

A person wearing a white shirt is partially visible on the right side of the frame. The background is black with several curved yellow lines that create a sense of motion or a stylized graphic. The text is positioned in the lower right area of the image.

The future skills in the aviation industry

Boughazi Melissa Tunon
international school



Introduction

The aviation industry is undergoing a major transformation, driven by the rise of digital technologies, environmental imperatives, and increasing global competition.

I undertook this research to understand how these changes are impacting the skills required in the sector and to identify gaps in current professional training.

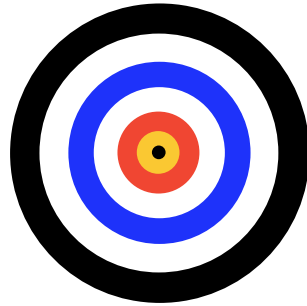
My motivation stems from a desire to contribute to better preparing aviation stakeholders for future challenges by proposing innovative solutions and adaptations that enhance the industry's competitiveness and sustainability.





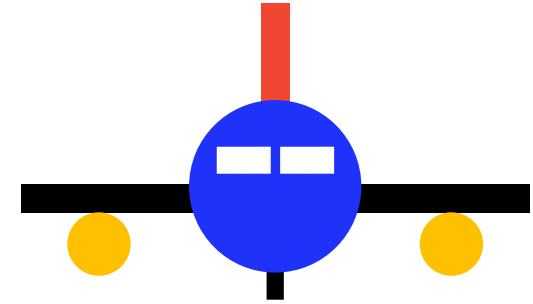
Current Situation: Trends and Challenges

- Current Skills
- Growth in Air Traffic
- Ecological Transition
- Adoption of New Technologies
- New Customer Expectations for travel



Future Needs

- Future Skills
- In 5 years
- In 10 years
- In 20 years
- In 30 years



Recommendations

- Missing skills...
- How to close the gap...

Current Skills

- **Technical Expertise:** Aircraft maintenance, operations.
- **Communication & Teamwork:** Effective collaboration.
- **Problem-solving & Crisis Management:** Quick response.
- **Adaptability:** Evolving work environment.
- **Safety Knowledge:** Compliance with regulations.



Growth in air traffic

- **Increased Passenger Demand:** More travelers expected in the coming years.
- **Skilled Workforce:** Higher need for pilots, engineers, and cabin crew.
- **Fleet Expansion:** New aircraft to meet demand.
- **New Routes:** Airlines expanding flight networks.
- **Infrastructure Growth:** Airports and air traffic systems adapting to increased traffic.



Ecological transition

- **Sustainable Aviation Fuels (SAF):** Reducing CO₂ emissions.
- **Electric Aircraft:** Innovations for a lower carbon footprint.
- **Environmental Regulations:** Stricter government standards.
- **Sustainability Expertise:** Training in eco-friendly practices.
- **Green Technologies:** Advancements in reducing environmental impact.



Adoption of New Technologies

- **AI:** Optimizing flight paths and maintenance.
- **Automation:** Drones and robotics for inspections.
- **Cybersecurity:** Protecting aviation networks.
- **Digital Management:** Advanced systems for air traffic control.
- **Smart Systems:** Automated systems for efficiency and safety.

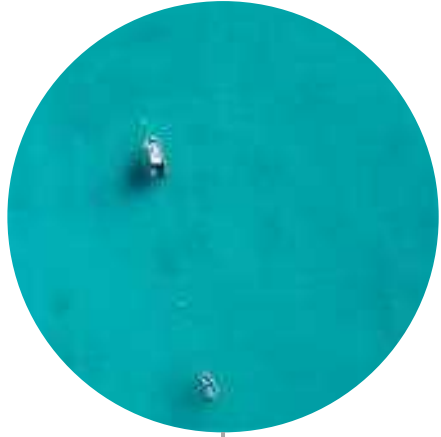


New Customer Expectations for Travel

- **Personalized Services:** Tailored travel experiences.
- **Seamless Digital Integration:** Easy online booking and check-ins.
- **Eco-friendly Options:** Demand for sustainable travel.
- **Improved Comfort:** Better seating and services.
- **Health & Safety:** Higher hygiene and safety standards.



Passenger Expectations for travel



Flexible Pricing

More dynamic fares based on demand and personalization.



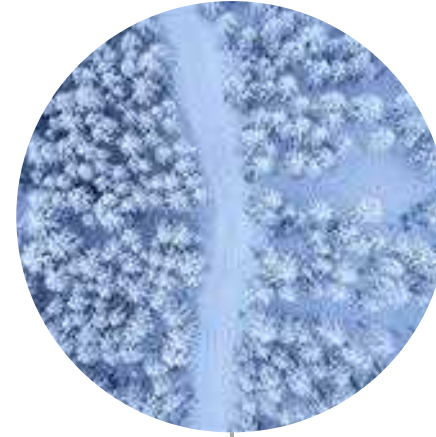
More Comfort & Space

Wider seats, extra legroom.



Fast Customer Service

24/7 support via app/chatbot.



Loyalty Rewards

More benefits and discounts for frequent travelers.



Subscription-Based Travel

Monthly plans for frequent flyers.

Future Skills

- **Data Analysis and Cybersecurity:** Protecting data and optimizing operations.
- **AI Programming and Management:** Developing and managing AI-driven systems.
- **Eco-Friendly Aircraft Design:** Creating sustainable aircraft solutions.
- **Automation and Robotics:** Implementing robotic systems for maintenance and inspections.
- **Advanced Flight Simulation:** Enhancing pilot training with cutting-edge simulations.



Future needs

In 5 years

- **Advanced Digital Literacy:** Proficiency with aviation tech tools.
- **Data Analysis & AI Integration:** Interpreting large datasets for efficiency.
- **Sustainability Knowledge:** Implementing green initiatives.
- **Cybersecurity Awareness:** Protecting digital aviation systems.
- **Enhanced Communication Skills:** Effective collaboration in a digital environment.



Future needs

In 10 years

- **Autonomous Aircraft Management:** Training for drones and pilotless planes.
- **Advanced Propulsion Engineering:** Expertise in hydrogen/electric aircraft.
- **Enhanced Passenger Experience:** Innovations in comfort and service.
- **AI-driven Air Operations:** More AI use in flight management.
- **Advanced Air Traffic Management:** Managing high-tech control systems.



Future needs

In 20 years

- **Next-generation Air Traffic Control:** Managing automated systems.
- **Space Tourism:** Handling space travel logistics.
- **Supersonic Travel:** Managing high-speed air travel.
- **Bioengineering & Alternative Fuels:** Developing sustainable fuels.
- **Robotics Integration:** Using robotics for maintenance and operations.



Future needs

In 30 years

- **Full Flight Automation:** Minimal human intervention in operations.
- **Hydrogen/Electric Aircraft:** Adoption of zero-emission fleets.
- **Space & Hypersonic Travel:** Expanding travel routes and capabilities.
- **Global Digital Network Management:** Managing a connected global system.
- **Personalized Passenger Experience:** AI-driven, tailored services.





New Aviation Job Roles Emerging

Current Jobs (Existing Roles)	Jobs at Risk of Disappearing	Future Jobs (New Roles)	Required Skills
Pilots – Commercial & Cargo	Co-Pilots & Flight Engineers – As automation advances, single-pilot operations will become common.	AI-Powered Flight Operations Analyst – Manages AI systems optimizing flight paths, fuel efficiency, and predictive maintenance.	AI & data analysis, real-time decision-making, aviation software development
Aircraft Maintenance Technicians – Ensures aircraft safety & performance	Traditional Air Traffic Controllers– AI-driven air traffic management (ATM) systems are taking over manual monitoring.	Autonomous Aircraft Supervisor – Oversees drones, pilotless planes, and urban air mobility (air taxis).	Autonomous vehicle supervision, cybersecurity, robotics, UAV operations
Cabin Crew (Flight Attendants) – Ensures passenger safety & service	Check-in & Boarding Agents – Biometric identification & automation will reduce manual check-in processes.	Space Tourism Operations Manager – Handles passenger training & safety for space tourism companies.	Space operations, risk management, astronaut training
Air Traffic Controllers – Monitors aircraft movement & air safety	Baggage Handlers – Increased use of AI-powered robots and conveyor systems will replace manual handling.	Cybersecurity Specialist for Aviation – Protects digital aviation systems from cyber threats.	Cyber risk management, aviation IT security, encryption technologies
Aircraft Designers & Engineers – Develops & tests aircraft	Manual Aircraft Inspectors – Drones and AI-based systems will replace human inspections.	Sustainable Aviation Engineer – Develops eco-friendly aircraft (hydrogen, hybrid, electric).	Aerodynamics, sustainable fuel technology, propulsion engineering
Aviation Meteorologists – Provides weather forecasts for flights	Airline Call Center Representatives – AI-driven customer service bots are replacing traditional call centers.	Alternative Fuels Chemist – Researches & develops biofuels, hydrogen & synthetic aviation fuels.	Chemistry, energy science, sustainable engineering
Airport Ground Operations Staff – Manages refueling, towing, etc.	Traditional Airport Security Screeners – AI-powered security scanners and biometric tech will reduce manual security checks.	Urban Air Mobility Coordinator – Manages aerial taxis & flying cars in urban areas.	Airspace management, regulatory knowledge, smart city planning

Recommendations

Missing Skills and solutions

Missing Skills	Solutions
AI & Cybersecurity Expertise	Specialized Training Programs
Sustainability Training	Collaboration with Industry
Autonomous Aircraft Systems	Sustainability in Courses
Robotics & Alternative Fuels	Continuous Professional Development



Recommendations

Closing the gap...

- **Specialized Training:** Focus on AI, sustainability, and digital tech.
- **Industry-Academia Collaboration:** Strengthen partnerships for relevant learning.
- **Continuous Development:** Upskill the workforce to keep up with tech advances.
- **Sustainability Focus:** Integrate eco-friendly practices in education.
- **R&D Investment:** Support innovation in sustainable aviation.



Conclusion

The aviation industry is at a turning point, where digitalization, environmental concerns, and evolving passenger expectations are reshaping the required skill sets. By identifying skill gaps and implementing targeted training programs, the sector can ensure a workforce capable of navigating future challenges.

Key takeaways:

- **Artificial intelligence, automation, and sustainability** will be central to aviation's future.
- **Collaboration between universities, airlines, and regulatory bodies** is crucial to align training with industry needs.
- **Continuous learning and adaptability** will define successful aviation professionals.

By investing in education, innovation, and sustainability, the aviation industry will maintain its growth trajectory while reducing its environmental footprint.



Sources :

1) International Air Transport Association (IATA) –
Passenger Demand Forecasts

1. www.iata.org

2) Boeing Commercial Market Outlook 2024 –
Projected Workforce Needs

1. www.boeing.com

3) Airbus Global Market Forecast 2024-2043 –
Emerging Technologies and Skills

1. www.airbus.com

4) International Civil Aviation Organization (ICAO) –
Sustainable Aviation Policy

1. www.icao.int

5) NASA Aeronautics Research Institute (NARI) – AI in
Future Air Traffic Control

1. www.nasa.gov

6) European Union Green Deal – Aviation Sustainability
Measures

1. www.europa.eu

