

Impact Assessment of The Covid-19 Pandemic on Service Performance of Sofia Airport

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Abstract

The main objective of the research presented in the paper is to examine the impact of the COVID pandemic on the volume of passenger and freight traffic and the quality of the services provided by Sofia Airport, as well as to examine the factors influencing the demand for air freight transport and the extent of their impact. The authors focus on using two approaches, namely SERVPERF and SERVQUAL, in studying factors influencing the demand for transport. The study analyses a system of indicators with independent influences on the demand for air transport, but they are all related to the development of macroeconomic indicators at the national level under the influence of the COVID pandemic. The study of the impact of the pandemic on the service performance and quality of services provided by Sofia Airport allows us to predict the volume of transport activity and to plan the activities of airlines and ground operators, their transport capacity, as well as the need for adopting measures for recovery of the airport from the negative impacts of the pandemic and the necessary investments in airport facilities. The authors argue that evaluating the service performance and the quality of services could contribute to developing appropriate measures for recovery. They summarized appropriate measures based on the leading quality indicators for air transport services.

Keywords: Air Transport, Impact Assessment, COVID pandemic, Service Performance, Service Quality.

1. Introduction

Air transport is a crucial sector that provides connectivity to economies, serves trade and logistics, provides jobs, ensures various opportunities for tourism and mobility, etc. The spread of the Covid-19 pandemic has struck air transport worldwide. The drastic decline in the volume of passengers, goods, and aircraft movements are only part of the consequences it has suffered over the past two years (Mueller, 2022). The sector is expected to recover by 2024 until it reaches pre-crisis levels. At the national level, Sofia Airport has not stopped its activity during the most affected months of 2020 but has reported a drastic decrease in the number of passengers transported for the last two years. In this regard, the paper analyses the changes in the activity of Sofia Airport for the period before and during the pandemic. Measures implemented by countries in the European Union (EU) to tackle the pandemic and address the challenges facing the air sector are also addressed. The report's main objective is to assess the impact of the COVID-19 pandemic on the activity of Sofia Airport using SERVPERF and SERVQUAL approaches. Air transport is a crucial sector that provides connectivity to economies, serves trade and logistics, provides jobs, ensures various opportunities for tourism and mobility, etc. The

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spread of the Covid-19 pandemic has struck air transport worldwide. The drastic decline in the volume of passengers, goods, and aircraft movements is only part of the consequences it has suffered over the past two years. The sector is expected to recover by 2024 until it reaches pre-crisis levels. At the national level, Sofia Airport has not stopped its activity during the most affected months of 2020 but has reported a drastic decrease in the number of passengers transported for the last two years. In this regard, the paper analyses the changes in the activity of Sofia Airport for the period before and during the pandemic. Measures implemented by countries in the European Union (EU) to tackle the pandemic and address the challenges facing the air sector are also addressed. The report's main objective is to assess the impact of the COVID-19 pandemic on the activity of Sofia Airport using SERVPERF and SERVQUAL approaches, as well as regression analysis for assessing the impact of different macroeconomic indicators on the air freight services during the COVID pandemic.

2. Research Methodology

A system of indicators that are essential to the transportation process is applied to assess the pandemic's impacts on the effectiveness and quality of the air transport services provided. Security, safety, regularity, accuracy, flight intensity, travel time, convenience, and service culture are a few examples of these indicators. Based on this rationale, the authors employ the SERVPERF vs. SERVQUAL strategy suggested by Jain & Gupta in their article "Measuring the Quality of Services: SERVQUAL vs. SERVPERF Scales" to evaluate the quality of services as a strategic tool to achieve operational efficiency and improved business performance, i.e., business competitiveness (Jain & Gupta, 2004). They argue that due to the inherent qualities of the services that set them distinct from the goods, it is difficult to identify and assess the quality of transport services. The two primary methods for evaluating the standard of services are SERVQUAL and SERVPERF. Regarding the explanatory potential of the models, Jain and Gupta provide evidence that the SERVPERF scale provides an approximately accurate and scientifically valid explanation of the quality of services. However, the scale has some drawbacks in terms of its diagnostic potential.

The authors of this study provide evidence that the SERVQUAL scale surpasses the SERVPERF scale, providing a higher diagnostic potential to identify areas for management interventions in the event of service quality gaps or the need to define key elements of this quality. The SERVPERF approach emphasizes the direct correlation between customer satisfaction and various quality indicators by providing statistical evidence of the effect of multiple factors on the dimensions of service quality on user satisfaction. Given how customers rate the services offered by air transport operators, this study is pertinent to managerial choices regarding the development of high-quality services and the provision of advice on service improvements (Carvalho & Medeiros, 2021), particularly in the context of the evaluation of the Covid-19 pandemic's effects on the condition of air transport services.

With regards to the study of the impact of the COVID pandemic on air freight transport, regression analysis is used to clarify the influence of the development of the leading

economic indicators on air freight traffic as it depends not only on the restrictive measure but on the economic developments (Mishev et al., 2017).

To widen the study's scope and examine the effect of the COVID-19 pandemic on the air transport sector and passenger rights, an account of the specific characteristics of the shift in air transport demands over the last two years should be taken. In their paper "Changes in air passenger demand as a result of the COVID-19 crisis: leveraging Big Data to guide tourism policy," Gallego and Font (2021) offered evidence that, for travel between May and September 2020, the willingness to travel (based on the number of flight searches) has declined by approximately 30% in the Americas and Europe and by around 50% in Asia, but the intention to travel (evaluated on the base of the number of flight picks, the final selections among flight searches) has decreased by about 10%-20%. However, the majority of source markets continue to be optimistic about air transport in the final quarter of 2020 and throughout 2021, indicating a U-shaped rebound. Nevertheless, recent advancements in aviation demonstrate a recovery curve that is more like a flatline L (Gallego & Font, 2021).

3. Service performance analysis: a case study of Sofia Airport

Since the beginning of March 2020, the Directorate General for Civil Aviation Administration (DG CAA) has imposed protective measures to be applied on the territory of Sofia Airport due to the outbreak of the COVID-19 pandemic. The restrictions imposed in all the countries worldwide have led to a drastic decrease in the number of passengers traveling by air transport during and after 2020.

It is clear from the data presented in Figure 1 that there has been a continuous increase in the number of the air movements to and from Sofia Airport until 2019, which has led to an overrun of its design capacity and required the urgent measures to be taken to meet the increase of air traffic in Bulgaria. The rapid development of air transport until 2019 posed a significant issue related to the exhaustion of the capacity of Sofia Airport. Since the beginning of 2020, the number of aircraft movements and the number of passengers served, have recorded a more than 90% decrease. The recovery of the air sector is expected to continue until 2024 when it reaches pre-pandemic levels. The total number of aircraft movements for 2021 increased 12% compared to the previous year.

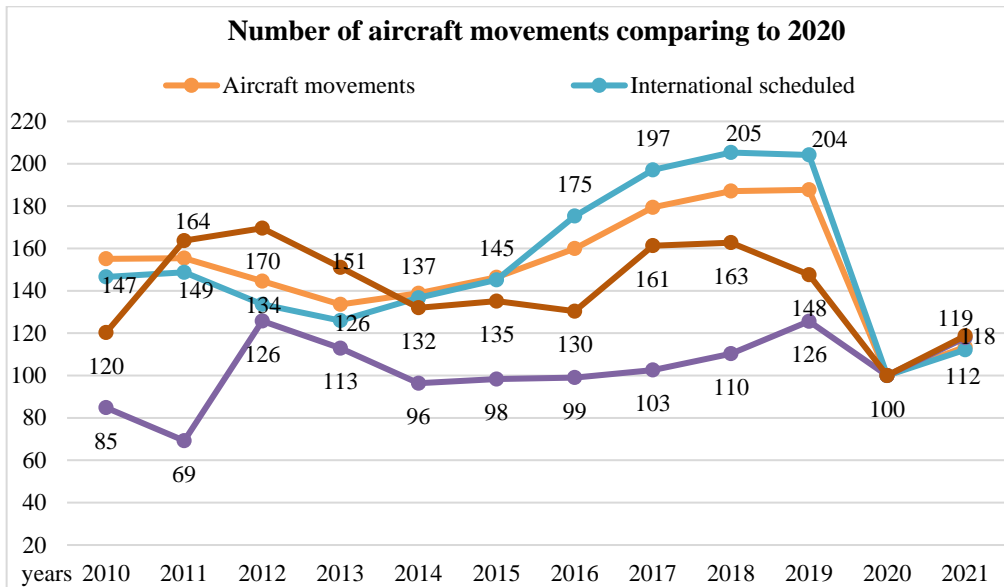


Figure 1: Number of aircraft movements at Sofia Airport compared to 2020

Source: Own calculations based on GAA statistics

The analysis of the data presented in Figure 2, shows that there has been a serious increase in the number of passengers served at Sofia Airport - almost 7.1 million passengers passed in 2019, an increase of 2.1% compared to 2018. The data for 2010–2019 show a continuous increase in passenger traffic. This increase is noticeable regarding the regular international services. Passenger traffic on international scheduled services accounts for 92% of the total volume of passengers served. The most substantial decline was in 2020 when passenger service was 94.2% less than the previous year. Analysis of several passenger data shows that for 2021 there is a significant growth in passengers served on international charter flights.

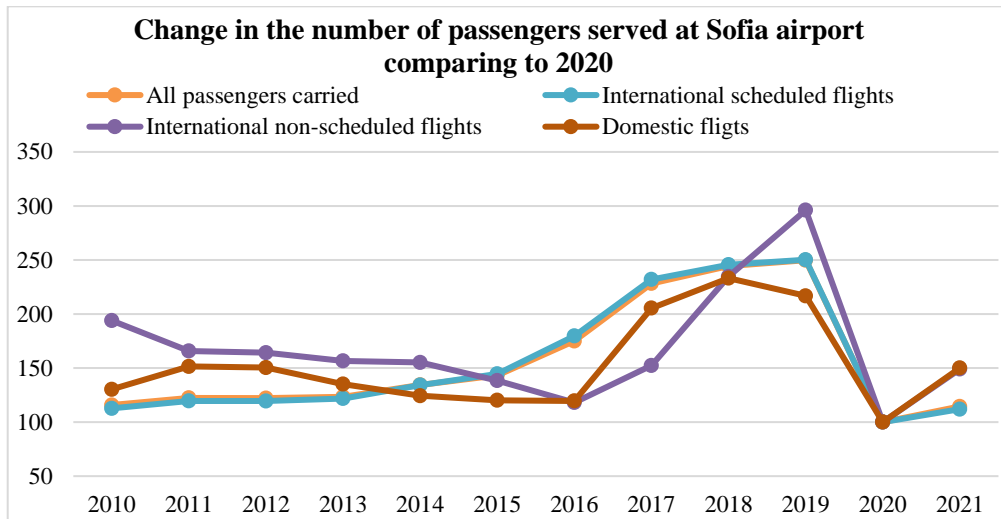


Figure 2. Change in the number of passengers served at Sofia airport compared to 2020

Source: Own calculations based on GAA statistics

Figure 3 presents data on air freight services to and from the airport, showing that the difference in the quantities of goods for 2019 and 2020 is not as significant as for the passengers. This is because, in the context of the COVID-19 pandemic, air transport did not remain paralyzed in terms of freight transport and mainly served cargo flights.

Sofia Airport reported a decrease of 2.7% for 2020 compared to 2019. In 2019, there was a peak in the quantities of goods handled at the airport, but the performance in the next two years is strongly affected by the impact of the Covid pandemic. In 2021, the quantities of goods unloaded increased compared to those of loaded goods. Over the period, the quantities of mail transported had constant levels, with slight increases recorded by 2019. After this period, the processed mail decreased due to the Covid pandemic. As a result, the quantities of processed mail shall be carried mainly by passenger flights. Since the pandemic occurred in early 2020 and because of the numerous cancelled passenger flights, the quantities of mail transported have fallen dramatically for 2020 and 2021.

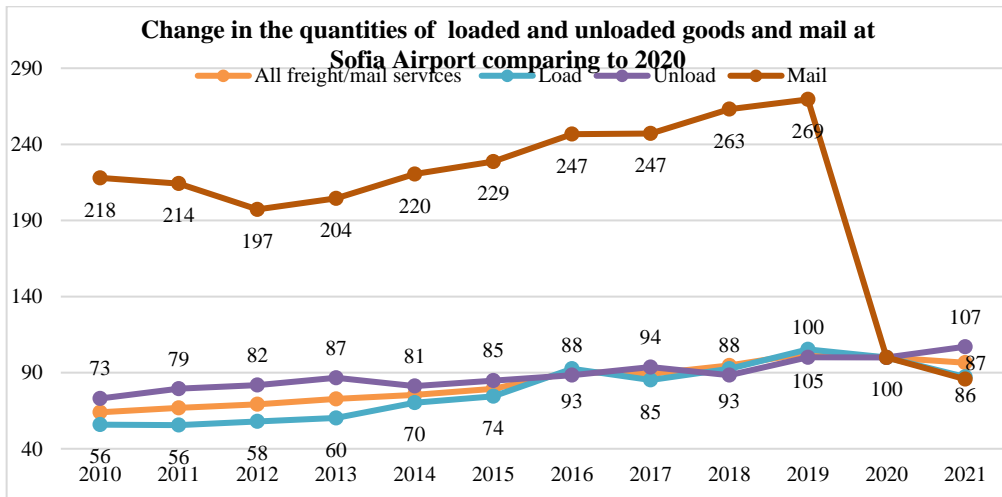


Figure 3. Change in the quantities of loaded and unloaded goods and mail at Sofia Airport compared to 2020
Source: Own calculations based on GAA statistics

4. Impact assessment of the macroeconomic indicators on the air freight and passenger traffic

The analysis of the influence of leading economic indicators reflecting the impact of the COVID pandemic on the country's economy and the demand for air transport is the basis for carrying out a multiple regression analysis of the effects of each of the macroeconomic indicators on the quantity of freight in tonnes (number of passengers) and the tonne(passenger)-kilometres performed in air transport, respectively the impact on the realized demand for freight and passenger transport (West & Rubin, 2011). The focus is on freight transport at this stage as the passenger services depend mainly on the restriction on people's movements. However, the freight services depend mainly on other factors, such as economic conditions and developments.

With regards to this, the main tasks of the study at this stage are as follows:

- based on the possibilities of the single-factor and multiple regression analysis to determine the indicators that have the most significant impact on the relevant indicators of the volume of freight transport in air transport.
- to conclude impact indices to determine to what extent the performance of freight transport in air transport depends on the specific economic factors.
- based on the regression analysis, to identify those factors that have the most significant impact on freight transport and identify themselves as determinants of demand. For this purpose, a rectangular matrix (E1... E5), when the pillars (n) have the influencing factors (j) and the lines (m) rank the impact indicators (i). Each of the indicators assumes specific values depending on the functions it performs. Respectively, the table 1 below presents a model of the dependencies between the influencing factors and the impact indicators of the different economic factors on demand for air freight transport, which will serve as a basis for removing the force of this impact.

Table 1: Matrix for assessing the impact of the main economic factors on the volume of freight in air transport during the COVID-19 pandemic

IMPACT INDICATORS			
INFLUENCING INDICATORS	IMPACT	Quantities of freight (tonnes)	Volume of freight traffic (tkm)
	Real GDP	β_{11}	β_{12}
	Real GDP per capita	β_{21}	β_{22}
	Total household income	β_{31}	β_{32}
	Total household expenditure	β_{41}	β_{42}
	Construction of buildings	β_{51}	β_{52}
	Construction of facilities	β_{61}	β_{62}
	Production of industrial enterprises	β_{71}	β_{72}
	Production of agriculture	β_{81}	β_{82}
	Exports	β_{91}	β_{92}
	Imports	β_{101}	β_{102}
	Exchange rate of the national currency	β_{111}	β_{112}
	Consumer Price Index	β_{121}	β_{122}
	Employees by economic activities	β_{131}	β_{132}
	Wholesale	β_{141}	β_{142}
	Retail sales	β_{151}	β_{152}
	Gasoline prices	β_{161}	β_{162}
	Diesel fuel price	β_{171}	β_{172}
	Final consumption of fuels	β_{181}	β_{182}
	Final energy consumption	β_{191}	β_{192}

Source: Elaborated by the authors

Based on the statistical analysis of the leading economic indicators and trends in the development of freight transport during the COVID pandemic, the influencing factors and the results of the dimensions are attributed to the following:

- *Influencing factors* – Real GDP; Real GDP per capita; Total household income; Total household expenditure; Construction of buildings; Construction of road facilities; Production of industrial enterprises; Production from agriculture; Exports by country – main trading partners; Imports by country – main trading partners; Exchange rate of the national currency; Consumer Price Index; Employees by economic activities; Wholesale; Retail sales; Gasoline prices; Diesel fuel prices; Final consumption of fuels; Final energy consumption.

- *Impact indicators* – the volume of freight transport in tonnes; the volume of freight traffic in tkm.

The step-by-step multiple regression analysis of the dependencies between the identified macroeconomic indicators and the demand for air freight as converted in natural logarithms provides grounds to conclude that statistically significant influences are established in terms of the impact of the real GDP per capita on the dynamic indicator 'volume of freight traffic in tkm', which also considers the distances of transport (table 2). The country's real GDP, wholesale and retail sales should be excluded from the model as the calculated p-value show that the relationship between the indicators and the air traffic volume is not statistically significant. The measured beta regression coefficient for the impact of real GDP per capita shows, in essence, that the established correlation dependency and the correlation between the factor and result values are significant. Consequently, the impact of the respective macroeconomic indicator on demand for air freight transport is significant.

Table 2: Multiple regression analysis results for air freight transport

SUMMARY								
OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0,8							
	2							
	0,6							
R Square	8							
Adjusted R Square	0,5							
	3							
Standard Error	0,4							
	5							
Observations	14							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	4	3,8	0,9	4,7	0,03			
Residual	9	1,8	0,2					
		3	0					
Total	13	5,6	5					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95,0%	Upper 95,0%
Intercept	59,69	52,10	1,15	0,28	-58,16	177,54	-58,16	177,54
Real GDP	-11,91	7,84	-1,52	0,16	-29,65	5,83	-29,65	5,83
Real GDP per capita	12,86	5,66	2,27	0,05	0,07	25,66	0,07	25,66
Wholesales	2,63	3,39	0,78	0,46	-5,03	10,30	-5,03	10,30

Retail	-4,72	4,35	-1,09	0,31	-14,57	5,12	-14,57	5,12
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Source: Own calculations

Note: The multiple regression analysis is based on data for the period 2007 – 2021 converted in natural logarithms for providing homogeneity and comparability of the variables.

In identifying demand for air freight transport during the COVID pandemic, significant impacts were identified in terms of real GDP per capita on the volume of freight traffic in tkm. However, the beta regression coefficient reflecting the size of the relevant impact are not so high, which leads to the conclusion that the demand for freight transport on this mode of transport depends mainly on other (external) factors. In view of the regression analysis results, it can be concluded that the determinants of demand for air transport freight are related only to few macroeconomic indicators and other external factors of impact and development of the global economy and international economic relations are more important. Data on the analysis period and the specificities of the development of freight transport activity in air transport related to relatively low transport volumes show little or no dependence on the selected macroeconomic indicators.

Regarding passenger transport services, a similar matrix for evaluation has been developed including additional indicators as population number, trips of citizens abroad and visits of foreigners to the country (see table 3).

Table 3: Matrix for assessing the impact of the main economic factors on the volume of passenger traffic in air transport during the COVID-19 pandemic

IMPACT INDICATORS			
INFLUENCING INDICATORS	IMPACT	Number of passengers	Volume of passenger traffic (pkm)
	Population number	β_{11}	β_{12}
	Real GDP	β_{21}	β_{22}
	Real GDP per capita	β_{31}	β_{32}
	Total household income	β_{41}	β_{42}
	Total household expenditure	β_{51}	β_{52}
	Exchange rate of the national currency	β_{61}	β_{62}
	Consumer Price Index	β_{71}	β_{72}
	Employees by economic activities	β_{81}	β_{82}
	Gasoline prices	β_{91}	β_{92}
	Diesel fuel price	β_{101}	β_{102}
	Final consumption of fuels	β_{111}	β_{112}
	Final energy consumption	β_{121}	β_{122}
	Trips of Bulgarian citizens abroad	β_{131}	β_{132}

Visits of foreigners to Bulgaria	β_{141}	β_{142}
Travel expenses	β_{151}	β_{152}

Source: Elaborated by the authors

As a result of the step-by-step multiple regression analysis made using Excel software, a statistically significant influence on the number of air passengers is found regarding the indicators of real GDP, national currency exchange rate, wholesales, and visits of foreigners to Bulgaria. Furthermore, the corresponding correlation dependencies show that the factors related to visits of Bulgarian citizens abroad and retail sales fit well in the model. Still, the indicators do not significantly influence the number of passengers served at the Sofia airport (see table 4).

Table 4: Multiple regression analysis results for air passenger transport

SUMMARY OUTPUT									
Regression Statistics									
Multiple R	0,94394872								
R Square	0,89103918								
Adjusted R Square	0,71670187								
Standard Error	0,20136358								
Observations	14								
ANOVA									
	<i>d</i>	<i>f</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	8	1,65	0,20	5,11	0,044				
Residual	5	0,20	0,04						
Total	13	1,86	0,24						
		<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept		10,60	28,438	-0,373	0,725	-83,702	62,503	83,702	62,503
Real GDP		24,50	6,698	-3,659	0,015	-41,725	7,290	41,725	-
Real GDP per capita		4,615	2,885	1,599	0,171	-2,802	12,032	-2,802	12,032

National currency exchange rate						15,9		15,95
BGN/USD	9,770	2,407	4,060	0,010	3,584	57	3,584	7
	17,31					25,6		25,67
Wholesales	7	3,253	5,323	0,003	8,954	79	8,954	9
						-		
						4,77	11,55	
Retail	-3,387	3,176	-1,067	0,335	-11,551	7	1	4,777
Visits of Bulgarian citizens abroad	1,925	0,930	2,071	0,093	-0,465	4,31		
Visits of foreigners to Bulgaria (number)	-1,780	0,669	-2,660	0,045	-3,499	5	-0,465	4,315
						-		
						0,06		-
						0	-3,499	0,060
						0,76		
Travel expenses	0,128	0,246	0,520	0,625	-0,505	1	-0,505	0,761

Source: Own calculations

Note: The multiple regression analysis is based on data for the period 2007 – 2021 converted in natural logarithms for providing homogeneity and comparability of the variables.

No statistically significant dependence is revealed concerning macroeconomic indicators' influence on air passenger traffic volume.

The use of these macroeconomic indicators which have been revealed to have a significant impact on the result indicators to predict their estimated impact on demand for air freight in the future has shown a similar existence of a strong link between indicators and a shallow level of impact (see Figure 4).

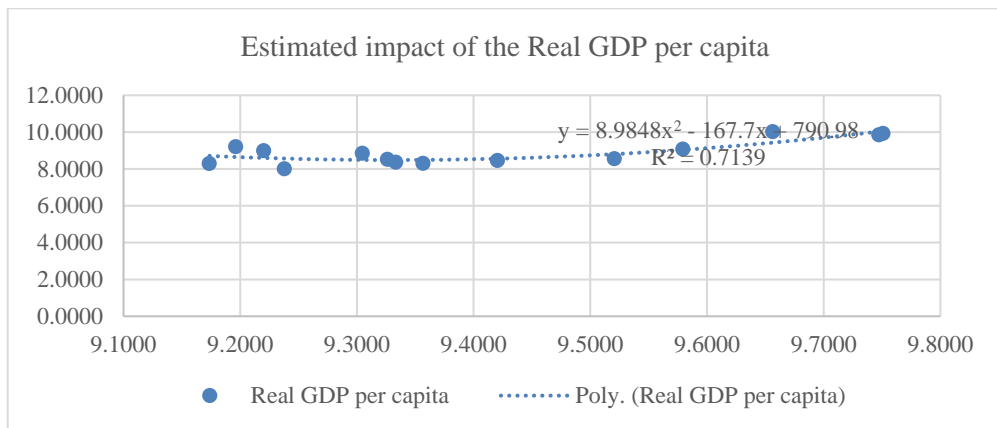


Figure 4. Estimated impact of real GDP per capita on the volume of air freight traffic

Source: Own calculations

With regards to passenger traffic, the prediction of the future demand for passenger services shows strong relation between the number of air passengers and the number of visits of foreigners to the country (see figure 5) showing statistically significant influence within the forecasts.

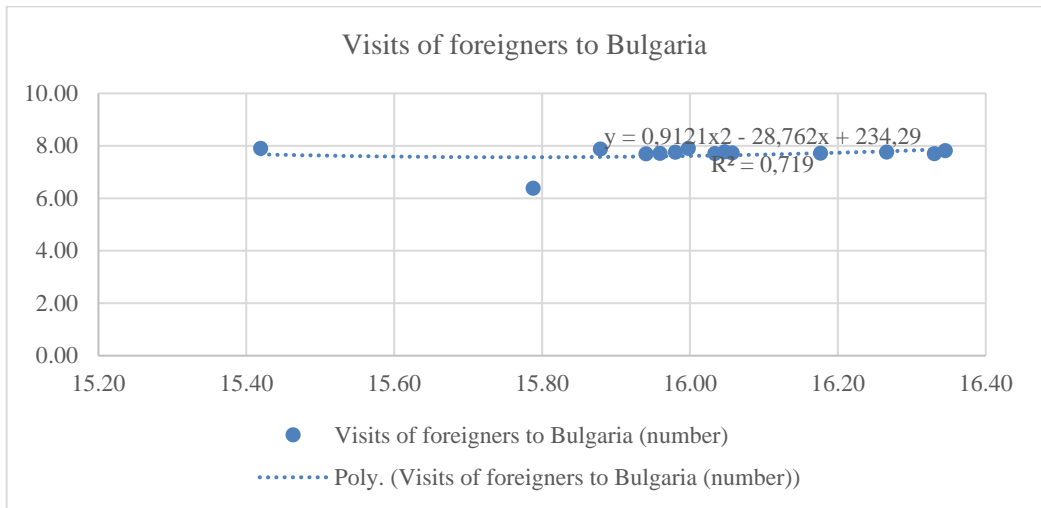


Figure 5. Estimated impact of visits of foreigners to Bulgaria on the number of air passengers carried
Source: Own calculations

Based on the model developed to predict the impact of macroeconomic indicators on demand for air services, the following conclusion can be made:

The forecasting of air freight and passenger traffic volumes applied as part of the methodology of this study is based on the development of air transport activity in the period 2007 - 2020. The prediction of the future state of freight and passenger volumes is based on the study of previous development trends and outputs of demand determinants, based on the multiple regression analysis and the strong links established between macroeconomic indicators and the results of the volume of freight and passenger traffic. Therefore, the forecasts developed to describe the prospects for demand for air freight and passenger services to the extent that they are determined by objectively formed processes in economic development, without considering emerging factors and impacts after the period considered (such as the war in Ukraine, etc.). For this purpose, methods and models are used mainly of extrapolation nature. Extrapolation methods are based on determinism, according to which the future stems from the present, i.e., the continuity of the relationship between the past, the present, and the future.

Consequently, the use of extrapolation as a scientific method of forecasting is based on objectively considering the existing inertia of economic systems, which is also confirmed by the previous experience of economic activity not only in transport but also in several other sectors of the economy. This inertia is, in practice, the impossibility of changing the system's behaviour by limited means and for short periods. Therefore, the projections are developed on the presumption of preserving influencing factors and determinants.

5. Assessment of the quality of the services offered at Sofia Airport during the COVID-19 pandemic

Different quality indicators are to be analysed and assessed to clarify the influencing factors and the role of air service quality on demand for freight and passenger transport.

The COVID pandemic from early 2020 is causing severe restrictions on air passenger transport, which will have a long-term impact and require years to rebuild the air sector. The virus's rapid spread has stranded millions of passengers worldwide, closed airports, and led to airline bankruptcies, substantially impacting aviation workers. In addition, restrictions applied separately from European countries have caused difficulties for passengers, ground operators, and airports. As a result, Europe's highly developing air sector, which faces a pilot shortage and infrastructure capacity for passenger and freight services by early 2020, is currently facing severe challenges in restoring air transport to pre-crisis levels.

Changes in passenger transport conditions during the pandemic have led to significant complications and uncertainties about travel. The check-in agents carry out a thorough check of travel documents. Each country has specific restrictions on the entry of foreign nationals. The Countries of the European Union have introduced electronic health declarations, which must be completed by all passengers, regardless of their nationality. The health form includes specific details of the passenger's status – passport number, date and time of departure, name of the airline performing the flight, address where he/she will stay, etc. The introduction of such a form aims at detecting an infected traveller with Covid-19 to quickly track what contacts he had with others to limit the spread of the virus. For journeys to EU countries, passengers are required to provide travel health documents, namely: a PCR test for Covid-19 that is negative and is made within 72 hours, an antigenic test up to 48 or 72 hours, a COVID-19 disease certificate, a vaccine certificate and/or passenger locator form, for journeys before the passenger entered the country. In the case of a passenger who does not have the necessary documents, they shall not be allowed on board the aircraft. Airlines and ground operators face fines for passengers returned by a country's border authorities. Even if the passenger is well-off and has all the necessary documents to enter the country concerned (visa, permanent residence card), the border authorities may refuse him entry since he has arrived from a third country, which has a high rate of COVID-19 spread. All these requirements complicate and delay the service of passengers before and during boarding.

The implementation of different travel measures and restrictions by the governments of each EU country has an impact on passenger confidence. For example, frequent changes in the requirements for entry into the country confuse passengers and, in many cases, lead to denied boarding due to a lack of the necessary health documents. Harmonizing travel measures during a pandemic within European countries will help restore passenger confidence and the economic situation of air transport.

Another major problem is the presentation of false travel tests by passengers. At this stage, there is no health supervisory authority to verify the veracity and validity of the pre-departure tests from the country concerned, which is a prerequisite for spreading the virus, dealing more slowly, and slow recovery from the pandemic. Moreover, ground operators are not authorized to refuse travel to the passenger upon confirmation by the laboratory that the travel document submitted has been manipulated and invalid. To limit such situations, each state must appoint experts at exit points to verify the reliability of health

documents issued by state laboratories and, where irregularities are found, to refuse travel to the passenger and impose a penalty to produce false documents.

Since March 2022, almost all EU countries have eased health requirements for air travel, providing passengers mobility. These measures will positively affect the number of passengers served and improve the quality of service.

European Union regulations do not cover situations where passengers will optionally give up their journey or cannot travel because of the restrictions and measures applied by the country to which they are to travel. Since the pandemic occurred, airlines have been tolerant of passengers' rights and offer flexible conditions for changing travel. Most of them provide the opportunity to obtain travel vouchers. Valid for a period specified in the carrier's general terms and conditions.

In the event of a flight being cancelled because of a pandemic and reasons relating to the restriction of travel to and from a country, airlines are obliged to allow passengers to choose one of the following options:

- Reimbursement of the total cost of the ticket - the refund of the full cost of the ticket depends on whether the passenger has purchased a round-trip ticket as part of a single reservation or as two separate one-way flights with different airlines. In the first option, if the flight of departure within the meaning of Regulation (EC) No 261/2004 is cancelled, the fare will be refunded in both directions. Where the journey is operated by two different air operators and only one flight is cancelled, the amount to be refunded shall be for one direction only.
- Re-routing as soon as possible – in such a situation, the choice of this option is risky in the context of a pandemic.
- Change of travel date convenient for the passenger – the passenger is offered a choice of an alternative flight with the same or another airline while maintaining the travel conditions of the original flight.

All passengers who have been notified of the flight change less than 14 days before their journey shall be entitled to compensation. In all other situations, airlines are allowed to make changes to flight schedules and dates. Where public authorities impose pandemic control measures, by their very nature, these measures are not inherent in the normal functioning of airlines and are beyond their control and are defined as 'exceptional circumstances'. According to EU regulations, in the event of such circumstances beyond airlines' control and could not have been avoided, the right to compensation for a cancelled flight does not apply. Derogations (nationals of the country concerned or holders of permanent residence cards) result in a small number of passengers and cancellation of the flight concerned. When the airline decides to cancel a flight and proves that the decision is motivated by reasons of protecting the crew's health, such cancellation should also be considered an 'exceptional circumstance' (Official Journal of the European Union, 2020). In addition, the UK consultancy SKYTRAX, which operates a website that rates and reviews airports and airlines, offers the most recent COVID-19 Airline Safety Rating as a reliable assessment and certification of airline hygiene and safety measures during the coronavirus pandemic. This rating is based on a thorough and expert investigation of the standards being supplied by air carriers at airports and onboard flights. Skytrax Covid-19 Airport Safety Rating provides the world's only reliable assessment and certification of airport health, safety, and hygiene measures, based on a professional and scientific study

of the existing quality standards of pandemic airports' services worldwide. Pandemic safety accreditation shall be considered a global benchmark for determining a safe travel guarantee through a comprehensive analysis of safety assessment procedures and systems. More than 190 protocols involving cleaning, disinfection, policies, and control of social distance, use of protective masks by employees and passengers, disinfectants, and other systems to protect the health of air travellers are being investigated. The evaluation criteria align with the Working Party on Aviation Recovery – International Civil Aviation Organization (ICAO) and the European Aviation Safety Agency (EASA). In addition, facilities and services are evaluated to determine how effectively and consistently COVID-19 counter-impact procedures are applied (Skytrax, 2022).

The methodology applied by Skytrax to assess the quality of service at airports has been adapted by the authors of this study. It is used to assess the quality of the services offered by Sofia Airport during the pandemic. According to Skytrax ratings, the airport data analysis shows that the anti-epidemic measures that apply meet all the criteria, even exceeding the requirements for quality procedures in pandemic conditions (see Table 5). Some procedures remain valid after the air sector is opened regarding health documents for traveling abroad. On the territory of Sofia Airport, there are signs with instructions for movement in the terminals. Until March 2022, separate entrances and exits at both terminals allow travellers only. At the entrance are thermal cameras, stationary disinfectants, and information signs for the mandatory use of protective masks. In the terminals, COVID test facilities offer an extensive range of services, with results coming out within 15 minutes for antigen tests and up to 1.30h for PCR tests. Their working hours are under the flight schedule, so passengers have sufficient time to react if the ground operators have requested a mandatory travel test. Acoustic messages are made in the common areas of the terminals with warnings for mandatory observance of distance and wearing protective masks. Passengers are informed to prepare their certificates and documents for inspection at the arrival points, observe the distance, and wear protective masks. Both in planes and on the territory of the airport are offered safety masks, and in waiting areas, the seats are reduced by 50% to ensure greater distance.

Table 5. Skytrax Covid-19 Airport Safety Rating indicators applied for Sofia Airport

N:	Covid -19 procedures	SOF Airport
1	Covid-19 information signage	√
2	Terminal access rules enforced	√
3	Covid testing facilities	√
4	temperature checks	√
5	Customer face masks required	√
6	Face mask usage enforced	√
7	PPE vending availability	√
8	Hand sanitizer availability	√
9	Hand sanitizer prominence & utility	√

10	Social distancing markings & signage	√
11	Social distancing enforcement	√
12	Social distancing seat markings	√
13	Enhanced terminal airflow & filtering	√
14	Public areas cleanliness & monitoring	√
15	Washrooms cleanliness & monitoring	√
16	F&B areas cleanliness & monitoring	√
17	Security processing - hygiene policies	√
18	Security processing - staff PPE compliance	√
19	Immigration processing - staff PPE compliance	√
20	Other airport staff - PPE compliance	√
21	Shop/F&B capacity monitoring	√

Source: Concluded by the authors based on Skytrax indicators and rating

Based on the review of the quality of passenger service and the procedures applied at Sofia Airport, an individual assessment has been made. Skytrax's methodology under the rating system corresponds to five stars. Therefore, the Directorate-General for Civil Aviation Administration (DG CAA, 2022) continues to apply high requirements regarding the safe passage of passengers and achieves its objective of limiting the spread of the virus and protecting the health of passengers. Furthermore, based on the assessment, we can note that Sofia Airport remains competitive in the context of a pandemic.

6. Conclusions

Based on the analysis of service performance and service quality in air transport during the COVID pandemic, the authors conclude that it is evident that the air transport sector is one of the worst affected sectors but has a significant potential for recovery. The drastic reduction in the number of passengers carried, including bans on flights from individual countries, has led to cancellation of flights for many airlines, landing of the fleet and suspension of operations at some airports to free up places to stay on aircraft.

EU countries have imposed unprecedented travel restrictions to avoid the COVID pandemic's spread. However, these restrictions continue to have a high cost to passengers - additional travel costs such as costs for tests, safety masks, and prepaid tests upon arrival in the respective country. Therefore, it is necessary to create a level playing field for travel within the single market to allow for a safe and coordinated opening based on analysis of service performance and service quality so that citizens can fully enjoy their rights and restore economic and social activity (European Commission, 2021). This, in turn, will ensure faster recovery of the sector through a coordinated approach to safe opening that ensures the objective of lifting restrictions within a standard set of measures based on a clear understanding of ensuring and maintaining effective virus eradication. Furthermore, if carried out in a coordinated manner, this process will ensure the continuity of air

transport services in the Internal European market, which is inextricably linked to citizens' economic and social life. The existence of interdependence between countries means that, if there are restrictions in some Member States, in others, the successful opening will be limited. Furthermore, the research into the change in different macroeconomic indicators and their impact on air services' demand is vital for many segments of the national economy. In the long term, identifying determinants of air services' demand, analyses, and forecasts for their development support the business strategies of airlines and their planned investments during the recovery period. In the short term, forecasts identify challenges and opportunities for airport operators.

Air travel demand analysis and forecasts are essential for transport companies' business planning and marketing policies, economic assessments of pandemic recovery plans, and transport policy decisions at national and international levels. The need for adequate analyses and impact assessments of future projects is linked to improved coordination on applicable methods for analyzing and forecasting transport demand. However, there is some difficulty in measuring some of the impacts and benefits to society in terms of value. In addition, existing methods for the economic appraisal of infrastructure projects do not reflect all their effects. Consequently, focusing efforts on developing a methodology for forecasting transport demand, which is necessary for evaluating transport projects and policies, will make it possible to objectively assess their impact on various performance indicators, including sustainable transport development and recovery. Furthermore, since companies providing air services face requirements for continuous capital investments and operational and technological improvements to ensure their existence, the forecasts of possible future impacts of the COVID pandemic on demand for air services have high added value. Air transport has repeatedly faced economic and financial crises but using scientific approaches and tools could contribute to the sector's adaptability and flexibility in rapidly addressing changing and dynamic conditions.

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