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Economic Relationship Between Turkey and Pakistan

(Türkiye ve Pakistan Arasındaki Ekonomik İlişki)

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Abstract

The relation between Pakistan and Turkey has been strong since the independence of Pakistan due to strong cultural, religious, and economic bonds. Two countries have been working on enhancing their economic relations to hold a strong position in the global market as well as developing various opportunities for each other to foster their national economy. With respect to energy, trade, textile, and various other sectors the two countries hold a strong bond for better economic development. Also, in order to improve friendly bilateral and economic relations, several agreements in various aspects have been signed by both countries. With this study, it is aimed to analyze the economic relationship between Pakistan and Turkey especially in terms of new opportunities. It is found that the growing economic cooperation between Turkish and Pakistani governments is mainly manifested in the free trade agreements (FTA). Based on the findings, it has been concluded in the research that after being subjected to a number of anti-dumping cases brought by Turkey, Pakistan should take special care to ensure that all problems are addressed in the FTAs.

Anahtar Kelimeler:
Türkiye Ekonomisi, Pakistan Ekonomisi, Uluslararası Ticaret

Makale türü:
Araştırma

Öz

Pakistan'ın bağımsızlığından bu yana Pakistan ve Türkiye arasındaki ilişki sağlam kültürel, dini ve ekonomik bağlar nedeniyle güçlüdür. Her iki ülke birbirlerinin ekonomik ilişkilerini hem uluslararası pazarlarda hem de kendi pazarlarında güçlendirmek için birlikte çalışmaktadır. Enerji, ticaret, tekstil ve diğer çeşitli sektörlerle ilgili olarak, iki ülke daha iyi ekonomik kalkınma için güçlü bir bağa sahiptir. Ayrıca, dostane ikili ve ekonomik ilişkileri geliştirmek için iki ülke arasında farklı alanlarda çeşitli anlaşmalar imzalanmıştır. Bu çalışma ile Pakistan ve Türkiye arasındaki ekonomik ilişkinin özellikle yeni fırsatlar açısından analiz edilmesi amaçlanmaktadır. Türk ve Pakistan hükümetleri arasında artan ekonomik işbirliğinin esas olarak serbest ticaret anlaşmalarında (STA) ortaya çıktığı tespit edilmiştir. Araştırmada elde edilen bulgulara dayanarak, Pakistan'ın Türkiye'nin getirdiği bir dizi anti-damping davasına maruz kaldıktan sonra, tüm sorunların STA'larda ele alınmasını sağlamak için özel bir özen göstermesi gerektiği sonucuna varılmıştır.

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Introduction

For a long time, Pakistan and Turkey have enjoyed good relations and have strengthened them through the development of economic cooperation between the two governments in the areas of energy, transport, communications, raw materials, automobiles, horticulture, industry, food and dairy production, data innovation, oil and gas, and trade. A very significant and important element of this flourishing relationship is the proposed Specific Trade Agreement that in turn under pined the trade relationship and helps achieve our shared goal of $2 billion in trade (Khan, 2020). The aim is to experimentally unravel the current trade relationship between Pakistan and Turkey and explore the freedoms that Pakistan can exploit under the preferential trade agreement (PTA).

On the contrary, while there is a vast literature on the potential for trade between Pakistan and other major trading partners such as China and SAARC countries, particularly India (Sarfaraz, et al., 2018). As the potential for trade with Turkey, although Turkey is a larger transport market than India1 and there are stronger political interests between the two countries the studies are negligible. Not only is there little accurate research on Pakistan's trade potential with Turkey, but the existing studies are limited in their focus and do not provide a comprehensive understanding of this trade relationship (Suvankulov and Ali, 2012).

Since the freedom of 1947, Pakistan has maintained friendly relations with Turkey, generally based on fundamental cultural and international considerations. However, they are generally based on fundamental cultural and international considerations. Both countries are members of the Economic Cooperation Organization and developing countries such as the Organization of Islamic Cooperation. In order to strengthen their economic and trade relations, Turkey and Pakistan have entered into several agreements such as the 1965 Trade Agreement, the 1976 Economic and Technical Cooperation Agreement, the 1988 Double Taxation Prevention Agreement, and the 1997 Mutual Investment Promotion and Protection Agreement. Under the 1976 agreement, the two countries established the Turkey-Pakistan Joint Economic Commission Organization (Abbasi, et al., 2019). Since then, regular meetings have been held in Ankara and Islamabad with officials from both countries to assess their respective economic and trade relations.

The Turkey-Pakistan Economic Council was established to strengthen private sector relations and stimulate new business contacts between the two countries. It was last held in October 2011 and had not been held for five years (Yilmaz, 2019). In 2007, Turkey also launched the Turkey-Afghanistan-Pakistan Trilateral Summit, which aims to build mutual trust and cooperation between Pakistan, Turkey, and Pakistan. At present, the two countries are emerging market economies and the relationship between them has evolved into an economic partnership. Pakistan and Turkey's trade has reached about $10 billion in the last decade. Several Turkish companies have invested in Pakistan's private sector such as Bayinder, Enka, and Tekser, for various projects in Pakistan. In line with the global trend, economic exchanges should be the focus of Pakistan-Turkey relations. While the ongoing economic cooperation is

inadequate, economic relations have developed significantly through huge investments in infrastructure and trade (Guo, et al., 2019).

The two countries have been able to develop their economic relations in the past few years. When President Recep Tayyib Erdoğan visited Pakistan in June 2003, his entourage, which included 110 businessmen during the visit to Pakistan in 2010, about 18 Memorandums of Understandings (MoUs) were signed between the two countries. So far, Turkish companies have invested about $2.7 billion in Pakistan (Suvankulov and Ali, 2012). The Republic of Turkey is an emerging economic leader in Asia, Europe, and Africa. Turkey is the 16th largest economy in the world. Turkey is also a successful model of democracy in the Muslim world. Turkey has set an excellent example for all emerging economies to liberalize their economies without compromising their traditions. This has increased the potential for multilateral cooperation between the two countries on economic advancement.

The relation of Pakistan and Turkey is bilateral and is based on the various aspects and benefits for both the nation. It is a fact that when two countries are interconnected with each other is mostly through trade or in shape funds or economic factors (Suvankulov and Ali, 2012). Similarly, Turkey and Pakistan have friendly relations since their independence. Moreover, both countries are having a large trade as well as political bonding at a large scale. Both countries are in the developing phase and are focused to raise their economic scale in global markets.

Therefore, it is important for both countries to consider the business and economic gaps and helps each other in terms of creating opportunities. Pakistan and Turkey's good relations will be an element that needs to be analyzed in terms of creating more opportunities for the citizen and businesses (Yilmaz, 2019). Further, according to various scholars and historians, it is highlighted that filling economic gaps of a friendly nation is an open hand opportunity for the nations to raise their economy through providing services to other nations (Khan, 2020).

1. Pakistan-Turkey Relationship in the Light of Literature

As presented by Colakoglu and Sakaoglu (2016), religious, historic, and cultural ties between Pakistan and Turkey came down from the past to the recent era which has a great influence on the rapid development and establishment of bilateral relations since Pakistan came into existence in 1947. Similarly, the Pakistan Business Council (PBC) (2020) reported that Turkey and Pakistan have developed diplomatic relations in 1954 when a treaty was signed as an element of cooperation and friendship. These bilateral relations are based on common adversaries, historic ties, a similar vision of foreign policy, and mutual goals.

Although Turkey is smaller in size and population it is well-established in comparison with Pakistan in economic terms, and therefore increasing trade is helping Pakistan to grow (Hussain, 2008). Turkey being the modern Muslim state is known and respect as the second most important Islamic country after Saudi Arabia. The relations of Turkey and Pakistan are growing in the right direction and both countries

are enjoying cordial and close relations. In addition, the manifold commonalities between the two countries are deepening friendship and cooperation (Ali, 2017).

These include the geo-strategic location of both Turkey and Pakistan, the strong political ties which can be traced back to the time of British rule over India when Turkey showed Islamic unity to the Muslims of India. In addition, the two countries also enjoy excellent economic relations for a number of decades now which is a surprising element since historic ties do not reflect on better trade and economic cooperation. The companies from Turkey have invested in Pakistan like Enka, Bayinder, and Tekser for multiple projects however still there is a need for Pakistani companies to spread their business in Turkey (Hussain, 2008). Moreover, additional planning in terms of advancing adequate transportation services such as joint cargo and regular line vessel services from Karachi to Istanbul is also in process. Also, the infrastructure of Islamic banking in Pakistan aligned with the Turkish Banking system which has made a stronger bond between the two states (Majid and Ghazal, 2012).

This section of the research is carried out to present a critical and in-depth overview of the existing literature regarding the strong ties and relationship hold between Pakistan and Turkey enhancing economic stability. The chapter provides an analysis of the various aspects leading towards improved economic stability between Turkey and Pakistan. In addition, an overview of the impact of economic relations on both Turkey and Pakistan will also be presented highlighting results in a global aspect. Furthermore, advantages and disadvantages gained by the two countries after the development of strong bilateral relations will also be discussed followed by the new opportunities that can enhance the future growth of the countries with respect to bilateral projects. A theoretical framework and literature gap will also be presented in the current chapter.

2. Economic Developments of Both Pakistan and Turkey

As analyzed in the report by PBC (2015) and Syed (2021), Turkey and Pakistan have had long good relations which have been strengthened by the growth of economic cooperation among governments within sectors like energy, communications, textiles, infrastructure, food processing, automobiles, industry, agriculture, information technology, trade, oil, and gas. As stated by Syed (2020) in the article by Dawn news, to strengthen the economic stability for both Turkey and Pakistan, 13 MoUs were signed by the prime ministers to hold a joint declaration after the meeting of High-Level Strategic Cooperation Council (HLSCC). In this meeting, a Strategic Economic Framework (SEF) as an accompanying plan of action was approved for enhancing economic stability by increasing bilateral trade to $5 billion by 2023. The Turkish President Recep Tayyip Erdogan mentioned the signing ceremony with Pakistan President Imran Khan that this 71-point action plan is the roadmap for deepening economic cooperation (Syed, 2021).

Moreover, an important aspect of the thriving relationship is proposed by a Preferential Trade Agreement (PTA) which has the aim to boost the ties of trade and achieve the mutual target of trade of 2 billion dollars for the economic stability of both

the countries (Gul, 2014). As reported by PBC (2020), Pakistan is a much larger country than Turkey with an overpopulation of 212.2 million in 2018 whereas Turkey's population was recorded as 82.3 million.

However, Pakistan is still classified as the lower-middle-income country whereas Turkey is a much more industrialized country with a stable economy which a share of 29.5% in GDP by its industry in comparison with Pakistan which possesses only 18.0% market share to GDP (PBC Org, 2020). With the increasing trade of Turkey in Pakistan is also moving towards enhancing its global trade. The exports of Turkey complement Pakistan's imports and this trend is visible at an increasing pace since 2016. Furthermore, the study by Hussain (2008), has identified that there is a need for the permanent display of Pakistani products in Istanbul and vice versa. Besides, the scope of enhancing the cooperation in trade, tourism, economy, science, technology, and education is enormous among the two countries. It has been identified in the study by Gul (2014) and Ali (2017) that with enormous natural resources and pools of skilled and scientific workforce Turkey and Pakistan stand with strong bonds which is vital for enhancing the economic stability, especially for Pakistan. The existence of parallel economies in the two countries also develops a new level of cooperation in trade and commerce of products like rice, cotton, textiles, and leather (PBC Org, 2015; Majid and Ghazal, 2012).

3. Impacts of Economic Relation on Pakistan and Turkey

In addition, Turkey and Pakistan both owning to common geopolitical and cultural considerations are the founding members of the Economic Cooperation Organization (ECO) as well as the part of Organization of Islamic Cooperation of Developing 8 (D-8) countries (Gul, 2014). It is also noteworthy that in an attempt to maintain friendly bilateral and economic relations, several agreements have been signed by both the countries including the Economic and Technical Cooperation Agreement (1976), Reciprocal Promotion and Protection of Investments Agreement (1997), Trade Agreement (1965), and Prevention of Double Taxation Agreement (1988) (Gul, 2014).

Furthermore, within the agreement of 1976, the countries established a Turkey-Pakistan Joint Economic Committee Mechanism, and meetings were held in Islamabad and Ankara with public institutions taking part to evaluate the commercial and bilateral economic relations. In the report by PBC (2020), it has been reported that trade in Turkey is 4.6 times more as compared to Pakistan such that the global trade of the country is $391.0 billion whereas the global trade of Pakistan was worth $83.8 billion in 2018. However, the economic stability of Pakistan in global bilateral trade with Turkey is providing Pakistan a chance to grow. The biggest trade market from Turkey to Pakistan is "Denim". The research by Hussain (2008), has examined that the private businesses in Turkey need to be established with a Euro-centric look because the East does not have much to offer to Turkey. However, the huge consumer population in the East can provide companies a chance to expand their businesses. There are tremendous opportunities in the global market for Pakistan and Turkey to enhance their economic relations.

The relations in terms of trade and economy in the two countries are strengthened by the FTA negotiations at the market as the two parties have the chance to thoroughly discuss matters pertaining to customs facilitation, tariffs, safeguard measures, tariff education modality, customs facilitation, rules of origin, bilateral investment mechanisms and services (Colakoglu and Sakaoglu, 2016). Furthermore, according to Guo, Huang, and Wu (2019), an important source of development at the global level is energy which enhances economic sector by bringing imbalances in supply and demand of energy. Thus, an important source for the economic growth of Pakistan and Turkey is energy.

Pakistan located adjacent to the Middle East with the East bordering to China and India therefore major sea routes from Europe, Africa through the Persian Gulf, the Hormuz Strait, and the Red Sea pass through the southern coast of Pakistan which makes Pakistan an energy corridor crossroads (Guo, Huang, and Wu, 2019). Moreover, Pakistan hopes to import oil and gas from Western Asia, Gulf, and Central Asia through pipelines with an aim to alleviate domestic energy (Majid and Ghazal, 2012). This development in terms of social and economic aspects will create a positive impact on the development of the country. In the same manner, the strategic positioning of Turkey is between 47% of world energy resources in Central Asia, Russia, and the Middle East which makes it important from the geo-economic and geopolitical point of view. As analyzed by Ali (2017), Turkey is more beneficial in terms of getting benefit from the FTA however the overall impact will be positive for both the countries in which trade liberalization is favorable having a huge potential for bilateral trade in the chemical and textile sector.

3.1. Bilateral Trade: Advantages and Disadvantages

According to the research conducted by Gul (2014), the emerging economic cooperation among Turkey and Pakistan has greatly manifested an enhanced recently after the Preferential Trade Agreement (PTA). The research further demonstrated that this agreement has thereby served in strengthening the association among both nations. The report of Tribune (2013) has indicated that Turkey and Pakistan encompass good association that has been empowered through the emerging economic cooperation among the government of both nations. These associations are typically in the sector such as trade, oil, and gas, information technology, dairy development, food processing, industry, agriculture, automobile, textile, infrastructure, communication, transport, and energy, etc. More precisely the significant factor behind the emerging association between these two is particularly the trade agreement that has been predicting to boost the trade ties among these nations. Gul (2014) indicated that another advantage of these bilateral economic relation is that the two-nation received a potential push in the year 2013. It happens when Pakistan's prime minister visited Istanbul after which the prime minister of Turkey also visited Pakistan. The research further claimed that these state heads had thereby agreed to strengthen the mutual association to attain collaborative gains.

The report of PBC (2018) indicated one of the significant advantages of this bilateral economic relations is that through this Pakistan and Turkey signed three significant agreements. The report further indicated that with the help of bilateral trade relations the import of Pakistan from turkey has been increased by about 62 percent. However, the potential disadvantage of this relation is that the export of Pakistan to Turkey displayed a down during the year 2011. The PBC (2018) report further claimed that the export of Pakistan to Turkey was $236.87 million during 2016. However, the ratio of import from Turkey was more as compared to the export.

This results in about $23.21 million trade deficit which is considered as the highest trade deficit of all the year. The report indicated that the potential reason behind the variation and discrepancies in the Pakistan export between the years 2015 and 2016 is the further duties that were imposed by Turkey. These duties were imposed on all the imports of Turkey from all the countries including Pakistan as well (PBC, 2018). Below figure 1 display the Pakistan trade with Turkey from 2009-2016.

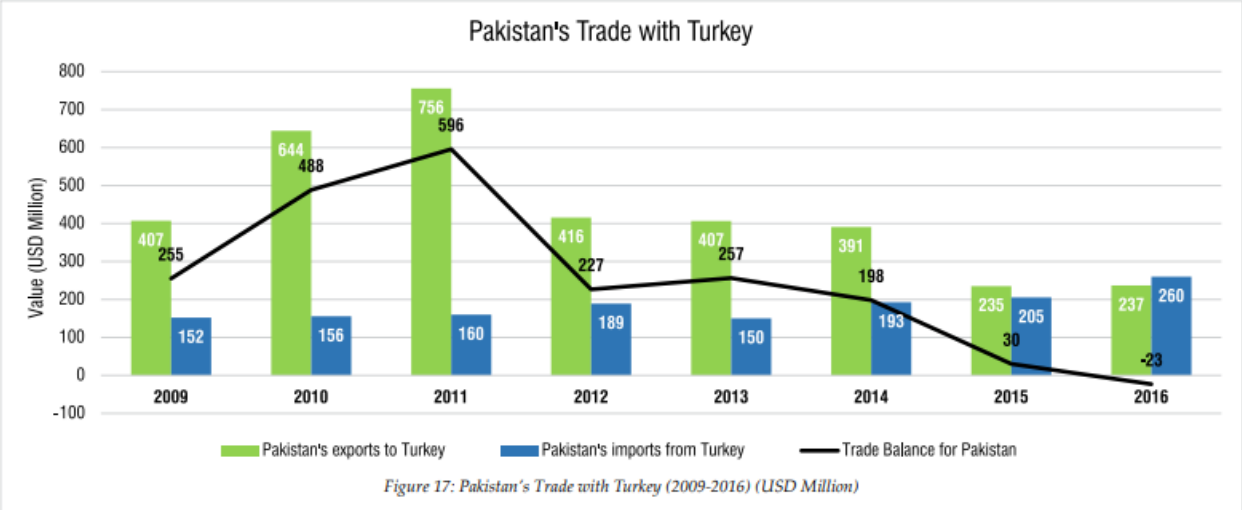

Figure 4.1 Pakistan and Turkey Trade Developments

Source: Pakistan Business Council (PBC), 2018

3.2. Future Aspects and Opportunities Based on the Previous Bilateral Projects

Adhering to the proposal for developing PTA during 2011 some researches has thereby determined the opportunities and the prospects that are being held by these nations. The research claimed that this agreement offers larger gain specifically to Turkey (Gul, 2014). Ashraf (2019) depicted that for about 70 years both nations i.e., Turkey and Pakistan have enjoyed the association with deep faith and harmony. Additionally, Turkey and Pakistan alliance has been developed on the basis of the ideologies. In the study of Suvankulov and Ali (2012), it is mentioned that these two nations has thereby stood with each other on various platforms and have merged against the terrorism. This has been done with beneficial military drills. The research of Kamal et al. (2012), stated that the economic cooperation among both the nation has been increasingly significant and will be in the future as well.

Moreover, this association has increased the potential for establishing such kind of economic alliance which will be attractive for all. Moreover, Klasra (2011) indicated that these bilateral projects have opened numerous opportunities. Such that, Turkey can enter to Pakistan and can invest heavily into the housing schemes of government by offering support in food processing, assistance in irrigation, and agricultural productivity. Moreover, it has been expected that Turkey can attain economic benefit from Pakistan by heavily investing in Pakistan's solar energy.

This aspect is considered to have the highest demand in the country. Similarly, as indicated by the research of Qadri et al. (2016), these two nations in the future can enhance the educational and workforce exchanges in order to attain better exposure and training. The research further indicated that this economic support can thereby offer benefit from the tourism exchange by expanding the avenues. Additionally, it has been found through the report of Shah and Li (2020), that Turkey has been added to the Visa-free list of Pakistan. Besides, these commercial ties are expected to be enhanced in the upcoming years. As stated in the research of Asraf (2019), the potential emphasis of the economic cooperation among these two countries is recognized as security and defense.

3.3. Free Trade Agreements between Pakistan and Turkey

Pakistan and Turkey are linked by a historic bond of sincere friendship. Whoever the government is in Pakistan, its relations with Turkey have always been cordial. From trade to military training and military agreements, the two countries depend on each other (Ali, 2017). According to Turkish media reports, a military agreement worth about 1.5 billion was signed between Pakistan and Turkey (Ali, 2017). Similarly, Turkish soldiers come to Pakistan for training and Pakistani soldiers go to Turkey. On the contrary, the former military dictator of Pakistan and former President General (retd) Pervez Musharraf had studied in Turkey for a long time. Kemal Atatürk, the founder of the Turkish Republic, was his idol (Khosa, 2015).

Similarly, the current Prime Minister Imran Khan has mentioned Kemal Atatürk's Turkish model much time. A regional trade agreement allows foreign trade between countries, mostly located in the same geographical region, to be free of a trade by removing barriers to foreign trade. Inadequate multilateral trade orders regarding WTO regulations and the launch of new markets to meet some of today's needs have forced countries to conclude bilateral and regional trade agreements.

With the expansion of the Free Trade Agreement (FTA) network between countries, many countries have provided their goods to FTA partners, and some countries outside the FTA network have some trade preferences (PBC, 2018). Opportunities have been missed. Because of this, governments have sought to create an FTA network. In this context, Turkey, in line with the trend of building FTA networks in international trade and within the jurisdiction of the Customs Union, agrees to similar agreements with these countries based on mutual interests with which the EU independently Trade agreements have been reached (PBC, 2018). Further progress has been made in the Free Trade Agreement (FTA) between Pakistan and Turkey.

The two sides discussed agreements on investment, services, and goods, and significant progress has been made on all of these agreements (PBC, 2018). Both sides proposed tariffs for giving concessions to each other in a cordial atmosphere. Given the directives of the top leadership of both the countries, it was agreed to hold.

3.4. Economic Opportunities between Pakistan and Turkey

The Pakistani prime minister wants more than aid from Turkey. He wants Turkey to invest in Pakistan and end the famine of foreign investment in Pakistan which has caused great damage to the Pakistani economy (Tribune, 2013). In his message to the Turkish business community, he said that they should come and take part in projects in Pakistan ranging from construction to tourism and natural resource exploration (Tribune, 2013). Given the geographical importance of Pakistan, the eyes of the United States are always on Pakistan, and the United States, which aspires to rule India in the region, always thinks that Pakistan should not do anything that will enable it to move forward (Klasra, 2011). The US statements and intentions regarding CPEC are linked to this fear.

It is important to understand that Pakistan and China alone cannot complete the CPEC, which is a game-changer for Pakistan's economy. Therefore, more allies are needed in this whole project and if a friend like Turkey becomes a part of this CPEC like China, then this project can be implemented quickly (Zhao, 2020). Pakistan and Turkey have good historical relations and good relations between the people of the two countries but there is a need to further enhance bilateral trade relations between the two brotherly countries and to promote joint ventures, especially in potential areas (Kocoglu, 2014). There is a need for enhancing relations between the business communities of the two countries so that the existing economic and trade relations could reach new heights. Turkish companies also need to invest in Pakistan's construction, construction, energy, and infrastructure sectors.

4. Challenges in Pakistan-Turkey Relations

Pakistan and Turkey are both strategically located in areas with a difficult regulatory environment. In their respective markets, both nations have been sufferers of Cold War and post-Cold War turbulence. Since Pakistan's inception, the two nations have had cordial and cordial relations. However, the sense of camaraderie and friendliness is primarily rhetoric. There has been insufficient attempt to turn existing benevolence into real relationships to reap the benefits (Khan, 2020a). Economic and commercial connections are the first and most pressing issue between the two countries. Notwithstanding both nations' frequent declarations that they want to improve their economic ties, there have been few real actions in this regard.

Commerce between the two nations is still under one billion dollars, and it has decreased by 40% in the previous two years. Various aspects play a role: since 2011, Turkey has levied protection taxes on Pakistani textile items, resulting in a drop in Pakistani exports. It has also lately slapped extra taxes on carpets and rugs, which are expected to have a more negative impact on Pakistani exports (Tribune, 2019). Pakistan

is not on the EU's list of nations granted GSP Plus accreditation by Turkey. Pakistan, alongside Armenia, was oddly omitted.

On the contrary, the exchange between Turkey and India amounts to more than 5000 million dollars. This reflects that India excels as a trading partner of Turkey if compared to Pakistan. Turkey has been seeing the boom phase of the economic cycle since the last decade, the major reason for which is the political stability of the country and a lot better economic policies. Whereas, on the contrary, Pakistan has been facing a severe crisis in terms of economy and politics, hence Pakistan's economy could not match the pace with the Turkish economy. Pakistan, however, had a chance to take advantage of the thriving Turkish economy (Khan, 2020a). The people-to-people interaction is another crucial area where Turkey and Pakistan might develop their relationship.

Both nations' citizens have great affections for one another, even though they have just met. Turkey's youngsters have little knowledge of Pakistan's location. They get most of their information about Pakistan from International sources, which is not particularly encouraging. The Pakistani public is in the same boat. Pakistanis have little to no contact with Turkish citizens. A barrier to better knowing each other is a shortage of research and wisdom about one another (Khan, 2020a). In both the countries of Pakistan and Turkey, there are barely any area experts or academic researchers. Both the regions are dependent on external, particularly western sources, for research and development. Likewise, no research institutes or academicians are researching on the other country in either country. There are no cultural centers in the different nations that can assist individuals in establishing a sense of familiarity, calm, and unity (Khan, 2020a).

5. Conclusion

Both the discussed countries, Turkey and Pakistan have unquestionably a strategically and geographically important relationship. On one hand, Turkey has the potential to serve as a link between Asia and Europe, while on the other, Pakistan shares borders with two big, densely populated countries and might serve as a gateway to Central Asia's abundant energy resources. Pakistan, however, needs Turkey more than Turkey needs Pakistan, given their current trade systems and quantities. Given the PTA's delay since 2011, the current administration should press harder for its implementation.

Pakistan's commercial growth with Turkey is expected to yield significant benefits. Given the current trade surplus and Turkey's enormous, mostly unexplored market, direct advantages are projected. The relation between both the countries have also strengthened these countries with strong economic cooperation in the areas of agriculture, raw materials, industry, food, dairy, oil, and gas, etc. The gains are mutual concerning both the countries at a global level. The growing economic cooperation between Turkish and Pakistani governments is manifested in the proposed preferential trade agreement (PTA) which has served the country to strengthen their good relations between Turkey and Pakistan in an attempt to achieve potential gains.

Moreover, it has been suggested by the findings of the study that the trade of Pakistan is in surplus with Turkey with strong similarities in export and intra-industry trade allowing greater opportunities for the countries to achieve greater value addition at a broader market base. In line with the ongoing economic cooperation, economic relations have developed through huge infrastructure, trade, and investments. Since the independence of Pakistan, the relations between the two countries have become stronger and both countries in the developing phase are working together to increase their economic scale at a global level.

The research is considered significant in terms of analyzing the fact that the increasing trade and strong relations have increased the chance of employment for Pakistanis in Turkey as they can easily travel and work there for a variety of sectors. The study also highlighted that Pakistan and Turkey alliance has been developed based on cultural and religious ideologies and standing with each other against terrorism. Economic cooperation will be important in the future as well with the development of numerous bilateral projects such that the governments are offering support to each other for different sectors. It has also been identified that the countries also share a strong bond with respect to the workforce and educational exchange for better exposure. It is proposed that Turkish companies increase their investments in Pakistan to over $1 billion in order to further extend and solidify their cultural and commercial relations. Turkey's leadership has taken a big step forward to assist Pakistan, increasing the potential to develop together.

Given the prospect for larger company synergies, there are also significant indirect benefits, allowing for long-term structural changes that are critical for Pakistan's sustainable economic success. The most significant feature of this partnership is the strong political will required to improve economic and commercial cooperation between the two nations. Although India and Turkey have nearly identical export market shares, the fundamental element that favors Turkey is the better predictability and consistency that defines its ties with Pakistan. Pakistan must take advantage of possibilities like the planned PTA with Turkey to maximize its profits. It is past time for the two nations' mutual goodwill stockpiles to be converted into profitable profits for Pakistan.

Pakistan and Turkey are fully aware of the regional and global significance and potential of their bilateral cooperation. Economic factors such as foreign investment, trading, and commerce can help to enhance this link. Pakistan has a paucity of infrastructure; nevertheless, Turkey has a wealth of infrastructure facilities and plans to assist Pakistan. In the sphere of information technology, Turkey might be beneficial to Pakistan. Pakistan may acquire these strategies from Turkey because it has good plains for agriculture and few strategies for using water for irrigation. Pakistan should also seek Turkey's assistance in the fields of science and technology, commerce, and business.

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Peer Production: Management, Educational Application, and Their Prospects

(Kolektif Üretim: Yönetim, Eğitim Uygulaması ve Beklentiler)

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Abstract

Peer production, also named commons-based peer production, is a socio-economical phenomenon which has emerged within various Internet platforms and digital communities. Technological advancements have enabled individuals to collaborate for a common goal, including to produce goods, exchange knowledge, organize work, and create other kind of values by cooperation in a decentralized manner. Peer production has the potential to impact several segments of economy, social relations among the members of those groups, and individuals who are open new opportunities. The main purpose of the research is to answer the question of: Can peer production be used efficiently for educational purposes, especially in a digital post-Covid world? If so, how can it improve education? Additionally, the article briefly defines this phenomenon, outlines a theoretical approach to peer production, and discusses peer production practice in fields such as management and education. The research also identifies tools, ideas, solutions, and possibilities dedicated to improving education and educational management within the capacities of peer production. This study might be useful for educational facilities, research groups, or business entities.

Keywords:
Peer production, Mass Collaboration, Education

Paper type:
Research

Öz

Kolektif üretim, diğer adıyla müştereklere dayalı kolektif üretim (CBPP), çeşitli internet platformları ve dijital topluluklarda ortaya çıkmış bir olgudur. Teknolojik gelişmeler, bireylerin merkezsizleşmiş bir biçimde iş birliği ile mal üretmek, iş organize etmek ve diğer türde değer üretmek dâhil olmak üzere ortak bir hedef için birlikte çalışmasına olanak sağlamaktadır. Kolektif üretim, ekonominin birçok sektörünü, bu gruplar içerisindeki bireylerin sosyal ilişkilerini ve yeni fırsatlara açık olan bireyleri etkileme potansiyeline sahiptir. Araştırmanın temel amacı şu soruyu yanıtlamaktır: Kolektif üretim özellikle Covid sonrası dünyada eğitimsel amaçlar için etkili bir şekilde kullanılabilir mi? Eğer öyleyse, eğitimi nasıl geliştirebilir? Buna ek olarak, makale bu olguyu kısaca tanımlamakta, kolektif üretime teorik bir yaklaşımın taslağını çizmekte ve yönetim ve eğitim gibi alanlarda kolektif üretim uygulanımını tartışmaktadır. Araştırma aynı zamanda kolektif üretimin kapasitesi dâhilinde eğitimi geliştirmeye adanan gereçleri, fikirleri, çözümleri ve olanakları belirlemektedir. Bu araştırma eğitim kurumları, araştırma grupları veya ticari işletmeler için faydalı olabilir.

Anahtar Kelimeler:
Kolektif üretimi, Kitle İşbirliği, Eğitim

Makale türü:
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Introduction

Indian-American author and journalist Fareed Zakharia in his latest book, *Ten Lessons for a Post-Pandemic World,* discusses the most crucial consequences of the pandemic that started in 2020 as lessons that we, as a global society, should learn in order to live in a post-pandemic world (Zakharia, 2020). According to authors like F. Zakharia, the pandemic did not change the pre-pandemic world, but it forwarded unavoidable changes. In lesson five – Life is Digital, he states that in the past twenty years we have acknowledged the rise of a digital economy that makes it possible to live life digitally. That kind of transition generally means that part of the activities we performed, after transforming into a new model of digital economy, can be replaced with digital ones, such as video conferences instead of face to face meetings, or replacing physical products with digital services (Zakharia, 2020).

This transition relates to every field of economy and social relations. In the history of our civilization such phenomenon as navigational tools, steam and motor engines or the printing press contributed to rapid development and were crucial for history's turning points. Inventing and developing the internet has become a key driver of social evolution towards a digital and information society. Digital society is defined as a "progressive society that has been formed as a result of adaptation as well as integration of advanced technologies into the society and culture" (Prantosh and Ajthal, 2019). Since a universal definition of information society has not been formed, literature points out an important feature, that it is "governed by knowledge, competence, and only informed decisions and actions. It demands and promotes clarity, precision, honesty, and openness" (Isazadeh, 2004). The Polish scholars Dariusz Jemielniak and Aleksandra Przegalinska outline another social model – collaborative society, which is formed by combining sharing and collaborative models and ideas combined with communication technologies such as social media, mobile technologies, cyber currencies and other digital services provided or distributed through digital platforms and commons (Jemielniak and Przegalińska, 2020). Terms such as collaborative economy, sharing economy, platform economy or platform capitalism seem similar to the mentioned concepts, but collaborative society (Jemielniak and Przegalińska, 2020) is a broader idea, because it includes social, economic and technological factors. The above mentioned ideas of future economy and digital environment rely on self-organized collaborations, innovation, social values and relations between peer group members, producing goods and values, utility, as independent work of their members (Frischmann, Madison and Strandburg, 2014).

1. Peer production - definition and characteristics

The issue of peer production and its educational application has not been extensively analyzed. Previous research mostly discussed educational tools, such as Wikipedia and learning commons or open access software, as examples of peer production, but not as a main area of concern. Researchers mostly outlined the general idea of peer production, its construction and ways of managing those groups. Recently

some publications analyzing the benefits of collaborative learning performed by peer production or mass collaboration (in a more narrow sense) have emerged. However these studies concentrate mostly on selected processes of learning, specific types of networks and cases of mass collaboration (Cress, U., Moskaliuk, J. & Jeong, H., 2016). The research presented here is unique in that it discusses both the idea of peer production and its application in education and learning. It analyzes the subject from a wider view and introduces readers to the main features of peer production. The analysis answers the question: can peer production be used successfully for educational purposes, especially in a digital post-Covid world and, if yes, how can it improve education?

Before discussing and determining a point of view on this article's main topic, we must define the following terms in order to understand management, education and work in a collaborative society. Originally, commons refers to a common source of resources utilized collectively, such as land, meadows, fisheries or infrastructure (Ostrom, 1990; Ostrom, 2000), but for this article, the most important is a contemporary meaning of commons understood within a cultural or digital sphere. Digital commons is defined as " information and knowledge resources that are collectively created and owned or shared between or among a community and that tend to be non-exclusive, that is, be (generally freely) available to third parties. Thus, they are oriented to favor use and reuse, rather than to exchange as a commodity. Additionally, the community of people building them can intervene in the governing of their interaction processes and of their shared resources" (Fuster Morell, 2010). Other types of commons are knowledge commons - socio-technical systems of knowledge production relying on mostly online collective projects (Papadimitropoulos, 2020). In other words, knowledge commons are groups of people arranged in a community manner coordinated by rules or soft-law outline. They rely on cooperation between participating units (people) using (mostly) new technologies or methods of communication to produce intellectual values, products or other (Frischmann, Marciano and Ramello, 2019). These projects can be open or limited to a certain group of people, regulated or unregulated, structured or diffused, relying on legal property rights or opened right to use (Hess, 2012). The most recognized digital commons are Wikipedia, free software and open-source hardware projects, digital libraries, open design movement, open-source research, and open educational resources.

One of the most discussed, fast spreading and improving among other collaborative-based ideas is peer production. Among other similar ideas or models, peer production seems to be the most universal and flexible. Despite being called a collaborative socio-economic or digital phenomenon, which may seem quite unconventional, the main point of this idea is to establish an efficient and appropriate model of organization and work environment for digital era/society. Peer production is characterized by "three core characteristics: (a) decentralization of conception and execution of problems and solutions, (b) harnessing diverse motivations, and (c) separation of governance and management from property and contract" (Benkler, 2016). Originally, peer production emerged as an internet, open-software or open

access collaboration that expanded to other fields of activity, mostly digital and innovative practices performed in a collaborative and open manner (Benkler, 2016; Benkler and Nissenbaum, 2006).

Peer production and mass collaboration are treated as synonyms by a part of scholars (Doan, Ramakrishnan and Halevy, 2010). Some scholars write about mass collaboration only in a specific context or due to specific problems, such as knowledge management and production of goods (Tapscott and Williams, 2008). Both terms are defined differently. Mass collaboration is defined as "the ability of large numbers of people, who may have no preexisting connection, to effectively work against a common goal" (Bradley, 2021), so the core of both conceptions remains, and in the article both designations will be used interchangeably. Apart from their designation, discussed in the paper, method or methods of collaborative work is a conductor of a specific idea that focuses on collaboration, group experimentation without supervision boundaries, voluntary participation, innovation and open sources used in work.

The first characteristic of peer production (also called commons-based peer production) relies on the collective character of the peer group organizational and institutional model. Most modern organizations are built on a hierarchical pattern of management, in which employees or members perform tasks directed by management officers appointed by executive management or directly by the owners (Steindl, 1945). In peer production groups, members solve problems independently, if necessary, collaborating with other group members to achieve the mutual goals. This type of relationship relies on self-governance and finding problem solutions in collective or independent work rather than competition between members of a centralized organization. As a result, a decentralized organization, according to the peer production concept,, is flattened or parallel complementary, which in practice means that members perform their tasks without taking orders, or that the group's structure is constructed with as few organization layers or supervision as possible (O'Neil and Broca, 2020; Benkler, 2016).

In the system of peer production, management, supervision and control are replaced with governance, leadership and peer review. In most collaborative-type organizations, governance provides basic organizational frames and does not tend to control the performance part of their members' work (Bauwens, 2005). In a traditional company, that includes management of work and ensuring that a company's needs are fulfilled. According to peer production theory, group members perform their tasks independently, without supervision, relying on self-control in organizing their work, as well as providing the best possible effect. In organized groups, part of the members need some sort of guidance, aid or consultation. In a traditional enterprise hierarchical management model, a worker is directed by a person who is responsible for the effect of his work and should be (at least in theory) more experienced and wise (Bauwens, 2005). Peer production differs from traditional forms of management in that aspect because it prefers leadership to control (Shaw and Hill, 2014). In effect, in collaborative groups, instead of managers, leaders or informal leaders, other participants show the right approach to solve problems, give advice and share values in a non-binding

manner. As a result, each group member should have in mind that self-organization and cooperation are essential for the group's success (efficient outcome), which can be perceived as the participant's success (O'Neil and Broca, 2020; Bruns, 2016; Fuster Morell, 2015). Another important factor in providing quality to group outcome is peer review, defined by Wikipedia as "evaluation of work by one or more people with similar competencies as the producers of the work". In most cases it plays a quality control role in temporary work and a group's outcome. In summary, decentralization of conception and execution of problems and solutions means that each participant works independently, without strict management control, but at the same time the group members solve problems and find solutions collectively (Bruns, 2016).

Another core characteristic of peer production, according to Y. Benkler, is various motives of project participants. In a traditional enterprise workers' motives are mostly monetary, but in peer production they correlate with theories of self-determination and satisfying social needs. Scholars distinguish intrinsic motivation – when the act of performing a task and participation in a project is a kind of reward. Spaeth and Niedergofer (2021) highlight the following intrinsic motives: enjoyment and fun, kinship amity, altruism, ideology. Extrinsic motivation relies on a situation in which the result of the work is a reward for the participant. Monetary motivation is the most common and probably the strongest motivation among workers worldwide and plays an important role for many people gathered in peer production groups. Another example of an extrinsic motive is self-improvement. A peer may join a group, and even work for free, hoping to improve and boost their career or gain useful skills. Another category of motivation is internalized extrinsic group motivation (containing features of both motives), defined as "an active, natural process in which individuals attempt to transform socially sanctioned mores or requests into personally endorsed values and self-regulations" (Spaeth and Niedergofer 2020). This means their motives are internalized extrinsic. Examples of that kind of motive are: own use value, learning, reciprocity and reputation, which contain elements of joy in performing tasks, but also reward from this performance. Theoretical and empirical research prove that multiple motives can be seen which may change during the performance of tasks in peer production groups or when facing free-market rules (Spaeth and Niedergofer, 2020; De Filippi, 2015; Deci and Ryan, 2000; Czetwertyński, 2019). Some researchers state that the most "pure" type of motive for joining a peer production group is a volunteer non-monetary purpose, but studies do not prove that commercial or financial motives collide with efficient performance of tasks or involvement in particular projects.

The third core characteristic of peer production "separates governance and management from property and contract" (Benkler, 2017) and relates to separation of ownership from control and participation in a project from contractual obligations. Peer production groups are mostly owned by the common – a group type of ownership or are organized in a scheme in which ownership can't be directly established. The participants don't perform their tasks because they are obligated by a contract executed by state officials (for breach of contracts or torts), but because their

motivation drives then to work efficiently for the group (Benkler, 2017; Bauwens, 2015; De Filippi, 2015).

2. Current issues in education

Due to the recent Covid crisis and rapid changes leading to a digital economy and society, one of the article's significant questions remains: how can education be adjusted to the following and how can knowledge be managed? Schleicher states in an OECD report (The Impact of COVID-19 on Education. Insights From Education at a Glance 2020) that the pandemic resulted in a serious economic slowdown in many developing countries, as well as in highly developed ones, and the spread of the virus caused a decline in gross domestic product, which in consequence lowered investments and government spending on education. According to some predictions, spending on education will maintain its level as before the pandemic, but nominally it will decrease (UNESCO Global Education Monitoring Report, 2020). New realities for education affected by COVID Cost predictions.). Some countries implemented immediate financial measures to support students, domestic educational systems, universities and other types of educational platforms. Government programs included: reducing costs of professional on-line courses and tuition (Australia and New Zealand), equipping schools with digital platforms and tools for distance learning, lending digital devices to less well-off students, and training school staff in methodologies and techniques for distance learning (Italy), supporting the cost of education for children that cannot attend school (England). The OECD reports that due to a lack of learning possibilities in educational facilities during the pandemic, state institutions have implemented online learning platforms, which were in some cases newly created for government use, some already existed but were contracted for state use during the pandemic or, as in Estonia, the government had already relied on private online platforms.

A United Nations Report (Policy Brief: Education during COVID-19 and beyond) concludes that distance learning provides a range of opportunities and challenges. Online courses and classes demand hardware and software tools, teachers have to be prepared for digital learning and last but not least – new solutions have to be supported by decision makers. Hopefully there is another side of this situation for developing countries or marginalized regions. Students and course participants have an unprecedented opportunity to participate in classes, seminars, courses and other learning events without having to travel (Zakharia, 2020). Before the digital society or digital age, a person desiring knowledge or wanting to participate in a scientific project in a science center was limited by time, space and resources. If a person participates in online courses, traveling, accommodation and living costs diminish. In most mentioned situations political borders and limits vanish, because it eliminates the need to apply for an entry, and people can participate in such events even in countries that seem unfriendly due to political matters. Online courses in a local or even global perspective seem to open new possibilities for a sustainable and, in some ways, egalitarian learning system (Policy Brief: Education during COVID-19 and beyond).

The paper International Commission on the Future of Education. 2020. Education in a post-COVID world: Nine ideas for public action, a part of the 2030 Agenda for Sustainable Development, provides many of the necessary signposts and guidelines are presented nine ideas for concrete actions that will advance education tomorrow:

1. Commit to strengthen education as a common good;
2. Expand the definition of the right to education so that it addresses the importance of connectivity and access to knowledge and information;
3. Value the teaching profession and teacher collaboration;
4. Promote student, youth and children's participation and rights;
5. Protect the social spaces provided by schools as we transform education;
6. Make free and open source technologies available to teachers and students;
7. Ensure scientific literacy within the curriculum;
8. Protect domestic and international financing of public education;
9. Advance global solidarity to end current levels of inequality.

At least six of the points above are strongly connected with new ways of learning, and five postulates can be realized through peer production or mass collaboration. Also, most of the following guidelines with learning schemes in which students or researchers play an active role and research activity generates a concrete outcome. Collaborative learning through mass collaboration (or peer production, depending on context or methodology) represents an innovative approach to activities, such as university research and science, business, or any other innovative projects (Fischer, 2016). It works best when: "(1) the objects of production are digital facilitating sharing and remixing; (2) the tasks can be modeled as nearly decomposable systems and can therefore be chunked into "pieces" that individuals can contribute; (3) the costs of integration and aggregation in a global, shared repository is reasonable" (Fischer, 2016). In other words, to fulfill these requirements, a lecturer or a leader must be active simultaneously to a student's activity. Students in this kind of composition must cooperate and participate equally, according to their abilities and roles in tasks they can perform collectively or individually. The objects and values students work on should be shared in a common place, eventually processed and used in a current or future project. The same ideas and patterns of collaboration are used in peer production or mass collaboration groups in high tech industries, open access projects aggregating millions of users, producing goods that are used in school teaching, education or research. In that production and learning model, a participant works individually performing his task, but also stays a part of a group exchanging ideas and values (Elliot, 2016).

3. Practical application of peer production

Collaborative learning shares some common problems with peer production. As researches point out, lack of motivation, exhaustion, or free-riding, friendship bias, and lack of collaborative skills are main problems in group knowledge projects (Le, Janssen and Wubbels, 2018). In monetary or ideologically motivated groups, such

problems can also occur, but they are mostly solved by leaders, or they fade if the motivation of the group's participants is stronger than personal animosities or other issues that could distract collective work (Le, Janssen and Wubbels, 2018). The scientific study of naming, defining and classifying groups of biological organisms based on shared characteristics (taxonomy) points out five activities applied from research of this science in general learning: (1) discussion, (2) reciprocal teaching, (3) problem solving, (4) graphical information organizing, (5) collaborative writing. Each of the mentioned activities can be used on a different ground for a different purpose, depending on the task's or participants' objectives (Zamiri and Camarinha-Matos, 2019). Even such factors as cultural context are very important for the group's efficiency, for example, if some or all of its participants' cultural background prohibits discussion, or the discussion is performed but does not lead to an actual solution. To avoid inefficiency in group work, group leaders, organizers or the group by itself should design such solutions and patterns that would ensure the best outcome in particular conditions (Le, Janssen, Wubbels, 2018; Baggetun, Rusman and Poggi, 2004).

After the discussion of theoretical aspects, some practices of mass collaboration and peer production in education and learning can be distinguished. Massive Online Courses (MOOC) are mostly courses held for a large number of people. They are provided mostly by technology platforms, but MOOCs can also participate in creating an intellectual and innovative environment, not only as a provider of services, but as a place where tools for teaching and research can be embedded. These include other internet tools or websites, such as blogs, discussion groups, chats, articles or projects performed by the members in or out of MOOC (Fischer, 2016). That form of participation can be a simple on-line course, but if students are motivated to develop their knowledge and feel free to participate, their cooperation and involvement creates new value that can be processed and reused by using more advanced tools.

Some scholars compare modern digital libraries to the ancient library of Alexandria, which gathered multiple volumes of books and documents provided not only by the authorities or the ruling class, but also by citizens of ancient Egypt. Today virtual, collective and sharable libraries create new types of libraries that not only collect volumes of books, but also accumulate knowledge and allow readers to participate actively. Participants can publish their own works in open-access publishing and share works that would not be found in most public or university libraries (Zamiri and Camarinha-Matos, 2019). Although mass collaboration is not an alternative for academic publishing, since that kind of work is reviewed by scholars in a formal manner, it can fulfill the needs of a particular research, be a great supplement for academic work or play the role of a source of information for people who seek practical, non-academic or niche knowledge. The quality of open-access publishing can be ensured by peer review or experiment and experience in a particular project. In that kind of project, research is performed by its members. Generated knowledge (also a value) circulates and is used to created new values in researches conducted in a particular project or used in new initiatives. Digitalization of work enables people to share, cross-reference and repurpose information (knowledge) within networks of

public and private institutions, universities, firms and other subjects beyond borders, but also disciplinary, institutional, commercial or other boundaries (Tapscott and Williams, 2008).

Wikipedia is often used as an example of peer production or an example of how peer production evolved from network societies to the broader phenomenon of a collective and voluntary internet phenomenon. It represents some features not mentioned in the article yet. It is created in a disintegrated way by thousands of users working individually on individual tasks, which are reviewed by experts in a certain field. These reviewers either already have an expert reputation when joining Wikipedia or gain their reputation by their performance (Jemielniak and Przegalińska, 2020). Despite their disintegration, all the Wiki projects create a single product and seem to be conceived by many people as a monolith – one encyclopedia or one group of articles. In this model, governance is more traditional than with peer production groups, because of hierarchy and a specific set of rules that position a participant as a performer of a single task that is checked by other members. The outcome is a free-access conglomerate of individual work available for everyone (Jemielniak and Przegalińska, 2020; Tkacz, 2010; Tapscott and Williams, 2008)

The process whereby members of a group collect, share, modify or review their knowledge, data, skills and other intellectual values for the purpose of solving societal issues is called collective intelligence (Zamiri and Camarinha-Matos, 2019). A very significant element of that definition is a moving and dynamic process, not a final product or definite outcome of collective work. It emerges from collaboration and shared values and the fruit of its members' work and is an improving part of a project. Another possible feature is the manifestation of some features of an individual person, because gathered data is processed by connected peers like a "collective IQ", while at the same time augmenting human intellect and creating spontaneously new value (Fu, 2016). Collective intelligence shares mutual values with other forms of collective work highlighted in the article. It aggregates shared and elaborated knowledge, and in some conditions, the experience and choices of multiple participants. The data entered into the common space is processed in a manner adequate to the group's goals, rules and specific character (Zamiri and Camarinha-Matos, 2019; Fu, 2016). However, aggregating and processing data by participants, or by an algorithm, is not an ultimate goal of collective intelligence. A comprehensive database elaborated and processed by many active users exchanging knowledge may be a very useful tool, but the main objective of collective intelligence is to solve problems and find solutions. Its role in learning and research conducted by peer production groups is to provide a more efficient search, process and extract information and to some extent, to create self-learning patterns. The most important feature and reason for creating such a phenomenon is to improve the collective outcome of the group. More advanced systems created by researchers or business generate intelligent behavior to provide solutions but regularly to achieve particular goals and apply computed solutions. The capability of collective intelligence is determined by the participant's performance and cooperation (Zamiri and Camarinha-Matos, 2019; Benkler, Shaw and Hill, 2015).

4. Conclusions

Over recent decades authors have uncovered new ideas, patterns and processes to perform, implement, and develop peer production (mass production) for educational and management purposes. Studies improving theoretical aspects and empirical analysis of data, metrics and results have created new organization concepts and solutions that allow to apply this approach in teaching, education and research, and in business and management. Collaborative work, if performed by a group of people with mutual ideas, seems to be a sufficient and modern design of an entity or project convivial for its participants. For educational facilities, it provides many new opportunities, such as on-line distance classes, forming groups consisting of a large number of students, on-line digital libraries and knowledge databases. It can also be treated as a tool for group work, giving an opportunity to boost its performance. This and other factors highlighted in the article lead to the conclusion that peer production can help create a great environment for students, especially those pursuing better skills, knowledge and who are willing to find new solutions.

From an analysis of the phenomena above and their influence on education, knowledge and related management, emerges a positive influence on teaching, knowledge processing and governing processes. As a consequence, applying peer production idea opens new prospects for educational institutions. First is starting classes, courses and research groups for people connected worldwide? It seems that in a new digital era borders would not matter in affiliating to a certain research or student group, instead it could agglomerate people of mutual ideas, values and interests wanting to work together. As a consequence, it gives educational facilities the possibility to extend their reach from local to global by lowering costs, because those facilities would bear the expenses of on-line infrastructure. These circumstances facilitate the gathering of participants and leaders who would manifest the will to create an environment of people sharing similar values and goals, which is a sine qua non condition for peer production group success.

Another advantage of transforming a traditionally managed educational facility into an institution applying a peer production model and values is the ability to transform a student group into a research group. Learning in a peer production manner is strictly connected to active participation, collecting and processing materials and data. As a result, a study group performs activities that are mostly associated with research, because on higher educational levels, research participants concentrate on the study of materials and sources in order to establish facts and reach new conclusions. Peer production concepts are similar to processes used while conducting research, therefore a group learning by research is more likely to transfer to critical thinking and cooperate to achieve mutual goals and use adequate tools.

Predictions made by such authors as F. Zakharia and by academics on the subject discussed lead to another conclusion. The changes mentioned will also be inevitable for teaching and research. New technologies and redefined globalization will allow people to connect and search for knowledge and ways of realizing their projects in a boundless manner. Also, access to education will be available, and the distance

between a student or a researcher to an educational or research facility will be shorter than ever before.

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Öğretim Elemanlarının Büyük Veri Farkındalık ve Eğitim Beklentilerinin Değerlendirilmesi[1]

(Evaluation of Big Data Awareness and Educational Expectations of Faculty Members)

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Anahtar Kelimeler: Büyük Veri, Büyük Veri Farkındalığı, Yükseköğretim, Büyük Veri Eğitimi

Makale türü: Araştırma

Öz

Bu çalışmanın amacı, Türkiye'deki öğretim elemanlarının büyük veri alanı ile ilgili farkındalık ve eğitimle alakalı beklentilerinin analiz edilmesidir. Bu doğrultuda öğretim elemanlarının büyük veri ile ilgili, aşina oldukları ve kullandıkları yazılımları, akademik ilgileri ve eğitimle alakalı beklentileri ortaya konulmuştur. Araştırmaya, Ankara ilinde belirlenen üniversitelerin Bilgisayar Mühendisliği, Matematik, İstatistik ve Yönetim Bilişim Sistemleri bölümlerinde ders veren 153 öğretim elemanı veri sağlamıştır. Elde edilen veriler tek örneklem t-testiyle analiz edilmiştir. Bulgulara göre, öğretim elemanları tarafından en çok aşina olunan büyük veri yazılımları Oracle Big Data, Apache Hadoop, Microsoft Hadoop ve Spark, en çok kullanılan yazılımlar ise sırayla Apache Hadoop, Oracle Big Data, Spark ve HDFS olmuştur. Öğretim elemanlarının büyük veriyle ilgili akademik ilgilenimleri, tamamlamakta oldukları veya halen devam eden akademik çalışmaları üzerinden gösterilmiştir. Büyük veri ile ilgili eğitim beklentileri ise, oluşturulan anket formunda yer alan ifadelerin ortalamalarının analiz edilmesiyle değerlendirilmiştir. Elde edilen bulgular uygulamaya yönelik tavsiyelerle birlikte tartışılmıştır.

Keywords: Big Data, Big Data Awareness, Higher Education, Big Data Eduation

Paper type: Research

Abstract

This study aims to determine the awareness of academicians about the big data field and their expectations about big data education in Turkey. In this context, the big data softwares that academicians are familiar with or previously used, academic interests, and expectations about education are analyzed. One hundred fifty-three academicians provided the data in the Computer Science, Mathematics, Statistics, and Management Information Systems departments of universities in Ankara. For the analysis of the survey data, t-test analysis was used. According to the findings, big data software that academicians are most familiar with were Oracle Big Data, Apache Hadoop, Microsoft Hadoop, and Spark. The most used big data softwares were Apache Hadoop, Oracle Big Data, Spark, and HDFS. The academic interest of faculty members in big data is demonstrated through their published and ongoing academic studies. The educational expectations of the academicians were discussed by analyzing the means of the items. Findings discussed with implications.

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Giriş

Büyük veri, bilişim ve teknoloji dünyasında özellikle son yıllarda çok fazla adından söz edilen ve ilgi duyulan bir araştırma alanı olmuştur. Teknolojinin hızla ilerlemesi, internetin gelişmesi ve sosyal medya kullanımının artış göstermesi gibi birçok faktörle beraber verinin büyüklüğü de hızla artmaktadır. Verinin büyüklüğünün çok hızlı artması, internet ve sosyal medya üzerinden erişilebilen kullanıcıların ürettiği veriler dolayısıyla olmaktadır. Bunun dışında sağlık uygulamalarından gelen veriler, sensör verileri, sunuculardan alınan log kayıtları da farklı kaynaklardan gelen verilere örnek olarak verilmektedir. Uluslararası Veri Kurumu (IDC)[2], dünyadaki verilerin her iki yılda bir, ikiye katlandığını iddia etmektedir. IDC istatistiklerine göre, 2018'den 2025'ye kadar ulaşılacak veri miktarının 33 zetabaytdan[3] 175 zetabayta kadar artacağı öngörülmektedir (Rydning, 2018).

Büyük veri uygulamaları Facebook, Google, Yahoo, LinkedIn ve daha birçok büyük teknoloji şirketleri tarafından yaygın olarak kullanılmaktadır. MGI[4]'nın raporunda, büyük verinin şirketlere çok büyük bir gelişme ve finansal fırsatlar sunduğu belirtilmiştir (Manyika vd., 2011). Amerika Birleşik Devletleri'nde yayınlanan raporlar ve hükümetin bu alana verdiği önem sonucunda, eğitim alanında büyük veri ile ilgili gelişmeler başlamıştır. 2016 yılında, ABD Federal Büyük Veri Ar-Ge planlarının geliştirilmesi veya genişletilmesi için rehberlik sağlayan Federal Büyük Veri Araştırma ve Geliştirme Stratejik Planı yayınlamıştır. Bu plan, büyük veri araştırma ve geliştirme için önemli görülen temel alanları temsil eden aşağıdaki yedi strateji etrafında inşa edilmiştir (Marzullo, 2016);

1. Büyük veri temelleri, teknikleri ve teknolojilerini kullanarak yeni nesil yetenekler oluşturma
2. Verinin güvenilirliğini anlamak ve keşfetmek, daha iyi kararlar vermek, yeni keşifler sağlamak ve güvenli bir şekilde harekete geçmek için Ar-Ge'yi destekleme
3. Temsilci misyonlarını destekleyerek büyük veri inovasyonu sağlayan siber altyapı araştırmasını oluşturmak ve geliştirmek
4. Veri yönetimi ve paylaşımını destekleyen politikalar yoluyla verinin değerini artırma
5. Büyük veri toplama, paylaşma, güvenlik, gizlilik ve etikle alakalı olarak kullanımına yönelik anlama
6. Daha geniş işgücüne yönelik hem derin analitik yetenek hem de analitik kapasite talebinin artması için büyük veri eğitimi ve öğretiminin ulusal olarak geliştirilmesi
7. Ulusal Büyük Veri inovasyon ekosisteminde bağlantılar sağlama ve geliştirme

[2] IDC: International Data Corporation

[3] 1 Zetabayt = 1,024 [7] bayt

[4] McKinsey Global Enstitüsü: 1990 yılında kurulan McKinsey şirketinin işletme ve araştırma enstitüsüdür.

Eğitimciler ve eğitim sağlayıcıları, öğrencileri bugünün ve yarının analitikle ilgili pozisyonlarına hazırlayan programlarla analitik becerilere yönelik artan talebe proaktif bir şekilde yanıt vermek zorundadır (Miller ve Hughes, 2017). Amerika Birleşik Devletleri'ndeki kolejler ve üniversiteler tarafından yürütülen federal destekli araştırmaların bir kısmını finanse eden ABD Ulusal Bilim Vakfı, 2012 yılında kendi başına bir disiplin olarak kurulan veri bilimine, büyük veri uygulamaları programını dâhil ederek bu alana katkıda bulunmuştur (National Science Foundation [NSF], 2019). Ulusal Bilim Vakfı, Bütünleştirici Faaliyetler Ofisi Başkanı Suzanne Iacono, ABD Federal Hükümetin üç nedenden dolayı büyük veriyle ilgilendiğini ifade etmektedir;

1. Ticareti ve ekonomiyi canlandırmak
2. Keşif hızını arttırmak ve yeni faaliyetler sağlamak
3. Eğitim, sağlık ve kamu güvenliği konularındaki ulusal zorlukların üstesinden gelmek

1. **Büyük Veri**

Büyük veri ifadesinin kavramsallaşması, *bilgi patlaması (information explosion)* ifadesinin ilk defa 1941 yılında Oxford İngilizce Sözlüğü tarafından kullanılmasıyla başlamıştır. 1944 yılında Fremont Rider'ın, Amerikan üniversite kütüphanelerinin 16 yılda bir iki katına çıktığını ileri sürdüğü *Bilimsel Araştırma Kütüphanesinin Geleceği* adlı makalesindeki ifadelere göre, 2040 yılında Yale Üniversitesinin kütüphanesinde 6.000 milden[5] fazla rafı işgal edecek 200.000.000 cilt olacağını ve bunlar için 6000'den fazla çalışanın olması gerektiğini ileri sürmüştür (Press, 2013).

1.1. Büyük Veri Tanımı

Büyük veri, geleneksel veri tabanı teknolojileriyle saklanması, işlenmesi ve analiz edilmesi zor olan veri hacmindeki artışı ifade etmek için kullanılan bir terimdir (Hashem ve diğerleri, 2015). Büyük veri kelime olarak üretilmiş çok miktarda veri anlamındadır. McKinsey Global Enstitüsü raporunda büyük veri, "*Boyutu, geleneksel veri tabanı yazılım araçlarının kaydettiği, yönettiği ve analiz ettiği yeteneklerin ötesinde bir boyuta sahip olan veri setleri*" olarak tanımlanmıştır (Manyika ve diğerleri, 2011). Gartner[6] analistlerinden Doug Laney, 2001'de yapılan araştırma raporuna göre büyük veriyi üç boyutuyla (3V: Volume, Velocity, Variety) ele alan ilk isim olmuştur (Laney, 2001). Daha sonra 2012'de, Gartner tanımını yüksek hacimli, çok çeşitli ve yüksek hızlı olarak güncellemiştir (Laney, 2012). 2005 yılında O'Reilly Media'dan[7] Roger Mougalas, Web 2.0 terimini oluşturduktan bir yıl sonra büyük veriyi, geleneksel iş zekâsı araçlarını kullanarak yönetimi ve işlenmesi neredeyse imkânsız olan geniş bir veri grubu olarak tanımlamıştır (Dontha, 2017). Davis ve Patterson ise "*SQL gibi geleneksel veri tabanı protokolleri tarafından analiz edilemeyecek kadar büyük boyutlarda olan*

[5] 1 mil = 1,6 km

[6] 1979 yılında kurulan araştırma ve danışmanlık şirketi

[7] Tim O'Reilly tarafından kurulmuş olan bu şirket, kitap yayınlamakta, teknik konferanslar düzenlemekte ve çevrimiçi öğrenme platformu sağlamaktadır.

veri" olarak tanımlamışlardır (Davis ve Patterson, 2012:4). Çeşitli kaynaklarda yer alan büyük veri tanımları Tablo 1'de gösterilmektedir.

Tablo 1. Çeşitli kaynaklarda büyük veri tanımları

Kaynak	**Tanım**
(Beyer ve Laney, 2012)	Gelişmiş görüş ve karar alma için yenilikçi, düşük maliyetli bilgi işleme biçimleri talep eden yüksek hacim, hız ve çeşitlilikte bilgi varlıklarıdır.
(Dijcks, 2012)	Büyük veriyi tanımlayan dört özellik hacim, hız, çeşitlilik ve değerdir.
(Intel, 2012)	Karmaşık, yapılandırılmamış veya büyük miktarda verilerdir.
(Suthaharan, 2013)	Üç veri özelliği kullanılarak tanımlanabilir: nicelik, süreklilik ve karmaşıklık
(Schroeck ve diğerleri, 2012)	Büyük veri, kuruluşların günümüzün dijitalleşen pazarda rekabet avantajını kazanması için bir fırsat yaratan hacim, çeşitlilik, hız ve gerçeklik kombinasyonudur.
(NIST Big Data Public Working Group, 2014)	Verimli depolama, manipülasyon ve analiz için ölçeklenebilir bir mimari gerektiren hacim, hız ve çeşitlilik özelliklerinde büyük veri kümeleridir.
(Ward ve Barker, 2013)	NoSql, Map-Reduce ve Makine Öğrenmesi tekniklerinin ve daha fazlasının kullanıldığı büyük ve karmaşık veri kümelerinin analizi ve depolanmasıdır.
(Microsoft, 2013)	Büyük ve karmaşık bilgi kümelerine makine öğrenmesi ve yapay zeka kullanılarak bilgi işlem uygulama sürecidir.
(Dumbill, 2013)	Geleneksel veritabanı sistemlerinin işlem kapasitesini aşan verilerdir.
(Fisher ve diğerleri, 2012)	Kolayca idare edilemeyen ve işlenemeyen verilerdir.
(Shneiderman, 2008)	Bir ekrana sığmayacak kadar büyük veri kümesidir.
(Manyika ve diğerleri, 2011)	Boyutu, tipik veritabanı yazılımı araçlarının tutma, saklama, yönetme ve analiz etme yeteneğinin ötesinde olan veri kümeleridir.
(Chen ve diğerleri, 2012)	İleri ve benzersiz veri depolama, yönetim, analiz ve görselleştirme teknolojileri gerektirecek kadar büyük ve karmaşık uygulamalardaki veri kümeleri ve analitik teknikleridir.
(Boyd ve Crawford 2012)	Teknoloji, analiz ve mitoloji etkileşimine dayanan kültürel, teknolojik ve bilimsel bir olgudur.
(Mayer-Schönberger ve Cukier, 2013)	Toplumu nasıl anladığımızı ve örgütlediğimizi, dönüştüren bilgileri analiz etme yöntemimizde üç önemli değişiklik meydana getiren olgu: 1.Daha fazla veri, 2. Messier (eksik) veri, 3. Nedenselliğin ötesinde korelasyon

Kaynak: (De Mauro, Greco ve Grimaldi, 2015)

1.2. Büyük Veri Karakteristikleri

Geleneksel araçlar ve yöntemler, sürekli büyüyen verileri yönetmek ve analiz etmek için uygun bulunmamaktadır. Yeni yöntem ve araç kullanımı gereksinimleri, verinin değişmesinden kaynaklanmaktadır. Büyük verinin karakteristiklerine bakmadan önce, geleneksel veriler ve büyük veri arasındaki farklılıkları ortaya koymak

gereklidir. Bu farklılıklar, büyük veri karakteristiklerinin belirlenmesinde önemli rol oynamaktadır ve Tablo 2'de sıralanmıştır.

Tablo 2. Geleneksel veri ve büyük veri arasındaki farklılıklar

No	Geleneksel Veri	Büyük Veri
1	Yapısal Veri	Yapısal olmayan veya Yarı-yapısal Veri
2	Verilerin boyutu çok küçük	Boyut, geleneksel veri boyutundan çok büyük
3	Veriler merkezidir	Veriler dağıtıktır
4	Veriler üzerinde çalışmak ve işlemek kolaydır	Verileri işlemek zordur
5	Normal sistem yapılandırması, verileri işlemek için yeterlidir	Verileri işlemek için yüksek sistem yapılandırması gerekmektedir
6	Geleneksel bir veri tabanı aracı yeterlidir	Özel araçlar gerekmektedir
7	Verileri işlemek için normal fonksiyonlar yeterlidir	Verileri işlemek için özel fonksiyonlar gerekmektedir

Kaynak: (Rajendran, Asbern, Kumar, Rajesh ve Abhilash, 2016)

Büyük veri, bazı kaynaklarda, 3V'ye ek olarak değer veya gerçeklik özellikleri de eklenerek oluşturulan 4V modeli ile tanımlanmıştır (Singh ve Singh, 2017; Trifu ve Ivan, 2014). Ancak en çok kullanılan, hacim, hız, çeşitlilik, gerçeklik ve değer bileşenlerinden oluşan 5V modelidir (Gahi, Guennoun ve Mouftah, 2016), Tablo 3'te büyük verinin 5V karakteristik özellikleri gösterilmektedir.

Tablo 3. Büyük verinin 5V karakteristik özellikleri

Veri Hacmi (Volume)	Veri Hızı (Velocity)	Veri Çeşitliliği (Variety)	Veri Gerçekliği (Veracity)	Veri Değeri (Value)
Terabaytlar Kayıtlar İşlemler Tablolar Dosyalar	Batch Gerçek Zamanlı Yakın Zamanlı Süreçler Akışlar	Yapısal Yarı Yapısal Yapısal Olmayan Çok Faktörlü Olasılıksal	Güvenilirlik Geçerlilik Kaynak Saygınlık Ulaşılabilirlik Hesaplanabilirlik	İstatistiksel Olgular Korelasyonlar Varsayımlar

Kaynak: (Demchenko, Grosso, deLaat ve Membrey, 2013)

1.3. Büyük Veri ve Eğitim

Teknoloji, kurumların yeni zorluklarla yüzleşme yeteneklerini güçlendirerek, amacını ve değerini değiştirmektedir. Eğitim kurumları da, büyük veri ve analitiği kullanımı ile birlikte karar alma mekanizmalarını geliştirmektedir. Yükseköğretimde çok fazla miktarda verinin mevcut olduğu ancak bu verilerin verimli bir şekilde kullanılmadığı görülmektedir. MGI'nın raporunda, yükseköğretimin veri toplama, bilgi teknolojileri yoğunluğu ve veriye dayalı karar vermede, endüstrinin tüm sektörleri arasında zayıf olduğuna dikkat çekiliyor. Kütüphane kullanımı, öğrenme yönetim sistemleri ve Twitter gibi sosyal etkileşimler yoluyla elde edilen, kullanıcıların dijital verileri, kurumsal süreçlerin başarısı ile ilgili girdilere yol açmaktadır. Büyük veri ve analitiği, yükseköğretime, karar verme ve kaynak yönetimi, risk analizi ile öğrenci başarısının arttırılması, kurumsal büyümenin arttırılması,

yenilikçi modeller geliştirilmesi gibi değerler katabilmektedir (Tulasi, 2013). 2010-2020 yılları arasında, Scopus veritabanında 'büyük veri' ve 'yükseköğretim' anahtar kelimeleri içeren makaleler araştırıldığında, makalelerin %30'u 'Öğretme ve Öğrenme Analitiği' (Teaching and Learning Analytics), % 15'i 'E-Öğrenme', %15'i 'zorluklar ve fırsatlar' konusu ile ilgili olduğu ortaya çıkmıştır. Ardından, müfredat geliştirme, etik/mahremiyet, değerlendirme, görselleştirme, benimseme, modelleme ve eğitim politikası ve zorluklar konularını içermektedir (Aytaç ve Bilge, 2020). Büyük veri birçok alanda yükseköğretime değer katacaktır. Bunladan bazıları şu şekilde sıralanmaktadır (Siemens ve Long, 2011):

1. İdari karar alma ve örgütsel kaynak tahsisini geliştirebilmektedir.
2. Risk altındaki öğrencileri tanımlayabilmekte ve öğrencilerin başarıya ulaşmalarına yardımcı olmak için müdahale sağlayabilmektedir. Eğitimciler, Moodle gibi Öğrenme Yönetim Sistemlerinde okunan mesajların, gönderilen tartışma mesajlarının ve ödevleri tamamlamanın analizi ile okulu bırakma riski olan öğrenciler belirlenebilmektedir.
3. Şeffaf veriler ve analizler yoluyla kurumun başarıları ve karşılaştıkları zorluklar ile ilgili olarak ortak bir anlayış oluşturabilmektedir.
4. Akademik modeller ve pedagojik yaklaşımların yanı sıra üniversite sistemini de yenileyerek değişiklik yapabilmektedir.
5. Sosyal ağlar ile teknik ve bilgi ağlarının birleşimi yoluyla karmaşık konuların anlaşılmasına yardımcı olabilmektedir: yani algoritmalar, veri ve risk altındaki zorlukları tanıyabilmekte ve bunlarla ilgili bilgi sağlayabilmektedir.
6. Yöneticilerin, karmaşık bir disiplindeki çeşitli unsurların (örneğin, maliyetlerin düşürülmesi) etkisini araştırmak için senaryoları ve deneyleri analiz ederek bütünsel karar verme sürecine geçmelerine yardımcı olabilmektedir.
7. Güncel bilgi sağlayarak ve zorluklara hızlı yanıt vererek kurumsal üretkenliği ve etkinliği artırabilmektedir.
8. Kurumsal yöneticiler tarafından yürütülen zor (örneğin, patentler, araştırmalar) ve kolay (örneğin, itibar, profil, öğretim kalitesi) fakülte faaliyetlerini belirlemelerine yardımcı olabilmektedir.
9. Öğrencilere kendi öğrenme alışkanlıkları hakkında bilgi verebilmekte ve gelişim için önerilerde bulunabilmektedir. Örneğin, Maryland Üniversitesi'nin 'Etkinliğimi Kontrol Et' aracı gibi öğrenmeye yönelik analizler, öğrencilerin kendi etkinliklerini, sınıf arkadaşlarının etkinliklerinin anonim bir özeti ile karşılaştırmasına olanak sağlayabilmektedir.

Birçok sektörde olduğu gibi eğitim sektöründe de büyük veri analitiği alanının katkısı belirgin bir şekilde göze çarpmaktadır. Bu bağlamda hem eğitim alanında hem de diğer alanlarda büyük veri analitiğinden faydalanmak için bu alanda yetişmiş personel açığının kapatılması yönünde adımlar atılmalıdır. Bu adımlar, öncelikle bu

alanda lisans ve yüksek lisans programlarının açılması ile ardından ilgili bölümlerde seçmeli ve zorunlu derslere yer verilmesi ile mümkün olabilmektedir. Örneğin Pace Üniversitesi, veri bilimi alanında 2015 yılında, lisans öğrencilerinin işletme, matematik, istatistik, grup çalışmaları ve üst düzey teknoloji becerilerini geliştirmeleri için tasarlanlanan 'Büyük Veri Analitiği Kavramları' dersini, lisans düzeyinde müfredatlarına eklemeye karar vermiştir (Lawler ve Molluzzo, 2015). ACM ve IEEE'nin 2005 yılında yayınladığı bilişim müfredatında, Bilgisayar Mühendisliği, Bilgisayar Bilimleri, Bilgi Sistemleri, Bilgi Teknolojileri ve Yazılım Mühendisliği olmak üzere beş temel lisans programı yer almaktayken (ACM ve IEEE, 2005:7), 20 ülkeden 50 uzmanın değerlendirmesiyle hazırlanan 2020 yılı bilişim müfredatına bu beş alana ek olarak Siber Güvenlik ve Veri Bilimi programları eklenmiştir. Veri bilimi lisans programında bilişimin temelleri, veri gereksinimi ve yönetimi, veri erişimi ve depolanması, veri gizliliği, güvenliği ve bütünlüğü, makine öğrenmesi, veri madenciliği, büyük veri, veri analizi ve sunumu gibi alanlar yer almaktadır (ACM ve IEEE, 2020:30). 2013-2016 yılları arasında yayınlanan öneri belgelerinde, lisans müfredatı, dağıtık paralel işleme algoritmaları ve depolama yapıları gibi konuları bir ölçüde içeren dersler olsa da, büyük veri varlığı olan dersler bulunmamaktadır (ACM ve IEEE, 2013:14, 2016:14).

Yükseköğretimde büyük veri alanına verilen önem küresel olarak artmakta, büyük veri alanının da içinde bulunduğu Veri Bilimi lisans programlarının sayısı her geçen yıl artmaktadır. Sadece Veri Bilimi olarak değil, Büyük Veri ve İşletme Analitiği (Suffolk Üniversitesi), Büyük Veri Yönetimi ve Uygulamaları (SUSTech), İstatistik ve Veri Bilimi (Colorado Eyalet Üniversitesi), Matematik ve Veri Bilimi (Güney Dakota Eyalet Üniversitesi), Moleküler Biyoloji ve Büyük Veri (Arizona Üniversitesi), İşletme Yönetimi ve Veri Analitiği (Kansas Eyalet Üniversitesi), Veri Bilimi ve İktisat (Colorado Eyalet Üniversitesi), Muhasebe ve Veri Analitiği (St. Mary's Üniversitesi) gibi çok çeşitli alanlarda büyük veri konusunu kapsayan lisans programları açılmaktadır (BachelorsPortal, 2021). Türkiye'de büyük veri ile ilgili doğrudan bir bölüm yoktur ancak veri bilimi ile ilgili tek lisans bölümü 2020-2021 eğitim öğretim yılında ilk öğrencilerini kabul eden İstanbul Teknik Üniversitesi (İTÜ)'nde yer almaktadır. İTÜ, Yapay Zeka ve Veri Mühendisliği bölümünü açarak, Türkiye'nin yapay zeka ve veri bilimini birleştiren ilk bölüm olduklarını belirtmiştir (İstanbul Teknik Üniversitesi, 2020). Büyük veri ile ilgili dersler içeren Yapay Zeka Mühendisliği bölümü ise ilk olarak, Hacettepe ve TOBB Ekonomi ve Teknoloji üniversitelerinde 2019-2020 eğitim öğretim yılında lisans düzeyinde açılmıştır. Ardından 2020-2021 eğitim öğretim yılında Bahçeşehir Üniversitesi de Yapay Zeka Mühendisliği bölümünü açarak, toplamda Türkiye'de sadece üç üniversitede bu bölüm bulunmaktadır (YÖK Atlas, 2020).

2. YÖNTEM

2.1. Amaç

Bu çalışmanın amacı, öğretim elemanlarının büyük veri alanı ile ilgili farkındalık ve eğitimle alakalı beklentilerinin değerlendirilmesidir. Bu doğrultuda aşağıdaki soruların cevapları aranmaktadır.

- Öğretim elemanlarının aşina oldukları ve kullandıkları büyük veri yazılımları nelerdir?
- Öğretim elemanlarının büyük veri alanına yönelik akademik ilgileri ne yöndedir?
- Öğretim elemanlarının büyük veri alanı ile ilgili eğitimle alakalı beklentileri nelerdir?

2.2. Örneklem

Araştırmanın evreni olarak Ankara ilinde Tablo 4'te belirtilen üniversitelerin Bilgisayar Mühendisliği, Matematik, İstatistik ve Yönetim Bilişim Sistemleri bölümlerinde ders veren öğretim elemanları olarak belirlenmiştir. Toplam 153 üniversite öğretim elemanı araştırmaya veri sağlamıştır. Başkent, Ostim Teknik ve Ankara Yıldırım Beyazıt üniversitelerinin Yönetim Bilişim Sistemleri bölümündeki öğretim elemanları araştırmanın evrenine dâhil edilmiştir. Bilgisayar Mühendisliği, Matematik ve İstatistik bölümlerinde ise anket sorularına cevap veren öğretim elemanlarının bölümlerindeki öğretim elemanları sayısı evrene dâhil edilmiştir. Bu doğrultuda üniversitelerin belirlenen bölümlerindeki öğretim elemanlarının sayısı her üniversitenin resmi web sayfasından alınarak, araştırmanın evreni 248 olarak belirlenmiştir. Krejcie ve Morgan (1970), örneklem büyüklüğü belirleme tablosunda 0,05 örnekleme hatası (d) ile 250 kişilik bir evren için, 152 kişilik bir örneklem olması gerektiğini belirtmektedir. Bu doğrultuda, 248 evren büyüklüğünde 153 öğretim elemanının katıldığı örneklem, araştırma yapmak için uygun olduğu gözlemlenmektedir. Katılımcılara dair çeşitli tanımlayıcı ve demografik istatistikler Tablo 4'te gösterilmiştir.

Tablo 4. Öğretim elemanlarının tanımlayıcı istatistikleri

		N	%
Cinsiyet	Erkek	110	71,9
	Kadın	43	28,1
Üniversite	Ankara Üniversitesi	17	11,1
	Ankara Yıldırım Beyazıt Üniversitesi	7	4,6
	Atılım Üniversitesi	15	9,8
	Başkent Üniversitesi	17	11,1
	Bilkent Üniversitesi	6	4
	Çankaya Üniversitesi	10	6,5
	Gazi Üniversitesi	23	15
	Hacettepe Üniversitesi	17	11,1
	Orta Doğu Teknik Üniversitesi	19	12,4
	Ostim Teknik Üniversitesi	11	7,2
	TOBB Ekonomi Ve Teknoloji Üniversitesi	7	4,6
	Belirtilmemiş	4	2,6
Unvan	Prof.Dr.	57	37,3
	Doç. Dr.	22	14,4
	Dr. Öğr. Üyesi	46	30,1
	Dr. Öğr. Gör.	1	0,7
	Öğr. Gör.	13	8,5
	Araş. Gör.	12	7,8
	Belirtilmemiş	2	1,4
Bölüm	Bilgisayar Mühendisliği	64	41,8
	İstatistik Bölümü	34	22,2
	Matematik Bölümü	36	23,5
	Yönetim Bilişim Sistemleri	15	9,8
	Belirtilmemiş	4	2,6
Toplam		153	100,0

Katılımcıların %71,9'u erkek, %28,1'i kadındır. En çok katılım sırayla Gazi, Orta Doğu Teknik, Hacettepe, Ankara ve Başkent üniversitelerinden olmuştur. Bu üniversitelerin katılımları %10'un üzerindedir. Atılım Üniversitesi'nden de %10'a yakın katılım sağlanmıştır. Bölüm olarak en çok katılım %41,8'lik oranla Bilgisayar Mühendisliği'nden olmuştur. Matematik bölümünden %23,5, İstatistik bölümünden %22,2, Yönetim Bilişim Sistemleri bölümünden %9,8 oranında katılım sağlanmıştır. Katılımcıların %2,6'sı üniversite belirtmemiştir. Katılımcıların %37,3'ü Profesör, %14,4'ü Doçent, %30,1'i Dr. Öğretim Üyesi, %8,5'i Öğretim Görevlisi, %7,8'si Araştırma Görevlisi ve %0,7'si de Dr. Öğretim Görevlisi olarak belirlenmiştir. Katılımcıların %1,4'ü unvan belirtmemiştir.

2.3. Veri toplama

Bu çalışmada veriler, nicel araştırma yöntemlerinin veri toplama yöntemi olan anket yoluyla elde edilmiştir. Anket üç bölümden oluşmaktadır. Birinci bölüm, öğretim elemanlarının büyük veri alanına olan akademik ilgileri ve büyük veri yazılımlarına olan aşinalık ve kullanımlarıyla ilgili dokuz sorudan oluşmaktadır. İkinci bölümde, öğretim elemanlarının büyük veri konusundaki beklentilerini anlamaya ve Türkiye'deki mevcut durumu değerlendirmelerine yönelik ifadelerin yer

aldığı 21 maddelik bir soru formu hazırlanmıştır. Üçüncü bölümde ise, katılımcıların, cinsiyet, unvan, bölüm ve üniversite bilgilerinin yer aldığı demografik sorular yer almaktadır. Anket soruları çevrimiçi olarak tasarlanmıştır ve ilgili üniversitelerdeki öğretim elemanlarına e-posta yoluyla ulaştırılmıştır. Söz konusu form için herhangi bir ölçek geliştirme çalışması örneklemin az olması sebebiyle gerçekleştirilmemiştir.

2.4. Araştırmanın kısıtlılıkları

Bu araştırma, büyük veri alanı ile ilgili olabilecek bölümlerde eğitim veren öğretim elemanlarını içermektedir. Bu doğrultuda, çalışmaya katılım Ankara ili içerisindeki 11 üniversitenin Bilgisayar Mühendisliği, Matematik, İstatistik ve Yönetim Bilişim Sistemleri bölümlerinde ders veren öğretim elemanları ile kısıtlanmaktadır. Yönetim Bilişim Sistemleri bölümü, Başkent, Ostim Teknik ve Ankara Yıldırım Beyazıt üniversitelerinde yer alan öğretim elemanları ile kısıtlanmaktadır. Bilgisayar Mühendisliği, Matematik ve İstatistik bölümlerinde ise anket sorularına cevap veren öğretim elemanlarının bölümleri ile kısıtlanmaktadır. Öğretim elemanlarının yoğunluğu nedeniyle örnekleme ulaşmada zorluklar yaşanmıştır.

2.5. Verilerin analizi

Bu çalışmada, anket verilerinin analizi için SPSS 20.0 yazılımı ile veri analizi yöntemlerinden t-testi analizi kullanılmıştır. Ortalama farkı olarak da bilinen bu yöntemde, temel olarak iki ortalama karşılaştırılır ve istatistiki olarak bir fark olup olmadığı ölçülür. Tek örnek t-testi, bağımlı iki grup ortalamasının testi ve bağımsız iki grup t-testi olmak üzere üç t-testi yöntemi vardır (Kurtuluş, 2010). Burada tek örnek t-testi yöntemi kullanılmıştır. Bu yöntemde, bir tek örneğe ait olan ortalamanın beklenen bir ortalamadan veya belirlenen bir değerden farkının ölçülmesi ile gerçekleştirilir.

2.6. Bulgular

Kurtuluş (2010), Cronbach's alpha değerinin en az 0,70 olmasının uygun olduğunu belirtmektedir. Bu çalışmada güvenilirlik analizi yapıldığında, Cronbach's alpha değeri 0,865 olarak hesaplanmıştır. Tablo 5 incelendiğinde, öğretim elemanları tarafından en çok aşina olunan büyük veri yazılımları Oracle Big Data, Apache Hadoop, Microsoft Hadoop ve Spark, en çok kullanılan yazılımlar ise sırayla Apache Hadoop, Oracle Big Data, Spark ve HDFS olmuştur. Ancak kullanılan yazılım sayılarının oldukça düşük olduğu görülmektedir. Katılımcıların aşina oldukları ve kullandıkları büyük veri yazılımlarının detaylı tablosu Ek-1'de paylaşılmıştır.

Tablo 5. Öğretim elemanlarının büyük veri yazılımlarına aşinalıkla ilgili tanımlayıcı istatistikleri

	Ortalama (μ)	**Standart Sapma**
Aşina olunan büyük veri yazılım sayısı	2,73	3,414
En az bir kere kullanılan büyük veri yazılım sayısı	1,08	2,113
		n
En fazla tanınan yazılımlar	Oracle Big Data	76
	Apache Hadoop	67
	Microsoft Hadoop	46
	Spark	30
En fazla kullanılan yazılımlar	Apache Hadoop	19
	Oracle Big Data	11
	Spark	10
	HDFS	8
	Hiçbirini kullanmadım	55

Tablo 6'da akademisyenlerin büyük veriyle ilgili akademik ilgilenimleri, tamamlamakta oldukları veya halen üzerinde çalıştıkları akademik çalışmalar üzerinden gösterilmektedir. Akademisyenlerin %15,5'inin büyük veri ile ilgili yayınlanmış bilimsel makalesinin olduğu ve %17'sinin devam etmekte olan yayınının olduğu görülmektedir. Akademisyenlerin %7,8'inin tamamlanmış projesi varken, %14,4'ünün halen devam etmekte olan projesinin olduğu görülmektedir. Bu yüzdelere bakıldığında bilimsel yayın ve proje geliştirme konusunda öğretim elemanlarının büyük veri alanına olan ilgilerinin arttığı gözlemlenmektedir. Akademisyenlerin büyük veri konusu ile ilgili yürütülmüş olan lisansüstü tez danışmanlığının oranı %13'7 iken, yürütmekte olunan tez danışmanlığı oranı %8,5 olduğu görülmektedir. Öğretim elemanlarının büyük veri alanı ile ilgili yürütmekte oldukları tez danışmanlıklarında, tamamlanmış tez danışmanlıklarına göre azalma olduğu görülmektedir.

Tablo 6. Büyük veri alanına yönelik akademik ilgi

	Evet		**Hayır**	
İfade	**n**	**%**	**n**	**%**
1. Büyük Veri konusu ile ilgili yayınlanmış bilimsel yayınınız var mı?	24	15,5	129	84,3
2. Büyük Veri konusu ile ilgili üzerinde çalışmakta olduğunuz (halen devam etmekte olan) bilimsel yayınınız var mı?	26	17	127	83
3. Büyük Veri konusu ile ilgili tamamlanmış projeniz var mı?	12	7,8	141	92,2
4. Büyük Veri konusu ile ilgili üzerinde çalışmakta olduğunuz (halen devam etmekte olan) projeniz var mı?	22	14,4	131	85,6
5. Büyük Veri konusu ile ilgili yürütmüş olduğunuz lisansüstü tez danışmanlığınız var mı?	21	13,7	132	86,3
6. Büyük Veri konusu ile ilgili yürütmekte olduğunuz lisansüstü tez danışmanlığınız var mı?	13	8,5	140	91,5

Bu çalışmada merak edilen sorulardan biri de öğretim elemanlarının mevcut lisans müfredatında büyük veri konusundan bahsedip bahsetmediği ve eğer bahsediyorsa

bunun hangi derslerde olduğudur. Tablo 7'de, katılımcıların %7,8'i büyük veri ile ilgili bir ders yürüttüğünü belirtmektedir. Büyük veri ile ilgili yürütülen dersler içerisinde, Büyük Veri, Büyük Veri Programlama, Büyük Veri ve Kişisel Veri Güvenliği, Dağıtık Veri İşleme ve Analiz ve Veri Madenciliği gibi derslerin bulunduğu görülmektedir. Katılımcıların %38'i yürüttükleri derslerde büyük veri konusundan bahsettiklerini belirtmektedir. Katılımcıların verdikleri cevaplar doğrultusunda büyük veri konusundan bahsedilen derslerin çok çeşitli olduğu ve farklı bölümleri ilgilendirdiği görülmektedir. Büyük veri konusundan bahsedilen derslerin oranının yüksek olması ve çok çeşitli derslerde bahsedilmesi, ihtiyaç duyulan bir ders olduğu sonucuna varılabilmektedir.

Tablo 7. Büyük veri konusunun bahsedildiği dersler

		Evet		**Hayır**	
		n	**%**	**n**	**%**
Lisans düzeyinde büyük veri ile ilgili her hangi bir ders yürüttünüz mü?		12	7,8	141	92,2
Yürütmüş olduğunuz dersin adını belirtiniz.					
Bilgi Sistemleri	İstatistik ve Akıllı Yaklaşımlar				
Büyük Veri	Veri Madenciliği				
Büyük Veri Programlama	Veri Yoğunluğu Uygulamaları				
Büyük Veri ve Kişisel Veri Güvenliği	Yönetim Bilişim Sistemleri				
Dağıtık Veri İşleme ve Analiz	Zaman Serisi Analizi				
		n	**%**	**n**	**%**
Lisans düzeyinde yürüttüğünüz derslerin herhangi birinde büyük veri konusundan bahsediyor musunuz?		58	37,9	95	62,1
Lisans düzeyinde Büyük Veri konusundan hangi derste bahsediyorsunuz?					
Algoritma	Oyunlaştırma				
Bilişim Sistemleri Giriş	Örüntü Tanıma				
Bilişim Teknolojileri	Proje yönetimi				
Biyoinformatik Algoritmaları	Üretim Planlama ve Stok Kontrolü				
Bulut Hesaplama	Veri Bilimi				
Büyük Veri	Veri Madenciliği				
Eğitimde Yeni Teknolojiler	Veri Tabanı				
Görüntü İşleme	Veri Yapıları				
İleri Programlama	Veri Yoğunluk Uygulamaları				
İstatistik	Yalın Üretim				
Kestirim (Forecasting) Yöntemleri	Yazılım Mühendisliği				
Makine Öğrenmesi ve Veri Yönetimi	Yönetim Bilişim Sistemleri				
Nitel Araştırma Yöntemleri					

Anket formunda kullanılan ifadeler, bu ifadelerin ortalama ve standart sapma değerleri tek örneklem t-testi sonuçlarıyla birlikte Tablo 8'de paylaşılmıştır. T-testi için referans değeri ölçeğin orta değeri olan 3 (Fikrim Yok) olarak alınmıştır.

ACM ve IEEE (2020), bilişim müfredatına, Veri Bilimi programını eklemiştir ve lisans programında Büyük Veri dersleri de bu alanda yer almaktadır. Aynı doğrultuda katılımcılar, büyük veri konusunun lisans müfredatında daha fazla yer alması

gerektiğini (3,830) ve müfredatta mevcut bir derse konularının eklenmesi gerektiğini (3,895) düşünmektedir (Ortalama değer (3,830) ve (3,895) ölçeğin orta noktasından (3) istatistiki olarak anlamlı bir şekilde (p=,000) yüksektir). Ankette verilen ifadelerden ortalamanın üzerindeki en büyük farklar, yani katılımcıların en çok hem fikir olduğu ifadeler; 'Bilgisayar mühendisliği ve ilgili bölümlerde büyük veri üzerine seçmeli ders açılmalıdır.' (μ=4,248) ve 'Türkiye'de büyük veri çözümlerinin önümüzdeki yıllarda daha çok kullanılacağını düşünüyorum.' (μ=4,209) olduğu görülmektedir.

Tablo 8. Öğretim elemanlarının tek örneklem t-testi analizi

İfadeler (N=153)	**Ortalama (μ)**	**Standart Sapma**	**t**	**df**	**p**	**Ortalama Farkı**
Büyük Veri ile ilgili konular lisans müfredatında daha fazla yer almalıdır.	3,830	,8568	,8568	,8568	,000	,8301
Lisans düzeyinde Büyük Veri konusunun, müfredatta mevcut bir derse konularının eklenmesi gerektiğini düşünüyorum.	3,895	,8596	,8596	,8596	,000	,8954
Lisans ders müfredatlarında, teknolojik gelişmelere göre güncelleme yapıldığını düşünüyorum.	3,111	1,1154	1,1154	1,1154	,220	,1111
Lisans ders müfredatlarında, sektörün ihtiyaçları göz önünde bulundurularak güncelleme yapıldığını düşünüyorum.	2,928	1,0767	1,0767	1,0767	,410	-,0719
Bilgisayar Mühendisliği ve ilgili bölümlerde Büyük Veri üzerine ders açılmalıdır. [Zorunlu Ders]	3,353	1,1780	1,1780	1,1780	,000	,3529
Bilgisayar Mühendisliği ve ilgili bölümlerde Büyük Veri üzerine ders açılmalıdır. [Seçmeli Ders]	4,248	,8451	,8451	,8451	,000	1,2484
Büyük Veri ile ilgili üniversitelerde lisans programları açılmalıdır.	2,562	1,1575	1,1575	1,1575	,000	-,4379
Büyük Veri alanında lisansüstü daha çok program açılmalıdır.	3,556	1,0569	1,0569	1,0569	,000	,5556
Büyük Veri ile ilgili etkinliklere katılmak isterim. [Eğitim]	3,647	1,2111	1,2111	1,2111	,000	,6471
Büyük Veri ile ilgili etkinliklere katılmak isterim. [Seminer]	3,869	1,0176	1,0176	1,0176	,000	,8693
Büyük Veri ile ilgili etkinliklere katılmak isterim. [Konferans]	3,739	1,0989	1,0989	1,0989	,000	,7386
Büyük Veri ile ilgili etkinliklere katılmak isterim. [Online Eğitim]	3,732	1,1921	1,1921	1,1921	,000	,7320
Büyük Veri ile ilgili etkinliklere katılmak isterim. [Çalıştay]	3,641	1,1732	1,1732	1,1732	,000	,6405
Sosyal medyada Büyük Veri ile ilgili paylaşımlar ilgimi çeker.	3,595	1,0224	1,0224	1,0224	,000	,5948
Türkiye'de büyük veri çözümlerinin önümüzdeki yıllarda daha çok kullanılacağını düşünüyorum.	4,209	,7403	,7403	,7403	,000	1,2092
Türkiye'de Büyük Veri konusuna yeterince ilgi gösterilmediğini düşünüyorum. [Kamu Kurumlarında]	3,484	1,0007	1,0007	1,0007	,000	,4837
Türkiye'de Büyük Veri konusuna yeterince ilgi gösterilmediğini düşünüyorum. [Özel Kurumlarda]	3,144	1,0222	1,0222	1,0222	,084	,1438
Türkiye'de Büyük Veri konusuna yeterince ilgi gösterilmediğini düşünüyorum. [Yükseköğretim Kurumlarında]	3,333	1,1239	1,1239	1,1239	,000	,3333
Görev yapmakta olduğum kurumda, yöneticiler Büyük Veri alanına gerekli önemi vermektedir.	3,098	,9785	,9785	,9785	,217	,0980
Yurt dışında bir üniversitede, Büyük Veri ile ilgili bir pozisyonda görev yapmak isterim. [Kısa Süreli Pozisyon]	3,131	1,2123	1,2123	1,2123	,184	,1307
Yurt dışında bir üniversitede, Büyük Veri ile ilgili bir pozisyonda görev yapmak isterim. [Uzun Süreli Pozisyon]	2,680	1,2012	1,2012	1,2012	,001	-,3203
1= Kesinlikle Katılmıyorum… 5= Kesinlikle Katılıyorum						

Ayrıca bilgisayar mühendisliği ve ilgili bölümlerde büyük veri üzerine zorunlu ders açılması (μ=3,353) konusuna da katılmakta oldukları görülmektedir. Katılımcılar, büyük veri ile ilgili üniversitelerde daha çok lisansüstü program açılması gerektiğini düşünmekte (μ=3,641), ancak lisans programı açılması konusuna katılmamaktadır (μ=2,563). Katılımcıların ortalamanın üzerinde bir değerle, büyük veri ile ilgili eğitim, seminer, konferans, çevrimiçi eğitim ve çalıştay gibi etkinliklere katılma isteği göstermekte ve sosyal medyada bu alanla ilgili paylaşımlar ilgilerini çekmektedir (p=,000). Ayrıca öğretim elemanları, Türkiye'de büyük veri konusuna kamu kurumlarında ve yükseköğretim kurumlarında yeterince ilgi gösterilmediğini düşünmektedir.

3. **Sonuç**

Öğretim elemanlarının büyük veri alanı ile ilgili farkındalık ve eğitimle alakalı beklentileri değerlendirilmiştir. Öğretim elemanları tarafından en çok aşina olunan büyük veri yazılımları Oracle Big Data, Apache Hadoop ve Microsoft Hadoop, en çok kullanılan yazılımlar sırayla Apache Hadoop, Oracle Big Data, HDFS ve Spark olmuştur. Kullanılan yazılım sayılarının oldukça düşük olduğu sonucuna varılmıştır. Öğretim elemanlarının büyük veri alanında bilimsel yayın sayılarına, gerçekleştirilen projelere ve lisansüstü danışmanlık sayılarına bakıldığı zaman akademik ilgilerinin düşük olduğu görülmektedir. Ancak, halen üzerinde çalışılmakta olunan proje sayısının, tamamlanmış proje sayısının iki katından fazla olduğu göz önünde bulundurulduğunda büyük veri alanına olan akademik ilginin arttığı anlaşılmaktadır. Lisansüstü düzeyde yürütülmüş tez danışmanlığı %13.7 iken, yürütülmeye devam eden tez danışmanlığının %8.5 olduğu görülmektedir. Bu oranların artması, büyük veri alanıyla ilgili lisansüstü programlarının sayısının arttırılması ile doğrudan ilişkilidir. Ayrıca ankete katılan öğretim elemanları da bu doğrultuda yanıt vererek, büyük veri ile ilgili üniversitelerde daha çok lisansüstü program açılması gerektiğini düşünmektedir. Strateji Ve Bütçe Başkanlığı'nın yayınladığı 2019-2023 stratejik planında; Hedef 4.2: 'Büyük veri temelli politika ve etki analizi çalışmaları yapılacaktır.' hedefine birinci ihtiyaç olarak 'Büyük veri analizi konusunda tecrübeli uzman/veri bilimci kapasitesinin artırılması ve altyapının güçlendirilmesi' yer almaktadır (Strateji ve Bütçe Başkanlığı, 2018). Bu doğrultuda, akademisyenlerin ankete verdikleri yanıtlar, büyük veri alanıyla ilgili lisansüstü düzeyde daha çok program açılması gerektiğini düşünmeleri, yayınlanan stratejik planla aynı doğrultuda yer almaktadır. Büyük veri konusunda tecrübeli veri bilimci kapasitesinin arttırılması, öncelikli olarak bu alanda lisans programlarının açılması ile mümkün olabilmektedir. Ancak öğretim elemanları, bu alanda lisans programının açılması gerektiği konusuna katılmamaktadır. Katılımcılar arasında büyük veri ile ilgili derslerin yürütülme oranının (%8) çok az olduğu anlaşılmıştır. Öğretim elemanları, büyük veri konusunun lisans müfredatında daha fazla yer alması gerektiğini belirtmiştir. Akademisyenler, Bilgisayar Mühendisliği ve ilgili bölümlerde büyük veri üzerine daha çok seçmeli ders açılması gerektiği sonucuna varmıştır. İstanbul Teknik Üniversitesi'nin, Yapay Zeka ve Veri Mühendisliği bölümünü, Hacettepe Üniversitesi,

TOBB Ekonomi ve Teknoloji Üniversitesi ve Bahçeşehir Üniversitesi'nin de Yapay Zeka Mühendisliği bölümünü açması, büyük veri ile ilgili seçmeli ve zorunlu ders sayısının artmasını sağladığı görülmektedir. Akademisyenlerin, Türkiye'de büyük veri çözümlerinin daha çok kullanılacağını düşündükleri, sosyal medyada büyük veri ile ilgili paylaşımlarla ilgilendikleri ve büyük veri ile ilgili eğitim, seminer, konferans, çevrimiçi eğitim ve çalıştay gibi etkinliklere katılmak istedikleri ortaya çıkmıştır. Büyük veri alanının, Türkiye'de yeni trend olma eğilimi dikkate alındığında, bu sonuçlar akademisyenlerin ileriye yönelik olarak büyük veri ile ilgili akademik ilgilenimlerinin artacağı olarak da yorumlanabilir. Katılımcılar, Türkiye'de kamu kurumları ile yükseköğretimde büyük veri alanına yeterince ilgi gösterilmediğini düşünmektedir. Bu doğrultuda, özellikle yükseköğretimde büyük veri alanında atılması gereken adımlar olduğu ve bu alana daha çok önem verilmesi gerektiği sonucuna varılabilir.

Gelecek çalışmalarda, araştırmanın kısıtlılıklarında belirtildiği gibi örnekleme bağlı olarak bu kısıtlar göz önünde bulundurularak farklı örneklemler üzerinde çalışılabilir. Öğretim elemanlarının, lisans düzeyinde büyük veri alanının bahsedildiği derslerin çok çeşitli olduğu göze çarpmaktadır. Büyük veri ve veri bilimi alanı, disiplinler arası bir alan olduğu için ve öğrencilerin mezun olmadan önce yetenek ve beceri sahibi olmak istedikleri bir alan olduğu için, sadece bilgisayar bilimleri ve benzer bölümlerde değil, işletme, sağlık ve diğer alanlarda da çalışmalar yapılabilir. İleride yapılacak çalışmalarda, büyük veri çözümleri sunan şirketlerle görüşmeler yapılarak üniversite sektör işbirliği ile bu alandaki beklentiler ve ihtiyaçlar belirlenebilir.

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EKLER

EK-1. Öğretim elemanlarının aşina olduğu ve kullandığı büyük veri yazılımları

	Aşinalık	**Kullanılma**			**Aşinalık**	**Kullanılma**
Yazılım	**Kişi (n)**	**Kişi (n)**		**Yazılım**	**Kişi (n)**	**Kişi (n)**
Oracle Big Data	67	11		Pig	4	3
Microsoft Hadoop	46	6		Flink	8	2
Apache Hadoop	67	19		Hortonworks	9	5
Amazon EMR	25	3		Ooize	3	2
Cloodera	22	5		Solr	0	0
Kafka	12	4		Sqoop	4	1
HDSF	20	8		Zoo Keeper	8	3
Cassandra	23	4		HBase	15	5
Yarn	5	3		Hive	12	6
Storm	10	1		Chukwa	1	0
Spark	30	10		Mahout	6	1
Avro	2	2		Flume	2	1
					N=153	N=153

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Volatility Analysis of the Food Sector in Turkey in the Period of COVID-19[1]

(COVID-19 Döneminde Türkiye'de Gıda Sektörünün Volatilite Analizi)

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Abstract

In the literature, there are many studies investigating the direct and indirect effects of the pandemic. After the first COVID-19 case, these studies began to spread rapidly in Turkey. Due to the measures taken, activities in many sectors were suspended partially and full-time. Among the sectors, the food sector has experienced one of the most challenging processes. The food industry has entered a new era due to reasons such as changing consumption and production behaviors and disruptions in supply chains. The purpose of this study is to determine the impact of the COVID-19 outbreak on the food and beverage industry. In this context, daily data between 03.01.2017-08.04.2021 was used and the Food and Beverage Index (XGIDA) was included in the models as an explanatory variable. In the light of this information, the relationship between the XGIDA index and COVID-19 was examined with Univariate Volatility Models. In addition to the asymmetry and leverage effect in the XGIDA sector, an intra-period forecast was made to determine the fluctuations in the XGIDA sector during the sampling period.

Anahtar Kelimeler:
COVID-19,
EGARCH Modeli,
XGIDA Sektörü,
Dönem içi Öngörü

Makale türü:
Araştırma

Öz

In the literature, there are many studies investigating the direct and indirect effects of the pandemic. After the first COVID-19 case, these studies began to spread rapidly in Turkey. Due to the measures taken, activities in many sectors were suspended partially and full-time. Among the sectors, the food sector has experienced one of the most challenging processes. The food industry has entered a new era due to reasons such as changing consumption and production behaviors and disruptions in supply chains. The purpose of this study is to determine the impact of the COVID-19 outbreak on the food and beverage industry. In this context, daily data between 03.01.2017-08.04.2021 was used and the Food and Beverage Index (XGIDA) was included in the models as an explanatory variable. In the light of this information, the relationship between the XGIDA index and COVID-19 was examined with Univariate Volatility Models. In addition to the asymmetry and leverage effect in the XGIDA sector, an intra-period forecast was made to determine the fluctuations in the XGIDA sector during the sampling period.

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Introduction

With the international emergency declaration of the World Health Organization (WHO) at the beginning of 2020, a new process began in the world. There have been outbreaks previously declared as an emergency by the World Health Organization. Firstly, we can examine Swine Flu in 2009. With the spread of the H1N1 virus and the death of more than 200 thousand people, WHO declared an emergency. In 2013, when polio was on the rise again, WHO also declared an emergency. In 2016, there was a virus that is quite dangerous especially in pregnant women, it has been proven that the virus can be transmitted to the unborn baby and this causes birth anomalies in the baby. An emergency was declared with the rapid spread of the Zika virus, which caused babies to be born without completing their development, in the American continent. In 2014, an emergency was declared twice due to the deadly disease Ebola. The first emergency was between August 2014 and March 2016. More than 11,000 people died in West Africa during this time. The second emergency was declared very recently in the Democratic Republic of Congo in 2019. When Ebola started to spread again, the World Health Organization used its emergency mandate for prevention to spreading (BBC, 2020). At this point, the fifth emergency announcement made by the World Health Organization included the coronavirus outbreak. From this point on, a new process started all over the world. The coronavirus pandemic has affected countries deeply in many ways. Important economic problems such as unemployment have been triggered. Therefore, many business sectors have also experienced serious losses and shrinkages. The food sector is also one of the sectors that have been subjected to a big test during the pandemic process. Studies have revealed that the food industry is affected by the pandemic in many ways.

According to previous studies such as Pimentel et al.(2010) explained that population is expected to reach almost 13 billion by 2050 ant it will create danger because of humanity's restricted natural resources and also when the climate and environmental change joined to this equation, increasing the likelihood of the other pandemics. These situations and probabilities are closely connected with food crises and food prices at the same time. One of the studies emphasis supply chain systems and it explain that the global food system effect by worker absenteeism. Employees who carried the viruses, changes in demand, or inventory shortages affected supply chains (Kumar and Chandra 2010). Pandemics are deeply affecting food systems. Transporting food is getting hard. The food system depends on many supply chains like water, electricity, and more. Because of this situation, many systems had challenges due to labor shortages (Beck et al. 2006).

When it comes to research about Turkey, research is carried out by Güney and Sangün (2021). According to this research methodology, they interviewed 1,023 people from the seven regions of Turkey. According to analysis that included an ordered probit regression model showed that the changes in food consumption behaviors because of the pandemic were related to price increase concerns, stockpiling, etc.

For this purpose, a study consisting of five main chapters has been carried out. In the second part of the study, a wide literature review is made and studies on the

COVID-19 pandemic are included. In the third chapter, the theory of Univariate GARCH models is explained. In the fourth section, the findings obtained by giving information about the data used in the analysis are interpreted. In the last part, some evaluations have been made as a result of these findings.

1. Review of Literature

The research by Toktaş, Y. (2021) found that a substantial increase is observed in food shopping via credit cards in Turkey during the pandemic compared to the previous year. In the research data which are provided from BKM (the Interbank Card Center) are used. It must also be noted that many groceries and e-commerce websites have begun offering services in food products delivery through mobile applications. The other study Boyaci et. al (2021) emphasizes that food shortages and price spikes could also be related to the difficulties observed in supply chains due to border closings and quarantine measures, as well as fewer workers available for harvesting, production, logistics, and decreased production. They also explain that food shortages appeared in retailing food because of panic buying behaviors. When it query with decreasing availability of food and price spikes in production, panic increased for everyone who both consumers and producers.

A study that is carried out by Şahin and Yılmaz (2021) find out that crises like pandemics are a huge threat for industries like food and beverage. In their research, the COVID-19 pandemic and its effects on firms in these industries in Turkey experienced problems about operations, employees, customer behaviors, and more. For this purpose, a holistic model is proposed for reveals the effects of the pandemic on these companies. The other article Aday and Aday (2020) said that every country should recognize the seriousness of the situation and sometimes tighten or loosen measures according to the spread of the pandemic. They also said that the supply chain must be flexible enough to fixed challenges.

Pandemics research by Ceylan and Özkan (2020) examined a SWOT Analysis of Turkish agriculture. They focused on the relationship between agriculture and pandemic. They explained this relationship with strengths, weaknesses, opportunities, and threats. According to strengths, one of the determinations can summarize as durable agricultural products and the other is the annual harvest. According to weakness, absence of imported inputs, transportation problems have put prices up in the domestic market. According to opportunities, one of the determinations is increasing the export potential of high-quality storable grain to countries where domestic resources are disrupted. According to threats, one of the determinations is an underdeveloped domestic input market for seeds, pesticides and herbicides pose problems for continuing agricultural production, and transportation costs are increasing because of local restrictions and social distancing rules contribute to rising prices as they explained. Like most of the articles, they also pointed out that all the systems are connected like a chain, and this kind of connection can cause crises with a domino-effect.

One of the articles focusing on more specific areas in the food industry was by Demirci et al. (2020). Their interesting area was the fishing sector and they researched for Hatay province in Turkey's Mediterranean Region. They put emphasized in the beginning to FAO, The Food and Agriculture Organization of the United Nations, and they explained that FAO has been evaluated the pandemic in a larger context as global food security (FAO, 2020) In their research which is in Hatay province, they found that for protection of the fisheries sector's economy cannot provide in the pandemic. Decreasing in fisheries export in Hatay after COVID-19 was 65% according to their research.

Uysal and Demiroglu (2020) said in their research that if the COVID-19 is prolonged, permanent policies should be produced for fragile sectors such as agriculture and agricultural support packages, etc. should be implemented immediately. They explained people who work in agricultural activities for more than 225 days a year represent 37.4% in Turkey and the emphasize on-farm system resilience due to pandemics. Yavuz (2020) focused on his research on agricultural policy in the post-pandemic period from both a national and international perspectives. He clarified the agriculture of Turkey. He said that advantages of Turkey's agriculture come from climate differences, rich gene resources, ancient agricultural culture, and market vitality due to increasing population and income, and proximity to the countries with high food consumption based on imports and he said that increasing social awareness of strategic importance of agriculture because of COVID-19 pandemic may provide an opportunity to solve these problems with a holistic approach. Studies in the literature also refer to agriculture as well as the pandemic and food sector. Agricultural studies also constitute the basic dynamics for the food sector.

One of the research which is done by Jribi et. al (2020) wanted to draw attention to how food-wasting behaviors affected with the pandemic. On the other hand, an article which is carried out by Bucak and Yiğit (2021) showed three main categories in their analysis. One of them is opinions for post the COVID-19. These three main categories generally focused on the after scenarios for COVID-19. The second category is the changes in the food and beverage sector after COVID-19. The last one is including the opinions of the Turkish chefs.

2. Econometric Methodology

Another important feature of financial asset returns is volatility clustering. Mandelbrot (1963), the view put forward by the large scale price changes in financial assets that occur in large-scale price changes; Small-scale price changes follow small-scale price changes, forming a cluster. This situation is expressed as "volatility clustering".

The best methods for modeling volatility clusters that emerge in this way are GARCH, EGARCH and GJRGARCH (TGARCH) models, known as ARCH Family Models. The ARCH models and their extensions (GARCH, EGARCH, etc.) are among the most popular models that provide market returns, volatility and forecasting. For

volatility models, an average model is needed first. In this study, the average model is established with the 1-period lagged value of the dependent variable. The parameters of the average model should be meaningful.

As a result of the emergence of uncertain behavior in financial time series, the need to analyze this uncertainty arose. Modeling of the second or higher-order moments of the series played an important role in addressing uncertainty as a research topic. The model formed by modeling the second moment is the Autoregressive Conditional Variable Variance (ARCH) model proposed by Engle (1982). Engle determined that when the unconditional variance is constant while the conditional variance is time-dependent, it is a function of the squares of the error terms. He also states that conditional mean and variance can be modeled separately.

Bollerslev (1986), has expanded the linear ARCH model by including current conditional variance values into the past conditional variance equation and introduced the Generalized Autoregressive Conditional Variable Variance (GARCH) model. This model predicts volatility better than the ARCH model. In addition, it provides an advantage by including the historical values of the infinite number of squares of errors into the model. The GARCH model is calculated as follows Bollerslev (1986);

$$y_t = \phi y_{t-1} + \varepsilon_t$$
$$\varepsilon_t = \eta_t \sqrt{h_t}$$
$$h_t = \omega + \alpha \varepsilon_{t-1}^2 + \beta h_{t-1}$$
$$\omega > 0 \;\; \alpha \geq 0 \;\; \beta \geq 0 \;\; \alpha + \beta < 1$$

There is also a positivity condition for the parameters in the GARCH model. In addition, the sum of ARCH and GARCH parameters must be less than 1. The closer this total is to 1, the more the volatility persistence will be.

The GARCH model also has some limitations. While the model is estimated, the positivity condition of the coefficients is neglected. It does not take into account the effect of leverage. It cannot establish a linear relationship between conditional mean and conditional variance and does not take into account the asymmetry in volatility (Sarıkovanlık et al.2019).

Another model used in the study is the model known as the exponential GARCH (EGARCH) model is a constrained version of the ARMA (p, q) model and shows asymmetrically the effect of shocks on volatility. This model was developed by Nelson (1991). Also, this model takes into account the leverage effect. EGARCH model includes error terms of conditional variance and signs and sizes of conditional standard deviation. EGARCH (p, q) model is the most commonly used method to model variance. This model takes into account the possibility that upward and downward movements in the markets have a different effect on the predictability of future volatility of financial assets (Çil, 2018).

The reason why it is highly preferred is that the positivity condition in ARCH and GARCH models is not in this model. As a matter of fact, with the EGARCH model, the

variance is also guaranteed to be positive. The EGARCH (p, q) model is shown as follows (Nelson,1991);

$$y_t = \phi y_{t-1} + \varepsilon_t$$
$$\varepsilon_t = \eta_t \sqrt{h_t}$$
$$\ln h_t = \alpha_0 + \beta_1 \ln h_{t-1} + \theta \frac{e_{t-1}}{\sqrt{h_{t-1}}} + \gamma \left| \frac{e_{t-1}}{\sqrt{h_{t-1}}} \right|$$

conditional variance of ht; ε_t, zero mean and constant variance error term; γ and β_1 show the effects of ARCH and GARCH on conditional variance, and θ shows the effect of asymmetry, respectively.

Since the presence of an asymmetric effect can be seen, it is also known as the asymmetric volatility model. If the θ parameter is statistically significant, there is an asymmetric effect, that is, positive shocks and negative shocks have different effects on volatility. If the value of the θ parameter is found to be negative, then we can conclude that the presence of leverage effect, negative shocks increase volatility more than positive shocks. β parameter is the parameter that shows the permanence of volatility. It is expected to receive a positive value.

Glosten et al. (1993) developed the GJRGARCH model in their work. This model is also referred to as the TGARCH model. The GJRGARCH model is defined as a simple extension of the GARCH model. The GJRGARCH model is an ARCH model that has a different effect on the volatility of the positive and negative shocks occurring in the series and takes into account the asymmetry in volatility. The GJRGARCH model is shown as follows (Glosten et al., 1993);

$$y_t = \phi y_{t-1} + \varepsilon_t$$
$$\varepsilon_t = \eta_t \sqrt{h_t}$$
$$h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} + \gamma_1 \varepsilon_{t-1}^2 * D_{t-1}$$
$$D_{t-1} = \begin{cases} 1, & \varepsilon_{t-1} < 0 \\ 0, & \varepsilon_{t-1} \geq 0 \end{cases}$$

If the residuals obtained from the average are less than 0, it takes the value 1, if it is equal to or greater than zero. γ parameter is the parameter that reveals the presence of an asymmetric effect. If it is statistically significant, the presence of an asymmetric effect is mentioned. If it is meaningless, the TGARCH model becomes the GARCH model. In the GJRGARCH model, we can only observe the presence of asymmetric effects.

2.1. Forecast Performance Criteria

One of the widely accepted criteria in the process of choosing one of the various forecasting models is that the forecasting success of the model is high. In this context, various statistics are used to compare the prediction accuracy of the models.

For the successful test of the prediction, the differences between the predictive values and the actual values available based on the predicted model, that is, the prediction errors (u-residuals), are standardized with some formulas that can help to compare the prediction accuracy of the models. Statistics used to measure the prediction accuracy (prediction performance) of models;

I. Mean Squared Error (MSE) = $\frac{\sum_{t=1}^{n}(u)^2}{n}$

II. Root Mean Squared Error (RMSE) = $\sqrt{\frac{\sum_{t=1}^{n}(u)^2}{n}}$

III. Mean Absolute Error (MAE) = $\frac{\sum_{t=1}^{n}|u|_t}{n}$

IV. Mean Percentage Error (MPE)= $\frac{\sum_{t=1}^{n}\frac{u_t}{Y_t}}{n}$

V. Mean Absolute Percentage Error (MAPE) = $\frac{\sum_{t=1}^{n}\frac{|u_t|}{Y_t}}{n}$ *100

VI. Theil-U statistic = $\sqrt{\frac{\sum_{t=1}^{n-1}(^{u_t}/_{Y_t})^2}{\sum_{t=1}^{n-1}(Y_{t+1}-Y_t/Y_t)^2}}$ $= \frac{Error\ Relative\ Change\ of\ the\ Established\ Model}{Relative\ Variation\ of\ Random\ Walk}$

The desired result in these statistics is to create the prediction model with the smallest value MSE, RMSE, MAE, MPE and MAPE statistics.

3. Data and Empirical Findings

After the COVID-19 pandemic, there has been excessive demand for food products all over the world. The main motivation for this study was whether this increase in demand in the sector was reflected in the financial markets. In this context, the purpose of this study is to determine the impact of the pandemic on the returns and volatility of the food and beverage industry.

For this reason, the Food and Beverage Index (XGIDA) in Borsa Istanbul was used as a variable in the study. In the light of this information, the extent to which the XGIDA index is affected by COVID-19 was examined with Univariate Volatility Models. To determine the asymmetry and leverage effect in the XGIDA sector, as well as to determine the fluctuations in the XGIDA sector within the sampling period, a forecast was made within the period.

In this context, daily data between 03.01.2017-08.04.2021 were used. The data of the XGIDA industry has been compiled from investing.com. In the study, firstly, the returns of the daily price series were calculated and the formula rt = (Pt - Pt-1) / Pt-1 was used. Analyzes were made with Eviews 9 package program. The graphs of the return series are presented below in Figure 1 and Figure 2, respectively.

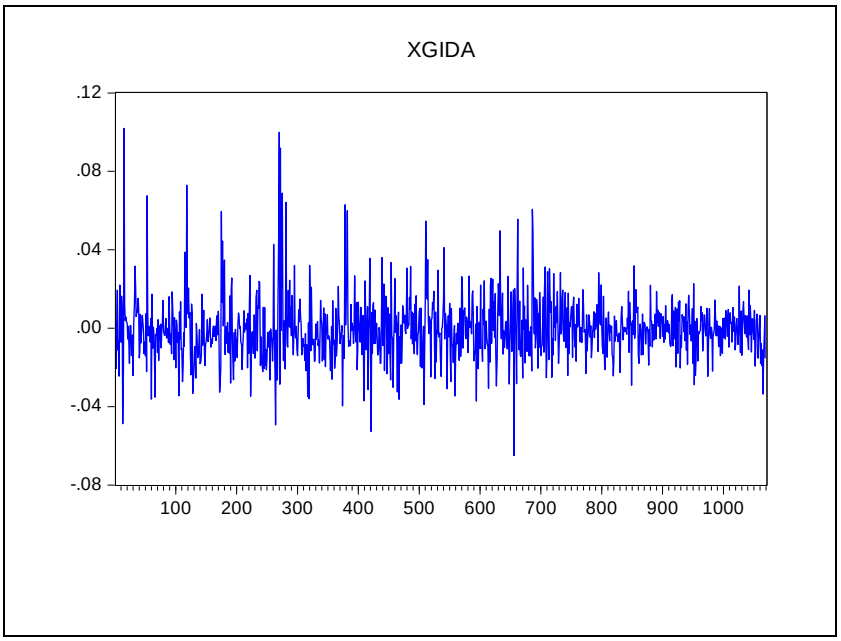

Figure 1. Graph of the XGIDA Sector

The most important features of financial asset returns are volatility clustering. When the chart above is examined, a distinct volatility cluster is seen for the XGIDA return. Figure 2 shows the histogram and statistics of the XGIDA return series.

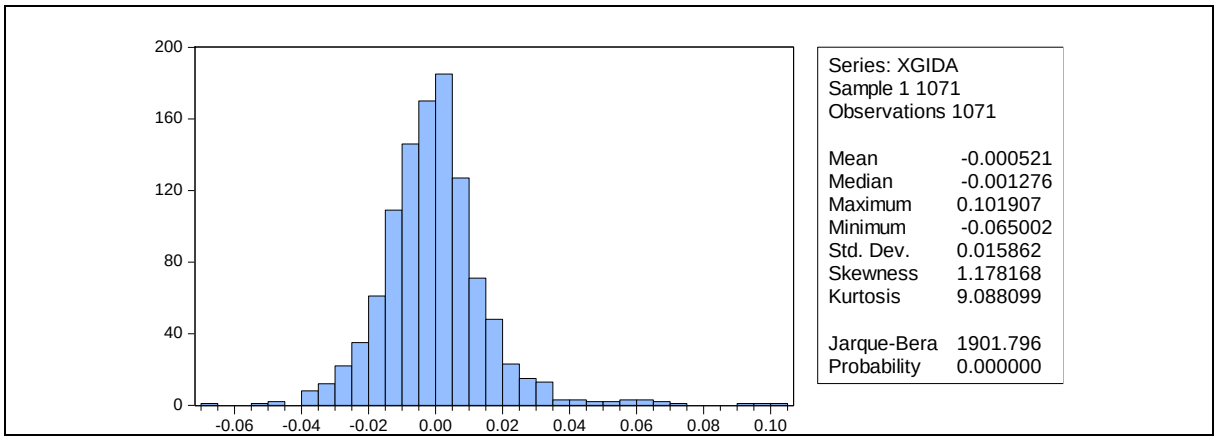

Figure 2.Histogram of XGIDA Sector

The distributions of financial asset returns, expressed as fat-tail, have a thicker distribution than the normal distribution in the tail part of the distribution and a sharper distribution on the average, and the XGIDA return series does not conform to the normal distribution. They show a leptokurtic distribution. When the histogram for the variable is examined, it is seen that it displays a skewed distribution to the left.

When the descriptive statistics are examined, it is observed that the average values of the return series are much smaller than the standard deviation values. This proves that financial time series follow a random walk process. For the normal distribution, the skewness value should be 0 and the kurtosis value should be 3. According to the table, it is seen that the XGIDA return series is positive, skewed to the left and flattened. In addition, considering the probability value of Jargue Berra test statistics, it is understood that the return series are not normally distributed.

After this stage, to use volatility models, it will be necessary to establish the average model and test the presence of the ARCH effect in this model. ARCH Family models can be used if the ARCH effect is detected.

There are 2 different methods commonly used to determine the average model. One of them is to decide the appropriate ar and ma delays for the XGIDA yield series by correlogram, and the other is to model the XGIDA yield series with a period delay. In this study, the ARCH test and Autocorrelation test were performed by establishing a model with a 1-period delay of the XGIDA return series. The results obtained are presented in Table 1.

Table 1.Autocorrelation and Heteroskedasticity Test Results for the XGIDA Return Series

		nR^2	**Probability**
XGIDA	Breusch Godfrey LM Testi	0.374870	0.8291
	ARCH-LM (1)	7.396372	0.0065

***ARCH-LM (1) refers to the values in 1st dela**y.

The hypotheses used for the ARCH test can be shown as follows;

H0: There is no ARCH effect.

H1: There is the ARCH effect.

According to the results, the ARCH effect was determined according to the probability value of the XGIDA return series. Volatile models can be used in this case.

The hypotheses established for the Breusch Godfrey LM Test can be shown as follows;

H0: There is no autocorrelation.

H1: There is autocorrelation.

According to these results, it was determined that there was no autocorrelation problem, but the existence of a variance problem. ARCH family models can now be used as the ARCH effect has been detected.

Table 2. GARCH (1,1), EGARCH (1,1) and TGARCH (1,1) Models of XGIDA Index Returns

		GARCH(1,1)	EGARCH(1,1)	TGARCH(1,1)
Mean Equation				
Constant		-0.0012* **(0.0019)**	-0.0012* **(0.0026)**	-0.0012* **(0.0025)**
XGIDA(-1)		0.0526*** **(0.0926)**	0.0548*** **(0.0760)**	0.0507*** **(0.0849)**
Variance Equation				
α_0		0.5915* **(0.0096)**	-0.6117** **(0.0067)**	0.3305* **(0.0328)**
α_1		0.1008* **(0.0001)**		0.0413* **(0.0441)**
β_1		0.8392* **(0.0000)**	0.9454* **(0.0000)**	0.8511* **(0.0000)**
θ			-0.0558* **(0.0465)**	
γ			0.2061* **(0.0000)**	0.1210* **(0.0039)**
AIC		-5.6621	-5.6718	-5.6678
SIC		-5.6389	-5.6438	-5.6399
ARCH-LM		0.6318	0.5005	0.4715

Note1: *, ** and *** denote 1%, 5% and 10% significance level, respectively.

Note2: Expressions in parentheses give probability values.

In Table 2, GARCH (1,1), EGARCH (1,1) and TGARCH (1,1) models were used to estimate volatility in the food and beverage industry. The 1-period delay and constant term of the dependent variable in the mean equation were found to be significant.

Since the ARCH (α) and GARCH (β) parameters in the established volatility models are positive and statistically significant, it is concluded that all index returns have both ARCH and GARCH effects. This result indicates that shocks in all index returns and previous period volatility affect current period volatility. The sum of $\alpha + \beta$ must be less than 1 to fulfill the stationary condition of ARCH and GARCH models. This equation gives information about the volatility clustering of returns. The closer to 1, the more volatility persistence and volatility clustering. According to the information obtained from the table, it was found as $\alpha + \beta = 0.93$. In the XGIDA sector, low-yield periods are followed by low-return periods, and high-return periods are followed by high-return periods.

GARCH models described above take into account the symmetrical effect. Positive shocks and negative shocks have the same effect on volatility.

The models where the asymmetric effect is valid, that is, positive shocks and negative shocks have different effects on volatility are EGARCH and TGARCH models. In the EGARCH model, θ is the parameter that provides information about the existence of the leverage effect. A Negative value (-0.055821) indicates the presence of leverage effect in the XGIDA sector. In other words, negative news increases volatility more than positive news. Being statistically significant indicates the presence

of an asymmetric effect in this sector. In other words, positive shocks and negative shocks have different effects on volatility. GARCH parameter β indicator of volatility cluster. Taking a value close to 1 as 0.94 gives information about the permanence of volatility shocks.

In the TGARCH model, another asymmetric model, γ is the parameter that takes into account the presence of the asymmetric effect. Since it is statistically significant, it can be mentioned that there is an asymmetric effect. If it is meaningless, the TGARCH model becomes the GARCH model.

According to the ARCH-LM test results, it is seen that the conditional variance problem has disappeared in all models. Among the alternative models, the model with the smallest AIC and SIC value is selected as the appropriate model. The most suitable model for the XGIDA sector was selected as the EGARCH model with an AIC value of -5.671704 and a SIC value of -5.643805. In other words, the most suitable model used in modeling the volatility in the food and beverage industry return series is the EGARCH (1,1) model.

Using the EGARCH (1,1) model, it is aimed to make an ex-ante forecast of the XGIDA sector in the light of the available information. In this context, the information in Figure 3 has been obtained.

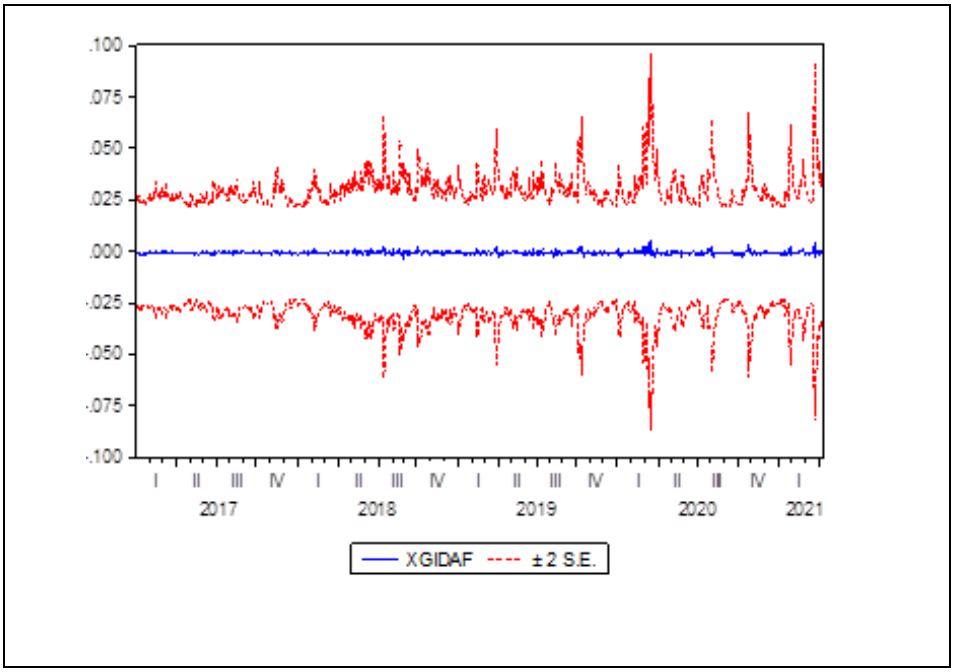

Figure 3.Ex-ante Forecast for XGIDA Sector

The red lines show the ± 2 standard error value band, while the blue lines show the forecast values of the XGIDA sector within the period. We can interpret the statistical results given below to evaluate the conformity of the estimates to graphical and actual values.

Table 3. Exante-Forecast Statistics

Forecast Sample	**01.03.2017 - 04.08.2021**
Root Mean Squared Error	0.015842
Mean Absolute Error	0.011110
Mean Abs.Percent Error	1.623.532
Theil Inequality Coefficient	0.093241
Bias Proportion	0.000196
Variance Proportion	0.100737
Covariance Proportion	0.899067

Root Mean Squared Error and Mean Absolute Error statistics depend on the scale of the dependent variable. These should be used as relative measures to compare forecasts for the same series across different models; the smaller the error, the better the forecasting ability of that model according to that criterion. Root Mean Squared Error and Mean Absolute Error values were 0.015842 and 0.011110, respectively. It is possible to conclude that the predictive ability of the model is quite strong.

Theil Inequality Coefficient is always between zero and one, and zero indicates a perfect fit and a value of 0.093241 indicates that the predicted values and the actual values are highly compatible with each other.

The bias proportion tells us how far the mean of the forecast is from the mean of the actual series.The variance proportion tells us how far the variation of the forecast is from the variation of the actual series. The covariance proportion measures the remaining unsystematic forecasting errors. Note that the bias, variance, and covariance proportions add up to one. If your forecast is "good", the bias and variance proportions should be small so that most of the bias should be concentrated on the covariance proportions. The Covariance Proportion value (0.899067) indicates that the estimate made is good.

Turkey, for the examination of the impact of the pandemic and its food industry COVID-19 chart, is shown below.

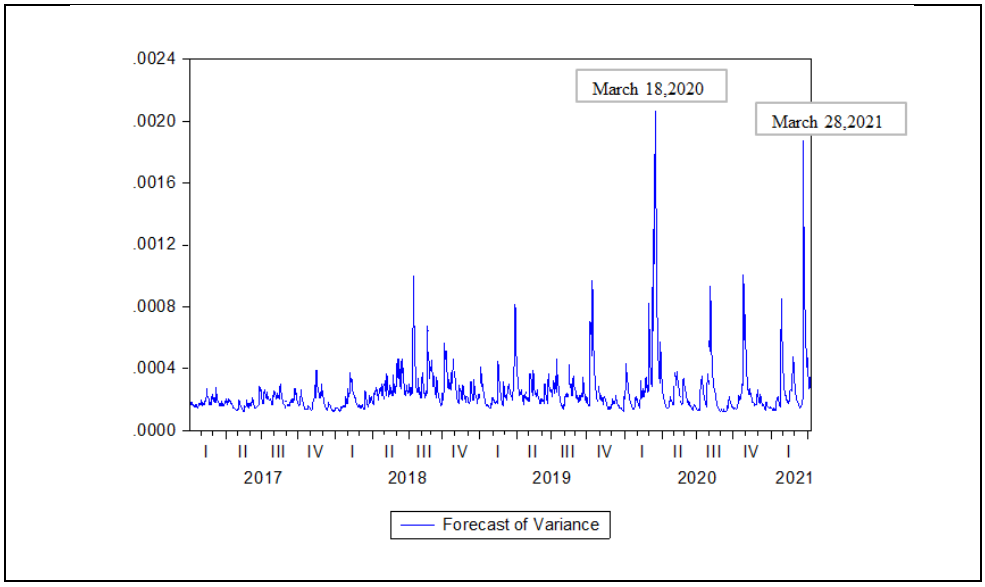

Figure 4. Movement of XGIDA Sector in the Period 01.03.2017 - 04.08.2021

When the graph above is examined, it is seen that there are sudden and big leaps at two different points. The first of these will be on March 18, 2020, and the second jump will be on March 28, 2021. Again between these dates, 3 different small leaps were detected in the XGIDA sector.

4. Conclusion

The food sector is one of the sectors least affected by the pandemic compared to other sectors. Some of the companies in the sector have expanded their activities, unlike other sectors, to meet the increasing customer demand. In this context, it aims to determine the effect of this increase on the market value of the food sector, taking into account the reaction of investors to the pandemic. For this purpose, daily data between 03.01.2017-08.04.2021 were used. The asymmetry and leverage effect in the XGIDA sector has been investigated with the help of volatile models. It was decided that the most suitable volatile model to be used in this study is EGARCH (1,1). According to the results obtained from this model, the existence of leverage and asymmetric effect has been observed in the XGIDA sector. In other words, negative news increases volatility more than positive news. In addition, positive shocks and negative shocks have different effects on volatility.

The measures taken by countries with the pandemic process caused by the effect of the COVID 19 virus have caused production to come to a halt all over the world. Therefore, consumption has led to more food and health. This situation can be clearly seen from the prediction graph. On March 18, 2020, it is seen that the number of COVID-19 patients reached 3 digits and some restrictions were brought to the agenda throughout the country. This situation created an atmosphere of panic in people and made them think that curfew decisions would be made and people were forced to stock up. This caused a sudden and huge movement in the food and beverage industry.

With a new decision taken on March 2, 2021, it is known that Saturday restrictions have been lifted in some provinces and Sunday bans are still valid. However, according to the data released in the first week of March, it is known that the number

This situation caused the second wave of panic throughout the country. We see that the idea of new restriction decisions to be taken at the meeting to be held on March 29, 2021, directed people to the food and beverage sector at that time. We can also see on the graph that the leap on March 28, 2021, is smaller than the leap on March 18, 2020. We can attribute this to the fact that the restrictions on March 28, 2021, are not as strict as those on March 18, 2020.

As a result, In the study investigating the effects of the COVID-19 pandemic on the food sector, the increases and decreases in the food sector have been determined since the first period of the pandemic in our country. It has been observed that these increases and decreases displayed a parallel movement with the restrictions taken within the scope of pandemic measures.

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Analyzing the Role of Mystic Appeals on Donation Intention

(Bağış Reklamlarında Mistik Tema (Gizem) Kullanımının Bağış Niyeti Üzerindeki Etkisinin Analiz Edilmesi)

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Abstract

Today, together with the increasing population, the social, economic, and environmental problems our World is experiencing are increasing and becoming prevalent. Donation by consumers is one of the essential income items of non-profit organizations that fight against these problems. Furthermore, the increase of these problems creates pressure on businesses, and businesses react to these pressures by organizing donation campaigns within social marketing. Several different methods are being used for delivering these campaigns to consumers, which are analyzed empirically in consumer behavior literature. This study analyzed the effect of mystically designed appeals on donation intention, which can be accepted as one of these methods. It is already known that mystic visuals create positive effects in landscape preference studies. Inspired by this fact, a pilot study was carried out in which the effect of mystical-themed appeals on donation intention was analyzed experimentally. Analysis of the study revealed the negative effect of mystical appeals on donation intention. Findings are discussed together with implications and theoretical contributions.

Anahtar Kelimeler:
Mistik Mesaj, Bağış Reklamları, Gizem, Sosyal Pazarlama, Bağış Niyeti, Reklam

Makale türü:
Araştırma

Öz

Günümüzde artan nüfusla beraber dünyamızın deneyimlediği sosyal, ekonomik ve çevresel sorunlar giderek artmakta ve yaygınlaşmaktadır. Bu sorunlarla mücadele eden kar amacı gütmeyen kuruluşların en temel gelir kalemlerinden birisi tüketiciler tarafından yapılan bağışlardır. Ayrıca, bu sorunların artması işletmeler üzerinde de baskı oluşturmakta ve işletmeler de bu baskıya karşı koyabilmek için sosyal pazarlama anlayışı çerçevesinde çeşitli bağış kampanyaları düzenlemektedirler. Bu kampanyaların tüketicilere ulaştırılmasında çeşitli yöntemler kullanılmakta ve bu yöntemlerin önemli bir bölümü bilimsel olarak incelenmektedir. Bu çalışmada bu kampanyaların iletişiminde kullanılan bir alternatif olarak değerlendirilebilecek olan mistik (gizemli) olarak tasarlanmış reklamların bağış niyeti üzerindeki etkisi analiz edilecektir. Mistik görsellerin manzara tercihi araştırmalarında olumlu bir etki yarattığı bilinmektedir. Buradan ilham alınarak çalışma kapsamında yürütülen pilot çalışmada, mistik temalı görsellerin bağış niyeti üzerindeki etkisi deneysel olarak analiz edilmiştir. Yapılan araştırma sonucunda kullanılan görselin gizemli olarak tasarlanmasının bağış niyeti üzerinde olumsuz bir etki yaptığı görülmüştür. Sonuç kısmında elde edilen bulgular tavsiyeler ve teorik yorumlamalarla birlikte tartışılmıştır.

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Introduction

"Ayşecik: Niçin çocuklara acımak, onlara yardım etmek bu kadar zor mu?
Ali: İnsanların dikkatini bir yere çekmek zor.
(Hayat Sevince Güzel, Yeşilçam Filmi, 1971)"

"Ayşecik: Is it so difficult to have mercy to children, to help them?
Ali: It is difficult to draw the attention of people
(Hayat Sevince Güzel, 1971, a Turkish movie)"

Most individuals agree that we live on an alluring planet. We often admire its beauty. One of the most welcomed outcomes of space journeys that seek life outside the World is the pictures of the World in which we can see how our planet is seen gorgeously from space. However, unconceivably, humans are notoriously destroying the planet by exploiting natural resources, killing animals, wiping out rain forests, polluting oceans and rivers. Today, we even have a plastic island in the pacific ocean called as Great Pacific garbage patch (National Geographic, 2019). The deforestation rate of the rain forests is almost 8 million hectares per year (Butler, 2020). In the United States alone, approximately 2.7 million stray animals are killed every year because of insufficient shelters and lack of adoptive homes (Pepelko, 2014). Three hundred children die due to malnutrition globally (Everyone.org, 2012). 2.2 billion people around the globe are not able to access safely managed drinking water, and around 4.2 billion (approximately 55% of the World's population) live without safely managed sanitation (United Nations, 2020).

Most of these social and environmental problems result from unethical or maladaptive consumption behaviors. Market globalization and harsh competition promote businesses to foster these maladaptive and unethical consumption practices. However, today especially in developed markets, businesses are under much pressure from governments, international organizations, and consumers to prevent themselves from stirring up these social and environmental problems and fight against them. Consumers, today, think that businesses have considerable responsibility for these social and environmental issues. One of the current research found that 86% of the consumers think that businesses should take action for social problems, and 64% of them expressed that they will purchase from a brand that takes stand on a social issue (SheltonGrp, 2018).

There are several ways for businesses to cope with this pressure and most of these ways are in the responsibility of marketing departments like; cause-related marketing campaigns, green marketing applications, sustainable marketing practices, and charity campaigns. The common goal of all these efforts is to encourage consumers to engage in prosocial consumption behavior. According to White, Habib, & Dahl (2020), prosocial consumer behavior can mean any act that includes *helping or benefitting a specific person or persons but could also reflect more general behaviors that benefit wider society* (p.2). Accordingly, all these behaviors can be classified under the concept of prosocial

consumption: charitable giving (monetary or non-monetary), blood or organ donation, ethical buying, engaging in cause-related campaigns, and consumer activism.

Today, we witness businesses, non-governmental organizations, sports clubs, and even governments running charity campaigns. For instance, during the Covid-19 pandemic, the Turkish government organized a donation campaign to support those negatively affected economically, lost his job, or had to have break working because of curfew (Hurriyet Daily News, 2020). In parallel with the increase of these campaigns, consumer behavior literature began to seek the most effective way of creating donations or other social marketing appeals.

As Prothero et al. (2011) remarked, today, marketing literature needs novel approaches and perspectives to help to boost sustainable consumption and implementing sustainable marketing strategies. The effectiveness of many different approaches in designing social marketing appeals is tested empirically (e.g., Wang, Mukhopadhyay, & Patrick, 2017; Brennan & Binney, 2010; Winterich, Gergana, & Gonzales, 2019). Nevertheless, to the best of the author's knowledge, there is no attempt in the literature that discussed the mystic appeals. In the current study, it is tried to analyze the effectiveness of mystic appeals on donation analyzed. Mystic appeals refer to appeals that contain limited and promising information with lower visual access. The rest of the paper is organized as follows. First, studies related to social marketing appeals are summarized. Second, the mysticism in environmental studies is briefly discussed, considering the main inspiration of designing appeals mystically was findings in this field. Third, a pilot study was conducted in which a charity campaign's mystically designed appeal is tested. Finally, findings are discussed together with implications and avenues for future research.

1. Social Marketing Appeals

The efforts of social marketing are rapidly increasing since it is introduced in the 70's. Kotler and Zaltman (1971; p.5) explained how marketing techniques begin to apply in social issues as follows:

> *"Marketing men have advised churches on how to increase membership, charities on how to raise money, and art museums and symphonies on how to attract more patron."*

They implied that social marketing is started by basically applying classical marketing techniques to achieve a social goal. In parallel with this, a comprehensive definition of social marketing created as follows *'the adaptation and adoption of commercial marketing activities, institutions and processes as a means to induce behavioral change in a targeted audience on a temporary or permanent basis to achieve a social goal* (Dann, 2010, s. 151). Along with the rise of the social marketing paradigm, marketing researchers increasingly seek answers about the effectiveness of these social marketing efforts mostly by analyzing how appeals are presented.

According to Noble, Pomering, and Johnson (2014), rational appeals are not effective as emotional appeals. Correspondingly, many studies focused on

emphasized emotions in appeals such as guilt, sadness, hope, fear, pride, and shame. In an early study, Bagozzi and Moore (1994) found that sadness can enhance empathy and lead to prosocial behavior. Guilt and fear appeals[1] also accepted as effective, thus widely used by marketers (Hoog, Stroebe, & Wit, 2007; Huhmann & Brotherton, 1997). However, some scholars claimed that these negative emotional appeals could backfire (Snyder & Blood, 1992; Kohn et al., 1982) thus, marketers should employ positive emotions like optimism (Peter & Honea, 2012) or pride (Antonetti & Maklan, 2014). According to Henley, Donovan, and Mooerhead (1998) main points that differentiate positive appeals to negatives are those (p.48); (1) *Eliciting or promising positive or negative emotions, (2) appealing to positive or negative motivations, (3) offering rewards or punishments, (4) promoting benefits vs. disbenefits, (5) promoting adoption of desirable vs. cessation of undesirable behaviors.*

Brennan & Binney (2010) called marketers to use these negative appeals by caring for consumers' core emotional and psychological well-being, and Gallopel-Morvan et al. (2011) suggested using fear appeals by combining with self-efficacy and cessation support messages. Another study showed that although it is not affecting donation intention, a negative (vs. positive) Karma connotation[2] in donation appeals significantly lessens satisfaction and consumers' intention to revisit (Sharma, 2021).

Apart from emotions, several different factors affect the success of prosocial appeals. One widely used method is emphasizing norms (White, Habib, & Hardisty, 2019). In one example, authors found that emphasizing descriptive norms (what other people commonly do) can be more effective than traditional messages (Goldstein, Cialdini, & Griskevicius, 2008). However, when most people do undesirable actions (e.g., high rate of littering), emphasizing these descriptive norms can backfire (Cialdini, 2003). Also, it is found that emphasizing injunctive norms (what other people approve) can also lead to sustainable behaviors (Reno, Cialdini, & Kallgren, 1993).

The focused benefit in the presented information intended to lead sustainable behaviors also plays a crucial role. For example, Thompson and Stoutmeyer (1991) found that focusing on the long-term environmental benefits of water conservation was more effective in decreasing water waste than solely focusing on the personal economic benefits (Thompson & Stoutemyer, 1991). White and Peloza (2009) found that self-benefit appeals are more effective when consumer's responses are gathered in a private setting; on the other hand, other-benefit appeals can be more useful when the setting is public (White & Peloza, 2009). In other words, other-benefit appeals are more effective when consumers are publicly accountable for their responses.

Consumers also can be motivated through how the information related to social identity is emphasized. For instance, when consumers learn that other associated

1 While the fear appeal is defined as a persuasive communication attempting to arouse fear to promote precautionary motivation and self-protective action (Ruiter, Abraham, & Kok, 2001, p. 614), guilt appeal means a psychological and rhetorical strategy in persuasive communication such as advertising, classified as both emotional and negative, which seeks to arouse in the individual feelings of guilt which the desired response would be perceived as likely to assuage (Oxford Reference, n.d.).
2 Messaged that framed within Karma philosophy.

group members engaged in sustainable action, they are more inclined to do so (Goldstein, Cialdini, & Griskevicius, 2008). Another study found that consumers are more inclined to engage in recycling when they learn their dissociative groups performs well in recycling (White, Argo, & Sengupta, 2012)

Another widely discussed issue about appeals is self-related messages. Consumers are inclined to support their current views and protect self-identity; thus, messages that threaten self-identity [e.g., political identity, Hart and Nisbet (2012)] can demotivate consumers to engage in the prosocial act. Hence, scholars called for the endorsement of self-affirmation (Prooijen & Sparks, 2014). One study found that self-esteem messages motivate people to buy e ugly (safe, edible, but aesthetically unattractive) fruits and vegetables that are not generally preferred (Grewal et al., 2019).

Prompting - placing reminders just before the behavior occurs (e.g., "turn off lights when leaving room" or "put recyclables out tomorrow [Osbaldiston & Schott, 2012, s. 272]) - is another widely used strategy in encouraging prosocial behavior. Prompts are modification messages given just before the behavior occurs to remind the consumer what the desired sustainable behavior is. It should be noted that rather than persuasive appeals, prompts are simple reminders and works when the desired action requires minimal effort (Lehman & Geller, 2004; Vermeir et al., 2020).

The role of used visual elements in appeals is also widely discussed in marketing literature. Wang, Mukhopadhyay, and Patrick (2017) found that *Kindchenschematically*[3] cute visuals trigger prosocial and sustainable behaviors by increasing feelings of tenderness (Wang, Mukhopadhyay, & Patrick, 2017). Winterich, Gergana, & Gonzales (2019) demonstrated the positive effect of transformation salience on recycling in designing appeals. They activated transformation salience by placing images that show how recycled items transform a new product. Koo, Oh, & Patrıck (2019) showed how the anthropomorphization of old (not fresh) visuals of fruits and vegetables enhances consumers' preference.

It should be noted that several psychological and demographic characteristics can affect the response to these appeals. In general, the literature suggests that women, younger, and educated people are more inclined to engage in prosocial consumption (White, Habib, & Hardisty, 2019). Also, there is some specific evidence about the gender-based differences in reaction to social marketing appeals. For example, Noble et al. (2014) found that females respond more strongly to negative emotional appeals. Brough et al. (2016) illustrated that males are afraid of being eco-friendly because of the prevalent association between green behavior and femininity.

2. Mysticism in Environmental Studies

Environmental psychology studies analyzed landscape preference by comparing judgments on landscape scenes of individuals. One of the widely discussed frameworks is put forward by Kaplan and Kaplan (1989). According to this preference

[3] Baby-like appearance.

matrix (Table 1), all four predictors (Coherence, complexity, legibility, and mystery) will be positively related to preference (Kaplan & Kaplan, 1989, s. 53).

Table 1: The Preference Matrix

	Understanding	**Exploration**
Immediate	Coherence	Complexity
Inferred, predicted	Legibility	Mystery

Among these predictors, mystery is one of the most empirically analyzed landscape features, whether in a street view or in a forest setting. Mystery, in this context, is a matter where a place promise to learn more if one goes deeper. Kaplan and Kaplan (1989) defined mystery in environmental context as; *`Something in the setting draws one in, encourages one to enter and to venture forth, thus providing an opportunity to learn something that is not immediately apparent from the original vantage point*' (p. 55). A similar conception created by Appleton called as secondary prospect that represents to a prospect where viewer cannot experience directly from the place where currently stands (Hagerhall, 2000). Both concepts are related to individuals' curiosity; in other words, both concepts are about intention to explore more. Curving pathways, partial concealment, and shadows increase the perception of mystery (Herzog & Bryce, 2007).

Herzog and Bryce (2007) found that if visual access is high within a forest context, mystery is positively related to preference. To put it differently, when the visual access is more explicit, mystery positively affects landscape preference, but mystery backfires if the visual access is very low. The lower visual access enhances the perception of danger which is negatively related to preference (Herzog & Smith, 1988). In a virtual experiment, Nasar and Cubukcu (2011) found that individuals' preference in street view setting increased together with perceived mystery and surprise. Although it sounds similar, surprise is about current feelings, and mystery is about the future responses (Nasar & Cubukcu, 2011). To put it differently, in surprise, anticipated new information suddenly revealed however, in mystery, new information is currently available and continuous (Herzog & Bryce, 2007). Overall, mystic views are considered as promising views with low (not very low as dangerous views) visual access.

3. Current Study; Mystic Appeal and Donation Intention

Within the context of this study, a mystic appeal was designed for testing its effectiveness by taking environmental studies' conceptual framework into consideration. To the best of the author's knowledge, the idea is not tested empirically in previous literature; accordingly, the current investigation is designed as a pilot study (limited sample, fewer variables, and only two appeals tested). The visual used in the appeal is designed mystically; information is limited but inviting (e.g., questions are used instead of sentences in the text that are placed in appeal), and the used visual is less apparent compared to control appeal (Appendix A).

Both control and experimental appeal asked participants to support a project which aims to help stray animals. The text under the appeal says that food and shelter will be provided with generated money for stray animals that live in the gardens of mosques and other religious places. Thus religiosity in the data analysis was taken as

a control variable. Prior work illustrated that most Turkish people make donations to religious institutions such as; mosques, Quran schools, or religious associations and philanthropy mostly seen as fulfilling religious obligation (Çarkoğlu & Aytaç, 2019, p. 38-39,56-57).

It is predicted that the inviting nature of mystic appeals will enhance consumers' intention to engage in prosocial action. Thus;

H1: *Mystic (vs. control) appeal enhance consumers' intention to donate a cause*

4. Method

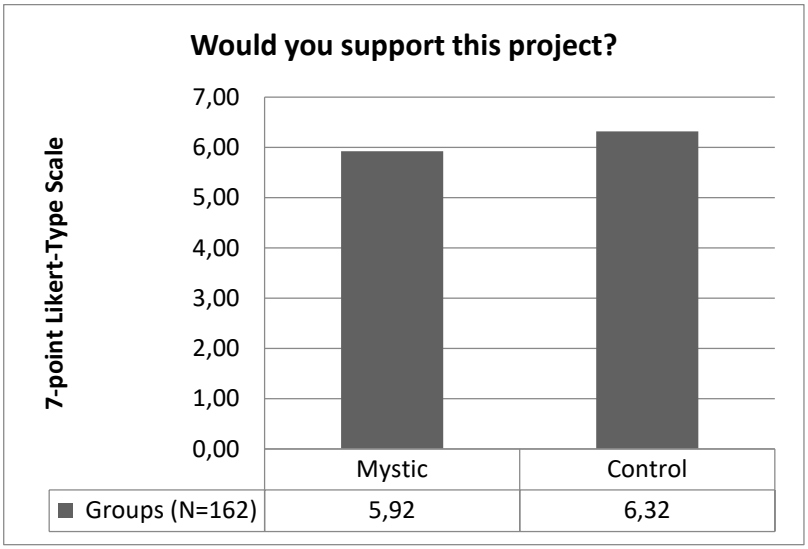
Participants and Procedure. Participants were invited to the study with an online link via the author's social media channels and a Turkish university's portal. Participants who failed to fill attention check item correctly and the item *'I understand that current project is not associated with any religious parties or groups'* are excluded from the study. Participants were randomly assigned one of two conditions (mystic appeal vs. control appeal). Before seeing appeal, they filled Turkish adaptation of intrinsic religiosity scale (Allport & Ross, 1967; Ok, 2011, α=.903). Following this, participants were exposed to appeals with a text. Both appeals have the exact text just under a cat picture. The cat picture also contains another text, 'which is differentiated for both appeals'. The color of the picture is adjusted for creating mystery (Appendix A). The perceived mystery was measured with a manipulation check item *'How much mystical do you think the appeal was?'* with a 7-point type Likert scale (1= Not mystical at all, 7= Very mystical).

Following the appeal, participants' intention to support the project was analyzed. One item with a 7-point Likert type scale (1= I would definitely not support; 7= I would love to support) was used for measuring donation intention. The amount of money they want to donate monthly (in Turkish Liras) is measured with an open-ended question. Survey finished with manipulation check items and demographics.

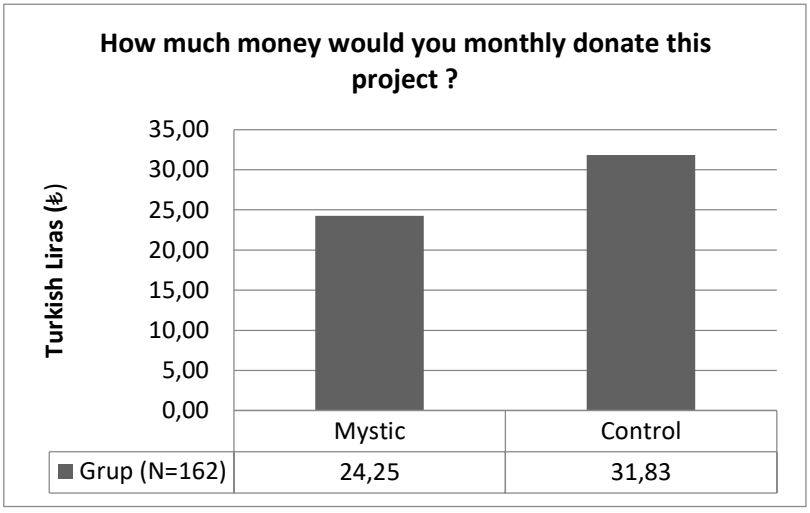
4.1. Results

Manipulation Check. Participants who were exposed the mystic appeal had higher responses than those who were exposed to control appeal, to the manipulation check item: *"How much mystical do you think the appeal was?"* ($M_{\text{mystic appeal}}$= 5.09, SD=1.05; $M_{\text{control appeal}}$=3.76, SD=1.76; t (137,133) = 5,877, p=.00).

Donation Intention. An ANCOVA analysis is run for comparing both groups' intention to support asked charity campaigns. Contrary to expectation, participants who were exposed mystic appeal significantly stated less intention to support charity campaign ($M_{\text{mystic appeal}}$ =5.92, SD=1.43; $M_{\text{control appeal}}$=6.32, SD=1.21; F (1.160) = 4.34, p=.039) when controlling intrinsic religiosity (p = .463; $\eta 2$ = .003). Thus H1 is not supported.



Donation Amount[4]. Another ANCOVA analysis was conducted to compare groups' stated amount of money to donate monthly to the asked charity campaign. Similar with donation intention, participants in the control condition stated that they are able to donate more money monthly ($M_{mystic\ appeal}$ =24.25, SD=24.04; $M_{control\ appeal}$=31.83, SD=39.29) but not significantly ($F(1.160) = 2.04$, $p=.15$) when controlling for intrinsic religiosity ($p = .97$; $\eta 2 = .00$).



4.2. Discussion

In this study, contrary to the developed hypothesis, it is found that appeals that created mystically decrease consumers' intention to donate. Because the offered campaign includes some religious motives, intrinsic religiosity is controlled. No significant difference is found between groups in terms of the monthly donation amount.

[4] Participants who did not fill this item were deemed as donating 0 Turkish Liras.

5. Conclusion

Increasing social problems creates pressure on social marketers to find novel ways to encourage people to engage in prosocial behaviors. In the current investigation, a new communicative way is borrowed from environmental psychology for social marketing appeals. Because environmental preference studies found that mystic views enhance preference, the same positive effect is expected for social marketing appeals due to abstract information and promising views being considered preferable compared to detailed information and more explicit exposure. However, it is found that these mystic appeals can backfire. Because no positive effect was found, further studies in which underlying mechanism could be questioned are not conducted in the current research. A possible explanation of this counterproductiveness may be; limited information and lower visual access could create insecurity and fear. It is already known that when experienced fear is not moderate, it can result with inaction (O'Neill & Nicholson-Cole, 2009).

Future studies should test this kind of appeals in different consumption contexts such as luxury products. Creating mystery on a luxury product may be charming because of limited information, and low visuality can enhance the perception of luxury by sending signals about the uniqueness or scarcity of the product. Also, the effectiveness of mystic appeals should be tested on different social marketing campaigns. As Herzog and Bryce (2007) found within a forest context mystery positively affects preference, mystical appeals may create a positive effect for social marketing campaigns that aim to protect nature.

Furthermore, it should be noted that every prosocial consumption research should be carefully conducted in Turkey considering the interpersonal trust level is among the lowest countries. This distrust reflects on charitable giving campaigns, especially for those running by organizations. In one research, it is found that only 21% of the respondents agreed to the statement that *'most people can be trusted'*, only 62% of them stated that they did not donate for anybody within last year, and only 12% of them said they could prefer giving through an organization (Çarkoğlu & Aytaç, 2019, s. 22-23, 30-31). Accordingly, for more robust findings, future studies can test mystic appeals in a different cultural context.

In the current study, a mystic message was created minimally and traditionally, just adjusting the text and the colors. Creating mystic messages with more sophisticated technologies like interactive screens or virtual reality could create effective mystic social marketing appeals.

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Appendices

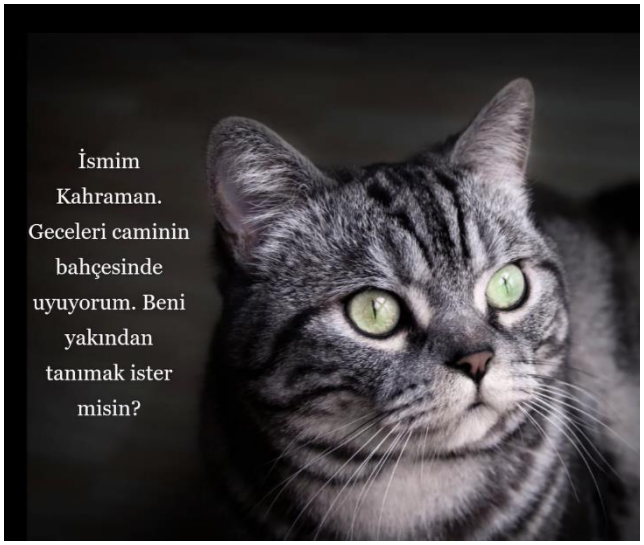

Figure 1. Control Appeal

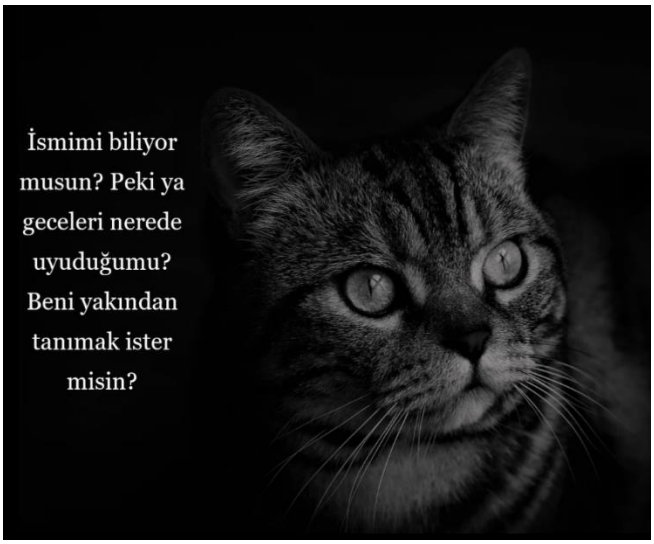

Figure 2. Mystic Appeal

The text in the Control Appeal (In English): My name is Kahraman[5]. I am sleeping in the yard of the mosque at night. Do you want to get to know me better?

The text in the Mystic Appeal (In English): Do you know my name? And where do I sleep at night? Do you want to get to know me better?

The text at the bottom of appeal (In Turkish): 2021 yılı itibariyle çeşitli illerde sokak hayvanlarına yardım edebilmek için bir kampanya düzenlenmesi planlanmaktadır. Bu kapsamda sokak hayvanlarının sık yaşadığı camii ve diğer dini mekânlarda yerleştirilecek olan mama ve su kaplarının düzenli olarak doldurulması planlanmaktadır.

The text at the bottom of appeal (English Translation): As of 2021, it is planned to organize a project to help stray animals in various cities. Thus, it is planned to regularly refill the food and water feeders in mosques and other religious sites where stray animals often live.

[5] Kahraman a Turkish name, means 'hero' used both for humans (mostly male) and animals.