle açıklamak gerekirse; bir veri setinde müşteriler ve bu müşterilerin harcamaları olduğu varsayıldığında, müşterileri sadece harcamalarına göre kümelemek için ideal küme sayısı diye bir sayı yoktur. Burada müşteriler çok harcama yapanlar ve az harcama yapanlar olarak iki kümeye de ayrılabilir ya da çok harcama yapanlar, orta harcama yapanlar ve az harcama yapanlar olarak üç kümeye de ayrılabilir. Bu çalışmada kümeleme sonuçlarının değerlenmesi açısından birbirinden farklı veri setleri kullanılmış ve kümeler arasında ayırt edici özelliği bulunmayan özelliklerinin elenmesi yöntemiyle farklı kümeleme çalışmaları test edilmiştir. Aynı zamanda tüm çalışmalarda dörtlü, altılı ve sekizli küme analizleri yapılmıştır.

- Tüm özelliklerin veri setinde bulunduğu, 100.000 adet sipariş verisinin analizi
- Tüm özelliklerin veri setinde bulunduğu, farklı 100.000 adet sipariş verisinin analizi
- İlk veri setindeki farklılaşmayan özelliklerin azaltılarak yeniden analiz edilmesi
- İlk veri setindeki azaltılmış özelliklerin yeniden farklılaşmayan özelliklerin azaltılarak analiz edilmesi
- Büyük kümenin alt kümelere ayrıştırılması

Kümeleme sonuçlarına ait tabloların anlaşılması açısından açıklamalar, Ek 1'de gösterilmiştir. Ayrıca analiz sonuçlarının ve takip eden alt bölümlerdeki tabloların rahat okunabilmesi için aynı özellikteki kümelere aynı harf atanmıştır. Ek 2'de gösterilen tüm özelliklerin bulunduğu bu ilk 100.000 adetlik veri setinin sonuçları incelendiğinde, A, B ve C kümelerinin ayrıştığı ve X kümesinin aykırı olduğu gözlemlenmiştir.

X kümesinin sipariş adetlerinin fazla olması nedeniyle detaylı inceleme yapıldığında, bunun sebebinin şubeler tarafında oluşturulan merkezi içecek gönderimi olduğu anlaşılmıştır. Bu noktada algoritmanın X kümesini diğerlerinden ayırt etmesi ve "outlier" başka bir ifadeyle aykırı olduğunu ortaya çıkarması nedeniyle, anomali ve farklılıkları doğru bir şekilde tespit edebildiğini göstermiştir.

A kümesi incelendiğinde, kümenin, tüm müşterilerin %85'ini oluşturduğu ve bu kümeye ait müşterilerin diğer kümelere kıyasla en az sipariş veren küme olduğu söylenebilir. Buradan yola çıkarak verileri incelenen pizza firmasını, yeni müşteri ağırlıklı ve frekansı düşük müşterilerin tercih ettiği söylenebilir. Bunun sebebinin neler olduğu bu çalışmanın kapsamında değildir. Bununla birlikte toplam cironun %50'si bu küme tarafından gerçekleştirilmektedir. İnternetten sipariş verme oranı en düşük olan bu küme, aynı zamanda yan ürün tercihi olarak da en son sırada yer almaktadır. Çift katlı taban gibi özellikli ürünleri tercih etmeyen bu kümenin pizza ağırlıklı alışveriş yaptığı söylenebilir. Bu noktada hem frekansının düşük olması hem de pizza oranının yüksek olması, bu kümenin promosyon veya kampanya zamanlarında alışveriş yapan ve fiyata duyarlı olan bir müşteri grubu olma ihtimalini arttırmaktadır. Karışık pizza oranının diğer kümelerin üzerinde olması, pizza çeşitlerine hakim olmadıklarını gösteriyor olabilir. Nakit ödeme oranının yüksek olması, bu kümenin daha cazip kampanyaları tercih ettiklerini gösteriyor olabilir.

A kümesi, tüm müşterilerin %85'ini oluşturduğu için K-Means algoritmasında yeniden alt kümelere ayrılmak üzere analiz edilmiştir. Bu doğrultuda Ek 3'de gösterildiği üzere A kümesinin A1 ve A2 olarak iki alt kümeye ayrıldığı gözlenmiştir.

A kümesinin yeniden analiz edilmesi sonrasında A1 kümesinin müşterilerin %64'ünü ve cironun %75'ini oluşturduğu gözlenmiştir. A2 kümesi ise müşterilerin %36'sını ve cironun %25'ini oluşturmaktadır. Bu iki kümenin temel ayrıştığı özellikler, Frekans – Son Sipariş Zamanı ve Toplam Pizza İçindeki Oranı olmuştur. Bu noktada A1 kümesinin daha fazla sipariş veren ve pizza miktarı daha fazla olan küme olduğu söylenebilir. A2 kümesinin sene başında sipariş vermiş ve tekrar alışveriş yapmamış olduğu gözlenmektedir.

B kümesi, müşterilerin %13'ünü ve toplam cironun %35'ini oluşturmaktadır. A kümesinden sonra hem müşteri sayısı hem de ciro payı olarak en büyük ikinci kümedir. Yıl içerisinde ortalama yedi sipariş veren bu küme, internet siparişlerini en fazla kullanan ikinci kümedir. Yan ürün tercihleri A numaralı gruba göre daha yüksek olmakla birlikte yaklaşık olarak her iki siparişin birinde yan ürün sipariş verdikleri söylenebilir. Akşam siparişleri diğer kümelere göre en yüksek olan kümedir.

C kümesi, müşterilerin sadece %1'ini oluşturmasına rağmen toplam cironun %13'ünü oluşturmaktadır. Yıl içerisinde 20 adet sipariş ile en fazla sipariş veren kümeyi oluşturmaktadır. Yan ürün satın alma oranı en yüksek olan bu kümenin çift katlı taban gibi özellikli ürünleri en çok tüketen küme olduğunu söyleyebiliriz. Bununla birlikte etsiz pizzaların da %7 gibi bir oranla tüm kümeler arasında en yüksek değere sahip olduğu dikkat çekmektedir. Sipariş saatine göre incelendiğinde ise, gece siparişinin en yüksek olduğu söylenebilir. Sipariş sıklığı ve sadece pizza tercih etmeyip diğer özellikli ve yan ürünleri de kullanıyor olmaları nedeniyle bu kümenin pizzayı seven, ürün algısı ve dışardan yeme alışkanlığı yüksek, aynı zamanda yeniliklere açık bir küme olduğu söylenebilir. İnternet kullanımının ve aynı zamanda gece siparişlerinin de en yüksek oranda olması, bu kümeyle ilgili pazarlama stratejilerinde üzerinde durulması gereken bir nokta olarak dikkat çekmektedir.

Bununla birlikte çalışmada kullanılan toplam 52 özellikten bazılarının diğer kümeler arasında anlamlı bir fark yaratmadığı tespit edilmiştir. Özellikle coğrafik analizlerde kullanılması için eklenen şehir ve bölge kırılımı, diğer kümelerle benzer dağılım göstermektedir. Ayrıca evlere servis, gel al ve masaya servisi ortalama sepet tutarlarının 15'er TL'lik dilimlere ayrılarak bu fiyat aralıklarındaki dağılımlar analiz edilmek istenmiş olup analiz sonuçlarında anlamlı bir fark bulunamamıştır. Bunun gibi farklılık bulunmayan diğer özellikler de bir sonraki çalışmadan çıkartılmıştır.

Farklı algoritma ve küme sayıları ile yapılan çalışmalarda ve azaltılmış özelliklerin test edildiği analizler doğrultusunda müşterilerin üç temel küme etrafında ayrıştığı tespit edilmiştir. Bunlar A, B ve C kümeleridir. Küme sayısı arttıkça bu kümelere ait analizlerde yeni kümelerin değil, mevcut kümelere ait alt kümelerin oluştuğu gözlenmiştir. Bununla birlikte küme sayısı arttıkça alt kümeler bir veya iki özellik tarafından ayrıldığı için genel olarak benzerliklerini korumakla birlikte bu kümelere ait ayrıştırıcı özellikler yetersiz kalmaktadır. Bu değerlendirme çalışmanın başında yapılan Sillhoutte, Calinski Harabasz ve Davies Bouldin indeksleri ile de paralellik göstermiştir. Bu nedenle pazarlama stratejileri oluşturma konusunda farklılıklarını koruyan temel A, B ve C kümeleri, çoklu regresyon analizlerinde kullanılmak üzere seçilmiştir. Ayrıca A kümesinin büyüklüğü nedeniyle ve kümeyi daha iyi tanımlayabilmek adına A1 ve A2 alt kümeleri kullanılması kararlaştırılmıştır. Seçilen küme ve özellikler Tablo 3'de gösterilmiştir.

Tablo 3: Seçilen Müşteri Kümeleri

	MÜŞTERİ KÜMELERİ			
	A1	**A2**	**B**	**C**
Toplam Müşteri İçindeki Oranı	64%	36%	13%	1,0%
Ciro İçindeki Oranı	75%	25%	35%	13%
Frekans	2,2	1,4	7	20
Recency	74	285	59	27
ATP / Ort Sepet Tutarı	36,87	33,30	35,27	34,35
Web Sipariş Oranı	54,8%	47,3%	65,3%	67,0%
Toplam Pizza İçindeki Oranı	74,2%	25,8%	35,8%	12,3%
Yan Ürün Oranı	43,1%	43,6%	49,0%	62,0%
Çift Katlı Taban Oranı	1,6%	1,5%	2,7%	5,1%
Etsiz Pizza Oranı	4,8%	4,5%	5,5%	7,6%
Küçük Pizza Oranı	16,0%	13,0%	16,1%	18,9%
Karışık Pizza Oranı	15,1%	17,7%	11,4%	10,9%
Çok Malzemeli Pizza Oranı	20,0%	23,4%	19,8%	17,6%
Akşam Sipariş Oranı	59,1%	59,0%	59,2%	55,3%
Nakit Ödeme Oranı	55,4%	58,3%	49,8%	50,6%
Gel Al ve Masaya Servis Oranı	13,4%	11,3%	13,0%	10,9%

Evlere Servis Oranı	86,6%	88,7%	87,0%	89,1%

4.3. Çoklu Regresyon Analizine Yönelik Bulgular

Her bir küme için şu bağımlı değişkenler test edilmiştir: Frekans, ortalama sepet tutarı, evlere servis oranı, gel al ve masaya servis oranı ve pizza oranı.

4.3.1. Bağımlı Değişken: Frekans / Sipariş Sıklığı Olmak Üzere Çoklu Regresyon Analizi

Müşterilerin çoklu ve tekil olmak üzere tüm sipariş adetlerinin analizi ve bu doğrultuda frekans diğer bir ifade ile sipariş sıklığı ile ilgili çoklu regresyon sonuçları incelenmiştir.

A1 Kümesi için Çoklu Regresyon Analizi

Değişkenlere ait VIF değerleri Şekil 8'de gösterilmiştir.

Şekil 8: A1 kümesi VIF Değerleri

	VIF Factor	features
0	2.71	Recency
1	2.19	TotalWeb
2	1.37	TotalSides
3	1.03	TotalDublex
4	1.14	TotalVegiPizza
5	1.30	TotalKucukPizza
6	1.60	TotalKarisikPizza
7	1.54	TotalBolMalzemosPizza
8	2.55	TotalAksam
9	3.00	TotalPaymentMethodType26
10	7.97	TotalPizza
11	6.08	AvgNetAmt
12	9.41	TotalOrderTypeD
13	2.57	TotalOrderTypeC

CountOrder (frekans) başka bir ifade ile sipariş sıklığı; TotalOrderTypeD (evlere servis) ve TotalOrderTypeC (gel al ve masaya servis) siparişlerinin toplamı olduğu için, bu iki bağımsız değişkene ait VIF değeri 10'un altında bir değer alsa da Şekil 9'da paylaşılan regresyon analizinde 1'e eşit çıktığı görülmektedir. Ayrıca R^2 değeri de 1 çıkmıştır.

Şekil 9: A1 Kümesi İçin Bağımlı Değişkenin Frekans Olduğu Çoklu Regresyon Analizi

OLS Regression Results

Dep. Variable:	CountOrder	R-squared (uncentered):	1.000
Model:	OLS	Adj. R-squared (uncentered):	1.000
Method:	Least Squares	F-statistic:	6.991e+32
Date:	Mon, 25 May 2020	Prob (F-statistic):	0.00
Time:	08:49:53	Log-Likelihood:	1.1589e+06
No. Observations:	35883	AIC:	-2.318e+06
Df Residuals:	35869	BIC:	-2.318e+06
Df Model:	14		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Recency	1.392e-17	9.5e-20	146.588	0.000	1.37e-17	1.41e-17
TotalWeb	7.654e-16	2.34e-17	32.723	0.000	7.2e-16	8.11e-16
TotalSides	1.214e-16	1.47e-17	8.256	0.000	9.26e-17	1.5e-16
TotalDublex	-7.841e-16	8.12e-17	-9.660	0.000	-9.43e-16	-6.25e-16
TotalVegiPizza	3.521e-16	4.4e-17	8.006	0.000	2.66e-16	4.38e-16
TotalKucukPizza	4.361e-16	2.16e-17	20.229	0.000	3.94e-16	4.78e-16
TotalKarisikPizza	3.023e-16	2.28e-17	13.241	0.000	2.58e-16	3.47e-16
TotalBolMalzemosPizza	-8.5e-17	2.12e-17	-4.010	0.000	-1.27e-16	-4.34e-17
TotalAksam	3.66e-16	2.22e-17	16.496	0.000	3.23e-16	4.1e-16
TotalPaymentMethodType26	1.687e-16	2.29e-17	7.358	0.000	1.24e-16	2.14e-16
TotalPizza	-2.689e-17	1.92e-17	-1.401	0.161	-6.45e-17	1.07e-17
AvgNetAmt	-7.36e-17	7.62e-19	-96.543	0.000	-7.51e-17	-7.21e-17
TotalOrderTypeD	1.0000	3.36e-17	2.97e+16	0.000	1.000	1.000
TotalOrderTypeC	1.0000	4.51e-17	2.22e+16	0.000	1.000	1.000

Omnibus:	1797.847	Durbin-Watson:	1.991
Prob(Omnibus):	0.000	Jarque-Bera (JB):	3131.666
Skew:	0.405	Prob(JB):	0.00
Kurtosis:	4.200	Cond. No.	1.42e+03

Diğer kümelere ait regresyon sonuçlarında TotalOrderTypeD başka bir anlatımla, evlere servis sipariş değeri, çoğunlukla 10'un üzerinde çıktığı için bu değişken, bağımsız değişkenlerden çıkartılmıştır ve bağımlı değişken olarak kullanılmıştır. Bu değişkenin yerine TotalOrderTypeC diğer bir deyişle, gel al ve masaya servis siparişleri bağımsız değişken olarak kullanılmıştır. Bu doğrultuda yeni VIF sonuçları Şekil 10'da gösterilmiştir.

Şekil 10: A1 kümesi VIF Değerleri

	VIF Factor	features
0	2.51	Recency
1	1.91	TotalWeb
2	1.35	TotalSides
3	1.03	TotalDublex
4	1.14	TotalVegiPizza
5	1.29	TotalKucukPizza
6	1.56	TotalKarisikPizza
7	1.53	TotalBolMalzemosPizza
8	2.25	TotalAksam
9	2.29	TotalPaymentMethodType26
10	7.55	TotalPizza
11	5.88	AvgNetAmt
12	1.32	TotalOrderTypeC

Her değişkenin faktör değeri istenilen sınırlar içinde kaldığı için bir sonraki aşama olan çoklu regresyon sonuçları Şekil 11'de incelenmiştir.

Şekil 11: A1 Kümesi İçin Yeniden Oluşturulan Çoklu Regresyon Analizi

OLS Regression Results

Dep. Variable:	CountOrder	**R-squared (uncentered):**	0.910
Model:	OLS	**Adj. R-squared (uncentered):**	0.910
Method:	Least Squares	**F-statistic:**	2.779e+04
Date:	Wed, 27 May 2020	**Prob (F-statistic):**	0.00
Time:	11:28:46	**Log-Likelihood:**	-14019.
No. Observations:	35883	**AIC:**	2.806e+04
Df Residuals:	35870	**BIC:**	2.817e+04
Df Model:	13		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Recency	0.0008	1.43e-05	55.392	0.000	0.001	0.001
TotalWeb	0.2489	0.003	72.567	0.000	0.242	0.256
TotalSides	0.0572	0.002	24.973	0.000	0.053	0.062
TotalDublex	-0.0121	0.013	-0.952	0.341	-0.037	0.013
TotalVegiPizza	-0.0397	0.007	-5.748	0.000	-0.053	-0.026
TotalKucukPizza	0.0658	0.003	19.556	0.000	0.059	0.072
TotalKarisikPizza	0.0980	0.004	27.640	0.000	0.091	0.105
TotalBolMalzemosPizza	0.0561	0.003	16.908	0.000	0.050	0.063
TotalAksam	0.2273	0.003	69.520	0.000	0.221	0.234
TotalPaymentMethodType26	0.3309	0.003	105.127	0.000	0.325	0.337
TotalPizza	0.1300	0.003	44.328	0.000	0.124	0.136
AvgNetAmt	0.0041	0.000	34.772	0.000	0.004	0.004
TotalOrderTypeC	0.0692	0.005	13.600	0.000	0.059	0.079

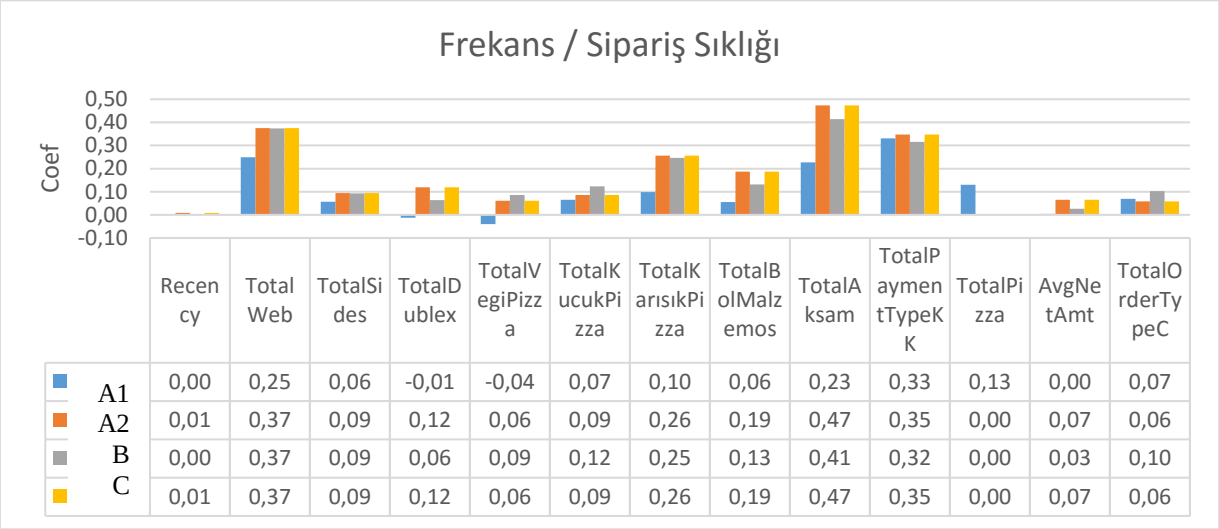
Omnibus:	1483.128	**Durbin-Watson:**	1.947
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	2892.746
Skew:	0.310	**Prob(JB):**	0.00
Kurtosis:	4.245	**Cond. No.**	1.42e+03

A1 kümesi için yapılan regresyon çalışmasında R^2 değeri 0,91 olarak çıkmıştır. Değişkenler içerisinde gözlenen en yüksek değerler, ödeme yöntemi, web siparişi ve akşam siparişi olmuştur. Frekans ile ters yönlü ilişkide olan değişkenler ise çift katlı taban ve etsiz pizza siparişleri olmuştur.

A1 kümesi özelinde paylaşılan çoklu regresyon analiz süreci diğer kümelerde de aynı şekilde yapılmış olup bundan sonraki bölümlerde her küme için aynı analizleri paylaşmak yerine tüm kümeler üzerindeki sonuçları toplu şekilde gösterilecektir.

Bağımsız değişkenlere ait değerlerin tüm kümeler üzerindeki dağılımı Şekil 12'de gösterilmiştir. En yüksek değerlerin akşam ve internet siparişleri ile kredi kartıyla ödeme yönteminde olduğu gözlenmiştir.

Şekil 12: Bağımlı Değişken: Frekans / Sipariş Sıklığı Olmak Üzere Çoklu Regresyon Analizi



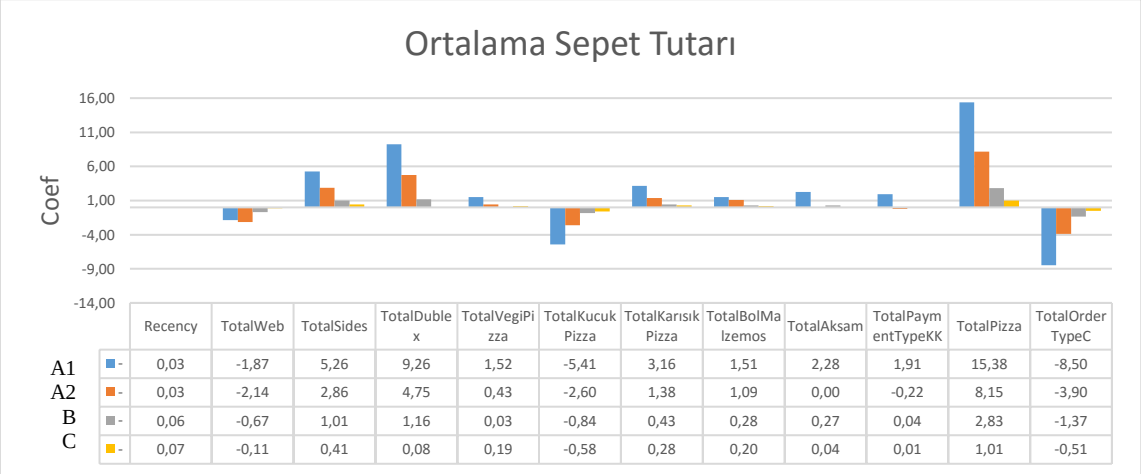
	Recency	Total Web	TotalSides	TotalDublex	TotalVegiPizza	TotalKucukPizza	TotalKarısıkPizza	TotalBolMalzemos	TotalAksam	TotalPaymentTypeKK	TotalPizza	AvgNetAmt	TotalOrderTypeC
A1	0,00	0,25	0,06	-0,01	-0,04	0,07	0,10	0,06	0,23	0,33	0,13	0,00	0,07
A2	0,01	0,37	0,09	0,12	0,06	0,09	0,26	0,19	0,47	0,35	0,00	0,07	0,06
B	0,00	0,37	0,09	0,06	0,09	0,12	0,25	0,13	0,41	0,32	0,00	0,03	0,10
C	0,01	0,37	0,09	0,12	0,06	0,09	0,26	0,19	0,47	0,35	0,00	0,07	0,06

Kümeler üzerindeki dağılımına baktığımızda A1 kümesinin etsiz pizza seçimlerinde ters korelasyon ile hareket ettiği gözlenmektedir. Bununla beraber çift katlı taban gibi özellikli ürünlerde de aynı eğilim bulunmaktadır. A2 ve C kümelerinin ise akşam siparişlerinde en yüksek artış yapma potansiyelinin olduğu gözükmektedir. B kümesinin ayırt edici bağımsız değişken sonucu ise küçük boy pizza ve etsiz pizza artışlarında gözlenmiştir. Ayrıca gel al ve masaya servis siparişlerinde en fazla artış gösteren kümedir.

4.3.2. Bağımlı Değişken: Ortalama Sepet Tutarı Olmak Üzere Çoklu Regresyon Analizi

Bağımsız değişkenlere ait değerlerin kümeler üzerindeki dağılımı Şekil 13'de gösterilmiştir. En yüksek değerlerin pizza adedi ve çift katlı taban seçeneğinde olduğu gözlenmiştir. Bununla birlikte üç değişkende negatif yönlü hareket olmuştur. Bu üç değişken, internet siparişleri, küçük pizza ve gel al ve masaya servis siparişleridir.

Şekil 13: Bağımlı Değişken: Ortalama Sepet Tutarı Olmak Üzere Çoklu Regresyon Analizi



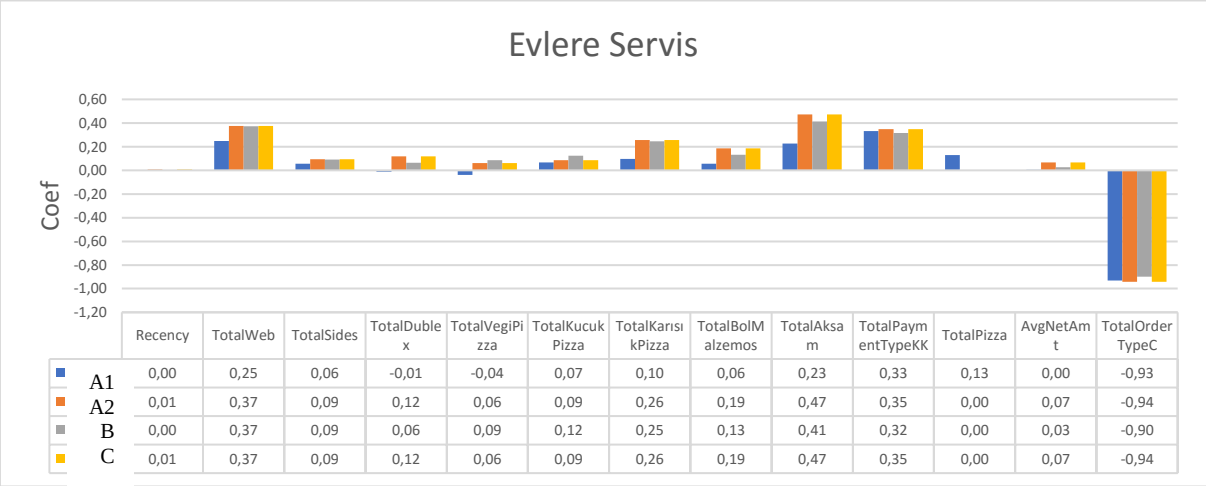
	Recency	TotalWeb	TotalSides	TotalDublex	TotalVegiPizza	TotalKucukPizza	TotalKarısıkPizza	TotalBolMalzemos	TotalAksam	TotalPaymentTypeKK	TotalPizza	TotalOrderTypeC
A1	0,03	-1,87	5,26	9,26	1,52	-5,41	3,16	1,51	2,28	1,91	15,38	-8,50
A2	0,03	-2,14	2,86	4,75	0,43	-2,60	1,38	1,09	0,00	-0,22	8,15	-3,90
B	0,06	-0,67	1,01	1,16	0,03	-0,84	0,43	0,28	0,27	0,04	2,83	-1,37
C	0,07	-0,11	0,41	0,08	0,19	-0,58	0,28	0,20	0,04	0,01	1,01	-0,51

Kümeler üzerindeki dağılımına baktığımızda A1 kümesinin internet siparişleri hariç tüm bağımsız değişkenler üzerinde en yüksek değere ulaştığı söylenebilir. En az sipariş veren küme olmasına rağmen fiyat ile ilgili bariyerlerin kaldırılması durumunda hem ürün hem de yan ürün tüketiminin en yüksek seviyede artacağı gözlenmiştir. Bu doğrultuda sadakat programları veya tekrar siparişlere ekstra indirim sağlanması gibi uygulamaların A1 kümesini teşvik edeceği düşünülmüştür. Benzer sonuçlar A2 için de söylenebilir.

4.3.3. Bağımlı Değişken: Evlere Servis Siparişleri Olmak Üzere Çoklu Regresyon Analizi

Bağımsız değişkenlere ait değerlerin kümeler üzerindeki dağılımı Şekil 14'da gösterilmiştir. En yüksek değerlerin akşam siparişleri, kredi kartı ile ödeme yöntemi ve internet siparişlerinde olduğu gözlenmiştir. Bununla birlikte gel al ve masaya servis değişkeninde negatif yönlü hareket tespit edilmiştir.

Şekil 14: Bağımlı Değişken: Evlere Servis Siparişleri Olmak Üzere Çoklu Regresyon Analizi



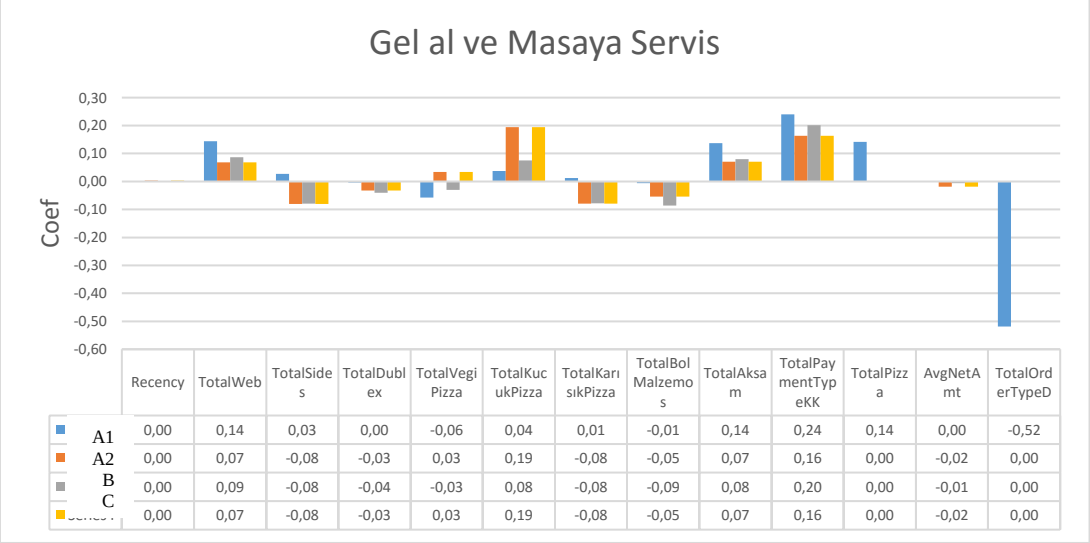
	Recency	TotalWeb	TotalSides	TotalDublex	TotalVegiPizza	TotalKucukPizza	TotalKarısıkPizza	TotalBolMalzemos	TotalAksam	TotalPaymentTypeKK	TotalPizza	AvgNetAmt	TotalOrderTypeC
A1	0,00	0,25	0,06	-0,01	-0,04	0,07	0,10	0,06	0,23	0,33	0,13	0,00	-0,93
A2	0,01	0,37	0,09	0,12	0,06	0,09	0,26	0,19	0,47	0,35	0,00	0,07	-0,94
B	0,00	0,37	0,09	0,06	0,09	0,12	0,25	0,13	0,41	0,32	0,00	0,03	-0,90
C	0,01	0,37	0,09	0,12	0,06	0,09	0,26	0,19	0,47	0,35	0,00	0,07	-0,94

Kümeler üzerindeki dağılımına baktığımızda A1 kümesinin etsiz pizza tercihlerindeki negatif eğilimin bağımlı değişkenin evlere servis olduğu siparişlerde de devam ettiği gözlenmiştir. A2 ve C kümeleri tüm bağımsız değişkenlerde aynı eğilimi göstermektedir. Bu durum diğer çoklu regresyon analizinde de geçerliliğini korumaktadır. Bu nedenle en az sipariş veren A2 kümesinin, en değerli C kümesi ile aynı davranış özellikleri sergiledikleri söylenebilir. B kümesinin küçük pizza ve etsiz pizza özelindeki yüksek değeri bu bağımlı değişken özelinde de devam etmektedir.

4.3.4. Bağımlı Değişken: Gel Al ve Masaya Servis Siparişleri Olmak Üzere Çoklu Regresyon Analizi

Bağımsız değişkenlere ait değerlerin kümeler üzerindeki dağılımı Şekil 15'de gösterilmiştir. En yüksek değerlerin kredi kartı ile ödeme yönteminde gözlenmiştir. Bununla birlikte özellikle etsiz pizzalarda ve küçük boy pizza değişkenlerinde kümeler arasında farklar oluştuğu gözlenmiştir.

Şekil 15: Bağımlı Değişken: Gel Al ve Masaya Servis Siparişleri Olmak Üzere Çoklu Regresyon Analizi



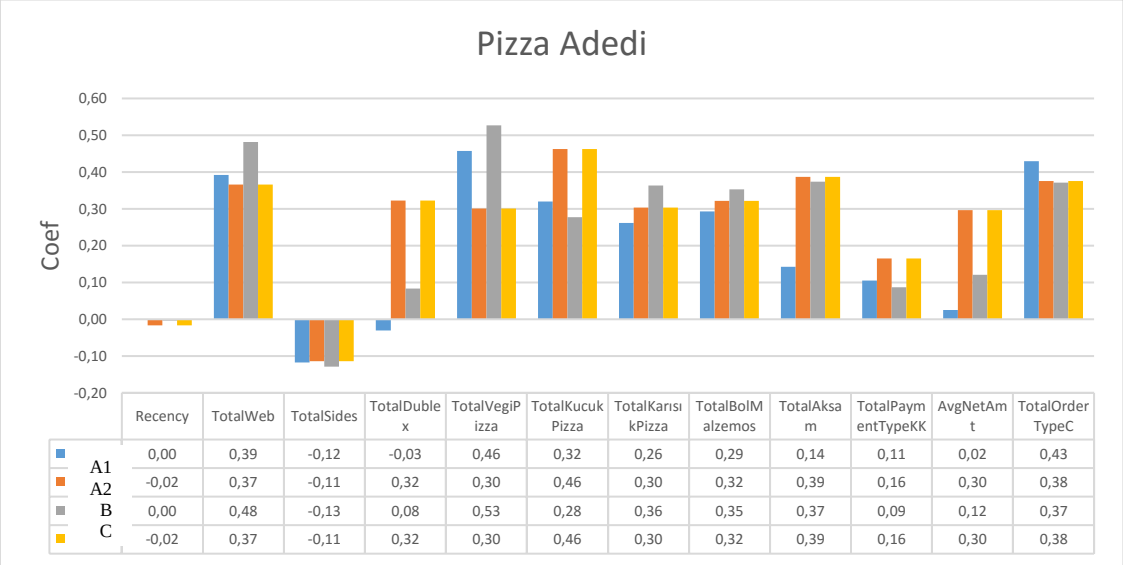
	Recency	TotalWeb	TotalSides	TotalDublex	TotalVegiPizza	TotalKucukPizza	TotalKarısıkPizza	TotalBolMalzemos	TotalAksam	TotalPaymentTypeKK	TotalPizza	AvgNetAmt	TotalOrderTypeD
A1	0,00	0,14	0,03	0,00	-0,06	0,04	0,01	-0,01	0,14	0,24	0,14	0,00	-0,52
A2	0,00	0,07	-0,08	-0,03	0,03	0,19	-0,08	-0,05	0,07	0,16	0,00	-0,02	0,00
B	0,00	0,09	-0,08	-0,04	-0,03	0,08	-0,08	-0,09	0,08	0,20	0,00	-0,01	0,00
C	0,00	0,07	-0,08	-0,03	0,03	0,19	-0,08	-0,05	0,07	0,16	0,00	-0,02	0,00

Kümeler üzerindeki dağılımına baktığımızda gel al ve masaya siparişlerde yan ürün kullanımının A1 kümesi hariç diğer tüm kümelerde negatif korelasyon ile hareket ettiği gözlenmiştir. Aynı şekilde özellikli ürün ve çok malzemeli pizzalarda da aynı eğilim devam etmiştir. Bu bağımlı değişken özelinde ortalama sepet tutarının düştüğü ve bu kanalı daha ucuz fiyat nedeniyle tercih edildiği söylenebilir. Bununla birlikte bu satış kanalında şube içerisinde internetten sipariş vererek beklemeden gel al kullanımının da arttığı gözlenmiştir ve akşam saatlerinde bu kanalda sipariş yoğunluğunun yaşanacağı söylenebilir.

4.3.5. Bağımlı Değişken: Pizza Adedi Olmak Üzere Çoklu Regresyon Analizi

Bağımsız değişkenlere ait değerlerin kümeler üzerindeki dağılımı Şekil 16'da gösterilmiştir. Yan ürün hariç hemen hemen tüm değişkelerde yüksek değerler gözlenmiştir. A1 kümesi çift katlı taban değişkeninde diğer kümelerden farklı yönde ilişki sergilemiştir.

Şekil 16: Bağımlı Değişken: Pizza Adedi Olmak Üzere Çoklu Regresyon Analizi



	Recency	TotalWeb	TotalSides	TotalDublex	TotalVegiPizza	TotalKucukPizza	TotalKarısıkPizza	TotalBolMalzemos	TotalAksam	TotalPaymentTypeKK	AvgNetAmt	TotalOrderTypeC
A1	0,00	0,39	-0,12	-0,03	0,46	0,32	0,26	0,29	0,14	0,11	0,02	0,43
A2	-0,02	0,37	-0,11	0,32	0,30	0,46	0,30	0,32	0,39	0,16	0,30	0,38
B	0,00	0,48	-0,13	0,08	0,53	0,28	0,36	0,35	0,37	0,09	0,12	0,37
C	-0,02	0,37	-0,11	0,32	0,30	0,46	0,30	0,32	0,39	0,16	0,30	0,38

Kümeler üzerindeki dağılımına baktığımızda ise B kümesinin bağımsız değişkenler üzerindeki dağılımı dikkat çekmektedir. Özellikle internetten sipariş, etsiz pizza siparişi, karışık pizza ve çok malzemeli pizza değişkenlerinde en yüksek değere ulaşmıştır. Bu küme özelinde internete yönelik ve özellikli ürün iletişiminin olduğu tutundurma faaliyetlerinin etkili olacağı düşünülmüştür. A2 ve C kümelerinin paralel hareketleri bu bağımlı değişken özelinde de devam etmekte olup A2 kümesinin potansiyelini bir kez daha ortaya koymaktadır.

5. SONUÇ VE ÖNERİLER

Teknolojik gelişmelerin artması ve internetin yaygınlaşmasına paralel olarak, veri madenciliği ve büyük veri yönetimi alanında geliştirilen teknikler, pazarlama faaliyetlerine her türlü veriyi anlık olarak takip etme imkanı sağlamıştır. İşletmeler bilginin ulaşılabilir olması, maliyetinin azalması ve dolayısıyla değerinin artması ve müşteri odaklı pazarlama anlayışının gelişmesiyle birlikte, ilişkide bulundukları müşteriler hakkında çeşitli verileri toplamak, depolamak ve bu verileri yararlı bir şekilde bilgiye dönüştürerek stratejiler geliştirmek amacıyla birtakım çalışmalara yönelmişlerdir.

Bu çalışmaları inceleyen veri tabanlı pazarlama sayesinde müşterilere ait verilerden yola çıkılarak etkili stratejiler geliştirilmektedir. İşte bu kapsam dahilinde yapılan uygulama hem büyük veri ile veri tabanlı pazarlama literatüründe farklı bir örnek oluştururken hem de uygulamacılara örnek bir model ve strateji belirleme metodolojisi sunmaktadır.

Pazar bölümleme ile ilgili literatürde en çok kullanılan ve Kotler'in ortaya atmış olduğu bölümleme kriterleri kullanılmıştır. Bunlar; demografik, coğrafik, psikografik ve davranışsal kriterlerdir. Veri setinin içeriği bakımından uygulama, coğrafik ve davranışsal bölümleme kriterlerinden oluşmaktadır. Yapılan çalışmalar davranışsal kriterlerin bölümleme açısından önemine vurgu yapmaktadır.

Literatürdeki çalışmalarda veri boyutunun sınırlı kalması, çalışmada kullanılan makine öğrenmesi ve kümeleme algoritmalarının istenilen performansta çalışmasına engel olmaktadır. Bu doğrultuda çalışmada kullanılan 24 milyon satır uzunluğundaki veri tabanı ve örneklem grubundaki 100.000 adet müşteri verisi, bu alanda yeni bir çalışmanın ilk adımını oluşturmaktadır. Bununla birlikte

veri tabanlı pazarlama literatüründe yapılan çalışmalar incelendiğinde, çalışmaların pazarlama süreçleri açısından sadece bir bölümü kapsadığı dikkat çekmektedir. Bu açıdan bakıldığında yapılan çalışma hem büyük veri ile ilgili adımları kapsarken, bununla birlikte müşteri kümelerinin oluşturulması, belirlenen kümelerin ileriye yönelik davranış modellerinin belirlenmesi için yapılan çoklu regresyon analizleri ve son olarak bu veriler ışığında belirlenmiş kümelere yönelik pazarlama karmalarının oluşturulması adımları ile uçtan uça tüm süreçleri kapsamaktadır.

Literatürde en çok kullanılan kümeleme algoritmalarının test edildiği bu uygulamada, DBSCAN algoritmasının, uygulamada kullanılan veri setine uygun olmaması nedeniyle kümeleme analizinde tüm verinin %91'ini bir kümeye atarak geri kalan veriler, outlier farklı bir ifade ile aykırı olarak sınıflandırılmıştır. Bu doğrultuda içerisinde demografik verinin bulunmadığı, davranışsal özelliklerin verinin anakütlesini oluşturduğu çalışmalarda K Means veya Gauss Karışım (Gaussian Mixture) gibi algoritmaların daha iyi sonuç verdiği gözlenmiştir.

Küme sayısı, bölümlendirme için önemli bir etken olarak dikkat çekmektedir. Farklı yöntemlerle birlikte, pazar hakkında bilgi sahibi olarak da belli tahminlerde bulunulabilmektedir. En yaygın kullanılan yöntemlerden biri olan Elbow yöntemi, bir fikir vermekle birlikte kesin bir sonuç ortaya koymamaktadır. Bu nedenle, farklı küme sayılarına göre kümeleme analizleri yapılmasının ve çıkan sonuçları karşılaştırılmasının en güvenilir yöntem olduğu düşünülmüştür. Bununla birlikte K means algoritmasında her farklı küme sayısı için ayrı ayrı analizlerin yapılması gerekmektedir. Bu durum, çalışmanın süresini arttırmakta ve fakat çıkan sonuçları gözlemlemek açısından, bir nevi oluşan kümelerin sağlamasını yapma imkanı sağlamaktadır.

Uygulama sonuçlarından ve analizlerinden yola çıkarak aşağıdaki çıkarımlar yapılmıştır:

Ürün yelpazenin daha dar olduğu ve ana ürünün pizza olduğu bu uygulamada coğrafi özelliklerin kümeleme analizinde farklılık yaratmadığı gözlenmiştir. Bu doğrultuda ürün çeşitliliğinin fazla olduğu e-ticaret veya market sektörlerinde coğrafi özeliklerin daha fazla önem kazanacağı düşünülmüştür.

• Evlere servis siparişi ile internetten sipariş verme eğiliminin arttığı gözlemlenen bu çalışmada müşterilere, sadece hızlı olmanın yetmediği aynı zamanda tüm kanallardan sipariş verebileceğinin iletişiminin de önemli hale geldiği tespit edilmiştir.

• Artan internet siparişleriyle birlikte kredi kartı kullanımın da arttığı gözlemlenen bu çalışmada, anlaşmalı kurumlar ve bankalar aracılığı ile yapılacak çalışmaların, bu kanaldaki trafiği arttıracağı gözlenmiştir. İşletmeler açısından azalan nakit para akışının bankalar aracılığı ile toplanması, kuryelerin gün sonlarındaki hesap kapama işlemlerini, müşteri ile para üstü trafiğini azaltsa da işletmeler açısından banka komisyonlarının giderek artması, olumsuz etki olarak gözükmektedir.

• Gel al ve masaya servis tercih eden kümelerin, daha ekonomik olması sebebiyle bu kanalı tercih ettiği gözlemlenmiştir. Bununla birlikte, tüm kümelerde genel çoğunluğun evlere servis siparişleri oluşturduğu; ancak hala geleneksel kanalların tercih edildiği ve bu kanallara yatırım yapılması gerektiği düşünülmüştür.

• Ürün anlamında inovasyon çalışmalarının her kümeye hitap etmese bile müşterilerin gözünde yenilikçi bir iletişim olması açısından önemli bir tutundurma faaliyeti olduğu söylenebilir. Özellikle frekansın arttığı kümelerde, bu tarz ürünlerin tüketiminin çok fazla olduğu gözlenmiştir. Ancak etsiz pizza gibi daha kısıtlı tüketimi olan ürünlerin toplam satışın içerisinde payı az olsa da, menü çeşitliliği ve her kesime hitap edilebilmesi açısından işletmenin dikkate aldığı gözlenmiştir. Bununla birlikte günümüzde teknolojinin gıda ürünlerinin yapımına etkisi düşünüldüğünde, artık "Beyond Meat" gibi oluşumların bitkilerden oluşturdukları yapay et üretimiyle sadece et tüketmeyen müşteri kitlesine değil, kitlesel üretime karşı duruş sergileyen kesime de hitap eden yeni ürün geliştirdikleri bilinmektedir. Bugün birçok hızlı tüketim gıda pazarındaki büyük aktör, bu bitki bazlı etleri menülerine eklemeye başlamışlardır.

Çalışmanın önemli kısıtı, büyük verinin sadece bir firmaya ait olması ve firmanın sadece bir yıllık verilerinin kullanılarak çalışmanın gerçekleştirilmesidir. Bir diğer kısıt ise, bölümleme kriterlerinden sadece coğrafik ve davranışsal bölümleme kriterlerinin kullanılmış olmasıdır. Bunun temel sebebi ise KVKK kapsamında, veri setinde hiçbir demografik verinin bulunmamasından kaynaklanmaktadır. Bu doğrultuda yapılan analizlerde yaş, cinsiyet, eğitim durumu vb. kriterlerin kümeler üzerindeki dağılımları ve bu kriterlerdeki davranış modelleri ortaya konulamamıştır.

Kümeleme çalışmaları, veri bilimi ve analiz tekniklerinin gelişimiyle günümüzde artık her bir müşterinin kendisine özgü ve sadece kendisini kapsayan bir küme şeklinde detaylı bir alana doğru evrilmektedir. Bu doğrultuda benzerliklerden ziyade farklılıklar üzerinden yola çıkılarak yeni akademik çalışmaların yapılabileceği düşünülmüştür.

KAYNAKÇA

Alpaydın, E. (2013). Yapay Öğrenme (2. Baskı). İstanbul: Boğaziçi Üniversitesi Yayınevi.

Calinski, T. Harabasz, J. (1974). A dendrite method for cluster analysis. *Communication in Statistics*. 3(1): 1-27.

Canepa, G.A. (2016). What You Need To Know About Machine Learning. Birmingham: Packt Publishing.

Chaffey, D. (2009). E-Business and E-Commerce Management: Strategy Implementation and Practice, London: Pearson Prentice Hall.

Cui, G. Wong, M.L. Lui, H. (2006). Machine learning for direct marketing response models: bayesian networks with evolutionary programming. *Management Science*. 52(4): 597-612.

Davies, D.L. Bouldin, D.W. (1979). A cluser separation measure. *IEEE Transactions On Pattern Recognition and Machine Intelligence*. 1(2): 224-227.

Dibb, S. Meadows, M. (2004). Relationship marketing and CRM: a financial services case study. *Journal of Strategic Marketing*. 12(2): 111-125.

Durmuş, M.S. İplikçi, S. (2007). Veri kümeleme algoritmalarının performansları üzerine karşılaştırılmalı bir çalışma. Akademik Bilişim Konferansı Bildirileri. 393-400.

Gülcan, B. (2000). Sadık müşteri yaratabilme ve sürekli satış yapabilmenin yolu: veri tabanlı pazarlama. *Ticaret ve Turizm Eğitim Fakültesi Dergisi*. 3: 27-48.

Harrigan, K.R. (1985). An application of clustering for strategic group analysis. *Strategic Management Journal*. 6(1): 55-73.

Haşıloğlu, S.B. Sezgin, M. Bardakçı, A. (2008). Hizmet sektöründeki veritabanlı pazarlama araştırmalarının değerlendirilmesi. *KMU İİBF Dergisi*. 10(14): 228-240.

Hoda, M. Jocumens G. (2003). How to implement marketing strategies using database approaches? *Journal of Database Marketing & Customer Strategy Management.* 11(2): 135-148.

Jackson, R. Wang, P. (1996). Strategic Database Marketing. İllinois: NTC Publishing Group.

Kantardzic, M. (2011). Data Mining: Concepts Models Methods And Algorithms. New Jersey: John Wiley & Sons Inc.

Ketchen, D. Shook, C.L. (1996). The application of cluster analysis in strategic management research: an analysis and critique. *Strategic Management Journal*. 17(6): 441-458.

Kordinariya, T.M. Makwana, P.R. (2013). Review on determining number of cluster in k-means clustering. *International Journal of Advance Research in Computer Science and Management Studies*. 1(6): 90-95.

Koslowsky, S. (1999). Reducing your risk: whats's happening in retail database marketing. *Direct Marketing*. 61(9): 40-43.

Kotler, P. Armstrong, G. (1999). Principles of Marketing (8. Baskı). New Jersey: Prentice Hall.

Lantz, B. (2013). Equidistance of likert-type scales and validation of inferential methods using experiments and simulations. *Electronic Journal of Business Research Methods*. 11(1): 16-28.

MacQueen, J.B. (1967). Some methods for classification and analysis of multivariate observations. Proceedings of Fifth Berkeley Symposium on Mathematical Statistics And Probability. University of California. 1: 281-297.

Mohri, M. Rostamizadeh, A. Talwalkar, A. (2012). Foundations of Machine Learning. London: MIT Press.

Rousseeuw, P.J. (1987). Silhouettes: a graphical aid to the interpretation and validation of cluster analysis. *Journal of Computational and Applied Mathematics.* 20: 53-65.

Sambamoorti, N. (1999). Hierarchical cluster analysis: some basics and algorithms. http://www.crmportals.com/hierarchical_cluster_analysis.pdf. (Erişim Tarihi: 11/12/2019)

Turing, A. (1950). Computing machinery and intelligence: mind. *Quarterly Review of Psychology and Philosophy*. 236(59): 433-460.

Verhoef, P.C. Spring, P.N. Hoekstra, J.C. Leeflang, P.S.H. (2003). The commercial use of segmentation and predictive modeling techniques for database marketing in the Netherlands. *Decision Support Systems*. 34(4): 471-481.

Yılmaz, Ş. Patır, S. (2011). Kümeleme analizi ve pazarlamada kullanımı. *Akademik Yaklaşımlar Dergisi*. 2(1): 91-113.

EKLER

Ek 1: Özelliklere Ait Açıklamalar

Özelliklere Ait Başlıklar	Anlamı	Açıklaması
%GT CustomerID	Toplam Müşteri içindeki Oranı	Küme içerisindeki müşteri sayısının toplam müşteri sayısına oranı
%GT TotalNetAmt	Ciro İçindeki Oranı	Küme içindeki müşterilerin oluşturduğu cironun, genel toplama oranı
Average of CountOrder	Frekans / Sipariş Sıklığı	Küme içindeki toplam alışveriş sayısının, küme içindeki müşteri sayısına oranı

Average of Recency	Son Sipariş Zamanı	Küme içindeki müşterilerin en son alışveriş yapma tarihinden, veri setindeki son tarihe kadar geçen sürenin küme içindeki ortalaması
Average of AvgNetAmt	Ortalama Sepet Tutarı / ATP	Küme içindeki müşterilerin ortalama sepet tutarlarının ortalaması
WebInTotal	Web Sipariş Oranı	Küme içindeki müşterilerin internetten yaptıkları alışverişlerin bütün yaptıkları alışverişe oranı
%GT TotalPizza	Toplam Pizza İçindeki Oranı	Küme içinde alınan Pizza sayısının bütün müşteriler tarafından alınan pizza sayısına oranı
SidesInTotal	Yan Ürün Oranı	Küme içindeki alınan yan ürün sayısının yapılan sipariş sayısına oranı
BuyukPizzaInTotal	Büyük Pizza	Küme içinde alınan büyük pizza sayısının toplam pizza sayısına oranı
KucukInTotal	Küçük Pizza	Küme içinde alınan küçük pizza sayısının toplam pizza sayısına oranı
ÇiftkatlıtabanInTotal	Çift Katlı Taban Oranı	Küme içinde alınan çift katlı özellikli tabanın bu küme içindeki toplam pizza alımına oranı
EtsizPizzaInTotal	Etsiz Pizza Oranı	Küme içindeki alınan etsiz pizza sayısının toplam alınan pizza sayısına oranı
AzmalzemeliPizzaInTotal	Az Malzemeli Pizza	Küme içinde alınan az malzemeli (7 malzemeli) pizza sayısının toplam pizza sayısına oranı
ÇokmalzemelipizzanTotal	Çok Malzemeli Pizza	Küme içinde alınan çok malzemeli (13 malzemeli) pizza sayısının toplam pizza sayısına oranı
KarisikInTotal	Karışık Pizza	Küme içinde alınan ismi karışık (7 malzemeli) olan pizza sayısının toplam pizza sayısına oranı
OgleInTotal	Öğlen Sipariş Oranı	Küme içindeki 16:00'a kadar verilen sipariş sayısının toplam verilen sipariş sayısına oranı
AksamInTotal	Akşam Sipariş Oranı	Küme içindeki 16:00 ile 22:00 arasında verilen sipariş sayısının toplam verilen sipariş sayısına oranı
GeceInTotal	Gece Sipariş Oranı	Küme içindeki 22:00'den sonra verilen sipariş sayısının toplam verilen sipariş sayısına oranı
PaymentMethodType26InTotal	Kredi Kartı ile Ödeme Oranı	Kredi Kartı kullanılan sipariş sayısının toplam sipariş sayısına oranı
D0InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 0-15 TL arasında olan müşterilerin oranı
D1InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 15-30 TL arasında olan müşterilerin oranı
D2InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 30-45 TL arasında olan müşterilerin oranı
D3InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 45-60 TL arasında olan müşterilerin oranı
D4InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 60-75 TL arasında olan müşterilerin oranı
D5InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 75-90 TL arasında olan müşterilerin oranı
D6InTotal	Evlere Servis Tutarı	Evlere servis sipariş tutarı 90 TL ve üzeri olan müşterilerin oranı
C0InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 0-15 TL arasında olan müşterilerin oranı
C1InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 15-30 TL arasında olan müşterilerin oranı
C2InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 30-45 TL arasında olan müşterilerin oranı

C3InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 45-60 TL arasında olan müşterilerin oranı
C4InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 60-75 TL arasında olan müşterilerin oranı
C5InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 75-90 TL arasında olan müşterilerin oranı
C6InTotal	Gel al&Masaya Servis Tutarı	Gel al ve masaya servis sipariş tutarı 90 TL ve üzeri olan müşterilerin oranı
IstanbulInTotal	İstanbul Siparişleri	İstanbul'dan sipariş verenlerin oranı
AnkaraInTotal	Ankara Sipairşleri	Ankara'dan sipariş verenleri oranı
BursaInTotal	Bursa Siparişleri	Bursa'dan sipariş verenlerin oranı
IzmirInTotal	İzmir Siparişleri	İzmir'den sipariş verenlerin oranı
AntalyaInTotal	Antalya Siparişleri	Antalya'dan sipariş verenlerin oranı
AkdenizInTotal	Akdeniz Bölge Siparişleri	Akdeniz Bölgesinden verilen siparişlerin oranı
DoguAnadoluInTotal	Doğu Anadolu Bölge Siparişleri	Doğu Anadolu Bölgesinden verilen siparişlerin oranı
EgeInTotal	Ege Bölge Siparişleri	Ege Bölgesinden verilen siparişlerin oranı
GuneydoguInTotal	Güneydoğu Bölge Siparişleri	Güneydoğu Anadolu Bölgesinden verilen siparişlerin oranı
IcAnadoluInTotal	İç Anadolu Bölge Siparişleri	İç Anadolu Bölgesinden verilen siparişlerin oranı
KaradenizInTotal	Karadeniz Bölge Siparişleri	Karadeniz Bölgesinden verilen siparişlerin oranı
MarmaraInTotal	Marmara Bölge Siparişleri	Marmara Bölgesinden verilen siparişlerin oranı
PazartesiInTotal	Pazartesi Oranı	Pazartesi günü sipariş verenlerin oranı
SaliInTotal	Salı Oranı	Salı günü sipariş verenlerin oranı
CarsambaInTotal	Çarşamba Oranı	Çarşamba günü sipariş verenlerin oranı
PersembeInTotal	Perşembe Oranı	Perşembe günü sipariş verenlerin oranı
CumaInTotal	Cuma Oranı	Cuma günü sipariş verenlerin oranı
CumartesiInTotal	Cumartesi Oranı	Cumartesi günü sipariş verenlerin oranı
PazarInTotal	Pazar Oranı	Pazar günü sipariş verenlerin oranı

Ek 2: Tüm Özelliklerin Veri Setinde Bulunduğu Dörtlü Küme Sonuçları

4 Kmeans	**A**	**B**	**X**	**C**
%GT CustomerID	85,00%	13,24%	0,01%	1,74%
%GT TotalNetAmt	50,70%	35,32%	0,55%	13,43%
Average of CountOrder	1,56	7,12	157,86	20,95
Average of Recency	157,76	59,85	8,86	27,23
Average of AvgNetAmt	35,59	35,27	52,61	34,35
WebInTotal	49,42%	65,27%	76,74%	67,02%
%GT TotalPizza	51,30%	35,82%	0,55%	12,32%
SidesInTotal	41,67%	49,01%	15,48%	62,03%
BuyukPizzaInTotal	19,17%	20,08%	66,17%	19,06%
KucukInTotal	15,09%	16,14%	26,56%	18,92%
ÇiftkatlıtabanInTotal	1,43%	2,65%	0,00%	5,12%

EtsizPizzaInTotal	4,49%	5,53%	1,48%	7,59%
AzmalzemeliPizzaInTotal	24,00%	24,52%	75,85%	22,63%
ÇokmalzemelipizzanTotal	21,08%	19,79%	1,91%	17,57%
KarisikInTotal	17,01%	11,39%	0,18%	10,87%
OgleInTotal	23,32%	24,08%	35,29%	25,71%
AksamInTotal	58,70%	59,20%	50,05%	55,29%
GeceInTotal	17,98%	16,71%	14,66%	18,99%
PaymentMethodType26InTotal	57,80%	49,79%	88,14%	50,62%
D0InTotal	1,95%	2,63%	2,26%	3,52%
D1InTotal	36,52%	38,38%	1,00%	42,25%
D2InTotal	32,46%	29,91%	0,90%	28,08%
D3InTotal	9,74%	9,54%	0,09%	8,91%
D4InTotal	4,44%	4,53%	0,00%	4,43%
D5InTotal	1,16%	1,23%	0,00%	1,19%
D6InTotal	0,07%	0,07%	6,70%	0,21%
C0InTotal	2,59%	3,04%	27,06%	2,67%
C1InTotal	6,08%	5,98%	44,34%	5,11%
C2InTotal	2,75%	2,57%	13,30%	1,90%
C3InTotal	0,95%	0,97%	2,99%	0,68%
C4InTotal	0,32%	0,31%	1,18%	0,24%
C5InTotal	0,10%	0,08%	0,09%	0,08%
C6InTotal	0,07%	0,07%	6,70%	0,21%
IstanbulInTotal	37,95%	39,35%	55,48%	42,33%
AnkaraInTotal	10,07%	10,35%	11,22%	8,51%
BursaInTotal	4,94%	5,17%	22,17%	6,22%
IzmirInTotal	7,39%	7,51%	10,41%	8,08%
AntalyaInTotal	3,14%	4,05%	0,18%	3,21%
AkdenizInTotal	8,81%	8,92%	0,18%	6,40%
DoguAnadoluInTotal	1,68%	1,43%	0,00%	1,37%
EgeInTotal	12,88%	13,19%	10,41%	13,42%
GuneydoguInTotal	2,97%	2,54%	0,00%	2,40%
IcAnadoluInTotal	14,50%	14,40%	11,22%	11,62%
KaradenizInTotal	6,53%	5,28%	0,00%	6,40%
MarmaraInTotal	52,64%	54,24%	78,19%	58,39%
PazartesiInTotal	13,79%	14,05%	17,19%	14,83%
SaliInTotal	12,21%	12,51%	13,85%	13,29%
CarsambaInTotal	13,54%	13,97%	12,13%	14,25%
PersembeInTotal	14,87%	15,40%	17,83%	15,57%
CumaInTotal	14,90%	15,34%	13,21%	15,23%
CumartesiInTotal	13,62%	12,71%	13,57%	12,08%
PazarInTotal	17,07%	16,02%	12,22%	14,75%

Ek 3: Tüm Özelliklerin Veri Setinde Bulunduğu Dörtlü Küme Sonuçları

2 Kmeans	**A1**	**A2**
%GT CustomerID	63,99%	36,01%
%GT TotalNetAmt	75,21%	24,79%
Average of CountOrder	2,2	1,41
Average of Recency	36,87	33,30
Average of AvgNetAmt	73,91	284,68
WebInTotal	54,76%	47,27%
%GT TotalPizza	74,23%	25,77%
SidesInTotal	43,06%	43,62%
BuyukPizzaInTotal	19,46%	18,88%
KucukInTotal	16,02%	12,98%
ÇiftkatlıtabanInTotal	1,59%	1,52%
EtsizPizzaInTotal	4,75%	4,51%
AzmalzemeliPizzaInTotal	24,53%	23,26%
ÇokmalzemelipizzanTotal	20,00%	23,40%
KarisikInTotal	15,12%	17,67%
OgleInTotal	23,39%	23,27%
AksamInTotal	59,12%	59,04%
GeceInTotal	17,48%	17,69%
PaymentMethodType26InTotal	55,35%	58,30%
D0InTotal	1,71%	3,40%
D1InTotal	35,05%	41,62%
D2InTotal	32,37%	30,81%
D3InTotal	10,28%	8,23%
D4InTotal	5,02%	3,27%
D5InTotal	1,27%	0,85%
D6InTotal	0,09%	0,05%
C0InTotal	2,31%	3,19%
C1InTotal	6,55%	4,70%
C2InTotal	2,96%	2,22%
C3InTotal	1,02%	0,72%
C4InTotal	0,36%	0,30%
C5InTotal	0,09%	0,09%
C6InTotal	0,09%	0,05%
IstanbulInTotal	37,94%	38,84%
AnkaraInTotal	10,16%	10,18%
BursaInTotal	5,12%	4,15%
IzmirInTotal	7,20%	7,09%
AntalyaInTotal	3,56%	3,25%
AkdenizInTotal	8,48%	8,95%
DoguAnadoluInTotal	1,71%	1,68%
EgeInTotal	13,16%	12,50%
GuneydoguInTotal	2,87%	3,04%

IcAnadoluInTotal	14,42%	15,08%
KaradenizInTotal	6,41%	6,39%
MarmaraInTotal	52,96%	52,36%
PazartesiInTotal	13,63%	14,23%
SaliInTotal	12,29%	11,88%
CarsambaInTotal	13,50%	13,33%
PersembeInTotal	14,75%	15,70%
CumaInTotal	15,04%	14,60%
CumartesiInTotal	13,30%	14,44%
PazarInTotal	17,49%	15,82%

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

PERFORMANCE EVALUATION SYSTEMS AND LEADERSHIP

DOI: 10.17261/Pressacademia.2021.1410
JMML- V.8-ISS.2-2021(3)-p.112-120

Duygu Hidiroglu
Mersin University, Recreation Management Department, Mersin, Turkey.
duyguhdr@mersin.edu.tr, ORCID: 0000-0003-2647-8750

Date Received: March 10, 2021 **Date Accepted:** June 21, 2021

To cite this document
Hidiroglu, D., (2021). Performance evaluation systmes and leadership. Jounral of Management, Marketing and Logistics (JMML), 8(2), 112-120.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2021.1410

ABSTRACT

Purpose- This study aims that the performance evaluation systems practiced by associating the leadership concept and the performance evaluation system will make significant contributions to the academic literature. Additionally, the study is expected to help leaders with understanding the importance of performance evaluation systems in the business world and its contributions to the development of a successful business leadership, and to propose leaders some useful suggestions on how performance evaluation systems can be executed successfully.

Methodology- In this study, first of all, the concept of performance evaluation and why performance evaluation systems should be applied in companies are discussed. Then, the importance of performance evaluation systems in the company for leaders and their contribution to management systems are explained. It has been mentioned how performance evaluation systems and in which departments of an organization should be used mostly to reach organizational success. Then, the performance evaluation process and methods are explained. In the final part, the features of an accomplished performance evaluation system necessary for accomplished leaders to establish an effective leadership system in the organization are explained and the implications of problems encountered in the performance evaluation systems that prevent the accomplishment in business leadership are discussed.

Findings- The factors that many businesses have control over are simply the conditions within their own business organization. In fact, it is still not possible to say that many business leaders have 100% control over these factors. This is where the importance of the concept of leadership is felt in a business organization. If a leader could maintain performance evaluation system and manage the employee's performance system in an effective manner, it will not be difficult or a coincidence for him to achieve success in organization.

Conclusion- The most important point of the performance evaluation is that it is not the person who is evaluated, but the value of his performance. Leaders should distinguish the performances of employees by establishing an effective and objective performance evaluation system and act according to the results. This will both motivate the employee to work and enable the establishment of a healthy organizational structure.

Keywords: Performance evaluation system, leadership, performance management, performance evaluation methods, employee performance.
JEL Codes: M10, L20, L25.

1. INTRODUCTION

The ups and downs in the economy and the uncertainties in the stock market are increasing day by day. In addition, new technologies continue to develop rapidly, which can completely override integrated business models with advanced technology overnight. Sometimes technological developments that completely eliminate the functionality of business models, and sometimes only the presence of strong competitors in the competitive environment can cause this rapid change. Unfortunately, companies often do not have the control to suppress the power of their competitors.

Pople who have the sole control over the faciltiies of a business organization and its performance management system are called as the leaders, and if the leaders manage the organizations and provide effective and efficient performance evaluation systems in the organization, they can take organization under their control successfully and the organizations reach the success in business facilities. The leader, like a conductor, skillfully determines the rhythm of the music in the establishment; sometimes he directs

the music as he wishes, sometimes by a fast rhythm and sometimes in a slow tempo, with his baton swinging in his hand in naive movements.

If a leader aims to have successful and high-performing company, the leaders should focus on the performance of the employees and these employees ashould be particularly interested and inspired by middle managers in the light of business strategies that the leader has set for the company. Recent studies argue that ensuring the commitment of employees to the organization and improving the performance of employees in the company depends on establishing the right communication among organizational levels.

Proformance issues in organizations, organizational level business communication and organizational commitment have gained more significance today, especially during the Covid-19 pandemic period. Leaders who desire to reach the organizational achievement that they aim about company performance, provide and sustain employees' motivation and increase their loyalty to the organization. To do that tle leaders also should develop good relations with senior and middle-level managers as well and have set effective communication business channels in an organizational structure.

Especially the most common mistake of those who work in difficult conditions such as the conditions of the current pandemic, and perhaps all of us, is to protect ourselves from each other. We usually waste our time and energy for this. I say wasted; Because this approach does not do much other than weakening the strength of our business. In fact, by doing so, the organization's resources are transferred to useless work without realizing it. However, if employees feel safe within the business organization by avoiding anxiety and worry, they can comfortably combine their talents and strengths to achieve a single goal. In this way, it can be easily focused on a single point in order to overcome the dangers outside and seize the opportunities discovered and transfer the resources of the enterprise to the right place despite all the difficulties.

2. LITERATURE

In short, the most fundamental role of a leader by making his employees in his business feel safe within the organization; to try to solve whatever problem and concern they have and to make them feel belonging to the organization they are in. One of the best examples of implementing this is a technology company located in America (Sancino and Hudson, 2020: 723-724). The CEO of this New York-based company, the leader, asks the following question, which clearly sets out his approach to business employees: People are all having a hard time in the family (Haslam, Reicher and Platow, 2020: 396-404).

Would it be the first thing you did at such times to lay off your child with whom you worked at your business? The answer of this question; of course, none of people would ever do that. So why is it that the first thing we do when employees in our organization go wrong or worry and underperform is firing them?

This company in the example is a company that has achieved sustainable success in its sector for many years, and contrary to what you all think, it has implemented a lifelong employment policy and it is seen that its business performance was not affected negatively by this practice. All employees are confident that when they start at the company they will never be fired for poor performance (Rozi et al., 2020:55-56). They know that there are experts to coach them when there are problems with their performance and they are ready to provide them with the necessary support.

Here is a general accepted definition of an accomplished leader. The managers have such an imitable vision of future of the company and business facilities are called as successful business leaders (Alrowwad and Abualoush, 2020: 196-222). Hence these accomplished managers usually prefer to make sacrifices in order for their employees to be safe and protected, and by ensuring that their employees gain profit under all circumstances. They firmly maintain them the believes that they will threaten them like their families and do the sacrifice required for their business without hesitation. These are what all employees expect from their leaders do.

Leaders should have innovative features. Leaders improve the innovative approaches and facilities in the companies. Leaders must face all possible difficulties that they may encounter while integrating innovative processes into the business level facilities. Leaders do not have to generate innovative ideas; but they must develop and encourage an innovative organizational culture which will allow these innovative products and services to emerge in the companies own organizational culture.

Leaders should ensure that employees at all levels no matter lower, middle or upper levels gain innovative vision and use their imagination to encourage innovation. Leaders are inspiring, and one of the most common methods of inspiring is the employee's question of "What can be done at any moment?" rather than just accepting what is a reality. They encourage their employees or followers asking continuous questions and they support their followers' questioning perspective and envision them.

Besides, leaders establish project teams to encourage teamwork in organizational culture where they bring together their employees from various perspectives and areas of expertise and organize brainstorming techniques. Leaders should set idea development workshops on various topics. In such teams, employees feel that their ideas are valued and are more motivated to develop innovative ideas, and it is ensured that the views of the employees are constantly improved. In addition, when advanced technology integrated systems are used during the idea development workshops, it is almost impossible to imitate the innovative products and services developed as a result of the innovative idea created by the rival companies.

When leaders act with the safety of employees in mind and makes them feel this. The leaders develop their sense of belonging to the organization they are in, allowing their employees to adopt the mission of their business as one of the personal goals about their lives. The performance of employees who chose to sacrifice their own individual comfort by sacrificing their comfort for the business in every job that needs to be completed allows unexpected extraordinary performance results and success to be achieved.

3.PERFORMANCE EVALUATION CONCEPT

Performance; is a concept that determines, quantitatively or qualitatively, what is obtained as a result of a purposeful and planned activity in general (Modi and Mishra, 2010: 549-551). Performance evaluation is the study aims at determining the actual success of the employees in a certain period and their development potential for the future (Narkunienė and Ulbinaitė, 2018:131-134). Performance evaluation process is a process that includes determining performance targets, measuring performance, providing feedback to the employee and motivating (Büyüközkan and Karabulut, 2018:263).

3.1. Purposes of Performance Evaluation

The main purpose of performance appraisal is to communicate the business mission to all employees, to examine the progress towards the business goals regularly and in a planned manner, to make a common discussion about what work will be done by the manager and the staff, how to achieve the desired results and the extent to which the goals agreed with the performance to reach understanding (Niiranen, 2008: 1221).

Performance Evaluation has two purposes. First goal is to learn about job performance. Management staff of an organization cannot and should not make managerial decisions without the information gained from performance evaluation. If it is desired to facilitate the management of the working unit and personal performance in relation to the organization objectives in a broader sense, first of all, information about the job performance should be obtained (Niiranen, 2008:1219). The second purpose of performance evaluation is to provide feedback on the extent to which employees approach the standards determined in job descriptions and job analyzes (Niiranen, 2008:1220). For example; Managerial decisions regarding remuneration policy, promotion system, professional development, job design and discipline, determination of recruitment criteria, training issues, other managerial activities are among the information obtained from performance evaluation (Behn, 2003).

3.2. Importance of Performance Evaluation

The performance evaluation provides some benefits to business leaders. Improving communication and the performance of individuals and the organizations, identifying the strengths and weaknesses of workers, revealing existing and potential future problems, revealing improvement requirements and training needs of employees, providing more valid and useful information that allows the high level of job satisfaction and obtaining more reliable data gathering on positive manner of employees' behaviors are the positive outcomes of performance evaluation of the successful leaders (Shingler et al., 2008: 1103-1104).

The performance evaluation maintains some benefits for subordinates. Determining and clarifying the roles of the employees, increasing the satisfaction from the job, improving the self-confidence provide the organizations the opportunities to learn more of their own strengths, the opportunities to debate and argue the goals of the organization and its vision and the sustainability of the relationships by examining the results of the performance training, development (Azzopardi and Nash, 2013: 222-233). Besides the rewarding mechanisms according to performance evaluation results provides employees some additional benefits that motive them to persuade the goals of the organizations.

The performance evaluation provides some benefits for the organizations. Improving the performance of individuals and units, increasing profitability and efficiency, improving the quality of the service, making the information regarding personnel turnover more valid, and seeing a need for motivation at the institutional level are among the benefits provided to the organization (Tetiana et al., 2018: 2-10).

4. THE PERFORMANCE MANAGEMENT SYSTEM

The organizational structure, which influences the performance management system not only as a business system in a regular basis but also as a combination of all dynamic business processes in the organizations. A critical management system in organizations aims to regulate, evaluate and develop the performance of employees and approaches affecting the performance evaluation from a broader sense of vision called as the Performance Management System (Lawler, 2003).

There are six main stages of the performance management system (Merinov et al, 2020:235-237). These are;

- ✓ The individual performance planning (through goal setting meetings between the subordinate and the superior at the beginning of the term),
- ✓ The determination of the necessary criteria to evaluate individual performance (selection of performance evaluation methods),
- ✓ Reviewing the performance in line with the selected methods (filling the evaluation forms in line with the predetermined principles and evaluating the performance),
- ✓ Providing feedback to the assessed individual regarding his performance (Conducting evaluation interviews),
- ✓ Coaching to improve performance in line with the feedback provided to the individual,
- ✓ The performance evaluation results are the basis for individual decisions (remuneration, promotion, career development, training, etc.) (Aguinis, 2019: 319-323).

The official who will carry out the evaluation program should have sufficient monitoring capabilities and be in a position to closely monitor the staff. In addition, evaluating the employees and customers and referring to their opinions will have positive results in terms of the success of the performance evaluation process.

There ara seven main tasks that companies can apply the Performance Management Systems. These are;

Human Resources Planning: The strategies of the business organizations are transformed into individual plans and goals. These strategies are tried to be realized in integrity with general purposes. For instance, if an organizational strategic plan envisions introducing three new products to the market within the following years, it will require research and development, production, marketing parts etc.in the organization to achieve these purposes. Lots of people working in the units require action. Employees' performance values constitute the basic building block in the studies in the facilities on Human Resources Management Department (Gruman and Saks, 2011:125-128).

Procurement and Selection: Data on the performance levels of the existing employees are also required in the planning studies carried out to determine the required qualifications and the number of employees for the organizations to achieve their goals. For instance; performance evaluation results influence a system that contributes to the staff planning function by determining the decisions regarding promotion and appointment (Aguinis, 2019: 319-323).

Training and Development: The success of the training and development activities in organizations depends on the well planning of these activities. To illustrate; if the job requirement of an employee is technical drawing skills, the evaluation to be made can determine whether the employee has a skill deficiency in this regard (Miri et al., 2014: 228-231).

Career Planning and Development: Career planning and development process can be evaluated as an individual or an organizational perspective. In both cases, the data obtained as a result of performance evaluation constitute the basis for determining the strengths and weaknesses of an employee and the potential improvement of the employee's skills (Rothwell et al., 2015:231-235).

Pay Salary Programs: Performance Evaluation results provide a basis for rational decisions about wage adjustments. Data obtained as a result of performance evaluation are used in decisions regarding the distribution of wage increases and other monetary awards (Risher, 2000:27-33).

In-house Employee Relations: Performance Evaluation data are used to make decisions about internal employee relations such as motivation, promotion, rank reduction, dismissal, dismissal, transfer (Eaidgah et al., 2016:211-213).

Evaluating Employee Potential: Some organizations try to evaluate employee performance while evaluating job performance. The best indicator of future behavior is past behavior. An employee's past performance does not mean that the employee will perform

well at a higher tier. Therefore, the full potential of the employee must be revealed and the employee should be promoted to a managerial position appropriate to the employee's potential (Ahmed and Kaushik, 2011: 102-109).

5. PERFORMANCE EVALUATION AND ENVIRONMENTAL FACTORS

The Performance Evaluation Process has five main stages. These are 1) Performance Evaluation Plan, 2) Qualifications to be Evaluated, 3) Determination of the Evaluators, 4) Multi-Source Evaluations: 360 Degrees and 5) Evaluation Period.

Regarding the Performance Evaluation Plan, achieving the expected benefits from performance evaluation depends on the development of a systematic individual evaluation plan and monitoring a certain process, rather than random evaluation.

Based on qualifications to be assessed, personality characteristics; depending on the nature of the profession and the work done, individuals are evaluated according to personality traits such as attitude, judgment and common sense, appearance, initiative, attitude towards friends, desire for cooperation, reliability, dignity in cases where the character of the person is important or is handled together with personal success. In terms of behavior; it is the evaluation of the person's behavior related to the task. In terms of competencies; when competencies are taken as criteria, they are evaluated according to whether individuals show attitudes and behaviors expected of them for superior performance (Aguinis and Pierce, 2008: 139-145). Task outcomes bring the evaluation of the results according to the nature of the work done by an employee. Recovery and improvement are generally accepted as the factors such as an individual desire for success, obtaining information, analytical thinking, customer focus, cooperation and teamwork. These factors are also evaluated according to the tasks the employees have to complete (Aguinis, 2019: 319-323).

Determinations of evaluators consist of the evaluation process by the closest superior or supervisor, colleagues and subordinates to whom the employee is affiliated, self-evaluation of employees, evaluation by a committee or group, and customer evaluation processes (Rozi et al., 2020:57).

Regarding Multi-Source Evaluations: 360 Degrees, the performance of an employee depends on the process of evaluating the performance in the light of job multitask data gathered from his colleagues, managers, superiors, subordinates, internal and external customers, other members of the project teams that the employee is a part of (Simmons, 2008: 463-468).

The significant point of the performance evaluation period is in what time interval the evaluation period will take place. The evaluation period is common practice and almost an obligation in organizations to do once in a year. Usually, an assessment can be made at times of increase in wages or before making decisions on promotion and transfer, or when the employees' supervisor, leader, position or qualifications change (Rozi et al., 2020:58-61).

6. THE PERFORMANCE EVALUATION METHODS

6.1. Graphic Measurement Method

The Graphic Measurement Method is the oldest and most useful the performance evaluation method. A form is given to the assessor for each subordinate to evaluate. The evaluator makes the evaluation according to the criteria in the graphic measurement form. This method is suitable for small businesses that having few employees (Bititci, Cocca and Ates, 2016: 1582-1590).

To give an example of this method: The closest superiors who will make the evaluation are given a printed form for each person to be evaluated and asked to fill in. In this form, the qualifications that the employee should have and the numbers showing their various degrees or good, good, weak, etc. There are adjectives. A numerical value is also given to each adjective. The evaluation is made by marking the place deemed appropriate by the authorized supervisor. The total evaluation result is found by adding the values that correspond to all criteria. By comparing the total numerical values with each other, it is determined how successful each subordinate is compared to the other (Ensslin et al., 2015: 995-997).

6.2. Forced Distribution Method

In this method, it has been developed in order to prevent the evaluators from clustering the employees they evaluate with subjective judgments anywhere in the evaluation scale and therefore inconsistencies that may arise.

In this method, which is similar to the compulsory distribution method in terms of application, it is possible to rank the employees from top to bottom from the most successful to the least successful and assign points. Thus, a ranking among the employees is created (Giumetti et al., 2015:180).

6.3. Mandatory Selection Method

The form of this scale includes many descriptive evaluations, each consisting of four or five sentences. The evaluator marks the two sentences that best describe the individual. There are two positive and two negative evaluations for the worker in each quarter. Then the assessment is scored and evaluated.

It is a method based on the rater to choose one from each group among the grouped criteria. In order to prevent the positive appraisal tendency in the graphical measurement method, some statements are given to the evaluator that cannot be easily predicted which one has a high score, and the evaluator is forced to choose one of them (Podgórski, 2015).

6.4. Critical Incident Method

The critical incident method is based on the principle of determining the extraordinary positive or negative behaviors of the employee instead of evaluating the routine business activities and making the evaluation based on these critical or interesting events only.

For example; in this method, the supervisors who will make the evaluation are asked to record interesting events showing the success or failure of each subordinate to be evaluated during the evaluation period. The method is inspired by observations and practices during the war. The critical events and behavior that were effective in the success or failure of the aviators who took office in the war were carefully observed and a "critical events list" was prepared with the help of the interviews made with the relevant people (Damoah, 2018:332-333). Then, the officers were evaluated by determining the appropriate or contrary behaviors to the critical events written in this list. In this method, the evaluation is based on observations and concrete events throughout the period, not on the impressions during the evaluation. On the other hand, reminding the relevant negative events observed in the critical event method allows the subordinate to correct his behavior.

6.5. On-Site Inspection and Observation Method

This method provides managers and supervisors with the professional help they need in the assessment. In this method, a personnel department representative leaves his desk and goes to the supervisor's duty area to obtain information about the work of individual employees. Later, the human resources specialist prepares a report about the success of the subordinate by asking questions to the supervisor (Chen et al., 2010:237-238).

6.6. Behavioral Basis Assessment

The Behavioral Basis Assessment consists of a combination of traditional evaluation scales and critical event method elements. It is aimed at measuring to what extent individuals can exhibit behaviors that will effectively fulfill their specific job requirements.

This method, which is created by using the compulsory selection method and the rating method together, is based on the principle of marking the only option that indicates the status of the employee. Allowing the employee to participate in the preparation of the behavioral evaluation form enabled the employee to adopt the form compared to other methods (De Waal, 2003: 689-693).

6.7. Results Based Systems

In the result-based system, managers and subordinates come together to determine individual goals or objectives for the evaluation period and review the level of achieving these goals at the end of the period. At the end of the evaluation period, the extent to which these goals have been achieved is checked (Folan and Browne, 2005:670-675).

6.8. Team Based Performance Evaluation

There are three factors are used in team-based performance evaluation:

- ✓ The amount of process improvement achieved by the team; measured by outputs, results, process measurement and customer satisfaction. These measures are made into a single score and allocated to each member of the team.
- ✓ Contribution of the individual to team process development efforts; contributions of the individual, contributions made in team meetings, and process analysis to be done by the individual. The contributions made are reflected in the current performance.
- ✓ The level of skills developed by the employee to develop the process and contribute to the team: it is the manager's evaluation of the efforts made by the person to improve the process. The purpose of this evaluation is to reward employee development (Aguinis and Pierce, 2008: 139-145).

7.THE FEATURES OF EFFECTIVE EVALUATION SYSTEMS

The Performance Evaluation data should be examined as a whole and analyzed in detail. The results of the performance evaluation data, the factors that cause these results and how to achieve the desired results are very important. The reliability and success rate of the performance evaluation system, those affecting this reliability and success rate should be determined. What subjects will performance data be used for? Is it allowed to make the staff feel their presence in the performance evaluation system? All these have a very important place in the analysis of performance evaluation data and interpretation of the results.

Features of a good evaluation system; relationship with the job, trained evaluators, performance expectations, standardization, continuous open communication (Roshanov et al., 2013:346).

Evaluation criteria should be determined through job analysis. Job Knowledge and Ability, Individual Characteristics, Basic Quality and Quantity of the Work can be given as examples to these criteria. Evaluation of employee performance is usually given to those who observe the work or above the employee. The person should be educated regardless of the evaluation (White, 2014: 5-12).

Managers and subordinates should agree on performance expectations before the evaluation period. Subordinates need to know what the expected behavior and performance level are. Therefore, managers need to set standards and behaviors that can be reached. Subordinates under the same work group and the same superior supervision should be evaluated with the same evaluation methods. In other words, the standard should be applied in every job. Examples of these standards are specificity, measurability, and reality (Safar et al., 1998: 17-21). Most employees require to know what their performance is and how well they are doing their job. Therefore, performance evaluation results should be reported to employees and recommendations should be made.

These problems; Unidirectional Measurement Error, Tolerance-Stiffness, Average Tendency, Personal Biases and Lack of Objective and Contrast Errors can be grouped under the headings. Some standards are set to achieve success. These standards will be decisive for the employee's performance. If the evaluator evaluates according to only one of the success standards, an erroneous evaluation result will be reached (Gerhart et al., 2000: 833-834).

Regarding this type of error, the higher evaluation of the manager subordinate could be reached. Such a tendency is undesirable for both the subordinate and the manager. Because if their deficiencies and faulty aspects are ignored, their development will be prevented. On the other hand, evaluating the employees as if they were at a lower performance level than their performance level reveals the rigidity error (Trivedi et al., 1993: 589-611).

For instance, a person who shows an extraordinary performance in creativity can be considered extraordinarily successful in other performance dimensions. The probability of making such mistakes increases, especially if the evaluator does not have all the necessary information about the person (Zaslow, 2014:99-113)

Evaluators consider the worker they deal with as average and do not consider it to be low or high. This eliminates the possibility of feedback to the assessed person.

An example of the average tendency is the inability to have sufficient information about the performance of the subordinate. This may be due to the inadequate observation skills of the manager and sometimes the unwillingness to spend time on this issue (Zakharova et al., 2015:154)

In addition, some job tasks are difficult to observe by managers due to their nature. For example, if a truck driver of a distribution company is constantly operating away from his supervisor. In such cases, the manager who has limited opportunity to observe his subordinate, especially in certain performance dimensions, will turn to middle scores as a solution.

Some evaluators reflect their personal bias in their evaluations. Past relationships lead to bias in evaluating personal approaches to age, race, language, religion, and gender. For an effective evaluation, the process must be free from prejudices (Eagly and Diekman, 2005:20-27).

If this is the problem; in particular, the past relationships of the evaluator and the evaluated and various personal prejudices regarding age, gender, religion and race can be given as examples for the personal prejudices and lack of objectivity.

The contrast errors have arisen from the fact that the manager is affected by the score of the previous evaluated person while evaluating an employee. For example; a mid-level employee can be considered unsuccessful when evaluated after a few very successful employees, or successful when the same employee is evaluated after several unsuccessful employees (Arvey and Murphy, 1998: 141-168).

8. CONCLUSION

The most important point of the performance evaluation is that it is not the person who is evaluated, but the value of his performance. Leaders should distinguish the performances of employees by establishing an effective and objective performance evaluation system and act according to the results. This will both motivate the employee to work and enable the establishment of a healthy organizational structure.

At the beginning of the study, the definition of the performance evaluation concept is given and why performance evaluation systems should be in practiced companies are discussed. After then that, the significance of the performance evaluation systems in the firm performance and for leadership success and their contribution to managerial systems are described. Also, how performance evaluation systems and in which departments of an organizational structure should be used mostly to reach organizational success are discussed.

Moreover, the performance evaluation stages and the evaluation methods are explained. In the last part, the features of an accomplished performance evaluation systems necessary for accomplished leaders to establish an effective leadership system in the organization are explained and the effects of problems encountered in performance evaluation that prevent the success in business management are discussed.

To conclude, this study aims that the performance evaluation systems focus on associating the leadership concept and the performance evaluation system will make significant contributions to the literature. Furthermore, the study is expected to help leaders with understanding the importance of performance evaluation systems in the businesses and its useful insights and efficient contributions to the improvement of the business level strategic management, and to propose leaders some useful suggestions on how performance evaluation systems can be executed successfully.

REFERENCES

Ahmed, P., & Kaushik, M. D. (2011). Career planning-an imperative for employee performance management system. *International Journal of Business Insights & Transformation*, *4*(2), 102-109.

Aguinis, H. (2019). *Performance management for dummies*. John Wiley & Sons. 319-323.

Aguinis, H., & Pierce, C. A. (2008). Enhancing the relevance of organizational behavior by embracing performance management research. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, *29*(1), 139-145.

Alrowwad, A. A., & Abualoush, S. H. (2020). Innovation and intellectual capital as intermediary variables among transformational leadership, transactional leadership, and organizational performance. *Journal of Management Development*. 39 (2),196-222.

Arvey, R. D., & Murphy, K. R. (1998). Performance evaluation in work settings. *Annual review of psychology*, *49*(1), 141-168.

Azzopardi, E., & Nash, R. (2013). A critical evaluation of importance–performance analysis. *Tourism management*, *35*, 222-233.

Behn, R. D. (2003). Why measure performance? Different purposes require different measures. *Public administration review*, *63*(5), 586-606.

Bititci, U., Cocca, P., & Ates, A. (2016). Impact of visual performance management systems on the performance management practices of organisations. *International Journal of Production Research*, *54*(6), 1571-1593.

Büyüközkan, G., & Karabulut, Y. (2018). Sustainability performance evaluation: Literature review and future directions. *Journal of environmental management*, *217*, 253-267.

Chen, Y., Okudan, G. E., & Riley, D. R. (2010). Sustainable performance criteria for construction method selection in concrete buildings. *Automation in construction*, *19*(2), 235-244.

Damoah, O. B. O. (2018). A critical incident analysis of the export behaviour of SMEs: evidence from an emerging market. *Critical Perspectives on International Business*, 14 (2/3), 309-334.

De Waal, A. A. (2003). Behavioral factors important for the successful implementation and use of performance management systems. *Management Decision*, 41(8), 688-697.

Eaidgah, Y., Maki, A. A., Kurczewski, K., & Abdekhodaee, A. (2016). Visual management, performance management and continuous improvement: a lean manufacturing approach. *International Journal of Lean Six Sigma*. 7 (2), 187-210.

Eagly, A. H., & Diekman, A. B. (2005). What is the problem? Prejudice as an attitude-in-context. *On the nature of prejudice: Fifty years after Allport*, 19-35.

Ensslin, S. R., Ensslin, L., dos Santos Matos, L., Dutra, A., & Ripoll-Feliu, V. M. (2015). Research opportunities in performance measurement in public utilities regulation. *International Journal of Productivity and Performance Management*. 64 (7), 994-1017.

Folan, P., & Browne, J. (2005). A review of performance measurement: Towards performance management. *Computers in industry*, *56*(7), 663-680.

Gerhart, B., Wright, P. M., MC MAHAN, G. C., & Snell, S. A. (2000). Measurement error in research on human resources and firm performance: how much error is there and how does it influence effect size estimates? *Personnel Psychology*, *53*(4), 803-834.

Giumetti, G. W., Schroeder, A. N., & Switzer III, F. S. (2015). Forced distribution rating systems: When does "rank and yank" lead to adverse impact? *Journal of Applied Psychology*, *100*(1), 180.

Gruman, J. A., & Saks, A. M. (2011). Performance management and employee engagement. *Human Resource Management Review*, *21*(2), 123-136.

Haslam, S. A., Reicher, S. D., & Platow, M. J. (2020). *The new psychology of leadership: Identity, influence and power*. Routledge.

Lawler, E. E. (2003). Reward practices and performance management system effectiveness. *Organizational Dynamics*, *32*(4), 396-404.

Merinov, M. V., Pavlova, A. V., & Khayrullina, A. D. (2020). Specific features of organization performance management at stages of its life cycle. In *Innovative Economic Symposium*, Springer, Cham, 2 (1), 233-248.

Miri, S. A., Mansor, N. N. A., Chasempour, Z., & Anvari, R. (2014). Staff organization training: designing, stages, and methods. *Procedia-Social and Behavioral Sciences*, *129*, 227-235.

Modi, P., & Mishra, D. (2010). Conceptualising market orientation in non-profit organisations: Definition, performance, and preliminary construction of a scale. *Journal of Marketing Management*, *26*(5-6), 548-569.

Narkunienė, J., & Ulbinaitė, A. (2018). Comparative analysis of company performance evaluation methods. *Entrepreneurship and Sustainability Issues*, *6*(1), 125-138.

Niiranen, V. (2008). The many purposes of performance evaluation. *International Journal of Public Administration*, *31*(10-11), 1208-1222.

Podgórski, D. (2015). Measuring operational performance of OSH management system–A demonstration of AHP-based selection of leading key performance indicators. *Safety Science*, *73*, 146-166.

Risher, H. (2000). Dow Chemical's Salary Program: A Model for the Future? *Compensation & Benefits Review*, *32*(3), 26-34.

Roshanov, P. S., Fernandes, N., Wilczynski, J. M., Hemens, B. J., You, J. J., Handler, S. M., ... & Haynes, R. B. (2013). Features of effective computerised clinical decision support systems: meta-regression of 162 randomised trials. *BMJ*, *346*.

Rothwell, W. J., Jackson, R. D., Ressler, C. L., Jones, M. C., & Brower, M. (2015). *Career planning and succession management: Developing your organization's talent—for today and tomorrow: Developing your organization's talent—for today and tomorrow*. ABC-CLIO. 2(1), 231-235.

Rozi, A., Agustin, F., Hindriari, R., Rostikawati, D., & Akbar, I. R. (2020). The effect of leadership on employee performance at PT. Stella Satindo in Jakarta. *HUMANIS, Humanities, Management and Science Proceedings*, *1*(1), 55-61.

Safar, M., Jafar, M., Abdel-Jawad, M., & Bou-Hamad, S. (1998). Standardization of RO membrane performance. *Desalination*, *118*(1-3), 13-21.

Sancino, A., & Hudson, L. (2020). Leadership in, of, and for smart cities–case studies from Europe, America, and Australia. *Public Management Review*, *22*(5), 701-725.

Shingler, J., Van Loon, M. E., Alter, T. R., & Bridger, J. C. (2008). The importance of subjective data for public agency performance evaluation. *Public Administration Review*, *68*(6), 1101-1111.

Simmons, J. (2008). Employee significance within stakeholder-accountable performance management systems. *The TQM Journal*. 20 (5), 463-475.

Tetiana, H., Karpenko, L. M., Olesia, F. V., Yu, S. I., & Svetlana, D. (2018). Innovative methods of performance evaluation of energy efficiency projects. *Academy of Strategic Management Journal*, *17*(2), 1-11.

Trivedi, K. S., Ciardo, G., Malhotra, M., & Sahner, R. A. (1993). Dependability and performability analysis. In *Performance evaluation of computer and communication systems*, Springer, Berlin, Heidelberg, 1 (1), 587-612.

White, T. (2014). Evaluating Teachers More Strategically: Using performance results to streamline evaluation systems. issue brief. *Carnegie Foundation for the Advancement of Teaching*. 1-12.

Zakharova, E. N., Prokhorova, V. V., Shutilov, F. V., & Klochko, E. N. (2015). Modern tendencies of cluster development of regional economic systems. *Mediterranean Journal of Social Sciences*, *6*(5 S3), 154.

Zaslow, M. (2014). General features of effective professional development. *Preparing early childhood educators to teach math*, 97-115.

PressAcademia
www.pressacademia.org/journals/jmml
JMML
ISSN 2148-6670
Journal of Management, Marketing and Logistics YEAR 2021 VOLUME 8 ISSUE 2

CONSUMER OPINIONS ABOUT INGREDIENTS OF ORGANIC PRODUCTS

DOI: 10.17261/Pressacademia.2021.1411
JMML- V.8-ISS.2-2021(4)-p.121-139

Ayse Ersoy Yildirim
Malatya Turgut Ozal University, International Business Management Department, Malatya, Turkey.
ayse.yildirim@ozal.edu.tr , aysersoy@gmail.com, ORCID: 0000-0002-6895-309X

Date Received: April 26, 2020 **Date Accepted:** February 18, 2021

To cite this document
Yildirim, A.E., (2021). Consumer opinions about ingredients of organic products. Journal of Management, Marketing and Logistics (JMML), 8(2), 121-139.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2021.....

ABSTRACT

Purpose- The aim of this study is to examine the consumer approach towards the use of organic ingredients in the production of organic products according to sociodemographic variables.

Methodology- The sample group of the study, in which quantitative research method was used, consists of 608 female consumers in Malatya. To reach the data of the research, a questionnaire form and a personal information form were used to measure the consumer approach to the use of organic ingredients in the production of organic products. Questionnaire forms were completed face-to-face in the city center between November 1 and December 30, 2019. The obtained data were analyzed with inferential and descriptive analysis.

Findings- One of the reasons why the demand for organic products is not as high as it should be is because consumers are sceptical of organic products' reliability, as well as the ingredients used. Consumers have a favourable attitude toward organic items. However, in this study, despite the positive evaluations for organic products, it was seen that there were question marks about the ingredients used and there was a dilemma. The participants were found to be unable to fully trust the definition of "organic product" or to be certain that organic products were free of synthetic raw materials, paraben, SLS, and other non-organic ingredients.

Conclusion- In Turkey and around the world, consumers' opinions regarding organic food products and their purchase behaviours, mostly on organic agricultural products, were investigated. What makes products organic are the ingredients used and the production methods. However, it is mentioned to directly explain what consumers think about organic ingredients with this study. The approaches of consumers regarding the ingredients of organic products within the framework of their socio-demographic characteristics is examined. In this context it has been discovered that consumer views on the use of organic ingredients in organic products vary depending on socio-demographic factors.

Keywords: Organic inputs, organic production, organic ingredient, organic consumption, consumer approach.
JEL Codes: M30, M31, M39.

1.INTRODUCTION

Consumption has increased with social enrichment. To meet the increasing consumption needs, the number of products produced has also increased. Nevertheless, the number of ingredients used in production have increased drastically even though scientific, and technological innovations affect life positively. As well as to extend the durability and average life of products, a wide variety of complex ingredients are used in production all over the world to reduce production costs and increase production quantities. Parallel to the negative impacts of production ingredients on human resources have begun to be considered, and it has been recognized that the quality of a sustainable life is determined by the quality of a sustainable product. Producers and consumers in many nations, particularly in high-income countries, have begun to turn to organic products that do not disrupt the natural balance, pollute the environment, or harm human health. Organic products are those that are produced and processed without the use of genetic engineering, artificial and similar fertilizers, preservatives, colorants, additives, chemicals, polishing agents, or chemical packing materials. Promoting sustainable consumption depends on spreading awareness of the environmental impact of products, product quality and product safety, and concern for the health aspect of products, especially for developing countries, the demand for organic products has increased and new market opportunities have emerged. In line with this interest, organic products are an essential sustainable consumption option among product alternatives. Indeed, while turning to organic products,

consumers chose a product based on whether it was made with safe ingredients (Eryilmaz et al., 2015: 200). The starting point of this study is the thoughts of consumers about the ingredients used in the production of organic products. In this direction, the aim of this study is to determine the consumer approach towards the use of organic ingredients in the production of organic products within the framework of socio-demographic variables. With this study, it is thought that there can be contributions to overcome by discovering an obstacle in front of organic consumption to eliminate the concerns of consumers about organic ingredients and thus to encourage the expansion of the organic product market in our country.

2.THEORETICAL FRAMEWORK

2.1. Organic Production

Following the industrial revolution, technological advancements highlighted the need to boost the number of products available to meet the demands of an expanding population. While achieving maximum output in such a production process, the ecological balance has been disrupted along with the product quality. Uncontrolled and high-dose applications in the production process have wreaked havoc on the environment and human health. As a result, not only consumers but also producers have become concerned about environmental degradation, the threat of depletion of natural resources, and epidemic diseases. Organic production, known for its environmental friendliness, is a method of achieving ecological balance and economic self-sufficiency (Ak, 2004: 490). In other words, organic production can be characterized as a system that uses methods that minimize harm to human health and the environment as much as possible and is supervised by authorized institutions at every stage of the production-consumption cycle. Organic production promotes the utilization of renewable resources, energy conservation, environmental protection, and resource conservation without the use of synthetic ingredients (Organic Produce Export Committee, 2002). Besides, organic products are classified into three categories based on their content: 100 percent organic, organic, and product created with organic elements. If all the ingredients in the finished product are organic, it is referred to as a "100% organic product." The term "organic product" refers to a product that contains at least 95% organic ingredients. The remaining amount consists of inorganic substances in these products. And finally, a product is described as "manufactured with organic materials" if at least 70% of the ingredients in the final product are organic (Kılıç et al., 2014: 43-44). In Turkey, the terms organic and ecological have the same meaning, and "organic" refers to any product that is generated in a controlled and verified manner without the use of chemical ingredients in production (Kılıç et al., 2014: 40). This understanding entails assessing and documenting the enterprise's, product's, and input's compliance with the law at various phases, such as production process, processing, and storage (Gök, 2008: 37-39). In Turkey, like others, has rules prohibiting the sale of products that do not have an organic product certificate (Arasl and Esen, 2008: 23). Ecocert, USDA, ICEA, Soil Association, BDiH, CosmeBio, and Control Association are the top organic certification bodies in the global market. Organic agricultural products and processed organic food products, organic livestock, and non-food organic products market are the four primary groups that the organic product market may be divided into. Nuts, dried fruits, dried vegetables, fresh vegetables and fruits, legumes, spices and medicinal plants, industrial plants, oilseeds, and grains are the most common organic agricultural products. Frozen fruits and vegetables, fruit juices and concentrates, and other agricultural products are examples of processed organic food products. Organic animal items include milk, meat, and eggs, whereas non-food organic products include wooden furniture, toilet paper, children's toys, cosmetic products, home textiles, leather shoes, and bags (Marangoz, 2008: 81-86; Kılıç et al., 2014: 40).

2.2. Literature Review and Development of Research Hypotheses

Organic products give consumers the option of ensuring a high quality of life in contrast to synthetic products, which destroy natural life and ecological balance while also posing a health risk to consumers. In this context, Steenkamp, and Van Trijp (1996) analyzed demand in European organic product markets and discovered that, because of the low growth in demand, the choice of buyer markets is influenced by the diversity of traditional production in international competition. Kristensen, Juhl and Ostergaard (2001) demonstrated the long-term survival strategies of products that are faced with market conditions and delivered through the formulation of various organic product supply chains from producers to retailers. Zanoli investigated consumer patterns in organic product quality issues (2004). Sylvander and Francois (2006) drew attention to the environmental and ethical concerns regarding organic products. In their investigations, Willer, Yussefi-Menzler, and Sorensen (2008) looked at the evolution of the world-leading European organic market. In a comparison of organic and traditional products, Gakobo and Jere (2016) looked at consumer concerns about the impacts of chemical accumulation in traditional food products. Mhlophe (2016) investigated the link between organic product storage conditions and consumer concerns about pesticides and nutrition. In their study on climate change issues, Xie et al. (2015) discovered that organic ingredients relate to the absence of synthetics such as pesticides and chemical-based fertilizers used in agriculture. Wier et al. (2008) found that because the ingredients of organic products are free of chemical ingredients, consumers show a higher interest in organic products than traditional products. Curl et al. (2013) looked at the demographic, socioeconomic, and living environment factors that influence organic product use. Sarıkaya (2007), in his field

research on the factors affecting organic product consumption, determined that the organic product preferences of consumers vary according to their demographic characteristics. Davies et al. (1995) found that gender and family income have a role in consumers' organic product preferences, showing that women are more likely to prefer organic products than men, and people with higher incomes are more likely to choose organic products than those with lower incomes. Çelik (2013) discovered that organic product preferences fluctuate depending on gender, wealth, and education level in a study evaluating consumer purchase behaviour. Varoğlu and Turhan (2016) reported that the purchase of organic products by middle-aged and above consumers with high education and income levels is high in their study on determining consumer trends in organic products. In this setting, demographic characteristics are expected to indicate a considerable difference in consumer behaviour toward organic ingredients. Consumer value judgments in organic food belief were investigated by Lea and Worsley (2005), who discovered that consumers consume less organic food because they have restricted access to it and because it is expensive. Chan (1999) found a link between environmental awareness and a preference for organic products in a study of the ecological market segment in Hong Kong. When Laroche et al. (2001) looked at consumers willing to pay more for environmentally friendly products, they discovered that environmental awareness is the most important factor that consumers with a high level of education and a higher-than-average economic income consider when shopping for organic products. Sandalloğlu (2014) found that organic items are mostly purchased through markets and supermarkets in a study on the consumption of organic agricultural products in Adana. İnci, Karakaya and Şengül, (2017) investigated the effect of mass media on the consumers' knowledge about organic products in Diyarbakır. Naspetti and Zanoli (2009) explored consumers' awareness of how organic foods are produced and processed. In their study, Curl et al. (2013) discovered that social perceptions of organic products, socioeconomic characteristics, and individual characteristics all play a role in organic product consumption. In this perspective, demographic characteristics are expected to reflect a considerable difference in consumer behaviour toward organic ingredients. When current and new consumers look at the big picture, they want to know what is done to preserve and even strengthen organic standards in the industry, and what the standards are, according to the Organic Trade Association's (2015) "All Things Organic" conference, where the organic market and consumer trends are discussed. It is not necessary to make a special distinction between organic products for consumption in this study since it has been determined that there is little difference for the consumers between the organic products and non-food organic products, according to the study of Bozga (2015). It is also especially important to what extent consumers find reliable the information that the ingredients of products such as food, textile, cosmetics which are grown without the use of synthetic fertilizers, pesticides, and hormones, and processed without the use of synthetic chemicals, are organic. In this study, it is aimed to find answers to questions about the relative importance of organic ingredients in consumers' evaluations of organic products. Hypotheses have been constructed based on the survey questions prepared in this direction to ensure that consumers' opinions about organic ingredients are understood.

H1: According to the socio-demographic characteristics of the consumers, there is a statistically significant difference in their approaches on the use of organic ingredient in organic products.

$H1^a$: The opinion that organic ingredients are totally used in organic products (OIP) shows a statistically significant difference according to the socio-demographic characteristics of the consumers.

$H_1{}^b$: The opinion that organic ingredients are not totally used in organic products (NOIP) shows a statistically significant difference according to the socio-demographic characteristics of the consumers.

3. METHOD

3.1. The Purpose and Model of the Research

This study aims to determine the relative approaches of the consumers towards the ingredients used in the production of organic products. It was attempted to examine whether consumer attitudes on the usage of organic ingredients in organic products differed based on sociodemographic variables. In this vein, the aim of this study is to examine the consumer approach towards the use of organic ingredients in the production of organic products according to sociodemographic variables. The perceptions that "organic ingredients are totally (%95 and more) used" and that "organic ingredients is not totally (%95 and more) used" in the production constitute the approaches of consumers towards the use of organic ingredients in the production of organic products. While consumers' approaches to the use of organic ingredients in organic products express the dependent variable; socio-demographic variables represent independent variables. The model of the study is to examine whether the approaches of consumers differ based on socio-demographic variables, according to OIP and NOIP. The predicted outcome of the study is that OIP and NOIP determine consumers' approaches to the use of organic ingredients in organic products (OIOP) and vary depending on socio-demographic factors.

3.2. Sampling and Data Collection Method

When the studies on organic products and organic consumption are examined, it is obvious that women are more inquisitive about organic products than men and that they buy and consume more (Storstad and Bjorkhaug, 2003: 151-163; Curl et al., 2013: 769-778; Akn et al., 2010: 29-56). Women are more health conscious (Kemmer et al., 1998; Fagerli and Wandel, 1999) and are more concerned with their children and household responsibilities, according to research (Lockie et al., 2002). As a result, the study's primary focus is on women consumers residing in the Malatya province. According to 2019 figures, the province's female population is 401961 (TÜK, 2019). The study's sample size was determined using the simple random probability sampling method. In determining the sample size (n), "p" represents the ratio of the sample to represent the population, "q (1-p)" represents the non-observation rate of the sample, "zα" represents the standard value corresponding to the confidence level (1.96 for $\alpha = 0.05$ at 95% confidence level), and "d" represents the accepted error tolerance level (which is determined as 0.05) (Arıkan, 2017: 308; Özdamar, 2003: 116-118). As a result of the calculations, $(p \times q \times z^2\alpha) \div d^2 = 384$ samples were determined. Although 650 samples were collected for this investigation, the pre-analysis exams determined that 608 samples were appropriate. The study's participant questionnaire forms were completed face-to-face in the city center between November 1 and December 30, 2019.

3.3. Scale of the Study

The survey form of the study consists of two parts. In the first part, the "Scale of the consumer approach to the use of organic ingredient in the production of organic products'' (OIOP) was used. The scale used in this study to determine consumer attitudes toward the use of organic ingredients in the production of organic products is based on the "Perceived risk" scale used in Ness, Brennan, Oughton, Ritson, Ruto (2010) studies as well as the "Organic food beliefs" scale used in Dreezens, Martijn, Tenbult, Kok, Vries' study (2005). The participants were asked to mark the option they thought was acceptable with the expressions "strongly disagree, disagree, undecided, agree, totally agree" on a five-point Likert-type scale. In the factor analysis process, factor load values were examined in the process of assigning or removing scale items to factors. Nine items were eliminated from the 18 questions given to 110 participants in the pre-test as they did not meet the relevant factor. The participants were given a questionnaire form with nine questions in this direction. The OIOP approach was separated into two variables as a consequence of the analysis: With six questions, the first element is "the belief that organic ingredients are totally utilized in the manufacture of organic products," and the second element is "the belief that organic ingredients are not totally utilized in the creation of organic products." As a result, the scale was created to illustrate the OIOP approach. The normal distribution of kurtosis and skewness values obtained from within-item scales is between +3 and -3 (Kline, 2005; Brown, 2006; Aldrich, 2014). In the second section of the study, 12 questions based on Dreezens et al. (2005) are asked about the participants' socio-demographic characteristics. The relation between consumers' attitudes toward organic ingredients usage in organic products and their socio-demographic features has been investigated in this direction.

3.4. Analysis and Evaluation of Data

The data from the study were analyzed using the statistical package applications SPSS 21.0 and AMOS 21. Validity and reliability are required for the data gathering instrument to achieve its goal (Spector, 1981: 37). As a result, the study's data gathering tool's validity and reliability were investigated. To determine whether the scale is suitable for factor analysis, the KMO and Bartlett's sphericity test (Punch, 2005; Kalaycı, 2010) were used. After determining the structure of the factors, the factor structure was tested with confirmatory factor analysis and the fit indices were calculated. As a result, the validity of the scales used in the study was confirmed through confirmatory factor analysis. Following this, parametric analysis approaches were employed to assess factor dimensions and participants based on sociodemographic variables. Therefore, the research's assumptions were proven correct at a 95% confidence level.

4. FINDINGS OF THE STUDY

4.1. Inferential Statistical Findings (EFA)

After the Explanatory Factor Analysis (EFA) was performed to test the reliability of the measuring tool, Cronbach's Alpha internal consistency coefficient (α) value was determined as 749. The score ranges of the items in the Explanatory Factor Analysis, as well as the values that fall within these ranges, are shown in table 1.

Table 1: Factor Analysis Results of Consumer Approach Towards the Use of Organic Ingredients in Organic Products (OIOP)

Dimension	Items	Explanation	Factor Load	Variance Ratio	Cronbach 's Alpha
The opinion that organic ingredients are used totally (%95 and more) in the manufacturing of organic products (OIP)	OIOP3	Ingredients such as raw materials and semi-processed products used in the production of organic products do not harm human health and nature.	.743	30.341	.749
	OIOP1	I believe that organic products are produced without the use of chemicals and synthetic substances.	.731		
	OIOP4	I believe that the ingredients used in the production of non-organic products threaten human health, and I support the use of organic products.	.708		
	OIOP5	I support organic food production to protect future generations and nature.	.613		
	OIOP8	I believe that there are no paraben, SLS, etc., chemical and synthetic ingredients in organic products.	.591		
	OIOP9	I believe that only organic ingredients such as organic raw materials and organic fertilizers are used in the production of organic products.	.562		
The opinion that organic ingredients are not used totally (%95 and more) in the manufacturing of organic products (NOIP)	OIOP6	I believe that inorganic ingredients are used in the production of organic products as in the production of classical products.	.846	22.338	.711
	OIOP2	I believe that chemicals are used in the production of organic products.	.785		
	OIOP7	I think that some inorganic raw materials are inevitably used in the production of organic products.	.709		
Total				52.679	.721
Kaiser-Meyer-Olkin Test: 0.766					
Bartlett Sphericity Test: 1223.513 df: 36 Sig:0.000					

In the analysis undertaken to assess the consumer attitude toward the use of organic ingredients in the manufacture of organic products, the KMO value was estimated as 0.766. As a result, the sample size (KMO> 0.500) is suitable for factor analysis. The $\chi 2$ value was found to be 1223.513 and statistically significant ($p<0.05$) within the scope of the Bartlett test. The data were found to be suitable for factor analysis based on the results of the KMO and Bartlett tests (Bryant and Yarnold, 1995: 112). The scale was discovered to have two factors based on the results of a factor analysis performed to reduce many connected variables to a few significant and independent factors (Kalaycı, 2009: 321). The scale's first dimension, which represents the idea that organic ingredients are totally used in the manufacture of organic products, is made up of six items with factor loads ranging from 0.562 to 0.743. The dimension's ratio of explaining total variance is 30,341 percent, with a reliability coefficient of 0.749. The idea that organic ingredients are not totally utilized in the production of organic products is represented by the second dimension of the scale, which consists of three items with factor loads ranging from 0.709 to 0.846. The ratio of the dimension to explain the total variance is 22.338 percent, while the reliability coefficient is 0.711. As a result, 52.679% was calculated as the ratio of explaining the total variance of both dimensions. The scale is reliable, and the reliability coefficient for the consumer approach to the use of organic ingredients in the production of organic products (OIOP) was found to be 0.721 (Trierweiler, 2009).

4.2. Inferential Statistical Findings (CFA)

Confirmatory factor analysis (CFA) is a method of determining how well factors (latent variables) derived from a large number of variables and supported by a theoretical foundation fit the actual data (Sümer, 2000: 52). In other words, CFA aims to examine to what extent a predetermined or constructed structure is in compliance with the collected data.

Table 2: CFA Findings Regarding the OIOP Approach

Acceptable Fit Indices	**χ2/sd <5**	**GFI>0.90**	**AGFI>0.90**	**CFI>0.90**	**RMSEA <0.08**	**RMR <0.08**
Calculated Fit Indices	5.710	0.949	0.905	0.901	0.097	0.084

Acceptable levels of fit indices values are (χ2/sd<5, GFI>0.90, AGFI>0.90, CFI>0.90, RMSEA <0.08, RMR 0.08) (Wang and Wang, 2012). While it is seen that the GFI, AGFI, CFI fit indices calculated in the CFA analysis provide acceptable fit indices, it is seen in table 2 that χ2/sd, RMSEA, and RMR indexes are close to and provide acceptable fit indices. In the factorial structure of the consumer approach scale towards the use of organic ingredients in organic products (OIOP), the two-factor measurement model was developed. OIP Dimension (the opinion that organic ingredients are totally used in organic products) and NOIP Dimension (the opinion that organic ingredients are not totally used in organic products). The covariance value (Kline, 2005), which shows the change of two variables relative to each other, was calculated as 0.22, bidirectional between OIP and NOIP. When one of these two dimensions changes, the other changes by 0.22. The bidirectional covariance values regarding the consumer approach to the use of organic ingredients in the production of organic products between the items were found to be as follows: between OIOP3 and OIOP1 items, cov (df / e2, df / e1) = 0.16; between OIOP4 and OIOP5 items, two-way cov (df / e4, df / e3) = 0.4; between the OIOP3 and OIOP9 items, negative two-way cov (df / e6, df / e1) = 0.15. As a result, a one-unit change in OIOP3's standard deviation produces a positive 0.16 change in OIOP1's standard deviation and a negative 0.15 change in OIOP9's standard deviation. A change in one of the items of OIOP5 and OIOP4 causes a change of 0.4 in the other. If the path coefficient value calculated in the confirmatory factor analysis roadmap is >0.50, this is considered a strong effect (Hatcher, 1994: 332). For all items in the CFA roadmap for the consumer approach to the use of organic ingredients in the production of organic goods, the road coefficients are more than 0.50. The road coefficients were calculated as .67, .58, .59, .50, .51, .55, .83, .62, .58 for the items OIOP3, OIOP1, OIOP4, OIOP5, OIOP8, OIOP9, OIOP6, OIOP2, OIOP7 respectively, and the road coefficients were observed to be statistically significant. The OIOP6 item was found to have the most modifications among the fit indices. Confirmatory factor analysis was also utilized to confirm the validity of the scales employed in this study.

Table 3: Normality Test of Consumer Attitude Factors for the Use of Organic Ingredients in Organic Products

	n	**Min.**	**Max.**	**Average**	**ss**	**Skewness**	**Kurtosis**
OIP Dimension	608	1.00	5.00	3.53	0.67	-.707	1.473
NOIP Dimension	608	1.00	5.00	3.42	0.84	-.346	-.054
OIOP-Consumer Approach	608	1.00	5.00	3.47	0.58	-.617	2.008

In statistical studies, it is desirable that the sample distribution be normal or close to normal (Curran et al., 1996: 17). Finney and DiStefano (2013) described ± 2 interval for skewness and ± 7 interval for kurtosis normal (Finney and DiStefano, 2013: 439; Muthén and Kaplan, 1985: 171). The data gathered in the study had a normal distribution, as shown in appe 3. For this reason, parametric techniques (independent sample t-test, one-way analysis of variance) were utilized in the analysis conducted in the research (Kline, 2005).

4.3. Descriptive Statistical Findings

4.3.1. Socio-Demographic Findings Regarding Participants

It was found that 84.1 percent of the study's participants reside in a metropolitan area. After the province of Malatya became a metropolitan city in the 2014 local elections, it was found that 509 participants resided in the metropolitan city in terms of the settlement. Of the participants, 8.8% reside in the city and 7.1% of them in the county or village. The proportion of married participants is 54.4%, whereas the rate of single participants is 45.5%. Consumers between the ages of 18 and 26 make up 39.7% of the study's participants; consumers between the ages of 27 and 35 make up 25.4 percent; consumers between the ages of 36 and 44 make up 23.1 percent, and consumers aged 45 and above make up 11.8 percent. As a result, consumers aged 45 and under are the majority of those who participate in this study. The proportion of participants with undergraduate and graduate education is 46.7 percent, the proportion of participants with high school education is 33.3 percent, and the proportion of participants with primary education is 20%. Students make up 28.5 percent of the participants, while housewives make up 38.8%, employees make up 27.7%, and retirees make up 2.9 percent. An average monthly income was discovered in 52.1 percent of the individuals with

an income level between 2500 and 6500 TL. The proportion of those who had previously consumed or are continuing to consume organic items was determined to be 68.9% in the inquiry about whether the participants consumed organic items. This is an indication of the familiarity of organic products in Malatya province. It was also determined that 61.1% of consumers evaluated based on health awareness and found organic products beneficial for health. The percentage of individuals who said social impacts were the most important factor in their decision to buy organic products is 26.4 percent. The tendency of consumers in Malatya to consume organic products based on environmental awareness was 6.2%, and the rate due to other factors (prices, campaigns, etc.) that they consider was 6.3%. The percentage of participants who find organic products affordable is low (21.1%), whereas the percentage of consumers who do not find them affordable is high (78.9%). As a result, the idea that organic products are not cost-effective from the perspective of consumers persists. The percentage of persons who suggested organic items they had previously consumed or used to others they knew or did not know (people in close circles, friends, people they knew and didn't know on social media, etc.) was found to be as high as 88.7%. The rate of respondents who answered "directly from the producer in Malatya" to the question of where they bought or can buy organic products was determined as 28.6%. This rate was followed by 28 percent of participants who picked the grocery store chains option. The fact that organic items are sold in the aisles of grocery store chains in the province of Malatya and that 28 percent of consumers prefer this alternative demonstrates that consumers have faith in the province's grocery store chains when it comes to organic products. In the province of Malatya, it was discovered that 18.7% of participants prefer to buy organic products from the internet by using the websites of the producers, mostly e-commerce sites in the role of distributors, when they are unable to obtain the product, they desire or cannot find in grocery store chains. The remaining 24.7 percent of interviewees chose other local retailers, which were expressed as bazaars. The ratio of the participants who spend up to 200 TL per month on organic products is 63.5%. Consumers who spent 201-500 TL on organic items every month made up 20.1 percent, while 9.1 percent spent more than 500 TL, and 7.3 percent did not spend at all. It can be argued by looking at these rates that consumers in Malatya province spend on organic products in one way or another. In general, the demographic characteristics of the participants are regarded to provide adequate and healthy data for evaluating the study's findings.

4.3.2. Participant Findings on OIOP Approach

To determine the evaluations of the consumers participating in the research on the use of organic ingredients in the production of organic products, table 4 shows the average and percentage distributions of consumers showing their level of agreement with the statements of the OIOP approach.

Table 4: Levels and Average of Consumers' Agreement in Statements of the OIOP Approach

	Strongly Disagree		Disagree		Undecided		Agree		Totally Agree		
Items	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**Average**
OIOP1	72	11.8	81	13.3	244	40.1	151	24.8	60	9.9	3.08
OIOP2	48	7.9	87	14.3	217	35.7	187	30.8	69	11.3	3.23
OIOP3	35	5.8	66	10.9	208	34.2	223	36.7	76	12.5	3.39
OIOP4	26	4.3	53	8.7	100	16.4	321	52.8	108	17.8	3.71
OIOP5	19	3.1	24	3.9	57	9.4	250	41.1	258	42.4	4.16
OIOP6	38	6.3	62	10.2	209	34.4	203	33.4	96	15.8	3.42
OIOP7	28	4.6	51	8.4	154	25.3	276	45.4	99	16.3	3.60
OIOP8	38	6.3	62	10.2	257	42.3	182	29.9	69	11.3	3.30
OIOP9	19	3.1	40	6.6	228	37.5	243	40.0	78	12.8	3.53

Within the framework of the questions addressed to the consumers participating in the research, the answers given to the items that help explain the dimensions of the study were examined. As a result, the following are the assertions that consumers most usually agree with in this study:

- "I believe that the development of organic products should be encouraged in order to safeguard future generations and the environment."

- "I think that the ingredients used in the production of non-organic products threaten human health and I support the preference of organic products."
- These are the expressions that have the highest average level of consumer agreement. In this regard, it may well be claimed that the consumers who took part in this study have favorable attitudes toward organic products. Following these two statements, it can be concluded that the high level of agreement among consumers with the statement "I believe that some non-organic raw materials are inevitably used in the production of organic products" reveals that, despite consumers' positive opinions of organic products, there are concerns about the ingredients used. The statements that consumers did not agree with in this study are as follows:
- "I believe that organic products are produced without the use of chemicals."
- "I believe that chemicals are used in the production of organic products."

These are the expressions that have the lowest average level of consumer agreement. It was determined that 25.1 percent of consumers disagreed that organic items were manufactured without the use of chemicals, while 22.2 percent disagreed that they were made using chemical ingredients. Consumers cannot fully accept the notion of "organic product" in their minds, as seen by these expressions, and are unclear whether organic products are chemical-free. The statement that the consumers were most undecided about in this study is "I think that there is no paraben, SLS, etc. chemical ingredients in organic products". In this regard, it was discovered in this study that consumers were unable to make a clear judgment and were uncertain in their evaluation due to a lack of belief in the necessity of producing organic products using organic ingredients.

In terms of the variables of the place where the participants live, the OIOP approaches were examined, and the results of the one-way variance test findings are presented in table 5.

Table 5: Examination of Consumers' OIOP Approaches in Terms of Where They Live

	Location	**n**	**Average**	**sd**	**F**	**p**
OIP Dimension	Metropolis	509	3.52	0.66	1.542	.215
	City	53	3.42	0.73		
	County/Village	43	3.66	0.61		
NOIP Dimension	Metropolis	509	3.42	0.82	0.176	.839
	City	53	3.36	0.92		
	County/Village	43	3.47	0.93		
OIOP Consumer Approach	Metropolis	509	3.47	0.57	1.028	.359
	City	53	3.39	0.70		
	County/Village	43	3.56	0.58		

*p<0.05

According to the data acquired, there is no statistically significant difference in terms of OIOP with the conclusions that organic ingredients are used or not used in the production (p> 0.05). The findings of this study shows that consumers' attitudes on the use of organic ingredients are not affected by their geographic location.

The ANOVA test findings of the OIOP approaches in terms of the age variable of the participants are given in Table 6.

Table 6: Age Analysis of Consumers' OIOP Approaches

	Age	**n**	**Average**	**sd**	**F**	**p**	**Multiple Comparison**
OIP Dimension	18-26	239	3.47	0.69	3.304	.020*	2>4
	27-35	153	3.63	0.54			
	36-44	139	3.56	0.68			
	45 and above	71	3.37	0.77			
NOIP Dimension	18-26	239	3.38	0.85		.463	

	27-35	153	3.43	0.77		
	36-44	139	3.40	0.84	0.858	
	45 and above	71	3.55	0.88		
	18-26	239	3.42	0.62		
	27-35	153	3.53	0.48		
OIOP-Consumer Approach	36-44	139	3.48	0.58	1.068	.362
	45 and above	71	3.46	0.63		

*p<0,05

There is no statistically significant difference in the opinion of consumers of different ages that organic ingredients are not used in the production of organic products (p> 0.05). However, based on the age variable, there is a statistically significant difference in the belief that organic ingredients are totally used in the production of organic products (p<0.05). As a result, it was discovered that consumers aged 27-35 perceived organic product ingredients to be more reliable compared to consumers aged 45 and over. Based on the findings, it was discovered that the OIOP consumer approach did not change statistically depending on age (p>0.05).

The t-test findings of the OIOP consumer approaches based on the marital status variable of the participants are given in Table 7.

Table 7: Examination of Consumers' OIOP Based on Marital Status

	Marital Status	**n**	**Average**	**sd**	**t**	**p**
OIP Dimension	Single	275	3.49	0.66	-1.399	.162
	Married	330	3.56	0.68		
NOIP Dimension	Single	275	3.49	0.82	1.917	.056
	Married	330	3.36	0.85		
OIOP-Consumer Approach	Single	275	3.49	0.60	0.571	.568
	Married	330	3.46	0.57		

*p<0,05

According to the findings, there is no statistically significant difference in consumers' marital status between the OIP, NOIP and OIOP approaches (p>0.05). According to the study findings, the approach does not alter depending on whether the consumers are married or single.

The one-way variance test findings of the OIOP approaches based on the educational status of the participants are given in Table 8.

Table 8: Examination of Consumers' OIOP Approaches Based on Educational Status

	Educational Status	**n**	**Average**	**sd**	**F**	**p**
OIP Dimension	Primary School	119	3.60	0.67	1.392	.244
	High School	198	3.51	0.72		
	University	248	3.49	0.56		
	Master's/PhD degrees	29	3.33	0.97		
NOIP Dimension	Primary School	119	3.36	0.96	0.571	.634
	High School	198	3.47	0.88		
	University	248	3.44	0.71		

	Master's/PhD degrees	29	3.33	0.79		
OIOP- Consumer Approach	Primary School	119	3.48	0.59	0.636	.592
	High School	198	3.49	0.66		
	University	248	3.47	0.49		
	Master's/PhD degrees	29	3.33	0.68		

*p<0,05

There is no statistically significant difference in the consumer approach of OIP, NOIP and OIOP based on the educational status variable (p> 0.05). Consumers' opinion on the use of organic ingredients have been found to be unaffected by education level.

The ANOVA test findings of the OIOP approaches based on the vocation variable of the participants are given in Table 9.

Table 9: Analysis of Consumers' OIOP Approaches Based on Vocation

	Vocation	**n**	**Average**	**sd**	**F**	**p**
OIP Dimension	Worker	27	3.30	0.95	1.682	.111
	Official	56	3.71	0.49		
	Retired	17	3.64	0.55		
	Housewife	226	3.51	0.67		
	Self-employed	10	3.50	1.09		
	Student	166	3.47	0.66		
	Jobless	29	3.48	0.54		
	Employed in private sector	49	3.68	0.73		
NOIP Dimension	Worker	27	3.40	0.70	0.433	.882
	Official	56	3.27	0.62		
	Retired	17	3.45	0.97		
	Housewife	226	3.40	0.91		
	Self-employed	10	3.43	1.03		
	Student	166	3.43	0.83		
	Jobless	29	3.53	0.69		
	Employed in private sector	49	3.52	0.89		
OIOP- Consumer Approach	Worker	27	3.35	0.70	0.636	.726
	Official	56	3.49	0.40		
	Retired	17	3.54	0.41		
	Housewife	226	3.46	0.59		
	Self-employed	10	3.47	1.00		
	Student	166	3.45	0.61		
	Jobless	29	3.51	0.46		
	Employed in private sector	49	3.60	0.59		

*p<0,05

There is no statistically significant difference in OIP, NOIP and OIOP approaches of consumers with different vocations (p> 0.05). Based on these data, it was discovered that consumer views were unaffected by their occupations.

The ANOVA test findings of the OIOP approaches based on the household average monthly income variable of the participants are given in Table 10.

Table 10: Analysis of Consumers' OIOP Approaches Based on Household Average Monthly Income

	Average Monthly Income	n	Average	sd	F	p
OIP Dimension	less than 2500 TL	221	3.50	0.73	.215	.930
	2500-4500 TL	236	3.55	0.66		
	4501-6500 TL	78	3.54	0.62		
	6501-8500 TL	30	3.52	0.54		
	8501 TL and above	26	3.58	0.51		
NOIP Dimension	less than 2500 TL	221	3.40	0.90	.666	.616
	2500-4500 TL	236	3.40	0.84		
	4501-6500 TL	78	3.56	0.77		
	6501-8500 TL	30	3.48	0.71		
	8501 TL and above	26	3.36	0.67		
OIOP-Consumer Approach	less than 2500 TL	221	3.45	0.63	.455	.769
	2500-4500 TL	236	3.47	0.58		
	4501-6500 TL	78	3.55	0.51		
	6501-8500 TL	30	3.50	0.42		
	8501 TL and above	26	3.47	0.43		

*p<0,05

When the average monthly income of the household was evaluated, it was shown that there was no statistically significant difference between the consumers' OIP, NOIP and OIOP approaches (p> 0.05). The approach to the use of organic ingredients does not alter as per the average monthly income of consumer households, according to the study findings.

The t-test findings of the OIOP approaches based on the participants' consumption of organic products are given in Table 11.

Table 11: Analysis of Consumers' OIOP Approaches Based on Consumption of Organic Products

Do you consume organic products?		n	Average	sd	t	p
OIP Dimension	Yes	410	3.55	0.67	1.096	.274
	No	185	3.49	0.66		
NOIP Dimension	Yes	410	3.40	0.84	-.947	.344
	No	185	3.47	0.84		
OIOP-Consumer Approach	Yes	410	3.48	0.58	-.051	.959
	No	185	3.48	0.59		

*p<0,05

Based on the findings of the t-test (p> 0.05), it was determined that there was no statistically significant difference. It has been determined that whether consumers use organic products does not make a difference in their thoughts about the ingredients of organic products.

Based on whether the participants find organic products economical or not, the t-test findings of the OIOP approaches are given in Table 12.

Table 12: Analysis of Consumers' OIOP Approaches whether they find organic products economical or not.

Do you find organic products economical?		n	Average	sd	t	p	Multiple Comparison
OIP Dimension	Yes	127	3.60	0.83	1.386	.166	
	No	475	3.51	0.62			
NOIP Dimension	Yes	127	3.27	0.98	-2.233	.026*	2>1
	No	475	3.46	0.79			
OIOP-Consumer Approach	Yes	127	3.44	0.74	-0.812	.417	
	No	475	3.49	0.53			

*p<0,05

According to research, it has been determined that 78.9% of consumers do not find organic products economical. No statistically significant difference in terms of OIP and consumers finding organic products economical (p>0.05). However, there is a statistically significant difference between the consumers' thought of NOIP and the opinion that organic products are economical (p<0.05). Accordingly, it has been determined that the approaches of consumers who are NOIP but do not find organic products economical are more positive than those who find it economical. However, in the overall analysis, it was also discovered that consumer approaches to the use of organic ingredients did not differ statistically significantly in terms of finding organic products economical (p> 0.05).

The t-test results of the participants' OIOP approaches based on suggesting organic goods to others (that they had previously consumed or are now consuming) is illustrated in Table 13.

Table 13: Analysis of Consumers' OIOP Approaches Based on Recommending Organic Products to Others

Would you advise others of the organic products you use?		n	Average	sd	t	p	Multiple Comparison
OIP Dimension	Yes	508	3.59	0.62	5.819	.000*	1>2
	No	65	3.09	0.83			
NOIP Dimension	Yes	508	3.43	0.81	1.645	.101	
	No	65	3.25	1.02			
OIOP-Consumer Approach	Yes	508	3.51	0.54	4.528	.000*	1>2
	No	65	3.17	0.77			

*p<0,05

It has been revealed that 88.7% of consumers recommend to the others about organic products that they have consumed or currently consuming. Consumers' intention of recommending organic products to friends or strangers, differ statistically significantly as well as their OIP approach (p <0.05). It has been determined that consumers who recommend organic products to the others have more positive opinion compared to those who do not. However, the NOIP approach does not display a statistically significant difference (p> 0.05). In the general evaluation, there is a statistically significant difference in the approach of OIOP in terms of consumers' recommendation of organic products to other consumers (p<0.05). It has been discovered that consumers who recommend organic products to others have a more favourable attitude toward the use of organic ingredients in organic products than consumers who do not.

Table 14 shows the results of the one-way Anova test used to evaluate the OIOP approaches based on the amount of money spent on organic products each month by the participants.

Table 14: Analysis of Consumers' OIOP Approaches Based on Monthly Money Spent for Organic Products

Money spent monthly		n	Average	sd	F	p	Multiple Comparison
OIP Dimension	0	42	3.24	0.61	3.901	.009*	1<2 1<3
	1-200	366	3.57	0.65			
	201-500	116	3.56	0.72			
	501 and above	52	3.41	0.69			
NOIP Dimension	0	42	3.27	0.74	4.118	.007*	2>3
	1-200	366	3.48	0.83			
	201-500	116	3.21	0.88			
	501 and above	52	3.55	0.87			
OIOP-Consumer Approach	0	42	3.25	0.57	4.133	.006*	1<2 3<4
	1-200	366	3.53	0.55			
	201-500	116	3.38	0.66			
	501 and above	52	3.48	0.57			

*p<0,05

In this study, it was discovered that 20.1 percent of consumers spend 200-501 TL on organic goods per month, 9.1 percent spend 501 TL and above, 63.5 percent spend 1-200 TL, and 7.3 percent do not spend any money. It has been observed that there is a statistically significant difference in terms of the belief that organic ingredients are used in the production of organic products by the consumers, whose monthly spending on organic products is different (p <0.05). Accordingly, those who spend between 1 and 200 TL have a more optimistic opinion compared to those who do not spend at all; and those who spend between 201-500 TL have a more optimistic opinion than those who spend 501 TL and more. It was discovered that there is a statistically significant difference in the opinion of NOIP among consumers with varying monthly expenditure on organic products (p<0.05). As a result, individuals who spend between 501 TL and more and 1-200 TL are more likely to believe that organic ingredients are not used in organic products than those who spend between 201 and 500 TL. It was discovered that consumers with varying monthly spending on organic products have statistically significant differences on OIOP approach (p<0,05). Accordingly, those who spend between 1 and 200 TL have a more positive approach compared to those who do not spend at all; and those who spend 501 TL and more, have positive approach than those who spend between 201-500 TL.

The results of the Anova test, which was used to look at the fundamental aspects that participants evaluate while shopping for organic products in terms of OIOP approaches is shown in Table 15.

Table 15: Analysis of Consumers' OIOP Approaches in Terms of the Fundamental Aspects Considering in Organic Shopping Preferences

		n	Average	sd	F	p	Multiple Comparison
OIP Dimension	Social effects	154	3.43	0.66	4.867	.002*	3>2
	Environmental Awareness	36	3.33	0.67			
	Health awareness	356	3.62	0.64			
	Other	37	3.39	0.83			
NOIP Dimension	Social effects	154	3.32	0.77	3.218	.022*	2<3
	Environmental Awareness	36	3.13	0.84			
	Health awareness	356	3.50	0.84			
	Other	37	3.37	0.96			
OIOP-Consumer Approach	Social effects	154	3.38	0.58	6.530	.000*	
	Environmental Awareness	36	3.23	0.48			

	Health awareness	356	3.56	0.56	3>2
	Other	37	3.38	0.71	

*p<0.05

Consumers prefer organic products for a variety of reasons, the most common of which are health concerns, followed by social concerns and environmental concerns, with very few opting for organic products for reasons other than these. According to the basic factors they consider in the choice of organic product shopping, the ANOVA test revealed that there is a statistically significant difference in the opinion of OIP (p<0.05). This difference has been discovered to be related to the fact that consumers who buy organic products for health reasons are more optimistic than those who buy organic products for environmental reasons. According to the basic factors they consider in the choice of organic product shopping, there is a statistically significant difference in the opinion of NOIP (p <0.05). This disparity has been discovered to be attributable to the fact that consumers who shop for organic items out of concern for the environment have more negative thoughts than consumers who shop for organic items out of concern for their health. It was determined that there is a statistically significant difference in terms of OIOP approaches of consumers according to the basic factors they consider in the choice of organic product shopping (p <0.05). Consumers who prefer organic products because of health concerns have a more positive approach than those who shop for organic products because of environmental concerns.

The ANOVA test conducted to analyse the OIOP approaches based on the location where the participants buy organic products is given in Table 16.

Table 16: Analysis of OIOP Approaches of Consumers Based on the Location Organic Products Purchased

		n	Average	sd	F	p
OIP Dimension	Supermarket	163	3.49	0.68	1.537	.204
	Bazaar	144	3.47	0.62		
	Internet	109	3.63	0.62		
	Directly from producer	167	3.56	0.73		
NOIP Dimension	Supermarket	163	3.43	0.89	0.118	.950
	Bazaar	144	3.40	0.80		
	Internet	109	3.39	0.82		
	Directly from producer	167	3.44	0.83		
OIOP-Consumer Approach	Supermarket	163	3.46	0.64	0.501	.681
	Bazaar	144	3.43	0.54		
	Internet	109	3.51	0.56		
	Directly from producer	167	3.50	0.58		

*p<0,05

Retail chains, specialized stores, neighborhood bazaars, wholesalers, producers selling through retailers directly or online are the main sales locations for organic products. Organic products are mostly purchased directly from the producer and from the market, according to research. Consumers' OIP and NOIP approaches in terms of where they buy organic products did not show statistically significant differences (p> 0.05). As a result, it has been discovered that consumers' OIOP approaches do not differ in terms of where they purchase organic products (p> 0.05)

5. DISCUSSION AND CONCLUSION

In Turkey, the demand for organic products is insufficient. The reasons for this include, inaccurate or incomplete information, overly high product costs relative to income, a lack of consumer awareness, and insufficient use of marketing mix elements (Kaya, 2003). Low production hinders organic products from becoming widely available, while a lack of perceived value reduces the desire for organic products on the other hand (Honkanen et al., 2006). One of the reasons why the demand for organic products is not as high as it should be is because consumers are sceptical of organic products' reliability, as well as the ingredients used. In this study, consumers' attitudes toward the use of organic ingredients in use of organic products are explored in the context of their socio-demographic features. In addition to having a local or regional identity, organic products that can respond to changes in the organic structure with the product assurance label, where the specific features of the products are protected with the

measures created for artificial ingredients. By this study it has been determined that organic products are supported by consumers. It has been discovered that consumers have a favourable attitude toward organic items. However, in this study, despite the positive evaluations for organic products, it was seen that there were question marks about the ingredients used and there was a dilemma. The participants were found to be unable to fully trust the definition of "organic product" or to be certain that organic products were free of synthetic raw materials, paraben, SLS, and other non-organic ingredients. Demographic characteristics play a role in consumers' opinions and purchasing behaviours toward organic products, according to studies (Radman, 2005; Ustaahmetoğlu and Toklu, 2015; Varoğlu and Turhan, 2016; Bahşi and Akça, 2019: Curl et al. 2013). However, it was concluded in this study that the consumers who took part in the survey did not differ in their attitudes toward the use of organic ingredients in organic goods solely because of demographic factors. This study discovered that whether consumers utilize organic products has no bearing on their views on the ingredients used in organic products. In addition to Lea and Worsley's (2005) finding that consumers consume fewer organic products because they are not cost-effective, this study found that consumers who believe that organic products are not used in organic products and do not find organic products cost-effective have more positive attitudes than those who find organic products economical. To increase the level of knowledge Naspetti and Zanoli (2009) emphasized the need to transfer production processes to consumers while İnci, Karakaya and Şengül (2017) pointed out the role of mass media in consumers' acquisition of information. Consumers' tendency to share information with one another can also have a positive impact. According to this, it has been found that consumers who recommend organic products that they consume to others have a more positive approach towards the use of organic ingredients in organic products than those who do not. It has been found that those who spend between 1 and 200 TL per month on organic products have a stronger positive opinion that organic ingredients are used in organic products than those who do not spend at all. Again, it was found that those who spend between 201-500 TL on organic products have a stronger positive opinion that organic ingredients are used in organic products than those who spend 501 TL or more. Furthermore, individuals who spend between 501 TL and more and 1-200 TL are more inclined to believe that organic ingredients are not used in organic products than those who spend between 201 and 500 TL. It has been determined that consumers who turn to organic products based on health awareness with the belief that organic ingredients are used in the production of organic products have a more positive opinion than consumers who turn to organic product shopping with environmental awareness. The health factor is the most important element in organic product preference, according to Hamilton and Hekmat (2018). Similarly, in this study, the health component stands out, and it was discovered that consumers who switch to organics because of health concerns have favourable feelings toward ingredients. The link between environmental awareness revealed by Chan (1999) and the preference for organic products is not prominent in this study. Consumers who shop for organic products because they care about the environment have a negative attitude compared to those who shop for organic items because they care about their health. Consumers who choose organic products based on health awareness have a more favourable attitude than consumers who shop organic products based on environmental awareness, according to the basic aspects they consider in their choice of organic product purchasing. It has been determined by this study that consumers' approaches to the use of organic ingredients do not vary depending on where they buy organic products. Consumers, on the other hand, choose producers, supermarkets, health, and natural product stores, according to Sandalloglu's (2014) study. Similarly, in certain countries, such as Germany, organic items are more successfully sold in market chains that specialize in natural items, as well as in hypermarkets in countries such as Switzerland and the United Kingdom (Kristensen, Juhl, & Ostergaard, 2001). As a result of all these assessments, it has been discovered that consumer views on the use of organic ingredients in organic goods vary depending on socio-demographic factors. In our country and around the world, consumers' opinions regarding organic food products and their purchase behaviors, mostly on organic agricultural products, were investigated. What makes products organic are the ingredients used and the production methods. However, it is aimed to directly explain what consumers think about organic ingredients with this study. In this respect, the study aimed to examine the approaches of consumers regarding the ingredients of organic products within the framework of their socio-demographic characteristics. According to the findings of this study, the ingredients utilized in the manufacture of organic products are also crucial in consumer evaluations of organic products. In this context, the study is expected to provide a theoretical contribution to the marketing literature.

6. LIMITATIONS AND SUGGESTIONS

Regardless of whether they consume organic products or not, consumers who have a neutral point of view towards organic products have been the focus of this study. The attitudes of female consumers dwelling in a certain province toward the research issue were attempted to be determined in order also to examine the viewpoints of individuals who are unfamiliar with the subject, rather than merely the consumers with extensive experience with organic products. It was also thought that not everyone would have equal access to organic products, nor would they have equal opportunities to make these choices, and that the organic products might not be available in all consumer communities. In the coming years, marketing initiatives to inform consumers about the use of organic ingredients in the manufacture of organic products are likely to boost consumer preference for organic

products over traditional products. Future studies in this direction could look at sociocultural and related human factors using a large sample size. It also is worth debating how to better promote organic products to current and new consumers. In addition, it can also be considered to carry out more comprehensive studies to support the production and consumption of organic products in the industrial market to prevent individual and social health risks and environmental losses.

REFERENCES

Aldrich, E. (2014). Statistics how to? https://www.statisticshowto.com/probability-and-statistics/statistics-definitions/kurtosis-leptokurtic-platykurtic/ asp (08/09/2020).

Ak, I. (2004), Ecological agriculture and animal husbandry, *Isparta: 4th National Zootechnical Science Congress oral presentations,* 490-498.

Akaichi, F., Glenk, K., Revoredo-Giha, C. (2019). Could animal welfare claim, and nutritional information boost the demand for organic meat? Evidence from non-hypothetical experimental auctions. *J. Clean. Prod,* 207, 961–970.

Akın M., Çiçek, R., İnal, M., Toksarı, M., (2010). A research on the difference between the sociodemographic characteristics of consumers in Niğde province, their attitudes towards organic foods and their individual values*. Dokuz Eylul University Journal of Social Sciences Institute*, 12(1), 29-56.

Arasli, Z.S. and Esen, A. (2008). Organic farming industry. Turkish Development Bank Inc., Ankara: Technology Monitoring and Research Directorate Publication.

Arıkan, R. (2017). *Research methods and techniques (3rd Edition).* Ankara: Nobel Publishing.

Bahşi, N. ve Akça, A. (2019). A research on the determination of consumers' perspectives on organic agricultural products: The example of Osmaniye and Şanlıurfa provinces, *KSU Journal of Agriculture and Nature,* 22 (1): 26-34.

Bozga N. A. (2015). The perception of romanian consumer upon organic products' prices, *Procedia Economics and Finance* (27), 323 – 333.

Brown, T. (2006). *Confirmatory factor analysis for applied research.* NY: The Guilford Press.

Bryant, F.B. and Yarnold, P.R. (1995). Principal components analysis and exploratory and confirmatory factor analysis. In: Grimm, L.G. and Yarnold P.R., Eds., Reading and understanding multivariate statistics, *American Psychological Association*, Washington DC, 99-136.

Capatina E., Keane M. and Maruyama, S. (2018). Health shocks and the evolution of consumption and ıncome over the life cycle, *UNSW Economics Working Paper,* (14), 1-50.

Curl, C.L., Beresford, S.A., Hajat, A., Kaufman, J.D., Moore, K., Nettleton, J.A., Diez-Roux, A.V. (2013). Associations of organic produce consumption with socioeconomic status and the local food environment, *Multi-Ethnic Study of Atherosclerosis (MESA), 8*, 769–778.

Curran, P. J., West, S. G. ve Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, 1(1), 16–29.

Çelik, S. (2013). Who buys organic food and why? A field study, *Selcuk University Journal of Social Sciences Institute,* 30: 93-108.

Chan, K. (2000). Market segmentation of green consumers in Hong Kong, *Journal of International Consumer Marketing,* 12 (2), 7- 24.

Davies, A. Titterington, J. and Cohrane, C. (1995). Who buys organic food? A porfile of the purchasers of organic food in Northern Ireland, *British Food Journal*, 97(10), 17- 23.

Dreezens, E., Martijn, C., Tenbült, P., Kok, G., de Vries, N.K. (2005). Food and values: an
examination of values underlying attitudes toward genetically modified- and organically grown food products, *Appetite*, 44(1), 115-222.

Doğan, H.ve Gürel, E. (2016). Determining the attitudes and behaviours of consumers living in the central district of Kırşehir in the consumption of organic products, *Journal of Gaziosmanpaşa University Faculty of Agriculture,* 33 (2), 147-156.

Eryılmaz, G. A., Demiryürek K. ve Emir, M. (2015). Consumer behaviour towards organic agriculture and food products in the European Union and Turkey. *Anatolian Journal of Agricultural Sciences,* 30: 199-206.

Fagerli, R.A., Wandel, M. (1999), Gender differences in opinions and practices with regard to a healthy diet, *Appetite*, 32, 171- 190.

FİBL and IFOAM (2019). *Organics international*. *The world of organic agriculture*, Germany.

Finney, S. J. and DiStefano, C. (2013). *Non normal and categorical data in structural equation modeling*. G. R. Hancock ve R. O. Mueller (Ed.), *Structural equation modeling: A second course*. NC: Charlotte.

Gakobo, T. and Jere, M.G. (2016). An application of the theory of planned behaviour to predict intention to consume African indigenous foods in Kenya. *British Food Journal*, 118(5), 1268- 1280.

Gil, J., Gracia, A. and Sanchez, M. (2001). Market segmentation and willingness to pay for organic products in Spain. *International Food and Agribusiness Management Review*, 3(2), 207-226.

Gök, S.A. (2008). Evaluation of Turkey in terms of organic agricultural products trade in the expanding European Union market. Ankara: Ministry of Agriculture and Rural Affairs EU Expertise Thesis.

Hamilton, K., Hekmat, S. (2018). Organic food and university students: A pilot study. *Nutrition Food Science Journal.* 15, 133- 134.

Harper, G.C. and Makatouni, A. (2002). Consumer perception of organic food production and farm animal welfare. *British Food Journal*, 104(3), 287- 299.

Hatcher, L. (1994). A step-by-step approach to using the SAS system for factor analysis and structural equation modeling, *The SAS Institute Review*, 325-339.

Hughner, R.S., Mcdonagh, P., Prothero, A., Shultz, C.J. and Stanton, J. (2007). Who are organic food consumers? A compilation and review of why people purchase organic food? *Journal of Consumer Behaviour*, 6, 1- 17.

Honkanen, P., Veerplanken B. and Olsen, S. (2006). Ethical values and motives driving organic food choice, *Journal of Consumer Behaviour*, 5, 420-430.

Ilgar, R. (2017). Sustainability and organic agriculture in agriculture in Çanakkale. *Eastern Geography Journal,* 22 (37), 159-178.

İnci, H., Karakaya, E. ve Şengül, A.Y. (2017). Factors affecting organic product consumption - Diyarbakır province example, *Kahramanmaraş Sütçü İmam University Journal of Natural Sciences,* 20(2), 137-147.

Kalaycı, Ş. (2010). *SPSS applied multivariate statistical techniques*. Ankara: Asil Publishing.

Kaya, H. (2003). Organic agricultural product trade and consumer reactions in the world and in Turkey. http://www.bahce.biz/organic/organic_trade. asp (01/11/2020).

Kılıç, S., Duman, O. and Bektaş, E. (2014). A field study on the marketing strategies of organic products and businesses. *Business and Economics Research Journal,* 5 (1), 39-65.

Kemmer, D., Anderson, A.S., Marshall, D.W. (1998). Living together and eating together: changes in food choice and eating habits during the transition from single to married/cohabiting. *The Sociological Review*, 46(1), 48-72.

Kline, R. B. (2005). *Structural equation modeling*. N.Y: The Guilford Press.

Kristensen, K., Juhl, H. J. and Ostergaard, P. (2001). Customer satisfaction: Some results for European retailing, *Total Quality Management*, 12(7), 890-897.

Laroche, M., Bergeron, M., and Forleo G. (2001). Targeting consumers who are willing to pay more for environmentally friend products, *Journal of Consumer Marketing,* 18(6), 504-507.

Lea, E. and Wosley, T. (2005). Australians' organic food beliefs, demographics and values, *British Food Journal,* 107(11), 855- 869.

Lockie, S., Lyons, K., Lawrence, G. and Mummery, K. (2002). Eating green: motivations behind organic food consumption in Australia. *Sociologic Ruralis,* 42(1), 20- 37.

Magnusson, M.K., Hursti, U.K. (2002). Consumer attitudes towards genetically modified foods. *Appetite*, 39, 9- 24.

Magnusson, M. (2004). *Consumer perception of organic and genetically modified foods: health and environmental considerations*. Uppsala: ACTA Universitatis Upsaliensis.

Magnusson, M.K., Arvola, A., Koivisto Hursti, U.-K. and Aberg, L. (2001). Attitudes towards organic foods among Swedish consumers. *British Food Journal,* 103(3), 209- 227.

Magnusson, M.K., Arvola, A., Koivisto Hursti, U., Aberg, L. and Sjodén, P. (2003). Choice of organic foods is related to perceived consequences for human health and to environmentally friendly behaviour. *Appetite*, 40(2), 109- 117.

Makatouni, A. (2002). What motivates consumers to buy organic food in the UK? Results from a qualitative study. *British Food Journal*, 104(3/4/5), 345- 352.

Marangoz, M. (2008). *Marketing of Organic Products*. Bursa: Ekin Publications.

Merdan, K. (2018). Factors affecting organic product consumption: Determination of consumers' attitudes in Gümüşhane. *International Journal of Disciplines Economic and Administrative Sciences Studies,* 4(8), 174- 188.

Merdan, K. (2018). Marketing opportunities and development ways in organic production. Journal of Social and Humanities Sciences Research, 5(19), 663- 672.

Muthén, B. O. ve Kaplan, D. (1985). A comparison of some methodologies for the factor analysis of non-normal likert variables. *British Journal of Mathematical and Statistical Psychology,* 38(2), 171- 189.

Mhlophe, B (2016). Consumer purchase intentions towards organic food: Insights from South Africa. *Business and Social Sciences Journal*, 1(1), 1-32.

Ness, M. R., Brennan, M., Oughton, E., Ritson, C., Ruto, E. (2010). Modelling consumer behavioural intentions towards food with implications for marketing quality low- input and organic food. *Food Quality and Preference*, 21, 100- 111.

Onurlubaş E. ve Öztürk D. (2015). Factors that affect organic product preferences and consumer attitudes. *Turkish Studies International Periodical for the Languages, Literature and History of Turkish,* (10/14), 557-578.

Organic Produce Export Committee (2002). *National standard for organic and bio-dynamic produce*. Australian Quarantine and Inspection Service, Canberra.

Özdamar, K. (2003). *Modern Bilimsel Araştırma Yöntemleri*. Eskişehir: Kaan Kitabevi. *Modern Scientific Research Methods.* Eskisehir: Kaan Publishing.

Punch, K. (2005). *Introduction to social research: Quantitative and qualitative approaches*, (1st Edt.), Sage Publications.

Radic, I.; Canavari, M. (2014). Viennese consumers' preferences and willingness to pay for raspberries from Arilje, Serbia. *Econ. Agro Aliment*., 22, 70- 75.

Radman, M. (2005). Consumer consumption and perception of organic products in Croatia. *British Food Journal*, 107 (4), 263-273.

Sandallıoğlu, A. (2014). Consumption of organic agricultural products and consumer trends in Adana (PhD Thesis). Adana: Çukurova University Institute of Science and Technology, Department of Agricultural Economics.

Sarıkaya, N. (2007). A field study on factors and attitudes affecting organic product consumption, *Kocaeli University Journal of Social Sciences Institute*, 14(7), 110-125.

Sümer N. (2000). Structural equation models: Basic concepts and sample applications. *Turkish Psychology Writings*, 3(6), 49-74.

Schäufele, I. and Hamm, U. (2018). Organic wine purchase behaviour in Germany: Exploring the attitude-behaviour gap with data from a household panel. *Food Qual. Prefer.,* 63, 1- 11.

Schleenbecker, R. and Hamm, U. (2013). Consumers' perception of organic product characteristics. *Rev. Appet.* 71, 420- 429.

Spector, P. E. (1981). *Industrial and organizational psychology: Research and practice*. USA: John Wiley & Sons, Inc.

Steenkamp, B. J and Trijp C. M. (1996). Quality guidance: A consumer-based approach to food quality improvement using partial least squares. *European Review of Agricultural Economics,* 23(2), 195- 215.

Stolz, H., Stolze, M., Hamm, U., Janssen, M., foodtRuto, E. (2011). Consumer attitudes towards organic versus conventional food with specific quality attributes. *NJAS Wagening. J. Life Sci., 58*, 67–72.

Storstad, O. and Bjorkhaug, H. (2003). Foundations of production and consumption of organic food İn Norway: Common attitudes among farmers and consumers. *Agriculture and Human Values,* 20, 151- 163.

Sylvander, B. and Francois, M. (2006). *Organic and low input food consumers: Concerns and perspectives for developing the organic market in the future.* Paper at: Joint Organic Congress, Odense, Denmark.

Trierweiler, T. (2009). An evaluation of estimation methods in confirmatory factor analytic models with ordered categorical data in LISREL (Doctoral dissertation). N.Y: Fordhame University.

Ustaahmetoğu, E. ve Toklu, İ. (2015). A study on the effect of attitude, health awareness and food safety on organic food purchase intention, *Journal of Economic and Social Research,*11(1): 197- 212.

Varoğlu, S. ve Turhan, Ş. (2016). A research on the determination of consumer trends in organic products Sakarya province example*, Journal of Gaziosmanpaşa University Faculty of Agriculture*, 33(3), 189-196.

Wang, J., and Wang X. (2012). *Structural equation modeling: Applications using Mplus: Methods and applications.* West Sussex: John Wiley and Sons.

Wägeli, S., Hamm, U. (2016). Consumers' perception and expectations of local organic food supply chains. *Org. Agric*., 6, 215- 224.

Wier, M., Jensen, O.K., Andersen, L.M. and Millock K. (2008). The character of demand in mature organic food markets: Great Britain and Denmark compared, *Food Policy Journal*, 33(5), 406- 421.

Willer, H., Yussefi- Menzler, M. ve Sorensen, N. (2008). *The World of organic agriculture statistics and emerging trends*. Modena, The 16 th IFOAM Organic World Congress, 143-149.

Xie, S., Deser, C., Vecchi, G., Delworth, T. (2015). Towards predictive understanding of regional climate change. *Nature Climate Change Journal*, 5, 921- 930.

Yazdanpanah, M. and Forouzani, M. (2015). Application of the theory of planned behaviour to predict Iranian students' intention to purchase organic food. *Journal of Cleaner Production,* 107, 342- 352.

Zanoli, R. and Naspetti, S. (2002). Consumer motivations in the purchase of organic food: a means-end approach. *British Food Journal*, 104(8), 643-653.

Zanoli, R. (2004). The European consumer and organic food. OMIARD University of Wales, Aberystwyth.