MAZOVIA Regional Studies
DOI: 10.21858/msr.se.2025.02
pp. 37–51

Aviation clusters and state and regional security

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ABSTRACT

The aviation industry is looking for innovative solutions to optimise costs and exchange knowledge. One of such solutions are aviation clusters. The aim of the article is to demonstrate that aviation clusters are an important tool in a comprehensive systemic approach to ensure security of the state and region. The article outlines the origins of cluster creation, along with several definitions of industrial clusters, and an attempt is made to define an aviation cluster. It also presents the actions of the Polish government within the framework of cluster policy and provides an analysis of the current state of cluster policy implementation in Poland. The article emphasises the necessity of collaboration between the aviation industry and the government. The activities requiring changes include: cooperation and supervision at both national and self-government levels (voivodeship, district, municipal). The publication also indicates areas requiring improvement for the proper functioning of aviation clusters in Poland. It should be emphasised that the article does not cover all issues related to this area. However, the author hopes that the research conducted and the issues presented will highlight the opportunities and threats related to the existence of aviation clusters for the development of Polish aviation industry and its importance on the international stage, especially in the context of the post-war potential of the Ukrainian aviation industry.

Key words: cluster, aviation cluster, Aviation Valley, state security, regional security

Introduction

Security of the state is seen on a par with security of the individual in the face of challenges and threats, while at the same time constituting a basic need for every human being [Świerszcz 2016]. Within the framework of state security, spheres relating to energy, ecology, military or a sea, among others, are distinguished [Zdrodowski 2019]. One of the links is undoubtedly also aviation security, covering not only airlines or airports, but also the aviation industry. According to the *Aviation Strategy for Europe* [*Europejskia strategia w dziedzinie lotnictwa*], air transportation is a factor that plays an essential role in shaping country's economic growth, mobility, trade and employment in the European Union [*Projekt dokumentu Polityka…* 2023], while also performing an important function in ensuring the country's internal security.

In recent years, the perception of aviation security has changed from an organisational approach to a comprehensive systemic approach with the change in its perception by the International Civil Aviation Organization (ICAO). According to the current approach, the aviation industry in each country is considered as a single system in which the role of subsystems is played by aviation entities with their designed

security management systems. Such an approach, according to the fourth edition of the ICAO document referred to as the *Doc 9858 Safety Management Manual* [*Doc 9858 Podręcznik zarządzania bezpieczeństwem*], states that a comprehensive systemic approach to security enables individual countries to develop cooperation between aviation entities, as well as to determine more accurately the causes and effects of actions taken. This is essential given that the creation of an aviation security system in each country requires its own innovative efforts in the operation of the interface between cooperating systems [*Doc 9858…* 2018]. With the changing perception of security in civil aviation, new solutions are also being sought to enable more cost-effective solutions in terms of production and distribution, sourcing of skilled workers, and the development of innovative solutions. It should be pointed out that imitating the systemic solutions of other countries depends on many factors and does not always turn out to be the right action. Sometimes it can have far-reaching negative effects, which is why each country needs to develop and refine its own way of interacting at the aviation industry–government level in order to continuously prevent possible threats and enhance the importance of the country and region in the world.

Aviation clusters are one of the modern tools to support activities as part of a comprehensive systemic approach in the aviation field and to enhance state and regional security in the future. They enable improved cooperation between aviation industry entities located within the country and government/self-governments. This cooperation, pursuant to the document *Doc 9858 Safety Management Manual*, is essential as the perception of security breach risk may vary from one aviation entity to another. Functioning of aviation clusters is also desirable between the entities themselves so that, consistent with a comprehensive systemic approach, it would be possible, among others, to cooperate with universities in order to attract qualified personnel or to reduce the costs associated with transportation of raw materials and finished goods manufactured by sub-suppliers [*Doc 9858…* 2018].

What is an aviation cluster?

Industrial clusters are becoming an increasingly popular solution worldwide, having attracted the attention of researchers for several decades. At the same time, theoreticians and practitioners point out that the solution in the form of industrial clusters is an attractive solution for supporting the social and economic development of a given region, and the examples of the largest industrial clusters in Poland demonstrate the advantages of similar initiatives in favour of both local and state security [Grycuk 2010]. It is therefore necessary to clarify the meaning of the expression industrial clusters and to indicate the genesis of their formation.

The precursor of industrial clusters is considered to be the cluster of Sumerian cities that emerged in ancient times. However, the scientific approach to the existence of industrial clusters came much later. In the article titled *Evolution of the location theory of agricultural*

production in relation to cities [*Ewolucja teorii lokalizacji produkcji rolniczej względem miast*], eighteenth-century researcher Johann von Thünen, creator of the 4 zones of production location[1], is identified as the first person to study the phenomenon of clusters. This solution, nowadays known as Thünen's rings, led to the concept of the location theory and began to be seen as a way to achieve economic success [Rokicki, Golonko 2018].

However, Alfred Marshall's creation of the industrial district theory on the basis of research carried out in the 19th century is increasingly regarded as the beginning of recognition of the phenomenon nowadays known as clusters. According to the Marshallian theory, the creation of a concentration of firms within a single industry was supposed to benefit its participants. It was Marshall who illustrated the essence of enterprises' relationships based on equivalent and mutual provision of services. Among the advantages of such cooperation observed by the British economist is the popularisation of innovative solutions, while the existence of districts depends on the functioning norms and values ruling the community. Marshall's theory also recognised the relevance of external benefit for entities competing and cooperating within districts and emphasised the importance of anthropological and social determinants, with the socioeconomic situation of the enterprise, industry and region in a broad sense cited as one of the most important factors. The isolation of a specialised market tailored to the needs of a given region, the creation of specialisation in services rendered and production, and the exchange of knowledge between entities operating within a single industrial district have been recognised as a positive effect of the creation of industrial districts [Mazurkiewicz-Pizło, Pizło 2011].

The development of Marshall's concept by American professor and economist Michael E. Porter led to the current perception and study of the phenomenon of formation and functioning of industrial clusters. It is Porter who is considered to be the author of the definition of clusters, depicting them as "a geographic concentration of interconnected firms, specialised suppliers, service rendering units, firms operating in related sectors and related therewith institutions (e.g. universities, standardisation units, industry associations) in particular fields not only competing with each other, but also cooperating" [Baran 2009]. This definition is also included in the Polish document defining cluster policy after 2020 titled *Directions of Cluster Policy Development after 2020* [*Kierunki rozwoju polityki klastrowej po 2020 roku*]. Like Marshall, Porter also recognised the dependence of the industrial cluster on economic structures, as well as the social factor and the prevailing culture in a given area [Mazurkiewicz-Pizło, Pizło 2011].

Based on the meaning of a cluster as defined by Porter, other highly convergent definitions of a cluster have been created. For example, the Organisation for Economic Co-operation and Development (OECD) formulates the definition of a cluster

[1] Four zones indicated in the Johann von Thünen's concept are as follows: 1st zone – intensive agriculture, 2nd zone – forest economy, 3rd zone – extensive agriculture and 4th zone – extensive livestock production.

as "a sectoral and geographic concentration of firms that, through linkages with specialised suppliers, access to raw materials and components and the local labour market, achieve the benefits of agglomeration. These enterprises are actively supported by a network of public and private sector institutions that promote collective learning and innovation diffusion processes" [den Hertog, Maltha, Brouwer 2001]. In turn, for example, according to the Lithuanian *Concept of the Development of the Lithuanian Clusters*, i.e. the basic document of a Lithuanian cluster policy, a cluster is understood as "a voluntary association of firms and/or scientific and research institutions and other interrelated entities, functioning on a partnership basis, whose members, acting together, have reached a scale sufficient to develop specialised knowledge, services, resources, suppliers and skills, and increase the added value created" [Vaiginienė, Nausėdaitė, Mažeikait 2019][2].

However, it should be emphasised that not every country in the world has defined the concept of clusters in its own legal order. Such countries include, among others, the USA, Canada, Japan, Germany, the Netherlands and Sweden. At the same time, each country and international entity also takes an individual approach to the division of industrial clusters in its own legal order, distinguishing more or less in detail their types. Such an example is France distinguishing the following clusters: innovative, regional, business, competitiveness and territorial poles of economic cooperation [Piotrowski 2019].

So how should the definition of an aviation cluster be understood? Consistent with the above-mentioned definitions of the word "cluster", an aviation cluster may be defined as a concentration of entities functioning on a partnership basis, focused on aviation sector activities in order to achieve greater economic efficiency among firms operating in the aviation industry and service providers operating in the external environment of these entities. Enterprises functioning within a cluster are interconnected (Fig. 1), forming cluster core and cluster surroundings [Baran 2009].

However, it should be emphasised that it has still not been possible to develop a uniform model for the functioning of clusters that would be recognised by all, even within the European Union. One of the ways of classifying cluster policy, indicated in Jan Kaźmierski's article titled *Realities and Determinants of Cluster Policy in Poland and Regional Competitiveness* [*Realia i uwarunkowania polityki klastrowej w Polsce a konkurencyjność regionalna*], is distinguished, among others, by a division due to the complexity and direction of interactions in the innovative system and is divided into [Kaźmierski 2011]:

- national model – used in Luxembourg, France, Slovenia, Latvia and Lithuania;
- intermediate model – used in the United Kingdom, Italy, Germany, Sweden and Austria, which relied on creating a framework at a national level to implement policies at a regional level;
- regional model – used, among others, in Spain, Belgium and Hungary;

[2] Own translation from the Lithuanian.

– the differentiated model – characterised by the lack of an explicitly formulated cluster-based policy. Among the countries utilising this model, Kaźmierski mentioned Central and Eastern European countries, including Bulgaria, Estonia, the Czech Republic and Slovakia.

There is also still no uniform definition of cluster forms. According to one of the most popular concepts by Prof. Ann Markusen, the following forms of clusters are distinguished [Kłosiewicz-Górecka 2012]:

– concentric – enterprises are concentrated around large firms from the same industry, acting as suppliers of services and goods, constituting a supply chain and meeting the other needs of the enterprises, around which they are concentrated;
– institutional – enterprises are concentrated around administrative and research centres, whose primary purpose is to meet the needs of the public administration bodies;
– satellite – linkages between firms refer to the integration between cooperating parties and dominant enterprises;
– net – dominated by small enterprises functioning in one market sector or associated therewith. In this type of cluster, firms are prepared to respond appropriately to changing market conditions, while their market advantage comes from cooperation with other entities, including firms and research centres.

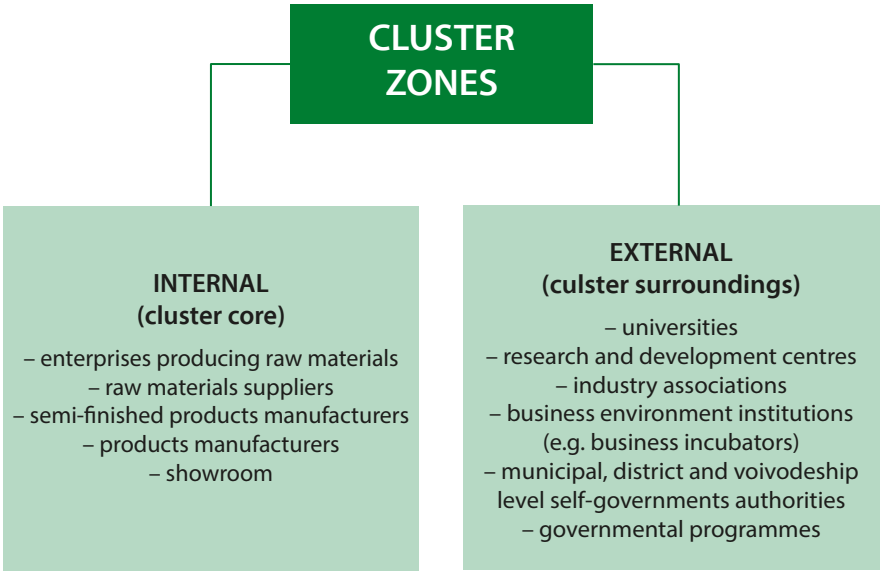

Fig. 1. Cluster zones division
Source: own elaboration based on: M. Baran 2009, p. 45

Also with regard to the functioning of aviation clusters in terms of a legal form, each country takes an individual approach. For example, the Italian IR4I Aerospace Cluster and the Austrian A Cstyria Mobilitätscluster have the legal form of a limited liability company, whereas other Italian clusters, as well as Polish or Portuguese clusters, among others, have the legal form of an association [https://clustercollaboration.eu…]. The diversity of the subjectivity of aviation clusters is a negative phenomenon creating inequalities in the opportunities to foster cooperation between government/self-government institutions and the aviation industry. In addition, the differences are exacerbated by the uneven development of the industry across countries due to the lack of cooperation primarily between research centres and enterprises [Smura 2021].

This situation has made it necessary to take action through national cluster programmes in Europe, among others, including the promotion of initiatives, including social economy for local development strategies, support for cluster members and entrepreneurship, especially among spin-offs[3] and start-ups, while at the same time promoting internationalisation, supporting the regional innovation ecosystem and R&D activities, as well as strengthening cooperation between research and industry centres [*European Observatory for Clusters*… 2019].

Besides pursuing cluster policy, countries around the world are starting to pay more and more attention to cluster-based development policy, i.e. all activities and instruments used by both the state government and self-government administrations to increase the level of competitiveness of the economy [Brodzicki, Szultka, Tarnowicz 2004]. This is a reasonable solution, as industrial clusters bring more benefits compared to the popular Special Economic Zones (SEZs) in Poland. Their advantage over SEZs stems primarily from supporting investors not only economically, being one of the instruments of the country's economic policy, but also, among others, shortening supply chains, acquiring outsourcing support, knowledge and educated personnel through cooperation with universities and other research centres [Kaźmierski 2012]. It should be emphasised, however, that enterprises can function simultaneously in an industrial cluster and in a Special Economic Zone. The combination of these two solutions facilitates an increase in the support received from entities from the external environment, e.g. obtained from governmental programmes.

Nonetheless, it is the advantages of the existence of clusters that have made cluster policy an indispensable element of economic policy for many countries, where they are used as tools for the development of national and regional economic systems, becoming a tool for the implementation of functions assigned to public institutions in areas such as education, economic promotion or circular economy [*Directions of Cluster Policy Development*… 2020].

[3] Spin off – entity having specified autonomy, predominantly economic and legal autonomy, spun off the parent company, which carries out R&D work.

Aviation clusters and the example of Poland

In Poland, according to data from the Central Register of Actual Beneficiaries (CRBR) and the National Court Register (KRS) there are 7 aviation clusters in the form of associations supervised by mayors of cities with district rights, on the territory of which the seat of a given cluster is located (as of 1 April 2023). However, despite several, or even more than a dozen years of functioning of aviation clusters in the country, only Śląski Aviation Cluster and Subcarpathian Aviation Valley are counted among the Key National Clusters (KNCs), i.e. clusters with high international competitiveness and significant importance for the country's economy, in which one of the criteria is "activity for public policies" [*Directions of Cluster Policy Development…* 2020].

The remaining aviation clusters, i.e. Bydgoski Aviation Cluster, Dolnośląski Aviation Cluster, Lubelski Aviation Cluster, Mazowiecki Aviation Cluster and Wielkopolski Aviation Cluster, despite completing the step of perfecting leaders in individual clusters (Fig. 2), were still unable to establish their own position in the country and abroad.

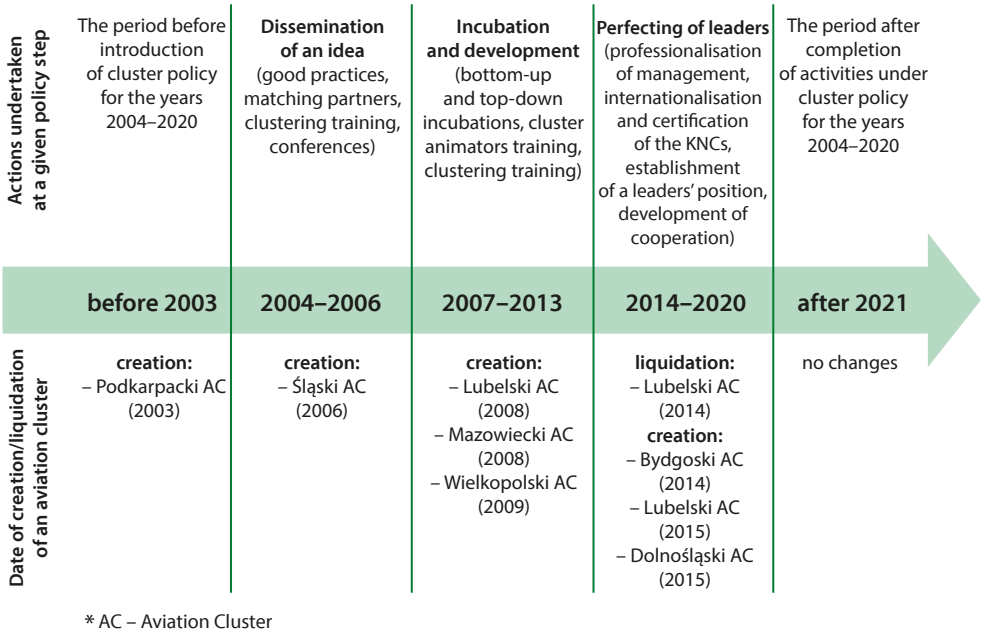

Fig. 2. Cluster policy and the development of aviation clusters in Poland in the 21st century (as of 1 April 2023)

Source: own elaboration based on: *Directions of Cluster Policy Development after 2020*, Warszawa 2020, p. 23 and data from the National Court Register

An analysis of the draft documents also reveals that both the *Draft Document Policy of Civil Aviation Development in Poland until 2030 (with the Prospects until 2040) of 5 July 2021* and *of 22 June 2023* [*Projekt dokumentu Polityka rozwoju lotnictwa cywilnego w Polsce*

do 2030 r. (z perspektywą do 2040 r.) z dnia 5 lipca 2021 r. i *z dnia 22 czerwca 2023 r.*] distinguish only 4 aviation clusters functioning in the Wielkopolskie, Dolnośląskie, Śląskie and Podkarpackie Voivodeships [*Projekt dokumentu Polityka…* 2021; *Projekt dokumentu Polityka…* 2023]. At the same time, authors of the draft do not mention the existence of aviation clusters located in the Kujawsko-Pomorskie, Mazowieckie and Lubelskie Voivodeships [https://www.owg.pl…; https://krs-pobierz.pl...; https://rejestr.io...].

The cluster policy, pursued in Poland between 2004 and 2020, succeeded only in the aviation clusters located in the Podkarpackie and Śląskie Voivodeships. In the case of other aviation clusters, despite that they were brought into existence in a second phase, i.e. incubation and development, they did not produce the expected results, while during the third phase there was even a dissolution of the aviation cluster located in the Lubelskie Voivodeship [https://spis.ngo.pl] and the creation of a new formation in its place one year later [*Lubelski Aviation Cluster…* 2015] [*Lubelski klaster lotniczy…* 2015].

One of the factors accountable for this state of affairs may be the lack of implementation of appropriate activities to counterbalance the emergence of new clusters, considering that, apart from the Śląski and Podkarpacki clusters, the remaining aviation clusters did not participate in phase 1, i.e. the phase defined in the document titled *Directions of Cluster Policy Development after 2020* as a period of dissemination of the clustering idea [*Directions of Cluster Policy Development…* 2020]. It should also be emphasised that the Aviation Valley cluster had been created one year before the implementation of the Polish cluster policy pursued between 2004 and 2020. In addition, the determinant in favour of the development of an aviation cluster in the Subcarpathia in particular was the long history of industry and aviation in this area and the location of 90% of the Polish aviation industry in the area of the current cluster, including the employee base educated at one of the Rzeszów universities [Chrzanowski, Dziedzic, Woźniak 2015]. The latest government documents concerning the Aviation Valley cluster indicate there the location of currently 80% of the aviation industry plants in Poland [*Draft Document Policy…* 2023]. Moreover, the location of such a large concentration of aviation industry firms in the south-eastern region of Poland is linked to the Central Industrial District located therein in the 1930s.

Currently, in the major Polish aviation cluster, i.e. Aviation Valley, an upward trend in investments by entities with foreign capital and a recognised brand on the global market may be observed (Fig. 3).

Of the 178 members of Aviation Valley (as of 1 April 2023 according to the cluster's official website), as many as 77 entities were firms with foreign capital functioning as commercial law companies, branches, representative offices or agencies of the companies in question. Among the remaining 101 Polish entities, only 85 companies were commercial law companies, including 2 development agencies, which, excluding other entities, account for only 52.5% of all commercial law companies located in the cluster, while more than half of the firms with foreign capital came from the USA, the United

Kingdom and Germany. Among foreign entities, one can also find firms with, among others, Chinese, Japanese, French and Canadian capital. At the same time, it should be emphasised that according to data of 1 April 2023, it is the foreign entities that make up the position of this cluster in the country and region [https://www.dolinalotnicza.pl].

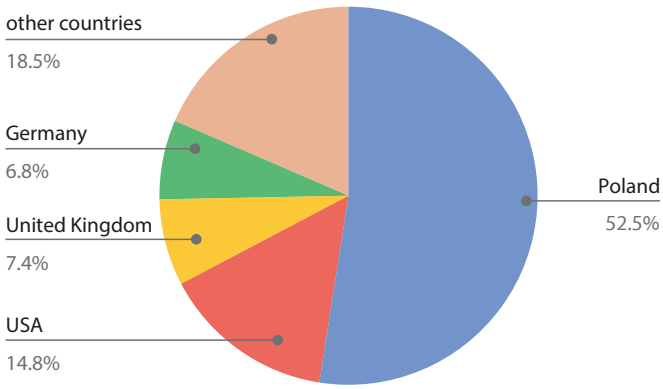

Fig. 3. Commercial law companies with foreign capital in Podkarpacki Aviation Cluster
Source: own elaboration based on: https://www.dolinalotnicza.pl/czlonkowie/ [accessed 1.04.2023]

This is particularly important for Poland, among others, in the context of the situation that will arise after the end of hostilities in Ukraine and the dynamic growth of the aviation industry predicted by the author. The Ukrainian aviation industry, based, among others, on the existing aviation cluster in Dnipro [https://www.eacp-aero...] and key state-owned aviation entities such as Antonov (aircraft manufacturing and services company) or Motor Sich (manufacturer of e.g. aircraft and helicopter engines), has the basis for a dynamic development of the aviation industry during peace, creating serious competition for the Polish aviation industry.

Since the start of hostilities in February 2022, a number of entities with as yet undisclosed names and locations have also begun to emerge in the Ukrainian territory, specialising in the production of unmanned aerial vehicles, which will also become serious competitors for the Polish aviation industry after the end of hostilities. As early as 2023, the Ukrainian authorities reported that within a year of the Russian invasion of Ukraine, the number of unmanned aerial vehicles manufacturers had doubled up to 200 operators [*Ukraine's drone industry*…]. It should also be emphasised that Ukrainian unmanned aerial vehicles manufacturers can already improve the parameters of the models under production and, in the future, produce civilian versions of the military unmanned aerial vehicles being produced so far [Łomanowski 2024]. It is also worth noticing that unmanned aerial vehicles not used during the conflict will be able to find use in the civilian market, as was the case with the aircrafts used by the Americans during the First World War.

Aviation clusters are also a solution to offset the competitive imbalance of Polish aviation enterprises resulting from the additional financial support received by aviation enterprises from e.g. Turkey, Moldova, Armenia or Ukraine under EU aid, e.g. *EU-Ukraine Cluster Partnership Programme* running from 19 March 2024 to 4 June 2024, which does not include domestic enterprises. This programme allows aviation firms to obtain a funding rate of 90% of the estimated financial contribution up to €500,000 per project [*EU-Ukraine Cluster*…]. Moreover, already at a time of uncertainty in Ukraine, foreign entities are choosing to enter into contracts to invest in new factories. One such example is the Turkish firm Baykar, which has announced the establishment of a plant to produce approx. 120 Bayraktar TB2 or TB3 unmanned aerial vehicles models annually [Magid 2024].

Such a situation makes that the countries of Central and Eastern Europe, including Poland, urgently need to implement solutions to increase the potential for the development of aviation clusters by eliminating the errors identified in government documents. It is also becoming necessary to implement long-term measures aimed at supporting the development of existing aviation clusters, especially those not qualifying for the status of Key National Cluster.

However, as a result of the high probability of conflict, it is to be expected that, in order to protect trade secret, foreign firms, at the expense of security of the state and region in which the closed plants are located, may extinguish production in order to protect technology, while reducing the degree of restoration of combat capability of the damaged military equipment. This type of action may also be taken by foreign firms as a result of political decisions taken by national governments to safeguard their own interests[4].

Such a practice in the case of political change is a dangerous yet realistic vision, and the existence of aviation clusters in the perspective of the planned development of air transportation is crucial for increasing security of the state, e.g. by securing supply chains. The essence of the functioning of aviation clusters in Poland, as exemplified by the objectives of the Association of the Aviation Industry Entrepreneurs Group Aviation Valley is, among others, to affect, in the field of aviation industry, the economic policy pursued by the Polish government, to support firms from the aviation industry and to promote Polish industry and to create conditions enabling the development of firms of the aviation sector in the region, and above all to strengthen the south-eastern part of Poland in its efforts to become a leading region in Europe [*About the Aviation Valley*…, *O Dolinie Lotniczej*…]. A strong industry and region also means a strong state that provides its citizens with security and satisfies their needs.

However, there has already been a noticeable lack of strong cooperation between enterprises and research centres, despite the participation of global aviation giants in the Polish aviation industry. Insufficient funding, among others, is cited as a reason

[4] For example, the case of the USA imposing export restrictions on certain devices for manufacturing microprocessors and semiconductors to the People's Republic of China between 2022 and 2023.

for such a state of affairs. The need to make cooperation between research centres and entities of the production and services sector more dynamic is indicated. Therefore, support for third sector entities is one of the possible solutions strengthening the development of the industry and realising the action provided for until 2030, as stipulated in the *Draft Document Policy of Civil Aviation Development in Poland until 2030 (with the Prospects until 2040) of 22 June 2023* which is the intensification of cooperation between Polish manufacturers and research centres and support for innovative projects of the Polish industry [*Draft Document Policy…* 2023]. Thus, support for the development of the aviation industry by associations is one of the potential solutions for increasing the innovativeness of the industry and the economy, increasing the level of employment in the aviation industry, internationalising Polish entities on foreign markets and their products and ultimately increasing the wealth of society and ensuring economic security.

The documents nevertheless point out the failure to perform strategic analyses at the socioeconomic level, as well as the need to increase cooperation between government and self-government bodies in order to pursue development perspectives and define a course of action. The creation of a unified supervisory system at a regional and national level would in turn make it possible to introduce a cluster policy evaluation system. The analysis made in the document *Directions of Cluster Policy Development after 2020* reveals, among others, the incompleteness of the strategic analysis and the lack of uniform action on the part of self-governments [*Directions of Cluster Policy Development…* 2020]. At the same time, the need for cooperation in a coordinated manner at the local, regional, macroregional, national and EU levels is formulated at the European level. However, the lack of a single European cluster model results in the need to develop one's own practices in order to gain a competitive advantage, taking advantage of the global network and the trends that have already occurred [*Guidebook Series. How…* 2016].

Conclusions

Aviation clusters are one of the innovative solutions to support the development of the national aviation industry. They are also a tool to balance the inequalities resulting from the financial support received by aviation companies from non-EU countries under EU aid or government subsidies. This is important because the lack of support for the industry among EU countries will lead to the disappearance of aviation entities globally, affecting the economic situation of the country.

In addition to achieving economic benefits, aviation clusters may also become one of the tools of the Ministry of Foreign Affairs to pursue economic diplomacy by realising activities aimed at strengthening the country's international position in the international arena, e.g. through membership in international institutions functioning on a partnership basis or attracting foreign investment and promoting domestic production worldwide. From the author's point of view, taking appropriate action in response

to the anticipated scenario of rapid economic development following the end of hostilities in Ukraine is important to maintain the existing significance of the aviation industry in the country and region.

It is undeniable that aviation clusters support the realisation of paramount goals of the state by international cooperation in the form of the exchange of experience and knowledge in the creation of new technologies. At the same time, this enables the country's technological progress to be supported through the possible use of the technological solutions produced, as well as aviation knowledge in other industrial sectors, creating the opportunity for wider economic development of the country. It is also undeniable that aviation clusters attract foreign investment and create new jobs, as well as internationalise domestic firms and products and pursue expansion activities into foreign markets, with the unequivocal development of domestic projects affecting the country's image and brand. Following also one of the theories of security, i.e. *doux commerce*, one can also conclude that aviation clusters foster the creation of interdependencies in which both parties benefit; that is to say, foreign entities, investing in the country, obtain skilled workers, as well as supply and distribution chains, while developing local entities and, simultaneously, the region itself, which, affected by the new investments, begins to develop. Such an action determines the creation of international stability, as states are less inclined to go to war when they maintain economic relations for the benefit of their own citizens. Thus, with security understood in this way, the effective use of aviation clusters may strengthen a country's position in the international arena in the future and support the building of sustainable international relations.

In conclusion, aviation clusters are one of the tools of a comprehensive systemic approach, enabling the country to increase its importance in the international arena and thus consistent with the idea of *doux commerce*, ensure security of the country and region. In addition, such a solution enables the development of cooperation between aviation industry entities and affects other industrial sectors, while constituting an important tool for strengthening the position of the region and country in the international arena. However, in order to exploit the full potential of aviation clusters in Poland, urgent remedial actions and a debate on the directions of development of not only aviation clusters, but also other industrial clusters, must be undertaken. It also requires to compile a long-term concept for the national spatial development plan, a closer examination of the impact of clusters on regional and national security and the elimination of many shortcomings and inadequacies hindering the full potential that aviation clusters functioning may provide.

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Klastry lotnicze a bezpieczeństwo państwa i regionu

STRESZCZENIE

Przemysł lotniczy poszukuje innowacyjnych rozwiązań umożliwiających optymalizację kosztów oraz wymianę wiedzy. Jednym z takich rozwiązań są klastry lotnicze. Celem artykułu jest próba dowiedzenia, iż klastry lotnicze stanowią istotne narzędzie kompleksowego podejścia systemowego dla zapewnienia bezpieczeństwa państwa i regionu. W ramach artykułu przestawiona została geneza tworzenia klastrów, wraz z przytoczeniem kilku definicji klastrów przemysłowych, oraz podjęta została próba zdefiniowania klastra lotniczego. Przedstawione zostały także działania polskiego rządu w ramach polityki klastrowej oraz zaprezentowana została analiza stanu realizacji polityki klastrowej w Polsce. Artykuł wskazuje również na konieczność podjęcia działań w ramach współpracy przemysłu lotniczego i rządu. Wśród działań wymagających zmian wymienia się m.in. współpracę i nadzór zarówno na poziomie krajowym, jak i samorządowym (wojewódzkim, powiatowym, gminnym). Publikacja wskazuje także obszary wymagające poprawy dla prawidłowego funkcjonowania klastrów lotniczych w Polsce. Należy podkreślić, że artykuł nie obejmuje całości problematyki związanej z tym obszarem. Autor ma jednak nadzieję, że dzięki przeprowadzonym badaniom i przedstawionemu problemowi zostaną dostrzeżone szanse i zagrożenia związane z istnieniem klastrów lotniczych dla rozwoju przemysłu lotniczego Polski oraz jej znaczenia na arenie międzynarodowej, szczególnie w kontekście powojennego potencjału ukraińskiego przemysłu lotniczego.

Słowa kluczowe: klaster, klaster lotniczy, Dolina Lotnicza, bezpieczeństwo państwa, bezpieczeństwo regionu

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to cite:
Olejarz A., 2025, *Aviation clusters and state and regional security*, MAZOWSZE Studia Regionalne, MAZOVIA Regional Studies, Special Edition 2025, Mazovian Office of Regional Planning in Warsaw, Warsaw, pp. 37–51, https://www.doi.org/10.21858/msr.se.2025.02