



ASSEMBLY — 42ND SESSION

ECONOMIC COMMISSION

Agenda Item 26: Economic Development of Air Transport

TACKLING THE IMPACT OF SUPPLY CHAIN DISRUPTIONS AND HUMAN CAPITAL SHORTAGES

(Presented by Denmark on behalf of the European Union and its Member States¹ and the other Member States of the European Civil Aviation Conference² and EUROCONTROL, and co-sponsored by Canada)

EXECUTIVE SUMMARY

Having largely recovered from the COVID-19 pandemic, the air transport sector experienced record high demand in 2024. However, its future growth faces significant headwinds from supply chain disruptions and critical shortages of skilled personnel.

Supply chain disruptions, stemming from geopolitical instability, trade friction, and logistics bottlenecks, are hindering aerospace manufacturing and aircraft deliveries. This limits airlines' ability to meet growing demand and delays progress on sustainability goals. Furthermore, the sector is grappling with a shortage of human capital across various roles, including pilots, crew, air traffic controllers, technical staff, and regulators. This is a consequence of pandemic-related workforce departures, interrupted recruitment and training, increased competition from other sectors and a perceived lack of attractiveness of the sector for new recruitment.

Addressing these interconnected challenges requires concerted international action.

Action: The Assembly is invited to:

- a) request the International Civil Aviation Organization (ICAO) to explore alternative means of securing sustainable growth of the sector in the light of the supply chain challenges set out in part (2) of this paper. Regarding the human capital shortages set out in part (3), Air Transport Regulation Panel (ATRP) should work closely with other ICAO bodies to help ensure that the relevant ICAO activities are coordinated complementary, transparent and in line with the United Nations Sustainable Development Goals (UN SDGs);
- b) encourage ICAO Member States to develop appropriate national strategies focussing on increasing the competitiveness and attractiveness of the aviation sector, in terms of staff recruitment and retention. This could include specific actions to improve the representation in aviation careers of under-represented groups in order to ensure non-discrimination and fair opportunities in accessing the different professions; and
- c) Invite ICAO to use the occasion of the Seventh Worldwide Air Transport Conference (ATConf/7) to focus attention on easing supply chain disruptions and boosting participation in the aviation sector.

1 Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

2 Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Monaco, Montenegro, North Macedonia, Norway, Republic of Moldova, San Marino, Serbia, Switzerland, Türkiye, Ukraine and United Kingdom.

<i>Strategic Goals:</i>	This working paper relates to Strategic Goal: The Economic Development of Air Transport Assures the Delivery of Economic Prosperity and Societal Well-Being for All.
<i>Financial implications:</i>	The activities referred to in this paper will be undertaken with the resources available in the Regular Programme Budget and/or from extra-budgetary contributions.
<i>References:</i>	

1. INTRODUCTION

1.1 Generally, in terms of demand for air travel, the air transport industry has recovered from the COVID-19 pandemic, which caused severe disruption to the air transport industry worldwide. In almost all regions air traffic has since recovered to the levels seen in 2019. In January 2025, The International Air Transport Association (IATA) reported that 2024 marked a year of record high demand, with year-on-year growth of 13.6% in revenue passenger kilometres (international traffic only). However, in certain countries which have been affected by geopolitical upheaval, the recovery is likely to take longer.

1.2 Although air carriers' profitability has markedly improved since the pandemic, the sector now faces significant challenges to its future growth prospects. Indeed, the fact that those same statistics also showed a record high average load factor indicates that bottlenecks and constraints are now impacting the ability of the sector to provide sustainable growth at the service of passengers and the global economy. This paper will explore two broad categories of such constraints: firstly, the impact of supply chain disruptions; and secondly, the continuing challenges in recruiting and maintaining the staff required in the entire aviation value chain to service the demand for air connectivity.

2. DISRUPTION TO SUPPLY CHAINS

2.1 The sector continues to suffer from disruptions to supply chains, meaning that it has become more difficult for the sector to adequately cater for the connectivity needs of businesses and citizens worldwide. Whilst some of these disruptions date back to changes wrought by the COVID-19 pandemic, the importance of these has lessened and most of the issues faced are due to more recent factors. They include disruptions caused by the impact of conflict zones, increased friction impacting international trade flows (including maritime traffic), heightened export controls and other hindrances to trade.

2.2 Aerospace manufacturing, and commercial aircraft in particular, relies on a complex and intertwined global network of suppliers for parts and components. Disruptions to global shipping and freight logistics, such as container shortages and port congestion, have delayed the delivery of these critical supplies. Materials shortages have also impacted production schedules. The strong recovery in demand for travel following the pandemic led to airlines ordering more aircraft, creating a backlog of orders. Aircraft manufacturers and suppliers have struggled to meet the increased demand, further exacerbating supply chain bottlenecks.

2.3 These difficulties, compounded in some cases by increased and unforeseen maintenance costs, hinder growth and are delaying progress on sustainability goals. Solutions which have typically been used by airlines do not sufficiently address these constraints. Whilst airlines' network growth is dependent on obtaining new aircraft as well as maintenance of the current fleet, there is potential for 'soft' operations to assist with this growth, including liberalising leasing, interlining and code sharing as well as considering the regulation of interchange operations. However, in order for these options to provide an adequate solution, it is important to ensure that social, safety and

environmental considerations are fully taken into account while they are further facilitated by regulators.

3. THE CHALLENGE OF SCARCE HUMAN CAPITAL

3.1 In addition to these supply chain disruptions, there is an ongoing shortage of skilled personnel in many domains, including not only pilots, crew, technical staff, air traffic controllers, ground handling, security staff and management positions in the sector but also for regulatory agencies.

3.2 During the pandemic, many employees left the workforce, leading to a shortage of specialists in areas such as engineering, technicians, and assembly line production, which together have impacted production rates. In addition, the pandemic interrupted hiring and training processes for many organisations. When pandemic-related travel restrictions eased and airlines were able to resume operations, many aviation workers who had been laid off had found jobs in other areas and did not return, leading to shortages. Regulators have not been immune to this and in some jurisdictions have also been struggling with staff shortages affecting specialist staff, leading to delays in the issuance of essential safety-related regulatory approvals.

3.3 At the same time, there has been increased competition with other sectors for skilled staff. The attractiveness of the sector has lagged somewhat, reflected in diminished working conditions; a lack of diversity and strong gender roles in the sector, all making it difficult to attract and retain a young and diverse workforce. Finally, rapid technological transformation and its impact on aviation (e.g. digitalisation, artificial intelligence, automation, development of unmanned aviation and the transition to more sustainable aircraft and energy resources) has the potential to further aggravate labour shortages now and in the future demanding more people with technical skills in already scarce labour market.

3.4 The combined result of the shortages, the pandemic disruption in recruitment and training, and the increased labour market competition is a negative impact on production rates, delays in the issuance of regulatory approvals, increased fatigue of staff, increased cost of recruitment and training, and a lack of diversity in the sector, hindering innovation and increased productivity.

3.5 A diverse and inclusive workforce, with effective policies on diversity, equality and inclusion as ways to improve the overall working environment, representation and participation in aviation, is an enabler of increased economic development of the aviation sector and contribute to its resilience to future crises and events. Given the experience of the last few years and the loss of many skills in the sector following the pandemic, greater attention should be paid to the impact of labour conditions in accordance with the International Labour Organization's (ILO) Decent Work Agenda.

3.6 There are already a number of initiatives to improve the attractiveness of the aviation sector. ICCAIA, the International Coordinating Council of Aerospace Industries Associations, has established the Global Aviation and Aerospace Skills Taskforce bringing together States, regulators and industry to pool resources and collaborate on workforce challenges. The International Civil Aviation Organization (ICAO) has been active in this area, drawing attention to it in resolutions adopted at the 39th and 41st Assembly sessions. ICAO has also established the Next Generation of Aviation Professionals (NGAP) initiative, aiming to ensure a sufficient supply of qualified and competent professionals to operate, manage, and maintain the future international air transport system. In the future, consideration should also be given to promoting outreach, training programs and scholarships for underrepresented groups, by extending partnerships with national authorities to include universities and other training and education institutions.

3.7 ICAO has also convened high level events including Global Aviation Gender Summits in 2018 and 2023 in order to discuss the challenges faced by women in aviation, and the barriers to attract, retain and promote women within the aviation workforce. The International Civil Aviation

Organization - European and North Atlantic (ICAO-EUR/NAT) held a Regional Workshop on Gender Equality and Empowerment of Women in Aviation 4-5 March 2025 to address the regional challenges. In Europe, the European Commission has established Ambassadors for Diversity In Transport to promote diversity, equality and inclusion within the European Union (EU) transport sector. The European Civil Aviation Conference (ECAC) Charter on Diversity and Inclusion, adopted in May 2023 by the Directors General of Civil Aviation in 44 ECAC Member States, marks a significant step forward in fostering Diversity, Equity, and Inclusion (DEI) across European civil aviation. The Charter affirms ECAC's commitment to promoting diverse, equitable and inclusive work environments where everyone feels respected, valued, and empowered. Established in December 2022, the ECAC Network on Diversity and Inclusion in Civil Aviation brings together experts from civil aviation administrations across ECAC Member States. EUROCONTROL has created a Diversity, Equity and Inclusion in Aviation toolkit to provide pragmatic and efficient approaches while complementing, mapping and referring to existing initiatives.

4. CONCLUSION

4.1 These challenges underscore the need for further action at the international level. Regarding supply chain disruptions, regulators should examine the case for alternative operational options that facilitate the market growth for airlines, including wet and dry leasing, code-sharing, interline and interchange arrangements, whilst fully taking into account the need to uphold standards of safety, environmental performance and social protection.

4.2 Regarding the human capital shortages, there is now a need further to increase cooperation between governments, stakeholders and education institutions, including on exchanging better practices, existing materials, consolidating activities and monitoring and following up the staff issues.

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