Dominican Republic
Air Transport Case Study

P/15 Agenda Item 8 Secretariat
Eighth Meeting of the North American, Central American and Caribbean Directors of Civil Aviation (NACC/DCA/08)
Ottawa, Canada, 31 July to 2 August 2018

Introduction
Policy and Regulation
Safety Audit Results
Air Connectivity and the State of Air Transport
Economic Benefits and Job Contribution
New Dominican Republic aviation connectivity case study to shine spotlight on economic planning and growth benefits

As part of ICAO's continuing efforts to assist Small Island Developing States (SIDs), the Director of ICAO's North American, Central American and Caribbean (NACC) Office, Mr. Melvin Cintron (fourth from right), was joined by officers from the ICAO Air Transport Bureau and civil aviation officials and key stakeholders from the Dominican Republic yesterday to forge the parameters of a new air transport case study to quantify the economic and social benefits of aviation connectivity in the Dominican Republic.

Objectives of the Study

- Demonstrate that a country’s political will and commitment to establishing aviation as a national priority can drive economic development to the country
- Quantify the economic and social benefits from civil aviation to Dominican Republic, using data and analysis of the past two decades
- Provide a more relevant and accurate representation of the “before” and “after” effects on the economies and sustainable developments of Small Developing Island States (SIDS)
Small Island Developing States (SIDS) consist of 38 maritime developing countries, including Dominican Republic (and 20 non-UN Members and Associate Members) facing specific social, economic and environmental vulnerabilities.

- Small domestic markets with heavy dependence on foreign markets
- High costs for energy, infrastructure, transportation and communication
- Long distances from major trading and tourist-generating markets
- Low and irregular international traffic volumes
- Little resilience to natural disasters and fragile natural environments

Study Outline

I. Introduction
II. State of air transport
III. Connectivity
IV. Policy and regulation
V. Navigational scenarios in the Dominican Republic
VI. Safety audit results
VII. Direct and indirect economic and job contributions of civil aviation to the Dominican Republic’s economy
VIII. Policies that could further enhance economic contribution of civil air transport
Aviation as Priority

DECISION & POLITICAL WILL

Dominican Republic chose to make aviation a priority sector in their national development planning and policies

Civil Aviation Law No.491-06 (promulgated 28 December 2006)

- Strengthen the role of the civil aviation board and its mandate for negotiations (3rd and 4th freedom rights)
- Allows for more flexibility for foreign operators

Source: JAC
Aviation as Priority

Modifications for higher degree of liberalization

2010 – Resolution No.180-(2010) (promulgated by JAC, currently under review)
- 6th freedom rights for passenger, cargo and combined
- 7th freedom rights for all-cargo

2013 – Law 67-13 (amending Law 491-06)
- Relaxation of ownership requirements for national operators (company with foreign capital (up to 100%) can be considered as a national air operator, provided, that the investment is from an internationally known airline)

Source: JAC

Aviation as Priority

JAC Requirement Manual
(Version 6.0)

Regulatory framework for the Civil Aviation Board

- Includes regulatory framework for charter and special permits
- More flexible requirements for the issuance of Operating Permits were introduced and simplified gradually

Source: JAC
Air Services Agreements

Bilateral Agreements:

Total number: 60
- incl. 5th freedom: 54
- incl. 6th freedom: 17
- incl. 7th freedom: 19 (all cargo)

Multilateral Agreements:

Air Transport Agreement of Association of Caribbean States (ACS)
(rubricated February 2004, final signature pending)

Multilateral Agreement of Open Skies among the Member States of the Latin American Civil Aviation Commission (LACAC)
(signed November 2011)
How Safety Affects Air Traffic

- Safety reputation might affect travelers’ choice of destination and airlines
- Accidents and incidents might lead to an immediate decline of demand to travel with a particular airline
- Using an econometric model, it is estimated that 10 per cent improvement of the effective implementation of a State’s safety oversight system might generate, on average, an additional 1.8 per cent of aircraft departures from the State concerned.

Source: Aviation Benefits report, 2017, ICAO

Safety Audit Results

- Dominican Republic improved Effective Implementation (EI) from 85.98% (2009) to 90.52% (world average is 66.32%), ranking the country 4 of 21 in NACC region.
- Dominican Republic reached the Global Aviation Safety Plan (GASP) Targets.

Source: ICAO
Dominican Republic Performance Dashboard based on ICAO Safety Audits

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Value</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAOAP EI (Unsatisfactory)</td>
<td>66%</td>
<td>95.52%</td>
<td>Yes</td>
</tr>
<tr>
<td>Significant Safety Concern (SSC)</td>
<td>0</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>Fatal Accidents</td>
<td>0</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>Aerodrome Certification</td>
<td>Satisfactory</td>
<td>Satisfactory</td>
<td>Yes</td>
</tr>
<tr>
<td>State Safety Programme (SSP) Foundation</td>
<td>100%</td>
<td>95.01%</td>
<td>Yes</td>
</tr>
<tr>
<td>State Safety Programme (SSP) Level 2</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Value</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICAO</td>
<td>&gt;0</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>PAA ICAO</td>
<td>Cat 1</td>
<td>Cat 1</td>
<td>Yes</td>
</tr>
<tr>
<td>ESI Safety List</td>
<td>Unrestricted</td>
<td>Unrestricted</td>
<td>Yes</td>
</tr>
<tr>
<td>ESI</td>
<td>100%</td>
<td>NA-APL</td>
<td>No</td>
</tr>
<tr>
<td>Global Aviation Training Activities</td>
<td>&gt;0</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>Corrective Action Plan Update</td>
<td>&gt;0</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>Positive Safety Mergers</td>
<td>55</td>
<td>5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Green indicates that the State exceeds the target set by ICAO

Source: ICAO
Definition of Air Connectivity

Movement of passengers, mail and cargo involving the minimum of transit points

- which makes trip as short as possible
- with optimal user satisfaction
- at the minimum price possible

Measurement of Air Connectivity

<table>
<thead>
<tr>
<th>Departure</th>
<th>Share of 2016 Pax</th>
<th>0 stop (Direct)</th>
<th>1 Stop 2016</th>
<th>2 Stops 2016</th>
<th>Weighted average Stops 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>7.87%</td>
<td>47.0%</td>
<td>46.3%</td>
<td>6.8%</td>
<td>0.60</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>7.06%</td>
<td>84.3%</td>
<td>14.6%</td>
<td>1.1%</td>
<td>0.17</td>
</tr>
<tr>
<td>Germany</td>
<td>5.12%</td>
<td>75.5%</td>
<td>22.7%</td>
<td>1.8%</td>
<td>0.26</td>
</tr>
<tr>
<td>Spain</td>
<td>4.94%</td>
<td>83.9%</td>
<td>14.5%</td>
<td>1.6%</td>
<td>0.18</td>
</tr>
<tr>
<td>Italy</td>
<td>3.76%</td>
<td>75.2%</td>
<td>22.6%</td>
<td>2.2%</td>
<td>0.27</td>
</tr>
<tr>
<td>France</td>
<td>3.65%</td>
<td>77.7%</td>
<td>20.7%</td>
<td>1.6%</td>
<td>0.24</td>
</tr>
<tr>
<td>Japan</td>
<td>2.91%</td>
<td>75.1%</td>
<td>22.3%</td>
<td>2.5%</td>
<td>0.27</td>
</tr>
<tr>
<td>Republic of Korea</td>
<td>2.33%</td>
<td>84.6%</td>
<td>12.7%</td>
<td>1.1%</td>
<td>0.15</td>
</tr>
<tr>
<td>Thailand</td>
<td>2.17%</td>
<td>75.3%</td>
<td>22.4%</td>
<td>2.3%</td>
<td>0.27</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>2.16%</td>
<td>86.2%</td>
<td>13.1%</td>
<td>0.7%</td>
<td>0.14</td>
</tr>
<tr>
<td>Canada</td>
<td>2.05%</td>
<td>54.5%</td>
<td>38.8%</td>
<td>6.6%</td>
<td>0.52</td>
</tr>
<tr>
<td>India</td>
<td>2.00%</td>
<td>51.1%</td>
<td>43.8%</td>
<td>5.2%</td>
<td>0.54</td>
</tr>
<tr>
<td>Hong Kong, SAR, China</td>
<td>1.77%</td>
<td>87.6%</td>
<td>11.9%</td>
<td>0.5%</td>
<td>0.13</td>
</tr>
<tr>
<td>Taiwan Province of China</td>
<td>1.68%</td>
<td>89.5%</td>
<td>9.5%</td>
<td>1.0%</td>
<td>0.12</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>0.43%</td>
<td>61.1%</td>
<td>36.6%</td>
<td>2.4%</td>
<td>0.41</td>
</tr>
</tbody>
</table>

The World Bank uses this connectivity index in it’s major report which focuses on understanding the role of connectivity in economic growth and development.
The score of Dominican Republic (23) is close to the average for other developing countries (25).

The State of Air Transport
Dominican Republic

- Over 99.9% of traffic is international
- More than 90% of tourists arrive by air
- 80% of passengers originating in Dominican Republic depart from Punta Cana and Santo Domingo airports
- Half of passengers departing from Dominican Republic fly to United States
- Eight out of the top 10 outbound routes are to United States
- More than 20% of passengers departing from Dominican Republic travel to New York/Newark

Source: ICAO-ICM
Airlines of Dominican Republic

1995: Dominicana de Aviación ceased all operations

2001-2004: Massive drop of domestic capacity partly due to the increased road connectivity within the State

2003: PAWA Dominicana was founded

2005: Aerolíneas Mas was founded

2012: End of scheduled domestic services

2012-2014: PAWA Dominicana temporarily ceased scheduled flights, only offering non-scheduled flights

2015: Aerolíneas Mas ceased all operations

2018: PAWA Dominicana ceased all operations

Source: ICAO

Passenger Arrivals

Source: JAC, Dominican Republic
Number of Flights

Source: JAC, Dominican Republic
Dominican Republic has enjoyed strong economic growth in recent years and a significant reduction in poverty, although the country remains vulnerable to natural disasters such as hurricanes (World Bank Group)

- Small Island Developing State (SIDS)
- Upper middle-income developing country (by World Bank Group)
- 99th in Ease of Doing Business Ranking 2018 (by World Bank Group)
- 104th in Global Competitiveness Index 2017-2018 (by World Economic Forum)
- 76th in Travel & Tourism Competitive Index 2017 (by World Economic Forum)

Source: ICAO

Real GDP and Population of Dominican Republic

Source: World Bank national accounts data, and OECD National Accounts data files
Income Generated by Tourism in Dominican Republic

Time-series regression analysis

\[ \text{Income generated by tourism} = f(\text{Expenditure, Tourists, GDP, Jobs, Hotels}) \]

- **Dependent variable**: Income generated by tourism
- **Independent variables**:
  - Total jobs, expense per trip, number of tourists (Dominican non-residents and non-resident foreigners), hotel rooms available and GDP
  - Some independent variables may be multiplied together, logged and/or first differenced

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient ((r_i))</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Non-Resident Expenditure per Year (FNRE)</td>
<td>0.950965</td>
<td>41.13</td>
</tr>
<tr>
<td>Lagged Difference of Dominican Non-Resident Expenditure per Year (L.D.DNRE)</td>
<td>-0.552799</td>
<td>-3.17</td>
</tr>
<tr>
<td>Lagged Difference of GDP (L.D.GDP)</td>
<td>0.0103679</td>
<td>4.24</td>
</tr>
<tr>
<td>Number of Jobs Created per Dollar of GDP (JGDP)</td>
<td>-2359.008</td>
<td>-4.91</td>
</tr>
<tr>
<td>Number of Jobs Created per Tourist (JPT)</td>
<td>4845.298</td>
<td>2.08</td>
</tr>
<tr>
<td>Number of Rooms Booked (NRB)</td>
<td>35261.2</td>
<td>7.97</td>
</tr>
<tr>
<td>Constant ((\beta))</td>
<td>-747.3531</td>
<td>-3.45</td>
</tr>
</tbody>
</table>
Simulated Actual Scenario

- Use the estimated coefficients and the actual values of each independent variables for simulation
- Can be a good approximation to the actual results (income generated by tourism), which endogenously reflect the policy change to make aviation a priority in 2006

Hypothetical Scenario that assumes no aviation policy change in 2006

- Use the coefficients estimated in the regression analysis
- Use the adjusted number of tourists from 2006 to 2017 (Dominican non-residents and non-resident foreigners) for 3 independent variables
  - Forecast “after 2006 period” by extending the trend line of “prior to 2006 period”
  - Add 0.9% difference in air traffic compound annual growth rate observed at the global level between the two periods
- Can yield the “hypothetical” income generated by tourism after 2006 if the tourist volume increased at the same rate as prior to 2006
The simulated actual scenario and the hypothetical scenario are compared to estimate an overall effect of aviation policy change on income generated by tourism over time.

This preliminary analysis indicates that aviation policy change in 2006 contributed to approximately USD 10 billion (i.e. 17.5% more) cumulative income from tourism from 2007 to 2017.
Quantification of Policy Change Impact
Preliminary Analysis

In 2014,
- **15.8%** of total gross value added by aviation (i.e. USD 1.2 billion out of USD 7.4 billion)
- **1.8%** of Dominican Republic's GDP
can be attributed to aviation policy change made in 2006

Sustainable Development Goals (SDGs)
Attainment of the SDGs relies on advances in sustainable air transport, which is a driver of sustainable development.

- Many of the SDGs are directly and indirectly connected to sustainable air transport (especially SDG 9, 8, 11 and 13)
- Progress towards the goals needs to be monitored and evaluated by adequate and quality data
- **SDG Target 9.1** – Develop quality, reliable, sustainable and resilient infrastructure with a focus on affordable and equitable access for all
  - ICAO is a custodial agency responsible for collecting traffic data and sharing the information with the UN system to support the agreed global indicator *(passenger and freight volumes by mode of transport)*
This study will serve as a template for other SIDS to consider in order to optimize their own air transport benefits.

Source: United Nations
Air Connectivity of Dominican Republic

2011

2017

Source: ICAO-ICM

Passenger Traffic Composition of Dominican Republic in 2017

- Total Traffic: 5,993,618
  - Domestic: 1,970
  - International: 5,991,648

Source: ICAO-ICM

ICAO-ICM Global Air Transport Diagnosis using Marketing Information Data Transfer (MITD) Data
80% of passengers originating in Dominican Republic departed from Punta Cana (PUJ) and Santo Domingo (SDQ) airports in 2017.

### Origin Airports for the traffic from Dominican Republic (DO)

- **PUJ**: 2,866,795 (48.33%)
- **SDQ**: 1,691,637 (31.56%)
- **STI**: 350,045 (9.26%)
- **POP**: 279,772 (8.54%)
- **LIM**: 109,832 (1.92%)
- **AZS**: 89,209 (0.99%)
- **JIM**: 86,770 (0.33%)

Source: ICAO-ICM

### Top 10 Destination Countries

Half of passengers departing from Dominican Republic flew to United States.

### Destination Traffic

Country destinations for traffic that originated from Dominican Republic (DO):

- **US**: 2,017,316 (50.35%)
- **EA**: 697,818 (16.85%)
- **DE**: 274,748 (4.85%)
- **ES**: 225,283 (3.47%)
- **FR**: 100,575 (3.11%)
- **IT**: 173,908 (3%)
- **AR**: 88,406 (2.55%)
- **CH**: 97,589 (2.56%)
- **IT**: 155,903 (1.93%)
- **CO**: 91,234 (1.52%)

Source: ICAO-ICM
**Top 10 Outbound Routes**

Eight out of the top 10 outbound routes from Dominican Republic are to United States in 2017.

![Bar chart showing top 10 outbound routes from Dominican Republic to United States in 2017.]

Source: ICAO-ICM

**Top 10 Destination Airports**

More than 20% of passengers departing from Dominican Republic travel to New York (JFK or EWR) in 2017.

![Bar chart showing top 10 destination airports for traffic from Dominican Republic in 2017.]

Source: ICAO-ICM
Passenger Arrivals

Scheduled flights

Non-scheduled flights

Source: JAC, Dominican Republic

Passengers by Region of Origin: Scheduled Flights to Dominican Republic

Source: JAC, Dominican Republic
Passenger Arrivals

Passengers by Region of Origin: Non-scheduled Flights to Dominican Republic

2005

- Europe: 63.6%
- Central America/Caribbean: 9.9%
- South America: 10.8%
- North America: 6.7%

2017

- Europe: 62.3%
- Central America/Caribbean: 6.8%
- South America: 8.0%
- North America: 22.9%

Source: JAC, Dominican Republic

Number of Flights

Scheduled flights

2006

- Europe
- Central America/Caribbean
- South America

Source: JAC, Dominican Republic
**Number of Flights**

**Flights by Region of Origin: Scheduled Flights to Dominican Republic**

**2005**
- Europe: 9.6%
- Central America/Caribbean: 40.8%
- South America: 2.2%
- North America: 47.4%

**2017**
- Europe: 8.4%
- Central America/Caribbean: 23.2%
- South America: 7.8%
- North America: 60.6%

Source: JAC, Dominican Republic

**Flights by Region of Origin: Non-scheduled Flights to Dominican Republic**

**2005**
- Europe: 34.2%
- Central America/Caribbean: 35.0%
- South America: 2.6%
- North America: 28.2%

**2017**
- Europe: 27.4%
- Central America/Caribbean: 9.1%
- South America: 36.3%
- North America: 27.1%

Source: JAC, Dominican Republic
In Dominican Republic, more than 90% of tourists arrive by air.

Source: UNWTO
Expenditure and Duration of Stay

Daily expenditure and average duration stay of non-resident foreigners

Source: Dominican Republic

Expenditure and Average per Night

Expenditure and average per night of Dominican non-residents

Source: Dominican Republic
Expenditure per Stay

Expenditure of Dominican non-residents and non-resident foreigners

Source: Dominican Republic

Hotel Room Units and Load Factor

Hotel room units and load factor (1980-2017)

Source: Hotels & Tourism Association of the Dominican Republic and Central Bank of the Dominican Republic
Jobs Generated by Hotels in Dominican Republic


Direct jobs and Indirect jobs

Source: Hotels & Tourism Association of the Dominican Republic and Central Bank of the Dominican Republic

Long-term Traffic Forecasts

Revenue Passenger Kilometres (RPK) departing from Dominican Republic

Source: ICAO
Long-term Traffic Forecasts

Number of flights and load factor departing from Dominican Republic

- **Source:** ICAO

What is Satellite Account?

- The System of National Accounts (SNA) is the internationally agreed standard set of recommendations on how to compile measures of economic activity in accordance with strict accounting conventions based on economic principles.
- A Satellite Account is to provide more depth on measuring economic activities and social behavior of certain economic sectors that are not defined as industries in national accounts.
- Examples of existing Satellite Accounts:
  - Tourism Satellite Account
  - Health Satellite Account
  - Unpaid household activity
**Aviation Satellite Account (ASA)**

**Need of Aviation Satellite Account (ASA)**

- Difficult to quantify contribution of aviation to economy
- Incremental impact of investments in aviation in different sectors is unclear
- Importance of aviation industry is often felt underestimated
- No existing standard framework to measure the economic impact of civil aviation activities

**What does ASA Framework Measure?**

The ASA will provide State an articulated framework measuring all aviation related economic activities.
Aviation’s Economic Contribution

Latin America and the Caribbean (2014)

- Jobs Total: 5.2 million
  - Aviation direct: 806,000
  - Indirect: 941,000
  - Induced: 408,000
  - Tourism catalytic: 3,000,000
- GDP Total: $167 billion
  - Aviation direct: $40 bn
  - Indirect: $45.9 bn
  - Induced: $21.3 bn
  - Tourism catalytic: $60 bn

SIDS (2014)

- Jobs Total: 1.4 million
- GDP Total: $25.3 billion
- Aviation direct: 74,000
- Induced: 54,000
- Indirect: 54,000
- Tourism catalytic: 1,200,000

Source: Aviation Benefits Beyond Borders 2016, ATAG