St Petersburg University

Graduate School of Management

Bachelor in International Management

RECOMPOSITION OF THE VALUE CHAIN OF RUSSIAN COMMERCIAL AIRLINES IN CURRENT ENVIRONMENT

Bachelor thesis

4th year student of a bachelor's program

International Management

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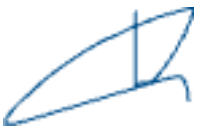

Saint Petersburg

2024

STATUTORY STATEMENT ABOUT THE INDEPENDENT CHARACTER OF THE BACHELOR THESIS

I, Zakamskikh Sofia Vladimirovna, (fourth) year bachelor student, program 38.03.02 International Management, state that my bachelor thesis on the topic “Recomposition of the Value chain of Russian commercial airlines in current environment”**,** which is presented to the Bachelor Office to be submitted to the Official Defense Committee, for the public defence, does not contain any elements of plagiarism.

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Saint Petersburg 30 May 2024

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Abstract

This work identifies options for recomposing the value chain of commercial airlines in Russia subject to restrictions in the form of sanctions. The value chain in the airline industry from the supply chain side has been determined, and the areas most susceptible to change have been identified. Through sanctions against Russian airlines, a number of restrictions were introduced, mainly aimed at the property part of the airline to reduce the likelihood of the use of airline industry products for dual purposes, through the suspension of partnerships (with supplier and consumer countries) and enhanced export controls. Countermeasures to support airline processes include fleet nationalisation, increased focus on developing Russia's airline industry (creation of spare parts, new aircraft and supporting businesses), and increased cooperation with partner countries.

Key Words: Value Chain, Sanctions, Airlines, Recomposition alternatives, Strategic decisions.

Данная работа определяет варианты рекомпозиции цепочки создания стоимости коммерческих авиакомпаний в России подверженной ограничениям в виде санкций. Определена цепочка создания стоимости в авиационной отрасли со стороны цепочки поставок, а также идентифицированы наиболее подверженные изменениям зоны. Через санкции в отношении российских авиакомпаний был введен ряд ограничений, в основном направленных на имущественную часть авиакомпани для снижения вероятности использования продуктов авиаиндустрии в двойном назначении, путем приостановки партнерских отношений (со странами-поставщиками и странами-потребителями) и усиленного экспортного контроля. Контрмеры для поддержания процессов авиакомпаний включают в себя национализацию флота, усиленный фокус на развитие авиаиндустрии России (создание запчастей, новых самолетов и поддерживающих предприятий), а также усиленное сотрудничество с странами-партнерами.

Ключевые слова: цепочка создания стоимости, санкции, авиакомпании, альтернативы рекомпозиции, стратегические альтернативы

INTRODUCTION

The aviation industry has played a significant role in facilitating global connectivity and fostering economic development. Over the years, this industry has experienced ongoing changes driven by advancements in technology, shifts in geopolitics, and evolving consumer preferences. In recent times, the global airline sector has encountered challenges posed by geopolitical tensions, and economic instabilities. In this rapidly evolving industry, Russian airlines have faced distinctive challenges and opportunities. Historically, the Russian airline sector has been a major player in both domestic and international air travel, with carriers like Aeroflot being prominent figures in the global market. In 2022, Russian airlines following the pandemic in light of evolving global dynamics, were affected by regulatory restrictions, infrastructure constraints, and economic volatility. In response, it has become crucial for these airlines to strategically adapt and reposition themselves within the global value chain to maintain competitiveness and sustainability in the long term within Russian and global markets. Due to the novelty of the restrictions and their evolving status, analyses of the impact of sanctions on airlines are provided in the public domain in a limited and generalised version, stating the fact of the accomplishment and superficially justifying the impact on business processes. The researchers mainly focus on either sanctions itself and their development or general effects on the Russian market. There are researches that analyse impacts of sanctions on industries, not including the airlines one. Even though there are many organisations responsible for publications of airline and aviation industry changes, they predominantly analyse sanctions from the analysis of indexes. Research on what solutions are available to an airline company in a given situation and their analysis is limited or provided on a contractual (consulting) basis.

Problem Statement

The airline industry, a key global sector essential for technological, economic, and social progress among nations, is significantly influenced by various economic, political, social, and technological factors in its external environment. Sanctions implemented in February 2022 resulted in disruptions in the supply in the air industry and closures of airspace between countries. Sanctions such as the prohibition on supplying aircraft and its spare parts to Russia have had financial and operational repercussions on aircraft manufacturers and maintenance services. The ability of these airlines to reshape their operational strategies is crucial for their sustainability and expansion in the both domestic and global marketplace. The examination of these adjustments not only offers insights into the strategic measures adopted by these airlines but also adds to a wider comprehension of the dynamics of international aviation under

regulatory constraints. In response to the evolving regulatory environment, Russian commercial airlines are compelled to adapt and recalibrate their value chains to sustain operations and maintain competitiveness. Previous models are no longer suitable for the environment due to a complex landscape of sanctions, restrictions, and limited supply volumes, which collectively threaten the business models and operational logistics of these airlines

Research goal and objectives

The goal of this paper is to identify the options for Russian commercial airlines value chains recompositing in response to sanctions and regulatory pressures

The paper's objectives are:

- To identify the ways in which Russian commercial airlines were having their value chains.
- To identify the impact of sanctions and regulations on the operations of Russian commercial airlines.
- To identify the strategies employed by Russian commercial airlines to mitigate the effects of these challenges
- To identify a pull option of how airlines might adjust to the environment affected by the global regulatory landscape.

Research questions

Object: Russian airline companies

Subject: Value Chain recomposition strategies

1. What are the differences between frameworks that analyse the value of a business within its operations?

2. What are the distinctive features of the value chain in the airline industry?

3. How governments contributed to the changes of Russian airlines business processes?

4. What impact do sanctions and regulations have on the Value Chain of Russian commercial airlines?

5. What options may be incorporated in airlines value chain recomposition

Methodology

To empirically identify the impact of sanctions on the airline industry, qualitative research is useful for several reasons. Firstly, this method allows to identify the connection and consequences between both direct and indirect impacts of sanctions on a specific sector, which during the quantitative analysis may not have been included in the sample or may not have been immediately detectable (Crossman, 2020)[1]. Moreover, qualitative methods offer a high level of flexibility and adaptability[2], making them beneficial for analysing international policy instruments[3]. This is especially beneficial in scenarios where circumstances evolve rapidly and unpredictably, and where decisions can lead to unintended consequences. These consequences, which may not be readily quantifiable due to data limitations, are crucial for a thorough assessment of the effects of sanctions. Thirdly, gaining an understanding of the various viewpoints held by stakeholders who are impacted by the sanctions can offer valuable insights into the efficacy of the measures, their repercussions[4] (both intended and unintended), and can also aid in framing the research findings within a broader context.

Secondary data

One approach to collecting data involves utilising secondary information sources. This includes information gathered from reputable sources such as the official government and business websites, newspapers, and other media outlets. Predominantly this method is used in the literature review, as these sources provide valuable insights on terms, sanctions, and compliance with regulations by both countries and businesses as well as on the existing research on related topics. Data on sanctions will be sourced from official government websites and council regulations, as well as from media reports, and presented in chapter 2.

Semi-structured interviews

In chapter 2 the value chain of airlines is going to be presented, based on the information from the previous chapter 1. After identification of the value chain, the impact of sanctions is going to be identified on the base of secondary data resources, as mentioned above. In order to confirm the findings from data collected, present the value chain in different forms and identify certain trends and segmentation patterns, semi-structured interviews will be used. This type of

[1] URL: https://www.thoughtco.com/qualitative-research-methods-3026555
[2] "The Advantages of Qualitative Research in Market Research." *FasterCapital*, 6 Apr. 2024
[3] Ford, Tiffany N., and Annelies Goger. "The Value of Qualitative Data for Advancing Equity in Policy." *Brookings*, 14 Oct. 2021
[4] "The Advantages of Qualitative Research in Market Research." FasterCapital, 21 Apr. 2024

interview involves the interviewer who uses a prepared guide/questions to obtain information (answers) on specific topics. The main advantage of this method is flexibility, that is, some topics can be answered more fully than others through discussion. “The semi-structured interviews provided richer context and were easier to process” (Paz-Soldan et al., 2014, p. 2)[5]. This allows for deeper exploration of certain areas by counterbalancing the rigidity of structured interviews, the focus of which can be biassed. (Qu & Dumay, 2011)[6].

The pull of participants consists of 4 people who are related to the airline industry, namely (1) sustainability communications manager and airport development manager with experience as public relations specialist in Northern Capital Gateway LLC and aviation marketing, (2) pilot of a private airline in the USA with experience as pilot in Aeroflot (3) Project lead in consulting company with experience in Innovation Development Department of Rossiya Airlines and aviation marketing department of Northern Capital Gateway LLC (4) operations analyst at Northern Capital Gateway LLC. In accordance with ethical guidelines and the interviewee's preferences, no recordings were made of the interviews. Detailed notes were taken during the interviews, and the information was anonymized to ensure confidentiality. Their responses were paraphrased and summarised.

Case study analysis

In chapter three the options of recomposition of the value chain in the airline industry are going to be identified. Case study research according to Creswell (2013)[7] is designed to examine a "real-life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection using various sources of information" (p. 97). As a result, a case study as a deep investigation of a single entity aiming to generalise findings across a broader spectrum[8].

Miles and Huberman (1994)[9] pointed out that for case study analysis selecting suitable cases is crucial. Research identifies changes in the value chain of the Russian commercial airlines. The Ministry Of Transport Of The Russian Federation Federal Air Transport Agency

[5] Kakilla, C. Strengths and Weaknesses of Semi-Structured Interviews in Qualitative Research: A Critical Essay. Preprints 2021
[6] Qu, Sandy Q., and John Dumay. *Qualitative Research in Accounting and Management*. Emerald Insight, 30 Aug. 2011.
[7] Creswell, John W. *Research Design : Qualitative, Quantitative, and Mixed Methods Approaches*. 3rd ed., Los Angeles, Sage, 2009
[8] Ridder, Hans-Gerd. “The Theory Contribution of Case Study Research Designs.” Business Research, vol. 10, no. 2, 16 Feb. 2017, pp. 281–305. springer
[9] Miles, Matthew B., and A. Michael Huberman. Qualitative Data Analysis: An Expanded Sourcebook. Sage. SAGE, 1994.

proposes a register of airlines – the list of operators holding an operator certificate for commercial air transportation (sample from the FSIS "Register of Operators and Aircraft" for the website of the Federal Air Transport Agency as of 10/20/2023). Further elimination was according to the object and subject of the research. From the database were eliminated organisations that carry out any type of activities except 51.1 – Passenger activities air transport and 51.10.1 – Transportation by air passenger transport subject to a schedule. and which have Full Service Carrier or Low Cost Carrier business models along with both internal and international flight routes. Charter airlines were eliminated due to specifics of the Business Model. Rowley (2002)[10] has noticed three case selection factors that are: (1) Time, (2) Accessibility, and (3) Resources. Not having just access, but easy access to the case is also one crucial criterion. These factors are supported by other case study research authors such as Yin (2003), Stake (1995), Seawright (2008) and Gerring (2010). The confidentiality of information required affects its availability, which affects the final choice of cases. Therefore, the final decision on the pool of companies is the Aeroflot group with regular investor presentations and annual reports.

1. Aeroflot - Russian Airlines Public Joint-Stock Company – Full Service Carrier
2. Pobeda Airlines Limited Liability Company – Ultra Low Cost Carrier
3. Rossiya airlines Joint-Stock Company – Full Service Carrier

[10] Rowley, Jennifer. “Using Case Studies in Research.” Management Research News, vol. 25, no. 1, Jan. 2002, pp. 16–27

CHAPTER 1. LITERATURE REVIEW

Value chain definition

According to the Legal Information Institute a business involves a natural person or entity performing an activity or trade with the intent of making a profit in a form of revenue, a charitable or social purpose or any other type of organisational mission[11]. The activity or trade may be commercial, industrial, professional, or otherwise, aimed at meeting customer needs.[12] The success of business is determined by the effectiveness of the strategy it follows. Business strategy is an action plan aimed to shape the decision making process and achieve the vision of an organisation[13]. Meskendahl (2010), Wirtz et al. (2016) describe a business strategy as ways of how the enterprises gain competitive advantage, how they decide to compete in the market, and what business model provides them with a competitive advantage[14]. It is done in order to improve the company's position in a competing market by setting certain objectives.[15] In order to have a competitive advantage on a market a business may choose between four types of competitive strategy. They were introduced by Michael Porter in 1985 as Four Generic Strategies and included strategic targets (industrywide or particular segment) and competitive advantage (uniqueness and value or cost positioning).

According to Cambridge dictionary[16] cost is the value of the resources that an entity must invest to get a good or service. Value for money according to OECD[17] is the optimum combination of whole-life cost and quality (or fitness for purpose) to meet the user's requirement, that can be assessed using the criteria of economy, efficiency and effectiveness. Business value means understanding how valuable a product is to a company, its customers, and other involved parties. Thus, value is certain benefits that could be expressed in terms of creation cost (raw to end-user production) or uniqueness perceived. W. Chan Kim and Renee Mauborgne work Blue Ocean Strategy (2005)[18] stated that the strategy of a business is about the decision on the tradeoff between cost and value. Abdulhussien & Hamza (2012)[19] and Williams & Naumann

[11] URL: https://www.law.cornell.edu/wex/business
[12] URL: https://businessnes.com/what-is-business/
[13] The Strategy Institute. "What Is Business Strategy? Definition, Importance, Levels, and Examples." 20 Oct. 2023
[14] Strakova, Jarmila, et al. "The Value Chain as the Basis of Business Model Design." *Journal of Competitiveness*, vol. 13, no. 2, 30 June 2021, pp. 135–151
[15] https://consulterce.com/business-strategy/#what-is-a-business-strategy
[16] "COST | Meaning in the Cambridge English Dictionary." Dictionary Cambridge
[17] Jackson, Penny. WHAT IS VALUE for MONEY and WHY IS IT on the AGENDA? May 2012
[18] W Chan Kim, and Renée Mauborgne. Blue Ocean Strategy. Boston, Mass., Harvard Business School Press, 2005.
[19] Junidi, Al & Warrad, Lina. (2022). Strategic management accounting techniques and their effect on the capital structure. Academy of Strategic Management Journal. 21. 1-18.

(2011) [20]claim that utilising tools such as value chain analysis and benchmarking can lead to cost reduction, enhanced product quality, and improved performance evaluation for businesses, making the decision between cost and value justified. Value Chain was introduced by Michael Porter in his book "Competitive Advantage: Creating and Sustaining Superior Performance" (1985)[21] as a framework to understand how exactly businesses may add value to their inputs. Every firm is a group of activities performed to design, produce, market, deliver, and support its product. Porter introduced the Value Chain as a business with primary and support activities that add value to the final product and, thus, it gains a competitive advantage by performing strategically important activities more cheaply or better than its competitors. It consists of the margin being the difference between total value and the collective cost of performing the value activities, that are physically and technologically distinct.

Primary Activities: (1) Inbound logistics – receiving, storing, disseminating inputs to the product, (2) Operations – transforming inputs into the final product form, (3) Outbound Logistics – collecting, storing, physically distributing the product to buyers, (4) Marketing and Sales – providing a means and inducing customers to purchase the product, (5) Service – providing service to enhance or maintain the value of the product.

Support Activities: (1) Procurement – purchasing inputs used in the firm's value chain, (2) Technology development – procedures, or technology embodied in process equipment, (3) Human Resource Management – recruiting, hiring, training, development, and compensation of all types of personnel, (4) Firm Infrastructure – general management, planning, finance, accounting, legal, government affairs, and quality management.

Value chain of airline

In the case of airlines, Porter (1996)[22] states that the strategy involves a whole system of activities, not a collection of parts. Competitive advantage in airline business comes from the way activities fit and reinforce one another. According to IATA, McKinsey & Company and Porters works, the value chain for airlines is illustrated in Table 1. This is a general value chain for many airlines and includes most of the activities performed. The information was ratified by the results of semi-structured interviews conducted. As this is a generic value chain, Russian

[20] Williams, Paul, and Earl Naumann. "Customer Satisfaction and Business Performance: A Firm‐Level Analysis." *Journal of Services Marketing*, vol. 25, no. 1, 22 Feb. 2011, pp. 20–32

[21] Porter, Michael E. *Competitive Advantage : Creating and Sustaining : Superior Performance*. New York, The Free Press, 1985.

[22] Harvard University. Graduate School Of Business Administration. *Michael E. Porter on Competition and Strategy.* Boston, Mass., Harvard Business School Publishing, 1991.

airlines have as well the same operations, which develop and extend throughout the years with the development of the global airline industry.

Table 1 Value Chain of airlines

Support Activities					
Firm Infrastructure	Accounting, Legal, Finance, PR Marketing, Sales, Quality Assurance, General Management, Financial Policy, Accounting, Regulatory Compliance, Community Affairs, Grounding Services, M&A and R&D department				
Human Resource Management	Recruitment and development of employees Labour relations and employee satisfaction initiatives	Pilot Training Safety Training Inflight Training	Baggage Handling	Agent Training	Ground Staff training Support personnel training
Technology	IT systems for Reservation System, Inflight System, Flight Scheduling System, Yield Management System			Product Development Market Research	Baggage Tracking System
Procurement	Purchasing aircraft, fuel, and in-flight supplies. Information Technology Communication				
Primary Activities:	Inbound Logistics	Operations	Outbound Logistics	Marketing & Sales	Service
	Route Selection Passenger Service Yield Management Fuel Flight / Crew Scheduling Facilities Planning Aircraft acquisition Coordination with fuel suppliers. Receiving, storing, and distributing supplies such as food and beverages, aircraft parts, and other necessary items for flights.	Ticket Counter Operations Gate Operations Aircraft Operations Onboard Services Baggage Handling Flight operations, including piloting and navigation. Aircraft maintenance and safety checks. Ground operations such as baggage handling, aircraft cleaning, and catering services. Managing crew schedules.	Baggage System Flight Connections Rental Car and Hotel reservation system Ticketing and reservation systems. Scheduling flights to maximise the efficiency of fleet utilisation. Coordinating with airports for gate assignments, takeoff, and landing slots.	Promotions Advertising Frequent Flyer / Alliance program Travel Agent programs Group Sales Electronic Tickets Advertising and promotional activities. Loyalty programs. Partnerships with other airlines, hotels, and car rental services. Sales through various channels, including direct sales, online portals, and travel agencies.	Lost Baggage Service Complaint Follow-up Customer service, including check-in, boarding, in-flight services, and handling customer complaints and requests. Providing extra services such as lounge access, priority boarding, and in-flight entertainment.

Source: [compiled by the author based on Porter (1996)]

Value Chain and Business Model relation

PWC in 2024 published a report for assistance in navigation in disclosure requirements[23]. There the value chain is defined as “the full range of activities, resources and relationships related to a reporting entity’s business model and the external environment in which the reporting entity operates”. According to Harvard Business School, the Value Chain identifies the key sequence of activities that create and deliver the product, in order to find ways to generate and enhance value and identify areas for improvement (enhancement of value) or cost reduction[24]. Business model is the associated physical resources and partnerships that deliver in the value chain. It highlights how a business creates, delivers, and captures value to ensure alignment between customer needs and the business's offerings.

Overall, Business Model is the core idea of companies operations while Value Chain is the sequence of those activities to improve the operations. Before 1980 the aero industry was highly regulated by the government with strict rules to follow, making the business models of them similar with no room for differentiation or cost competition. After 1980, according to the research of Ganesh Sitaraman[25], when the industry was deregulated, the “cutthroat competition

[23] “Navigating the SEC Climate-Related Disclosure Requirements.” Viewpoint.pwc.com, 14 Mar. 2024
[24] Stobierski, Tim. “What Is a Value Chain Analysis? 3 Steps.” Harvard Business School, 3 Dec. 2020
[25] Neal, Jeff. “Airline Deregulation May Be Why Flying Is Such a Miserable Part of Holiday Travel.” Harvard Law School, 14 Nov. 2023

between the airlines" appeared due to new entrants, absence of alliances or unions, and focus on the high-volume routes. At that moment differentiation between airlines took place; new business models, service and goods offerings became a way of competitive advantage[26] emphasising the value creation from different approaches. Thus, airline value chains are similar to each other from the most of the aspects of primary activities, but depending on the business model the offerings from support activities vary.

Being global as necessary measure for airlines

As mentioned previously, in the past, government-controlled airlines relied on resources provided by countries' forces, but as technology and approaches to operating airlines evolved, industry participants shifted their focus to quality and specialisation, leading to a more efficient distribution of forces across the global landscape. This resulted in a duopoly between Boeing and Airbus in the manufacturing market. With globalisation in the 21st century, many airlines moved towards foreign suppliers, creating a Global Value Chain in the airline industry. This involves collaboration across geographic spaces to bring a product from concept to end use. Thus, each part of the Value Chain of an airline is forced by history and its specifics to be taken from global suppliers and markets, making it a Global Value Chain from the perspective of an airline. GVC involves working with entities across geographic spaces to bring a product from concept to the end use and beyond[27]. Further in the work, due to the global characteristics of the industry, consider the value chain as a global value chain.

Value network and value grid as extended framework in aerospace industry

In order to observe this global connection, another approach in analysis of value creation can be used. In this case, the perspective does not describe the processes of a company, but has a broader look at raw to end user activities from the industry perspective with step-by-step flow of product creation among multiple organisations or business divisions.

[26] National Air and Space Museum. "The Evolution of the Commercial Flying Experience." Airandspace.si.edu
[27] Seric, Adnan, and Yee Siong Tong. "What Are Global Value Chains and Why Do They Matter?" Industrial Analytics Platform, Aug. 2019

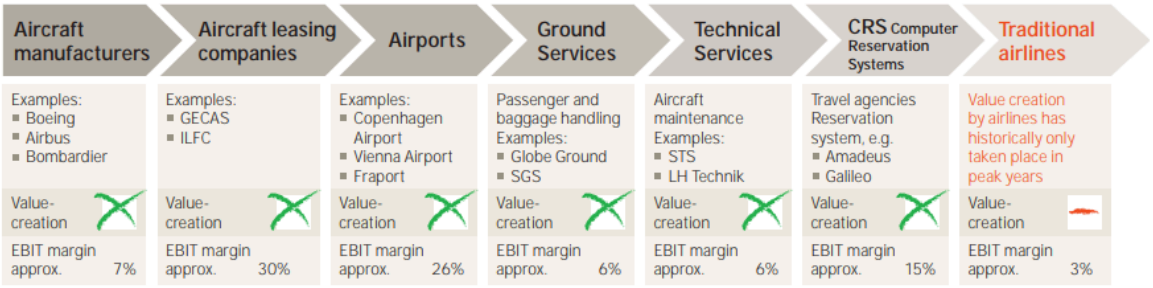

Figure 1 Value Network Framework

Source: [SAS Group, 2003]

According to SAS Group (2003) air transportation participants in general include many players that could be distributed into interconnected one after another groups as presented in Figure 1[28]. This linear type of connection is also known as the **value network framework.** According to Briscoe, Keränen and Parry (2012)[29]. It is a group of organisations, where members convert their expertise into both tangible and intangible deliverables that might result in mutual benefits and support value-creation. Juan Carlos Cuesta et al., (2010)[30] define value networks as a web of relationships which contribute to increase financial return and other profits through complex dynamic exchanges. The airline functions as the integrator of all the products in the system making it an important binder between all entities. Consequently, in the long run airlines are the low-margin part of the chain, according to the International Air Transport Association (IATA)[31], as they buy all the other products from other participants and deliver them to the commercial aviation industry customers. However, taking an even broader look at the aerospace industry, commercial carriers have similarities of sharing raw materials and products with other industries such as military, helicopter, space, drones, etc. transportation. The connection between these organisations can be represented in a 3D model as in Figure 2 named **value grid framework.**

[28] "The SAS Group's Annual Report 2003 & Sustainability Report." 2003.
[29] Briscoe, Gerard, et al. "Understanding Complex Service Systems through Different Lenses: An Overview." European Management Journal, vol. 30, no. 5, Oct. 2012, pp. 418–426
[30] Juan Carlos Cuesta, et al. "Grid Value Chains – What Is a Grid Solution?" Springer EBooks, 13 Oct. 2009, pp. 83–96
[31] IATA. "Airlines Set to Earn 2.7% Net Profit Margin on Record Revenues in 2024." Www.iata.org, 6 Dec. 2023

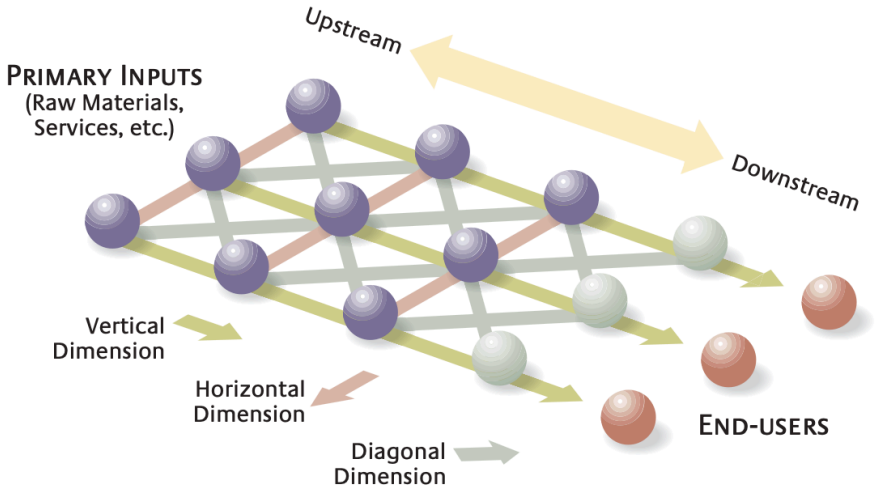

Figure 2 Value Grid Framework

Source: [Pil & Holweg, 2006, p. 74]

This model from Pil & Holweg (2006)[32] encompasses the totality of objects and their relationships, facilitating the creation of value through interactive processes. This approach differs from traditional value chain structures because it uses non-linear thinking and includes three different dimensions: vertical, horizontal and diagonal - enabling the company new ways to increase its performance[33]. This approach can help to give an overview of actors involved and how value-adding activities and competencies vary and allocated among them (Stanoevska-Slabeva et al. 2007)[34], making this model applicable to have the view over the aerospace industry in general from the perspective of an organisation within it.

To summarise, Figure 3 illustrates the relation between each concept. Value grid provides a general overview across many industries that may be interconnected directly or non-directly . In order to do that vertical, horizontal and diagonal directions are used to find the new interconnections from raw to end-user connections. It analyses the possibilities of partnership between value chains of each industry, as selected in blue, green, red and yellow frames on figure 3. This Value Network or Chain (depending on the context) provides a selected market-based view on how product is created and transferred to the end-consumer. Porter's Value Chain provides a view on one company's processes. Each business operation is distributed among activities (primary or support) based on its features and individually brings significance. Porter chain allows further creation of market-based views, which are built in the form of

[32] Pil, Frits K. by Matthias Holweg. MIT SLOAN Management Review, 2006
[33] Pil, Frits K. by Matthias Holweg. MIT SLOAN Management Review, 2006
[34] Stanoevska-Slabeva, Katarina, et al. "Development of a Generic Value Chain for the Grid Industry." Lecture Notes in Computer Science, 2007, pp. 44–57

partnerships. In appendix Table 6 there is a detailed comparison between each framework. Important to notice, that the value chain looks for ways to enhance the product's value along the supply chain. Supply chain deals with building the product and getting it to the consumer. This means that all those value concepts (chain, network, grid) are based on the supply chain between entities and are looking for ways to create a better supply in terms of cost or benefits (value), and coordination and logistics management[35].

According to the Merriam-Webster dictionary, recompose (verb) means to compose again. It is similar to definition of rearrange – to arrange (to put into a proper order or into a correct or suitable sequence, relationship, or adjustment[36]) again in a different way[37]. According to Cambridge Dictionary[38], a synonym to rearrange is rethinking – the act of thinking again about a plan, idea, or system in order to change or improve it. According to those definitions, "rearrange" can be treated as action of processes that change something to happen, while rethinking is an action of intent to do something and creation of prerequisites for action to be taken (recomposition itself).

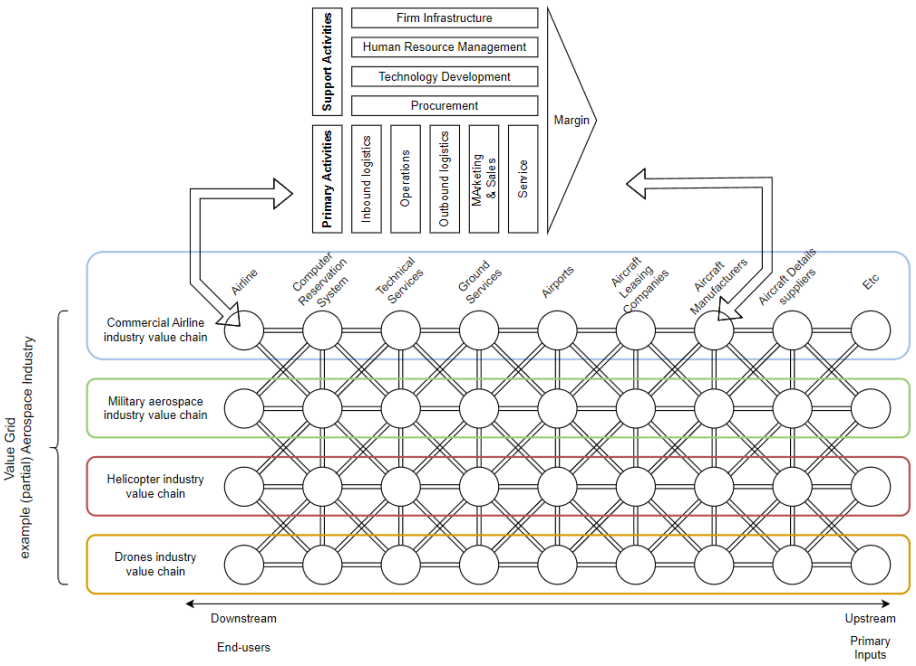

Figure 3 Relation between value grid, value network ad value chain frameworks

[35]Stobierski, Tim. "What Is a Value Chain Analysis? 3 Steps." *Harvard Business School*, 3 Dec. 2020
[36] "Definition of ARRANGE." www.merriam-Webster.com, 25 May 2024
[37] "Definition of REARRANGE." www.merriam-Webster.com, 22 May 2024
[38] Cambridge Dictionary. "Rearrange." @CambridgeWords, 29 May 2024

Source: [compiled by the author. Example used from SAS Group (2003)]

Value Chain upgrading, as defined by Gereffi (2005), is the transformative process where economic entities, including nations, companies, and workers, shift from engaging in low-value to higher-value activities within production networks. Currently, airlines' value chain is increasingly carried out by third parties (outsourcing) with a necessity to be conducted on global level, as chain specialisation expanded to cover not only products, but also tasks[39]. Depending on the selected value analysis framework, the change might be conducted in horizontal, vertical or diagonal dimension (see Appendix Table 6) for upstream or downstream operations. Forward linkages are created when entity A supplies resources that are used for production of entity A ("Seller" perspective or supply side). While Backward linkages are created when entity A uses resources from entity B for usage ("Buyer" perspective or sourcing side) (Figure 4). In airline value chain forward linkage is flight for customers and backward linkage is acquisition of aircraft.

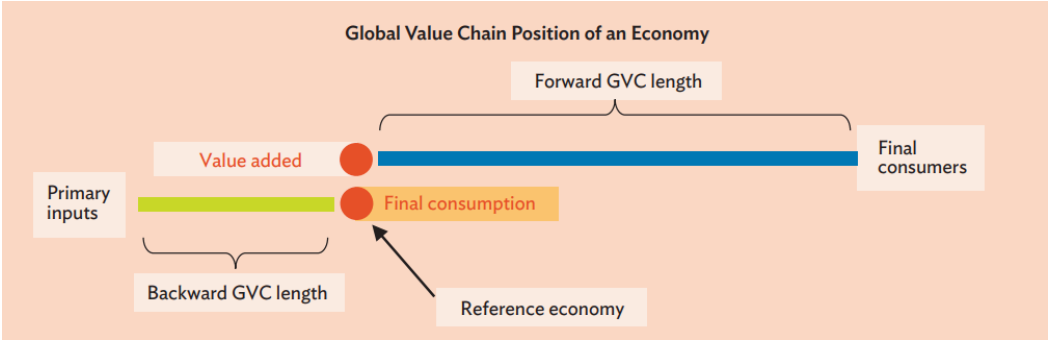

Figure 4 Global Value Chain Position of an Economy

Source: [Alvarez et al., 2021, p. 11][40]

Value chain recomposition is the process of reorganising the different activities that make up a company's value chain to optimise performance, enhance competitiveness, or adapt to changing market conditions[41]. There are many researches that analyse possible ways of development of the aviation industry in the future. Aviation 2035 is topic discussed by many

[39] Kaur, Dr Kiranjot, and Iuliia Kau. "1.2 Components of Global Value Chain." *Ecampusontario.pressbooks.pub*, 11 July 2022
[40] Kaur, Dr Kiranjot, and Iuliia Kau. "1.2 Components of Global Value Chain." Ecampusontario.pressbooks.pub, 11 July 2022
[41] "Impact of Restructuring on Health and Safety of Workers | European Foundation for the Improvement of Living and Working Conditions." Eurofound Europa

companies and researchers, such as Mathieu Blondel (2018)[42], IATA (2018)[43], Airbus[44], IIAG[45], COP27[46] and others. All of them are rethinking about possible recomposition (action) of the aero industry and demand in airlines in the future. In the report by IATA it was stated that drivers of the value chain of the airline industry are geopolitics and data-related themes.

Disruptions of Value Chain

Value chain disruption is caused by various factors like natural disasters, political conflicts, technological processes and pandemics, leading to a disturbance in the production, sales, and distribution of goods or services. There is extensive research into airline value chains, involving both individual researchers and various organisations such as IATA, McKinsey[47] and Michael Porter. These studies often describe parts of the value chain and provide insight into broader industry dynamics, including various aspects of aviation such as strategy, operations and industry analysis. For example, there are analyses of low-cost airlines with explanations of the reasons for their performance, as well as analyses of successful global airlines and an explanation of their formation.

These collaborative efforts have made significant contributions to the understanding of the structure and challenges of the airline industry. Many studies and reports primarily describe the value chain, demonstrating relationships between various operational aspects, focusing on describing components of the value chain such as suppliers, operations, marketing and sales, or tracking changes in various measures of business operations (e.g. load factors, profitability, cost per kilometre of available space) and analysis of the reasons underlying them. It is also important to note that studies fall into two categories: analyses that are often more quantitative in nature and focus on performance indicators (which are presented in the form of an annual report for investors and stakeholders), and those that focus on structural relationships within the value chain. Otherwise, the researchers identify possible development of the value chain within the existing environment on how to achieve the higher rate of return[48].

[42] "Aviation 2035 | Arthur D. Little." Adlittle, 9 Nov. 2018
[43] "FUTURE of the AIRLINE INDUSTRY 2035." 2018.
[44] "Airspace Cabin Vision 2035+ | Airbus Aircraft." Aircraft.airbus.com, 23 May 2023
[45] Predicting the Future of Aviation Industry in 2035. 21 Nov. 2023
[46] Rehman, Raheela. "The Future of Aviation: How Will We Fly to COP in 2035?" Www.energy.cam.ac.uk, 25 Nov. 2022
[47] "What Strategists Need: A Meeting of the Minds | McKinsey." McKinsey
[48] Tretheway, Michael W., and Kate Markhvida. "The Aviation Value Chain: Economic Returns and Policy Issues." Journal of Air Transport Management, vol. 41, Oct. 2014, pp. 3–16

However, there is little research on the topic of value chain changes caused by external geopolitical factors. The number of countries with the airline industry affected by sanctions is relatively small. Until 2022, there were North Korea (2006), Libya (2011), Syria (2013) as only countries affected by flight restrictions[49]. Certain researchers analyse the value and supply chain of airlines in those countries, however, there is still limited research on identifying the possible adaptation decisions on change of the value chain under those restrictions.

In February 2022 European Union, United Kingdom, United States and other countries imposed sanctions on the overall Russian market. By the end of 2023, Russia had become the most sanctioned country in the world. More than 18,000 restrictions on various products were introduced, which is more than the total number of sanctions against Iran, North Korea and Syria[50]. These activities affected the air transportation industry drastically as the borders between countries were closed for Russian commercial and other air forces and export controls were introduced. With the latest affecting the lease agreements between organisations, supply of aeroplanes, spare parts, technologies, and etc. This led to various changes in partnerships and operations of the Russian airlines, thus, bringing the changes to the value chain and its reconfiguration as a core part of the airline industry was affected.

The Russian aviation industry has recently faced obstacles due to the introduction of international sanctions and export controls. These sanctions, primarily imposed by Western countries, have disrupted supply chains and limited access to critical technologies, reducing the efficiency of Russian airlines. In response, Russia imposed sanctions on the European Union, the United States and the United Kingdom in an effort to protect its aviation industry. This led to significant disruption to air traffic and mutual airspace closures, illustrating wider geopolitical divisions affecting airlines. At the moment, the situation with sanctions is at a stage of maturity (comparable to the innovation life cycle diagram). “Russia’s economy is doing quite well, and its political system is not in danger of collapse either in the short or medium term,” says the material published by the American edition of The Washington Times. There are many experts that discuss the topic comprehensively, but the lack of academic research on impact of sanctions directly on airline business processes is perceptible. The airline industry, with its complex operating environment, requires more detailed analysis beyond the traditional value chain model to examine the interdependencies and interactions between different functions and organisations in the industry that recently bore .

[49] “EU Sanctions Map.” Sanctionsmap.eu, sanctionsmap.eu/#/main.
[50] “All Publications - IMD Business School for Management and Leadership Courses.” IMD

The concept of sanctions

Aviation is a global industry heavily reliant on international cooperation, technology, and access to markets or air routes[51]. As countries become increasingly connected to global value chains and multinational production, disruptions or prohibitions in this system can lead to different outcomes for the countries involved. Sanctions and export controls impact global supply chains, potentially hampering the cross-border movement of goods between countries.

According to Cambridge Dictionary, Sanction is an official order, such as the stopping of trade, that is taken against a country in order to make it obey international law. Self-governing states use sanctions to affect economic, social, political, and military change with countries, institutions, and individuals to manage national—and international—relations. Sanctions are administered on a case-by-case basis and can last as long as the imposing party deems prudent. Sanctions are typically only lifted if the targeted party is willing to meet the requirements and agree to the terms and conditions of the sanctioning party (or parties). Unwillingness to comply could result in further, more severe sanctions.

In the legal context, they are defined as punishment (or the threat thereof) to which actors acting unilaterally in the international arena, their associations or international organisations subject other states (or organisations) in response to violations of international law, as well as other agreements. and obligations existing in the international community (Doxey M.P., 1980[52]; Daoudi M.S., Dajani M.S., 1983).

Existing research on adaptation of the airlines processes affected by sanctions

Even though sanctions are completely ineffective when applied to developed countries, when it comes to the aviaation industry, sanctions can indeed have significant impacts. Research by Nima Sanandaji (2018) shows that sanctions rarely achieve foreign policy goals and instead create negative externalities by limiting economic well-being and eroding economic and civil liberties.[53] They can disrupt supply chains, limit access to critical technologies, impede financing, and restrict market access, all of which can profoundly affect airline companies, regardless of their location, but overall reduce the amount of imported-exported goods or

[51] ICAO. *Aviation Benefits Report*. 2019.
[52] Doxey, M. P. (1980). Economic sanctions and international enforcement. 2e ed. London: MacMillan.
[53] "Blocking Progress: The Damaging Side Effects of Economic Sanctions." Institute of Economic Affairs

services. Pond (2017)[54], states that “sanctions increase the production of import-competing goods and reduce the production of export goods”.

In the study "Risks, Resilience, and Pathways to Sustainable Aviation: A COVID-19 Perspective" by Gössling S[55]., the author concludes that the aviation business relies on government subsidies. The following paper by Abu-Rayash A. and Dincer I., "Analysis of Mobility Trends During the COVID-19 Coronavirus Pandemic: Exploring the Impacts on Global Aviation and Travel in Selected Cities"[56] corroborates the findings of the previously discussed work. Another article by Mirani S. Z. explores the effects of sanctions on Iran's tourism industry, concluding that Iran's aviation industry managed to survive after sanctions by improving domestic transportation and tripling passenger traffic[57]. Despite adjustments, over the years under restrictions, the aircraft have become quite outdated, and the tourism infrastructure remains incomplete; thus, there is a need for a comprehensive analysis of the external environment that will track the changes applied by sanction.

Overall, penalties against a country often result in increased control over its airline sector, which comes in various forms, such as bans on the purchase of aircraft and their components, restrictions on flights over certain territories, and restrictions on access to global airports. These measures could severely limit airlines' operating capabilities, increase their operating costs, reduce efficiency and undermine their competitiveness in international markets. In general, sanctions are measures intended to influence or punish either state or non-state entities with the goal of isolating the target. Sanctions can be either unilateral, imposed by a single nation, or bilateral, imposed by a group of nations such as a trade block.

Research gap

Restriction packages on the Russian market arose recently – in 2022 – and have been evolving ever since. The intensity of application of sanctions fluctuated, however, applied sanctions have never been cancelled[58], which is a rare case on a global political arena. This

[54] Pond, Amy. “Economic Sanctions and Demand for Protection.” Journal of Conflict Resolution, vol. 61, no. 5, 6 Aug. 2015

[55] Gössling, Stefan. “Risks, Resilience, and Pathways to Sustainable Aviation: A COVID-19 Perspective.” Journal of Air Transport Management, vol. 89, Oct. 2020, p. 101933

[56] Abu-Rayash, Azzam, and Ibrahim Dincer. “Analysis of Mobility Trends during the COVID-19 Coronavirus Pandemic: Exploring the Impacts on Global Aviation and Travel in Selected Cities.” Energy Research & Social Science, vol. 68, July 2020, p. 101693

[57] Mirani, S.Zahra. (2013). Investigating the Effect of Sanctions on Tourism Industry of Islamic Republic of Iran (Case Study: Hospitality and Aviation Industry). International E-Conference on Economy under Sanctions/ UMZ.

[58] “США признали отсутствие результатов от санкций против России, Китая и Ирана.” *Рамблер/финансы*, 24 May 2024

evolution compelled Russian airlines to adapt to the changing environment and disruptions applied. As a result, traditional value chain models have become irrelevant, and new value chains are still in the process of formation, reflecting the ongoing nature of the crisis. The scarcity of works examining the effects of political turmoil on the aviation sector highlights the significance of this investigation. While existing studies have delved into the sanctions[59] and their underlying reasons, along with some of their general impacts on specific industry[60], there is a noticeable gap in literature concerning the effect on operations of airline businesses in countries on which sanctions have been imposed.

This research aims to fill the knowledge gap by identifying the value chain from the supply chain perspective, the impact of restrictions (sanctions) on the value chain and adaptation strategies taken by Russian airlines. A deeper analysis of how sanctions impact airline business processes and strategic planning could shed light on the long-term impact of geopolitical tensions.

CHAPTER 2. THE IMPACT OF SANCTIONS ON AIRLINES VALUE CHAIN

Analysis of Russian commercial airline market

The history of Russian airlines has its roots back to aviation in the Soviet Union[61]. During the Soviet period, Aeroflot was established as the primary state-controlled aviation organisation, responsible for a wide range of services including commercial passenger flights, military transport, cargo services, and agricultural aviation (Figure 5). Aeroflot's monopoly allowed having control over air travel and logistics within the Soviet Union and internationally. The machinery for air transportation was produced in the USSR and had a double use purpose, meaning that in case of need, civil aircrafts might be transported for other (defence) purposes. This leads to the case of steps of the manufacturing process being shared between the value chain of commercial and military industries in the value network.

[59] Afesorgbor, Sylvanus. (2016). The impact of economic sanctions on international trade : how do threatened sanctions compare with imposed sanctions?.
[60] Meyer, Klaus E., et al. “International Business under Sanctions.” *Journal of World Business*, vol. 58, no. 2, Jan. 2023, p. 101426
[61] Singh, Sumit. “From Soviet Startup to Worldwide Carrier: Inside Aeroflot’s History.” Simple Flying, 29 Oct. 2021

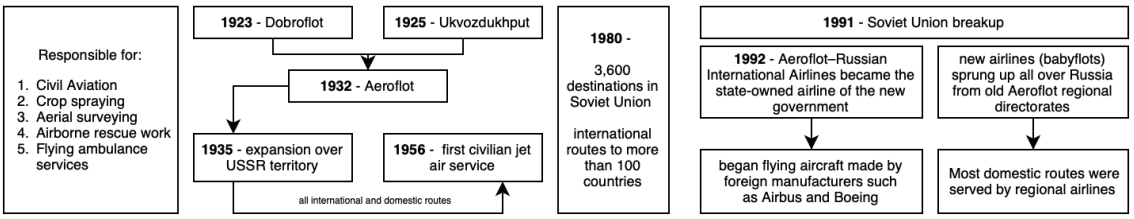

Figure 5 Russian airline sector during USSR period

Source: [compiled by author]

Following the dissolution of the Soviet Union in 1991, the Russian aviation industry underwent significant changes. The restructuring of Aeroflot was necessary as the organisation had operated as a unified entity. Due to the economic crisis, the aviation industry underwent changes (changes in the route network, reduction in accessibility, globalisation). In connection with these changes, a transition was made to a foreign manufacturer with a more efficient aircraft system and global standards. This activity was aimed to foster a competitive environment and adapt to the new market economy. By breaking Aeroflot into smaller regional airlines and was intended to increase operational efficiency and service quality through competition and innovation, while adapting to evolving geopolitical circumstances.

As a result Aeroflot was partially privatised, and became a flag carrier that emerged from a former state-owned enterprise. The government retains a majority stake of approximately 73.77% in the airline as of 2023[62]. The regional departments of ex soviet aeroflot were as well splitted. As a result airlines cover the same areas of operations as before but as separate entities. This diversification has created a more competitive and dynamic aviation market in Russia. The emergence of new airlines has provided consumers with more choices and has driven improvements in service quality and operational effectiveness. Several other airlines emerged from the remnants of Soviet aviation, focusing on various market segments. From large carriers with international routes to smaller regional airlines serving domestic travel, companies like S7 Airlines and Rossiya Airlines have become key players in the Russian aviation sector. As of 12 months of 2018 the Market Share (PAX), according to the aeroflot investor presentation 2019, was the following: 40.7% – Aeroflot Group, 15.2% – Foreign Airlines, 11.7% – S7, 6.6% – Ural Airlines, 5.7% – UTair and 20.3% – Other russian airlines. With different business models and route selections, the Value Chain of each airline is relatively the same, especially for primary activities.

[62] "Presentations | Aeroflot."

Value chain in the Russian airline industry

The airline industry's value chain includes various components such as aircraft acquisition, maintenance, operations, crew training, ticketing, airport services, and other shared activities spanning across multiple countries. The following Figure 6 is presented in the supply-chain view and based on Porter's framework (Table 1) and is composed of support and primary activities, interconnections between each were identified based on the results of semi-structured interviews and secondary data. This model allows one to observe the direct relation between each activity of any airline, proving Michael Porters' statement on competitive advantage of airline business, which comes from the way activities fit and reinforce one another. Airline industry is highly standardised and in order to be fully legal it must fulfil certain activities and obligations. Supply chain within those "must to obtain" features for every airline is the same, thus, depending on the business model and operation zone, the stakeholders as entities are going to be different making the value chain recomposition slightly differ, especially from the support activities side.

According to interviewees, the operations of the airline business can be divided into two phases: Pre-operations and Operations. Within the Operations phase, there are three subcategories: pre-flight, flight itself, and post-flight activities. This division allows for clearer delineation of responsibilities and better alignment of all involved parties throughout the processes.

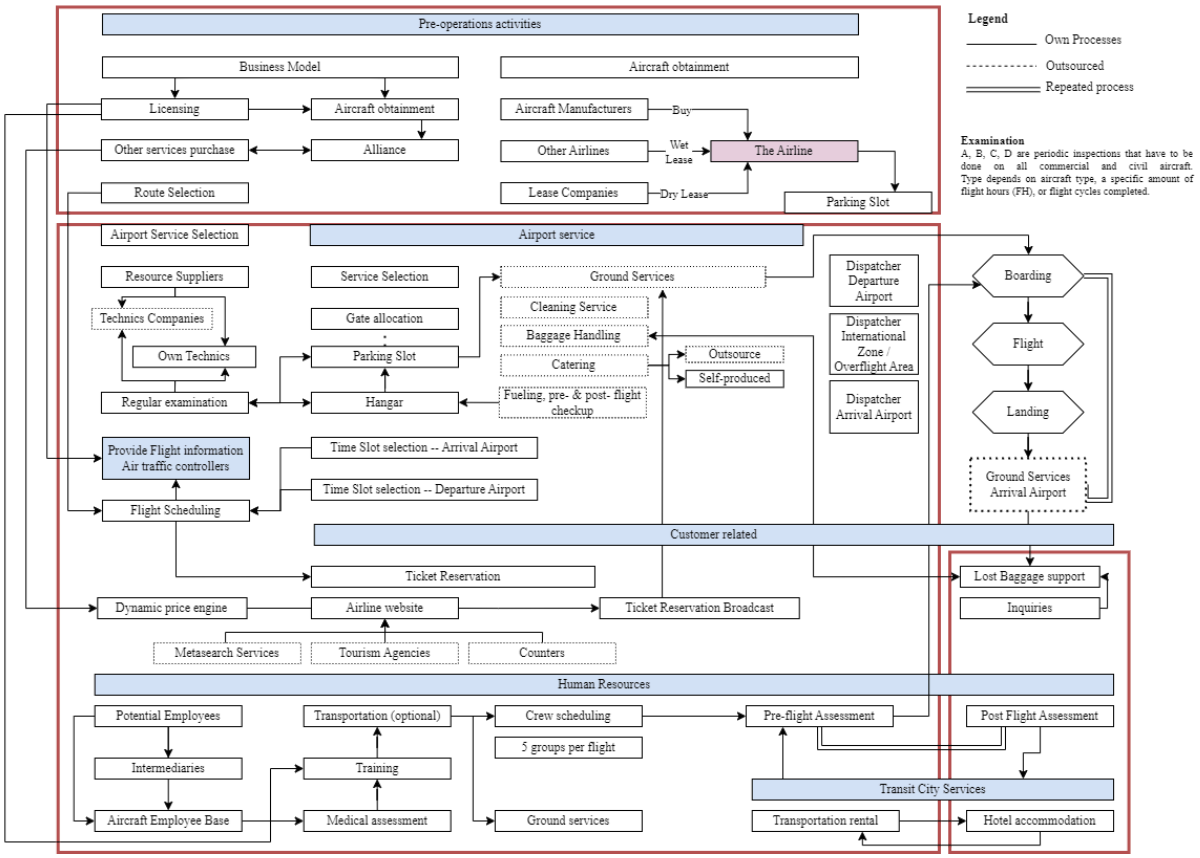

Figure 6 Value chain of airlines – supply chain view

Source: [compiled by the author, adaptation and enhancement of Porter Value Chain (1996)]

Phase 1. Pre operations

Before commencing operations, it is essential to define the business model (BM) of an airline. As it was mentioned previously, a business model is a core description of a company's business processes that outlines how a company creates, delivers, and captures value, intends to generate revenue, deliver products or services, and sustain itself in the market. Value Chain uses a business model to identify a series of activities and processes that a company undertakes to produce and deliver a product or service. It includes all steps from raw material acquisition to production, marketing, distribution, and after-sales service and procure all of the company infrastructure that is going to conduct operations, each adding value to the final product. Typically, there are three primary options for the business model (Appendix. Table 5)

Full-Service Carriers (FSCs) or Legacy Carriers emphasise delivering a wide array of services to their passengers, aiming for a luxurious flight experience at higher ticket prices. These airlines usually have a hub-and-spoke system where they operate out of major airports and

encompass both long-distance and shorter flights, typically connecting passengers to smaller regional airports through their networks. They provide a range of ticket categories from economy to first class, each with differing levels of comfort and amenities. Furthermore, FSCs boast widespread flight networks, participate in global airline alliances, and utilise efficient ticketing systems, making it more convenient and easier for travellers to reach a wide variety of destinations smoothly.

Budget airlines, commonly referred to as Low-Cost Carriers (LCCs), prioritise affordability and operational efficiency. These carriers excel in simplifying their operational model to cut costs, enabling them to offer competitive ticket prices. Differing from the traditional full-service model, budget airlines adopt a basic service offering, with additional amenities available for purchase. LCCs typically employ direct, point-to-point routing, connecting high-demand destinations without the need for transfers at major hubs. By opting for less busy airports or terminals and leveraging their bargaining power, these carriers can significantly reduce landing fees and other operational expenses, benefits that are often reflected in lower fares for passengers. Moreover, budget airlines strive to maximise aircraft usage by reducing turnaround times and efficiently planning flight schedules to allow for more daily operations. The turnaround time for LCCs is usually around 30-40 minutes, compared to over 50 minutes for Full-Service Carriers (FSCs). Recognizing the growth and profitability of the low-cost segment, some full-service carriers have established their own low-cost subsidiaries to compete in this market. These subsidiaries operate under the LCC model while leveraging the brand, operational support, and sometimes the existing infrastructure of their parent FSC. On the Russian market there is one LLC – Pobeda – subsidiary of Aeroflot airline.

Charter airlines, operating on a contract basis, cater to specific groups or destinations, offering tailored services of private airlines. Operating on a contract basis, charter airlines are hired to provide specific flights for a predetermined period or number of trips. This contractual arrangement allows clients to have greater control over their travel arrangements and ensures that the airline can effectively meet their unique requirements. These airlines often focus on niche markets, such as luxury travel, sports team transportation, pilgrimage flights, or remote destinations not easily accessible by scheduled carriers. Many charter airlines specialise in leisure and vacation travel, offering flights to popular tourist destinations, beach resorts, and holiday hotspots.

Decision on business model is crucial as at this stage the whole business processes of an airline are defined. It depends whether the entity will obtain a licence or not, which routes it is

going to serve, which airports are going to be partnered or alliances to join, with necessary assets (IT, offices, etc.) will be acquired and mainly what aircraft is going to be operated. Value Chain recomposition as selection of new ways to bring the product to the end customer will depend on the business model of an airline.

The next crucial step is to identify the ownership type of an aircraft. In general, there are 3 options available for acquiring aircraft in the aviation industry. One option involves direct purchase of new or used aircraft from manufacturers, leasing companies, or airlines, resulting in sole ownership by the airline. Another method is entering into leasing agreements with lessor firms. These arrangements may encompass dry or wet leases from other carriers or leasing entities.

Dry leases could be divided into two types. Financial lease, also known as a loan agreement or contract, necessitates inclusion in the company's accounting system, thus becoming a part of the balance sheet. Typically a long-term commitment, this type of lease involves the eventual transfer of ownership to the lessee at the conclusion of the lease term, with no option for cancellation. The lessee can take advantage of tax deductions for depreciation and finance charges, yet assumes responsibility for maintenance of the leased aircraft. Conversely, an operating lease, often referred to as a rental agreement or contract, does not require inclusion in the accounting system and remains off the balance sheet. Generally a short-term arrangement, ownership of the asset remains with the lessor and cannot be transferred to the lessee. While the lease may only be terminated during the initial term, the lessee benefits from tax deductions for rental payments. Furthermore, maintenance obligations are shouldered by the lessor. (see Appendix. Table 7). Those two types of lease agreement do not affect the business model, however, may depend on it. Low cost carriers, for instance, are likely to use operating leases as they allow them to expand a fleet without the requirement for large capital expenditures[63].

Additionally, airlines may opt to lease out their fleet through wet and damp leases offered by other airlines. These leases include aircraft with variations in the level of crew, maintenance, and insurance, thereby offering a turnkey solution to the lessee, which can be used with any business model, and typically popular among alliance connections[64]. In this model, the lessor maintains operational command over the flights, while the lessee benefits from a fully serviced

[63] Kitromilides, Luke Drake, Elia. “Operating Lease and Finance Lease – the Key Differences.” Legal Flight Deck, 29 Aug. 2023

[64] “The World’s Greatest Airline Alliances | BudgetAir.com Blog.” Budgetair

and crewed aircraft. Depending on the business model and strategic planning of the company, the method is going to be determined.

In parallel or prior with model selection and acquisition of an aircraft the route selection must be determined. There are regional and major airlines[65]. Major airlines focus on operating jets on any haul type routes while providing a full service under their own brands, while regional airlines fill the role of flying smaller aircraft on shorter routes primarily to feed traffic to the majors' hubs. Both of them can be international and local, depending on the market environment. Ghost airlines are a less known type, that may be a mixture of all previously stated business models. According to the results of the interviews, those airlines do not have a licence to operate the aeroplane. In their case, the lease agreements are contracted, when the company leases the whole aircraft with the crew and their services (turnkey solution). Such airlines may have characteristics of a charter airline and appear for a specific season to cover the demand of customers.

Furthermore, the airline must undergo a licensing process and register with aviation authorities (type, number, and owner details). The company can choose the country of registration based on leasing type and business goals. This is necessary to obtain operational and airworthiness certificates for aircraft, as well as flight crew licences.

Phase 2. Operations

In the context of an airline industry, operations are a complex structure that includes many functions that can be divided into 3 stages.

Stage 1 – Pre-Flight Procedures

All must-have operations were already completed and at this stage the support activities are negotiated, when the business model differences are the most perceptible. This is required to have partnerships in all airports that are going to be used for operations on an every-time basis.

Airport service

Airport services encompass a group of tasks including gate assignments, parking space allocation, scheduling for takeoffs and landings, alongside ground services provision. LCCs mostly operate in non-hub airports, while FSCs, depending on the brand status, have more power over hub-airports. Ground services involve pre-flight maintenance or run-ups, catering (which

[65] AviationOutlook. "The Difference between Major and Regional Airlines." *AviationOutlook*, 7 May 2021

may be in-house or outsourced), and baggage handling. The pre-flight stage necessitates assessments to ascertain flight readiness, incorporating medical evaluations and crew training, in addition to managing crew scheduling (which outlines a rotation or assignment for five teams per flight, each comprising two pilots and four to six cabin crew members, according to the results of interviews).

Providing flight information

Concurrently, the initiation of ticket bookings through various channels such as physical counters, travel agencies, metasearch engines, and the airline's website. These bookings are facilitated by dynamic pricing and reservation systems and all information is sent to the airport service counters in order to check the customers. Before takeoff, the airline must provide flight information (route, departure and arrival times, cargo, passengers and crew on board), aircraft details to aviation control centres and airport air traffic control to control the landing and take off of several aircrafts within the operated territory. After all preparation activities are done, the airline can be operated and must complete several more more activities.

Aircraft maintenance

Aircraft run-up or pre-flight check up is a list of control inspections that must be performed on an aeroplane before it can be declared ready for takeoff. It is conducted either at a gate in between flights by an aircraft mechanic or on a plane by a pilot. This is done as an additional pre-flight check to ensure that functional and safety factors in the cockpit, cabin and exterior are in the correct condition. [66] If the conditions of the machine are concerning or have to be corrected they are either fixed on site or the plane is unboarded and sent to the maintenance hangar.

Aircraft maintenance is either conducted by the airline's in-house technical departments or outsourced to specialised firms, encompassing systematic A, B, C, and D maintenance checks. A, B, C, D are periodic inspections that have to be done on all commercial and civil aircraft. Type depends on aircraft type, a specific amount of flight hours (every 400 to 600 flight hours), or flight cycles completed (between 200 and 300 cycles).

A and B checks are lighter inspections, also known as Line maintenance. Most Line maintenance tasks are carried out in accordance with the manufacturer manual's necessity to return to an overhaul base. A check is performed overnight while the plane stays at an airport

[66] Kemminer, Markus. ""Before the Flight"To-Do Lists – Safety First." *MTU AEROREPORT*, 2021

gate and requires up to 60 man-hours. Engineers and technicians cover detailed inspection of the aircraft wheel, brakes and emergency equipment, including the inflatable slides. B checks consist of a selected operational check of the aircraft fluid levels, such as oil and hydraulics alongside an open inspection of the panels and cowlings. Planes undergo them approximately every six to eight months and require approximately 120 to 150 man-hours. Depending on the aircraft type, these checks are usually completed within three days at an airport hangar. Manufacturers Boeing and Airbus merged the B check task list to form an A check. They also renamed the processes, marking them as A-1 through to A-10.

C and D categories are considered heavier maintenance tasks and referred to as Base or Heavy maintenance. Those tasks cannot be performed routinely as part of day-to-day operations and require the aircraft to be temporarily removed from service. The C check, which is performed approximately every 20 to 24 months or after a specific amount of flight hours as defined by the manufacturer. The inspection requires more space and is carried out while the jet is parked in a hangar at a maintenance base. Technicians perform task lists, which include A and B checks alongside examining the structures of load-bearing components on the fuselage and wings. Additional tasks include complete in-depth lubrication of jet fittings and cables. To ensure that all flight controls are particularly calibrated, major internal mechanisms are tested. An aircraft also undergoes a corrosion prevention program. The most demanding and expensive aircraft maintenance inspection is a D check, which occurs every six to 10 years, or 20,000 flight hours, and involves a comprehensive inspection and repair of the entire jet. Here, technicians and engineers dismantle and rebuild the entire plane during an investigation. Since D checks require a suitable maintenance base and tremendous effort, they can enter the million-dollar range, depending on man-hours and hangar slot prices in specific regions. In order to have a licence and be able to operate, aircraft maintenance is a mandatory activity.

Stage 2 – Flight Execution

This phase includes the actual flight, when the aeroplane is verified, supported by air traffic controllers and dispatchers from the departure airport, controllers in overflight territories and those at the destination airport. Important fact is that airports are responsible not only for their territory of the city, but also for zones with no airports or international zones. For instance, even though the U.S. territorial sea extends 12 nautical miles from the baseline (sovereignty extends to the airspace above and to the seabed below the territorial sea), American dispatchers are also responsible for part of the zone over pacific and atlantic oceans, which are considered

international territories. This is done in order to keep the safety of the flight and comply with aviation legislation.

Stage 3 – Post-Flight Operations

Following a flight, post-flight operations involve beforehand negotiated services like gate assignments and ground handling, augmented with external services like cleaning and fleet inspection. Subsequently, all decisions are made beforehand (stage 1), with airport service, support activities and regarding the next flight assignment or crew accommodation, which includes arranging transport and hotel lodging, in preparation for the aircraft's and crew's next flights. While the crew may have schedules for the following day, the aircraft might be slated for an immediate subsequent flight, making those 3 stages of operations repeated in the loop, or aeroplanes remain parked at the airport.

Customer support extends beyond the flight duration, embodying a sophisticated support network via the airline’s website, travel agencies, and other channels to address inquiries and issues, including lost luggage. The actions towards the customers vary depending on the stage, as presented on Figure 6, but most of them are conducted on the preflight step.

This delineation of an airline's value chain shows the intricate and interlinked processes essential for the industry, each contributing to the seamless delivery of passenger services and the operational efficacy of the airline. With stakeholders located in different regions and countries, global value chain disruptions might bring the need for restructuring the processes, finding new ways of increasing profits, maintaining pre-operation activities on the same level and changing the value chain.

As it was mentioned previously, the disruption of the airline processes is underdiscovered. From the beginning of the century the airline industry was globally cooperative and required contributions from different countries and entities. If one country has the airline network disruption it might bring various changes in the processes of all remaining value chain participants.

Analysis influence of sanctions on industry

The EU, Canada, and the US imposed a complete ban on Russian flights from its airspace. Later on more asian and oceania countries will impose bans as well. They also implemented export controls on aviation-related goods, requiring licences or prior approval for exports to Russia. This led to a ban on exporting aircraft, aviation and space equipment, engines,

spare parts, and technology. Additionally, certain financial and technical assistance, as well as other services, were restricted.

Export Control

The EU has implemented stricter export controls on dual-use goods to specifically target sensitive sectors within Russia's military industrial complex. This is aimed at restricting Russia's access to advanced technology that could potentially be utilised for unintended purposes. As the ban on export of aircraft and related resources emerged, it meant that technical data, support services for Western aircraft operated by Russian airlines will also be terminated, as those could be dual-use goods which contradicts with the core idea of sanctions. The US, The EU and UK have similarly restricted the provision of various aircraft-related services to Russian entities or for use in Russia, with specific exceptions and clarifications provided. Additionally, the export of jet fuel to Russia, irrespective of its origin, was banned. The aviation industry, subsequently, was initially isolated from all activities that could maintain the operable level of aircraft technologies in Russia. Furthermore, controls were not limited only on the provision of the aircraft and its parts, but also focused on control over leasing agreements and licensing, which potentially prohibit all operations of aircrafts on the grounds of leasing agreements or its registration number. In chapter 3 there will be more detailed information on the regulations provided.

These measures significantly impacted the aircraft leasing industry, particularly in the EU, where many Airbus aircraft were leased from. The value of an aircraft relies heavily on its maintenance records. Without these records, an aircraft cannot be re-registered or operated by another airline, significantly reducing its value. These records are typically controlled by the operating airline, which in this case, would be Russian airlines. While lessors retain key records, the extent varies significantly. This makes the licensing requirement a mandatory and helps the lessor companies comply with the terms of the deal. They are let to demand the obligations from russian airlines as their actions were violated. Restrictions on insuring aviation-related items for Russian entities, with certain exemptions clarified over time, such as when aircraft remain in Russia due to lease terminations or are being returned to their owners.

Overall, the restrictions aimed at isolating the target, which in this case is an asset and related support of it that directly affects business operation. Bans were on airspace, aircraft licences, insurance and lease contracts, service bans and export control over spare parts and fuel. The presented below diagrams represent the affected business processes, confirming that sanctions aimed at the root of the business processes. Based on the official newspapers of

government and airlines as well as of information from interviewees, the following diagram presents changes in the value chain with red areas representing the most drastic changes zone and yellow – changes in environment and regulations.

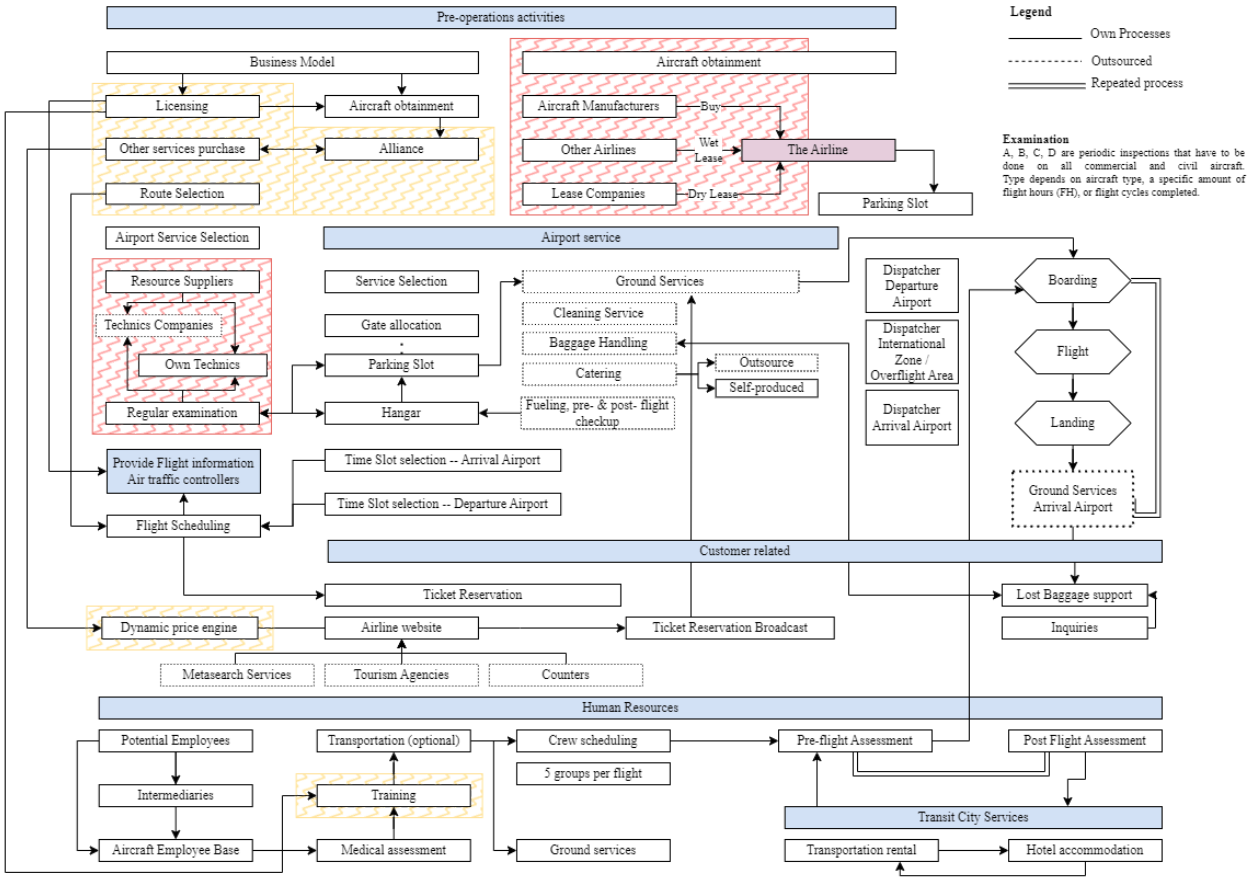

Figure 5 (Source: compiled by the author, adaptation and enhancement from Porter "Competitive advantage, creating and sustaining superior performance")

On Figure 5 the impacted zones of the airline value chain by sanctions are presented. In the red selections the most affected zones, while in the orange – subsequently affected operational areas. Information was compiled by the author based on the council regulation reports subtracted from the official journal of the European Union[67] and on the information provided by interviewees.

Faced with these challenges, airlines and their stakeholders have devised various strategies to mitigate the impact of sanctions. These include developing closer ties with non-Western aircraft manufacturers, investing in indigenous aviation technology, and exploring innovative financing mechanisms to circumvent sanctions. As of now, Russia's domestic aviation fleet consists of 1,302 aircraft, with 1,167 of them serving as passenger airliners. This marks a

[67] "Regulation - 2022/576 - EN - EUR-Lex." Europa.eu, 2022

slight increase compared to the figures reported in April 2022 when the country had a fleet of 1,287 commercial aircraft, including 1,101 passenger planes. At that time, approximately 67.1% of the fleet comprised foreign-made aeroplanes, responsible for handling 95% of passenger turnover.

By 2024, the cumulative effect of these adaptations and the evolving geopolitical landscape has led to a discernible shift in the global aviation industry. Airlines operating under sanctions have demonstrated a remarkable capacity for innovation and resilience, adjusting their business operations to navigate the challenging environment. However, these adaptations are not without their trade-offs. The focus on non-traditional markets and reliance on alternative suppliers and aircraft types may limit the growth potential and global competitiveness of these airlines in the long term. Moreover, the increased operational complexities and costs associated with circumventing sanctions present ongoing challenges.

Based on publications in newspapers, during the first nine months of 2023, there were 150 documented cases of aircraft malfunctions in Russia, compared to 50 in the same period in 2022. Critical aircraft components such as engines, landing gear, hydraulic systems, flaps, and software remain vulnerable areas in Russian aviation. The information cannot be accurately confirmed, since no document confirming the data was found. Based on the interviews, airlines will not take risks and use unusable aircraft and in order to maintain the condition of the fleet, despite Western sanctions designed to stop Russian carriers from procuring parts for their Airbus and Boeing jets, airlines actively utilised all available types of resources (original and not) present on the accessible markets. For example, Ural Airlines has imported over 20 of the U.S.-made devices. All told, at least $1.2 billion worth of aircraft parts flowed to Russian airlines from May 2022.

In conclusion, the impact of sanctions on the aviation industry has catalysed significant changes in the value chain and operational strategies of affected airlines. While the immediate effects are largely negative, the long-term outcomes may include increased self-reliance and innovation within the industry. The evolving situation underscores the importance of flexibility, strategic planning, and the ability to adapt to a rapidly changing global landscape. The following chapter analyses the sanctions and possible to-be-implemented strategies of airlines with case analysis of what was undertaken by the most influential and powerful airline of Russia and flag carrier – Aeroflot group airlines.

CHAPTER 3. VALUE CHAIN RECOMPOSITION

The aviation industry is currently experiencing significant shifts in its ecosystem due to punitive measures (the particular has the properties of the whole). This has prompted airlines to explore new sources for technology supply and aircraft, sometimes leading to suboptimal choices. These adjustments impact service quality and the ability of airlines to stand out in a competitive market and even enter it. Sanctions have also disrupted maintenance, repair, and overhaul (MRO) services, which are crucial for maintaining fleet safety and reliability. Difficulties in obtaining spare parts for Western-made aircraft are prompting airlines to seek alternative suppliers or repurpose existing parts, raising concerns about safety and operational effectiveness. These restrictions have prompted a strategic shift in the airlines' market focus. In response to challenges in the international arena, airlines may prioritise domestic routes or explore opportunities in countries not impacted by sanctions. This change in strategy necessitates a reassessment of airlines' primary offerings, identification of new target customer segments, and potential updates to their service offerings to meet the needs of these new markets.

As discussed in the preceding chapter, various core business processes have experienced impacts. Sanctions are aimed at isolating the country and focus on the basis of operations. In the case of airlines the preoperational stage of business processes were the target. These processes include aircraft ownership, resource supply and technical services, IT services for airlines (such as price engine), licences, and partnerships. Among these, aircraft ownership and resource supply are deemed the most crucial since decisions in these areas significantly influence the overall potential and volume of operations. In this chapter the adaptation strategies of Aeroflot Russian airlines are going to be described.

Ownership options for existing aircraft

The sanctions imposed have restricted the supply of aviation-related goods and technologies to Russia, as well as the sale or lease of aircrafts. This has led to the termination of existing agreements. Many Russian airlines lease aircraft from foreign companies, and the process of terminating leases may vary depending on the terms of the agreement as well as the length of the required notice and approval period. Aeroflot group has an active fleet of 366 aircrafts (without aircrafts out of operations) (Table 2). Important to notice that on the end of 2018 period only 6 aircrafts (DHC 8) were purchased by Aeroflot group members. Other aircrafts that were operated were leased on finance or operating lease type. (Appendix. Table 7). Finance leases involve the eventual transfer of ownership to the lessee at the conclusion of the

lease term, as during the leasing period are considered as airline assets. According to the presentation of the Aeroflot, 2018 results report is the latest with the lease type of the aircraft information. The disclosure on this topic during later periods was not found. However, information on the fleet quantity and orders could be found in the presentations, which in this research does not bring relevance, as adaptation strategies are identified, which can be extracted without these details, only via using general and approximate numbers, as the core idea of existence of those agreements is relevant.

Table 2 Aeroflot group fleet as of 2018

Aircraft Type	Operated by		Lease type		Owned	Total as of	Total as of	Change vs.
	Aeroflot	Subsidiaries	Finance	Operating		31-Dec-18	31-Dec-17	31-Dec-17
Wide-body	39	19	18	40	-	58	52	6
Airbus A330	22	-	8	14	-	22	22	-
Boeing 777	17	10	10	17	-	27	21	6
Boeing 747	-	9	-	9	-	9	9	-
Narrow-body (medium-haul)	164	80	16	228	-	244	222	22
Airbus A319	-	35	9	26	-	35	36	-1
Airbus A320	80	5	-	85	-	85	80	5
Airbus A321	37	-	7	30	-	37	38	-1
Boeing 737	47	40	-	87	-	87	68	19
Narrow-body (regional)	50	14	-	58	6	64	51	13
DHC 8	-	11	-	56	6	11	11	-

DHC 6	-	3	-	3	-	3	3	-
SSJ 100	50	-	-	50	-	50	37	13
Total fleet	253	113	34	326	6	366	325	41

Source: [Aeroflot Group Investor Presentation, April 2019]

Financial lease contract is not allowed to be cancelled as it implies a rent with subsequent purchase. The leasing documents are not available on the free access due to privacy and safety concerns, however, it could be suggested that external environment changes that violate international law could be considered as allowing reason for contract termination. In order to prohibit the usage of aircraft beyond the russian territory the EU introduced new regulation that requires Lessors to terminate affected aircraft leases entered into before 26 February 2022 by 28 March 2022. Even if the lessor companies and aircraft would terminate the lease contracts, the need for transfering aircrafts is present.

"1. It shall be prohibited to sell, supply, transfer or export, directly or indirectly, goods and technology suited for use in aviation or the space industry, as listed in Annex XI, whether or not originating in the Union, to any natural or legal person, entity or body in Russia or for use in Russia." – Article 3c[68]

For aircraft located outside of Russia, physical seizure became not a major problem. In various countries, authorities are seizing Russian Boeing and Airbus aircraft at the request of lessors (around 76 passenger ships). However, the main problem is with those aircraft that are on Russian territory. Due to the airspace closure and legal restrictions to terminate the contract and transfer the plane back is not directly available nor to make a payment via legal frameworks as banks were as well isolated from the global market. From the Russian side, in March 2022 the law was signed by the president allowing Russian airlines to keep and operate planes – on domestic routes – leased from international suppliers. It was recommended for operators to not fly these aircraft to international destinations, likely in a bid to prevent them from being seized. In order to prohibit the local operations of russian airlines the regulations were extended:

[68] Regulation (EU) 2022/328 of 25 February 2022

"2. It shall be prohibited to provide insurance and reinsurance, directly or indirectly, in relation to goods and technology listed in Annex XI to any person, entity or body in Russia or for use in Russia." – Article 3c[69]

Actions related to the registration or licensing of the aircraft itself stand as an important question as without them, planes are not allowed to take off (make a flight) nor to be sold. The cost of an aircraft is determined by both the physical aircraft itself and its maintenance documentation (records). An aircraft without registration data cannot be re-registered in another country or operated by an airline, thereby diminishing its worth. Typically, aircraft records are maintained by the operating airline and are usually stored at its base of operation or headquarters. Russian airlines are likely to have control and access to most of the records. Lease companies do keep copies of key records, the extent of this practice varies from organisation to organisation; however, it is improbable that they will have access to all pertinent aircraft records, making it hard to sell the aircraft. Thus, those changes in western legislation allows the lease companies who had contracts with Russian airlines before Feb 2022 to claim the violation of their rights. Furthermore, Russian airlines have utilised foreign aircraft registration (which might be offered due to lease agreement) to optimise tax procedures even more.[70] According to the global aviation consultancy IBA, 745 Russian aircraft are registered in Bermuda, with Ireland hosting 37 passenger aircraft and 10 on the Russian registry. Oleg Panteleev, the executive director of AviaPort agency, highlights that Bermuda's aviation authorities align their regulations closely with European standards and operate under British law, making it favourable for aircraft lessors as they employ a team of qualified experts to conduct audits, inspections, and registrations at a comparatively low cost for airlines.

Taking this information into account there are three available options to manage the ownership of the fleet from the perspective of an airline. Those aircraft that were leased are either nationalised or returned to the lessor or kept on the ground (Figure 7).

[69] Regulation (EU) 2022/328 of 25 February 2022
[70] ES. "Russian Airlines' Foreign Aircraft Escape VAT Liabilities until 2023." *Russian Aviation Insider*, 14 June 2019

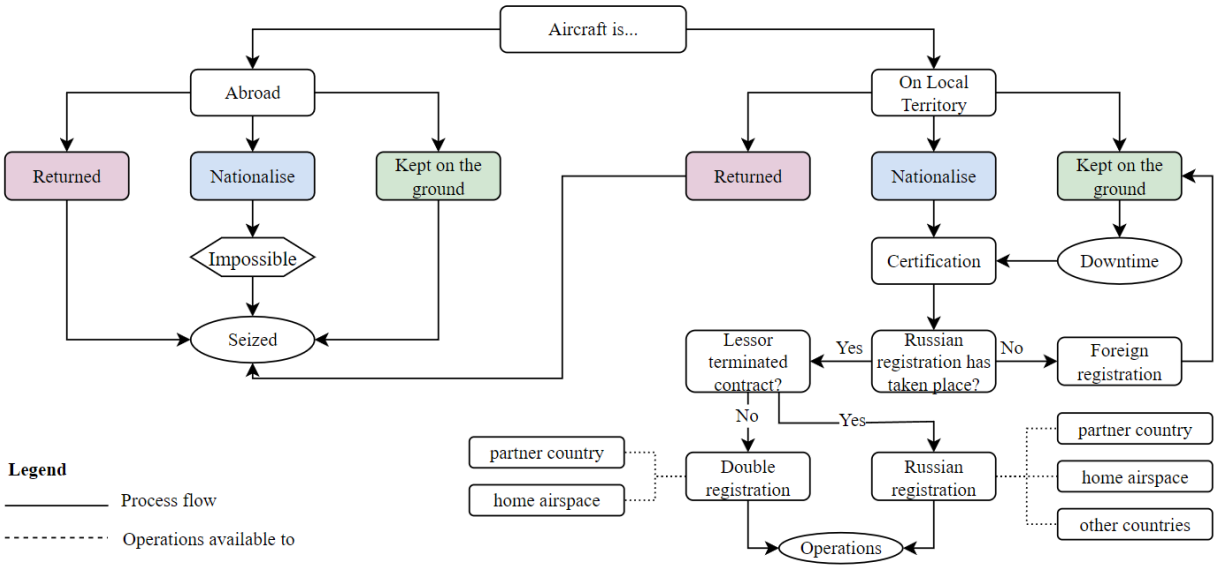

Figure 7 Ownership options decision tree

Source: [compiled by author]

Scenario 1. Aircrafts are abroad.

According to the new laws and international legislation airlines' leased aeroplanes must be returned to the lessor resulting in significant decrease in operation capacity, making it an unfavourable and partially inevitable scenario.

Scenario 2. Aircrafts are on Russian territory. Keeping the aerocraft on the ground.

This option results in downtime and losses on operations. In order to keep operations the certification of airworthiness is required. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation[71]. Regulations take precedence over the airworthiness support obligations of EU TCHs and other design approval holders. Specifically, as stated in Article 3c (4)(a) of Regulation (EU) No 833/2014, as amended by Council Regulation (EU) 2022/328 dated 25 February 2022, it is not allowed to offer technical assistance or related services for goods and technology used in aviation or the space industry, regardless of origin, to any individual, entity, or organisation in Russia or for use in Russia. Thus, Bermuda's Civil Aviation Authority[72] and other aviation authorities suspended the airworthiness of Russian airlines that were leased there. Until the certification of airworthiness is

[71] "Airworthiness." *SKYbrary Aviation Safety*, 19 Dec. 2020
[72] "EU Restrictive Measures against Russia." *EASA*

obtained (scenario 3), the option will result in moderate losses on rent of parking and decrease of operational efficiency.

Scenario 3. Nationalisation of the aircraft remained on Russian territory.

Given the modified licences and proper record-keeping by the operating airlines in Russia, this allows the nationalisation move to happen[73]. It presents a realistic scenario for maintaining the efficiency of the airline industry. Nationalisation of an aircraft is a protocol for adding an aircraft to the aviation registry of a specific state. Registered entities are provided with a distinctive registration mark obligatory for all civilian vessels, according to the International Convention on Civil Aviation (Article 83 of the Chicago Convention). Western aircraft in Russia could be utilised for domestic flights, reducing the risk of seizure in countries under sanctions. At the same time, making it completely legal to operate this fleet within home and partner countries. If certifications are not obtained, the aircraft might be stored on the ground, resulting in downtime (or scenario 2).

Scenario 4. Return the leased aircraft from Russia to the lessor.

This idea results in reputation sustentation, however, it leads to the decrease of operations resulting in revenue losses. As well, it requires the transfer of the aircraft without the registration to another country which is possible only via other carriers, due to aerospace closures and prohibition of the Russian carriers operations on the territory of the EU. This option will result in significant investments into actions predominantly focused on non-materialistic goals within legislation and agreements no longer requiring those activities.

Undertaken actions by Aeroflot towards fleet ownership

After publishment of a new law from March 2022 on certification processes, Russian airlines began to transfer to local jurisdiction and later, the head of the Rosaviatsiya department, Valery Kudinov, told reporters that starting from February 24, about 180 ships were transferred to the state register, including 80 Aeroflot aircraft and 27 Pobeda aircraft. A few days later, Kudinov was fired under the article on disclosure of information in accordance with the federal law “On Civil Service”[74]. As it could be seen, information on the transferred fleet is limited. However, according to Aeroflot group publications for investors and their news page, in 2023,

[73] KOENIG, DAVID. “Russian Airlines Will Keep Planes Leased from Foreign Firms.” *The Seattle Times*, 14 Mar. 2022
[74] “Что выиграли авиакомпании от регистрации самолетов в России.” *Forbes.ru*, 22 Mar. 2022

Aeroflot successfully completed settlements with foreign leasing companies for 98 aircraft[75], bringing the total number of aircraft available for unrestricted international flights to 153 by the end of the year.

December 22, 2023. — The process of settling relations between 28 aircraft and several groups of lessors has been completed[76]. November 9, 2023. — The process of settling relations for 8 aircraft with the lessor BOC Aviation (Ireland), as well as 1 aircraft under its management, has been completed[77]. October 2, 2023. — The process of settling relations with the lessor SMBC Aviation Capital (Ireland) for 16 aircraft and another 1 aircraft managed by SMBC Aviation Capital has been completed[78]. September 5, 2023. — The process of settling relations with the lessor AerCap (Ireland) for 18 aircraft and 5 aircraft engines operated by Aeroflot Group companies has been completed[79].

As part of these agreements, lessors waived any claims against Russian entities for the specified aircraft, including insurance policies and leasing agreements with Aeroflot PJSC, Pobeda Airlines LLC, and Rossiya Airlines JSC. Ownership of the aircraft was transferred to NSK Insurance Company LLC, which provided the settlement funds. Aeroflot Group is currently in ongoing negotiations to address outstanding claims with other lessors of foreign aircraft.

As we can see, option 1 was forced to happen no matter the airline decision. Option 3 – nationalisation – was the best alternative supported by the government to remain the operations ongoing. Sequential registration of the aircraft allowed it to carry out flights within the Russian borders and to partner countries, who stated to decline the option of seizure of the Russian fleet. Option 2 was an in-between step while nationalisation of the fleet happened. Information on the return procedures (option 4) was not available. Alexander Gushchin, director of the ACRA corporate ratings group, highlighted that Aeroflot's revenue for the nine months of 2023 has nearly matched pre-pandemic levels from 2019. Also it was noted that transportation volumes are on the rise, nearing peak levels from four years ago, with a shift in the structure of transportation between domestic and international routes. The increase in revenue can be attributed to higher traffic on international flights, made possible by an increase in the number of aircraft deregistered from foreign registers.[80]

[75] URL: https://www.aeroflot.ru/ru-ru/news/62839
[76] URL: https://www.aeroflot.ru/ru-ru/news/62990
[77] URL: https://www.aeroflot.ru/ru-ru/news/62921
[78] URL: https://www.aeroflot.ru/ru-ru/news/62874
[79] URL: https://www.aeroflot.ru/ru-ru/news/62836
[80] “Аэрофлот” нарастил выручку в 1,4 раза на фоне роста международных рейсов.” *РБК*, 29 Nov. 2023

Maintenance facilities

Aeroflot group operated the youngest fleet in the industry (4.2 years) among other airlines and, as a result of transferring ownership, the previously operated fleet became a fully controlled assets of airlines. With inability to purchase hostile-countries aircraft machinery due to intensified control over supply, the demand for purchasing new aircraft remains steady. As well, it was restricted to perform the MRO activities for the Russian airlines in countries whose borders are closed. Maintenance Repair and Overhaul significantly extend the life of expensive components and systems, providing alternatives to whole aircraft replacement. As well MROs are done to ensure the safety, reliability and efficiency of aviation operations and are a requirement for while having a licence. As ownership control shifted fully to the airlines and the maintenance of the fleet is obligatory for conduction the operations, the need for 1) maintenance service as action and 2) space parts for repair are required. In Table 3 the possible scenarios of where check-ups might be conducted are presented.

Table 3 Maintenance facilities

Name of the maintenance point	Overseas repair (hostile countries)	Repair in partner countries facilities	Repair on companies' subsidies facilities	Repair on local (not owned) facilities
Investments for creation	Not required	Not required	Required	Not required
Is the industry ready?	Yes	Yes	Partially	Partially
Possibility of repair	Not possible	Possible but certain risks	Possible	Possible

Source: [compiled by author]

The largest aviation holdings in the world have their own MRO subsidiaries. Overseas repair is prohibited for Russian airlines making this option unavailable at the moment of sanctions. Repair in partner country's facilities is possible, however, due to increased control over MRO activities from the supplier side (Airbus and Boeing), this option might bring risk

towards foreign partners, resulting in unwillingness of conducting the service. Two other options are conducted within the Russian territory making it completely legal and possible. The only obstacle here might be the development of necessary infrastructure. A, B, C, D checks require different equipment, knowledge and resources. As D-check being the most complicated one, when the aircraft is fully deconstructed, assessed and later reassembled, the facilities to operate D-checks are usually centralised in one company. With the amount of aircraft operating in Russia, main industry players opened a long time ago subsidiaries that conduct various check-ups of aircraft. The largest aviation holdings in the world have their own MRO subsidiaries. For instance, S7Technics Holding's production facilities are "certified under EASA, Bermudan, Russian and other countries' aviation requirements to provide maintenance on Boeing, Airbus, Sukhoi Superjet 100, Embraer and Cessna aircraft. The company's scope of work includes maintenance (up to and including D-checks), line maintenance, structural repairs, engineering services (including modification under EASA Part 21J and interior components manufactured under EASA Part 21 G)."[81] Important to notice, that even if a company performs heavy maintenance checks, the aircraft models for which activities might be performed varies based on the certification, experience, human resources and other resources obtained.

Undertaken actions by Aeroflot towards maintenance locations

Aeroflot has begun transferring production facilities and personnel resources of the technical maintenance department to the subsidiary Aeroflot Technics with the aim of creating on its basis Russia's largest provider of aircraft maintenance and repair services. In February 2024, the formation of the largest provider was completed. Aeroflot Technics received permission from the Federal Air Transport Agency to perform maintenance on Western-made aircraft with Russian registration.

As well, Aeroflot slightly tends to utilise friendly-country facilities. The C check marked the first time a Russian carrier had sent an airliner abroad for repair since the introduction of sanctions.[82] As this activity requires transportation of an aircraft and additional costs and risks associated, with prohibition of countries certificates, this option these days is considered, but unlikely to be utilised at even half of capacity.

[81] "S7 Technics - Russian Aviation News." Russian Aviation Insider
[82] "Aeroflot Airbus A330 Returns from c Check in Iran | Aviation Week Network." Aviationweek

Maintenance spare parts and technology procurement

Sanctions have been implemented that restrict the procurement of aircraft and their components by Russian organisations. This significantly impacts Russian airlines' ability to acquire spare parts and materials, beyond what is currently in their inventory. Obtaining essential parts may necessitate liaising with entities not based in the EU or US, potentially leading to increased expenses due to limited supplies and additional intermediary charges. Fleet maintenance could be continued via several modes. Four key strategies could be defined in Table 4: partial disassembly of the fleet, utilisation of non-original spare parts, implementation of parallel import practices, and transitioning to a local manufacturer for aviation equipment.

Table 4 Spare parts acquisition methods

	Disassemble of part of the fleet	Use of non-original spare parts	Parallel import	Switching to a local manufacturer
Repair and maintenance of fleet remaining in operation	Yes	Yes	Yes	-
Usage of original spare parts	Yes	No	Yes	-
Fleet availability	until 2025	Undefined	Undefined	Unlimited
Applicable to existing aircraft?	Yes	Yes	Yes	No
Remain air transportation capabilities	Yes	Yes	Yes	Yes
Maintain the entire fleet in working order	No	Yes	Yes	Yes
Violation of sanctions (subject to criminal liability)	does not violate	does not violate	violation only applies on the territory of Europe and the United States	does not violate
Allows to bypass sanctions	Yes	Yes	Yes	Yes
Creates risks of legal and	No	Yes	Yes	No

reputational consequences				
Sustainable long-term solution	No, at some point resources will end	No, at some point resources will not match	Questionable	Yes
Suspension of international flights	No	Yes	No	Negotiate
Withdrawal from the international aviation safety system	No	Yes	No	Negotiate
Risk of increased accidents and disruptions	Low	Medium	Low	Low
Reduction in flight safety	No	Yes	No	No
Decrease in passenger confidence	Low	Medium	Low	Medium
Increasing complexity of supply chains	No	No	Yes	No
Increase in expenses/investments	No	No	Yes (high costs of purchasing through intermediaries)	Yes
Reduction in the operating fleet	Yes	No	No	Gradually substituted
Time-consuming	No	Yes	Yes	Yes

Source: [compiled by author]

Option 1. Partial Disassembly of the Fleet

This approach involves selectively dismantling elements of the fleet to utilise components for the maintenance and repair of current aircraft. It provides opportunities for cost savings and

efficient allocation of resources, allowing airlines to prolong the operational lifespan of their fleet while minimising expenses on new parts.

Option 2. Use of Non-Original Equipment Manufacturer (OEM) Spare Parts

Incorporating non-OEM spare parts in maintenance procedures offers a cost-effective option compared to using original parts. While it has the potential to reduce costs, this method may raise concerns about the quality and compatibility of the parts. Important to notice, that companies that produced spare parts for global aircrafts are utilising the original contracts, thus, having extensive experience in production of such details, they might switch to production of identical parts with different (not original) certification. There are certain rumours regarding this activity, as it violates ethical and legal standards, but it is not prohibited to duplicate with slight differences a certain product. Therefore, stringent quality control measures are necessary to ensure operational safety and reliability.

Option 3. Procurement through Parallel Import

Huge companies, be it Boeing, Airbus or, for example, electronics manufacturers, are not able to fully control the distribution of their goods. Generally speaking, they do not have an appropriate apparatus: they were created for another purpose — to sell as many goods as possible to as many customers as possible, and preferably at a higher price. Parallel importation enables airlines to acquire spare parts from alternative suppliers outside of official distribution channels. This strategy provides flexibility in procurement and potential increase of cost due to presence of intermediaries and risks associated. It may introduce risks related to product authenticity and warranty coverage, necessitating thorough screening of suppliers and compliance with regulatory standards.

Option 4. Transition to Local Manufacturing

Shifting towards domestically manufactured spare parts is a strategic move to enhance domestic production capabilities and reduce dependence on foreign suppliers, especially when in Russia there is a full cycle of manufacturing aircraft parts on the market from the USSR times. By supporting local industries, airlines can potentially decrease procurement costs, stimulate economic growth, and strengthen supply chain resilience. However, this transition may require initial investments in infrastructure and technology to ensure the quality and competitiveness of locally produced parts. This option will violate the international standards on safety of the aeroplane, if the spare parts do not comply with the original producer requirements.

Option 5. Transition to operating local aircrafts.

With increasing demand and expectations in the aviation industry, there is a growing need for the acquisition of aircraft and maintenance of the existing fleet. Due to the volatile nature of direct aircraft purchases, reliance on local producers is becoming more essential. At present, due to heightened control over supply destinations, the acquisition of foreign aircraft (specifically Airbus and Boeing) is not an option until restrictions are lifted. Even though with proper maintenance, aircraft can remain operational for 30 years or more, many airlines do not utilise this option, as a younger and more modern fleet allows to reduce the costs of fuel, MROs, and other related costs.

Russian registration allows to perform operations to any country completely legally, as mentioned previously. The only limitation is closed airspace between countries. The moment restrictions have been lifted, this option will be completely legal and operable. Important to notice, that if a company has an aircraft registered in Russia before recent events and not subject to sanctions, such aircraft can formally operate internationally. This provides market advantages, particularly for companies operating domestic Superjet aircraft. Panteleev explains, "With a Russian-made aircraft, leased from a Russian lessor, and operated by a Russian airline, there is no need to register the aircraft in foreign registries."

Transitioning to locally produced aircraft can result in savings on transportation, negotiation, and maintenance expenses, in addition to reducing time spent on these processes and offering on-demand benefits.

Undertaken actions by Aeroflot towards maintenance spare parts

Cannibalisation of the fleet is not stated as undertaken action by Aeroflot, but rather appeared as a possible solution. Ural Airlines, Norwdind Airlines, S7, Aeroflot and others have imported $1.2 billion worth of spare parts from third parties between May 2022 and June 2023, according to the The Moscow Times agency's tally[83], citing customs data. The actual value of the imports is likely higher as calculations only accounted for direct shipments to Russian airlines and their maintenance units. It is possible for Russian airlines to order spare parts and even aircrafts under a different companies name, not necessarily registered in russia.

Most importantly, while keeping the existing fleet operable, Aeroflot moves for a long-term solution of switching to a local producer. Recently, at the Eastern Economic Forum,

[83] Times, The Moscow. "Russian Airlines Import $1.2Bln Worth of Western Parts despite Sanctions – Reuters." *The Moscow Times*, 23 Aug. 2023

Aeroflot Group and leasing company Aviacapital-Service finalised financial lease agreements for a total of 18 MS-21-310 aircraft and 34 SJ-100 aircraft. Additionally, in Aeroflot 2022 Yearly Report, the company announced a partnership with United Aircraft Corporation for the procurement of 339 domestically manufactured aircraft between 2023 and 2030. (ex. Tu-214, Tu-204, IL-96, IL-114)

Options for recomposition

As a result, sanctions affected ownership and maintenance of the fleet which according to the Figure 5 are the core activities to make overall operations possible. Based on the example of Aeroflot group, the recomposition of the business processes that are affected by external factors such as sanctions and other regulatory restrictions, is a simultaneous process that incorporates usage of different available options. On Figure 8 the prior described decisions are composed into one table reflecting the possible actions. Before aircrafts have certifications and are legally allowed to make flight to any destination, the decisions are either not using the machinery or allowing it to be seized. Both of them resulted in the losses of either aircraft or operational capacity, making it an unfavourable but inevitable choice.

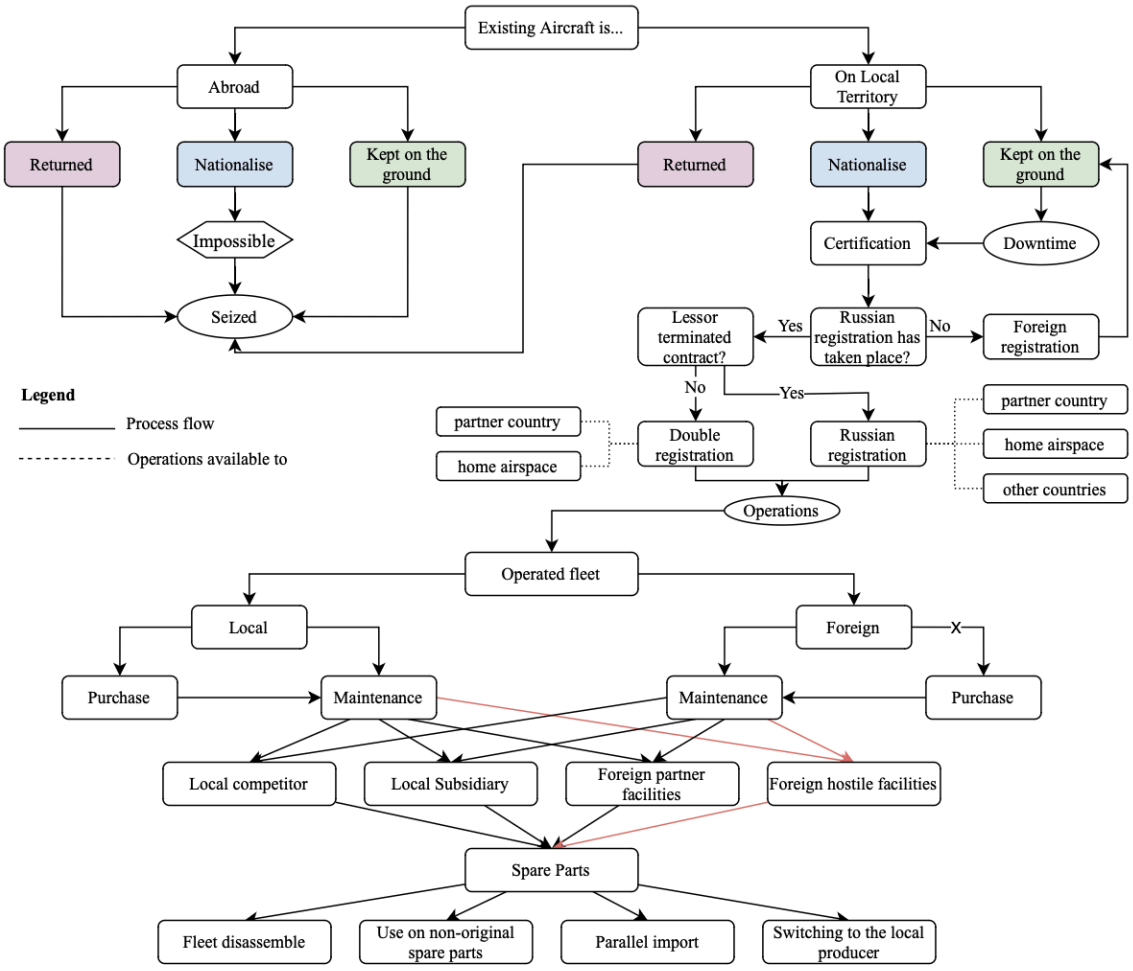

Figure 8 Option pull for value chain reconfiguration related to the fleet

Source: [compiled by author]

After nationalisation processes related to the aircraft, airlines have several options on further operation. If the lessor has not yet terminated the contract, the registration of the aircraft remains unchanged or foreign. In this case the flights are prohibited (Figure 5) and the aircraft must remain on the ground until registered in a local base. In the situation, when lease agreements were not terminated and nationalisation of the leased fleet took place, it allows the airlines to perform operations completely legally within local borders, international aerospace and partner countries, with the restriction of flights to, over and from foreign (hostile) countries. Whether it is a local or foreign aeroplane, a certain quality of machinery must be obtained. This is achieved via purchasing a new aircraft or maintenance of the existing fleet. Purchase of the foreign fleet is unavailable due to termination of partnerships and existing contracts, as well as market environment constraints such as aerospace closures. Purchasing locally produced machinery is a long-term solution that requires generous investments from time and financial

sides. Nonetheless, acquired aircrafts must undergo maintenance check-ups required for licensing not to be terminated. Those maintenance, repair and overhauls can be done either in foreign friendly country facilities that remained partnerships or locally on own subsidiary or other local competitor. Due to a wide variety of fleet from the airline side and differences within capacity and certifications from the technic organisations side, the choice which option to select depends on the needs and resources of the demanding side.

CONCLUSION

The aviation industry, an essential driver of global connectivity and economic development, faces changes due to evolving geopolitical decisions and sanctions. This study has identified the impact of applied sanctions on the value chain of Russian commercial airlines and the possible actions of recomposition within the value chain of airline business.

Sanctions against Russian airlines have significantly disrupted their operations, primarily targeting aircraft ownership, maintenance, and procurement of spare parts. These restrictions have forced airlines to adapt their value chains to maintain operational viability. It is highly important to own aircraft via purchase or leasing agreements and have maintenance in sustaining airline operations. Russian airlines, notably Aeroflot, have responded by nationalising their fleets, transferring aircraft ownership to Russian entities, and establishing local maintenance facilities. To circumvent sanctions, airlines have alternative procurement strategies, such as using non-original spare parts, parallel imports, and developing local manufacturing capabilities. These measures aim to ensure the availability of necessary parts and maintain the operational fleet. The ability of Russian airlines to adapt to the changing environment demonstrates their resilience. Strategic decisions, including fleet nationalisation and increased focus on domestic manufacturing, have enabled continued operations despite significant challenges. As a result it was found that all recomposition activities since 2022 were exploited. Depending on the resources of the company and its strategy, any option might be considered both simultaneously and individually, in order to achieve the objectives of the company.

It was identified that (1) investing in domestic production of aircraft and spare parts can reduce dependence on foreign suppliers and strengthen the aviation sector's resilience against future geopolitical disruptions. (2) Developing comprehensive local maintenance facilities, can ensure ongoing fleet maintenance and compliance with safety standards. Utilisation of partner-country facilities is possible, however, with greater costs and limitations, restricting possible action. (3) Strengthening cooperation with partner countries and exploring new markets

can help mitigate the impact of sanctions and diversify revenue streams as well as support the primary activities that could not be conducted due to limitations of certifications, especially in terms of export-import relations, as this mitigates the associated risks for intermediaries.

This research provides valuable insights into the strategic adaptations of Russian commercial airlines in response to sanctions, contributing to the broader understanding of how value chains can be reconfigured in the face of external shocks caused by sanctions and other regulatory restrictions. The findings offer practical recommendations for industry stakeholders, policymakers, and scholars, emphasising the importance of flexibility, strategic planning, and innovation in navigating regulatory challenges. This research provides identified information on available on the market options that could be utilised not only by Russian airlines, but other (not affected by sanctions) airlines in order to improve value chain.

Significance of the Study

This study generates knowledge on the resilience and option pull of adaptations of Russian commercial airlines in the face of regulatory challenges. The findings aim to offer strategic recommendations options for navigating regulatory obstacles, improving operational flexibility, and achieving sustainable growth for Russian commercial airlines in the aviation sector.

Practical Implications:

Practical benefits - identifying opportunities for value creation in the airline industry, as well as offering a tool for adjusting strategy and determining opportunity costs. The findings of this study can guide strategic decision-making for Russian airlines, enabling them to address challenges and make the most of opportunities within the value chain. Presented network of possible decisions might be utilised by consulting groups for strategy recommendations or for conducting audit, by transport-related companies (airlines, aircraft manufacturers, train and machinery related businesses), by government agents and other entities that might directly or indirectly be related to imports and/or production and/or utilisation of machinery and its parts. As well this report might bring significance to the reporters and aviation organisations that track the sequence of historical activities and analyse the performance of entities within related sectors.

Academic Contribution: This study adds to the current body of knowledge on strategic management within the aviation industry, specifically focusing on how value chains adapt to external shocks and industry changes affected by restrictions and sanctions.

Industry Collaboration: The research results could facilitate collaboration and knowledge exchange among industry players, fostering innovation, efficiency, and resilience within the Russian aviation sector. Potential investors and audit-consulting corporations who provide analysis of stocks and investments to the industry, as accessing the indicators might require explanation of fluctuations caused by companies action.

Scope and limitations

This empirical study identifies the adaptation strategies implemented by Russian commercial airlines in response to sanctions, regulations, and the global market conditions. The legitimacy of the sanctions is not accessed, but it is analysed from the point of view of the economy and the adaptation decisions of selected companies. The research is grounded in the examination of operational adjustments and value chain reconfigurations. Due to the dynamic nature of the aviation industry, the research may not capture all emerging trends. Limited availability of data, especially regarding proprietary strategies and performance metrics of specific airlines, may restrict the scope of the study. The research will rely on secondary data sources, potentially introducing biases or inaccuracies inherent in the data collection process.

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32. Council Regulation (EU) 2022/398 of 9 March 202 amending Regulation (EC) No 765/2006
33. Council Implementing Regulation (EU) 2022/396 of 9 March 202 implementing Regulation (EU) No 269/2014
34. Council Regulation (EU) 2022/39 of 9 March 202 amending Regulation (EU) No 833/201 – amendment to Article 2e
35. Council Regulation (EU) 2022/39 of 9 March 202 amending Regulation (EU) No 833/201 – new Article 3f
36. Council Regulation (EU) 2022/39 of 9 March 202 amending Regulation (EU) No 833/201 – amendment to Article 5a
37. Council Regulation (EU) 2022/39 of 9 March 202 amending Regulation (EU) No 833/201 – amendment to Article 5b
38. Council Regulation (EU) 2022/35 of March 202 amending Regulation (EU) No 833/201 – new Article 5h
39. Council Regulation (EU) 2022/35 of March 202 amending Regulation (EU) No 833/201 – new Article 5i
40. Council Regulation (EU) 2022/35 of March 202 amending Regulation (EU) No 833/201 – amendment to Article 2e
41. Council Regulation (EU) 2022/350 of March 202 amending Regulation (EU) No 833/201 – new Article 2f
42. Council Implementing Regulation (EU) 2022/35 of March 202 Implementing Regulation (EU) No 269/201
43. Council Regulation (EU) 2022/33 of 28 February 202 amending Council Regulation (EU) No 833/201 – new Article 3d and e
44. Council Regulation (EU) 2022/334 of 28 February 202 amending Council Regulation (EU) No 833/2014 – amendments to Article 5a

45. Council Implementing Regulation (EU) 2022/336 of 28 February 202 implementing Regulation (EU) No 269/2014
46. Council Regulation (EU) 2022/328 of 2 February 202 amending Regulation (EU) No 833/2014 – updated/new Articles 2, 2a-d, 3b-c
47. Council Regulation (EU) 2022/328 of 2 February 202 amending Regulation (EU) No 833/2014 – new Article 2e
48. Council Regulation (EU) 2022/328 of 2 February 202 amending Regulation (EU) No 833/2014 – amendments to Article
49. Council Regulation (EU) 2022/328 of 2 February 202 amending Regulation (EU) No 833/2014 – new Articles b-g
50. Council Regulation (EU) 2022/330 of 2 February 202 amending Regulation (EU) No 269/2014
51. Council Implementing Regulation (EU) 2022/33 of 2 February 202 implementing Regulation (EU) No 269/2014
52. Council Decision (EU) 2022/33 of 25 February 2022
53. Agreement between the European Community and the Russian Federation on the facilitation of the issuance of visas to the citizens of the European Union and the Russian Federation of June 2007, and the Agreement between the European Community and the Russian Federation on readmission
54. Council Implementing Regulation (EU) 2022/260 of 2 February 202 implementing Regulation (EU) No 269/2014
55. Council Implementing Regulation (EU) 2022/259 of 2 February 202 implementing Regulation (EU) No 269/2014
56. Council Implementing Regulation (EU) 2022/26 of 2 February 202 implementing Regulation (EU) No 269/2014
57. Council Regulation (EU) 2022/26 of 2 February 202 amending Regulation (EU) No 833/2014 (reflecting the adoption of Council Decision (CFSP) 2022/264)
58. Council Regulation (EU) 2022/26 of 2 February 2022

Appendix

Table 5 Airline Business Model

Airline Business Model	Full Service Carrier (FSC)	Low Cost Carrier (LCC)	Charter Airline
Generic Strategy	Differentiation by class (uniqueness perceived)	Differentiation by cost minimisation	On-demand offerings, Private airline service
Routes (Appendix Figure 9)	Hubs and Spokes Feeder routes Trunk routes	Point-to-point	Trunk routes Hub and Spokes
Routes	Short, Medium, Long-haul	Short-haul (optional Medium)	Short, Medium, Long-haul
Aircraft type	Various types (multiple families)	Uniform (one family type)	Various types (multiple families)
Classes	Business Economy Plus Economy etc.	Economy Other classes are subject to availability	Business Economy Plus Economy etc.
Example	Aeroflot S7 Emirates	Pobeda Schoot RyanAir	Pegasus Airline (IKAR) Marathon (Greece)

Source: [compiled by the author]

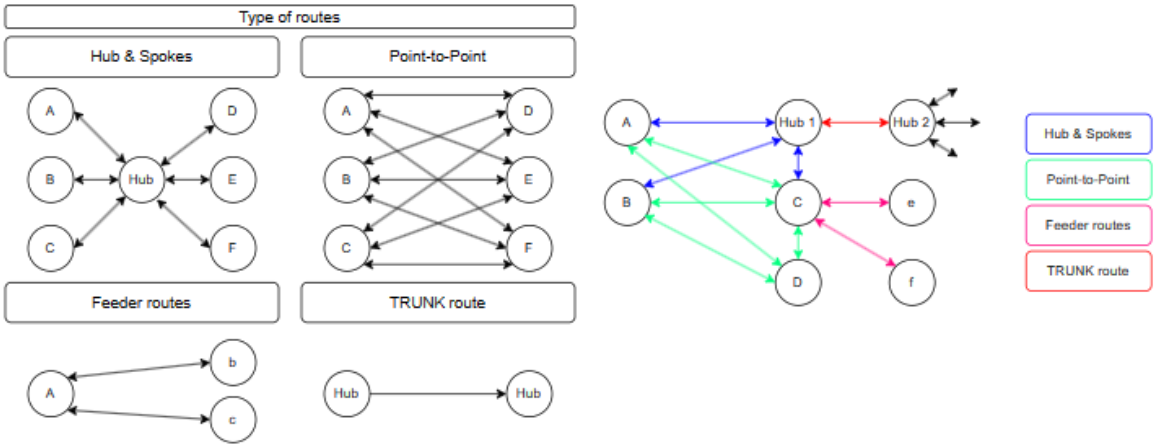

Figure 9 Airline Route Model

Source: [compiled by the author]

Table 6 Value Frameworks

Characteristic	Value Chain by Porter	Value Chain as Value Network	Value Grid
Perspective	Company	Industry	Related industries
Example	Airline perspective	Raw materials - Aircraft manufacturer - Airport - Technics - Airline - etc.	Aerospace: Airlines, Military, Helicopters, Drones, etc.
Focus on	Companies activities	Companies interconnectedness within industry	Companies interconnectedness within several industries
Dimensions	1D (one entity)	2D or linear (horizontal or vertical)	3D (vertical, horizontal, diagonal)
Horizontal	Within a tier, companies move across value chains to leverage existing competencies, manage risk, seize value embedded in other chains and develop novel value propositions that are not accessible to actors operating in single value chains.		
	• Seizing value • Integrating value • Creating new value propositions		
Vertical	Companies think non linearly about their value chain when they look downstream to end-users and upstream to supply and service providers to find ways to better understand end-users, enhance demand for products and capitalise on information accessible to other tiers of the value chain		
	• Influencing customer demand, both upstream and downstream		

	• Modifying downstream information access • Exploring multi tier penetration
Diagonal	Companies operate diagonally when they operate across tiers and parallel value chains. They take an inte-grative approach to gaining access to critical informa-tion, and they identify additional opportunities to ensure and enhance demand.
	• Pursuing pinch-point mapping • Defining demand enablers

Source: [compiled by author, based on information from Pil & Holweg, 2006]

Table 7 Two types of dry leases

	Financial lease	Operating lease
Contract name	Loan agreement/contract	Rent agreement/contract
Recording under the accounting system?	Required	Not required / Off the balance sheet.
Period	Long-term	Short-term
Ownership	Transferred to lessee	Cannot be transferred from lessor
Purchase ownership	At the end of the contractual period	-
Can it be cancelled?	No	Can only be revoked during the initial period
Tax	Tax deduction for depreciation and finance charges	Tax deduction for rent payments
Maintenance	Lessee responsibility	Lessor responsibility

Source: [Mukhopadhyay, Sayantan, “Financial Lease vs Operating Lease”, 2024]