Finance, Accounting and Business Analysis

Volume 5 Issue 1, 2023
http://faba.bg/
ISSN 2603-5324

Financial Performance of Air Transport Operators in the Conditions of Digital Transformation Processes

Petya Koralova-Nozharova

Department of Regional and sector economy, Economic Research Institute at Bulgarian Academy of Sciences, Sofia, Bulgaria

Info Articles

History Article:
Submitted 10 May 2023
Revised 27 May 2023
Accepted 31 May 2023

Keywords:
financial performance, air passenger carriers, digital transformation.

JEL: R41, G32, O31

Abstract

Purpose: The study aims to examine the financial performance of air passenger carriers in the case of a developing country with transition economy like Bulgaria. It also examines both the main trends in the digital transformation processes of the aviation sector and the obstacles that hinder the widespread implementation of information and communication technologies in the sector.
Methodology: Through regression modelling, it is identified which financial performance indicators most strongly influence the digital transformation process of air passenger carriers.
Results: The results of the study show that Bulgarian aviation operators are not capable to cover their short-term liabilities and are strongly dependent on their creditors, especially in terms of exogenous shocks like COVID-19 pandemics, political crisis, ongoing military conflicts in Ukraine and uncertain business environment. The country ranks on last place according to the values of DESI index in comparison to EU average levels in terms of digital skills of transport workers, e-commerce, and deployment of ICT.
Practical implications: The implications of the study could serve as basis for future research in the field of financial performance of other modes of transport or to be used for examining the air transport of countries with similar political and economic characteristics like Bulgaria.
Paper type: Research paper

* Address Correspondence:
E-mail: p.koralova@iki.bas.bg

INTRODUCTION

In the last few years, the national economies of member-states have been exposed to various exogenous shocks. The impact of these processes creates serious problems for the financial and economic development of separate economic sub-sectors like air passenger transport. Since 2019 the aviation operators have been forced to cope with several risks, such as the imposed travel restrictions in domestic and international carriages because of COVID-19; increase in the price of petrol and its derivatives; higher total costs for aviation carriers because of the requirements for climate neutrality of the transport sector till 2050; as well as the digitalization of transport activities and transport infrastructure. For example, according to the statistical chartbook of the International Air Transport Association in the end of 2022 the number of passengers carried globally is 25% lower than that number in 2019 (IATA 2022). In Europe the volume of passenger carriages in 2021 is 3 times lower than in 2019, while in 2020 this volume is even 4 times lower, compared to the values in 2019 (EUROSTAT 2023a). Even more drastic is the decline in the number of passengers carried by the licensed air transport carriers in developing member-states like Bulgaria, where in 2021 the volume of passenger carriages by air transport decreased 20 times compared to 2019 (Directorate General Civil Aviation Agency 2023a).

On the other hand, COVID-19 pandemic period turned out to be the appropriate time for accelerating the digitalization process of main economic activities of business organizations. More and more air companies globally are using biometric data for servicing passengers both at the airports and on board of aircrafts (WNS 2018). In order to improve the quality of flights and the passengers 'comfort during the flight, some of the air carriers have deployed applications for augmented and/or virtual reality. The usage of artificial intelligence and robots in the process of technical inspections for safety of aircrafts, as well as the introduction of digital technologies for making analysis for optimization of the air companies' total costs are only little part of the structural changes in the functioning of air transport at national, European and global level.

The deployment of digital technologies in the economic activity of air transport carriers is an intensive process that requires financial security, especially in the case of developing countries with transition economies, such as Bulgaria. This is due to: first – Bulgaria's air passenger transport occupies hardly 1.4 % of the European aviation market (EUROSTAT 2023b). Second, the reported financial indicators by the Bulgarian air passenger carriers for the period of the pandemic (2019-2021) show lack of passenger transport activity except for the national air carrier; high unemployment rate in the sector and financial insolvency (Registry Agency 2023a). Third, the level of digital technologies deployed by the aviation operators lags the average European levels, as hardly 10 % of the business organizations are using cloud technologies in their main activity and only 3 % of them have introduced artificial intelligence (DESI 2022).

In this regard, **the purpose** of the present study is to evaluate the financial performance of air passenger carriers in the case of Bulgaria as a prerequisite for more widespread implementation of digital technologies in the air transport. **The object** of research is a system of financial indicators (return on capital, revenues per employee, financial indebtedness, short-term liquidity rate), that characterizes the status-quo of the aviation operators. There will be used **the methods of analysis and synthesis**, as well as the **methods of induction and deduction** for the purposes of the literature review and the critical analysis of introduced policies for digitalization of the air transport. There will also be presented an **econometric model** of the correlation between financial and digital performance of Bulgarian air passenger carriers.

LITERATURE REVIEW

There are quite a few publications in the scientific literature, related to both the digitalization of passenger carriages by air transport and the financial performance of aviation operators. In the study of Zaharia et al. (2018) there have been identified the challenges to digital transformation of a key Romanian airport (Romanian Henri Coanda Airport). The authors have put the accent on the increase of operational effectiveness of the infrastructure site in terms of main airport operations, satisfaction of passengers on board of aircraft and generation of additional revenues for the ground-handling operators through the deployment of digital applications and digital walls. They summarize that there is a huge gap amongst the implemented Romanian airport management strategy and the development of the digital technologies globally. They outline that the persons employed by the ground -handling operator do not meet the digital requirements in terms of professional qualification and skills.

The publication of Bil et.al (2021) evaluates the impact of digital technologies on the main aviation operations. They focus their study over the answers of three questions: how the deployment of information and communication technologies will contribute to: satisfying passengers 'needs; achieving company's vision and goals and creating competitive advantage for the company. Based on comparative analysis amongst 5 low-cost companies and 5 full-service companies, the authors evaluate the level of usage of In-flight entertainment systems through the deployment of digital technologies.

The study of Büyüközkan et.al (2021) is also of interest for the purposes of the present research, as it presents an innovative model for assessing the digital transformation and competence of low-cost carriers (LCC) in the case of Turkey through applying an integrated IVIF FMCDM methodology. The authors conclude that the integration of digital technologies in the management and organization of LCC's main activities contributes to growth of their competitiveness, sustainability, productiveness, and better customers 'loyalty. Paprocki (2021) in his research tries to answer the question whether the usage of digital technologies and change of the applied business model for management of the air passenger transport could limit the energy consumption and greenhouse gas emissions by aircraft without reducing the quality of passenger services. In this regard he proposes the usage of "Virtual air hubs" (VAH), with the help of which the fuel consumption by air transport could be reduced, the passenger services will be adapted to the needs of the customers and sustainability of air transport to exogenous shocks (pandemics, wars) will be increased.

Regarding the financial performance of air carriers, an interesting publication is that of Raghavan and Yu (2021), whose main task is to evaluate the trade activity of large and medium-sized airport operators in the USA by using the financial indicators: return on investments, return on capital, return on sales, assets turnover, capital-debt ratio. For the purposes of the research, they apply regression analysis to study the correlation between airport operating specifics and their financial performance. They conclude that large hub airports perform better in liquidity ratios, while medium-sized hub airports perform better in leverage ratios. Perez et al (2022) examine the financial status-quo of 10 American aviation operators, which provide domestic passenger services so as to determine which indicators influence the most their economic recovery due to the pandemic COVID-19. According to them, the most important factors are carbon footprint of air carriers in relation to the climate change, change in the business management models and deployment of digital technologies.

Based on the conducted literature review, the identified publications do not repeat the purpose of the present study. In some of the articles, the authors also evaluate a system of indicators in terms of financial performance of aviation operators and/or airport operators. However, the present research differentiates amongst them, as it tries to examine the correlation between financial and digital performance of air passenger carriers in the case of a developing member-state with transition economy like Bulgaria.

TRENDS AND POLICY IMPLICATIONS IN THE DIGITALIZATION PROCESS OF AIR TRANSPORT

Modern digital technologies allow to all participants in the passenger carriages by air transport to gain utilities, such as: better quality and comfort during travel; introduction of many applications for entertainment of passengers during the flight; better environmental and productiveness efficiency for aviation operators and creating economic growth. Already in the end of 2020, with the introduction of Sustainable and smart mobility strategy (EC 2020), the European Commission sets out three main priorities for development of the relative transport modes: strongly limiting the dependence of rolling stock on fossil fuels; development and usage of sustainable transport modes in freight and passenger carriages through the deployment of information and communication technologies (ICT); internalization of the external costs of transport and introduction of the "polluter pay principle". In the section, concerning the development of air transport, it is proposed in the future to be used zero-emission technologies; to be constructed and introduced green aircraft; SESAR to be deployed so as till 2050 at the latest the greenhouse gas emissions by air transport to be reduced by 55 % compared to the values of 1990.

In this sense, in 2021 the European Commission introduced a proposal for sustainable aviation fuels regulation (ReFuel EU 2021), whose purpose is to propose measures air transport to be included in the European Emissions Trading Scheme (EU ETS), to be encouraged the usage of sustainable aviation fuel (SAF) and to be constructed electric power stations on the territory of airports. The measures, listed in the document will contribute to the achievement of European Green Deal and Fit for 55 package goals for climate neutrality till 2050. In the ReFuel Aviation Initiative it is indicated that till 2030 at least 5 % of the aviation fuel used need to be SAF and by 2050 its relative share must reach 63 %.

The fulfillment of such requirements is associated with an increase in the amount of the operational costs for air carriers, as they currently must comply with several imposed measures like:

- Paying infrastructure charges, depending on the quantity of CO_2 emissions and noise pollution in the vicinity of airports.

- Possible introduction of air transport to the European Union Emissions Trading Scheme.
- Offsetting carbon emissions through the participation of countries in the International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).
- Usage of synthetic and biofuels, which relative share since 01.01.2025 must be 2 % of the amount of the aviation fuel used.

The establishment of the SESAR Joint Undertaking back in 2007 was the first step to improvement of the safety and security management of air transport services and their development in terms of the so-called digital era (ACI 2019). At the end of 2019 there is already a talk about digital European Sky, where the latest digital technologies for transformation of the European aviation in terms of safe and efficient air traffic management while minimizing the harmful impact on the environment are used (SESAR 2019). In 2019, the European Parliament adopted a regulation on the rules and procedures for the operation of unmanned aircraft for civil purposes (EP 2019).

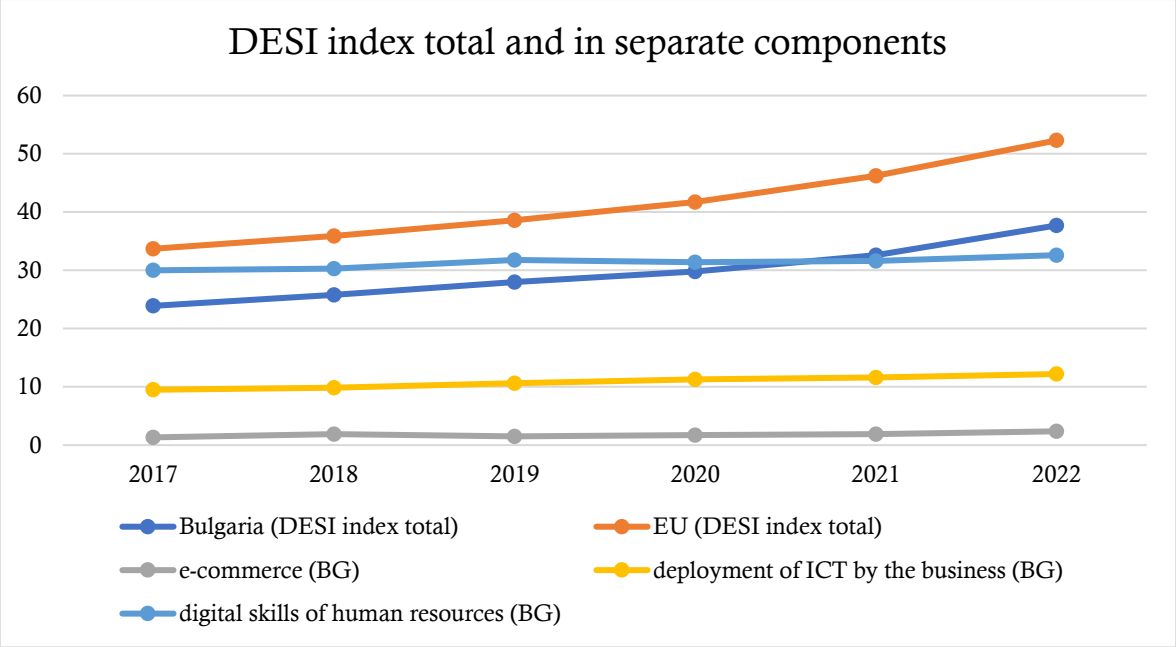
In this sense, the digitalization process impacts significantly, **first** the economic and financial status-quo of aviation operators because: till 2050 there will be observed revolutionary changes in the aircraft construction industry, concerning the aero-dynamic structure of airplanes; the architecture of their power engines, wings, and fuselage; the emergence of electric aircraft and planes, powered by batteries (IATA 2019). The introduction of such types of aircraft will lead to reductions in the sum of operational costs for air carriers, especially in the field of noise and environmental pollution. On the other hand, the system TaxiBot will be applied on the territory of airports. It is a revolutionary hybrid towing system, intended for taxiing of aircraft (van Winkel 2023). The usage of TaxiBot will have a positive economic effect on the financial performance of aviation operators, as it can contribute to 85 % fuel consumption reductions of aircrafts during their parking on the territory of airports.

Second, the deployment of digital technologies will also influence the employment rate in the field of air transport. For example, the introduction of One ID (2023) by IATA presents opportunities for passengers to rationalize their travel through sharing information and processing contactless check-ins by biometric recognition. This implies reductions in the number of persons employed by ground-handling operators and job losses.

Third, the deployment of digital technologies will create additional benefits for passengers by providing in-flight entertainments such as augmented and/or virtual reality, applying Internet of things for tracking passengers 'luggage location, which fact will improve the reliability and transparency of the transportation services provided.

In order to monitor the digital technologies implementation in the separate economic sectors of member-states, as well as to reach convergence in the digitalization process amongst countries, as early as 2014 the European Commission introduced the DESI index (DESI 2023). The index consists of the following main components: human capital digitalization, connectivity, integration of digital technologies and digital public services. In this regard, on figure 1 they are presented the trends in the development of DESI index for Bulgaria in comparison to the EU average levels of the index, as well as the development of some of its constituent components that are relevant to the purpose of the present study. This analysis will allow to be evaluated the level of digital technologies implementation by business organizations in Bulgaria and in particular by aviation operators.

As one can see from figure 1, Bulgaria is still lagging in the development of the DESI index, as in 2022 its value is 38, while the average European value is 52. For the period after the COVID-19 pandemic, the index increases by 35 % in 2022 compared to 2019. The value of the index' component "deployment of ICT by the business" is still significantly lagging the values of the component in the developed member-states like Belgium, Finland, Denmark, Slovenia, Austria and at the same time, this value is 2 times lower that the EU average values. In 2022 it is observed a growth by only 15 % in the value of the component, concerning the digital technologies implementation by Bulgarian business compared to 2019. This is because during the pandemics, most of the companies relied on state subsidies for covering their operational costs. Moreover, many companies were forced to cease their economic activities, especially in the field of air passenger transport, for example during that period, the national air carrier of Bulgaria operated 20 times lower volumes compared to 2019 (Bulgaria Air 2023).



Source: Digital Agenda EU, https://digital-agenda-data.eu/

Figure 1. Information about DESI index and its constituent components

The e-commerce in Bulgaria is also not sufficiently developed as according to the values of the component in DESI index, the country ranks on last place amongst the other EU member-states. Regarding the component "digital skills of the human capital", Bulgaria ranks second to the last Romania. According to the value of the indicator, 12.4 % of the population of the country possesses basic skills for using Internet and 20 % of the citizens have acquired specific digital skills. It is observed a slight increase by 8 % in the values of the component in 2022 in comparison to 2017, which means that business organizations do not allocate sufficient financial resources for reinvestments in better qualifications and skills of their personnel and there is no targeted government policy for acquiring new or improving the existing digital skills among the population.

EMPIRICAL ANALYSIS, RESULTS, AND DISCUSSION

The financial performance of air passenger carriers will be examined through the statistical analysis of a system of indicators, including short-term liquidity rate, return on capital, revenues per employee and financial indebtedness. For the purposes of the statistical analysis, it is made a representative sample of the licensed air carriers on the territory of Bulgaria who possess a valid Operating License of Community air carrier in Category A: Air Volta, Avio Start, B H Air, Bulgaria Air (the national carrier of Bulgaria), FLY2SKY and GULIVAIR.

On table 1 they are presented the trends in the development of the indicator „short-term liquidity ratio" of Bulgarian aviation operators.

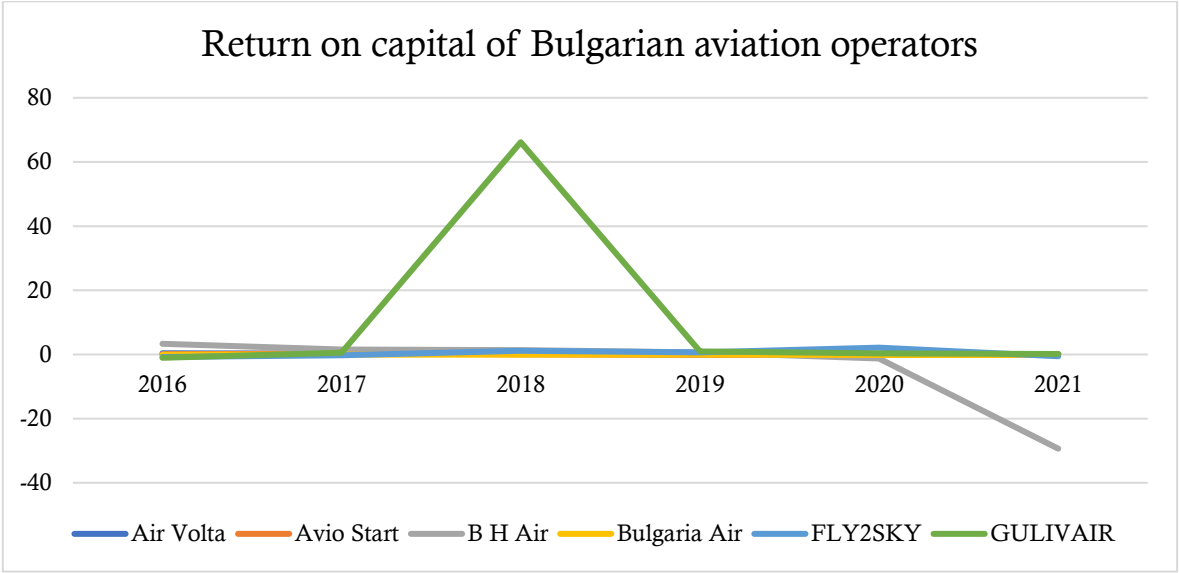
Table 1. Short-term liquidity ratio of Bulgarian aviation operators

	2016	2017	2018	2019	2020	2021
Air Volta	3.566	2.617	3.033	0.791	0.217	0.588
Avio Start	1.012	1.072	1.164	1.415	1.202	2.305
B H Air	0.777	0.928	1.669	1.129	1.092	1.062
Bulgaria Air	0.97	1.269	1.009	0.821	0.382	0.323
FLY2SKY	3.92	0.906	0.537	0.93	0.485	0.464
GULIVAIR	2.443	5.565	0.385	3.763	1.796	0.493

Source: Annual Financial Reports of the Licensed Air Passenger Carriers for the period 2016-2021

The short-term liquidity ratio is an important financial indicator and is especially useful for analyzing airline companies, as they are in general capital-intensive and have significant amounts of debt. The information on table 1 shows that for the period 2019-2021 – during the COVID-19 pandemics most of the

air passenger carriers have values under 1. Only for the carriers Avio Start and B H Air, the short-term liquidity ratio is around 1. It is observed a serious decline in the values of the indicator and in 2021 a drop by between 70 % and 90 % is reported for the air carriers Air Volta (-84 %), Bulgaria Air (-67 %), FLY2SKY (-89 %) and GULIVAIR (-80 %) compared to 2017. The observed high values of the indicator (from 2.4 to 5.6) for GULIVAIR for the period 2016-2019 are determined by the fact, that in this time the air carrier has not performed operation activity, as the company has acquired its license in the end of 2020. In this period the persons, employed by the aviation operator are 8 workers and the aircraft consisted of only one plane, while in 2021, the number of the employees grew 9 times (72) and that of planes grew 6 times (GULIVAIR 2022). The observed trends are due first to the significant drop in the volumes of passenger carriages, which volume only for the national air carrier is decreasing 20 times because of the pandemics. Second, except for Bulgaria Air, the rest aviation operators form their revenues and passenger turnovers based on seasonal charter flights operation, which operations were strictly forbidden during the COVID-19 pandemics (for some of the carriers, these drops were between 3 and 13 times) and at the end of 2022 and at the beginning of 2023 these flights started hardly to recover since pre-pandemic levels. Third, due to the imposed travel restrictions because of the health crisis in global, European, and national level, the liabilities of Bulgarian aviation companies to the personnel, creditors and external resources began to constantly increase in the expense of lack of incomes.

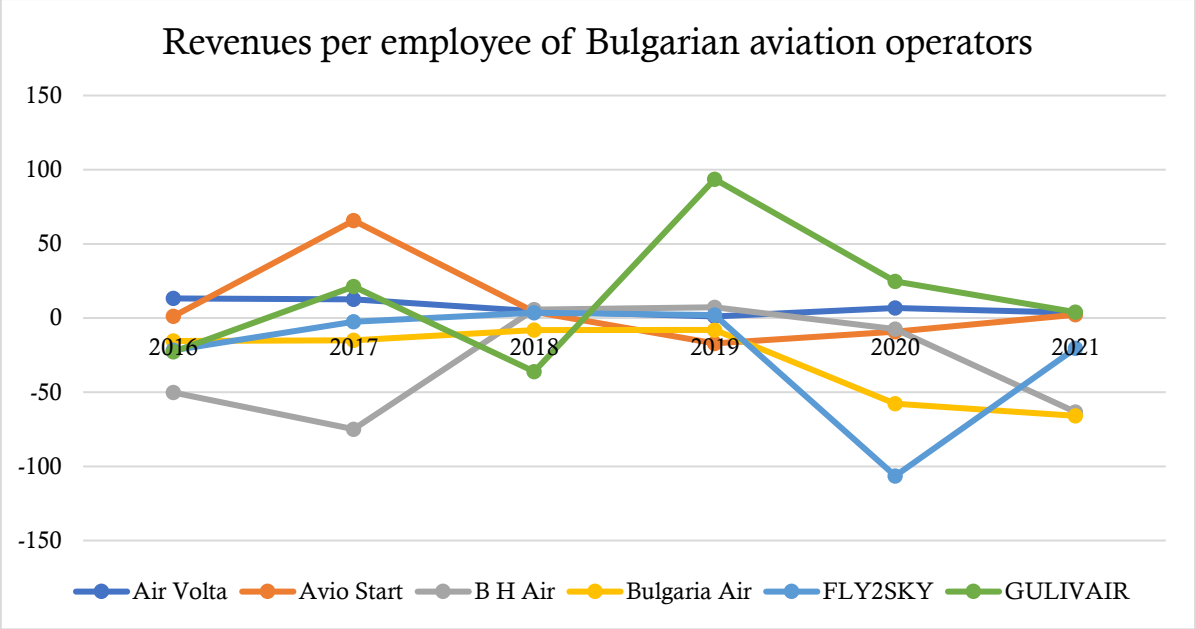


Source: Annual Financial Reports of the Licensed Air Passenger Carriers for the period 2016-2021

Figure 2. Trends in the development of Return on capital of Bulgarian aviation operators for the period 2016-2021

As one can see on figure 2, the indicator return on capital is taking values under 1 and during the COVID-19 pandemics its values are negative. This means that with the available material (aircraft, equipment), human (personnel, directly engaged with passenger carriages operation) and information resources Bulgarian aviation operators could not make profit and they strongly depend on crediting from external sources. For example, in 2021 only for Air Volta, Avio Start and GULIVAIR they are observed positive values of the indicator, although they are far below 1 but they give a signal that carriers are starting gradually to recover their financial performance from the health and economic crisis. The values of the indicator for the national carrier Bulgaria Air also show a recovery trend as the return on capital increases 5 times in 2021 compared to 2019. The observed trends in the development of the indicator characterize the inability of Bulgarian air carriers to maintain their fleet in accordance with the technological innovations in the sector, as well as they are unable to improve the qualification and skills of their personnel regarding the modern trends in the digital transformation of economic sectors. It also gives information that the developments in the material and human resources of aviation operators do not bring financial benefits for the companies and they are not effective – this fact is confirmed also by the reported drop in the values of the coefficient in 2021 compared to 2016, as for Air Volta return on capital decreases by 86 %, for B H Air – by 9 times, for FLY2SKY by 26 % and for GULIVAIR by 116 %.

Another indicator, which directly corresponds to the financial performance of air passenger carriers is the revenues per employee. On figure 3 one can see the trends in the development of the indicator for the period 2016-2021.



Source: Annual Financial Reports of the Licensed Air Passenger Carriers for the period 2016-2021
Figure 3. Trends in the development of the revenues per employer of Bulgarian aviation operators

The indicator revenues per employee accurately reflects the labor productiveness of personnel, employed by aviation operators. The values of the indicator are negative during the period of the health and financial crisis because of COVID-19 pandemics (its values are between -65 and 3). In this period a lot of companies in most of the economic sectors were funded through the state measures 60:40 in order to keep their personnel employed on the one hand and on the other – to ensure some kind of payment for the human labor and to compensate the impossibility for them to carry out their routine tasks because of the imposed restrictions on flights inn national, European and global aspect. As it was mentioned previously, the COVID-19 pandemics accelerates the digitalization processes of economic activities, which forces companies to hire workers with high professional qualification, possessing basic and specific digital skills and performing higher labor productiveness rates. Obviously, the statistical data provided on figure 4 shows that Bulgarian air carriers do not have enough qualified and skilled personnel who would successfully meet the requirements of the digital revolution, as the revenues per employee have strongly decreased during the studied period. There is a significant drop in the labor productiveness rate of employees as for most of the aviation operators it is between 96 % and 120 % in 2021 compared to 2017 and to 2019.

Financial indebtedness is another important indicator which represents the ability of economic agents to cover their liabilities with or without the help of creditors (Hristozov 2021). On table 2 they are presented the trends in the development of the indicator for the period 2016-2021.

Table 2. Trends in the development of the financial indebtedness indicator of Bulgarian aviation operators

	2016	2017	2018	2019	2020	2021
Air Volta	0.302	0.503	0.437	2.088	3.953	5.025
Avio Start	14.493	4.831	0.798	1.01	1.451	1.664
B H Air	-25	-5.435	90.909	45.455	90.909	500
Bulgaria Air	2.558	1.138	1.136	2.268	2.538	3.509
FLY2SKY	0.0305	4.926	29.412	16.129	-2.695	3.279
GULIVAIR	0.444	0.176	-10.87	0.366	1.887	2.793

Source: Annual Financial Reports of the Licensed Air Passenger Carriers for the period 2016-2021

For all the investigated carriers, the values of the indicator are many times higher than 1, which express a high degree of dependence of these companies on their creditors and inability to cover their liabilities by own capital resources. This is not a good example of an appropriately carried financial policy by the aviation operators, since any modernization of the aircraft in accordance with the modern digital

technologies, as well as any improvement of labor conditions and labor qualification will increase the liabilities of air carriers to creditors and there is a risk the operators to fall into a debt spiral. The greatest fluctuations in the development of the indicator are observed for the aviation operator B H Air, where the values of the indicator from -25 in 2016 have reached values of 500 in 2021. This trend is determined by some of the following circumstances: first, after 2019 the air carrier has not made any profit and the number of passengers carried have decreased to 305 in 2020 compared to 226727 in 2016 (Directorate General Civil Aviation Agency 2023b). Second, according to the annual reports of the company, it ranked on 2nd place in terms of liabilities amongst 74 companies in the sector and in terms of availability of equity capital it ranked on 16th place (Registry Agency 2023b). Third, obviously for the air carrier it is difficult to compete with the other air carriers the sector on the domestic and international aviation markets, since both indicators "duration of one turnover" (2077 days for 2021 year) and the number of turnovers per year (0.17) are far below the industry average levels - 298.4 days for one turnover for 2021 and 1.21 turnovers respectively (Registry Agency 2023c). Similar trend is also observed for the air carrier FLY2SKY, as higher values for the indicator "financial indebtedness" are reported for the period 2018-2019. Like B H Air, FLY2SKY is also operating seasonal charter passenger flights, but after 2019 the operator has differentiated its main economic activity and since then it has been providing wet and damp leasing (ACMI services) and as a result the financial indebtedness of the air carrier has started to decrease (FLY2SKY 2022). Moreover, even in 2021, the passengers carried by the air operator FLY2SKY are 4 times more than those carried by B H Air (Directorate General Civil Aviation Agency 2023b). For example, in 2021 the values of the indicator for Air Volta have increased to 5.02 in comparison to 2016 when the values of the indicator were under 1. A similar trend is observed for GULIVAIR (from 0.44 in 2016 financial indebtedness grows to 2.8 in 2021) and FLY2SKY (from 0.03 in 2016 the indicator has reached values of 3.3 in 2021). Only for the national carrier Bulgaria Air the financial indebtedness coefficient presents well, and its values are around 1, however during the COVID-19 pandemics the company's available equity is insufficient to cover the liabilities and the dependance of the operator on creditors is increasing.

Based on the empirical analysis of the indicators, characterizing the financial performance of Bulgarian air passenger carriers and on the degree of digitalization of the main economic processes in the country, there will be applied an econometric model for establishing a correlation between these two phenomena. In this regard a regression analysis will be applied, where the independent variables are return on capital, revenues per employee, financial indebtedness and short-term liquidity ratio and the dependent variable is deployment of ICT by the business. When the multiple regression analysis was processed, the phenomena "multicollinearity" was found, which means that there is interdependence amongst the independent variables. This is logical as most of the selected independent variables are calculated by using the same unit in the numerator or in the denominator fraction bar. Because of that, one-factor linear regression is applied in order to be determined which of the independent variables most strongly influences the dependent variable. Figure 4 presents the results of the linear regression processed.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.930167
R Square	0.865211
Adjusted R Square	0.831513
Standard Error	0.429412
Observations	42

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	4.734505	4.734505	25.67593	0.007145
Residual	4	0.737579	0.184395		
Total	5	5.472083			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	13.39976	0.534411	25.0739	1.5E-05	11.916	14.88352	11.916	14.88352
X Variable 1	-0.2946	0.058139	-5.06714	0.007145	-0.45602	-0.13318	-0.45602	-0.13318

Source: author's own calculations

Figure 4. Correlation between „short-term liquidity ratio" and „deployment of ITC by the business"

Based on the results obtained, it is obvious that a linear correlation between the independent variable "short-term liquidity ratio" and the dependent variable "deployment of ITC by the business" exists. This is confirmed by the values of Multiple R = 0.93 %, as well as by the values of Sig. F = 0.007, which is far lower than α (0.05) and they allow to interpret the results. The R Square is 0.865, which means that approximately 87 % of the changes in the value of "deployment of ICT by the business" could be explained by changes in the value of "short-term liquidity ratio" of Bulgarian air passenger carriers. Based on the information presented on figure 6, an equation of the correlation between the variables could be established and it is as follows:

$$Y_{\text{deployment of ICT by the business}} = 13.399 - 0.295 * X_{\text{short-term liquidity ratio}} + \varepsilon \quad (1)$$

The equation shows that if the values of the coefficient „short-term liquidity ratio" decrease by one point, compared to the previous reporting period, then the financial possibilities of the air carriers for deploying ICT will grow by 0.3 points. Consequently, if the observed trends for the development of the indicator "short-term liquidity ratio" in the period 2019-2021 are maintained and they change almost at the same rate in the next five years for the aviation operators Bulgaria Air, FLY2SKY and GULIVAIR (see table 1), then the share of deployed digital technologies by them will grow every year.

CONCLUSION

The purpose of the present study was first to evaluate the financial performance of Bulgarian aviation operators in the conditions of global digital transformation and second to examine if there is a correlation between these two phenomena. The literature review showed that in the field of air transportation services digitalization there is many scientific studies, however very few of them are trying to determine how the financial performance of air carriers influence the degree of information and communication technologies deployment in their main economic activity.

As a result of the empirical analysis of Bulgarian aviation operators' financial performance, the following could be summarized:

- Air passenger carriers are not financially capable to cover their main liabilities to the personnel and creditors in the short run. This is confirmed by the values of the short-term liquidity ratio, financial indebtedness coefficient and the return on capital (tables 1 and 2, fig. 2);
- The values of the indicator „revenues per employee "correspond with low labor productiveness rates, as they are not only lower than 1 but they are also negative. This fact will put a serious dilemma to the aviation operators in the near future whether to invest financial resources in qualification and digital skills improvement of the employees and keeping their number or to replace low-qualified employees with artificial intelligence (fig. 3);
- The unsatisfactory values of the return on capital coefficient correspond with inefficiency of the economic activity carried out by the Bulgarian air carriers.
- Bulgaria ranks on the last place according to the values of the DESI index, compared to the EU average levels. The country is also on the last place amongst the other EU member-states, concerning acquired digital skills by workers, deployment of ICT by the business and e-commerce (fig. 1);
- Based on the regression analysis applied, a statistically significant correlation between financial performance of aviation operators (expressed by the short-term liquidity ratio) in the short-run and the degree of ICT deployment exists.

Certainly, the financial performance of Bulgarian air passenger carriers is determined by high indebtedness rates to creditors, inability to cover their short-term liabilities by the existing human, material and information resources, low labor productiveness rate and insignificant volumes of passenger carriages. These factors will create obstacles for the process of digital transformation of the sector. In this regard, the national government will need to undertake appropriate policies to support the air passenger transport to overcome the exogenous shocks that have arisen (COVID-19 pandemics, the ongoing military conflict in Ukraine, the geopolitical relations in the Black Sea region). On the other hand, the European Commission is also trying to ensure financial support for the development of the aviation sector and most of the calls and mechanisms are open to all member-states. For example, through the mechanisms of SESAR III and Clean Aviation Partnership for the period 2021-2027 the Commission will allocate 3.4 billion euros to support implementation of hybrid and electric aircraft (ACI Europe 2023). The Innovation Fund is another opportunity for the air carriers, which main purpose is to support the development of sustainable and environmentally friendly transport modes. Through the mechanisms of the National Recovery and Resilience Plan, Bulgarian air passenger carriers could receive financial support by the envisaged social

policy for issuing vouchers for acquiring new or development of existing digital skills by the employees. The European Investment Bank is another source of financial support which credits and supports activities, related to the development of sustainable aviation.

The present study could serve as basis for performing similar research both in the field of financial performance of other transport modes or for aviation companies, licensed in other member-states or third countries with similar economic and political characteristics like Bulgaria.

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