

A Study to Analyze The Impacts of COVID-19 on The Textile Industry: Evidence from Bursa, Turkey

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Abstract

At the end of the year 2019, the world has been faced with New Coronavirus Pandemic, and it affected people's lives, the environment, the economy, and businesses in different sectors. During the pandemic, many sectors and businesses tried to mitigate the negative effects of the pandemic and tried to turn crises into opportunities. The textile sector - which has a big share in Turkey's economy in terms of export and production volume- was affected during the pandemic. This study aims to analyze the economic impacts of the New Coronavirus Pandemic and yearly based comparison analyses on the textile sector in Bursa, Turkey. Two questionnaires containing twenty-four questions were applied to 241 textile companies in Bursa. Data were analyzed with SPSS (Statistical Package for Social Sciences) 25.0 software. Analysis results showed that most of the participants have negative opinions in terms of the economy, and they have economic worries post-COVID-19. Tested hypotheses also showed the significant differences between operation year, legal status, the market of businesses, and the monthly turnover of companies and how they were affected by COVID-19. Internationally serving and operating for many years, corporations or limited companies have an advantage and less negative opinion. Study results also pointed out increased lead time of raw material and delivery time in 2021 compared to 2019.

Keywords

Coronavirus, Questionnaire, Supply Chain, Textile Sector

1. Introduction

Many epidemics and disasters have occurred throughout history and affected humanity. Beyond old ones such as Black Plague (14th century), the Spanish Flu (1918-20), and shortly SARS, Bird Flu, Swine Flu, and Ebola respectively affected humanity (Alaeddinoglu and Rol 2020). Recently Coronavirus emerged in the world. On 31 December 2019, the WHO (World Health Organization) was announced cases of pneumonia detected in Wuhan City, Hubei Province of China. On March 11, 2020, the WHO informed "Coronavirus disease 2019" (COVID-19) as a global pandemic. Unfortunately, over 200 countries were under the influence of the pandemic (WHO 2020). Because of the pandemic, 6,098,941 million people have lost their lives in the cases of 470,207,646 up to the end of the 20th of March in 2022 (Worldometer 2022).

The new Coronavirus Pandemic affected people's lives, working styles, the economy, and different sectors. The textile sector, which is one of the affected sectors, had the highest foreign trade surplus and contributes to over 10% of the country's gross domestic product in Turkey (Uyanık and Çelikel 2019). In 2019, Turkey's carpet, ready-made clothing, and apparel, textile, and raw materials export 28 billion in U.S. dollars and make 16% of the total country's exports. But decreased by 1 billion USD to 27 billion USD in 2020, accounting for 18% of total country exports (Textile Industry Analysis Report and Guide for TRB1 Region 2021). Increased and disrupted transportation days, increased raw material lead time and costs, decreased orders, and reduction of operation capacities due to social distance affected the textile sector negatively. But also, new product opportunities and production areas were raised due to the contagious nature of the pandemic. Companies that adopt quickly, use technology more, and have a chance to start

production of newly needed products took advantage. Keskin (2021) stated that companies started to produce and sell masks and antibacterial medical masks haven't been affected negatively as much as others.

Many types of research and reports around the world on the textile industry revealed that one of the most affected sectors by the pandemic is the textile sector (Textile Industry Analysis Report and Guide for TRB1 Region 2021). This paper focused on analyzing the New Coronavirus Pandemic's effects on textile sector companies in Turkey. Bursa was selected as a city for research that is one of the leading industrial cities in terms of the number of companies and production volume in the textile sector in Turkey. From 1st January 2021 to 31st December 2021, Bursa had 1.19 billion \$ export in the textile sector, also increased export volume by 32.2% in 2021 compared to 2020 (Turkish Exporters Assembly 2022). In this study, two different questionnaires with three-section; descriptive analyses, twenty-four questions for economic impact analyses, and comparative questions for years 2019-2021 were applied in textile sector companies in Bursa, Turkey.

The required data were collected from 241 textile companies on the dates between the 1st and 30th of December 2021 on online platforms. Different hypotheses were developed to analyze the impact on textile companies. To analyze data, SPSS (Statistical Package for Social Sciences) 25.0 packaged software was used. The paper is concerted into six sections. The justification and objectives of the study are presented in the introduction. The literature review is supplied in Section 2, the research methodology is provided in Section 3, the data collection is presented in Section 4 and the obtained analysis results are provided in Section 5. The final section includes the conclusion of the research and recommendations for future works.

2. Literature Review

Most of the search and reports around the world about the textile industry revealed textile sector is one of the most affected sectors due to the pandemic (Textile Industry Analysis Report and Guide for TR32 Region 2021). In literature, there are questionnaire researches to measure the effect on textile industries and to analyze company's methods to overcome and mitigate the negative effects of the pandemic. Textile Industry Analysis Report and Guide for TRB1 Region (2021) conducted a study with 113 textile companies. Most of the participants stated decreased exports in terms of U.S. dollars in 2021 compared to 2020. 38% of participants stated their export decreased by more than 51% in U.S. dollars and 21% of participants stated their export decreased by 1-25% in 2021 compared to 2020. In Turkey, one of the fundamental problems of the textile industry is the foreign dependency on raw materials. 32% participants stated increased price of raw materials and 28% stated, extended raw material lead time and pointed out decreased stock level of raw material and unavailability of raw materials in desired quality during the pandemic. Keskin (2021) made an interview with 9 respondents in the textile sector and participants stated the increased raw material expenses and collection time during the pandemic.

In literature, there are studies conducted on textile employees to analyze how they are affected in terms of workload and stress level. Mondal et al. (2021) applied a questionnaire to 162 participants, 79.4% stated their workload went up due to employees who left their job. Kaur (2021) were collected questionnaire data from 123 entrepreneurs from the textile industry and analyzed the effect of the pandemic on entrepreneurs. Results are shown that 80% of the entrepreneurs studied under stress during the pandemic. Analyses revealed stress level increase in case of postponement of pre-booked orders, variable health issues, difficulty in future marketing campaigns, but a decrease in case of being equipped with digital capabilities.

Many questionnaire studies were conducted in other sectors. Pan K and Yue X. G (2021) made a wide survey with 1015 participants around the world for multisectoral. 30% of the respondents pointed out that textile, international trade, and employment were affected negatively. The tourism sector has also been affected severely during the pandemic. Many businesses remained closed and these not only affected economy but also caused hundreds of millions of working people to become unemployed (Alaeddinoglu and Rol 2020). Surme (2020) conducted a study on 240 participants' and stated that participants' perceptions related to COVID-19 risk were so high that their purchase intention for holiday purchases was low during the pandemic. Aracı and Ergen (2021) applied a questionnaire to 9 participants in the tourism sector, and they stated they used technologies and digital systems more frequently after the pandemic. Usage of technology decreased also their general expenses. These positive effects of the pandemic may enable companies to adopt technology easier and may enhance to reduce their expenses.

Statistics have revealed that industries that don't have a permanency plan will fail three years after a disaster appeared (Cook 2015). Permanency plans, digital transformations, and using technology have gained more importance during the pandemic. Khan and Ponce (2021) made a study of the perishable food sector and stated digital skills and information technologies played an important role in the increased demand for home delivery. Keshavarzi (2021) conduct a questionnaire to 379 participants and showed in the study that 45% of participants stated pandemic caused enhanced digital construction of firms and helped to analyze their shortcomings better. Many studies in the literature pointed out the different effects of the pandemic on various sectors. But, no study analyzed both the economic effects of the pandemic and yearly-based comparison by developing hypotheses on the textile sector in Bursa, Turkey. And thus, it is thought that this study will contribute significantly to the literature.

3. Methods

In this study, questionnaires were used as material. Two questionnaires with three-section descriptive analyses, twenty-four questions for economic impact analyses, and comparative questions by years were applied on online platforms by preparing questionnaire form on the internet. In the first questionnaire, the descriptive questions part was applied to analyze descriptive information of participants and company-related information. The second section includes twenty-four questions with three subsets (COVID-19 effect on the sustainability of economic activities, opinions on economic policies implemented in COVID-19, economic forecasts for post-COVID-19) to measure the economic impact of COVID-19 was taken from the survey which applied before. (Nakıboğlu and Işık 2020) The third part is at aimed yearly-based comparison for 2019 and 2021 with eight different criteria.

4. Data Collection and Analyses

This study was conducted on the dates between the 1st and 30th of December in 2021 on online platforms. Participants from Bursa textile industries attended and 241 participants replied to the questionnaires on five scales from (1) Strongly Disagree to (5) Strongly Agree. A simple random sampling method was used and 8% acceptable margin of error and 90% confidence level were used and 241 firms have been accepted as representatives of the Bursa textile industries. After data was collected, data was analyzed by SPSS 25.0 packaged software.

Descriptive statistics, frequency, percentage, average and standard deviations were used for data analyses. To analyze the sufficiency of the sample, the Kaiser-Mayer-Olkin test was used and resulted in 0.9 showing the sample is sufficient. The Kaiser-Mayer-Olkin statistic value varies between 0 and 1. A value that is greater than 0.5 is accepted as sufficient (Kaiser 1974). Cronbach's Alpha test was used for reliability and resulted in a 0.92 Cronbach's Alpha statistic value that varies between 0 and 1. A value that is greater than 0.7 is accepted as satisfactory (Leung 2001). T-test and ANOVA tests were used to analyze the COVID-19 effect on participants and textile industries. P values less than 0.05 were considered significant in the study.

Different hypotheses were developed to analyze the impact of the pandemic.

Hypothesis (H1): There is a significant difference between the operation year of companies and how they are affected by the COVID-19.

Hypothesis (H2): There is a significant difference between the legal status of companies and how they are affected by the COVID-19.

Hypothesis 1 (H3): There is a significant difference between the market of companies and how they are affected by the COVID-19.

Hypothesis (H4): There is a significant difference between the monthly turnover of companies and how they are affected by the COVID-19.

5. Results and Discussion

In this survey, 134 men (55.6%) and 107 women (44.3%) took part. Figure 1 shows 144 participants (59.75%) have graduated from university with Bachelor's Degree, 76 participants (31.54%) with a Master's Degree, and 21 participants (8.71%) Associate Degree. Participants' age was mostly 46-55 years with 99 participants (41.08%), 36-45 years with 93 participants (38.59%), 56 and above with 24 participants (9.96%), 26-35 years with 17 participants (7.05%), 0-25 years with 8 participants (3.32%).

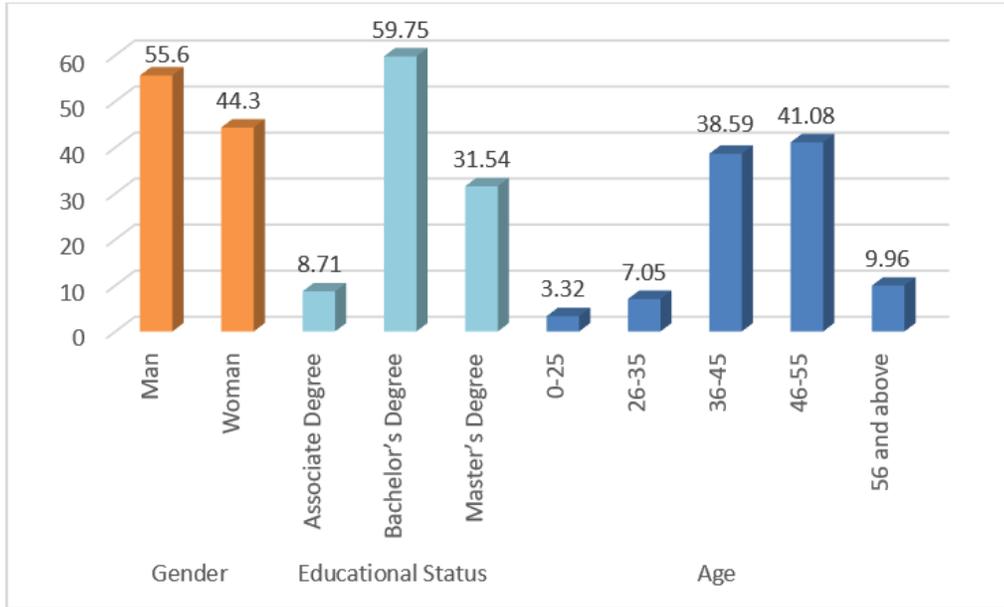


Figure 1. Demographic information of participants

As shown in Figure 2, 108 companies' operation year was 16-20 years with a high rate (44.81%), 67 companies' (27.8%) operation year was 21 and above, 46 companies' (19.09%) operation year was 6-10 years, 20 companies' (8.30%) operation year was 11-15 years. The legal status of companies was a corporation with a high rate of 58.92% (142 companies), then limited companies 21.99% (53 companies), and sole proprietorship 19.09% (46 companies). 167 companies served internationally with 69.29%, 60 companies served nationally with 24.9%, and 14 companies served locally with 5.81%.

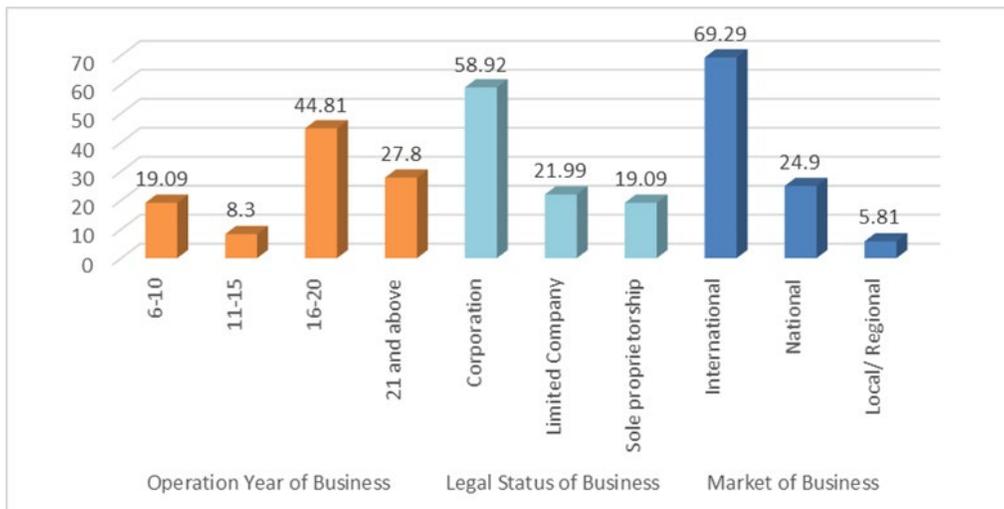


Figure 2. Company information

Opinions on COVID-19 effect on the sustainability of economic activities revealed how participants were affected negatively. The higher the dimension scores shows the higher level of impact. Table 1 states, most of the participants think they have to reduce the number of employees working at the company and they are worried about not being able to take care of their family and children.

Table 1. Opinions on COVID-19 effect on sustainability of economic activities

COVID-19 Effect on Sustainability of Economic Activities	X± s .d.	Factor load	Explained Variance	Internal Consistency
I think I have to decrease the number of employees who work at the company.	4.17±0.57	0.64	22%	0.84
I think I will not be able to pay the collateral.	3.59±0.70	0.60		
I believe, there will be no demand for the products and services we offer as before.	3.90±0.77	0.61		
I am worried about not being able to take care of my family and children.	4.08±0.78	0.58		
I think I will have trouble with banks cause of the loan payments.	3.99±0.78	0.60		
I think I will lose a significant job loss.	3.41±0.84	0.60		
I am scared of shutting down my business.	3.85±0.73	0.58		
I think I will not tend to do new entrepreneurship activities.	3.31±0.71	0.60		
I think I will not collect my debts.	3.78±0.77	0.61		
I think, applied economic policies cannot recover the damage which I have seen caused by the COVID-19.	3.77±0.78	0.62		

Opinions on economic policies implemented in COVID-19 show the adequacy of the economic precautions which are taken. The higher the dimension scores shows the higher level of impact. According to respondents' results in Table 2, the highest scores related to the opinion of they think they can't profit from the benefits which are given and that they think given economic incentives are insufficient.

Table 2. Opinions on economic policies implemented in COVID-19

Opinions on Economic Policies Implemented in COVID-19	X± s. d.	Factor load	Explained Variance	Internal Consistency
I think economic precautions are insufficient.	3.99±0.42	0.60	21%	0.85
I think, given economic incentives are insufficient	4.08±0.27	0.61		
I have economic worries for the future.	4.06±0.71	0.62		
I think, economic recessions these days will cause economic troubles in the future.	3.88±0.48	0.63		
I feel myself, economically insufficient.	3.77±0.83	0.64		
I don't believe that economy will not easily return to the old state from now on.	3.90±0.44	0.61		
I can't profit from the benefits which are given.	4.26±0.74	0.62		

Economic forecasts for post-COVID-19 show how negatively the economic effects will be in the future. The higher the dimension scores shows the higher level of impact. Generally, the high score results of respondents show that participants' perception of the economy will be worse in the future. Table 3 states opinions on economic forecasts for post-COVID-19.

Table 3. Opinions on economic forecasts for post COVID-19

Economic Forecasts for Post COVID-19	X±s.d.	Factor load	Explained Variance	Internal Consistency
I think, all the sectors are affected negatively in terms of economy.	4.13±0.43	0.63	22%	0.86
I think competition will be more and profitability will be less.	3.87±0.63	0.61		
I think inflation will increase significantly.	4.14±0.67	0.62		
I think, there will be a rapid transition from the general economy to a digital economy.	4.01±0.73	0.63		
I think small businesses are at risk of shutting down.	4.14±0.60	0.62		
I think unemployment will increase.	4.14±0.76	0.61		
I think the recovery of the economy will take a long time.	4.20±0.78	0.61		

Different hypotheses were created to examine the relationship between the economic effect of COVID-19 on companies and some criteria such as operation year of business, legal status, market, and monthly turnover in 2019 and 2021. Results are shown in Table 4.

Hypothesis (H1): There is a significant difference between the operation year of companies and how they are affected by COVID-19.

According to the results, significant differences between operation year and COVID-19 effect on the sustainability of economic activities. H1 was accepted for this subset ($p= 0.03$). Results were revealed that businesses operating for 6-10 years affected more. There was also a significant difference in opinions on economic policies implemented in COVID-19 ($p= 0.01$). H1 was accepted for this subset. But rejected for economic forecasts for post COVID-19 ($p> 0.05$).

Hypothesis (H2): There is a significant difference between the legal status of companies and how they are affected by the COVID-19.

H2 was accepted for all subsets. The significant difference between the legal status of businesses and COVID-19 effect on the sustainability of economic activities ($p= 0.01$), opinions on economic policies implemented in COVID-19 ($p= 0.01$), and economic forecasts for post COVID-19 ($p= 0.04$). Sole proprietorship businesses have more negative opinions of COVID-19 effect on the sustainability of economic activities and opinions on economic policies implemented in COVID-19. Moreover, limited firms have lower negative predictions for post -COVID-19.

Hypothesis (H3): There is a significant difference between the market of companies and how they are affected by the COVID-19.

According to the results, significant difference between the market of businesses and the COVID-19 effect on the sustainability of economic activities. H3 was accepted for this subset ($p= 0.01$). Results were revealed that businesses that serve internationally impacted less. There was also a significant difference in opinions on economic policies implemented in COVID-19 ($p= 0.01$). Firms that are serving locally have been affected more. H3 was accepted for this subset. But rejected for economic forecasts for post COVID-19 ($p> 0.05$).

Hypothesis (H4): There is a significant difference between the monthly turnover of companies and how they are affected by the COVID-19.

According to the 2019 and 2021 results, significant differences in the legal status of businesses and COVID-19 effect on the sustainability of economic activities ($p= 0.01$), opinions on economic policies implemented in Covid-19 ($p= 0.01$), and economic forecasts for post COVID-19 ($p= 0.04$). H4 was accepted for all subsets. In 2019, firms whose monthly turnover is less than 1,000,000 TL have a more negative opinion on COVID-19 effect on the sustainability of economic activities and opinions on economic policies implemented in COVID-19.

Table 4. Opinions based on Participants and Business Characteristic

Business Characteristics		COVID-19 Effect on Sustainability of Economic Activities		Opinions on Economic Policies Implemented in COVID-19		Economic Forecasts for Post-COVID-19	
		X+s.s.	p	X+s.s.	p	X+s.s.	p
Operation Year of Business	6-10	3.88+0.51	0.03*	4.19+0.21	0.01*	4.10+0.31	0.23
	11-15	3.58+0.42		3.86+0.30		3.99+0.27	
	16-20	3.80+0.50		3.85+0.35		4.05+0.29	
	21 and above	3.50+0.51		3.87+0.26		3.97+0.35	
Legal Status of Business	Corporation	3.63+0.50	0.01*	3.94+0.27	0.01*	4.08+0.27	0.04*
	Limited	3.55+0.47		3.91+0.27		3.93+0.37	
	Sole proprietorship	4.17+0.31		4.25+0.14		4.01+0.32	
Market of Business	International	3.63+0.47	0.01*	3.93+0.27	0.01*	4.04+0.29	0.52
	National	3.95+0.51		4.11+0.27		4.01+0.33	
	Local	3.83+0.70		4.24+0.11		4.05+0.43	
Monthly turnover 2019	1,000,000 TL and less	4.26+0.14	0.01*	4.16+0.13	0.01*	3.86+0.31	0.01*
	1,000,001 -15,000,000 TL	3.42+0.28		3.85+0.33		3.84+0.21	
	15,000,001 - 30,000,000 TL	3.4+0.28		3.88+0.31		4.02+0.28	
	30,000,001 - 45,000,000 TL	3.50+0.60		3.99+0.23		4.12+0.22	
	45,000,001 – 60,000,000 TL	3.74+0.2		3.96+0.12		4.14+0.16	
	60,000,001 - 75,000,000 TL	3.66+0.43		3.99+0.15		4.01+0.25	
Monthly turnover 2021	1,000,000 TL and less	4.26+0.14	0.01*	4.16+0.13	0.01*	3.86+0.31	0.01*
	1,000,001 -15,000,000 TL	3.79+0.55		3.99+0.35		4.01+0.37	
	15,000,001 - 30,000,000 TL	3.50+0.31		4.03+0.26		4.18+0.11	
	30,000,001 - 45,000,000 TL	3.37+0.23		3.78+0.28		4.05+0.34	
	45,000,001 – 60,000,000 TL	3.40+0.62		3.95+0.26		4.15+0.24	
	60,000,001 - 75,000,000 TL	3.80+0.20		4.02+0.07		4.08+0.19	

*0.05 as level of significance

According to a comparison in Table 5, in 2021, the monthly export average increased. In 2021, 87 participants stated their monthly export average was between 30,000,001-45,000,000 TL, compared to 29 participants in 2019. The monthly domestic sales average and monthly turnover results seem better in 2021 than in 2019. In 2021, 50 participants stated their domestic sales average 30,000,001-45,000,000 TL, compared to 12 participants in 2019. Also, 45 participants stated their monthly turnover 60,000,001-75,000,000 TL, compared to 7 participants in 2019.

Table 5. Comparison for monthly operating capacity, number of exporting countries, number of monthly employees

		2019 January- November		2021 January- November	
		n	%	n	%
Monthly Export Average	1.000.000 TL and less	91	37.80%	91	37.80%
	1.000.001-15.000.000 TL	38	15.80%	38	15.80%
	15.000.001-30.000.000 TL	83	34.40%	25	10.40%
	30.000.001-45.000.000 TL	29	12.00%	87	36.10%
Monthly Domestic Sales Average	1.000.000 TL and less	25	10.40%	25	10.40%
	1.000.001-15.000.000 TL	107	44.40%	144	59.80%
	15.000.001-30.000.000 TL	97	40.20%	22	9.10%
	30.000.001-45.000.000 TL	12	5.00%	50	20.70%
Monthly Turnover	1.000.000 TL and less	25	10.40%	25	10.40%
	1.000.001-15.000.000 TL	94	39.00%	93	38.60%
	15.000.001-30.000.000 TL	32	13.30%	16	6.60%
	30.000.001-45.000.000 TL	49	20.30%	20	8.30%
	45.000.001-60.000.000 TL	34	14.10%	42	17.40%
	60.000.001-75.000.000 TL	7	2.90%	45	18.70%

According to comparisons in Table 6, in 2021 monthly operating capacity, the average number of exporting countries, and the number of monthly employees increased. Especially the number of countries exported between 31-50 increased from 6.6% to 27.0%. The average number of employees between 1001- 1200 increased from 2.1% to 36.1% in 2021 increased compared to 2019. These can be related to the potential and location advantages of Bursa textile industry.

Table 6. Comparison of monthly operating capacity, number of exporting countries, number of monthly employees

		2019 January- November		2021 January- November	
		n	%	n	%
Monthly Operating Capacity	40% and less	9	3.70%	13	5.40%
	50%-60% capacity	26	10.80%	39	16.20%
	61%-70% capacity	64	26.60%	52	21.60%
	71%- 80% capacity	104	43.20%	72	29.90%
	81%-90% capacity	38	15.80%	63	26.10%
	91% and more	2	0.80%	2	0.80%
Average Number of Exporting Countries	10 and less	101	41.90%	93	38.60%
	11-30 country	124	51.50%	83	34.40%
	31-50 country	16	6.60%	65	27.00%
Average Number of Monthly Employee	200 and less	71	29.50%	89	36.90%
	201-400 employee	7	2.90%	7	2.90%
	401-600 employee	47	19.50%	16	6.60%
	601-800 employee	63	26.10%	23	9.50%
	801-1000 employee	48	19.90%	19	7.90%

	1001-1200 employee	5	2.10%	87	36.10%
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According to Table 7, the 2021 year results revealed an increased average lead time. The average lead time of raw material was 21-30 days with 0.4% of participants in 2019 but reached 35.3% of participants in 2021. While average delivery time was mostly 21-30 days in 2019 but reached 31-40 days in 2021. These are mostly related to disrupted and delayed transportation and shortage of raw materials during the pandemic.

Table 7. Comparison of the average lead time of raw material and average delivery time

		2019 January- November		2021 January- November	
		n	%	n	%
Average Lead time of Raw Material	0-10 day	81	33.60%	30	12.40%
	11-20 day	159	66.00%	126	52.30%
	21-30 day	1	0.40%	85	35.30%
Average Delivery Time	0-10 day	43	17.80%	17	7.10%
	11-20 day	48	19.90%	43	17.80%
	21-30 day	109	45.20%	70	29.00%
	31- 40 day	41	17.00%	111	46.10%

6. Conclusions and Recommendations

In this study, the Coronavirus Pandemic impact on the textile sector in Bursa, Turkey was analyzed. SPSS 25 software was used for the analysis. To analyze the economic impact on the textile sector, three subsets; COVID-19 effect on the sustainability of economic activities, opinions on economic policies implemented in COVID-19, and economic forecasts for post-COVID-19 analyzed. In terms of the sustainability of economic activities, most of the participants thought of decreasing the number of employees working at the company. In the scope of economic policies implemented during COVID-19, participants pointed out they couldn't profit from the benefits which were given and taken precautions were not sufficient. They also thought economic recovery will take a long time and inflation and unemployment will increase post-COVID-19. These opinions revealed that the textile sector in Bursa was affected negatively in terms of the economy and participants have economic worries for post-COVID-19. To mitigate negative effects and stimulate the economy after the pandemic, economic support packages of states have gained importance and should be better prepared.

Developed hypotheses were also tested and analyzed. Results showed that companies were affected differently according to their operation year. 21 and above years operating companies had a less negative opinion. That can be related to their experience and knowledge about how to manage a crisis. Companies were affected differently according to their legal status and their market. The sole proprietorship has more negative opinions about pandemics, so the importance of being institutional became apparent during the pandemic. Internationally serving companies have fewer negative opinions than national and local ones. Results showed that companies were affected differently according to their monthly turnover. In the years 2019 and 2021 firms whose monthly turnover is less than 1,000,000, TL have a more negative opinion. That was probably related to the size of the company. Companies that have less turnover were affected more negatively. This study's results showed the effects of some important characteristics of companies against the pandemic. Internationally serving and operating for many years, corporations or limited companies have an advantage and less negative opinion.

In the final stage, different criteria, such as monthly operation capacity, the average number of monthly employees, average delivery time, and average lead time, were compared based on years. Participants pointed out that average delivery time and average lead time significantly increased. Increased deadlines and delivery times related to the pandemic resulted in disrupted transportation activities, decreased working capacity, and lockdowns. But, compared to 2019, in the 2021 monthly operation capacity, the average number of monthly employees increased in the textile sector in Bursa. This can be related to increased production volume and the development of the textile sector in Bursa.

Results showed that despite the pandemic's negative impact on average delivery time, average lead time, and participant's negative opinions related to COVID-19 economic impact, most of the criteria, such as monthly operation capacity, the average number of monthly employees, export volume developed in Bursa textile sector. This also coincides with the results of the Turkish Exporters Assembly (2022), from 1st January 2021 to 31st December 2021, Bursa had 1.19 billion \$ export in the textile sector, also increased export volume by 32.2% in 2021 compared to 2020.

In Turkey and around the world, related questionnaire studies revealed negative impacts of the pandemic on the economy, production volume, increased lead times, workload, and stress level of employees in the textile sector and also in other sectors. But, studies pointed out the increased importance of using technology, having digital skills, and being agile during the pandemic. With a good experience of the pandemic, companies can allocate more budget to use technology more, improve their digital skills also transition to institutionalization. The limitation of the study is that it has conducted with a sample from only one city in Turkey. Researchers can do similar questionnaires by increasing the number of sampled cities. Employees and managers in textile sectors can also conduct similar studies and realize their deficiencies in terms of pandemic effect, and they can prepare action plans in case of facing similar pandemics, diseases, or disasters.

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