10.26411/83-1734-2015-1-49-3-21

# The Analysis of the Impact of Business Process Outsourcing on the Profitability of Commercial Airline in the Conditions of a Global Pandemic

Myroslava Semeriahina, Mariia Hryhorak, Dmytro Bugayko
*National Aviation University Kiev, Ukraine*

**Abstract**: this article provides an economic assessment of the impact of the global pandemic COVID-19 on the economic efficiency of commercial airlines. The dominant role of airlines in the formation of flexible service supply chain and service travel chain has been identified, which increases their customer orientation and competitiveness in the air transportation market, as well as allows them to adapt more quickly to the changing logistics environment. It has been proven that the use of the outsourcing mechanism in combination with the diversification of services provided, allows, on the one hand, to create added consumer value for customers, and on the other - necessitates building complex integration relationships with business partners in service supply chains. Analysis of statistics and experience of leading airlines with different business models in the air transportation market has shown that outsourcing business processes in a global pandemic has allowed carriers to optimize costs according to the volume of work, respond flexibly to changes in consumer demand and better overcome negative impacts external logistics environment.

**Keywords:** commercial airline, global pandemic, service supply chain, service travel chain, outsourcing, diversification.

## 1. INTRODUCTION

The global coronavirus pandemic (COVID-19) has had a devastating impact on the airline industry and forced airlines to operate in conditions of considerable uncertainty. According to the analysis of the International Air Transport Association (IATA), the total loss of the global aviation industry in 2020 amounted to about $ 400 billion.

This unforeseen event dashed all expectations for the development of the air passenger market, which was to reach 4,723 million passengers according to IATA forecasts to the actual 1 763 million passengers in 2020. At the same time, the net losses of commercial airlines worldwide amounted to $ 126.4 billion (Fig. 1).

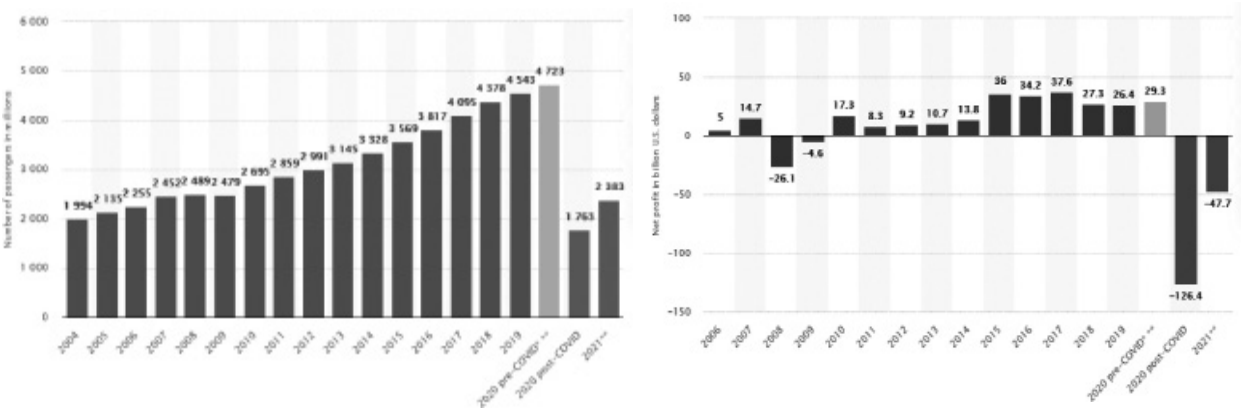
It should be noted that in accordance with international trends, air traffic in Ukraine and Poland has also decreased (Fig. 2).

Thus, in Poland, according to the Civil Aviation Authority of Poland, there was a decline of 64.55% in the number of passengers carried in three quarters of 2020 compared to data for three quarters in 2019. The number of passengers carried fell by 64.99% in 2020, compared to data of 2019 in Ukraine according to the State Aviation Administration of Ukraine. It indicates the same impact of the pandemic on aviation markets of different states, and accordingly the same negative impact on different scheduled passenger airlines, regardless of their market share.

Certainly, after a sharp fall, a gradual recovery of passenger traffic by air will begin. This is evidenced by the first forecast of IATA on the growth of passenger traffic by 35.17% and the decrease in net loss of commercial airlines by 62.26% to $ 47.7 billion in 2021.

Number of scheduled passengers boarded by the global airline industry from 2004 to 2021

Net profit of commercial airlines worldwide from 2006 to 2021




* Forecast was released prior to the coronavirus outbreak, ** Forecast

Figure 1. Number of scheduled passengers carried and net profit of global airlines worldwide

*Source: Statista*[1]

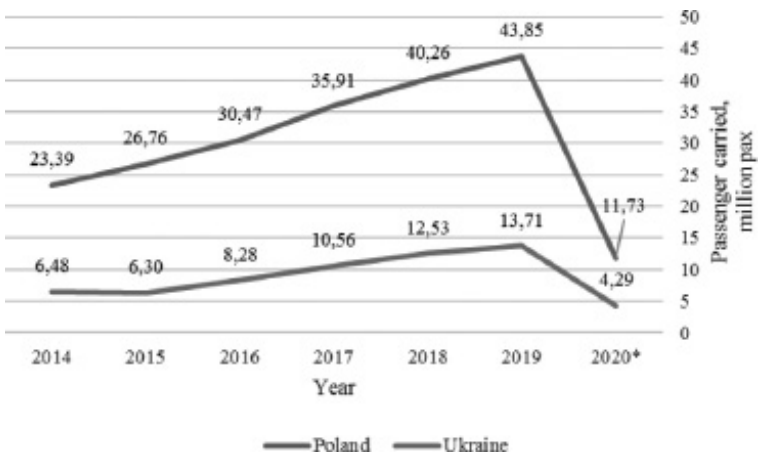



Figure 2. Dynamics of change in the number of passengers carried in Poland and Ukraine

* data in the three quarters of 2020 (Poland)

Source: Civil Aviation Authority of Poland2 and State Aviation Administration of Ukraine3

[1] Global No.1 Business Data Platform - https://www.statista.com/

[2] Statistics and Analysis of Air Transport Market by Civil Aviation Authority of Poland – https://www.ulc.gov.pl/en/market-regulation/statictics-and-analysis-of-air-transport-market

[3] Periodical information of State Aviation Administration of Ukraine – https://avia.gov.ua/pro-nas/statistika/periodychna-informatsiya/

Thus, in Poland, according to the Civil Aviation Authority of Poland, there was a decline of 64.55% in the number of passengers carried in three quarters of 2020 compared to data for three quarters in 2019. The number of passengers carried fell by 64.99% in 2020, compared to data of 2019 in Ukraine according to the State Aviation Administration of Ukraine. It indicates the same impact of the pandemic on aviation markets of different states, and accordingly the same negative impact on different scheduled passenger airlines, regardless of their market share.

Certainly, after a sharp fall, a gradual recovery of passenger traffic by air will begin. This is evidenced by the first forecast of IATA on the growth of passenger traffic by 35.17% and the decrease in net loss of commercial airlines by 62.26% to $ 47.7 billion in 2021. Currently, analysts and experts are developing clarifying forecasts and trying to identify trends. In general, the full recovery of traffic is projected no earlier than 2024 at best. Such data are provided by EUROCONTROL in its studies on the renewal of the number of flights[4]:

- the resumption of air traffic will take place no earlier than 2024 at the level of 97% of 2019 according to the most optimistic scenario;
- the air traffic will be at the level of 84% of the indicator of 2019 according to the most probable scenario in 2024;
- the air traffic in 2024 will be 74% of the figure for 2019 and will reach the figures observed in 2019 only in 2029 according to the pessimistic scenario.

Similar studies conducted in Ukraine indicate more positive forecasts[5]:

- with economic GDP growth of 4%, the volume of air passenger traffic will reach the level of 2019 in 2025 according to the pessimistic scenario, at the end of 2023 according to the realistic scenario, in late 2022 or early 2023 according to the optimistic scenario;
- with economic GDP growth of 6%, the volume of air passenger traffic will reach the level of 2019 at the beginning of 2025 according to the pessimistic scenario, at the beginning of 2023 according to the realistic scenario and at the end of 2022 according to the optimistic scenario.

This leads to increased interest in research on the impact of global processes in the world economy and the coronavirus pandemic on various aspects of airlines activities. In a dynamic environment, airlines need to make significant strategic efforts to increase their competitiveness in supply chains and service chains for passengers. This is especially true of the organization of cooperation with partners to meet customer requirements on an outsourcing basis.

It should be noted that the problem of applying outsourcing as a tool to manage airlines activities is attracting constant attention of researchers. So, Ghobrial, Atef (2005) made an interesting review of trends in the applying of outsourcing as a way to reduce operating costs of the airline[6]. Supporting a similar point of view, Liou, J. J. & Chuang, Y. T. (2010)[7] and Hsu, C. C. & Liou, J. J. (2013)[8] believe that the success of outsourcing

---

4 Five-Year Forecast 2020-2024. European Flight Movements and Service Units: Three Scenarios for Recovery from COVID-19, STATFOR Ref. DOC677 – https://www.eurocontrol.int/forecasting

5 Hryhorak M., Savchenko L., Vinyukov-Proshchenko A., *Scenario approach to forecasting the development of the passenger air transport market in the post-pandemic period,* [in:] *Fifteenth International Scientific Conference "AVIA-2021", April 20-22, 2021* – http://conference.nau.edu.ua/index.php/AVIA/AVIA2021/paper/view/8212/6649

6 Ghobrial A., *Outsourcing in the airline industry: Policy implications*, "Journal of Transportation Law, Logistics and Policy", 72 (2005)/4, pp. 457-473.

7 Liou J. J., Chuang Y. T., *Developing a hybrid multi-criteria model for selection of outsourcing providers*, "Expert Systems with Applications", 37 (2010)/5, pp. 3755-3761 – https://doi.org/10.1016/j.eswa.2009.11.048

8 Hsu C. C., Liou J. J., *An outsourcing provider decision model for the airline industry,* "Journal of Air Transport Man-

depends on the choice of partner, so they justify the methods and procedures of choosing an outsourcer. The expediency of outsourcing certain airline operations, in particular those related to aircraft maintenance, has been proven by Bazargan, M. (2016)[9] and Endrizalova, E. et al. (2018)[10]. Alshurideh, M., Alsharari, N.M. and Al Kurdi, B. (2019)[11] emphasize the need for strategic management of relationships with customers of the airline through the prism of integration processes in supply chains, which allows to optimize internal business processes and reduce logistics costs. Outsourcing as a way to implement innovations in the field of services is studied by Fernando, Y. (2013)[12].

Although most researchers emphasize the significant benefits of outsourcing in terms of reducing operating costs, they also note the significant risks associated with flight operating safety and the quality of services provided. In the event of an outsourcer's dishonesty, force majeure or bankruptcy, there may be significant losses associated with the need to urgently seek new partners or begin to perform functions, that were previously outsourced, by own efforts. Competent conclusion of contracts with fixing of all necessary conditions of performance of operating business processes and services has great value for prevention of possible risks[13]. Abdullah, M.A. and Satar, N.M. (2018)[14] investigated the impact of outsourcing on the performance of airlines from the Asia-Pacific region for the period 2003-2011. Of particular interest is their conclusion about the negative impact of outsourcing on the technical efficiency and productivity of airlines from the Asia-Pacific region, which was associated with the global economic downturn in 2007/2008. Particular interest is their conclusion about the negative impact of outsourcing on the technical efficiency and productivity of airlines from the Asia-Pacific region, which was associated with the global economic downturn in 2007/2008.
A brief review of the publications allows us to conclude that in a rapidly changing environment and growing political and economic global risks, airlines are forced to constantly improve their business models in accordance with customer requests.

The purpose of this study is to summarize the impact of the global pandemic on the efficiency of airlines' commercial activities, depending on the degree of outsourcing of business processes related to the providing of services in the supply chain of passengers on a door-to-door basis.

agement", 28 (2013), pp. 40-46 – https://doi.org/10.1016/j.jairtraman.2012.12.009

9 Bazargan M., *Airline maintenance strategies – in-house vs. outsourced – an optimization approach*, "Journal of Quality in Maintenance Engineering", 22 (2016)/2, pp. 114-129 – https://doi.org/10.1108/JQME-08-2015-0038

10 Endrizalova E., Novak M., Nemec V., Hyrslova J., Mrazek P., *Operating Lease As A Specific Form Of Airlines Outsourcing*, [in:] *18th international scientific conference Business Logistics in Modern Management, October 11-12, 2018, Osijek, Croatia,* Osijek 2018, pp. 641-655.

11 Alshurideh M., Alsharari N. M., Al Kurdi B., *Supply Chain Integration and Customer Relationship Management in the Airline Logistics,* "Theoretical Economics Letters", 9 (2019), pp. 392-414 – https://doi.org/10.4236/tel.2019.92028

12 Fernando Y., *Service innovation along the chain of service process in airline business,* [in:] *Outsourcing Management for Supply Chain Operations and Logistics Service*, IGI Global, 2013, pp. 185-201 – https://doi.org/10.4018/978-1-4666-2008-7.ch011

13 Gil R., Kim M., Zanarone G., *Relationships Under Stress: Relational Outsourcing in the US Airline Industry After the 2008 Financial Crisis,* "Management Science", (2021), pp. 1-22 – https://doi.org/10.1287/mnsc.2021.3970

14 Abdullah M. A., Satar N. M., *The Impact of Outsourcing on Airlines' Performance: Empirical Evidence from Asia and Countries in the Pacific*, "Airline Economics in Asia" 7 (2018), pp. 195-219 – https://doi.org/10.1108/S2212-160920180000007011

## 2. TRANSFORMATION CHANGES OF THE LOGISTICS ENVIRONMENT OF THE AIRLINE COMMERCIAL ACTIVITY

Given that airlines are active participants in the organization and providing of air chains for the supply of goods and delivery of passengers, they are active participants in the logistics environment. In this case, airlines are not only entities that influence the external logistics environment of other companies, but also entities that are influenced by other entities and various factors of the external logistics environment. In general, according to Sumets O.: "the operating environment of any enterprise is, on the one hand, complex socio-economic, organizational, legal and political systems that support or inhibit the development of its activities, and on the other hand, determines a specific set of external and internal factors of direct and indirect influence, which determine the conditions of operation and development of any enterprise"[15]. At the same time, in our opinion, we must not forget that any business system is surrounded by a business environment (internal and external), so the environment cannot act as a system. If we take the internal environment of the enterprise, it cannot exist without the enterprise (systems), while the external environment in which the enterprise operates or suspends its activities continues to exist, as it continues to operate other enterprises, which can be considered as systems.

Based on the above, it can be argued that the logistics environment of the enterprise is an environment consisting of various factors that support or inhibit the development of logistics activities of the enterprise due to direct and indirect influence of external and internal factors on design, organization, management and control of logistics processes ensuring the functioning of the supply chain and travel chain.

Thus, the airline's logistics environment can be defined as an environment consisting of various factors at the micro and macro levels that directly or indirectly affect the design, organization, implementation and control of logistics processes aimed at ensuring the functioning of supply chains and travel chain with the participation of air transport.

Given the above, the airline, ensuring the implementation of logistics processes, has an internal logistics environment, which creates and coordinates logistics processes that provide air supply chains and air travel chain. At the same time, we consider it important to emphasize on the direct and indirect impact of internal and external logistics environment. For example, if we discuss the micro level of the logistics environment, it can be the definition of the airline's logistics strategy directly affecting on the design, organization and control of the airline's logistics processes, while the strategy of airline has an indirect impact, because logistics strategy is developed on its basis. At the same time, the personnel policy of the airline can directly affect the organization and implementation of logistics processes through the selection of qualified logistics personnel and indirectly in the case of recruitment for other processes in the airline.

Similarly, considering the macro-level factors of the logistics environment, we can give the following example of direct and indirect factors. There are legal documents and standards that directly regulate the rules of logistics processes during the organization and implementation of air transportation of passengers, cargo and mail. Accordingly, such documents have a direct impact on the organization and implementation of logistics processes in the framework of air transportation. Other legal documents and standards regulating the activities of economic entities in general, licensing of activities in the field of air transportation are important for the operation of the airline, but do not directly affect the clarity and correctness of the organization and implementation of logistics processes involving air transport, but have indirect influence.

---

[15] Sumets O. M., *Theoretical and methodological principles of logistics activities of enterprises in the agro-food complex: a monograph*, Mandrid Printing House, Kharkiv 2015, p. 181.

Thus, we present the following classification of the logistics environment of the airline, which is involved in the organization and providing of logistics processes of the travel chain or supply chain on Fig. 3.

Let's analyse the components of the internal logistics environment of the airline. Among the main logistics strategies for airlines can be identified the main types of logistics strategies:

- strategy of integration of logistics functions and processes in travel chains and supply chains. This strategy can be used to develop the airline as a logistics provider to the level of 4PLP. Such a strategy will provide, first of all, the creation of a single information system for the design, organization and control of logistics processes in travel chains and supply chains;
- consolidation strategy may be aimed at optimizing the route network in order to reduce costs;
- cycle reduction strategy is characterized by the ability to reduce process execution time, for example: a) through the use of EDI in the transfer of data between participants in travel chains and supply chains, b) through the use of IT applications that provide the ability to register passengers for the flight themselves;
- logistics outsourcing strategy allows, based on the concept of strategic partnership in travel chains and supply chains, to carry out airlines only narrowly specialized process, i.e. air transportation of passengers, cargo and mail, while all other processes before and after air transportation are provided by partners (handling companies).

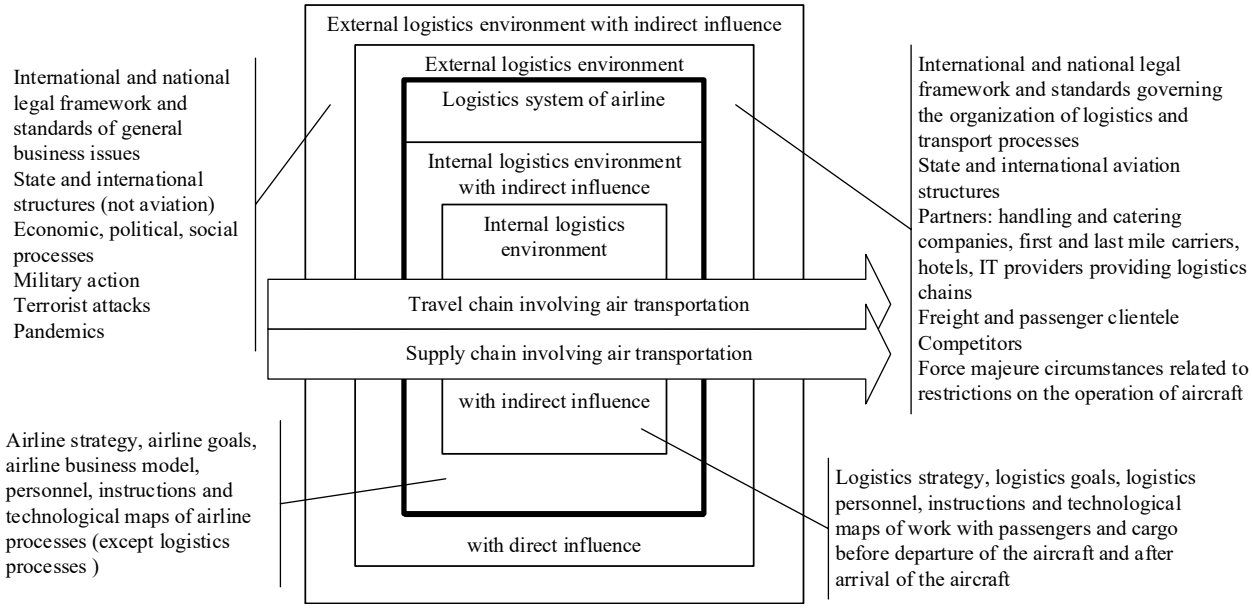



Figure 3. Airline logistics environment classification

*Source: own elaboration*

The airline's logistics goals are determined within the chosen logistics strategy. They will be reflected in the developed metrics of KPI and the sizes of quantitative and qualitative indicators which need to be reached and kept defined for them.

Personnel policy for the selection of qualified personnel in the logistics departments of the airline will relate to the development of special metrics, which must meet the staff in accordance with the defined position. For example, they may include data on the required level of education, work experience, advanced training certificates, etc.

The airline develops its own regulatory documents, such as instructions and process maps. for example: technological map of pre-flight preparation of the aircraft or technological map of service of the arrived aircraft, based on which the personnel have an algorithm of the order of actions and time characteristics of execution of any processes during the organization of pre-flight and post-flight service.

The internal logistics environment of indirect influence is characterized by general factors and processes that are not directly related to the implementation of logistics processes by airline personnel. however, such factors may affect the quality and integrity of the logistics process or the final opinion of the consumer of the logistics service on the overall quality of the airline's logistics services. The main factors of the internal environment of indirect influence include the strategy and goals of the airline for which the logistics strategy is developed and the logistics goals of the airline are determined.

The external logistics environment of direct influence, first of all, creates the basic legal and standardized framework for designing and construction of logistic processes with participation of air transportation as the basic kind. Accordingly, a significant role in the impact on airlines in this case is played by state and international aviation entities that regulate the organization of air transportation. In addition, various airline partners are also important players in this environment. They influence the performance of logistics processes helping to build flexible travel chains and supply chains involving air transport. An equally important factor of the external logistics environment of direct influence is the airline's cargo and passenger clientele, whose needs must be taken into account to create a competitive logistics product, the main part of which is air transportation. Various additional services provided by the airline's competitors, but not provided by the airline itself, can lead to a loss of airline customers and an increase in the cost of providing logistics services. Not the least role is played by force majeure circumstances regarding the ban on flights, which "break" the already built logistics chains and require a rapid response to their restructuring.

Similarly, but indirectly, travel chains and supply chains are affected by the start of military action, terrorist attacks and pandemics. This is due to the fact that such events affect changes in travel chains and the supply chain, but are directly related to the providing of another goal. Here are some examples: a) the 9/11 terrorist attack led to the reference of security measures in the United States in general and the reference of aviation security procedures around the world; b) military action in Donbass led to the closure of airspace after the crash of flight MH17 in 2014 in order to link aviation security; c) the COVID-19 pandemic has closed the borders of most countries in the world in order to reduce its spread, which has led to the cancellation of air passenger traffic around the world.

Other factors of the external logistic environment of indirect influence have a similar influence. This is due to cause-and-effect relationships, any external processes, events and actors in meta- and macro-logistics systems can lead to changes in travel chains and supply chains and can create both negative and positive effects impacting on them.

Generalization of the main trends of global trade allows us to conclude about the growing role of air transport in creating global value chains (GVC)[16]. The internationalization of production has led to the movement of significant volumes of components and semi-finished products that require fast and reliable delivery between production sites located in different countries. The development of tourism contributes to the growth of demand for passenger air transportation between countries and continents. New economic value is generated through complex dynamic exchanges between airlines serving global air route networks, its customers, airports,

[16] Shingal A., Raj A., *Value of Air Cargo: Air Transport and Global Value Chains: Consultant December 6th, 2016,* commissioned by IATA – https://www.iata.org/publications/economic-briefings/value-of-air-cargo-2016-report.pdf

suppliers and business partners. However, it is the airline that forms and controls the value network, as it manages the relationship with end users of goods and at the same time with logistics service providers for the rapid and efficient execution of customer orders. The main principle of its interaction with other participants of the air transportation market is the transition from fierce competition to the search for forms and methods of mutually beneficial cooperation, partnership and cooperation of different economic entities in one logistics chain with a common system goal of timely and high-quality satisfaction of consumer needs in transportation of passengers and cargo. This business model successfully uses the already well-known widely tested schemes of joint operation of airlines, interline agreements, code-sharing agreements, charter commercial agreements, bilateral and multilateral pool agreements, etc. At the same time, the current geo-economic situation requires deeper forms of integration - the creation of aviation alliances, international aviation holdings, various forms of vertical and horizontal integration - from acquisitions to conglomerate corporations, the formation of multifunctional aviation concerns, global logistics chains and supply networks, transport corridors with leading participation of air carriers.

The new system of relations in the air transport business is based on a logistical approach to the management of the global transportation chain and partnerships of airlines not only with customers and suppliers, but also with the local business environment, the public, local and governmental powers. Such cooperation in the field of innovation and investment becomes especially important and effective, in search of the best solutions for local conditions and specific situations and innovations from the arsenal of business know-how accumulated by leading airlines.

The development of forms of integration and the formation of integrative business structures increases the role of outsourcing in general, and logistics outsourcing in particular. Abandoning linear (unilateral) relationships with suppliers and customers in favour of an intertwined network, which provides for multidirectional and multilevel relationships, allows individual highly specialized companies to find their place in various integration entities. The best metaphor for this new level of interaction is the solar system, where participants are in a dynamic orbit around each other and attract other companies into their gravitational fields as they expand their offerings to end customers[17].

The intensification of integration processes in air transport has contributed to the emergence of service supply chains (SSC). SSC has received considerable attention in the scientific community recently. The first studies date back to the late 1990s, and the most significant study is "Understanding and Managing the Service Supply Chain" by Ellram, L. M., Tate, W. L., & Billington, C. (2004)[18]. The study found that "SSC is an integrated management of service information, service processes, service capacity, service performance and service funds from the earliest suppliers to the ultimate customers".

At the same time, a review of current research shows that there is no unambiguous definition of SSCs, as well as the structure and classification of such chains. Wang et al. (2015)[19] proposed that the SSC is classified into the service only supply chain and the product service supply chain. In the first case, the service is the end product. In the second embodiment, the management of material flows is carried out using intangible services. Aliakbari Nouri et al. (2019)[20] emphasize that SSC is usually associated with high level customer involvement

17 Cronin M. J., *Unchained value: The new logic of digital business,* Harvard Business School Press, Boston 2000, p. 47.

18 Ellram L. M., Tate W. L., Billington C., (2004). *Understanding and managing the services supply chain,* "Journal of Supply Chain Management", 40 (2004)/3, pp. 17-32 – https://doi.org/10.1111/j.1745-493X.2004.tb00176.x

19 Wang Y., Wallace S. W., Shen B., Choi T. M., *Service supply chain management: A review of operational models,* "European Journal of Operational Research", 247 (2015)/3, pp. 685–698 – https://doi.org/10.1016/j.ejor.2015.05.053

20 Aliakbari Nouri F., Shafiei Nikabadi M., Olfat L., *Developing the framework of sustainable service supply chain bal-*

and a dominate role of supplier. In general, Wang et al. [18] have reviewed the operational models in the service supply chain, covering a variety of hot topics, including service procurement, service outsourcing, contract design, pricing and quality decision making.

Currently, researchers have different understanding about the characteristics and structure of SSC which can be roughly divided into the following three types of categories[21]:

- the SSC and activities which are associated with the manufacturing supply chain from the service aspect. The essence is to find the optimal balance between service and the lowest cost way to run the service supply chain. Vargo and Lusch (2004)[22] define service as a process or as the use of one's resources or competencies for the benefit of another entity. Youngdahl and Loomba (2000)[23] identifies the importance of the role of service in global supply chain management. Saccani et al. (2007)[24] focus on the systemic view of the after-sales business for durable consumer goods, including the configuration choices, the relation between activities, and the influence of a set of drivers, can be of help to managers in charge of after-sales operations in order to configure a supply chain from scratch or in order to assess its present configuration;
- the SSC is the service only supply chain. Ellram (2004) [18] compared supply chain management in manufacturing sector and constructed a service supply chain model which adapts to service sector. Recently, Sengupta, Heiser and Cook (2006)[25] proposed and tested supply chain model of service sector by using empirical method. Akkermans and Vos (2003)[26] compare the strengthening effect in telecommunications industry and the bullwhip effect in the manufacturing supply chain;
- the SSC is a service supply chain integration. Zhang et al. [21] developed this idea of a service integrator and its role. The idea is that customers submit service requests to the integrator, who responds quickly to their requests, while the integrator breaks these requests into actual service providers, ie outsourcing such services.

Given that the airline is a service provider, it builds service chains of the airline relies on a strategy of diversification or outsourcing.

The advantages of the diversification strategy for the airline in service supply chains are the ability to control the level of logistics service and customer satisfaction, and, accordingly, timely and rapid response to needs and requests from customers. In addition, by diversifying its business activities in the related field, the airline diversifies its revenue streams, as it can not only provide its own service travel chain, but also act as an outsourcing partner for other companies. At the same time, this strategy assumes the risks associated with maintaining a large holding company, which is much more difficult to manage. There is also a risk of a simultaneous drop

*anced scorecard (SSSC BSC)*, "International Journal of Productivity and Performance Management", 68 (2019)/1, pp. 148-170 – https://doi.org/10.1108/IJPPM-04-2018-0149

21 Zhang R., Chen R., Zhang Y., *The conceptual model of the service supply chain research based on business processes,* [in:] *2009 International Conference on Management and Service Science: MASS 2009; Wuhan/Beijing, China, 16-18 [i.e. 20-22] September 2009*, Wuhan 2009, pp. 1–4 – https://doi.org/10.1109/ICMSS.2009.5301600

22 Vargo S. L., Lusch R. F., *The four service marketing myths: remnants of a goods-based, manufacturing model,* "Journal of Service Research", 6 (2004)/4, pp. 324-335 – https://doi.org/10.1177/1094670503262946

23 Youngdahl W. E., Loomba A. P. S., *Service-driven global supply chains*, "International Journal of Service Industry Management", 11 (2000)/4, pp. 329-347 – https://doi.org/10.1108/09564230010355368

24 Saccani N., Johansson P., Perona M., *Configuring the after-sales service supply chain: A multiple case study,* "International Journal of Production Economics", 110 (2007)/1-2), pp. 52-69 – https://doi.org/10.1016/j.ijpe.2007.02.009

25 Sengupta K., Heiser D. R., Cook L. S., (2006). *Manufacturing and service supply chain performance: a comparative analysis,* "Journal of Supply Chain Management", 42 (2006)/4, pp. 4-14 - https://doi.org/10.1111/j.1745-493X.2006.00018.x

26 Akkerman H., Vos B., *Amplification in services supply Chains: An exploratory case study,* "Production and Operations Management", 12 (2003)/2, pp. 204–223 – https://doi.org/10.1111/j.1937-5956.2003.tb00501.x

in demand for related services, such as air passenger transport, which interact most closely with the tourism sector, which has suffered even greater losses from the pandemic.

Studying the benefits of outsourcing, first of all, we emphasize that the airline will focus only on its own core process (air transportation of passengers and cargo) and provide it at the highest level. All other processes will be provided by outsourcing partners in accordance with the service level agreement, and the costs of such processes will be paid by the airline only in accordance with the volume of work performed. Thus, most of the costs that a legacy carrier includes in the fixed cost, get the status of variable ones. An important advantage of partnering with an outsourcer is that such a company is chosen as a strategic partner on a long-term basis. At the same time, this may be a disadvantage, because the airline will depend on the partner. For example, in the event of bankruptcy of an outsourcer or failure of business processes transferred to him, the airline will be forced to look for a new partner, and when looking for a new partner, poor service can significantly undermine customer loyalty to its brand.

The basis of successful outsourcing is the presence of two strategic partners, between which airline can share the workload of processes. This creates competition among outsourcers to protect the airline from poor quality services and airline can gain the main advantage of outsourcing: transfer of costs from fixed to variable, which allows more flexible response to requests from the external logistics environment.

## 3. ANALYSIS OF THE INFLUENCE OF THE AIRLINE'S EXTERNAL LOGISTICS ENVIRONMENT ON FINANCIAL INDICATORS

The market of air passenger transportation is provided by airlines of such basic business models as: legacy airlines, low-cost airlines and charter airlines, as well as their mixed options. In our study, we will analyse the performance of the largest participants in the market of passenger air transport, namely legacy airlines and low-cost airlines in order to determine the impact on their financial results of the approach to the organization of the air chain of passenger delivery.

Considering the supply chain of the traveller (travel chain) in terms of the organization of the air travel chain, it should be noted that depending on the above classification of airlines, there are some differences in the organization of logistics processes of the air travel chain between legacy airlines and low-cost airlines. Legacy airlines mostly have own passenger and cargo services at base airports. Low-cost airlines use the services of partner handling companies to check in and accompany passengers at all airports to which flights operate, including at base airports. It should also be noted that legacy airlines have many of their own branch offices, not only to sell air transportation, but also to organize all processes in the air travel chain and air supply chain, while low-cost airlines are looking for general agents to represent their interests in countries included in their air network. Such agents work for the airline for a percentage of sales and at rates that depend on other types of work.

In summary, it can be argued that legacy airlines rely on their own divisions to organize the air travel chains and air supply chains, i.e. follow an insourcing strategy, while low-cost airlines fully use the services of partners, i.e. follow an outsourcing strategy, including logistics business processes outsourcing.

A study of the financial performance of the main representatives of legacy and low-cost airlines (Table 1) shows that absolutely all passenger airlines in the world will report significant losses suffered due to the coronavirus crisis.

Results suggest that legacy airlines, which carry out most of the logistical processes involved in checking in and accompanying passengers to / from aircraft, have been hit hardest. One reason is that the legacy airlines need to maintain a permanent staff to ensure all type of processes, including checking in and accompanying passengers to / from aircraft. At a time when the market situation was favourable and traffic volumes were increasing, the legacy carrier also provided passenger handling services to other airlines, in this case such activity was cost-effective. However, in the context of the coronavirus crisis, air traffic was not carried out at all for several months and then increased extremely slowly due to traffic restrictions between individual countries, and legacy airlines incurred huge fixed costs, partly due to the cost of maintaining a passenger service department at their base airports.

Table 1. Net profit / loss and total number of passengers carried by leading passenger airlines

| Type of airline | Airline | Net Profit / Loss, million USD | | | | Passenger carried, million | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | 2020 | 2017 | 2018 | 2019 | 2020 |
| Legacy airlines | American Airlines | 1,282.0 | 1,412.0 | 1,686.0 | -8,885.0 | 199.6 | 203.7 | 215.2 | 95.3 |
| | Air France-KLM | 135.8 | 357.5 | 261.2 | -5,908.6 | 98.7 | 101.4 | 104.0 | 34.0 |
| | Lufthansa Group | 1,949.0 | 1,881.6 | 1,081.1 | -5,610.0 | 129.3 | 142.3 | 145.3 | 36.4 |
| | Air Canada | 132.7 | 27.3 | 1,136.3 | -3,659.5 | 48.1 | 50.9 | 51.5 | 13.8 |
| | Delta Airlines | 3,205.0 | 3,935.0 | 4,767.0 | -12,385.0 | 145.2 | 151.7 | 162.3 | 83.4 |
| Low-cost airlines | Southwest Airlines | 3,357.0 | 2,465.0 | 2,300.0 | -3,074.0 | 130.3 | 134.9 | 134.1 | 54.1 |
| | Easy Jet | 408.7 | 466.7 | 428.8 | -1,388.3 | 80.2 | 88.5 | 96.1 | 48.1 |
| | Ryan Air | 1,786.6 | 993.7 | 711.7 | -956.4 | 130.3 | 142.5 | 148.6 | 27.5 |
| | GOL | 114.2 | -200.9 | 44.6 | -1,135.1 | 32.5 | 33.4 | 36.4 | 16.8 |
| | Pegasus Airlines | 133.2 | 95.1 | 224.3 | -264.3 | 27.8 | 30.0 | 30.8 | 14.7 |

Source: own elaboration based on open data on the Internet sources

At the same time, low-cost airlines did not have such costs at all, as they pay according to number of passengers served by handling companies. This may be one of the reasons why net income has the most negative values for legacy airlines compared to values of low-cost airlines.

It should be noted that although the selected airlines are among the most powerful airlines in the world, but they still differ in terms of revenue, costs, profits, passengers carried, number of aircraft and more. That is why, in order to equalize the airlines, we propose to apply the ratio of financial indicators to the number of passengers carried, as well as to the number of operating aircraft (Table 2).

Table 2. Net loss per passenger carried and net loss per operating aircraft for leading airlines in 2020

| Type of airline | Airline | Net Profit /Loss Per Passenger, USD Per Pax | | | | Net Profit /Loss per aircraft, million USD per aircraft | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | 2020 | 2017 | 2018 | 2019 | 2020 |
| Legacy airlines | American Airlines | 6.42 | 6.93 | 7.84 | -93.21 | 1.35 | 1.48 | 1.79 | -10.39 |
| | Air France-KLM | 1.38 | 3.53 | 2.51 | -173.78 | 0.25 | 0.75 | 0.47 | -27.61 |
| | Lufthansa Group | 15.07 | 13.22 | 7.44 | -154.32 | 2.68 | 2.47 | 1.42 | -7.41 |
| | Air Canada | 2.76 | 0.54 | 22.05 | -265.95 | 0.59 | 0.12 | 5.46 | -17.59 |
| | Delta Airlines | 22.07 | 25.94 | 29.37 | -148.44 | 3.71 | 4.47 | 5.31 | -15.90 |
| Low-cost airlines | Southwest Airlines | 25.77 | 18.27 | 17.16 | -56.83 | 4.75 | 3.29 | 3.08 | -4.28 |
| | Easy Jet | 5.10 | 5.27 | 4.46 | -28.86 | 1.46 | 1.48 | 1.30 | -4.37 |
| | Ryan Air | 13.71 | 6.97 | 4.79 | -34.78 | 4.66 | 2.31 | 1.51 | -2.08 |
| | GOL | 3.51 | -6.01 | 1.22 | -37.86 | 0.96 | -1.66 | 0.33 | -5.00 |
| | Pegasus Airlines | 4.79 | 3.17 | 7.29 | -17.97 | 1.78 | 1.17 | 2.74 | -2.81 |

Source: own elaboration based on open data on the Internet sources

Analysing value "net loss per passenger carried" in 2020 - the year of the coronavirus crisis, it is clear that the most negative results were obtained by legacy airlines, which practice insourcing logistics business processes. Much lower value "net loss per passenger carried" were received by low-cost airlines in 2020, for which it is customary to outsource most processes, including logistics business processes (Fig. 4).

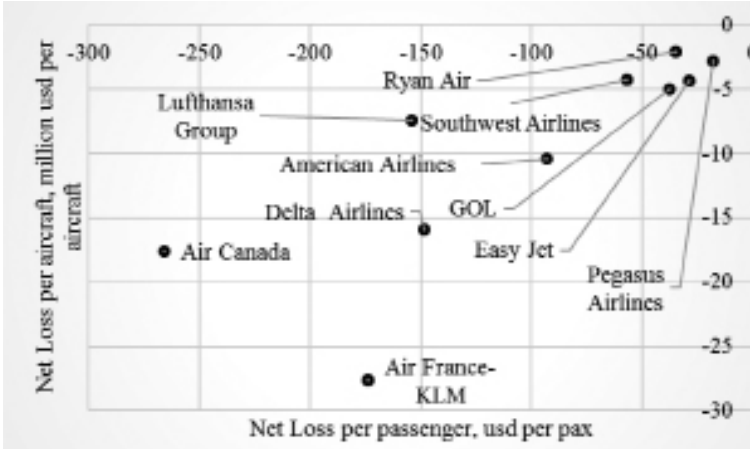



Figure 4. Net loss per passenger carried and net loss per operating aircraft for leading airlines in 2020
Source: own elaboration

It should be noted that similar trends are observed for the given net loss per operating aircraft. The data show that for selected low-cost companies the largest net loss is $ 5 million per aircraft, while for a legacy carrier the lowest net loss is just over $ 7 million per aircraft. It should be noted that the lowest indicator of net loss per aircraft belongs to Lufthansa Group, as this indicator takes into account not only passenger aircraft, but also cargo aircraft operated by Lufthansa Cargo.

By all means, all passenger airlines, seeking to reduce the negative impact of the pandemic on the final financial indicators, applied different options to support the airline. The most common option for airlines was to re-equip passenger cabin into cargo compartments and to carry out medical urgent cargo, which has significantly increased in demand during the closure of borders by countries due to a pandemic. This speed and flexibility of

airlines to the needs and challenges of the external environment has allowed airlines to temporarily transform their own business models, as well as gain additional skills in building supply chains.

Summing up the analysis, we note that:
- the net loss per passenger carried ranges within (-90; 300) USD per pax for legacy airlines, and within (15; 60) USD per pax for low-cost airlines;
- the net loss per operating aircraft ranges within (7; 20) million USD per aircraft for traditional airlines and within (2; 5) million USD per aircraft for low-cost airlines.

These results show that the logistics outsourcing strategy allows the airline to pay for the ground logistics passenger service in proportion to the actual number of passengers served at airports (variable costs of the airline). Accordingly, there is no need for the airline to maintain a specialized service staff and pay them salaries (fixed costs). The transfer of fixed costs to a variable one is particularly useful during periods of air traffic crisis related to economic crises, pandemics (e.g. COVID-19), etc.

## 4. SUMMARY

During the scientific investigation, the logistics environment of the airline's commercial activity was defined as a set of environmental factors that directly or indirectly affect the formation and design of flexible service supply chain and service travel chain.

Based on the analysis of statistical data on the volume of passengers carried by airlines around the world, as well as Poland and Ukraine, was investigated the negative impact of the coronavirus crisis on the logistics environment of the airline's business as a key link in consumer value chains. The analysis of the impact of outsourcing strategies and diversification of airlines' business processes on the profitability of its business in a global pandemic confirmed that turbulent events are less costly to overcome by airlines that use outsourcing as a tool to ensure their business processes. At the same time, diversified airlines continued to maintain full-time units to self-sustain this service chain and thus incurred higher costs. In general, the combination of strategies for outsourcing and diversification of services provided in the service supply chain and service travel chain, allows to create added consumer value and increase flexibility and reliability of customer orders in a turbulent logistics environment through partnership and rapid interaction of business partners. The article was written within the framework of the Jean Monnet Module "EU Transport Policy" of the Erasmus + program (№3 619652-EPP-1-2020-1-UA-EPPJMO-MODULE), which is implemented at the National Aviation University (Kyiv, Ukraine).

## REFERENCES

[1] Global No. 1 Business Data Platform – https://www.statista.com/

[2] Statistics and Analysis of Air Transport Market by Civil Aviation Authority of Poland – https://www.ulc.gov.pl/en/market-regulation/statictics-and-analysis-of-air-transport-market.

[3] Periodical information of State Aviation Administration of Ukraine – https://avia.gov.ua/pro-nas/statistika/periodychna-informatsiya/

[4] Five-Year Forecast 2020-2024. European Flight Movements and Service Units: Three Scenarios for Recovery from COVID-19, STATFOR Ref. DOC677 – https://www.eurocontrol.int/forecasting

[5] Hryhorak M., Savchenko L., Vinyukov-Proshchenko A., *Scenario approach to forecasting the development of the*

*passenger air transport market in the post-pandemic period,* [in:] *Fifteenth International Scientific Conference "AVIA-2021", April 20-22, 2021* – http://conference.nau.edu.ua/index.php/AVIA/AVIA2021/paper/view/8212/6649

[6] Ghobrial A., *Outsourcing in the airline industry: Policy implications*, "Journal of Transportation Law, Logistics and Policy", 72 (2005)/4, pp. 457-473.

[7] Liou J. J., Chuang Y. T., *Developing a hybrid multi-criteria model for selection of outsourcing providers*, "Expert Systems with Applications", 37 (2010)/5, pp. 3755-3761 – https://doi.org/10.1016/j.eswa.2009.11.048

[8] Hsu C. C., Liou J. J., *An outsourcing provider decision model for the airline industry,* "Journal of Air Transport Management", 28 (2013), pp. 40-46 – https://doi.org/10.1016/j.jairtraman.2012.12.009

[9] azargan M., *Airline maintenance strategies – in-house vs. outsourced – an optimization approach*, "Journal of Quality in Maintenance Engineering", 22 (2016)/2, pp. 114-129 – https://doi.org/10.1108/JQME-08-2015-0038

[10] Endrizalova E., Novak M., Nemec V., Hyrslova J., Mrazek P., *Operating Lease As A Specific Form Of Airlines Outsourcing*, [in:] *18th international scientific conference Business Logistics in Modern Management, October 11-12, 2018, Osijek, Croatia,* Osijek 2018, pp. 641-655.

[11] Alshurideh M., Alsharari N. M., Al Kurdi B., *Supply Chain Integration and Customer Relationship Management in the Airline Logistics,* "Theoretical Economics Letters", 9 (2019), pp. 392-414 – https://doi.org/10.4236/tel.2019.92028

[12] Fernando Y., *Service innovation along the chain of service process in airline business,* [in:] *Outsourcing Management for Supply Chain Operations and Logistics Service*, IGI Global, 2013, pp. 185-201 – https://doi.org/10.4018/978-1-4666-2008-7.ch011

[13] Gil R., Kim M., Zanarone G., *Relationships Under Stress: Relational Outsourcing in the US Airline Industry After the 2008 Financial Crisis,* "Management Science", (2021), pp. 1-22 – https://doi.org/10.1287/mnsc.2021.3970

[14] Abdullah M. A., Satar N. M., *The Impact of Outsourcing on Airlines' Performance: Empirical Evidence from Asia and Countries in the Pacific*, "Airline Economics in Asia" 7 (2018), pp. 195-219 – https://doi.org/10.1108/S2212-160920180000007011

[15] Sumets O. M., *Theoretical and methodological principles of logistics activities of enterprises in the agro-food complex: a monograph*, Mandrid Printing House, Kharkiv 2015.

[16] Shingal A., Raj A., *Value of Air Cargo: Air Transport and Global Value Chains: Consultant December 6th, 2016,* commissioned by IATA – https://www.iata.org/publications/economic-briefings/value-of-air-cargo-2016-report.pdf

[17] Cronin M. J., *Unchained value: The new logic of digital business,* Harvard Business School Press, Boston 2000.

[18] Ellram L. M., Tate W. L., Billington C., (2004). *Understanding and managing the services supply chain,* "Journal of Supply Chain Management", 40 (2004)/3, pp. 17-32 – https://doi.org/10.1111/j.1745-493X.2004.tb00176.x

[19] Wang Y., Wallace S. W., Shen B., Choi T. M., *Service supply chain management: A review of operational models,* "European Journal of Operational Research", 247 (2015)/3, pp. 685–698 – https://doi.org/10.1016/j.ejor.2015.05.053

[20] Aliakbari Nouri F., Shafiei Nikabadi M., Olfat L., *Developing the framework of sustainable service supply chain balanced scorecard (SSSC BSC)*, "International Journal of Productivity and Performance Management", 68 (2019)/1, pp. 148-170 – https://doi.org/10.1108/IJPPM-04-2018-0149

[21] Zhang R., Chen R., Zhang Y., *The conceptual model of the service supply chain research based on business processes,* [in:] *2009 International Conference on Management and Service Science: MASS 2009; Wuhan/Beijing, China, 16-18 [i.e. 20-22] September 2009*, Wuhan 2009, pp. 1–4 – https://doi.org/10.1109/ICMSS.2009.5301600

[22] Vargo S. L., Lusch R. F., *The four service marketing myths: remnants of a goods-based, manufacturing model,* "Journal of Service Research", 6 (2004)/4, pp. 324-335 – https://doi.org/10.1177/1094670503262946

[23] Youngdahl W. E., Loomba A. P. S., *Service-driven global supply chains*, "International Journal of Service Industry Management", 11 (2000)/4, pp. 329-347 – https://doi.org/10.1108/09564230010355368

[24] Saccani N., Johansson P., Perona M., *Configuring the after-sales service supply chain: A multiple case study,* "International Journal of Production Economics", 110 (2007)/1-2), pp. 52-69 – https://doi.org/10.1016/j.ijpe.2007.02.009

[25] Sengupta K., Heiser D. R., Cook L. S., (2006). *Manufacturing and service supply chain performance: a comparative analysis,* "Journal of Supply Chain Management", 42 (2006)/4, pp. 4-14 – https://doi.org/10.1111/j.1745-493X.2006.00018.x

[26] Akkerman H., Vos B., *Amplification in services supply Chains: An exploratory case study,* "Production and Operations Management", 12 (2003)/2, pp. 204–223 – https://doi.org/10.1111/j.1937-5956.2003.tb00501.x.

**Myroslava Semeriahina**
**National Aviation University Kiev, Ukraine**
**myroslava.semeriahina@npp.nau.edu.ua**
**ORCID: 0000-0001-7490-6874**

**Mariia Hryhorak**
**National Aviation University Kiev, Ukraine**
**mariia.hryhorak@npp.nau.edu.ua**
**ORCID: 0000-0002-5023-8602**

**Dmytro Bugayko**
**National Aviation University Kiev, Ukraine**
**bugaiko@nau.edu.ua**
**ORCID: 0000-0001-9901-4792**