

**ARTÍCULOS, NOTAS CRÍTICAS, COMENTARIOS, RECENSIONES,  
VALORACIONES TÉCNICAS, HOMENAJES**

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**QUALITATIVE ANALYSIS OF THE AVIATION MARKET IN POLAND  
DURING THE PANDEMIC. RESULTS OF ANALYZED SCENARIOS  
FOR REPRESENTATIVE ENTITIES OF THE AVIATION SECTOR IN  
POLAND**

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**ABSTRACT:** The article analyzes scenarios for representative entities of the aviation sector in Poland of the impact of COVID-19 on the aviation market, considering the expected changes in the demand for employees with various competence groups. The analysis was made by conducting quantitative and qualitative research in the aviation sector using the desk research method and surveying the opinions of selected entities, including a review of public registers, in particular CEiDG, KRS, Database of Development Services, Central Statistical Office, data of the Civil Aviation Authority, POL-on, reports and registers concerning the aviation industry, as well as statistical research of a representative group of entities through questionnaires and formalized interviews. The conducted research made it possible to identify the key factors influencing the aviation industry. 2019 was a record year in terms of the number of passengers served at Polish airports - over 49 million passengers. As a result of the pandemic, there was a drastic decrease in air transport - for regular traffic,

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the decrease in 2020 was 69.5%, and for charter flights - 77.3%. Air cargo was basically unaffected. Due to the COVID-19 pandemic, the global aviation sector was experiencing the greatest crisis in its history. Factors such as the economic slowdown and the coronavirus pandemic have influenced employers' HR policy. Not only did they withhold the decision to expand the staff, but also significantly reduced it. In the low-impact variant of the pandemic on the operations of the aviation industry, and thus it can be said to be optimistic, the return to international passenger traffic comparable to that in 2019 (before the pandemic) may take place in 2024, which will affect on the shape of the aviation industry also in this part of Europe. The analysis of the impact of COVID-19 was made within polish representative entities of aviation sector. The surveys in other countries may differ. Article presents original set of data from research. The obtained research results can be used by aviation managers willing to implement or develop risk management systems in their organizations in case of future pandemic or similar crises.

**KEY WORDS:** Aviation, Pandemic, Employee, The Impact of the COVID 19, Risk management, Safety

**ABSTRAKT:** W artykule przeanalizowano scenariusze dla reprezentatywnych podmiotów sektora lotniczego w Polsce wpływu COVID-19 na rynek lotniczy z uwzględnieniem przewidywanych zmian zapotrzebowania na pracowników o różnych grupach kompetencyjnych. Analizy dokonano poprzez przeprowadzenie badań ilościowych i jakościowych w sektorze lotniczym metodą desk research oraz badanie opinii wybranych podmiotów, w tym przegląd rejestrów publicznych, w szczególności CEiDG, KRS, Baza Usług Rozwojowych, GUS, dane Urzędu Lotnictwa Cywilnego, POL-on, raportów i rejestrów dotyczących branży lotniczej, a także badań statystycznych reprezentatywnej grupy podmiotów poprzez ankiety i wywiady sformalizowane. Przeprowadzone badania pozwoliły zidentyfikować kluczowe czynniki wpływające na branżę lotniczą. Rok 2019 był rekordowy pod względem liczby pasażerów obsłużonych na polskich lotniskach – ponad 49 mln pasażerów. W wyniku pandemii nastąpił drastyczny spadek przewozów lotniczych – dla ruchu regularnego spadek w 2020 roku wyniósł 69,5%, a dla lotów czarterowych – 77,3%. Przewozy cargo w zasadzie nie zmniejszyły się w okresie pandemii, w szczytowym okresie pandemii nawet wzrosły. W związku z pandemią COVID-19 światowy sektor lotniczy przeżywał największy kryzys w swojej historii. Czynniki takie jak spowolnienie gospodarcze i pandemia koronawirusa wpłynęły na politykę kadrową pracodawców. Nie tylko wstrzymali się z decyzją o powiększeniu personelu, ale też znacznie go ograniczyli. W małoinwazyjnym wariacie pandemii na działalność branży lotniczej, a więc można go uznać za optymistyczny, powrót do międzynarodowego ruchu pasażerskiego porównywalny z tym z 2019 r. (przed pandemią) może nastąpić w 2024 r., co wpłynie na kształt branży lotniczej również w tej części Europy. Analiza wpływu COVID-19 została przeprowadzona w polskich reprezentatywnych podmiotach sektora lotniczego. Ankiety w innych krajach mogą się różnić. Artykuł przedstawia oryginalny zestaw danych z badań. Uzyskane wyniki badań mogą być wykorzystane przez menedżerów lotniczych chcących wdrożyć lub rozwinąć systemy zarządzania ryzykiem w swoich organizacjach na wypadek przyszłej pandemii lub podobnych kryzysów.

**SŁOWA KLUCZOWE:** Lotnictwo, Pandemia, Pracownik, Wpływ COVID 19, Zarządzanie ryzykiem, Bezpieczeństwo.

## 1. *Introduction*

As already mentioned, in 2021 the project of the Sectoral Competence Council of the aerospace industry, operating under the auspices of the Polish Agency for Enterprise Development, was carried out under the Knowledge Education Development Operational Program, action 2.12-Increasing knowledge about qualification and professional needs from the European Social Fund. The project concerned, inter alia, analyzing scenarios for representative entities of the aviation sector in Poland of the impact of COVID-19 on the aviation market, taking into account the expected changes in the demand for employees with various competence groups.

The aim of the study was to assess the current state of the aviation sector and its environment, as well as to identify threats to the aviation industry in Poland, which may occur depending on the development variant of the COVID-19 epidemic, and to determine the likely scenarios of adapting the sector to these threats, taking into account changes in the demand for competences employees.

On the other hand, the following are the specific objectives:

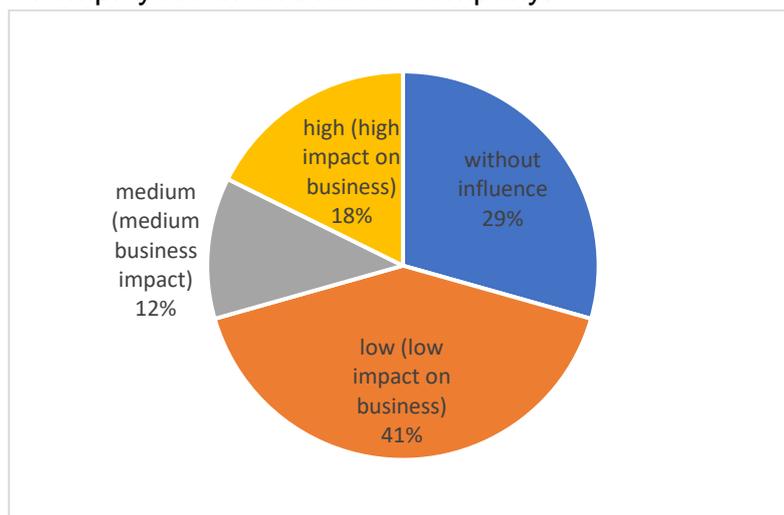
- Determination of the anticipated changes taking place in the aviation industry depending on the variants of the epidemic development (not less than the variants: low, medium and high impact) and possible actions of the State as part of crisis management, in particular identifying changes in the areas of operations that will be made by the sector enterprises;
- Building forecasts of employers' demand for changing employee competences and identifying needs in the field of education and training of staff for the aviation industry, including changes to the existing education / training programs and recruitment limits.
- In terms of identifying entities in the aviation industry in Poland, the tasks were carried out in two forms:
  - In the first form, quantitative and qualitative research in the aviation sector was carried out using the "desk research" method and the opinion polls of selected entities, including the analysis of public registers, in particular CEiDG, KRS, Baza Usług Rozwojowych, GUS, ULC data, POL-on;
  - In the second form, statistical surveys of a selected group of entities were conducted through formalized surveys and interviews, as well as an analysis of available reports and registers relating to the aviation industry, including the SUDOP database. Two electronic questionnaires were created for this study.
- This article contains only selected elements of the prepared report. The entire analytical material is available on the website of the Sectoral Competence Council of the Aero-space Industry. The research results for individual groups of entities in the aviation sector in Poland.

## 2. *Research Results and Discussion* *Airlines in Poland- survey results*

The impact of the COVID-19 pandemic on the aviation sector and the carrier development prospects that arise in connection with it has been included in four scenarios: base, low, medium and high in time perspectives from 2019, i.e. the beginning of the pandemic for the following years 2024, 2025 and 2029. Taking into account the problems of the sector and its development, the importance of the competences of employees is important, who, due to their potential related to experience and specialist training, are an extremely important factor influencing the value of aviation entities. In airlines, both employees performing aviation and administrative tasks must be well trained to properly and safely perform their duties. It is associated with large financial outlays for the entrepreneur. The situation with the Covid 19 pandemic caused serious problems in the implementation of air connections, which directly translated into dismissal of employees or their suspension in duties, and thus in wages.

The obtained competency matrix shows that compared to the baseline scenario, about 41% of aviation companies showed a low coronavirus impact rate on employee competences, in 29% this occupational group had no impact on the pandemic, but in 18% this measure was defined as high, and 12% % as average.

Figure 1. The impact of the COVID-19 pandemic on the need to change the competences of employees in an aviation company.



Source: own elaboration.

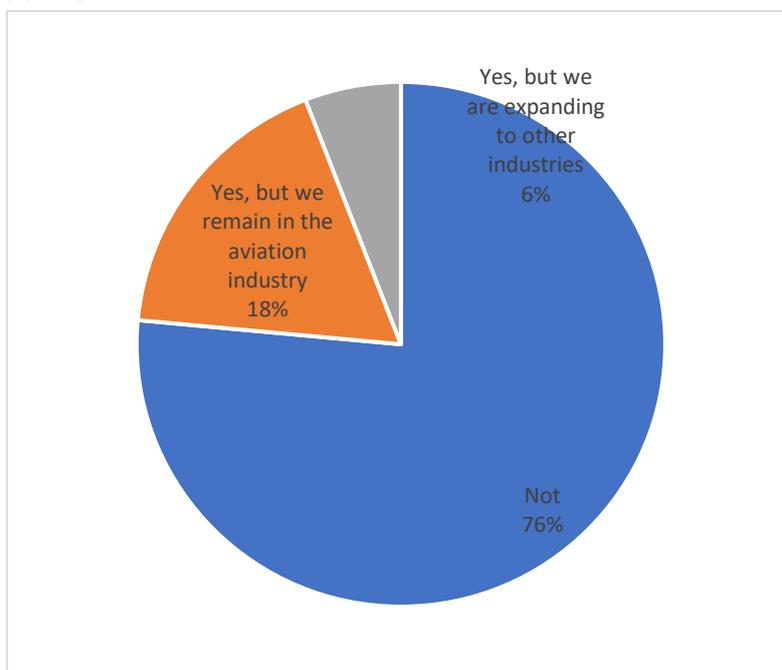
Nevertheless, workers' return to the industry is partly dependent on the gradual lifting of restrictions, which is related to the increasing number of vaccinated citizens and their obtaining a Covid passport. Starting from the baseline scenario, where in 2019 there were 0% vaccinated people but also no pandemic, further forecasts indicate that a low negative impact of the virus on aviation activities will be obtained assuming that over 70% of citizens will be vaccinated, the average oscillates between 40% and 60%, while the high im-pact was assuming the ratio below 40%. With vaccinated citizens above 70%, there is a chance to safely restore the workforce to work, prepare the workplace for future challenges and secure resilient and solid supply chains in a short time, even in 2024.

The process of returning to the situation from before 2020 depends on many factors, both political and economic, as well as the situation related to the inhibition

of the virus development. Restoring employees from the aviation industry to work is connected with great trust in the carrier, as well as the real situation of the aviation market. On the other hand, recruiting new employees involves additional costs for airlines due to the long-term training required for licenses and certificates necessary to perform safe air operations.

The fact that in 76% of companies the pandemic did not change the profile of their operations, which increases their credibility, is positive, while in 18%, which results from surveys among airlines, it slightly changed the company's profile, which means that they still remain in the industry aviation.

Figure 2. Change in the profile of an airline's activity in connection with the Covid 19 pandemic.



Source: own elaboration.

Unfortunately, the impact of a pandemic situation on the incidence of morbidity in citizens is unpredictable. It is assumed that various mutations of viruses increase in the autumn period, therefore the percentage of vaccinated citizens is of great importance. The summer season causes a decline in disease rates, which translates into a low impact of Covid on aviation activities. If the incidence persists in the autumn, the average scenario can be forecast, but unfortunately, the high degree of virus impact on aviation development will occur with an increase in the incidence.

A very important factor influencing the development of the aviation market during the pandemic is public aid, as well as the interest of citizens in air travel. The need to combat the negative social and economic effects of the coronavirus pandemic has not been sufficiently met by the State, despite the fact that the industry shield for companies subject to the restrictions resulting from the third wave of the pandemic includes exemption from social security contributions, a standstill benefit for natural persons running a business, a subsidy of up to 5,000. PLN for

micro and small entrepreneurs to cover the running costs of running a business, as well as an additional payment of PLN 2,000 PLN to the salaries of employees.

Stabilizing the situation of entrepreneurs, removing at least some of the risk of business failure that is growing in connection with the pandemic is one of the most publicized goals of the State, but the aviation industry has been severely affected by economic effects due to global policy restrictions, unpredictable in time and place.

Only LOT Polish Airlines, as it plays a key role for the network of connections and the Polish economy, received support of around EUR 650 million to fight the effects of the current crisis, approved by the European Commission. The aid measures include a subsidized loan of EUR 400 million (approximately PLN 1.8 billion) and a capital injection of approximately EUR 250 million (approximately PLN 1.1 billion). The measures were approved under the Temporary State Aid Framework.

The aviation sector also took advantage of the facilities related to the use of new technologies and the Internet to perform basic tasks such as audits, recertifications and transfer audits, certifications of other management systems: for example ISO 45001, occupational health and safety management - ISO 14001, environmental management - ISO 50001, energy management-ISO / IEC 27001, information security management and others, using remote audits. During the COVID-19 crisis, problems arose with the instability of global air supply chains, where failure of one link could potentially cause widespread disruption. Pandemic experiences have shown how to mitigate the spread of disease and absorb delays in production and global supply.

### *3. Airports in Poland- survey results*

All airports in Poland and around the world have been forced to introduce procedures aimed at counteracting the COVID-19 pandemic. This is very important as airports with millions of passengers per year are particularly prone to contamination within their complexes. The introduced procedures are designed not only to protect the life and health of passengers, but above all to take care of the safety of ground and on-board personnel working on site. Infecting one of the employees or crew members could completely paralyze and disable the airport from use, which would result in multi-million financial losses for both the airport itself and the airlines.

The COVID-19 epidemic has a disastrous impact on airport revenues, the development of which consists of many factors such as the availability of adequate infrastructure, manpower, etc. Air traffic is the driving force of the airport industry. Airports generate over 95% of all revenues from two operational sources: aviation and non-aeronautical services.

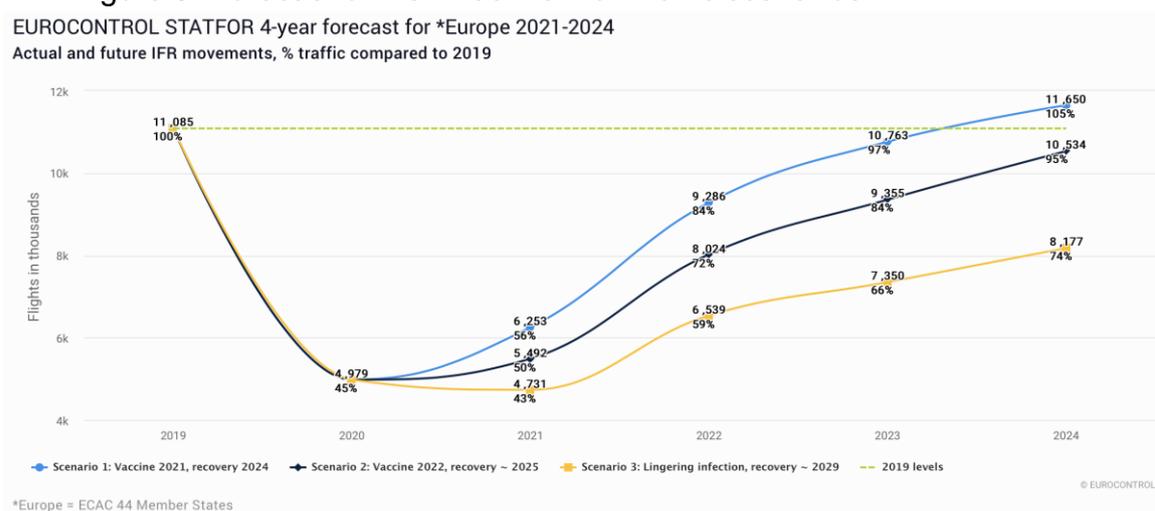
Most of the revenues from aviation activities are a direct function of traffic and consist of passenger charges levied on passengers and aviation charges levied on aircraft operators. As traffic declines, the ability of airports to charge these charges decreases proportionally. The impact of the COVID-19 crisis on airport revenues

worldwide translated into a loss of more than \$ 94 billion in revenues by the end of 2021, halving airport revenue expectations (-50.0%) from forecast baseline (-48.1% compared to the 2019 level). Pre-liminary data show that all airports in Poland did not generate revenues in the amount of about PLN 400 million, while in large Polish regional airports the loss in sales, depending on the port, may be at the level of PLN 30 to 40 million.

In order to compensate for the lost revenues as a result of the restrictions, the Government, with the consent of the European Commission, allocated a total of PLN 142 million to help Polish airports. The money transferred allowed to cover about 40 percent. losses, but three airports - Lublin, Olsztyn and Łódź - did not receive this aid.

Air traffic activity increased over the summer, but the question is what will come after it? The main problem is the lack of an adequate number of vaccinated populations. Unfortunately, in some countries, including Poland, immunization is not progressing as fast as might be expected. There is still a long way to go to the herd immunity that is to be expected after immunization above 70%. population. Therefore, questions arise about the fourth, fifth and subsequent waves of the pandemic, which can significantly affect air travel restrictions. The return to the level of air traffic from 2019 depends on the number of vaccinations performed and can be estimated in several variants. If vaccinations exceed 70% of the population, we will return to the base level in 2024. If the vaccination coverage will be at the level of 40-60%, air traffic may return in 2025, and if it is below 40%, the earliest forecasts for the return to the original figures will be in 2029. Similar variants are presented by Eurocontrol. In the most optimistic scenario, traffic is forecast to return to 2019 levels by 2024. However, in the second scenario (most likely), 2024 traffic would only be 92% of 2019. In the third scenario, traffic in 2024 would be 75% of the 2019 figure and would not reach the 2019 figure until 2029.

Figure 3. Forecast of the three main air traffic scenarios.



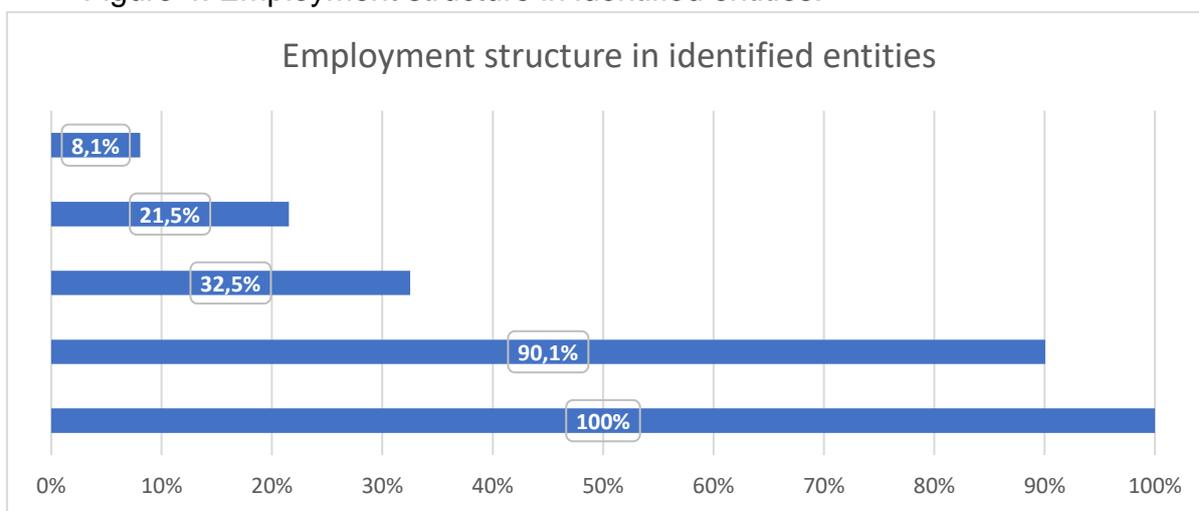
Source: Eurocontrol.

The issue of morbidity is also uncertain, it is assumed that the new Covid 19 variants should decrease with the currently performed vaccinations, then the decrease rates for the estimated variant will be low. Unfortunately, these are only optimistic assumptions, because subsequent variants assume that air travel may herald various mutations of the virus. The average scenario will be that the morbidity level remains or will increase dramatically, which will pose a high risk to the functioning of air traffic, and thus airports.

Compared to the base period of 2019, the number of passengers transported at Polish airports is estimated depending on the volume of air traffic. The challenge is to return to the number of 49 million passengers handled in 2019. Unfortunately, the number of passengers transported will depend on the restrictions and the development of the virus, and ultimately on the interest of passengers in air travel. The data provided by the Association of Regional Airports (ZRPL) indicate that in 2020 all airports in the country served a total of approximately 14.6 million passengers, which indicates a decrease by nearly 34.4 million compared to the base variant. What will the next years look like? Will airports have enough to make a living?

The employment structure at the airports, which is presented in the chart below, should also be considered.

Figure 4. Employment structure in identified entities.



Source: own elaboration.

The presented figure shows that, on average, Polish commercial aviation companies employ:

- about 8% of employees in the age group under 25;
- about 21% of employees in the age group over 50;
- about 32% of women;
- about 90% of employees work full-time under an employment contract;
- about 10% of employees have other forms of employment.

Bearing in mind the indicated data, one should refer to the base period and mention the competences and their changes during the pandemic. Many people had

to switch to remote working mode during the period of high impact of the pandemic on airport work. On the other hand, people who perform manual work related to servicing cruises must take into account the risk of dismissal or a change in the employment profile.

#### *4. Handling and aviation companies- survey results*

In the conducted study, the inventoried enterprises in the "Handling enterprise (ground handling of carriers in the port)" sector all described the impact of the pandemic on the business as high.

According to the surveyed companies, both the legal constraints on the functioning of organizations in the sector during the pandemic and financial constraints such as a drop in revenues, deterioration of liquidity, loss or lower profit had a high impact.

In addition, a high impact on the activities of enterprises was the limitation of social contact consisting in the need to keep the distance between employees (reduction of staffing), customers, decisions on the complete temporary closure of activities, the possibility of performing work related to business travel, suspension of the possibility of movement or the rigors of quarantine, no possibility of organization of mass events (sports competitions, fairs and exhibitions, conferences, etc.).

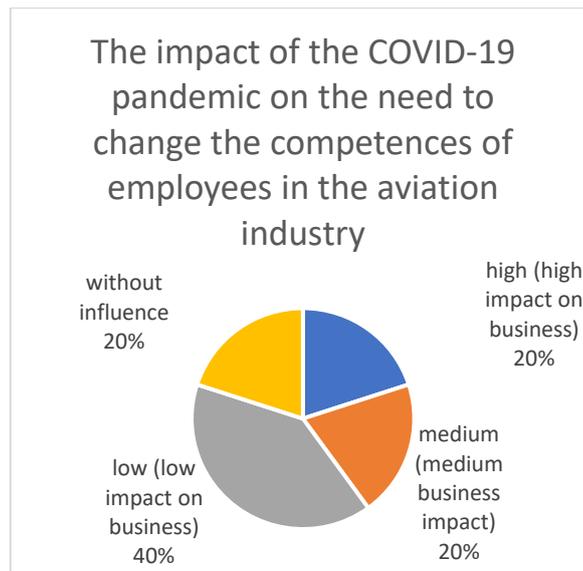
In the "Handling company (ground handling of carriers in the port)" sector, the COVID-19 pandemic has a significant impact on the need to change employee competencies. After the drastic decline in the number of operations and a significant reduction in employment after the first year of COVID-19, workers had to acquire new skills and competences to be more universal. The needs in enterprises regarding the education and training of personnel have increased. It is also necessary to maintain the qualifications and validity of training, even in the absence of air operations. According to the surveyed companies, the ability to react and adapt to changes will be critical.

In the aviation industry, the pandemic is just one of the problems. It is absolutely necessary to look at the wider economic situation that has emerged as a result of the pan-demic. As it turns out, a large number of companies depend on supplies from Asia, more-over, the loss of production capacity in Europe is also very worrying. Investments in Polish companies that will create Polish products should be considered, which will create a great opportunity for the development of the Polish aviation industry (as long as there are still staff who can create new products, and not just mass-produce according to someone else's instructions).

60% of aerospace companies rated the impact of the pandemic and regulatory re-strictions on their business as medium, and 40% as high.

80% of the surveyed entrepreneurs rated any financial constraints as high impact (loss of revenues, deterioration in liquidity, loss or lower profit) during the pandemic and 20% as medium.

Figure 5. The impact of the COVID-19 pandemic on the need to change the competences of employees in the aviation industry.



Source: own elaboration.

### 5. *The aviation production sector- survey results*

The aviation industry is a source of various types of economic activity, job creation directly related to the handling of passengers and airplanes of airlines, airports and air navigation (ANSP). The aviation sector also directly enables highly skilled work in the manufacturing sector - the production of aircraft, engines and other important technologies, in particular for the piloting of aircraft, navigation devices, diagnostic and repair devices and passenger service systems (e.g. ticket sales, airport service). travelers and goods).

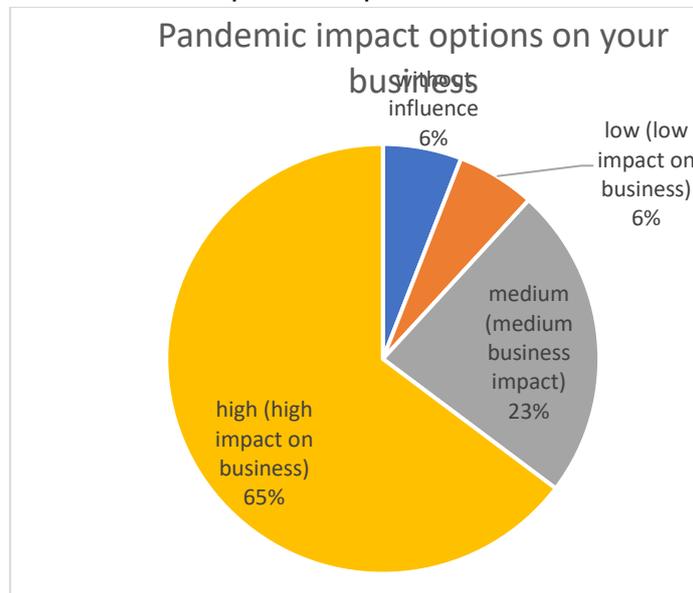
1,478 airlines worldwide carried a total of 4.5 billion passengers to 3,780 commercial airports worldwide in 2019 and carried 61 million tons of cargo. The related industry generated 11.3 million direct jobs and added \$ 961.3 billion to global gross domestic product (GDP). To put this into context, this is equivalent to 1.1% of global GDP, which is close to the primary metal industry (\$ 968 billion) 63. The air transport industry directly provided an estimated 11.3 million jobs worldwide, defining the employment structure: airport service 6.17 million jobs (55% total), including 648,000 operational jobs, incl. airport management, maintenance, air and service operations and passenger service support, e.g. shops, restaurants, hotels, government agencies), which gave an additional 5.5 million jobs, or 49% of the total. The air transport sector has created 3.6 million jobs (32% of the total) by airlines (e.g. flight crew, check-in staff, maintenance, reservations and headquarters staff). In contrast, the aviation manufacturing sector has 1.3 million jobs (11.6%) for the production of aircraft and related parts such as engines, electronic systems and components. Air navigation service providers employed an additional 237,000 people (2%).

Air transport (passenger and cargo) has a significant impact on the functioning of the aviation production sector. They generate the needs for the construction of new ships, production of spare parts, maintenance, servicing and repair of used aircraft and their disposal. The COVID-19 pandemic has forced the governments of

many countries to introduce restrictions that minimize the effects and reduce the number of cases. One of the key such limitations, which had a significant impact on the continuity of the sector's operation, was the limitation of social contacts (personal contacts). Restrictions on personal contacts forced passenger carriers to drastically reduce or even completely suspend flights, which resulted in other sectors of the sector, including reduction in the number of air operations, passenger checks, ongoing maintenance and servicing of ships as well as the need for spare parts and new aircraft. Production plants struggled not only with a drastic limitation of new and already implemented orders, but also had to verify the approach to work organization, including reducing personal contacts or increasing sickness absence, isolation and quarantine.

The research shows that the COVID-19 pandemic had: a high impact on the company's operations - 65%, and an average impact on 23% of enterprises. 6% of the respondents showed a low and no impact.

Figure 6. Variants of the impact of a pandemic on the aviation industry.

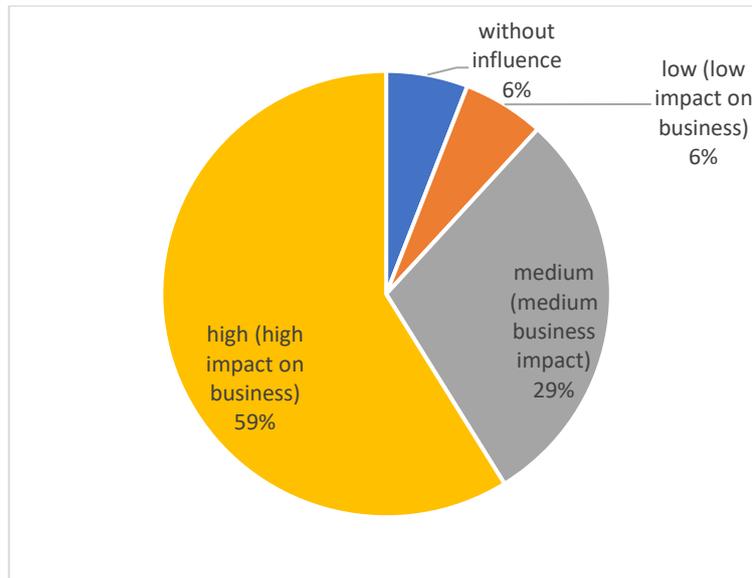


Source: own elaboration.

Legal restrictions on the operation of production companies had a significant impact on the aviation industry. In total, 59% of the respondents indicated that legal restrictions had a high impact on the functioning of the enterprise, 29% indicated a medium impact. These restrictions did not have any impact on 12% of respondents.

Legal limitations, in particular limitations of social contact consisting in keeping the distance between employees (reduction of staffing), limitations in customer service, complete ban on activity) also had a decisive impact on the functioning of the production industry. 59% of respondents indicated that the impact of restrictions on social contacts was high, 29% - medium, low and no impact at 6% each.

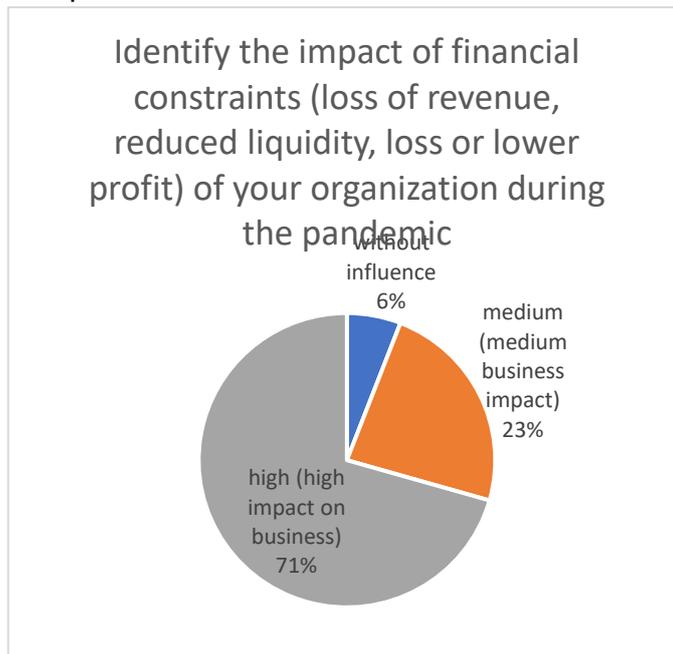
Figure 7. The impact of legal restrictions - quarantine and social contact restrictions on the activities of enterprises.



Source: own elaboration.

Legal restrictions also affected the finances of enterprises (decrease in revenues, deterioration of financial liquidity, increase in loss or decrease in profit). 71% of respondents indicated that financial constraints had a high impact on the conducted activity, and to a moderate degree of impact on 23% of respondents.

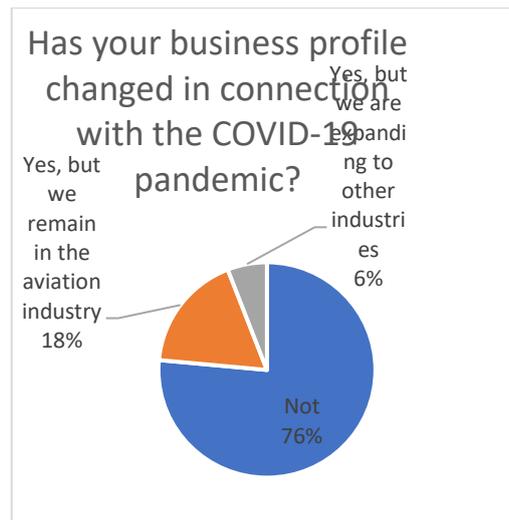
Figure 8. The impact of financial constraints on the activities of enterprises.



Source: own elaboration.

It should be emphasized, however, that despite the significant impact of the re-strictions related to the COVID-19 pandemic on production plants, in the majority of respondents (76%) they did not change the profile of their activity. 18% indicated a change in the profile, but they remain in the sector, 6% of the respondents expanded their business profile.

Figure 9. Change in the business profile of enterprises due to the pandemic.



Source: own elaboration.

In the low-optimistic scenario (minimal impact of the pandemic on the industry), the population of people vaccinated in the aviation industry (production, suppliers, investments) will increase, the number of cases will decrease, social contacts will be withdrawn, and the number of transports and air operations will increase. However, the number of passenger transports will not return to the baseline level (from 2019). Aviation companies will close or close the year 2020 with a loss without the possibility of making up for it, and the introduced limitations of social contacts will increase the interest in remote work, thus reducing the interest in business travel. Due to losses, many industries related to the aviation sector will seek to increase revenues and meet current needs, thus investments will be postponed - in the perspective of 2 years.

It was assumed that employees of production plants in the aviation sector would be vaccinated. Vaccination of employees will significantly reduce the transmission of COVID-19 infections, and the possible sickness absence will be shorter than in the case of the pre-vaccination period and / or unvaccinated people. This state of affairs will allow for a re-turn to the lifting of limitations of social contacts, which will bring the production back to the baseline state (from 2019). It is assumed that production plants will start production and return to the baseline production state, continuing the orders already in progress. In this scenario, there will be no need for a significant reduction in employment (the first group layoffs are recorded in September 2020).

Aviation plants in Poland are strongly dependent on the state of the global air transport market - the more air operations, the greater the interest in new aircraft, spare parts for them and other elements of aircraft maintenance systems (diagnostic tools, electronic systems, air navigation maintenance and infrastructure). aviation, including passenger service). Significant financial losses of related industries will result in a reduction - postponing - the number of orders for new aircraft and the demand for parts and maintenance services for those already in use.

An important element in the production of aviation plants in Poland is to maintain the supply chain of raw materials necessary to maintain production.

Constraints in a pan-demic may have caused suppliers to have short or long-lasting interruptions in the supply of raw materials, services or components, and accumulated stocks may have been depleted. Returning to the normal mode of production and the demand for raw materials will increase the prices of raw materials and services (e.g. components, transport, energy, etc.). A high level of vaccinated supplier populations will reduce the shortage of key personnel. The new model - remote work in the non-production sphere - will also reduce the susceptibility to legal restrictions.

Investments in the manufacturing industry of the aviation sector in Poland are strongly related to the global situation of the sector. Drastic restrictions in air traffic significantly influenced the economic situation of customers of production plants, limiting their sales. This situation applies to investing in new production technologies, product development or building new production and research plants.

Media signals indicate a reduction in employment in production plants (approx. 3,000 employees) - however, there is no data on the qualifications covered by the reduction, it is not known whether the reduction is related to the production chain or applies to employees of supporting (administrative) processes - the survey also does not have given answers in this regard.

It is assumed that in this scenario there will be no significant changes in the demand for new competences in the manufacturing industry of the aviation sector. The 2020 employment restrictions may remain or return to baseline. However, the development of the business or the emergence of new competencies will be limited. Public procurement may be an important stimulating factor, e.g. in the field of defense sector orders and the implementation of offset programs - unfortunately, despite the announcement of the purchase of combat aircraft and tanks for the Polish army, there is no question of an offset program, and thus acquiring new competences employees.

In the medium-skeptical scenario (the average impact of the pandemic on the industry), the population vaccinated in the aerospace industry (manufacturing, suppliers, investments) will increase but slightly, the number of cases will not decrease sharply, and the likelihood of a new virus strain and getting sick will be high. The seasonality of morbidity and the lack of high vaccination coverage levels may result in the introduction of periodic legal restrictions in the functioning of the aviation sector - restrictions on social contacts - incl. suspension of passenger services, restrictions on the check-in of passengers. Legal restrictions will be introduced seasonally, and the stability of air operations will be disturbed and difficult to plan. Investments will be limited, the demand for the industry's products will decrease, the costs of production and maintenance of key competences will be on the verge of profitability. The labor market situation in the aviation production industry may be comparable to the labor market situation in the catering sector at the turn of the second and third quarter of 2021 - lack of qualified staff, resulting from the need to change the industry, with the fact that the period of work outside the industry will allow you to return to the previously performed profession. The aviation production industry of large aircraft and unmanned aerial vehicles (UAV)

will not be able to provide conditions for maintaining social distancing and ensuring proper (profitable) passenger flow. In a crisis situation, it seems that the way to maintain passenger transport in the times of limited social contacts is the use of small aircraft. In this respect, there may be an increase in the production of this type of products as well as the demand for competences in this area.

The aviation production industry will limit production - reducing the amount of demand, incl. for new aircraft and spare parts. Failure to properly vaccinate production plant employees will result in sickness absences (isolation, quarantine, death) of key personnel.

The reduction of orders will also reduce the demand for skilled workers in the industry and its suppliers. Increasing the global deficit of orders will force global manufacturers to reduce operating costs, including consolidation of production points (liquidation of deficit plants). This situation will lead to temporary group layoffs and the need to retrain the dismissed staff. This is a large social cost, but most of all it requires the existence of a need for specific qualifications - the absorption of retrained employees by other industries.

Suppliers of raw materials and services will also struggle with the availability of key personnel as a result of their low vaccination coverage. Difficulties in handling orders (de-creasing demand for raw materials and services) may worsen the financial situation and maintain key competences in a crisis. Component suppliers may take into account the needs of other industries, but without the emergence of new customers, their economic situation may deteriorate. In addition, in the case of relocation of production - consolidation of production points - it can also cause problems for suppliers. Service providers - subcontractors, incl. mechanical processing plants for the aerospace industry.

It is assumed that in this scenario, new investments will be implemented only when necessary. Investments in progress will be assessed by investors for profitability, and the continuing crisis may result in a high probability of freezing or withdrawal. Financing entities, due to the increased investment risk, will increase the costs of servicing financing lines, which will reduce the credit capacity of investors. In the case of investments necessary for the consolidation of production points, there is a likelihood of relocating the place of these investments - shifting to plants similar to the interests of the owners of the production plants' capital. Investments in unmanned aerial vehicles (UAVs) will not change the situation of the industry much. The current UAV technology prevents passenger transport, nevertheless, this technology will not prevent passenger transport while maintaining a social distance. Investments in small aircrafts can be a way to make flights profitable in this scenario and keeping epidemic restrictions in passenger traffic.

In the high-pessimistic scenario (high impact of the pandemic on the industry), the population vaccinated in the aviation industry (production, suppliers, investments) will not increase, the number of cases will increase, and the likelihood of a new virus strain and getting sick will be very high. Frequent increase in incidence and the lack of a high level of vaccination coverage may result in frequent introduction and long-term legal re-strictions in the functioning of enterprises in

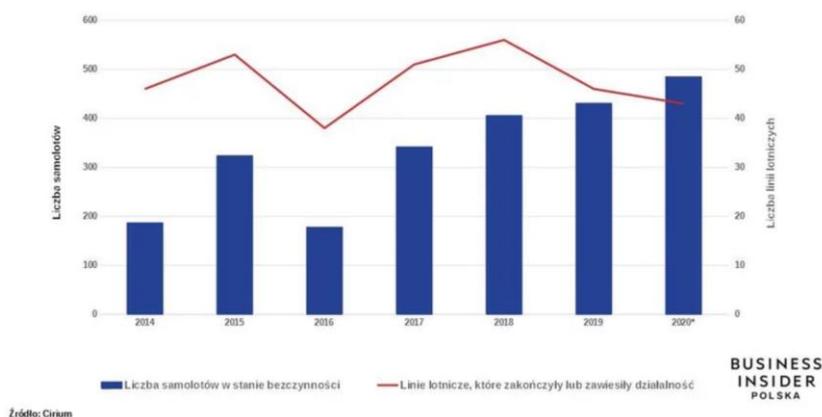
general - restrictions on social contact - incl. suspension of passenger services, restrictions on the check-in of passengers, restrictions in movement. Legal restrictions will be introduced seasonally, and the stability of air operations will be disturbed and difficult to plan. Investments will be limited, the demand for industry products will decrease significantly, and the costs of production and maintenance of key competences will be unprofitable. The difficult economic situation on the labor market in the aviation production industry may lead to a shortage of qualified staff, resulting from the need to change the industry, but the prolonged crisis and the period of work of specialists outside the industry will make it impossible to return to the previously performed profession. The aviation production industry of large aircraft and unmanned aerial vehicles (UAV) will not be able to provide conditions for maintaining social distancing and ensuring proper (profitable) passenger flow. In a situation of deepening crisis, the way to maintain passenger transport in the times of limitations in social contacts is the use of small aircraft. In this respect, there may be an increase in the production of this type of products as well as the demand for competences in this area and investments.

## 6. Conclusion.

Due to the COVID-19 pandemic, the global aviation sector is experiencing the greatest crisis in its history. The restriction of passenger air traffic, resulting from the introduced restrictions, meant that many airlines faced the threat of bankruptcy. In these circumstances, airlines from Central Europe would not be able to continue operating without government support. According to the IATA (International Air Transport Association), in the low-impact variant of the pandemic on the operations of the aviation industry, and thus it can be said to be optimistic, the return to international passenger traffic comparable to that in 2019 (before the pandemic) may take place in 2024, which will affect on the shape of the aviation industry also in this part of Europe.

The COVID-19 pandemic caused great perturbations in the aviation market around the world, causing numerous bankruptcies (in 2020 at least 43 airlines closed or suspended operations).

Figure 10. Number of airlines that went bankrupt in 2014-2020.



Source: Businessinsider.com.pl

The financial health of the aviation industry in Europe, as in other parts of the world, is relatively difficult. Without the financial support of governments, these types of companies would, in most cases, have to go bankrupt. In the summer of 2020, at a time when airlines usually generate significant financial revenues, many companies did not manage to raise funds for the weaker fall and winter season. It is very likely that the aviation industry will need further support in the coming months.

Considering the estimates of international organizations, the following years will also be extremely demanding, which is related to, inter alia, with a change in the model of the economy and the tourism sector. It is anticipated that many enterprises will, to a greater extent than before, conduct talks with foreign partners electronically, thus reducing the demand for transport fuels. In addition, changes can also be noticed in the tourism industry, which for years has played an important role in the economies of individual countries.

Many people hope that when the restrictions are lifted, air traffic will return to normal. However, the key factor will be the attitude of people to this type of travel, which has changed recently. According to IATA research, a large group of people can be distinguished who, even if the restrictions are lifted, will not decide to buy air tickets quickly, thus extending the period of reconstruction of the aviation market.

In Poland, at the beginning of February 2021, the regulation of the Council of Ministers on aid for entities involved in service activities supporting air transport entered into force. The amount allocated for their support is PLN 69.15 million.

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