

THE COMPLEX RELATIONSHIP BETWEEN AIR TRANSPORT INFRASTRUCTURE AND REGIONAL DEVELOPMENT. AN EMPIRICAL INQUIRY

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Abstract

Nowadays the development of the air transport infrastructure is acknowledged as an important driver of regional development, while the economic development processes impact the demand and volume of air transport as well. This paper investigates the complex relationship between air transport infrastructure and regional development proposing an empirical analysis for the case of Romania, whose relevance is supported by her unprecedented dynamism in the general European framework at the same time with the tendency of reducing regional disparities, the balanced geographical distribution of the airport network, and the country's geo-strategical position in the new international force field. By applying an in-depth analysis which combines the examination of strategic documents with the interpretation of statistical data and semi-structured interviews, relevant findings are provided with regard to the significance of air transport infrastructure in a context described by diversity of regional development levels, accompanied by insights into the policy-making framework, with emphasis on the requirements to be met for proper responses to the need to reinforce the air transport sector and to integrate the national vision with the specific regional development aspects.

Keywords: air transport infrastructure, regional disparities, place-based approaches, resilience, integration

JEL classification: R11, R19, R42, R58

1. Introduction

At present the contribution of transport infrastructure to regional development is largely acknowledged, evidence being provided on the positive correlation between them. In particular, the development air transport infrastructure is considered “a strategic transportation policy factor for regions” (Elburz et al., 2020, p. 128), taking into account the globalization and trade openness, on the one hand, and the capacity of aviation sector to enhance the international networks for business and tourism on the other hand (Elburz et al., 2020; Hong et al., 2011; ATAG, 2005). Considered one of the world's most important industries, the air transport impact envisages core economic domains such as welfare, jobs and wages, tourism, and broader aspects of economic growth, productivity and trade (Chapman, 2023), with important direct and indirect effects at local, regional, national and international scale (Tsiosas, 2022).

It enters into mutual relationships with GDP and employment – overall and structured by sector and by region, the intensity and direction of causality being still an intensely debated topic (e.g. Elburz et al., 2020; Kucukonal, Gulşah, 2017; Brueckner, 2003). Most studies have pointed out that the influence of air transport on the economic development of a region is higher compared to the effects that the economic development process can generate on the demand and volume of air transport. However, there are also researchers who consider that the two influences are almost of the same magnitude.

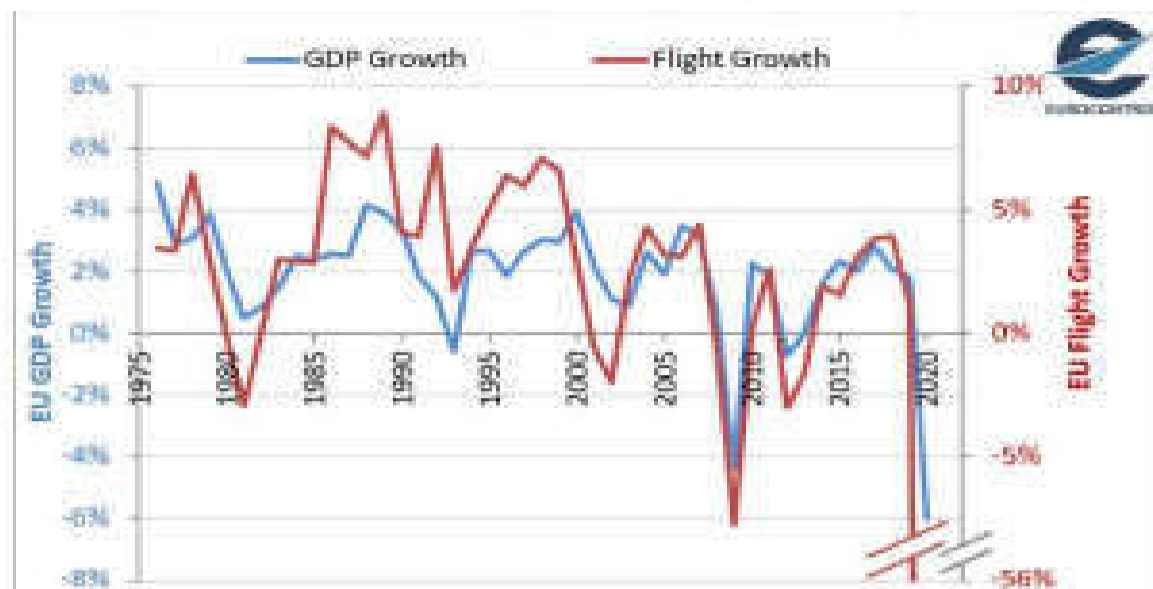
For example, Vijver et al. al (2016) analysed the causal relationship between air passenger transport and regional development using data from 2002 to 2011 for 112 European NUTS2

regions. They conducted their research by applying a Granger causality analysis and treating the service and manufacturing sectors separately. The aim of the research was to investigate the causal linkages between passenger air transport and regional development, expressed in terms of employment rates, while the established hypotheses concerned both the influence of air transport on employment and the extent to which the increase in employment can cause increases in the level of transport. The results indicated the presence of both directions of causality at the level of European urban regions, a fact that reveals the necessity but not the sufficiency of air passenger transport in generating regional growth. The higher level of employment observed in the service sector confirms its sensitivity to air passenger transport. The research also showed that, for most of the analysed regions, the effects of causality between passenger volume and total employment become visible after the passage of at least a period of one year. At the same time, the study revealed a stronger connection between air passenger transport and employment in the service sector, the following aspects being noted: the causal relationship starts from the number of passengers to employment, characteristic of the Central - European area, while the opposite causality was noticed in the case of six regions in Spain and the South of France. Bidirectional causality was also observed among 10 regions. Granger causality for the manufacturing sector was detected in 39 NUTS2 regions, particularly among those with high levels of employment, such as Piemonte and Lombardy in northern Italy. In summary, the results suggested that: causality patterns between air transport and employment were geographically heterogeneous or even absent; the influence of air transport on employment was more pronounced than the influence of employment on air transport, although the latter could also be noticed in the case of some regions; the causality between air transport and employment was stronger in the service sector compared to the manufacturing sector.

In another register, Hu et al. (2015) used recent panel time series methodology to examine the dynamics and causal relationship between economic growth and domestic air passenger traffic. They analysed quarterly data of 29 provinces in China, for the 2006 – 2012 period. The choice of China was motivated by the fact that it has become the second largest air transport market in the world in terms of distances flown, both for passenger and freight transport. The results highlight the existence of a long-term equilibrium relationship between economic growth and domestic passenger traffic. Specifically, a 1% increase in air passenger traffic was found to lead to a 0.943% increase in real GDP. Between these two data series, a strong bidirectional and long-term Granger causality, but also a unidirectional short-term causality from domestic air passenger traffic to economic growth was identified.

Without providing information on the direction of influence manifested between the two processes, a Eurocontrol report (2022) justifies their interdependence by the very way of realizing future traffic forecasts and scenarios. Specifically, the three scenarios regarding the possible evolution of air traffic up to the horizons of 2050 highlight and reaffirm the close connection between air transport infrastructure and economic growth, considering the following situations: the optimistic scenario is based on a strong economic growth, the basic one envisages a moderate level of it, while the pessimistic scenario assumes the existence and manifestation of conditions specific to a slow economic growth. The underlying analysis for 1975-2020 (Figure 1) has shown that the economic growth remains the most important factor of influence for the growth in air travel, the corresponding cycles being strongly correlated, but with the elasticity coefficient in Europe decreasing over the years. The distortion induced by the COVID-19 crisis is also captured, at the same time with the mentioned expectation regarding the restoration of the relationship in the next years.

In order to ensure the long-term resilience of the aviation sector, Tisdall et al. (2021) point to the need to address “a pathway for future sudden moments of dislocation” and propose policies able to support aviation “in a way that engages all levels of industry rather be airline centric” (p. 273). In the same register Gherghina et al. (2023) propose institutional resilience-based approaches that take into consideration three organisational traits, namely “preparedness, agility and robustness” (p. 426).

Figure 1: Correlation between GDP level and air transport demand in Europe, 1975-2020

Source: Eurocontrol (2022), p.5

Beyond the above interpretations on intensity and direction of causality, there is a plethora of well-grounded studies which illustrate and bring about solid arguments for the contribution of air transport infrastructure to regional development.

According to Baltaci et. al (2015), for developing countries transport is a key sector, with an essential contribution to the development process. Transport infrastructure not only favors the air connectivity growth but also facilitates the economic, social and cultural relations between countries and regions (Bekisz and Kruszynski, 2021; Morphet and Bottini, 2013; Stilianos and Ladas, 2011). In addition, Cascetta et. al (2020) highlights that an improvement of the transport system can also stimulate local production, by facilitating the access of producers to more distant markets and creating more opportunities to attract foreign direct investments, which contribute significantly to economic growth. It can also create significant competitive advantages for the envisaged regions (Tu et al., 2022). On the other hand, a low degree of accessibility to transport routes may, however, limit the degree of accessibility to employment opportunities, health and education services or other facilities.

Going deeper, Aguirre et. al (2019) demonstrate that an airport with an efficient activity can significantly contribute to the economy of the area it serves while improving the quality of life in the region as well. These effects occur together with the increase in employment that can be generated both by the new jobs created by the airport activity itself and by attracting new companies in that area. The wide range of employment opportunities can vary, starting from those related to air transport, such as management activities necessary to coordinate airport activity, maintenance services, ground cargo handling, radio communications, air traffic control, catering services, fuel refining, etc. to the establishment of new travel agencies in the area.

Based on these overall considerations, this paper aims to deepen the exploration of the relationship between air transport infrastructure and regional development by proposing for the empirical analysis the case of Romania, which is relevant in the recent international context from two perspectives, namely: 1. the unprecedented dynamism of the country in the general European framework combined with the tendency of reducing the inter-regional inequalities; air transport has a very interesting place in this picture, considering the quite balanced geographical distribution of the airports, with a good representation of this mode of transportation even in the less developed regions of Romania; 2. Romania's geostrategic position in the new international force field, in a time of overlapping crises (sanitary, resulted from the COVID-19 pandemic, the emerging economic one, the Russian-Ukrainian war, with entailed immigrant crisis, etc.), in other words, a complex polycrisis.

Thus, new knowledge deriving from empirical analysis can be added with regard to the complex relationship between air transport (with the support offered by the corresponding infrastructure) and regional development, shedding more light on the effects that one can manifest on the other as well as on the new ways of action and measures able to enhance the economic development processes in a more resilient manner.

2. Data and Research Methodology

In order to respond the research objective formulated above, an in-depth analysis is proposed, combining the overall image offered by strategic documents (e.g. General Transport Master Plan prepared by the Ministry of Transport and Infrastructure) and the interpretation of the statistical data offered by Statistical Yearbook of Romania and Eurostat with semi-structured interviews with representatives of relevant stakeholders in the field (e.g. Bucharest Airports National Company, county councils, etc.). As a result, useful findings with regard to the airport network will be revealed, providing insights with direct implications for increasing the air transport contribution to regional development in Romania.

3. Results

3.1. 3 Quantitative data interpretation

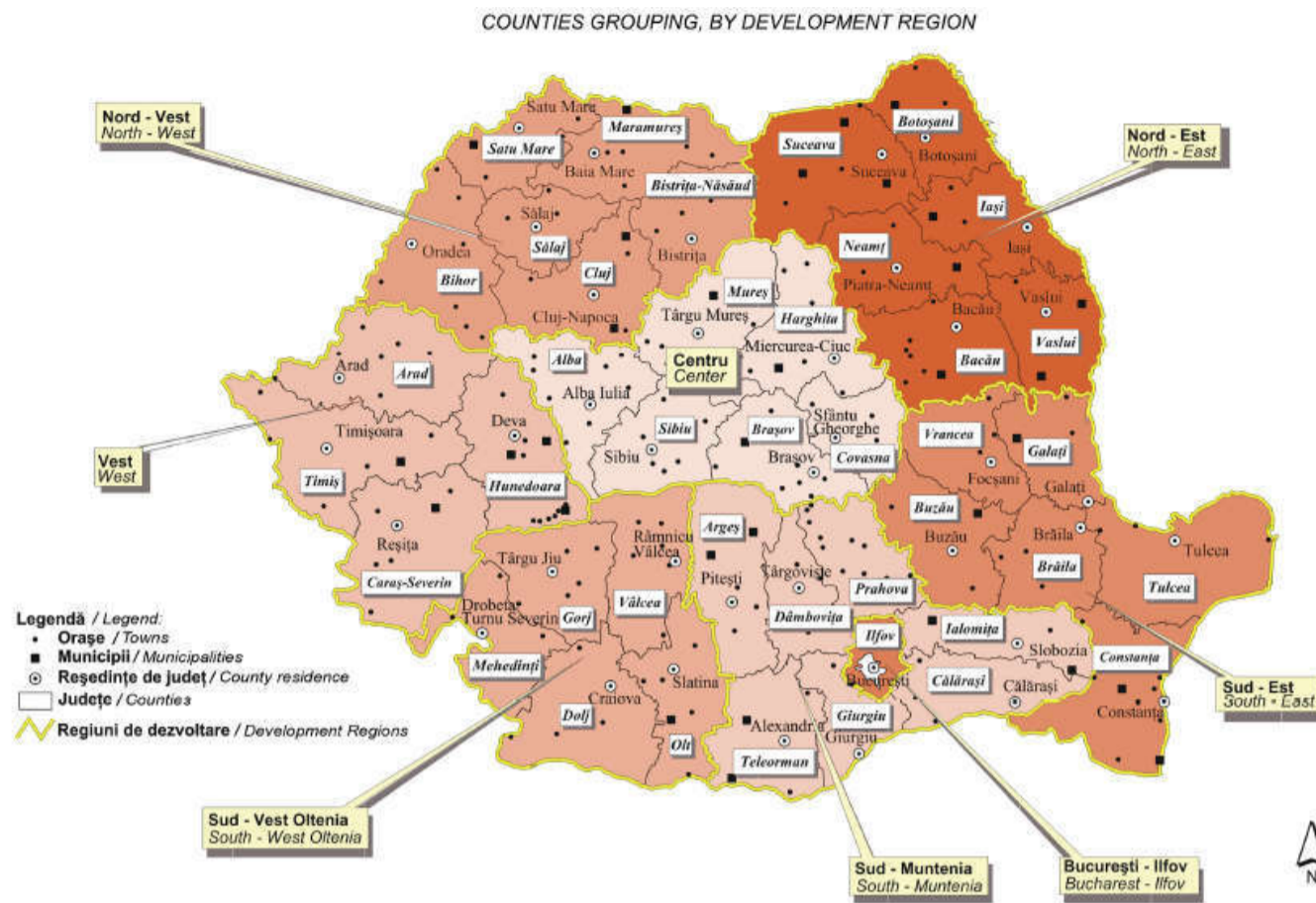
According to the Ministry of Transport and Infrastructure, Romania has 27 airfields and 6 heliports. Depending on their role and potential to attract internal and external traffic, the airfields fall into the following categories: international hub, international strategic airport, international airport, secondary international (regional) airport, airfield (other than the previous ones) (MTI, 2021). Table 1 shows the distribution of the airfields by development region and category; in addition, Figure 2 depicts the territorial organization of Romania by development region (NUTS2) and county (NUTS3), while Figure 3 offers a geographical image of the airport network at national scale.

Table 1. The distribution of airfields by development region and category

Development Region	Airfields	Category
North-East	Iasi	Principal intn'l airport
	Bacau	Secondary intn'l airport
	Suceava	Secondary intn'l airport
South-East	Constanta	Strategic intn'l airport
	Tulcea	Secondary intn'l airport
	Galati	National airfield
	Tuzla	National airfield
South-Muntenia	Climeni	National airfield
	Gradistea	National airfield
	Pitesti Geamana	National airfield
	Ploiesti Strejnic	National airfield
South-West Oltenia	Craiova	Secondary intn'l airport
West	Timisoara	Principal intn'l airport
	Arad	Principal intn'l airport
	Arad CBS	National airfield
	Caransebes	National airfield
	Deva	National airfield
North-West	Cluj-Napoca	Principal intn'l airport
	Baia Mare	Secondary intn'l airport
	Oradea	Secondary intn'l airport
	Satu Mare	Secondary intn'l airport
	Bistrita	National airfield
Centre	Sibiu	Principal intn'l airport
	Targu Mures	Principal intn'l airport
	Brasov	Secondary intn'l airport
	Orastie	National airfield
Bucharest-Ilfov	Bucharest-Otopeni	International hub
	Bucharest-Baneasa	Principal intn'l airport

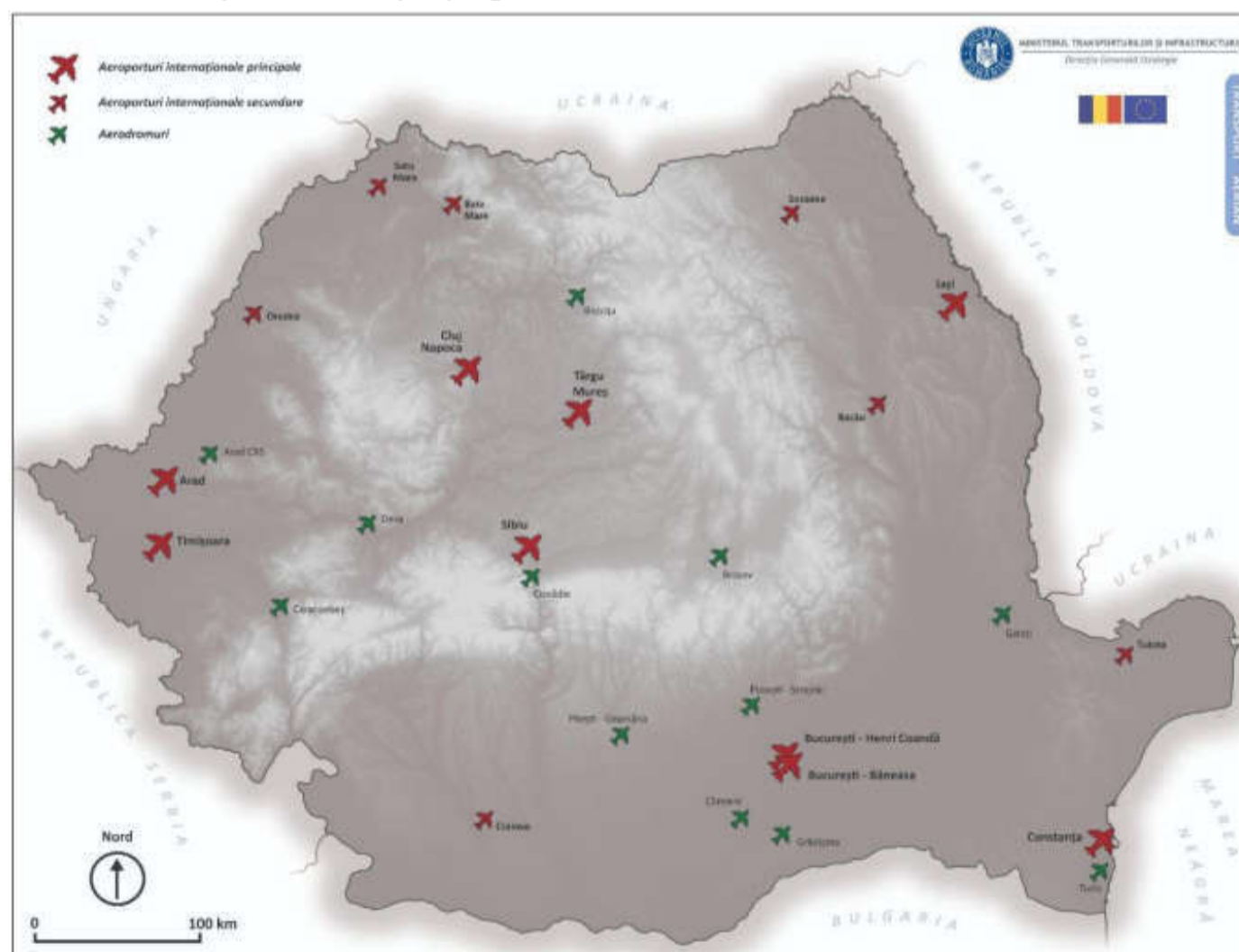
Source: authors' processing based on MTI (2021), p.208

Figure 2: The territorial structure in Romania – NUTS2 and NUTS3



Source: National Institute of Statistics

Figure 3: The geographical location of the Romanian airfields



Source: MTI (2021), p. 208

Note: In the meantime Brasov airfield has become a secondary international airport.

Thus, there is one international hub (Henri Coanda International Airport of Bucharest-Otopeni), one strategic international airport (Mihail Kogalniceanu International Airport of Constanta, which, besides civil flights, serves the NATO forces deployed in the military base nearby), seven principal international airports (of which the most important are those in Cluj, Timisoara and Iasi), eight secondary (regional) international airports and eleven national airfields, of which some are to benefit from investments that will transform them into small operational airports. From the relief shape viewpoint, most of them located in plain areas and

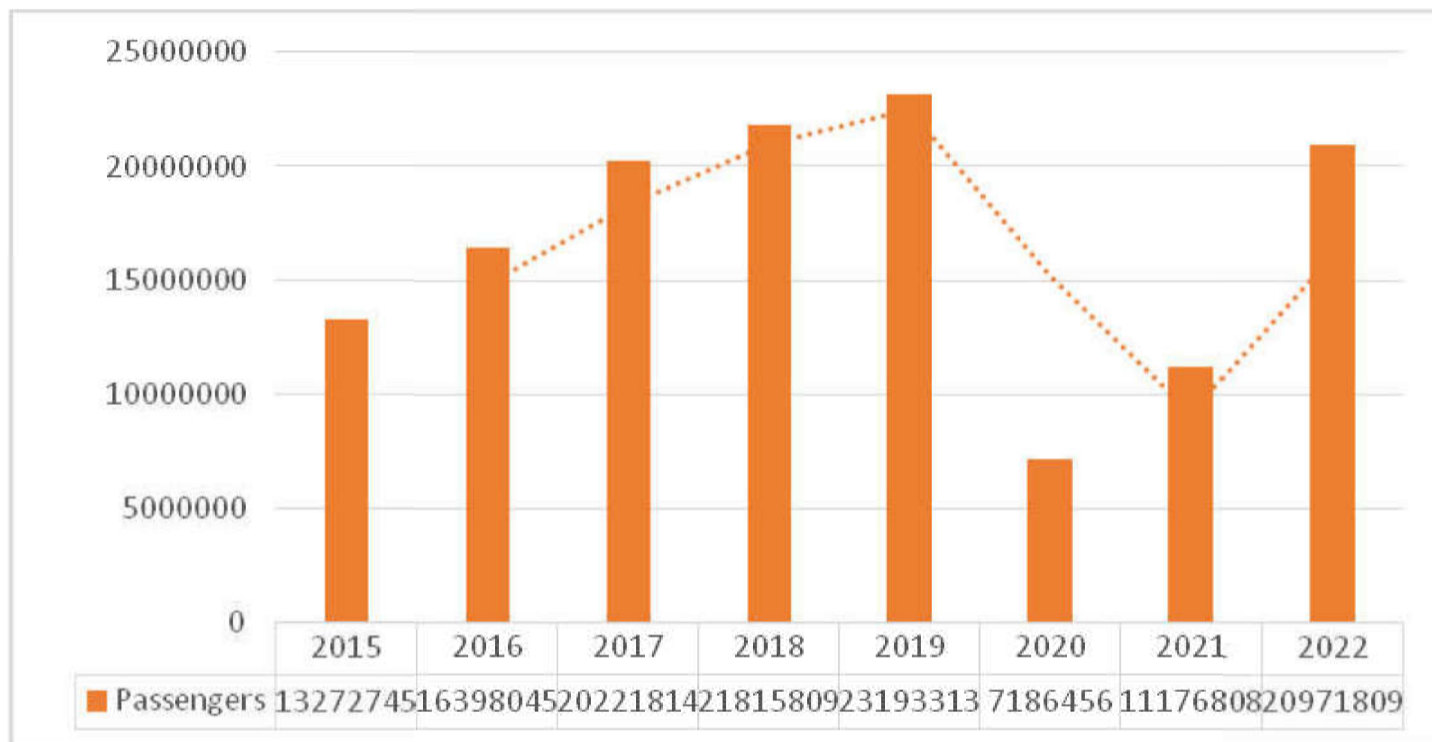
just a few of them at the bottom of mountain areas, which explains the lower number in the core of Romania, crossed by the Carpathian mountains.

In institutional-administrative terms, excepting Henri Coanda International Airport of Bucharest-Otopeni and Mihail Kogalniceanu International Airport of Constanta, which are subordinated to the Government of Romania, all other airports are subordinated to the county councils, following the general orientation of an integrated development at regional level.

The distribution of airports by development region looks quite balanced, creating favourable conditions for a proper support of air transport to regional development. There is just one NUTS2 region with no airport on its territory (but just a couple of small airfields) – South-Muntenia, given its particular situation (depicted in Figure 2) of ‘external hinterland’ for the Bucharest Metropolitan Area (which covers the whole Bucharest-Ilfov development region and several other localities beyond) (Grosu et al., 2014).

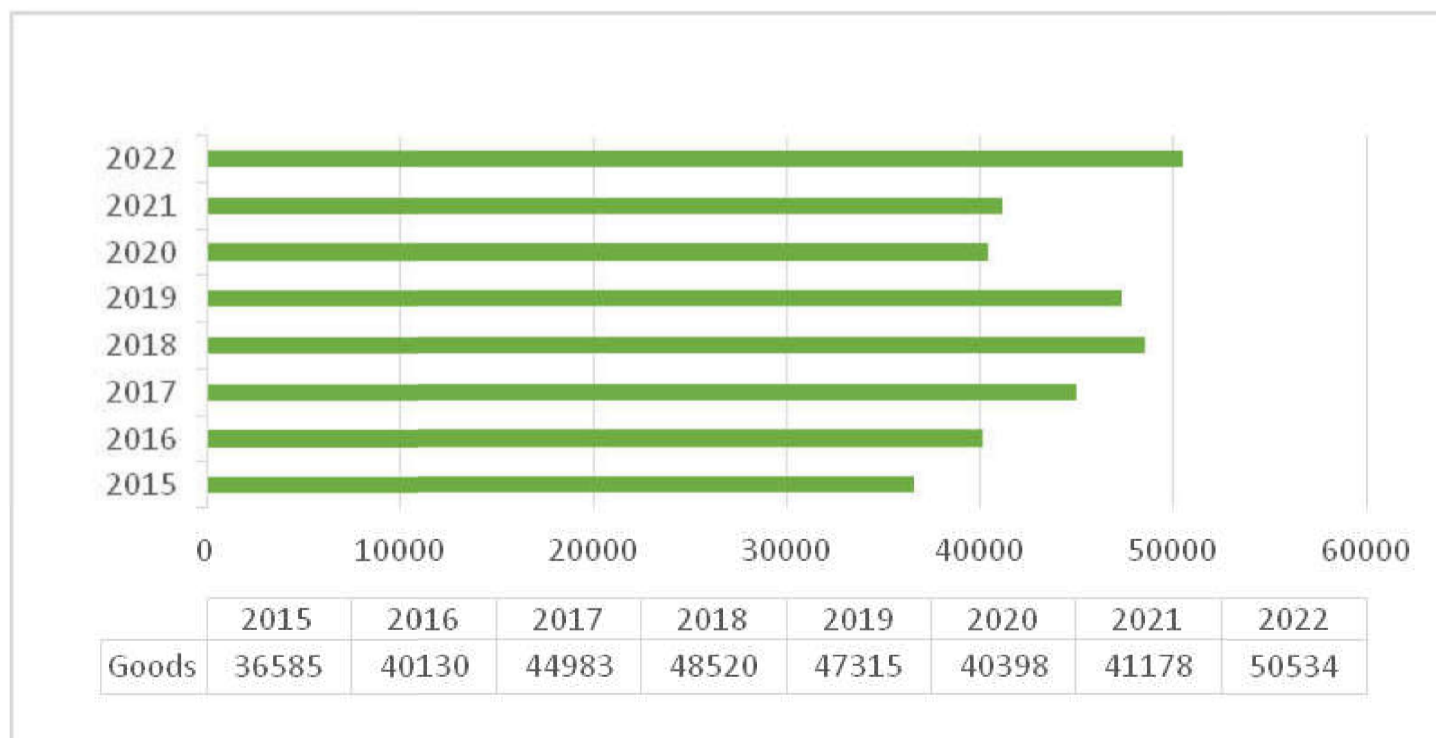
In quantitative terms, the National Institute of Statistics (NIS, 2023) provides data for air transport with regard to the number of passenger dynamics, the freight transport dynamics as well as the evolution of aircraft movements, all of them being synthesised in Figure 4, Figure 5 and Figure 6, which cover the 2015-2022 time span.

Figure 4: Air transport -the number of passenger dynamics, 2015 – 2022

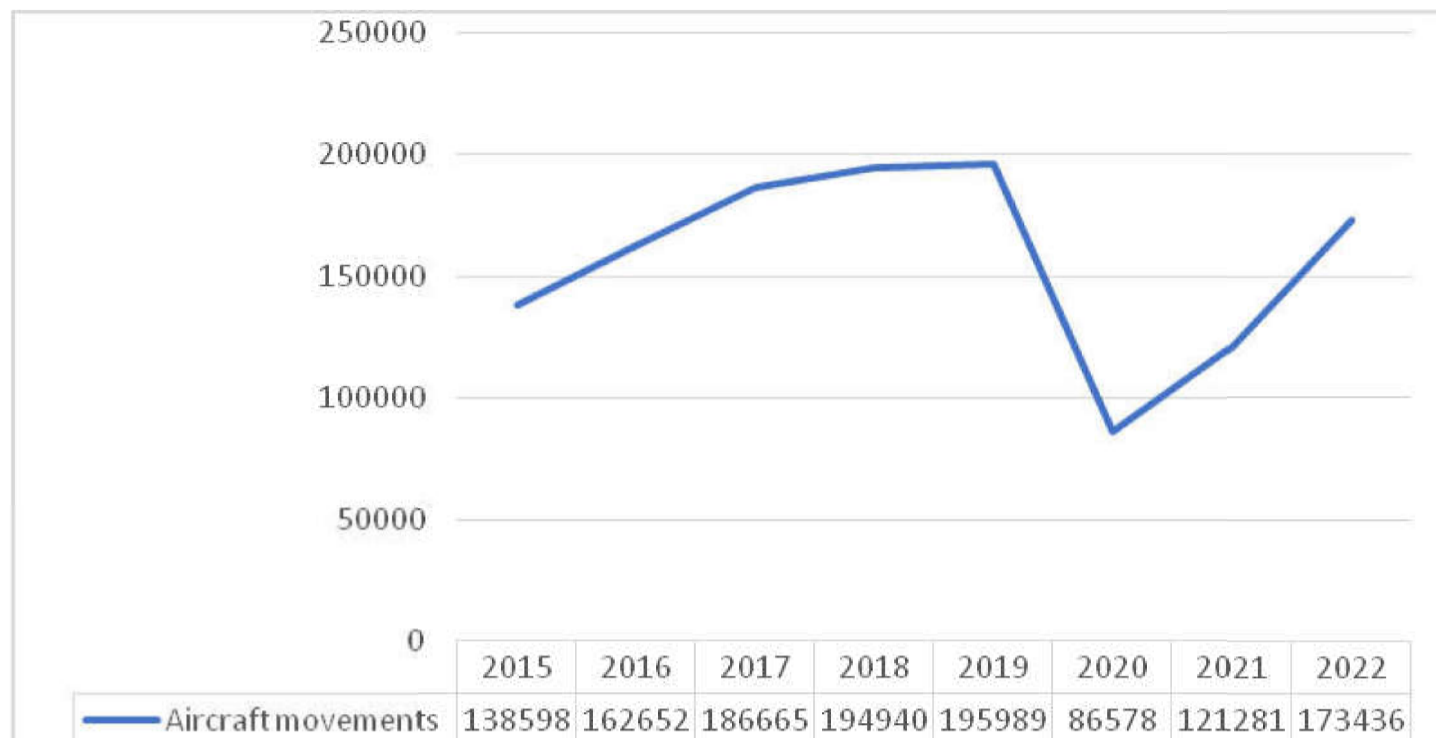


Source: authors’ representation based on NIS (2023)

Figure 5: The freight air transport dynamics, 2015 – 2022 (tones)



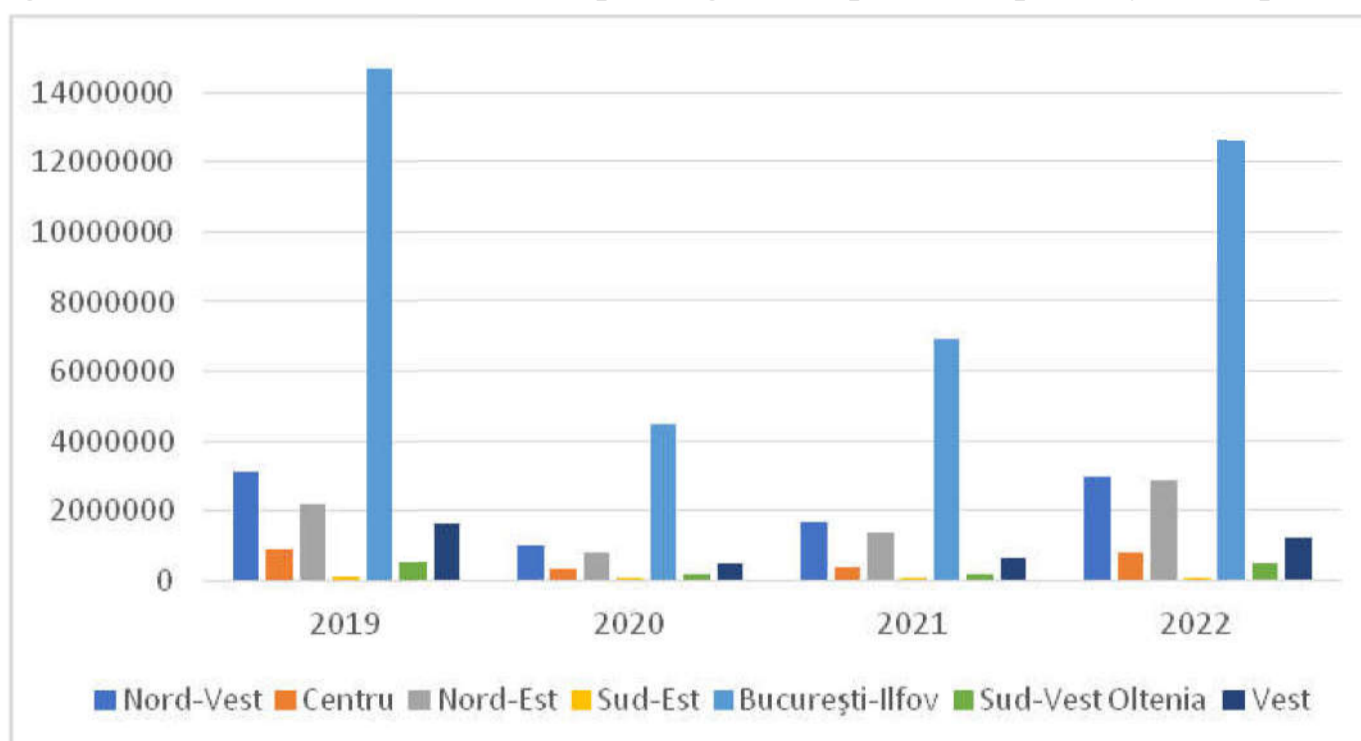
Source: authors’ representation based on NIS (2023)

Figure 6: The evolution of aircraft movements, 2015 – 2022

Source: authors' representation based on NIS (2023)

Besides the important dynamism in the 2015-2019 period, the above figures also capture the impact of the COVID-19 pandemic on the air transport industry in Romania, which recorded dramatic decreases in 2020 (69% in passenger number and 14.6% in freight volume, compared to the 2019 level). Then, the growth resumed, favourable conditions being ensured in order to reach and even exceed the pre-pandemic levels in 2023. The important increase in 2022 can be mainly explained by the economic recovery and related economic policy support measures; at the same time, the Ukrainian refugee flows that transited Romania after the beginning of the war also played its role, with the airports of Bucharest-Otopeni, Iasi, Suceava and Cluj as the main gates for the flights to Western Europe.

At regional level the most important indicator – number of passengers – also reflects the recovery trend (Figure 7).

Figure 7: International and domestic passenger transport of airports by development region

Source: authors' representation based on NIS (2023)

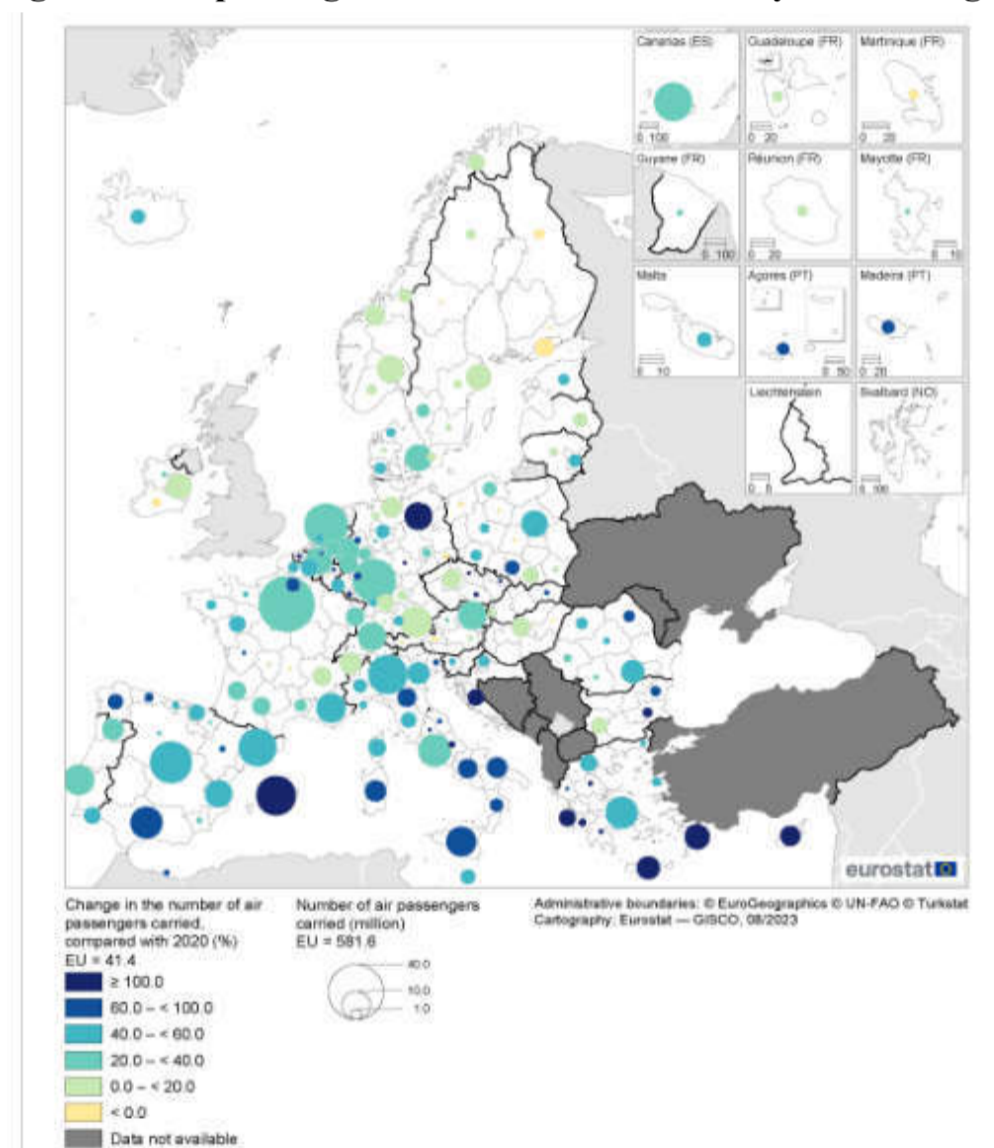
The above trends can be associated with the regions' vulnerability/resilience to the COVID-19 induced economic crisis, clearly reflected by the air transport dynamics.

In terms of the overall economic activity, as demonstrated by empirical studies with regard to the 2007-2008 global economic crisis (Goschin and Constantin, 2010), the underdeveloped areas are better protected from the effects of severe shocks compared to the developed ones, given the fact that the latter are much more connected to the evolution of the world economy and, as a consequence, much exposed to the crises shocks. The research undertaken by Goschin and Constantin (2021) in respect to the COVID-19 crisis, which provided vulnerability indexes by NUTS2 and NUTS3 territorial units, confirmed these findings,

revealing that Bucharest-Ilfov region displayed the highest vulnerability index, followed by Centre region, a well-developed region as well, while the lowest vulnerable was the North-East region - the least developed region in Romania, closely followed by South-West Oltenia and South Muntenia regions, also included in the lagging behind regions category. However, given their high economic potential, the most developed regions proved to be capable to absorb the shocks and to come closer to the pre-pandemic levels – in other words, a high resilience capacity.

From a broader view, the EU perspective confirms the capacity of Romanian regions to recover their air passenger services, all of them showing important positive changes in the number of air carried passengers compared to 2020 (Figure 8). Excepting the North-East region, all other regions recorded increases between 40% and 60%. In the case of the North-East region the increase is in the 60%-100% interval. This is in line with the general Eurostat's conclusion that "some of the fastest increases in passenger number were reported for several regions characterised by relatively small regional airports" (Eurostat, 2023a, p.1). At the same time, for the North-East region – still lagging behind – this statistics confirms the potential of air transport to give a boost to its future development. Especially considering its peripheral location, the improvements in transport infrastructure – here in particular in air transport infrastructure – can determine the reduction of travel time, the improvement of accessibility and thus local advantages are created for attracting new firms, new investments in this region (Vickerman et al., 1999).

Figure 8: Air passengers carried in 2021 in EU by NUTS2 region



Source: Eurostat (2023a)

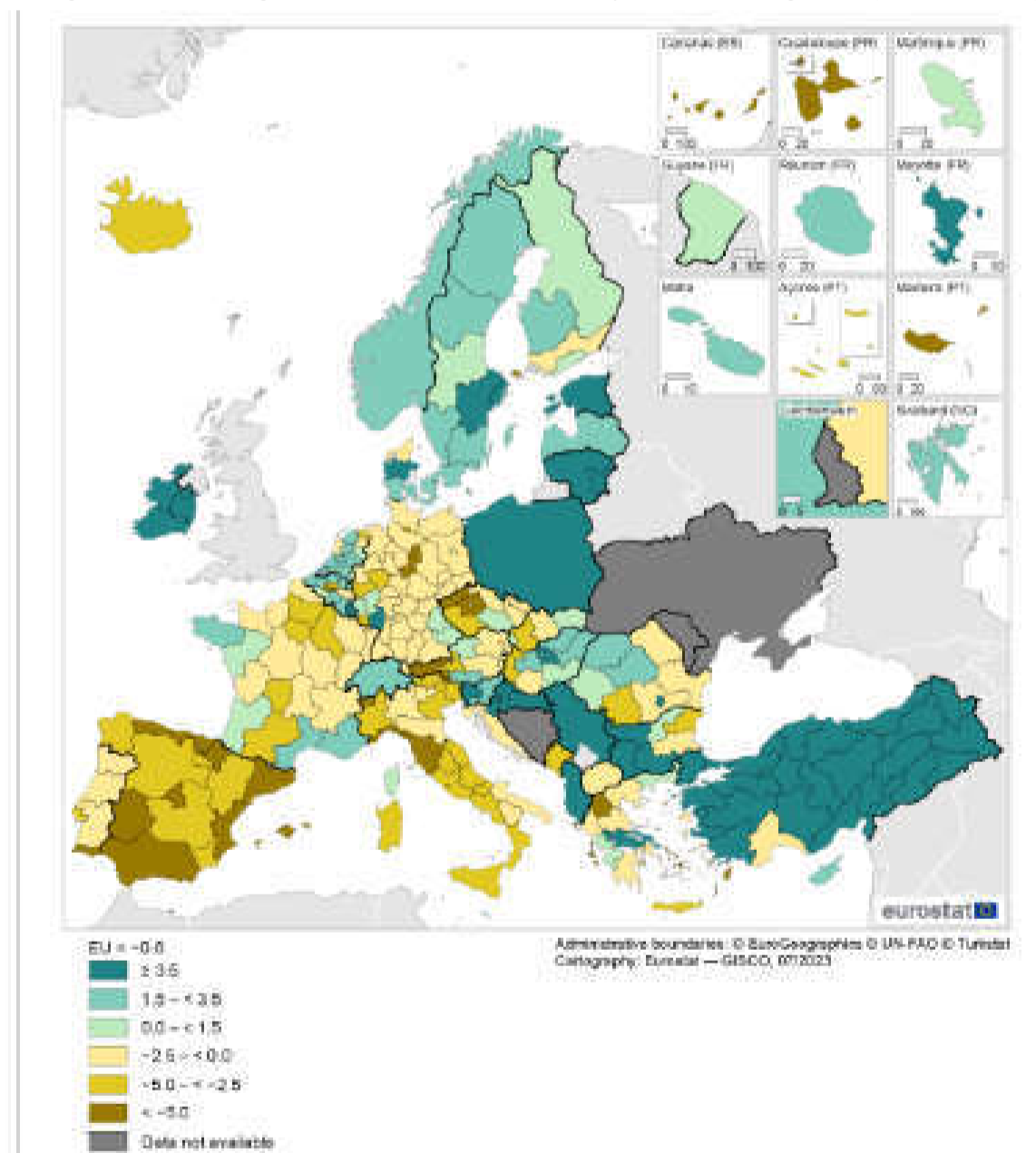
Further on, Table 2, which presents the development level in terms of GDP per capita (PPS) indicates that Bucharest-Ilfov region has succeeded to preserve its winner position not only in Romania, but also at EU level, while important regional disparities continue to exist (the relative amplitude being 3.4 : 1).

Table 2. Regional disparities in Romania by NUTS region, 2021

Development Region	GDP per capita PPS - euros	Relative inequalities (EU-27 = 100)
North-East	15800	48.7
South-East	19000	58.5
South-Muntenia	18400	56.7
South-West Oltenia	18700	57.6
West	24300	74.8
North-West	22600	69.6
Centre	22900	70.5
Bucharest-Ilfov	53900	166.0
EU-27	32470	100.0

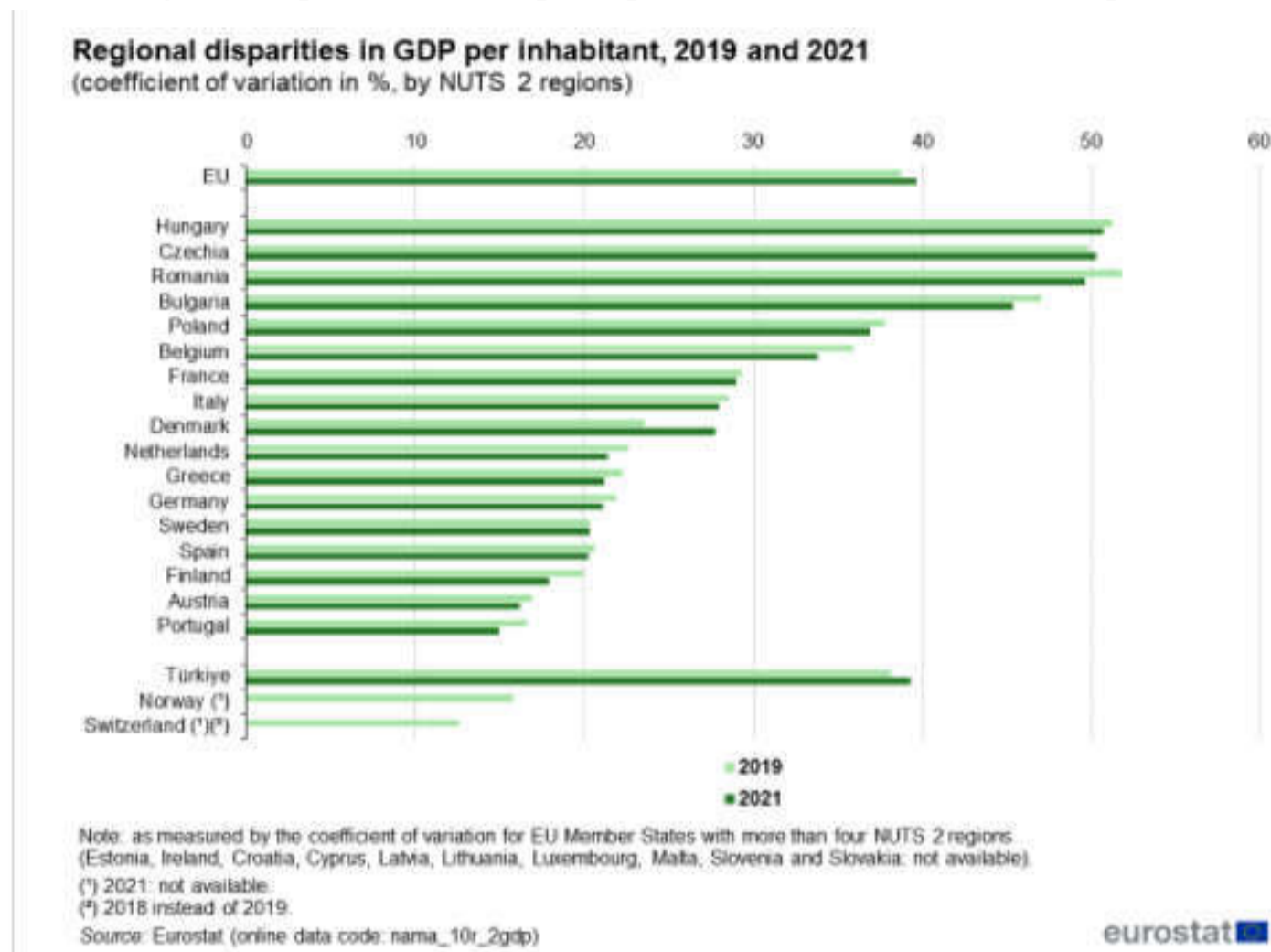
Source: authors' processing based on Eurostat

The higher resilience capacity of the most developed regions is confirmed by Eurostat (2023b) as well: Figure 9 highlights that these regions recorded higher overall changes in real terms compared with 2019, Bucharest-Ilfov being in top position, followed by North-West, Centre and West regions. At the same time (again!), the North-East region is no longer included in the lowest change class among the Romanian regions.

Figure 9: Change in GDP in EU, 2021 by NUTS2 regions (2019 = 100)

Source: Eurostat (2023b)

The most optimistic perspective is explicitly offered, however, by the Eurostat statistics regarding the changes in the regional disparities in GDP per capita in 2021 compared with 2019 (Figure 10), which points to the fact that “in Romania (...) regional differences narrowed due to the faster than average growth in a number of relatively ‘poor’ regions that were ‘catching-up’” (Eurostat, 2023b, p.1).

Figure 10: Regional disparities in GDP per capita, EU, NUTS2 level, 2021 compared with 2019

Source: Eurostat (2023b)

Finally, if the findings on air transport regional dynamics are connected with those regarding the economic development level and the evolution of regional inequalities, one can notice that in the former case the North-East region has a much better situation, indicating that the air transport has the potential to contribute to speeding up the development process in this lagging behind region while, the other way round, the high development level in Bucharest-Ilfov region (166% above the EU average) creates the need of further investments in the air transport sector so as to keep the pace with its economic dynamism, the same indication applying for the other well-developed regions, such as West or North-West.

3.2. Findings from semi-structured interviews

In addition to the previous analysis, significant information about the relationship between air transport infrastructure and regional development can be drawn from the semi-structured interviews. Interviewees were selected starting from the fact that in Romania there is a diversity of airports in terms of category to which they belong, located in regions with very different development levels, and considering the relevance of the institutions represented. Also, the leadership position and professional expertise mattered for selection, so as to get proper data and information as well pertinent opinions about the main theme discussed. As a result, the Director-General of the Bucharest Airports National Company (BANC), the Director of the Civil Aviation School and the Past President of the Suceava County Council were approached and accepted to be interviewed.

The Director-General of the BANC is in charge with the largest and most frequented airport of Romania – Bucharest-Otopeni, so he could provide statistical and technical information, such as necessary improvements in terms of activity or transport infrastructure so as to generate positive effects on the regional economy, while the Director of the Civil Aviation School drew attention to the importance of promoting professional training programmes for flight personnel, technicians or traffic controllers, but also to the strategic planning and the correlation of the interests and activities of all stakeholders in the aviation field, which are aspects that can contribute to an upward path in the evolution of the Romanian aviation industry and to the propagation of positive effects in related sectors.

With regard to the latter, it is worth adding that Suceava county (NUTS3) is included in the North-East region (NUTS2), the least developed region of Romania. In this region, Suceava county has a special development mission, based, inter alia, on a sector with a huge

potential – tourism (in Bucovina area), which, considering the peripheral position of this county (in the North, at the border with Ukraine) has a lot to benefit from a well-developed air transport sector, in terms of accessibility. The interview with the Past President of the Suceava County Council also took into account his expertise from the perspective of carrying out, during his mandate, the modernization works of the airport located in that area, namely "Ștefan cel Mare" International Airport of Suceava. He discussed the effects generated by the modernization process carried out on the airport from the angle of the administrative position he held, correlated with the perspective on the regional development strategy and policy which he coordinated as well. He also addressed the effects of the military crisis in Ukraine, the Suceava airport being the closest to Romania's border with this neighbouring state.

For the sake of ensuring a reasonable length of the article, only two interviews are to be extensively discussed in this paper, namely the interview with the Director-General of BANC - relevant for the international hub class - located in a developed region, and with the Past President of Suceava County Council – relevant for secondary international (regional) airports and lagging behind regions.

The interviews were conducted in March – May interval of 2022. In order to ensure the comparability of the information obtained similar questions were asked to the interviewees, so as to get a complex image of the studied phenomenon, but also of the collaborative relationships between the different stakeholders in the civil aviation field in Romania. Depending on the answers they offered, certain questions were accompanied by additional, complementary ones, aiming to deepen the understanding of the key issues addressed.

The results are organised and presented in Table 3 and Table 4.

Table 3. Findings from the interview with the General Director of the Bucharest Airports National Company (BANC)

Debated aspects	Results/ Interpretation	Quotes
The contribution of air transport infrastructure to the economic development of the region	The positive effect of air transport on the economy of the region is clearly highlighted, from the perspective of cargo transport, but the analogy can also be extended to the transport of passengers, who can cover longer distances much faster, traveling by the safest mode of transport used so far. As Henri Coanda International Airport of Bucharest-Otopeni is located in the capital region of Romania, it has an important contribution to its integration in international networks, with visible impact on region's economy.	"An airport is a very important driver for the region, with important influence on transport costs." "Although, at first glance, it seems more expensive, air transport of perishable products is more efficient in terms of transport time."
The direction of causality between (air) transport infrastructure and development	A well-developed infrastructure supports regional economic development.	"Although they influence each other a lot, personally, I believe that infrastructure development determines economic growth. "
The degree of development/preparedness of Romania's airport infrastructure at the present time	The Director-General's statements reiterate the need to expand the capacity to manage transport demand, by developing the infrastructure for both passengers and cargo, especially in the recent period, characterized by a post-COVID economic recovery.	"BANC's infrastructure is designed to handle 8-9 million passengers, but the level reached in 2019 was 14.5 million."
Impact on employment/tourism	Tourism may be one of the economic sectors impacted by airport development, but not necessarily directly. At the same time, for a sustainable development of tourism, the need to promote the region, to invest in types of services specific to tourism activities, to design and operationalize tourist circuits, etc.	"Indeed, the location of an airport in a region helps to develop tourism, but it is debatable. Airports are usually not 100% dedicated to tourist flights. Bucharest is an eloquent example from this point of view. It does not mean that if I have air access to that region, tourism will necessarily develop. Other efforts are also

Debated aspects	Results/ Interpretation	Quotes
	<p>must be taken into account. Business purposes-related travel must be also considered. Regarding the degree of employment, it indicates low values, at the moment, at the air transport level, mainly caused by layoffs during the pandemic. But usually, the air transport infrastructure generates a positive effect on the labour market, by creating many jobs both in the administrative sector, staff who carry out activities on the platform, in passenger information services, the outsourced, subcontracted by the aviation companies, but also the related ones, of transport, commercial or accommodation services that develop around the airport.</p>	<p>needed. I wouldn't say it's a direct proportional relationship, but rather an indirect effect."</p> <p>"From the point of view of the employed staff, the restructuring during the pandemic generated shortages in the context of the increase in activity of the last 2 months, but normally, an airport generates many jobs, through the actual transport activity, as well as in related activities. "</p>
Passenger flow management capacity	<p>Investments are clearly needed in the development and expansion of the Henri Coanda International Airport of Bucharest-Otopeni infrastructure, in order to increase the attractiveness of air transport for goods/cargo, but also for passengers. But this cannot be possible without investment in the road sector, which will facilitate the access of cargo carriers to and from the airport.</p>	<p>"The infrastructure is not ready at the moment to accommodate such a large number of passengers. This is also the reason why we have congestion, we wait too long for the luggage, etc."</p> <p>"We are also undersized in the area of processing the cargo component, although it has grown exponentially compared to the flow of passengers. Although we would have a 3-4 times greater potential, comparing ourselves with other European capitals, we only process 56,000t/year, while Budapest processes 185,000t/year, and Belgrade 350,000t/year. "</p>
Funding sources	<p>The main source of financing that can be used to start airport infrastructure development projects remains the own source. Since the aviation field is, by its nature, a field that generates massive pollution, and with a significant carbon footprint, in the absence of significant green or sustainable elements it is problematic to access non-refundable EU funds. However, such funding will be accessed for safeness, security and climate neutrality-related projects.</p>	<p>"The main sources of income are airport taxes paid by passengers, company fees for landing/parking and those obtained from auxiliary activities (parking lots, advertisements, cafes). "</p> <p>"Through the monopolistic structure of an airport, it can generate a lot of cash. In 2019, we had a turnover of 1.6 billion lei, of which we made a profit of 800 million lei."</p> <p>"The main sources of financing are our own sources, bank loans, loans offered by international financial institutions, such as the World Bank, public private partnership or the Build - operate - and transfer system. "</p>
Security level	<p>The Henri Coanda International Airport of Bucharest-Otopeni is the main air gate to Europe and not only, a fact that requires compliance and the implementation of all European norms and standards in transport, starting from take-off/landing procedures, cargo handling, up to passenger checks, their luggage and documents. From the safeness point of view, illegal acts are present, but not to the</p>	<p>"There are no security breaches at the European level that we cannot cover. Everything is done according to European standards, starting from the passenger check to the take-off, landing, storage, loading, handling procedures. In India they still fly the Boeing 737 – 300. In the EU, it is only allowed in the cargo area."</p> <p>"The security structure consists of: the transport police, the Anti-</p>

Debated aspects	Results/ Interpretation	Quotes
	<p>extent and severity of those manifested in larger airports in the world, known for violent crimes, such as the transport of drugs or armed attacks.</p>	<p>Terrorism Brigade, which ensures security at the baggage lanes, performs anti-drug and pyrotechnic checks, the Border Police (checks passports) and customs officers who register goods to be declared by passengers upon entry or exit from the country."</p>
<p>Deficiencies of the Romanian air transport system/ necessary future investments</p>	<p>The airport's shortcomings are numerous, attracting necessary investments in the order of millions of euros. These mainly aim at the expansion of Terminal 2, the increase in the number of parking spaces, the renewal of the interior infrastructure, the reorganization of the premises, the development of a business center, the purchase of scanners, vital tools for airport security, but also the development of cargo facilities, on a considerable area of 90 hectares. All these should be matched by public investment in the associated transport infrastructure to facilitate access for passengers and freight carriers.</p> <p>At the international industry level, a major change would be the time slot coordination between airports.</p>	<p>"The extension of Terminal 2 will facilitate the access of another 15 million passengers, thus doubling the current capacity." "Along with this terminal, it will also be necessary to develop the other transport branches in the area, both the railway that connects with the North Station and the highway junction, which will facilitate both passenger access and freight transport." "We do not have an intermodal node, which should include a train station, a bus station and a metro station." "Coordinating the time slots between the source and destination airports could lead to avoiding congestion and streamlining traffic." " "Increasing the number of airplane parking spaces from 40 we currently have to at least 60 to be able to handle aircraft movements." "Interior infrastructure: elevators, escalators (unchanged since 1992), baggage lanes at both terminals, both arrivals and departures (unchanged since 1998). Reorganizing the layout of passenger aisles, using spaces efficiently, creating more security filters." "We do not have a business centre where passenger meetings can be organized to avoid trips to the city centre." "We do not have enough body scanners, shoe scanners." "Regarding the value of future investments, 800 million lei are allocated for strategic objectives, excluding the expansion of Terminal 2." "90 hectares are intended for the development of cargo facilities in a build-operate and transfer regime."</p>
<p>The impact of COVID-19</p>	<p>The industry is gradually recovering, passengers are resorting more and more often to traveling by plane, which may soon lead to reaching the passenger threshold recorded in the pre-pandemic period.</p>	<p>"In 2020 the passenger flow decreased by 50%, and in 2021 we recorded 65% of the pre-pandemic flow. In April 2022 we reached 85%, which leads us to think that this year we will be able to exceed the forecast of 10.5 million passengers, maybe a little more, but with a larger distribution during the summer months, as a result of the holiday period. "</p>
<p>Postponed/suspended works</p>	<p>The lack of necessary funds during</p>	<p>"Projects were underway at the</p>

Debated aspects	Results/ Interpretation	Quotes
	the pandemic did not allow the company to take advantage of the suspension of flights, so the projects that were being implemented at that time were suspended.	time of the outbreak of the pandemic, but they were suspended due to lack of funds. The state redistributed the profit in the form of dividends to shareholders."
The relationship with the coordinating ministry	It can be noted an impartial nature of the relationship between the Henri Coanda International Airport of Bucharest-Otopeni and the coordinating ministry, which only consists in legislative support procedures in order to operationalize the projects started at the level of the subordinate company.	"The ministry that coordinates us has in its structure an air transport department, with attributions, of a rather regulatory nature, not of an operational nature. "

Table 4. Findings from the interview with the Past President of the Suceava County Council

Debated aspects	Results/ Interpretation	Quotes
The contribution of air transport infrastructure to the economic development of the region	Fundamental contribution to a sustainable development, which can compensate for the shortcomings of the road network (the highway project in the North-East region is just in the incipient implementation stage)	"The airport, aviation means development, access to new markets (revenues), it means tourism, exchanges."
The direction of causality between (air) transport infrastructure and development	The relationship can go in both directions, depending on the region's features and its current development level	"For Romania, in particular, infrastructure leads to development. However, there are also examples, at European level, where the development has attracted a need to expand the airport network, such as the tourist areas on the territory of Spain, Italy, Turkey."
The degree of development/preparedness of Romania's airport infrastructure at the present time	Sufficiently well prepared, without, however, reaching international intensity/ frequency (flights can be seen in real time via the Flyradar application). The current ratio between supply and demand can be satisfied and international openness is an opportunity for both airlines and travellers	"Prepared well enough" "We have a sufficiently well-developed air transport development, well distributed by region, so as to ensure accessibility to all areas of the country." "Even smaller, regional airports have international openness, with regular flights to various areas of Europe."
The impact on employment	The impact can be both direct, at the level of the actual activities in the aviation field, and indirectly, propagated in the related economic sectors (e.g. tourism).	"I could not say that it is an important direct impact. An airport the size of the one in Suceava has approximately 50 employees, but it leads to significant indirect creation of jobs: in transport, in the hotel industry, in restaurants or cafes, in commercial spaces inside the airport, in rental services, but also at the level of local businesses, by linking tourist circuits, connecting economic zones, human resource inputs, the future hope consisting in the development of the transport of goods intended for export. "
Passenger flow management capacity	Currently, the Romanian market still allows development, but this must be done in accordance with the level of demand. However, it does not exclude the need for modernization works for airports that have not yet benefited from	"The development of low-cost companies and, implicitly, the price accessibility for increasingly numerous categories of passengers has led to an important development. In the case of the airport in Suceava, at the time of

Debated aspects	Results/ Interpretation	Quotes
	such projects (e.g. Tulcea, Caransebeş), which would further determine a significant economic development of these areas.	signing the contract for the modernization works financing, it was estimated to have a processing capacity of 100,000 passengers annually, the number having been exceeded since the first year by 300%. A ranking made at the level of the Ministry of Transport indicates that Bucharest-Otopeni, Cluj airports (13 million passengers) were ranked first, while Iași or Suceava (both in NE region) are in the middle of the ranking with 2 million passengers in 5 years."
Funding sources	They can be external (mainly European) or national (local or governmental)	"In most cases, the works were financed from the budgets of the county councils (Bacău, Oradea, Iași), external sources being more rigid and more difficult to access."
Security level	At the time of the interview, no risks were mentioned, as Romania is not a significant transit zone for the illegal transport of narcotic substances, human trafficking or affected by immigration, but there is a possibility that the levels may have increased with the outbreak of the conflict in Ukraine.	"The geo-political situation of Ukraine generated a mobilization of NATO forces on the eastern flank, with daily patrol missions." "The crash of 2 aircrafts, the non-compliant landing of a Ukrainian air convoy in Bacău are also events that generate some panic at the level of the population. " "Many airlines have supplemented flights to foreign destinations, with a load ratio of 5 to 1 on departure to return, but it does not raise important security issues. " "We are, however, affected by the closure of the flight lanes over Ukraine."
Deficiencies of the Romanian air transport system	A vision on the future in the sustainable transport development field would be the design of strong regional airports, concentrically positioned, which can take over the transport demand from the whole region.	"An integrated vision!" "The best opportunity to develop the infrastructure is lost! What we could have done in the past with 10 million euros, we do now with 30!" "
The effects of the modernization works of the Suceava airport	The modernization of the airport was a starting point for capitalising on the tourist potential of Bucovina, and not only that.	"It is the only airport that benefited from complete reconstruction works in the last 32 years: new runways, modern beaconing, grounding systems, platforms, access roads."
Good practices that can be transferred to other projects	Suitability Teamwork Development of marketing activity	"Given the long duration of implementation and execution of the works, legislative changes occurred to which we had to adapt." " "In the past it handled an insignificant flow of passengers for any airline - 20,000 annually." "The results obtained following the implementation of the project were 3 times higher than those initially projected!"
The impact of COVID-19	The state aid offered to the autonomous authorities constituted the only opportunity for these entities to be able to continue their activity, the financial year ending well for all 12 airports in the	"Flights were cancelled, the flight schedule was restricted, and the lack of demand also led to a resizing of the offer. The government intervened with a state aid procedure in order to

Debated aspects	Results/ Interpretation	Quotes
	country.	compensate for the financial losses." "It can be said that we are close to reaching the pre-pandemic level."

4. A look ahead

The coordination of air transport infrastructure development at national scale is ensured by the Ministry of Transport and Infrastructure, which is expected to integrate it in a comprehensive approach of all modes of transportation following a EU-based perspective, on the one hand, and to offer place-based policy responses to the specific needs of each territory, on the other hand, in the latter case a close cooperation with the institutions in charge with regional development being required as well.

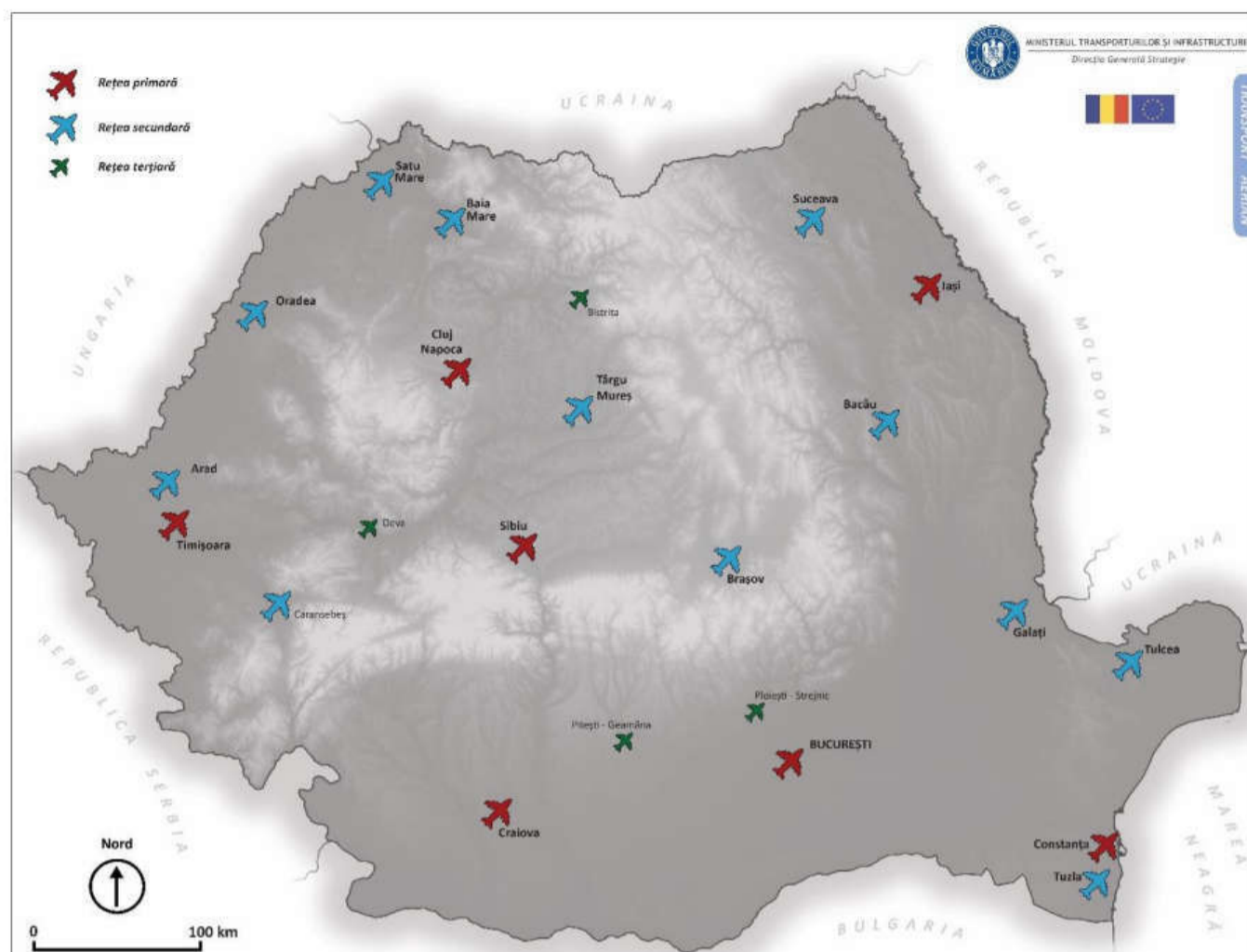
In strategy and planning-related terms the main instruments are Romania's General Transport Master Plan (GTMP) and the Investment Programme for Transport Infrastructure Development (IPTID) – 2021-2030 period.

The GTMP (MTI, 2016) is seeking to increase the national and trans-national connectivity for business environment and people as well, being driven by the efficiency, durability, flexibility and safety objectives. In terms of the associated implementation strategy, the identification of the needs reflected by transport infrastructure projects has been followed by their prioritisation, the examination of project costs in connection with the available financial resources and, last but not the least, the establishment of mechanisms for the projects' sustainable implementation. As regards the air transport infrastructure, the main objective envisages its development at the same time with the creation of new national and international linkages so as to ensure the increase of freight volume and the number of passengers transported.

The GTMP has been updated by the IPTID (MTI, 2021), as an expression of the milestones assumed by Romania within the National Recovery and Resilience Plan, in connection with the multi-annual financial framework 2021-2027 as well. Moreover, it covers the whole 2021-2030 decade, so that, building on the experience already gained by the MTI since 2016, to give an efficient course of the projects and to recover a large development gap compared to the other Member States, thus contributing to the modernization of the European connectivity and the implementation of new, sustainable technologies. It serves as a reference framework document for the most important public policies and for the institutions in charge with the accomplishment of the national transport infrastructure development objectives. The investment programme aims at a paradigm shift in the sense of "focusing Romania's political, institutional and financial efforts on a clear set of priorities, in line with national and European interests, leading at the end of the 2021-2030 decade to the creation of a national transport network that to represent the backbone of the development of the national economy" (MTI, 2021, p.1).

When it comes to the air transport the IPTID's strategic vision, which is correlated with that of the GTMP, has several pillars, as follows:

1. The structuring of airports and aerodromes overall network in Romania into a primary, secondary and tertiary network, in order to serve cargo and passenger transport performed by commercial air transport operators, general aviation air transport, as well as school flights and leisure (Figure 11).

Figure 11: The proposed structuring of the airport network in Romania according to IPTID

Source: MTI (2021, p. 216)

The primary network consists of international hub airports, principal international airports and strategic international (red colored symbol). These airports are meant to develop cargo and passenger terminals for national and international traffic and will need intermodal linkages with railway and road infrastructure.

The secondary network consists of secondary international (regional) and small regional airports (blue colored symbol). They have to develop passenger terminals for national and international traffic and may develop cargo terminals if the socio-economic analyses demonstrate their economic viability. Secondary network airports must have intermodal connections.

The tertiary network (green colored symbol) consists of aerodromes for national traffic, in particular for general aviation, school, sports and recreational activities which are not located in localities served by an operational airport.

The geographical distribution of the airports included in the above three networks lays a good foundation for the correlating with the other development objectives of the corresponding regions. At the same time, this structuring will respond to the differentiated needs identified for the bigger airports and the smaller ones depending on the area they are located in: wealthy, well-developed regions or lagging behind ones.

2. Investing in the increase of capacity to offer airport services, with emphasis on projects aiming at the infrastructure development as well as safety, security and climate neutrality.

3. Elaboration of state aid schemes for the development of passenger transport performed by Romanian air operators, as well as for the recovery of the air transport sector after the COVID-19 pandemic crisis.

4. Continuation of the EU funding-based support for the modernization of the air traffic management system by implementing the European policy built around the "Single European Sky" concept.

5. Deploying measures to underpin the climate neutrality of Romanian airports by "greening" the equipment, vehicles and airport infrastructure. In this context, the users of the aircrafts that operate on the basis of alternative fuels must easily find their place on the EU territory, including Romania, the airfields in this country being required to provide facilities for alternative fuels that are interoperable and easy to use, in accordance with the European Ecological Pact.

6. Strengthening the Henry Coanda International Airport of Bucharest-Otopeni status of international hub by creating the favourable conditions for long-haul flights to the central and western areas of North America, to Central America, Africa and Asia (including the Far East). This implies the increasing of the capacity of national operator (Tarom) to operate these destinations and the substantial improvement of the airline governance, so as to become more competitive in the international environment. For this goal to be achieved, most important investments will be oriented to this airport. The other Bucharest airport – Baneasa Airport will serve as a so-called ‘city airport’ in order to alleviate the pressure of the capital city’s numerous population, complementary to Henri Coanda airport.

In order to substantiate the successful implementation of this vision, a major concern/requirement is the integration and coordination of the air transport infrastructure development objectives with the overall provisions of the Partnership Agreement between Romania and EU and those of the Recovery and Resilience Facility, reflected in the National Recovery and Resilience Plan. A special emphasis should be placed on the correlation between the resulted Transport Operational Programme 2021-2027 and the eight Regional (Operational) Programmes, the Just Transition Operational Programme, etc., with a clear coordination of the actions supported by specific funds. For example, while the Cohesion Fund is aimed at contributing to the increase of the freight volume and number of passengers transported via substantial infrastructure projects, the European Regional Development Fund is expected to contribute to increasing the accessibility of business and local communities to air transport (i.e. good connections of the city and surrounding areas with the airport). In this way the expected synergies between air transport development and local and regional development can be ensured.

5. Concluding remarks

As revealed by our inquiry, there is a sustained interest in the literature devoted to the air transport infrastructure for the exploration of its relationship with regional development from various perspectives, such as: intensity and causality direction, direct and indirect effects generated, implications for regional disparities, required policy measures, etc.

The resulted findings suggest that air transport can have an important contribution to regional development provided it is integrated in a comprehensive strategy which combines the EU and national vision with the place-based approaches so as to create synergetic relationships between this sector and the related ones, driven by a rational combination between short, mid a long term sustainability goals and resilience-based policy measures and actions.

Depending on regions’ development level and differentiated needs, tailored responses in terms of air transport infrastructure should be provided. Thus, for the less developed regions, ensuring a proper infrastructure is a pre-requisite for attracting investments in sectors that can support the diminishing of development gaps, while in the developed regions additional investments in air transport infrastructure are required to keep the pace with the intense economic and social development. As such, the development perspective in the former category of regions has to be based on the messages conveyed by the supply-driven growth models, whereas the latter have to be guided by the perspective outlined by the demand-driven models. In the case of Romania, the North-East and Bucharest-Ilfov regions are relevant examples for the two cases. In a broader view, the quite balanced geographical distribution of the airport network, with a good representation of this mode of transportation even in the less developed regions, contributes to creating favourable conditions for a proper support of air transport to regional development.

Acknowledgement. Daniela-Luminita Constantin acknowledges the funding from the EU’s NextGenerationEU instrument through the National Recovery and Resilience Plan of Romania - Pillar III-C9-I8, managed by the Ministry of Research, Innovation and Digitization, within the project entitled „*Place-based Economic Policy in EU’s Periphery – fundamental research in collaborative development and local resilience. Projections for Romania and Moldova (PEPER)*”, contract no. 760045/23.05.2023, code CF 275/30.11.2022.

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