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Aviation and the role of CAREC : a scoping study

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AVIATION AND THE ROLE OF CAREC
A SCOPING STUDY

SEPTEMBER 2018

CAREC
Central Asia Regional Economic Cooperation Program

ADB

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Cover photo: The Almaty International Airport joins airline partners in providing new destination routes and better transport services (photo courtesy of Almaty International Airport and taken by Yelena Sergiyenko).

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Preface

This Scoping Study was prepared at the request of the member countries of the Central Asia Regional Economic Cooperation (CAREC) program. This study seeks to understand the current state of aviation in the CAREC region as well as identify areas in which CAREC activities can enhance regional connectivity and economic development through aviation.

The CAREC program is a partnership of 11 countries (Afghanistan, Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, the People's Republic of China, Tajikistan, Turkmenistan, and Uzbekistan), supported by six multilateral institutions, working together to promote development through cooperation, leading to accelerated growth and poverty reduction.

Guided by a recommendation made by the Prime Minister of Pakistan at the 15th Ministerial Conference in October 2016, CAREC member countries met in Singapore in April 2017 to conduct the group's first workshop on the aviation subsector. The workshop allowed the member countries to explore areas where regional collaboration and cooperation could lead to improved conditions for air transport. As a principal output from the event, participants recommended to recognize aviation as a new pillar within the CAREC transport and trade facilitation program.

To better understand CAREC's potential role in the aviation subsector, the participants to the Singapore workshop also proposed the development of a Scoping Study to assess and expand on regional cooperation opportunities in (i) policy and regulation (including regional agreements); (ii) infrastructure and equipment; and (iii) operations (including safety, security, and facilitation).

The production of this Scoping Study was confirmed during the meeting of the CAREC Transport Sector Coordinating Committee in May 2017 and during the Senior Officials Meeting in June 2017, with both meetings held in Tbilisi, Georgia.

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The CAREC Secretariat at the Asian Development Bank (ADB) administered and managed the production of this Scoping Study. The Secretariat team supporting CAREC aviation work includes Ko Sakamoto, Oleg Samukhin, Lloyd Wright, Kamel Bouhmad, Pilar Sahilan, and Debbie Gundaya. The principal authors of this study are Simon Russell and Brendan Sobie. For any inquiries related to this study, please contact Lloyd Wright (lwright@adb.org) at ADB.

The launch of CAREC aviation work also owes much to supporting national and international organizations. Appreciation is extended to the Civil Aviation Authority of Singapore for its assistance with the initial CAREC workshop on aviation in 2017. In addition, the support of Antonin Combes and other colleagues from the International Civil Aviation Organization (ICAO) ensured the CAREC program's aviation work was launched with a solid understanding of international best practices and knowledge relating air transport progress with economic development.

The aviation focal points from each of the CAREC member countries contributed invaluable inputs and data to this study. Much appreciation is expressed to each country that participated in the aviation survey as part of this study.

Abbreviations

ACI	Airports Council International
ADB	Asian Development Bank
ANSP	air navigation service provider
ASBU	Aviation System Block Upgrade
ASEAN	Association of Southeast Asian Nations
ATM	air traffic management
BRT	bus rapid transit
CANSO	Civil Aviation Navigation Services Organization
CAREC	Central Asia Regional Economic Cooperation
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
e-AWB	electronic airwaybill
EU	European Union
GASeP	Global Aviation Security Plan
GDP	gross domestic product
GHG	greenhouse gas
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IFI	international financing institution
km	kilometer
LCC	low-cost carrier
m	meter
MALIAT	Multilateral Agreement on the Liberalization of International Air Transportation
OAG	Official Airline Guide
PKD	public key directory
PPP	public–private partnership
PRC	People's Republic of China

Executive Summary

CAREC was created to foster connectivity. Air transport connectivity facilitates economic development, especially in moving perishable and high-value goods, encouraging tourism and business markets, and providing access and services to isolated areas. For the landlocked countries of the region, air connectivity provides a vital link that diversifies access options.

This Scoping Study was developed to understand the potential role the CAREC program can play in creating an effective aviation market for the region.

Current State of CAREC Aviation

Air transport connectivity within CAREC has much potential for growth and improvement. CAREC member countries are generally better linked to markets outside CAREC than within. Currently, less than half of all country pairs within CAREC are served with direct flights. Even excluding the People's Republic of China (PRC), there are approximately 1 million passenger seats between CAREC and international destinations weekly. However, for flights between CAREC member countries, there are merely 73,000 weekly seats.

Moreover, frequencies are generally low, making it difficult to travel between CAREC member countries, even in those markets with direct flights. Currently, 22 airlines based in CAREC member countries operate services to other CAREC member countries. However, only three of these airlines serve more than three CAREC member countries.

Almaty, Astana, Tashkent, and Urumqi have emerged as hubs for traffic within the region. However, a large portion of traffic between CAREC member countries now must go via hubs outside the region (such as Dubai and Istanbul) due to the lack of connectivity within the region.

As the successful case of Georgia currently demonstrates, a more open market coupled with lower fees and taxes can dramatically stimulate demand. Given that the region holds a somewhat unusually low factor of "propensity to travel," CAREC member countries have much scope to stimulate a more profitable air transport industry, for both passenger and cargo services.

Policy and Regulation

A gradual, phased policy approach toward a more open aviation market may be an option many CAREC member countries could consider to realize better connectivity. One such illustrative model is the approach taken by the 10 countries within the Association of Southeast Asian Nations (ASEAN).

While ASEAN has not become a true single aviation market, a mechanism has been in place for several years to improve connectivity while protecting local aviation providers. In the initial phase of the ASEAN agreement, third and fourth freedoms were provided between capital cities. The ASEAN agreement demonstrates it is not necessary to immediately include seventh, eighth, and ninth freedoms as is the case in the European Union (EU) single aviation market. It is also possible for subregions or member country pairs within CAREC to initially open up prior to implementation by all countries.

Given that the aviation sector represents one of the fastest-growing sources of greenhouse gas (GHG) emissions and contributors to local noise and pollution, progressive environmental policies should also be a priority. CAREC member countries could enhance the environmental performance of their aviation sector by considering participation in global programs to reduce aviation emissions and establishing local standards for aircraft noise levels.

The development of appropriate air safety policies and regulations will allow CAREC member countries to build a reputation for better reliability that can underpin market growth. Implementing significant industry changes arising from safety and security initiatives may necessitate collective agreements to track emerging issues and trends.

Infrastructure and Equipment

Per the International Air Transport Association (IATA), some $1.2 trillion–$1.5 trillion is expected to be spent on global airport infrastructure development up to 2030. Major airport expansion projects require a balance between development of cost-efficient facilities and passenger capacity of infrastructure compared to forecasted demand. Airport infrastructure constraints pose obstacles to aviation growth in several CAREC member countries.

Recent airport upgrades and/or expansions have recently taken place in Ashgabat, Astana, Baku, Dushanbe, Tbilisi, and Ulaanbaatar. In addition, initiatives are also currently underway in Bishkek, Islamabad, Turkmenbashi, and Urumqi.

Airport linkages to secondary cities can open economically vital tourism markets. CAREC member countries could improve access to targeted secondary cities through bilateral air service mechanisms, expansion of smaller international airports, and potential upgrading of domestic airports to handle international traffic.

Investment in multimodal options for connecting airports to nearby cities is fundamental to improving air transport viability. Quality public transport investments in bus rapid transit (BRT) and rail can ease travel for visitors and residents. Islamabad is currently constructing a BRT line to connect its new international airport to the city.

Upgrades to air navigation equipment are important to instilling confidence in safety regimes as well as realizing operational efficiencies. CAREC member countries are encouraged to leverage support from IATA and the International Civil Aviation Organization (ICAO) to align their respective air navigation plans based on specific member requirements.

Operations

Several countries around the world have begun to shift airport management from state control to the private sector. Typically, assets remain in the government's ownership, but concessionaires can manage day-to-day operations. A key benefit from public–private partnerships (PPPs) is access to proven, world-class management capability in operations. Such a structure allows airports to maximize commercial revenues from retailing, parking, office rental leases, and duty-free concessions.

Air traffic management is also currently in transition from being under restrictive control toward more competitive service providers. Air navigation service providers (ANSPs) are entities that manage air traffic systems on behalf of an airport or country. ANSPs are often accompanied by new institutional guidelines and structures that better serve airlines and air transport operators through the applications of increased safety, operational, technical, environmental, and economic requirements.

For airfreight services, the efficiency of customs processes and cross-border controls determines industry viability as air cargo tends to focus on time-sensitive, perishable products. Modernizing the purchase, tracking, and receipt of air cargo shipments across national borders provides greater efficiency and security for the consumer. Airports and regions that adopt modern, paperless systems create a competitive advantage that enables the realization of lucrative air cargo hubs. CAREC can assist in the penetration of paperless e-cargo systems.

Facilitation refers to key arrival and departure processes that enhance airport efficiency and ultimately affect passenger and freight-hauler satisfaction. Several CAREC member countries have eased visa requirements in recent years. However, CAREC member countries often exclude citizens of other CAREC member countries from their new or expanded visa-free lists. CAREC could consider introducing a uniform visa-free policy to facilitate travel between member countries as well as work to reduce processing time at immigration and customs, particularly for visitors from other CAREC member countries.

Enabling Factors

Many regional and international stakeholders stand ready to assist CAREC in improving its aviation sector. For example, CAREC country participation in knowledge events and standards programs from Airports Council International (ACI), IATA, and ICAO would be beneficial.

These and other organizations are also sources of capacity-building support and training. Through the survey for this Scoping Study, CAREC member countries particularly highlighted interest in further training sessions on regulations and policy (including open sky agreements) and airport management skills. As the CAREC program assisted with training on other subsectors of transport, capacity support to aviation should also be considered.

A factor in realizing the recommendations in this Scoping Study will be the availability of financing for CAREC aviation plans. Both public and private financing sources are relevant. Private investment through PPP structures are viable in air transport, especially where there is sufficient passenger or cargo demand to

underpin return on investment. In other instances, conditions may require partial or full public investment, especially in the case of secondary cities or isolated portions of a country, where air transport investment can be a key to local economic development.

Findings and Conclusions

A phased approach to opening the CAREC aviation market is a principal recommendation of this study. Such gradual market liberalization will attract investment in infrastructure and opportunities for aviation service providers such as airlines, ground handlers, catering, maintenance, and cargo operations while at the same time not disrupt the existing market.

CAREC should also facilitate investment in critical missing infrastructure links in the aviation sector, including airport facilities and equipment at both international hubs as well as secondary cities. Such investments will benefit from the early engagement of potential financing partners as well as the encouragement of private sector involvement through PPP structures.

The CAREC program is also well placed to provide targeted capacity building and training to countries on topics of mutual interest in aviation.

This study concludes that a safe, reliable, and efficient aviation sector can perform a catalytic role in local and regional economic development. The CAREC program can play a role in realizing this goal.

CHAPTER 1

Introduction

1. The strategic location of CAREC member countries means the region holds the potential to serve as a hub for aviation for both passenger and freight transport. The landlocked nature of many CAREC member countries also means air transport represents an essential mode in regional and global connectivity, and ultimately translates to the potential for economic growth.

A. Economic Development and Aviation

2. Air transport is particularly relevant to perishable and high-value goods. Globally, while air transport only carries 0.5% of goods, air cargo represents 35% of the trade by total value.[1] Precious commodities and perishable agricultural products from the CAREC region may only reach their full export potential if air links are robustly established.

3. Business growth and tourism are likewise dependent on accessibility through air services. The nascent stage of tourism in much of CAREC means the sector's growth will be closely linked to the establishment of air transport routes and services. The development of adequate airport infrastructure and systems in secondary cities near tourism hot spots can play a fundamental role in catalyzing local economic development.

B. Constraints and Opportunities

4. To date, the full potential of air transport in CAREC has not been realized. As this Scoping Study will describe, current air connectivity within the CAREC region is relatively weak with interconnectivity between countries often limited by the available air service agreements.

5. Financial constraints on aviation infrastructure investment, unmet capacity development for the sector, and the lack of a comprehensive regional agreement on open connectivity also limit aviation's role in the region's economies. The region's climatic conditions also present challenges to air safety.

6. Overall though, the region's central geographic position means aviation has the potential to play a role in economic development for CAREC. Airlines from nearby countries outside the region (e.g., Qatar, Turkey, and the United Arab Emirates) developed robust business models based on the region's strategic geography. Enabling CAREC member countries to also avail of this strategic advantage can help bolster the region's role as an aviation leader.

[1] Air Transport Action Group. 2016. Facts & Figures. https://www.atag.org/facts-figures.html.

C. Objectives and Structure of Scoping Study

7. This Scoping Study seeks to explore the potential role for the CAREC program to enhance the effectiveness of aviation in the region. In turn, the study's findings may be used to assist in shaping action items and capacity-building activities that underpin aviation's role in economic development.

8. The study first provides a stock-taking analysis of the current state of aviation in the CAREC region, including the connectivity between CAREC member countries and a description of current airline operations.

The study is then structured around the three principal components of aviation development:

(i) policy and regulation (including regional agreements),
(ii) infrastructure and equipment, and
(iii) operations (including safety, security, and facilitation).

The study also describes the enabling factors, such as training and financing, that may be necessary to realize the aviation enhancements sought by the member governments of CAREC. The study provides a set of conclusions and outlines possible ways forward for CAREC aviation.

CHAPTER 2

Current State of CAREC Aviation

9. This section reviews current air transport conditions in CAREC, focusing on and analyzing the connectivity between CAREC member countries.

A. Connectivity between CAREC Member Countries

10. Connectivity between CAREC member countries is relatively limited by international and regional standards. Currently, less than half of all country pairs within CAREC are served with direct flights. Of the 110 country pairs within CAREC, only 52 or 47% are linked. When excluding the People's Republic of China (PRC), there are flights on 41% of the potential country pairs.

11. The PRC is connected to all 10 other CAREC member countries. The PRC accounts for 47% of all flights connecting CAREC member countries. There are almost 150 weekly flights from the PRC to other CAREC member countries (or 300 weekly return flights).

12. Kazakhstan is the second best connected CAREC member country. Kazakhstan is connected with eight other CAREC member countries. There are nearly 130 weekly flights from Kazakhstan to other CAREC member countries. This includes 41 weekly flights from Kazakhstan to the PRC, the second most frequently served country pair within CAREC.

13. Uzbekistan has links to six other CAREC member countries. Azerbaijan and the Kyrgyz Republic have five links each. The other six CAREC member countries have links to four or fewer CAREC member countries.

14. Frequencies are generally low, making it difficult to travel between CAREC member countries even in those markets with direct flights. Of the 52 country pairs that are linked, 2 have fewer than seven frequencies (e.g., are not served daily). Tables 1 and 2 summarize the flight frequency and seat capacity for flights between CAREC member countries.

15. Airlines from the CAREC member countries often struggle to maintain regional international routes. Over the last five years, service was suspended on eight CAREC country pairs. If these eight markets still had service, 60 rather than 52 country pairs within CAREC would now be served. The country pairs within CAREC that have lost service since 2012 are:

(i) Afghanistan–Azerbaijan,
(ii) Afghanistan–Kyrgyz Republic,
(iii) Azerbaijan–Kyrgyz Republic,
(iv) Azerbaijan–Pakistan,
(v) Azerbaijan–Tajikistan,
(vi) Pakistan–Tajikistan,
(vii) Tajikistan–Turkmenistan, and
(viii) Turkmenistan–Uzbekistan.

16. CAREC member countries are generally better linked to markets outside CAREC. There are approximately 73,000 weekly seats between CAREC member countries, including approximately 42,000 weekly seats between the PRC and other CAREC member countries.

Table 1: Weekly Scheduled Frequencies between CAREC Member Countries
(as of September 2017)

From / To	Afghanistan	Azerbaijan	Georgia	Kazakhstan	Kyrgyz Republic	Mongolia	Pakistan	PRC	Tajikistan	Turkmenistan	Uzbekistan	CAREC Total
Afghanistan				1			8	1				
Azerbaijan			21	23				5		6	2	
Georgia		21		21				3				
Kazakhstan	1	23	21		13			41	8	2	18	
Kyrgyz Republic				13		3		10	2		2	
Mongolia					3			53				
Pakistan	8							12			2	
PRC	1	5	3	41	10	53	12		7	4	8	
Tajikistan				8	2			7			1	
Turkmenistan		6		2				4				
Uzbekistan		2		18	2		2	8	1			
Total	**10**	**57**	**45**	**127**	**30**	**56**	**22**	**144**	**18**	**12**	**33**	**554**
Total without PRC	**9**	**52**	**42**	**86**	**20**	**3**	**10**		**11**	**8**	**25**	**266**

CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.

Source: Official Airline Guide (OAG) database. https://www.oag.com/analytics/schedules-analyser.

Table 2: Approximate Weekly Scheduled Seat Capacity between CAREC Member Countries
(as of September 2017)

From: / To:	Afghanistan	Azerbaijan	Georgia	Kazakhstan	Kyrgyz Republic	Mongolia	Pakistan	PRC	Tajikistan	Turkmenistan	Uzbekistan	CAREC Total
Afghanistan				150			800	150				
Azerbaijan			2,700	1,600				900		1,200	300	
Georgia		2,700		2,100				500				
Kazakhstan	150	1,600	2,100		1,600			6,000	1,000	300	2,200	
Kyrgyz Republic				1,600		500		1,500	300		300	
Mongolia					500			4,800				
Pakistan	800							3,200			300	
PRC	150	900	500	6,000	1,500	4,800	3,200		1,300	1,000	1,700	
Tajikistan				1,000	300			1,300			150	
Turkmenistan		1,200		300				1,000				
Uzbekistan		300		2,200	300		300	1,700	150			
Total	**1,100**	**6,700**	**5,300**	**14,950**	**4,200**	**5,300**	**4,300**	**21,050**	**2,750**	**2,500**	**4,950**	**73,100**
Total without PRC	**950**	**5,800**	**4,800**	**8,950**	**2,700**	**500**	**1,100**		**1,450**	**1,500**	**3,250**	**31,000**

CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.

Source: OAG database. https://www.oag.com/analytics/schedules-analyser.

Table 3: Capacity Comparison between Inter-CAREC and International Flights (%)

CAREC Country	Percent of International Seat Capacity Allocated to Other CAREC Member Countries	Percent of International Seat Capacity Allocated to Other CAREC Member Countries, Excluding the PRC
Afghanistan	7	6
Azerbaijan	7	6
Georgia	8	7
Kazakhstan	20	12
Kyrgyz Republic	14	9
Mongolia	37	3
Pakistan	2	1
PRC	1	N/A
Tajikistan	13	7
Turkmenistan	15	9
Uzbekistan	14	9

CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.

Source: OAG database. https://www.oag.com/analytics/schedules-analyser (accessed September 2017).

17. Total weekly international capacity among the 10 CAREC member countries, excluding the PRC, is approximately 1 million seats. The PRC alone has more than 3.4 million international weekly seats.

18. While the PRC has the most links and capacity to other CAREC member countries, only 1% of the PRC's total international capacity involves CAREC destinations. For another four CAREC member countries, inter-CAREC connectivity accounts for less than 10% of their total international seat capacity. Mongolia has the highest portion of CAREC capacity, but has the smallest market among all CAREC member countries, and the PRC accounts for nearly all of Mongolia's CAREC capacity.

B. Airline Networks within CAREC

19. Most of the region's flag carriers have relatively small networks within CAREC. Currently, 22 airlines are based in CAREC member countries that operate services to other CAREC member countries. However, only three of these airlines serve more than three CAREC member countries. Georgia Airways is the only flag carrier in CAREC without any services to another CAREC member country. Every other CAREC member country has at least one airline with at least one passenger service to another CAREC member country. Table 4 provides service coverage by airline.

20. In addition to the 22 CAREC airlines operating services to other CAREC member countries, three airlines from outside CAREC have fifth freedom rights on select routes.[2]

[2] "Fifth freedom" rights refer to the ability of an airline to enter a non-home country and pick up passengers for travel to another third country.

Table 4: Service Coverage of Airlines from the CAREC Region

Airline	Number of CAREC Member Countries Served	Number of CAREC Airports Served
Air China (PRC)	3	4
Air Kyrgyzstan (Kyrgyz Republic)	1	1
Aero Mongolia	1	1
Air Astana (Kazakhstan)	6	7
Air Manas (Kyrgyz Republic)	1	1
Ariana (Afghanistan)	1	1
Avia Traffic (Kyrgyz Republic)	2	2
AZAL (Azerbaijan)	3	3
China Southern (PRC)	8	10
Georgian Airways	0	0
Hainan Airlines (PRC)	1	1
Hunnu Air (Mongolia)	1	4
Kam Air (Afghanistan)	1	2
MIAT (Mongolia)	1	1
Pakistan International Airlines	2	2
SCAT (Kazakhstan)	3	5
Shaheen Air (Pakistan)	1	1
Somon Air (Tajikistan)	2	2
Suparna (PRC)	1	1
Tajik Air (Tajikistan)	3	3
Turkmenistan Airlines	2	2
Uzbekistan Airways	6	8

AZAL = Azerbaijan Airlines, CAREC = Central Asia Regional Economic Cooperation, MIAT = Mongolian Airlines, PRC = People's Republic of China, SCAT = SCAT Air Company.

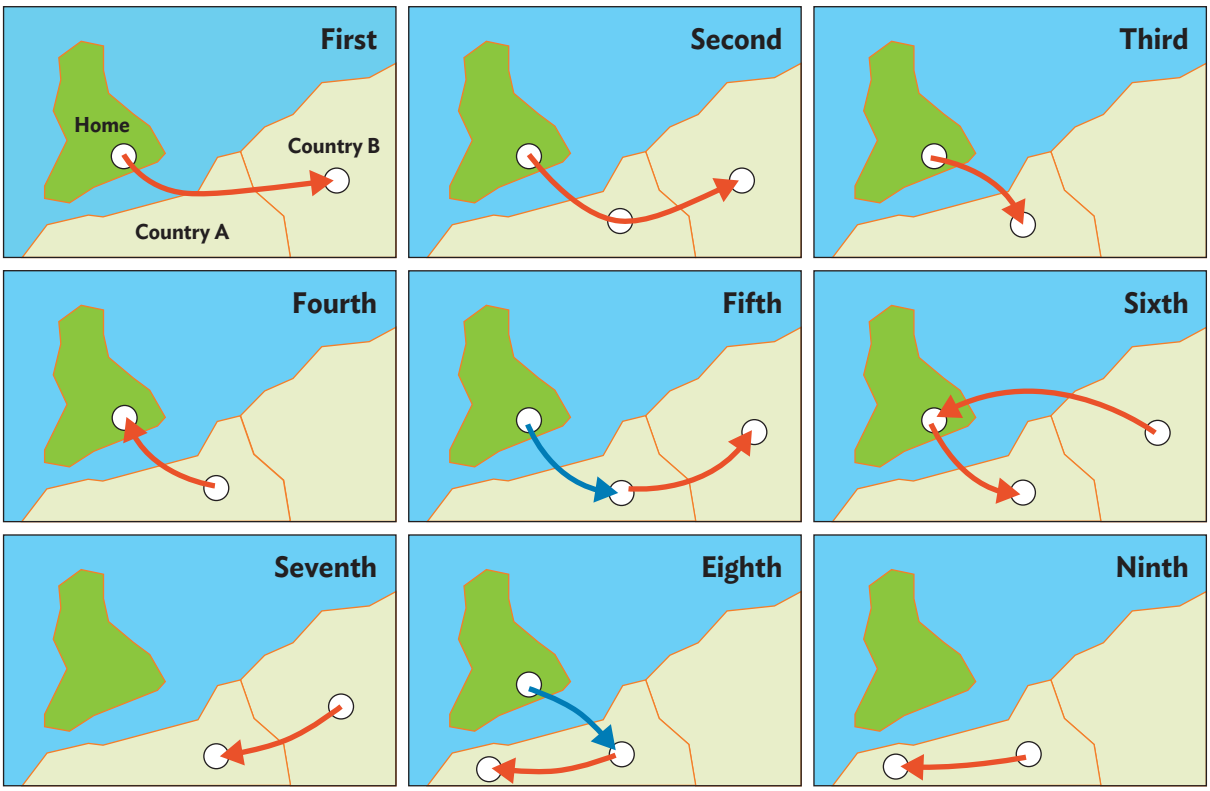
Source: OAG database. https://www.oag.com/analytics/schedules-analyser (accessed September 2017).

Figure 1 provides a visual overview of the nine types of air transport freedom rights between countries. The three fifth freedom competitors in CAREC are Lufthansa (operating between Baku in Azerbaijan and Ashgabat in Turkmenistan); Qatar Airways (operating between Baku in Azerbaijan and Tbilisi in Georgia); and Turkish Airlines (operating between Bishkek in the Kyrgyz Republic and Ulaanbaatar in Mongolia).

21. Air Astana, China Southern, and Uzbekistan Airways have the largest networks within CAREC. Air Astana is the strongest hub carrier in the region and allocates approximately one-quarter of its international seat capacity to other CAREC member countries.

22. Uzbekistan Airways allocates only 12% of its international seat capacity to other CAREC member countries as all eight of its routes within CAREC are served less than daily. Only 2% of China Southern's international seat capacity is allocated to CAREC member countries, but CAREC destinations account for a majority of its international capacity at Urumqi. China Southern has 16 international routes from its Urumqi hub, including 10 to CAREC destinations.

Figure 1: The Nine Rights of Freedom in Aviation



Source: Civil Aviation Authority of Singapore. *Air Services Liberalisation: The Singapore Experience.* Presented at the CAREC Aviation Workshop, Singapore, 6–7 April 2017.

23. Almaty, Astana, Tashkent, and Urumqi have emerged as hubs for traffic within the region. However, a large portion of traffic between CAREC member countries must now go via hubs outside the region (such as Dubai and Istanbul) due to the lack of connectivity within the region.

24. There are huge opportunities to improve connectivity between CAREC member countries. However, only with the right policies and support will connectivity improve. Under a more favorable policy environment (without bilateral limitations, visa restrictions, and high taxes), more cities in the region could be directly connected.

25. An open market and lower taxes would reduce the cost of air travel, stimulating demand. Airfares between CAREC member countries are now much higher compared to flights of similar length within other regions such as Europe, the Middle East, and Southeast Asia. High operating costs, lack of competition, and high taxes are major impediments to growth in air travel within CAREC.

26. With a few exceptions, the lowest return airfares between CAREC member countries are above $200. In some cases, the lowest fare is above $500. Airport fees and service charges alone are often more than $100, making it nearly impossible to reduce the cost of travel to a level where demand can be sufficiently stimulated.

CHAPTER 3

Policy and Regulation

27. This and the following two sections will begin to articulate options for advancing the state of CAREC aviation across the core subsector components. Within policy and regulation, the key topics are:

(i) market development (phased approach to market development),
(ii) environmental policy and standards, and
(iii) safety policy and standards.

A. Market Development

28. Aviation is an essential industry for world trade and tourism and is forecast to carry almost 4 billion passengers by the end of 2017. Despite being such a vital industry, aviation remains bound by a framework of economic restrictions and regulatory barriers that have existed since the early 20th century.

29. Several countries and economic trading partners pursued greater liberalization of air travel to improve market access and freedom of travel. Agreements can be realized both multilaterally and bilaterally. In the case of CAREC, the member countries should consider the relative benefits of each form of agreement. Multilateral agreements have the most extensive coverage but are considerably more complex and time-consuming to negotiate. Bilateral agreements are more realizable, but may be somewhat limiting in scope. The examples below are put forward as examples of these different types agreement without necessarily implying what is the best form for CAREC.
The example agreements presented are:

(i) Multilateral Agreement on the Liberalization of International Air Transportation (MALIAT),
(ii) ASEAN Open Skies Agreement, and
(iii) European Union–Georgia Agreement.

Multilateral Agreement on the Liberalization of International Air Transportation

30. MALIAT[3] originally formed by Brunei Darussalam, Chile, New Zealand, and Singapore, sets out a forward-looking framework for countries to participate in liberalized air services including "Open Skies."[4] The agreement was established as a protocol in 2001, and now includes additional signatory countries, with others considering membership.

31. Key features of MALIAT are:

(i) an open-route schedule;
(ii) open traffic rights, including seventh freedom cargo services;
(iii) open capacity;

[3] International Civil Aviation Organization (ICAO) Working Paper 34. Worldwide Air Transport Conference (ATCONF) Sixth meeting, Montreal, 18–22 March 2013: The Multilateral Agreement on the Liberalization of International Air Transportation (MALIAT): A Basis for the Future Economic Regulation of Air Services. Presented by New Zealand. 2 December 2013. https://www.icao.int/Meetings/atconf6/Documents/WorkingPapers/ATConf6-wp034_en.pdf.

[4] Government of New Zealand. Multilateral Agreement on the Liberalization of International Air Transportation (MALIAT). http://www.maliat.govt.nz/.

(iv) airline investment provisions which focus on effective control and principal place of business, but protect against flag of convenience carriers;
(v) multiple airline designation;
(vi) third-country code-sharing; and
(vii) a minimal tariff filing regime.

ASEAN Open Skies Agreement

32. Within ASEAN, there has been a consistent move from restrictive bilateral air services agreements toward open skies to grow connectivity between the 10 ASEAN countries. While ASEAN has not become a true single aviation market, a mechanism has been in place for several years to improve connectivity while protecting local aviation providers and infrastructure investment.

33. The ASEAN Open Skies agreement is different from other open skies agreements, such as those in Europe, because seventh freedom and domestic operations by foreign carriers (eighth and ninth freedoms) are excluded.

34. In the initial phase of the ASEAN agreement, third and fourth freedoms were provided between capital cities. In the current phase, third and fourth freedoms between capitals and secondary cities are also provided. All 10 ASEAN countries are now participating following ratification by the last remaining ASEAN members in 2015 and early 2016. The only exclusion is Indonesia, which opened up four secondary cities and the capital rather than all secondary cities. Fifth freedoms are also now permitted within ASEAN as long as the routes are in a straight line (backtracking is currently not permitted).

35. A decade prior to the initial discussions between all 10 ASEAN countries, there was also movement toward open skies between four ASEAN countries. A subregion consisting of Brunei Darussalam, Indonesia, Malaysia, and the Philippines was established in 1994 as the East Asia growth area (BIMP-EAGA) to promote the liberalization of the transport sector between the respective countries.[5] Aviation has since played a crucial role in the development of tourism within this subregion.

36. CAREC member countries could follow a similar phased approach to opening markets as practiced in ASEAN, i.e., initially permitting third and fourth freedoms before considering fifth freedoms. The ASEAN agreement has shown it is not necessary to immediately include seventh, eighth, and ninth freedoms as is the case in the European Union (EU) single aviation market. It is also possible for subregions or member country pairs within CAREC to initially open up prior to implementation by all 11 of the member countries.

37. For CAREC, the opportunity will be to define those cities and airports where competition can freely occur in a greater manner than at present, while offering an incentive for emerging aviation hubs and primary city airports to prepare for greater competition within the region.

38. A transitioned approach in CAREC toward greater open skies for the countries within the region would allow countries less ready for competition to upgrade and modernize aviation capability and infrastructure to compete with stronger member countries.

[5] ADB. Asia Regional Integration Center. Cross-border Infrastructure: Brunei Darussalam–Indonesia–Malaysia–Philippines East ASEAN Growth Area (BIMP-EAGA). https://aric.adb.org/initiative/brunei-darussalam-indonesia-malaysia-philippines-east-asean-growth-area.

39. **Recommendations:** CAREC member countries could work to permit open access for flights between international airports within the CAREC region, starting with third and fourth freedom rights. CAREC member countries could develop a phased and managed competition plan that would benefit the overall development of aviation in the region rather than creating a sudden imbalance between weaker and stronger operators. Aligning aviation capability and infrastructure requirements at CAREC level provides an opportunity for an emerging aviation sector to succeed.

European Union–Georgia Agreement

40. The EU signed a common aviation agreement with Georgia in 2010 to remove market restrictions for travel and to facilitate the integration of Georgia's air transport sector into the European aviation standards and rules framework. The agreement liberalizes access for European and Georgian carriers into each respective market and provides Georgia with support to align its aviation sector with the EU.[6]

41. Benefits from this association are expected to include increased investment, tourism growth, and improved passenger networks and air cargo movements. The agreement creates equal opportunities for competition based on a platform of standards regarding safety, air traffic management, environment, and security. Consumer benefits include greater choice, convenience of travel to an increased number of destinations, and competitive airfare pricing. Since the agreement came into effect, international passenger numbers increased fivefold in the period 2012–2016, with Georgia achieving approximately 1.4 million international arrivals in 2016. Appendix 1 provides a case study on Georgia's market growth.

Connectivity and Propensity to Travel

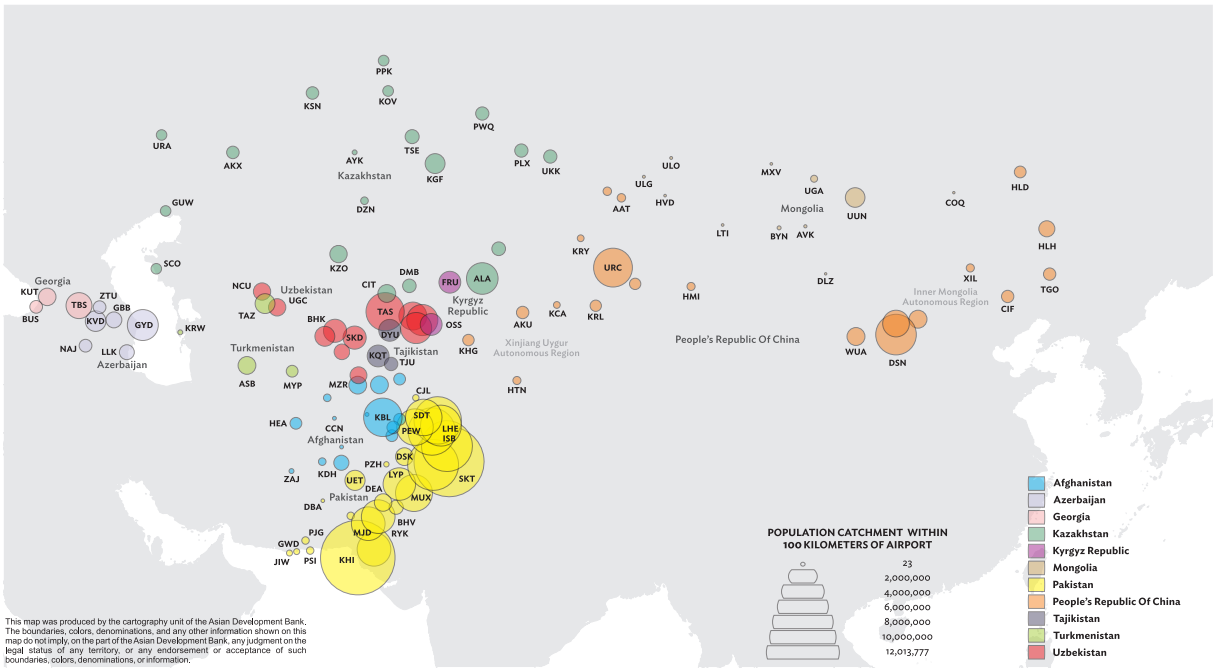
42. Preliminary analysis of unserved and underserved cities within CAREC identifies a significant number of cities which could benefit from improved air links for both domestic and international connections. In many cases, the closest airport to serve a particular city in CAREC actually is located in another CAREC country (Figure 2).

43. IATA identifies growth of air travel and the correlation with increases in national gross domestic product (GDP) as the "propensity to travel." Spending power is impacted by the relative ease or difficulty of travel by road and/or rail versus air, and affordability of airfares, as drivers of consumer demand for air travel. Figure 3 compares the propensity to travel between CAREC member countries and other Asian economies.

44. Benchmarking of key metrics highlights the low propensity to travel within CAREC member countries and to/from the region, as compared with other countries. After excluding the PRC, with 487 million trip movements and 0.35 trips per capita in 2016, an analysis of the 10 other CAREC member countries highlights an average propensity to travel of 0.13 trips per capita per annum. The propensity to travel for these 10 countries ranges from 0.05 trips per capita per annum to 0.28 trips per capita per annum. Four countries have 0.07 trips per capita or lower and only two countries have propensity to travel rates above 0.20 trips per capita. Table 5 provides a summary benchmarking comparison.

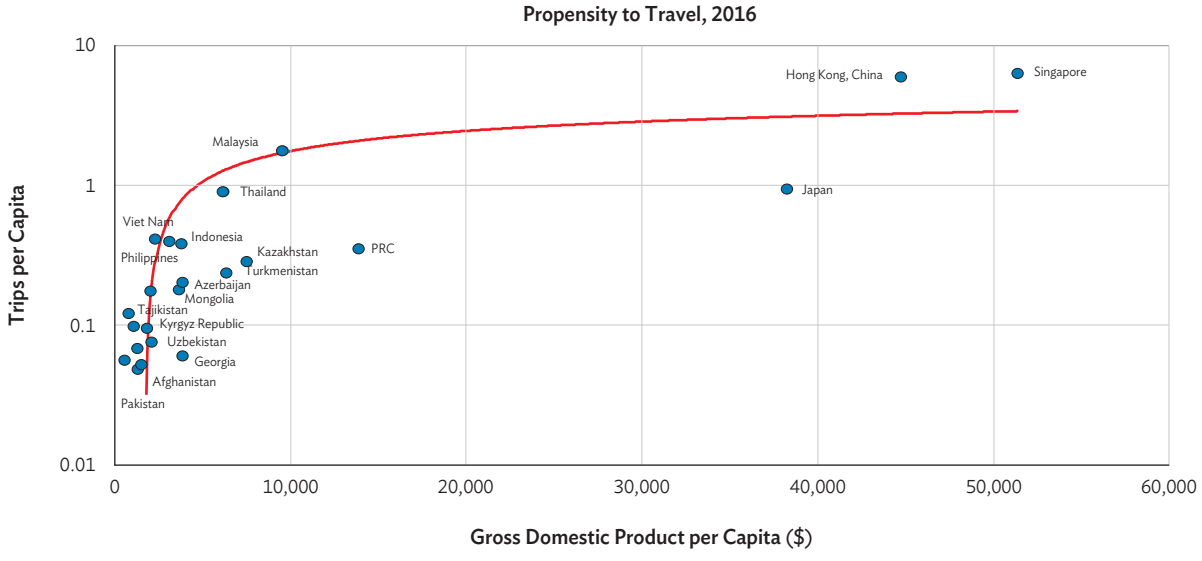
[6] European Union. Mobility and Transport. International Aviation: Georgia. https://ec.europa.eu/transport/modes/air/international_aviation/country_index/georgia_en.

Figure 2: Proximity of Secondary Cities across Borders that Could Benefit from Increased Freedom of Air Access



Note: Airports indicated by IATA code. See Appendix 2 for definition of airport codes by CAREC member country.
Source: Asian Development Bank.

Figure 3: Propensity to Travel – Comparison of CAREC Countries to Other Asian Economies



CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.
Source: Asian Development Bank.

Table 5: Propensity to Travel Benchmarking

	Afghanistan	Azerbaijan	Georgia	Kazakhstan	Kyrgyz Republic	Mongolia	Pakistan	PRC	Tajikistan	Turkmenistan	Uzbekistan
Population (millions)	34.66	9.76	3.72	17.80	6.08	3.03	193.20	1,379.00	8.74	5.66	31.85
GDP ($ billions)	19.47	37.85	14.33	133.70	6.55	11.16	283.00	11,200.00	6.95	36.18	67.22
GDP per capita ($)	562	3,877	3,854	7,510	1,077	3,686	1,468	8,123	796	6,389	2,111
Visitors	1,917,923	1,961,639	220,448	5,007,869	583,997	537,853	9,628,354	487,960,477	1,037,897	1,318,350	2,383,631
Propensity to travel	0.06	0.20	0.06	0.28	0.10	0.18	0.05	0.35	0.12	0.23	0.07

	Australia	Brazil	New Zealand	Singapore	Turkey	UAE
Population (millions)	24.13	207.00	4.69	5.60	79.51	9.27
GDP ($ billions)	1,205.00	1,796.00	185.00	297.00	857.00	348.00
GDP per capita ($)	49,927	8,650	39,426	52,960	10,787	37,622
Visitors	72,597,701	94,142,377	15,243,179	34,969,110	100,366,461	92,160,692
Propensity to travel	3.01	0.45	3.25	6.24	1.26	9.94

GDP = gross domestic product, PRC = People's Republic of China, UAE = United Arab Emirates.

Source: Asian Development Bank analysis, sourced from World Bank open data site: https://data.worldbank.org/.

45. Even the highest figure within CAREC (excluding the PRC) is relatively low. Asian states with similar GDP per capita levels as the CAREC group are achieving 0.5 to 1.0 trip per capita. Propensity to travel for Australia, New Zealand, Singapore, Turkey, and the United Arab Emirates is much higher, facilitated by frequency of air services between key cities, high international connectivity, and liberalized bilateral and multilateral agreements. At a level of 0.13 visitors per capita on average for CAREC, the propensity to travel indicates the underlying conditions of low service frequency, difficult connections, unserved secondary cities, restrictive bilateral air service agreements, and an absence of multilateral agreements.

46. Preliminary analysis shows that increasing the propensity to travel by a factor of two could generate approximately 50 million trips and a propensity to travel factor of 0.27, which would still be well below the average in Asia. If the factor was increased three times, the propensity to travel would be 0.40 across the region, generating approximately 75 million trips per annum. This should be achievable under a more open market environment, leading to increased competition and lower fares. Table 6 summarizes the potential growth in the propensity to travel for the CAREC region.

47. Increases in GDP will also stimulate demand for travel, as disposable income generates travel demand. The combination of higher disposable income levels and lower fares resulting from liberalization has driven rapid growth in markets such as Southeast Asia. With the right policies, Central and West Asia can achieve similar growth.

Table 6: Propensity to Travel Growth Potential for CAREC at Two Times and Three Times Current Journeys

CAREC Members, Excluding the PRC	Population (millions)	GDP ($ billion)	GDP per Capita ($)	Current Journey	Journey per Capita	Two Times Current Journeys	Journey per Capita	Three Times Current Journey per Capita	Journey per Capita
				Current		2 times		3 times	
Afghanistan	34.660	19.470	562.00	1,917,923	0.06	3,835,845	0.11	5,753,768	0.17
Azerbaijan	9.762	37.850	3,877.00	1,961,639	0.20	3,923,278	0.40	5,884,917	0.60
Georgia	3.719	14.330	3,854.00	220,448	0.06	440,896	0.12	661,345	0.18
Kazakhstan	17.800	133.700	7,510.00	5,007,869	0.28	10,015,739	0.56	15,023,608	0.84
Kyrgyz Republic	6.083	6.551	1,077.00	583,997	0.10	1,167,995	0.19	1,751,992	0.29
Mongolia	3.027	11.160	3,686.00	537,853	0.18	1,075,706	0.36	1,613,559	0.53
Pakistan	193.200	283.000	1,468.00	9,628,354	0.05	19,256,708	0.10	28,885,062	0.15
Tajikistan	8.735	6.952	796.00	1,037,897	0.12	2,075,794	0.24	3,113,691	0.36
Turkmenistan	5.663	36.180	6,389.00	1,318,350	0.23	2,636,700	0.47	3,955,050	0.70
Uzbekistan	31.850	67.220	2,110.65	2,383,631	0.07	4,767,262	0.15	7,150,893	0.22
Total	**314.500**			**24,597,961**	**0.13**	**49,195,923**	**0.27**	**73,793,884**	**0.40**

CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.

Source: Asian Development Bank analysis, sourced from World Bank open data site: https://data.worldbank.org/.

National Aviation Strategy

48. A national approach to aviation, tourism, and air transport infrastructure, supported by a modern regulatory framework and excellence in technical infrastructure provides the necessary incentives to encourage airlines to establish new routes.[7] Successful countries have a clearly articulated national aviation strategy to maximize efficiency of assets (aircraft, airports, air traffic control, airspace, other infrastructure) and provide commercial freedom for both public and private enterprises to increase connectivity, frequency, and customer satisfaction with service, linked with increases in demand.

49. As an example, Dubai in the United Arab Emirates, with few natural tourism assets and a small population, demonstrates how aviation can enhance a national economy through clear vision, careful planning, and collaborative execution.[8] By creating alignment of the aviation sector, the government facilitated public and private investment in building capability and competency in its aviation sector, both in the air and on the ground. Dubai attracted infrastructure investment, embraced open competition, and delivered global connectivity through efficient operations and a strong vision for expansion of the industry. By 2020, aviation is expected to contribute $53.1 billion to the economy and 37.5% of GDP, with over 750,000 jobs supported by the sector.[9]

50. IATA promotes aviation as a key strategy for governments and nation states to create efficient economic and social development through enhanced air connectivity. This is made possible by a liberalized approach to air services,

[7] I. G. Pusparani. 2017. Aviation Sector Sets to Soar in ASEAN Open Skies. Seasia. 21 June. https://seasia.co/2017/06/21/.

[8] R. Tadros. 2014. Aviation to contribute $53.1 billion to Dubai's economy, 37.5% to its GDP and will support over 750,000 jobs by 2020, Emirates. 17 November. https://www.emirates.com/media-centre/.

[9] Oxford Economics. 2014. Quantifying the Economic Impact of Aviation in Dubai. http://www.oxfordeconomics.com/my-oxford/projects/282178.

encouraging investment in aviation through a more open regulatory framework, and supporting local institutions to develop capability and capacity which underpins the growth of a safe and reliable aviation sector.[10]

51. **Recommendations:** CAREC member countries should prioritize the development of a national aviation strategy or update their strategies for those countries that already have a strategy. CAREC member countries may also wish to consider working toward developing a regional aviation strategy, aligning their individual strategies, and promoting travel within the region.

Market Access

52. ICAO actively works with governments and aviation stakeholders to defragment the air transport industry and create a more holistic and strong supporting policy framework which facilitates ease of travel.[11] This is based on the fundamental principle that movement of passengers and cargo by air with a minimum of transit points shortens journey time, increases customer satisfaction of the experience, and contributes to lowered cost of operation and, therefore, provides the potential for lower airfares with increased competition.

53. In conjunction with airlines supplying capacity to access routes and markets, the optimal use of air navigation services, efficient airport systems, and improved border facilitation and security measures contribute strongly to the intermodal transfer of passengers and cargo by air. First principles of aviation are safe, regular, efficient, and economical air transport. Market access creates connectivity options which lead to economic development. Improved aviation links also expand the requirement for highly skilled aviation jobs and improved infrastructure capability that further benefit development of the countries involved.

Vision and Policy Framework

54. Governments within CAREC generally (i) establish the vision and policy framework that aligns participants for increased efficiency, (ii) set policies which further reduce regulation, and (iii) determine the rate of liberalization to improve access to markets.

55. These factors were endorsed globally in the sustainable growth of air travel and for making an increase in the contribution of aviation to GDP. IATA quantified the crucial enabling role performed by aviation in conjunction with global value chains to support integration into the global trading system. A study found strong linkages between improved air cargo connectivity and higher total trade value, with a 1 % increase in air cargo connectivity associated with a 6.3% increase in total exports and imports.[12]

56. As part of the integration steps needed, countries with better developed air cargo connections in combination with good customs services and efficient borders are better at integrating into global value chains. The Organisation for Economic Co-operation and Development recognizes fast and efficient customs and port procedures as essential factors for a country, or regional trading bloc, to be attractive to foreign investment in transportation and infrastructure; this contrasts with unnecessarily complex processes and documentation that raise costs for business and cause delays to transfer of goods and services.[13]

[10] IATA. 2016. *Remarks of Tony Tyler, Wings of Change, Santiago.* http://www.iata.org/pressroom/speeches/Pages/2016-03-30-01.aspx.
[11] ICAO. *Economic Development of Air Transport.* https://www.icao.int/sustainability/Pages/Connectivity.aspx.
[12] IATA Economic Briefing. 2016. *Value of Air Cargo Air Transport and Global Value Chains.* http://www.iata.org/publications/economic-briefings/value-of-air-cargo-2016-summary.pdf.
[13] OECD. Trade Facilitation Indicators. http://www.oecd.org/trade/facilitation/indicators.htm (accessed September 2017).

57. **Recommendations:** CAREC can promote a partnership between government decision bodies and market actors to work jointly toward meeting latent demand for air travel (convenience, time efficiency, affordability). CAREC can also assist to create a competitive environment to lead to higher efficiency, producer surplus, and consumer surplus.

58. Global best practice is to have policies for key functions:

(i) Market design. Composition of routes and network for maximum coverage.
(ii) Managing monopolies. Suppliers and infrastructure (airports, air traffic control) allocation that maximizes flows of goods and services with minimal constraints or cost penalties for operators.
(iii) Public–private partnerships. How states interact with private investors and service providers to maximize overall efficiency, capability development, value realized, and service delivery.
(iv) Structure of airlines. Individual state requirements and CAREC overall structures.
(v) Value of bilateral (deregulation). Clear understanding of economic, social, and political benefits from bilateral and multilateral rights to maximize connectivity and access to markets.
(vi) Building capability and resources. Clarity on what capabilities and resources are required to increase efficiency and economic performance, and level of external assistance required.
(vii) Use of government subsidies and protections. Value of support for services and infrastructure investment exceeds cost of subsidy, with benefits clearly understood and transparent.

59. By taking a macro approach to the contribution of air transport to respective country economies and at the broader CAREC regional level, the benefits of aviation development and investment are enabled by market design and a series of policies and actions that facilitate and encourage industry participation. The purpose of defining the market will be to:

(i) lift level of country connectivity using bilateral agreements and transition to additional Freedoms of the Air;
(ii) provide capacity to targeted level of propensity to travel;
(iii) define network scale and reach based on consensus forecasts;
(iv) segment demand by third, fourth, fifth, and sixth freedom traffic;
(v) meet regional development needs; and
(vi) define CAREC airports by domestic, international, and airline hubs to optimize and increase ease of passenger and cargo traffic flows.

60. Various countries within CAREC are currently taking important steps to increase aviation reach and capability and improve international endorsement and recognition of the region. Alignment of growth potential and capability development as a regionally coordinated effort can further enhance the collective member country progress and, importantly, provide a platform and framework to significantly enhance the investment potential in regional aviation.

B. Environmental Policy and Standards

61. Globally, aviation is one of the fastest-growing sources of GHG emissions. Thus, governments are increasingly endorsing policies to secure aviation's contribution for sustainable growth. ICAO recently developed a Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA),[14] and approximately 65 states have agreed to CORSIA as a voluntary program until 2026.

[14] CORSIA was agreed on at ICAO's 39th Assembly in 2016.

62. From 2027, participation is mandatory for states meeting certain criteria related to their level of aviation activities, except least developed countries, small island developing states, and landlocked developing countries which are exempt, unless they volunteer to participate. Many CAREC member countries are included in the landlocked developing countries group, but nevertheless, consideration of the principles of CORSIA are important for CAREC. The priorities are:

(i) commercialization of sustainable alternative aviation fuels,
(ii) further definition of the details of CORSIA with sufficient time allowed for implementation by airlines, and
(iii) modernization of air traffic management.

63. For CAREC policy development and future-proofing of the industry, several policy drivers support governments in dealing with environmental issues when considering regional trade agreement features. These include:

(i) contribution to an overarching goal of sustainable development,
(ii) ensuring a level playing field among parties to the agreement,
(iii) enhancing cooperation in environmental matters of shared interest, and
(iv) pursuing an international environmental agenda.

64. Environmental considerations are increasingly part of international trade and environmental agreements.[15] Given aviation's growth as a major source of greenhouse gas and conventional pollutants, the sector's prominence in international environmental policy will likely grow as well.

65. The aviation industry and, more specifically, airlines will invest a further several trillion dollars in new aircraft technology purchases over the next 20 years to upgrade aging and fuel-inefficient aircraft fleets. Boeing's current market outlook estimates the world will need 41,030 new planes, worth $6.1 trillion between 2017 and 2036, with single-aisle jets as the major driver behind demand growth comprising 29,530 single-aisle jets, or approximately $3.2 trillion (footnote 15).

66. Air navigation technology to optimize flight tracks saves both fuel burn and time in the air. Upgraded and improved technology enables reduced flight times equating to reduced fuel burn by aircraft, which the industry as whole committed voluntarily to reducing carbon emissions to meet the global climate change agenda. Industry body IATA is leading a voluntary goal of a minimum of 25% reductions in carbon dioxide emissions and fuel consumption by 2020 in comparison with 2005. Lower fuel consumption directly lowers emissions, and IATA airlines improved fuel efficiency between 2000 and 2007 by 3.1%.

67. Latest generation aircraft are "70% more fuel efficient than 40 years ago, and 20% better than 10 years ago" according to IATA.[16] Introduction of new aircraft types has additional benefits for the environment through reduced noise pollution as a result of new aircraft and engine technologies.

[15] C. George. 2014. Environment and Regional Trade Agreements: Emerging Trends and Policy Drivers. *OECD Trade and Environment Working Papers.* No. 2014/02. Paris: OECD Publishing. http://dx.doi.org/10.1787/5jz0v4q45g6h-en.

[16] IATA. Climate Change Policy. http://www.iata.org/policy/environment/Pages/climate-change.aspx; and Zacks Equity Research. Nasdaq 2017. *Boeing (BA) Hits a 52-Week High on Consistent Performance*. 15 December. http://www.nasdaq.com/article/boeing-ba-hits-a-52-week-high-on-consistent-performance-cm892379.

68. Potential environmental gains in the aviation sector are not confined to just aircraft technologies. Energy efficiency technologies, such as efficient lighting, can substantially reduce energy consumption at airport facilities. The Leadership in Energy and Environmental Design (LEED) certificate program is the most widely used green building rating system in the world. Many airports globally have achieved gold and even platinum status for the design and implementation of energy and environmental design features. In addition, the use of low- or zero-emission vehicles to shuttle passengers between terminals and from gate to aircraft is another opportunity. Creating quality public transport systems to airports can do much to discourage access via private cars, which contributes to the overall energy and environmental performance of air travel systems.

69. By 2050, IATA airlines are targeting aviation emission reductions of 50% (net) when compared with 2005 emission levels (footnote 15). These improvements are expected to be achieved through:

(i) improved technology, e.g., sustainable low-carbon fuels;
(ii) improved efficiencies in aircraft operations;
(iii) modern technology introduced for air traffic management systems and infrastructure improvements and efficiencies; and
(iv) a single global market-based measure to quantify any emissions gap.

70. CAREC member countries can benefit from these initiatives through introduction of new aircraft technology, improved air traffic management systems, infrastructure improvements for ground handling, and efficient aircraft operations and coordination of aircraft runway taxiing.

71. **Recommendations:** CAREC member countries could enhance the environmental performance of their aviation sector by considering the following recommendations:

(i) participation in global programs (such as CORSIA and LEED) to reduce aviation emissions,
(ii) establish local standards for aircraft noise and pollutant levels, and
(iii) maintain an assessment of risks for local and global industry to ensure sustainability.

C. Safety Policy and Standards

72. Airworthiness of aircraft and safety of operation is crucial for CAREC to expand aviation across the region and globally from the Central Asia region. Harmonizing operating procedures and rules across global airspace makes for a safer and more efficient aviation industry. Flights over Central Asia typically cross multiple flight information regions, and common practices and procedures simplify the process for airlines and air traffic control centers, which also reduce risks in communications and operating criteria.

73. An opportunity exists to align policies within CAREC to build the reputation and reliability of aviation within the region. This will require individual countries and the collective bloc to implement the following:

(i) maintain an efficient set of rules and regulations that meet ICAO standards and CAREC needs;
(ii) align standards across CAREC regions to facilitate cross-border collaboration and training;
(iii) approve new entrants into CAREC aviation;

[17] Airways. Performance-Based Navigation. https://www.airways.co.nz/products-and-services/aeronautical-support-services/performance-based-navigation/.

(iv) monitor performance of all approvals (airworthiness, operations, security, training, maintenance, repair and overhaul, dangerous goods, etc.); and
(v) intervene as necessary for noncompliance and performance failures and manage exits from the CAREC system of aviation.

74. Performance-based navigation is instrumental in improving the efficiency of airspace across the globe, with new procedures that effectively redesign the airspace. Performance-based navigation is credited with improving air traffic flow and efficiency, increasing airspace capacity, and simplifying the workload of air traffic controllers. New Zealand was the first air navigation service provider (ANSP) globally to "receive ICAO's endorsement as an instrument procedure design organization for Performance-Based Navigation and conventional designs."[17]

75. The application of Required Navigation Performance Authorization Required procedures allows ANSPs to equip aircraft to fly very precise and highly accurate paths that improve both efficiency and safety. New Zealand's experience allows jet aircraft operations across a challenging range of weather conditions, and over some of the most challenging terrain in the world, which has implications for CAREC to adopt the technology.

76. Emerging technologies are impacting on airspace management with new entrant craft, such as drones, balloons, and increased space vehicle activity. Major advances in technologies are also changing the way the aviation industry manages airspace safely and efficiently, and include Automatic Dependent Surveillance–Broadcast and digitization of air traffic control towers. New initiatives, such as System Wide Information Management, recognize the importance of global interoperability and standardization as being essential for future airspace management.[18]

77. Sharing of information is critical for:

(i) Pilots. During take-off, at cruise altitude, navigating, and landing.
(ii) Airport operations centers. Departure management, airport ground movement, gate availability and allocation, and arrivals management.
(iii) Airline operations centers. Constructing schedules, flight planning and routing, fuel planning and uplift or reserves calculations, passenger connectivity, and managing and planning of flight delays and recovery from delays.
(iv) ANSPs. Proactive management of national airspace and coordination with Air Traffic Services, and managing air traffic transiting their airspace.
(v) Meteorology service providers. Notice to Airmen (NOTAM), weather, and forecasting.
(vi) Military operations centers. Planning missions, blocking airspace to conduct training operations, fulfilling national security tasks.

78. Information to be shared with relevant aviation stakeholders includes:

(i) Aeronautical. Information resulting from the assembly, analysis, and formatting of aeronautical data.
(ii) Flight trajectory. The detailed route of the aircraft defined in four dimensions (4D), so the position of the aircraft is also defined with respect to the time component.
(iii) Aerodrome operations. The status of different aspects of the airport, including approaches, runways, taxiways, gate, and aircraft turnaround information.

[18] Eurocontrol. System Wide Information Management (SWIM). https://www.eurocontrol.int/swim.

(iv) Meteorological. Information on the past, current, and future state of earth's atmosphere relevant for air traffic.
(v) Air traffic flow. The network management information necessary to understand the overall air traffic and air traffic services situation.
(vi) Surveillance. Positioning information from radar, satellite navigation systems, aircraft datalinks, etc.
(vii) Capacity and demand. Information on the airspace users' needs of services, access to airspace and airports, and the aircraft already using it.

79. Coordination and alignment across CAREC and standardization by individual member states is required for the region to maximize intra-CAREC air traffic and upper airspace management of flight information region transit flights to maximize safety and generate significant revenue potential from growth in use of the airspace.

80. ANSPs will need to adjust current business models in preparation for changes, and possible divestment of some services where new technologies are being introduced, so countries can facilitate further liberalization and commercialization in this area of the industry.

81. Remaining up to date with current initiatives and directives at a global level is crucial for CAREC, to prepare for new and future airspace users plus increased air traffic through expected growth in the region. To achieve this, a series of investments by CAREC member countries to modernize and upgrade infrastructure will be required, where those actions have not already been made.

82. To transform global air traffic management (ATM) performance and to deliver seamless airspace will require investment in new technology that can clearly demonstrate benefits from implementation among CAREC member countries. This is a principal goal of the Civil Aviation Navigation Services Organization (CANSO). Implementing significant industry changes arising from safety and security initiatives will also require collective agreements to track emerging issues and trends. For CAREC, participation by respective civil aviation authorities in CANSO would provide benchmarking and awareness of proposed changes and advancements for air navigation service providers (ANSP activity).

83. CAREC faces several issues in adopting security standards and checks across the member countries, where no overarching, governance body exists, as compared with the EU. The EU has the European Commission, European Court of Justice, and European Aviation Safety Agency to oversee the aviation sector, and a recommendation would be to assess whether one or more of these features are planned for development by the region. CAREC also does not have any regulatory body or organization to settle disputes and ensure adherence among countries or aviation service providers, and to arbitrate on issues between member countries for issues such as standardization of airfare pricing, or compliance with and auditing of aviation security directives issued globally or within the region.

Air Laws and International Air Services Transit Agreement

84. The Transit Agreement of 1944 has seven of the CAREC member countries as signatories, with the Kyrgyz Republic, the PRC, Tajikistan, and Turkmenistan as non-signatories. Greater unification of CAREC upper airspace to maximize overflight options will necessitate the remaining member countries to sign the ICAO agreement.

85. All CAREC member countries are signatories to the Chicago Convention of 1944 and Montreal Convention of 1971 (Table 7).

Table 7: Ratification of International Aviation Agreements by CAREC Member Countries

CAREC country	Chicago Convention (1944)	Article 93 bis (1947)	Article 45 (1954)	Articles 48 (a), 49 (e) and 61 (1954)	Article 50 (a) (1961)	Article 48 (a) (1962)	Article 50 (a) (1971)	Article 56 (1971)	Article 50 (a) (1974)	Article 83 bis (1980)	Article 3 bis (1984)	Article 56 (1989)	Article 50 (a) (1990)	Intl. Air Services Transit Agreement. (1944)	Warsaw Convention (1929)	Montreal Convention (1971)	Montreal Protocol No. 4 (1975)	Montreal Protocol (1978)	Montreal Supplementary Protocol (1988)	Montreal Convention (1999)	Cape Town Convention (2001)	Cape Town Aircraft Protocol (2001)	Beijing Convention (2010)	Beijing Protocol (2010)	Montreal Protocol (2014)
Afghanistan	x	x	x	x						x				x	x	x					x	x			
Azerbaijan	x									x	x			x	x	x	x	x	x	x					
Georgia	x									x	x			x		x			x	x					
Kazakhstan	x									x	x			x		x			x	x	x	x			
Kyrgyz Republic	x	x	x	x		x				x	x	x	x		x	x			x						
Mongolia	x									x	x	x	x	x	x	x			x	x	x	x			
Pakistan	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x			x	x	x	x			
PRC	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x			x	x	x	x			
Tajikistan	x									x	x					x			x		x	x			
Turkmenistan	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x			x						
Uzbekistan	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x						

CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.

Source: Asian Development Bank analysis, sourced from ICAO Aeronautical Treaty Collection. https://www.icao.int/secretariat/legal/Pages/TreatyCollection.aspx.

Additional annexes and outstanding treaties, such as Beijing, Cape Town, and Montreal conventions and protocols, are not yet ratified by various member countries. To promote CAREC as a safe, reliable airspace region and attract investment by foreign airlines, airports, and infrastructure service providers, the ratification of outstanding treaties to normalize and harmonize the laws of the region's air may be a useful step.

86. **Recommendations:** CAREC member countries could enhance the safety performance of their aviation sector by considering the following recommendations:

(i) Review any restrictions for aircraft age to comply with the requirements of the state of certification.
(ii) Ratify ICAO Transit Agreement of 1944 by remaining countries to maximize overflight potential of upper airspace for airline transit flights.
(iii) Ratify outstanding ICAO conventions on air safety and participate in ICAO air safety programs.

CHAPTER 4

Infrastructure and Equipment

87. A key strength of the CAREC program is its ability to collectively mobilize financing for physical investment projects. This section will begin to explore the type of infrastructure and equipment investments within CAREC member countries that can enhance regional trade and economic development through the aviation sector. Among the key components of aviation infrastructure and equipment are:

(i) airport facilities and equipment (terminals, runways, maintenance facilities);
(ii) intermodality (connectivity to and from airports);
(iii) fleet (aircraft ownership and procurement options); and
(iv) communications and navigation equipment, including equipment for managing overflights.

A. Airport Facilities and Equipment

88. Per IATA, some $1.2 trillion–$1.5 trillion is expected to be spent on global airport infrastructure development up to 2030.[19]

89. Major airport expansion projects require a balance between development of cost-efficient facilities and passenger capacity of infrastructure compared to forecast demand. Airlines require the levels of service and operational efficiency to match the investments made in facilities. Both under-investment and overinvestment can create inefficiencies detrimental to the air transport system and to economic development.

90. Airport infrastructure constraints pose an obstacle to aviation growth in several CAREC member countries. There are opportunities to significantly grow passenger traffic—both between CAREC member countries and outside—with the right policies and a more liberalized approach to air services. However, traffic growth will put further pressure on infrastructure.

91. CAREC member countries need to be proactive and invest in aviation infrastructure to ensure they can accommodate the anticipated growth in passenger traffic. Falling behind the growth curve has huge consequences, impacting tourism and the economy as a whole.

Kazakhstan Case Study

92. Kazakhstan's rapid growth as a regional hub makes for an illustrative example of the need to match infrastructure and equipment capacity to growth expectations. Infrastructure limitations inhibited traffic growth for several years at Almaty, Kazakhstan's largest city and one of the largest airports in CAREC, excluding the PRC.

93. Almaty International Airport currently handles approximately 5 million passengers per annum, which is above its designed capacity.

[19] IATA: Operations and Infrastructure. http://www.iata.org/whatwedo/ops-infra/airport-infrastructure/Pages/index.aspx.

The airport's terminal has reached capacity limitations, resulting in restricted levels of service for passengers, particularly transit passengers. Apron space is limited and runway and taxiway conditions are issues.

94. A runway reconstruction project commenced in August 2017 and is expected to be completed by the end of 2018, improving the condition of the runway and adding high speed taxiways. However, the pressing issue of terminal space has not yet been resolved. A planned new airport for Almaty may ultimately be needed for the market to grow.

95. In the capital city of Astana, capacity doubled to 8.2 million passengers following the opening of a new terminal in June 2017. The Astana International Airport, which handled 3.5 million passengers in 2016, was approaching its designed capacity prior to the opening of the new terminal. In recent years, Air Astana has focused most on expansion, including growth in transit traffic, at Astana due to the limitations at its larger Almaty hub.

96. Astana now has one of the largest and most modern airports in the region, improving its position as a hub for traffic traveling to, from, and between CAREC member countries. However, further investments are still required, including runway upgrades. Over time, terminal expansion will also again be required to keep ahead of the growth curve.

97. Airport upgrade projects are also underway or planned for several of Kazakhstan's regional airports as part of a program to improve the country's aviation infrastructure. New terminals and reconstruction of existing terminals will improve service levels and facilitate growth.

98. Runway upgrade projects will improve safety levels and reduce delays or cancellations in poor weather conditions. Runway lengths are not an issue—almost all of Kazakhstan's commercial airports can accommodate wide-body aircraft, although the domestic and regional international market can be sufficiently served with narrow-body aircraft. However, runway conditions are often below international standards.

99. Kazakhstan has more than 20 airports with commercial services, including 14 with scheduled international services. There are opportunities for the smaller international airports to attract more regional international services, improving connectivity within CAREC.

100. Six of Kazakhstan's international airports now have less than one scheduled international flight per day. Another five airports have an average of two to five daily international flights.

101. International connectivity is critical as Kazakhstan is a vast country with secondary cities that, in some cases, are closer to capitals or major cities in neighboring countries than to Astana or Almaty. For example, a flight from Aktau (the third-largest airport in Kazakhstan) to Baku or Tbilisi is only 1 hour, but a flight to Astana is more than 2 hours and a flight to Almaty is 3 hours.

102. Secondary cities in Kazakhstan would benefit from more flights to other CAREC member countries. However, currently the market is inhibited by a combination of bilateral constraints, tax and fee levels, and airport limitations.

103. Passengers have to endure long road or rail journeys due to a lack of air options—or affordable air options. A short international flight is typically several times more expensive than a longer domestic flight due to high taxes and lack of competition. For example, a return flight from Aktau to Tbilisi costs at least $300, including taxes.

Table 8: Kazakhstan Airports with Commercial Services

Airport (Airport Code)	2016 Total Passenger Traffic	Number of Weekly International Departures, September 2017	Runway Length (m)
Almaty (ALA)	4,878,000	490	4,500; 4,397
Astana (TSE)	3,446,000	322	3,500
Aktau (SCO)	866,000	100	2,935
Atyrau (GUW)	625,000	34	3,000
Shymkent (CIT)	621,000	23	2,800; 3,300
Aktobe (AKX)	338,000	12	3,097
Oskemen (UKK)	287,000	12	2,510
Karaganda (KGF)	222,000	28	3,301
Kyzylorda (KZO)	198,000	0	2,700
Uralsk (URA)	189,000	4	2,800
Pavlodar (PWQ)	177,000	6	2,500
Kostanay (KSN)	117,000	6	2,484
Semey (PLX)	66,000	0	3,096
Taraz (DMB)	55,000	2	3,500
Taldykorgan (TDK)	27,000	0	3,001
Zhezkazkan (DKN)	25,000	0	2,600
Kokshetau (KOV)	14.000	2	2,850
Petropavl (PPK)	4,000	0	2,489
Baykonur (BXY)	Not available	2	3,100
Zaysan (SZI)	Not available	0	1,505
Balkhash (BXH)	Not available	0	2,502

m = meter.

Sources: Kazakhstan Civil Aviation Committee, Kazakhstan Report. Presented at the CAREC Aviation Workshop, Singapore, 6–7 April 2017; and Official Airline Guide (OAG). Database. www.oag.com (accessed September 2017, by subscription only).

Airport Facilities and Equipment across CAREC

104. The need to upgrade existing airports and develop smaller airports in secondary cities is evident in many other countries of the CAREC region if anticipated passenger growth is to be realized.

105. There are several major airport projects in CAREC member countries that have been completed in recent years or are about to be completed. A terminal expansion project at Tbilisi International Airport was just completed, increasing the airport's capacity from 5 million to 7 million passengers per annum. Tbilisi traffic doubled over the last 4 years and the airport now has more than enough capacity to support another doubling of traffic.

106. Turkmenistan opened a new terminal at Ashgabat in September 2016, increasing the airport's capacity to 17 million annual passengers. Baku in Azerbaijan and Dushanbe in Tajikistan opened new terminals in 2014. Dushanbe began construction in 2017 of a new cargo terminal.

Aviation infrastructure development. The recently completed terminal expansion at Tbilisi increased capacity to 7 million passengers per year (photos by Lloyd Wright, ADB).

Aviation infrastructure development. The new Ulaanbaatar airport will increase passenger capacity up to 12 million (rendering by the Government of Mongolia).

107. A new airport for Mongolia's capital, Ulaanbaatar, is almost complete and is slated to open in 2018. The new airport will have initial capacity to handle up to 3 million passengers, which is sufficient given the size of Mongolia's aviation market. Future expansion could raise capacity up to 12 million, but hinge on an ambitious goal to turn Ulaanbaatar into a hub for east–west traffic. Ashgabat, Tbilisi, and Ulaanbaatar are exceptions in a region where most major airports are behind the growth curve. The balance between demand and investment is key. As noted earlier, overinvestment can introduce its own risks and inefficiencies, as the resources used could likely be more economically beneficial when optimized in other areas.

108. Baku opened a new terminal in 2014, and subsequently boosted capacity to 9 million annual passengers. Only half the current capacity is used, but the market is growing fast. Baku passenger traffic increased by approximately 20% in 2016 and more than 30% in 2017. Azerbaijan is keen to establish Baku as a hub for the region.

109. Uzbekistan suspended in June 2017 a new terminal project which would increase Tashkent's capacity to 5.7 million passengers per annum. Tashkent International Airport has emerged as another hub for the region due to network expansion by Uzbekistan Airways. However, Tashkent would likely also require larger and more modern terminals to improve service levels, particularly for transit passengers. Uzbekistan Airways was initially hoping the new terminal would open in 2019, but this now appears to be delayed.

110. The Kyrgyz Republic announced in July 2017 the postponement of plans to develop new cargo and passenger terminals at Bishkek Manas International Airport until 2022. The project, which also includes a second runway, is part of an initiative to position Bishkek as a hub. Bishkek Manas currently only has capacity to handle 3.5 million passengers per year. At the same time, the Kyrgyz Republic postponed plans to modernize and upgrade several regional airports until 2022.

111. Larger, more modern major airports would be beneficial in all the countries to support tourism growth (both from within and outside CAREC) and more transit traffic. Upgrades at secondary airports are likely necessary to support more regional international services within CAREC. In Georgia, the country is looking to develop smaller airports in the secondary cities of Ambrolauri and Omalo. Both these cities possess tourism potential

with the nearby Caucasus mountain range. However, since land routes to these cities can involve long drive times, the opportunity is largely missed, as tourists traveling over long weekends simply would not be able to invest the travel time. With an airport, connecting flights from international airports in the country could make tourism more viable for these secondary cities.

112. Excluding the PRC, there are currently 53 airports in CAREC with scheduled international services. Most of these are smaller airports with limited infrastructure. For these smaller airports, the development of customs and immigration capacity is also a key consideration if international services are to expand.

113. Additional cross-border routes within CAREC present a huge opportunity for secondary cities poorly served today. Nearly every CAREC member country has secondary cities which would benefit from increased Freedoms of the Air access.

114. The challenge will be expanding international facilities, which are needed to support more international flights within the region, without increasing taxes for passengers and airport charges for airlines. The cost of air travel between CAREC member countries should ideally be reduced to stimulate demand while infrastructure should be upgraded to improve service levels and accommodate the increased traffic levels.

115. The PRC is an obvious exception given its mammoth investment in airports across the country—at practically all 70 plus of its international airports as well as domestic airports. Of most significance for CAREC is Urumqi International Airport, which has become a hub for Central Asia. Urumqi commenced a major upgrade project at the beginning of 2017, which will include a new terminal and runway.

Table 9: Number of Airports with International Services

CAREC Member Country	Number of Airports with Scheduled International Services
Afghanistan	3
Azerbaijan	5
Georgia	3
Kazakhstan	14
Kyrgyz Republic	2
Mongolia	1
Pakistan	11
People's Republic of China	74
Tajikistan	3
Turkmenistan	1
Uzbekistan	10

CAREC = Central Asia Regional Economic Cooperation.
Source: Asian Development Bank.

116. Urumqi's capacity is expected to be increased to nearly 50 million passengers per year by 2020, reinforcing Urumqi's position as the biggest hub in the region. Urumqi surpassed the 20 million passenger milestone in 2016, but only approximately 5% of its traffic is international. Urumqi has nearly 50 domestic routes and 20 international routes, including 11 international routes to CAREC member countries.

117. There are still opportunities for other CAREC member countries to establish new regional hubs or expand what are now relatively modest hubs. While Urumqi is geographically well placed to handle traffic heading between Northeast Asia (particularly other parts of the PRC) and CAREC member countries, it is not well placed for connections within CAREC.

118. **Recommendations:** CAREC member countries should consider investment in upgrading airport infrastructure at both major and secondary airports, with potential financial assistance from

international financing partners and PPP structures. CAREC member countries could also work toward improving access to air travel for targeted secondary cities through bilateral air service mechanisms, reduction in taxes, expansion of smaller international airports, and potential upgrading of domestic airports to handle international traffic.

B. Connectivity to and from Airports (Intermodality)

119. Connectivity to and from CAREC airports is a major issue that can inhibit growth and tourism within the region.

120. Airports need to be well connected to cities and offer public transportation options to attract more passengers. More flights between CAREC member countries and a reduction in the cost of flying (including lower taxes) will stimulate demand, but only if traveling from the airport to the city can be done easily and inexpensively.

121. Many CAREC member countries currently are not able to provide sufficient public transportation options for traveling to and from airports. New projects could be pursued to address this issue and ensure that travel around CAREC is seamless.

122. Georgia's investment in a rail link from Kutaisi Airport to the capital Tbilisi is a recent example. Construction of the new rail link, which will connect the airport with Georgia's existing east–west train line, should be completed in 2018. Kutaisi, located 250 kilometers (km) to the west of Tbilisi, is Georgia's second-largest city and its airport has emerged as an alternative gateway to the country. Georgia has developed Kutaisi as a low-cost airport, attracting budget airline flights to several primarily European destinations. The new rail link is an important component of an initiative to make Georgia more accessible and boost tourism.

▲ **Airport connectivity.** A bus rapid transit corridor under development in Islamabad, Pakistan will connect the newly constructed international airport to the city center (rendering by the National Highways Authority of Pakistan).

123. When the new spur line is completed, Kutaisi Airport will be linked by rail with both Tbilisi and the Black Sea resort city of Batumi in three hours or less. Georgia also has plans to improve access to more remote areas—where there is no rail and limited road access—by renovating and reopening several small domestic airports.

124. Construction began in 2017 of a new light rail system in the Kazakhstan capital Astana which will include a stop at the Astana International Airport. Kazakhstan's other major airport, Almaty International Airport, is connected by bus.

125. Bus rapid transit (BRT) is a relatively low-cost means to provide a quality mass transit option for airport connectivity. BRT uses dedicated busway infrastructure, enclosed weather-protected stations, information technology and smart fare systems, and modern vehicles to provide rapid and convenient services. Islamabad is currently constructing a BRT line between the city and its new international airport.

126. In several major cities in CAREC member countries, the main rail station is often less than 10 km from the airport, but there are often no rail or bus links to the airport. Requiring additional transfers between the airport and main rail or BRT corridors are inconvenient, adding significant time to the total journey, and decreasing the attractiveness of a destination to tourists. This is especially true for passengers carrying bags and luggage.

127. With a direct public transport link to the main international airport, residents of secondary cities are more likely to travel by air. Secondary cities are also more likely to attract tourists if they have a direct public transport link with an international airport.

128. Rapid and frequent public transport links connecting secondary cities to international airports are particularly important for travel between CAREC member countries. Flights within the region are short, making weekend trips and short holidays feasible. However, short holidays become nearly impossible if flights are infrequent or if travel from the airport to the destination is not quick and convenient.

129. Improved connectivity is not just relevant to passenger services. The effectiveness of air cargo depends upon linkages with road and rail intermodality. Cargo processing facilities at airports and the associated road and/or rail network require planning and investment to ensure high-value air cargo can reach its destinations efficiently. The development of dry ports and other cargo processing facilities can often be achieved through the right incentives for partnerships with the private freight and logistics industry.

130. Successfully boosting regional travel within CAREC requires a multipronged effort. Simply adding flights is not enough. Airports must be accessible to both the main city and to tourist destinations in more remote areas. Airports must also be quick and efficient in processing passengers (ideally without visas), and have reasonable charges and taxes. Otherwise, cost and time factors will dissuade residents of CAREC member countries from taking holidays within the region. Airport facilities must also cater to intermodality for cargo shipments.

131. **Recommendation:** CAREC to work toward improving intermodal connectivity of airports, including new airport public transport stations and corridors.

C. Fleet

132. CAREC member countries, with the exception of the PRC, have relatively modest fleet sizes of commercial aircraft. Airlines based in the PRC have a combined fleet of more than 3,000 aircraft while none of the other CAREC member countries have a fleet of more than 100 commercial aircraft. Kazakhstan, Pakistan, and the PRC are the only countries with active commercial fleets of more than 50 aircraft (as of September 2017). They are also the only countries with more than 10 operators. Overall, approximately 375 commercial aircraft are registered in CAREC member countries outside of the PRC. This includes nearly 330 passenger aircraft and nearly 50 freighters.

133. The wide-body fleet is relatively small as there is limited demand for long haul services from CAREC member countries, excluding the PRC. Only approximately 70 wide-body aircraft (including freighters) are registered to CAREC member countries, excluding the PRC. Emirates alone has more than 260 wide-body aircraft in its fleet—nearly four times the CAREC total.

134. The majority of the CAREC fleet consists of narrow-body aircraft (primarily A320 and 737 family aircraft) and regional aircraft. Currently, approximately 300 narrow-body and regional aircraft are registered in CAREC member countries, excluding the PRC, accounting for over 80% of the total fleet.

135. Long-haul routes (flights of more than eight hours) from CAREC member countries, excluding the PRC, are generally not viable. Long-haul destinations are currently only viable served as one-stop transfers via major hubs such as Dubai and Istanbul. Therefore, CAREC airlines might be better off focusing on flights of up to 8 hours using narrow-body and regional aircraft.

Table 10: CAREC Commercial Aircraft Fleet by Country, as of September 2017

CAREC Member Country	Number of Wide-Body Aircraft	Number of Narrow-Body Aircraft	Number of Regional Aircraft	Total Active Fleet	Mix of Passenger Aircraft/Freighters
Afghanistan	3	8	5	16	15/1
Azerbaijan	22	12	9	43	25/18
Georgia	9	8	6	23	12/11
Kazakhstan	4	36	52	92	90/2
Kyrgyz Republic	0	11	6	17	14/3
Mongolia	2	4	10	16	16/0
Pakistan	16	47	23	86	85/1
PRC	386	2,619	234	3,239	3,158/81
Tajikistan	1	11	8	20	14/6
Turkmenistan	3	21	0	24	24/0
Uzbekistan	12	13	13	38	34/4
Total	458	2,790	366	3,614	3,487/127
Total (excluding the PRC)	**72**	**171**	**132**	**375**	**329/46**

CAREC = Central Asia Regional Economic Cooperation, PRC = People's Republic of China.

Source: Centre for Aviation (CAPA). CAPA Data Centre, Fleet Database. https://centreforaviation.com/data (accessed on September 2017, by subscription only).

136. New generation narrow-body aircraft are capable of reaching most of Asia and Europe from Central Asia. Regional aircraft (turboprops and regional jets seating up to 100 passengers) can used on routes between CAREC member countries and for domestic flights.

137. Regional aircraft already provide critical access to smaller domestic destinations and are used by some CAREC airlines for regional international services. For example, Air Astana uses 97-seat Embraer E190s on most of its international flights to other CAREC member countries, excluding the PRC. Azerbaijan Airlines AZAL also uses E190s on regional international routes, including flights under its low-cost brands, AZALJET and Buta Airways.

138. Expansion of the regional aircraft fleet will be necessary to support improved connectivity within CAREC. Potential new routes within CAREC are generally too thin to support narrow-body aircraft, such as A320s and 737s. Expansion of the regional aircraft fleet would also enable airlines to operate more frequencies on existing routes between CAREC member countries, a majority of which are not served daily.

139. Regional jets have the range to operate virtually any route between CAREC member countries, excluding the PRC. Turboprops can be used to open secondary international routes between neighboring or nearby CAREC member countries. There are several potential international routes of less than 1,000 km connecting a secondary city that, in many cases, is closer to a major city of another CAREC member country than the capital of its own country.

140. These are relatively small markets but have sufficient demand to support air services if the right size aircraft is used and if fares and taxes are reasonable. Most passengers in these markets are now opting for quite long bus and train journeys as direct flights are not available or are not affordable.

141. CAREC member countries should encourage the acquisition of more regional aircraft to support growth in air travel within the region. Financing support will be required, particularly if airlines opt for new generation regional aircraft rather than outdated second-hand equipment. Most CAREC airlines have historically acquired second-hand aircraft. With the right support, more airlines should be able to acquire new aircraft—or at least newer second-hand aircraft.

142. Fleet renewal is important to raise service levels and attract more international passengers. The average aircraft age in CAREC (excluding the PRC) is now relatively old in comparison to international standards. In six CAREC member countries, the average age of the fleet is more than 20 years old. In the other four CAREC member countries (excluding the PRC), the average age is at least 10 years old.

143. CAREC airlines, excluding the PRC, currently only have commitments for approximately 50 new aircraft. Financial support is necessary to acquire more aircraft for both renewal and growth.

144. Leasing new aircraft is also an option for airlines pursuing fleet renewal and growth. Most aircraft operated by CAREC airlines are now owned, rather than leased. Operating leases have traditionally not been pursued as most CAREC airlines opted for older relatively inexpensive aircraft and did not have the credit rating necessary to secure leases.

145. With the right support, more CAREC airlines should be able to pursue deals with aircraft leasing companies. As the fleet expands and becomes "younger," the portion of leased aircraft could increase significantly. Currently, the portion of leased aircraft is 30% or less for all CAREC member countries and, in some countries, is 10% or less. Credit ratings may also have an effect on leasing activity in the region. An absence of

Table 11: Aircraft Age, Procurement Type, and New Orders, as of September 2017

CAREC Member Country	Average Aircraft Age	Percent of Owned versus Leased Aircraft	Number of Aircraft on Order
Afghanistan	28	94%/6%	0
Azerbaijan	10	76%/24%	14
Georgia	26	74%/26%	0
Kazakhstan	21	89%/11%	18
Kyrgyz Republic	26	81%/19%	0
Mongolia	20	70%/30%	4
Pakistan	14	72%/28%	13
People's Republic of China	7	Not applicable	1,148
Tajikistan	29	75%/25%	0
Turkmenistan	11	100%/0%	0
Uzbekistan	14	89%/11%	4

CAREC = Central Asia Regional Economic Cooperation.

Source: Centre for Aviation (CAPA). CAPA Data Centre, Fleet Database. https://centreforaviation.com/data (accessed on September 2017, by subscription only).

signatories to the 2001 Cape Town Convention may also have influenced low levels of leased aircraft. The Cape Town convention is the international agreement that clarifies owners' rights to repossess aircraft assets when lessees are in default.

146. The total fleet in CAREC (excluding the PRC) could easily double in size by 2025. Larger fleets and, in particular, more narrow-body and regional aircraft, will enable growth in passenger traffic within CAREC. Wide-body aircraft are generally too big for most CAREC markets and are too large for routes within CAREC.

147. For traffic growth within CAREC to be realized, at least 100 additional narrow-body aircraft and at least 100 additional regional aircraft (a mix of regional jets and turboprops) will be required over the next 5 to 7 years. Larger fleets will enable CAREC airlines to launch new routes, improve their efficiency levels, and become more competitive. Regional jets and turboprops provide the ability to operate more frequencies on new and existing routes.

148. There are over 50 airlines based in the 10 CAREC member countries, excluding the PRC. However, only seven of these airlines have an active fleet of at least 10 aircraft: Air Astana (Kazakhstan), AZAL (Azerbaijan), PIA (Pakistan), SCAT (Kazakhstan), Shaheen Air (Pakistan), Turkmenistan Airlines, and Uzbekistan Airways. Five CAREC member countries do not have any airlines operating 10 or more aircraft.

149. Excluding the PRC, Air Astana, PIA, and Uzbekistan Airways are the largest airlines in the region; each operating between 30 and 40 aircraft. AZAL, Shaheen Air, and Turkmenistan Airlines each operate between 20 and 30. The only other airline with more than 10 aircraft is SCAT, which has an active fleet of nearly 20 aircraft.

150. Most airlines in the region have subscale fleets, leading to relatively inefficient operations. Airlines with small fleets generally have challenges becoming profitable due to relatively high costs and a lack of economies of scale.

Improved aircraft efficiency. For airlines such as Azerbaijan's AZAL, fleet renovation with narrow-body jets optimizes economic and operational efficiencies (photo by AZAL).

151. CAREC member countries should consider amending foreign ownership regulations to allow cross-investment between airlines. This would facilitate the establishment of airline groups consisting of airline subsidiaries or affiliates in multiple CAREC member countries. Airlines that are part of larger such groups would be able to leverage synergies and enjoy economies of scale they would never be able to achieve on their own.

152. Fleet synergies would be one of several key benefits generated by the establishment of cross-border airline groups within CAREC. Airline groups would operate larger fleets than any airline would individually, resulting in an improved level of efficiency. Airline groups would also be able to negotiate better deals with aircraft manufacturers, leasing companies, and other suppliers than they would individually.

153. It is important for CAREC airlines to expand and modernize their fleets. However, airlines will need access to capital to invest in new aircraft. A more liberal environment will help airlines attract capital, including for new aircraft acquisitions, and improve profitability and grow.

154. **Recommendation:** CAREC could play the role of provider of information and knowledge to assist member countries to understand current trends and options in fleet procurement.

D. Communications and Navigation Equipment

155. Communications and navigation equipment forms a cornerstone for safe and efficient air operations. This equipment, though, can also serve several other purposes. Air navigation systems can be improved to enhance the use of CAREC countries' airspace, which would bring in additional system revenue. Air navigation systems can also bring greater benefit to the aviation value chain through the optimization of routes, flight frequency, gate turnarounds and pushback, and taxiway dwell times.

156. Communications, navigation, and surveillance are areas where IATA works globally with ICAO to promote global standards, recommending practices and guidance material used by airlines, air navigation service providers, and regulatory agencies for the benefit of all stakeholders.[20] ICAO particularly works with member states to implement the Global Air Navigation Plan with its Aviation System Block Upgrades (ASBU) methodology. CANSO defines an ASBU[21] as a package of capabilities (modules) with:

(i) clearly defined and measurable operational improvements with relevant measurements to determine success;
(ii) required equipment and/or systems in aircraft and on the ground together with an operational approved or certification plan;
(iii) standards and procedures for airborne and ground systems; and
(iv) positive business case over a clearly defined period of time.

157. For CAREC, ASBUs guide the development of a road map to assist ANSPs with individual strategic plans and investment decisions, aligning these objectives with the overall goal of global aviation system interoperability.

158. This is a programmatic and flexible global systems engineering approach providing CAREC member countries with the capability and expertise to advance their own air navigation capacities based on the country's specific operational requirements. Outcome of the block upgrades is to enable aviation to achieve the global harmonization, manage increased capacity demands, and improve environmental efficiency as a result of modern air traffic growth in demand.

159. **Recommendation:** CAREC member countries are encouraged to leverage support from ICAO and IATA to align respective air navigation plans based on specific member requirements.

[20] IATA. Air Traffic Management. http://www.iata.org/whatwedo/ops-infra/air-traffic-management/Pages/index.aspx.
[21] Civil Air Navigation Services Organisation (CANSO). Introduction to the Aviation System Block Upgrade (ASBU) Modules: Strategic Planning for ASBU Modules Implementation, 2013. https://www.canso.org/sites/default/files/Introduction%20to%20the%20ASBU%20Modules.pdf.

CHAPTER 5

Operations

160. This section covers core operational aspects for both passenger and cargo services. Building on the challenges and issues noted earlier in this study, this section will highlight latest practices, knowledge, and technologies that can make CAREC air transport operations more efficient, safe, secure, and customer friendly. These issues cover:

(i) airport operations (ownership and management, human resource capacity development);
(ii) air navigation services providers (ANSPs) (air navigation modernization plans, ownership, and management);
(iii) air safety and security;
(iv) e-cargo; and
(v) facilitation services (visa processes, customs, etc.).

A. Airport Operations Ownership and Management

161. Several countries around the world have begun to divest airports from state control to private management. A mix of models has been used. Typically, assets remain in the ownership of the government while a concession contract for a fixed term is provided for management services. In Saudi Arabia, Medina Airport moved into private management using a build–operate–transfer model in a contract with TAV Turkish Airports Group. Other airports in Saudi Arabia hold management contracts with private administration firms, including Dublin Airports Authority in Riyadh and Changi Airport Service in Jeddah. In Brazil, several airports are now managed by concessions with both local and foreign investors who hold contract terms of up to 30–40 years.

162. National and state governments normally are often paid a concession derived from the financial returns. A key benefit from PPPs is access to proven, world-class management capability in operating airports for both commercial and aeronautical reasons. Typically, a successful airport will maximize commercial revenues from parking, office rental leases, advertising, food and beverage vendors, and duty-free retailing. These revenue sources typically represent approximately one-half of total airport revenue, with the remainder being principally landing fees and other direct flight-related revenues.

163. Private investors are active in the Asia and Pacific region due to unrealized growth potential and consistent income from new and emerging airports. A portion of airports in the region are run under concessions with private expertise. However, many airports remain partially or fully owned by national governments.[22]

164. Understanding the value of airport assets and their optimal performance is an important step for governments in any decision-making regarding

[22] J. Turner. 2014. Too high a price? The risks and rewards of airport privatisation. *Airport Technology*. 31 July. http://www.airport-technology.com/features/featuretoo-high-a-price-the-risks-and-rewards-of-airport-privatisation-4327078/.

Optimizing airport assets. Using the newly renovated Tbilisi International Airport as an example, airport commercial activities, such as parking (upper left), food and beverage (upper right), advertising (lower left), and duty-free shopping (lower right) can all be lucrative airport revenue sources (photos by Lloyd Wright, ADB).

privatization or divestment. Airport concessions allow private enterprise to manage the asset to return a profit and generate additional revenue, which can highlight the true asset performance and value potential ahead of any future sale or partial divestment.

165. As the market is further deregulated and demand increases for CAREC destinations, it is critical that infrastructure has the capacity ready ahead of the demand, so as not to constrain the demand and limit economic growth. Airports are a fixed cost and, therefore, the size and location of the assets are not reversible decisions. Thus, at the same time, overinvestment can be a risk as well. Airports have an economic life in excess of 50 years and risks must be understood prior to major decisions. Typically, decisions are a trade-off between unconstrained capacity and capital efficiency, and the forecasting process at national level needs to involve the airport operators in the planning process.

166. As CAREC member countries seek to separate airport operations from the role of the government regulatory organization, corporatization is an option to lift performance of the airport on a commercial basis while retaining ownership, whereas privatization is divestment of the asset. A transition to private sector participation will require a different and more important role for CAREC governments, to ensure investment in capacity and globally competitive levels of efficiency and service. To create economically

viable opportunities for the private sector, the establishment of capacity planning and standards setting is key. Such planning can influence distribution of demand across airports by targeted use of bilateral air rights, as was achieved in the UK.[23]

167. To lift performance and service levels at government-controlled airports, where required, a gap analysis of current performance and target performance can identify the level of assistance that may be required (where there is a shortfall in service quality, or lack of capability). This action enables respective states to determine how the airport infrastructure could be maximized, and the impact on airline operators and service suppliers.

168. To strengthen airport hubs and increase traffic through secondary airports will require a coordinated approach and alignment with bilateral agreements, airline operators, service providers, together with an understanding of current skills and capabilities, so that the best options and solutions to lift performance can be identified.

169. Investment has already been made in airport modernization and facility upgrades in several countries across CAREC.[24] Infrastructure has been built with public funding, and policy options include subsidiarization and evaluating private sector participation.

170. If airports operate as monopolies, they have large capital risk due to potentially low usage. Private participation will benefit from certainty that a clear framework of policies will deliver commercial potential for investors that can collaborate with national and local governments.

171. **Recommendations:** To prepare for quality private sector operations, CAREC member countries should establish policies on service standards as well as develop processes for input on user and consumer complaints at airports. In addition, CAREC member countries can perform gap analysis on current airports to determine growth potential and benefits for both government and private investors and operators. Private sector concessions for airport operations should be considered as a means to drive efficiency and cost recovery.

B. Air Navigation Services Providers

172. Globally, air traffic management (ATM) is currently in transition from being under restrictive government control toward more competitive service providers. Air navigation service providers (ANSPs) are entities that manage air traffic systems on behalf of an airport or country. ANSPs are often accompanied by new institutional guidelines and structures that better serve airlines and air transport operators, through the applications of increased safety, operational, technical, environmental, and economic requirements. The global, seamless, and safe airspace required from ANSPs need cost-effective and efficient services, and a level of capacity planning to serve air transport operator needs.

173. Organizations, such as the European Organisation for Civil Aviation Equipment, are currently working with CANSO to improve aviation operations and develop stronger levels of cooperation on industry standards and support for global and regional interoperability of ATM

[23] ITF-OECD. *Forecasting Airport Demand Review of UK Airports Commission Forecasts and Scenarios: Case-Specific Policy Analyses.* 2015. https://www.itf-oecd.org/forecasting-airport-demand-review-uk-airports-commission-forecasts-and-scenarios.

[24] Russian Aviation Insider. 2017. Kyrgyzstan's Osh Airport Completes Terminal Expansion. 11 April. http://www.rusaviainsider.com/kyrgyzstan-osh-airport-completes-terminal-expansion/; and Kazakhstan to Open 15 New Airfields By 2020. 28 July. http://www.rusaviainsider.com/kazakhstan-open-15-new-airfields-2020/.

systems.[25] Major new issues for ATM include the safe integration and implementation of standards for unmanned aircraft systems, and the importance of cybersecurity measures to secure airspace and control aviation activity. Active participation in this level of enhanced policy making and standards development affords additional protection to build the reputation and capability of individual member states.

174. Collaboration on the implementation of new and emerging technologies ensures that a safe, seamless, and efficient aviation system is developed where various parties exchange information and best practice methodology, as well as sharing of expertise and capability building through working groups and joint support initiatives. Cooperation between member countries enhances credibility on the regional and global stage while providing access to the latest training and standards that can assist in building world-class capability and skills in the local aviation scene.

175. CANSO was formed to meet these challenges and provide a coordination and leadership role with aviation stakeholders. Within the CANSO Vision 2020 plan[26] is an overall objective of creating seamless air navigation systems that include a safe and borderless airspace consistent with ICAO's global ATM concept to account for regional differences in traffic densities and complexity. Another feature of this concept is the implementation of specific key characteristics, including standardized rules, procedures, information management, and ground infrastructure.

176. ICAO has released a Global Air Navigation Plan for 2016–2030[27] with the specific aims of:

(i) safety,
(ii) air navigation capacity and efficiency,
(iii) security and facilitation,
(iv) economic development of air transport, and
(v) environmental protection.

177. **Recommendation:** CAREC can assist member countries to encourage the effective use of ANSPs to enhance the safety, operational, and commercial objectives of managing airspace.

C. Air Safety and Security

178. The ever-increasing volume of air passenger and cargo travel along with recent events mean that safety and security are principal concerns for the industry. Organizations, such as ICAO and IATA, exist to promote the crucial role of regulation in conjunction with commercial and operational collaboration for a safe and secure world aviation system. Clarity and certainty for all is an outcome of harmonized regulation and is recognized as a benefit for both consumers and the aviation industry itself.

179. Therefore, consideration of safety and security aspects during the development of regulatory change and adherence to standards is of paramount importance. The industry also recognizes that resources are limited in many developing states. An increasingly multinational operating environment presents challenges for the speed of change and level of capability

[25] U. Ellichipuram. 2017. CANSO and EUROCAE Collaborate to Jointly Develop Aviation Industry Standards. *Airport Technology*. 13 October. http://www.airport-technology.com/news/newscanso-eurocae-collaborate-to-jointly-upgrade-aviation-standards-5946962.

[26] CANSO. Vision 2020: Supporting Strategies and Plans. June 2013. https://www.canso.org/sites/default/files/CANSO%20Vision%202020_1.pdf.

[27] ICAO. 2016–2030: Global Air Navigation Plan. Montreal. 2016. https://www.icao.int/publications/Documents/9750_5ed_en.pdf.

required from many national-based safety and security regulatory systems[28] and, therefore, global cooperation becomes even more important.

180. Global organizations, such as ICAO, aim to establish consistent air safety and security standards across member state aviation jurisdictions. Under a recent initiative, the Global Aviation Security Plan (GASeP), ICAO aims to improve the basis for more effective information-sharing among states and with the industry stakeholders to addressing current and future security threats. Program initiatives include the management of current threats and risk environment, and the management of traffic growth in a secure and efficient manner to lift public confidence. The GASeP initiative will guide states' priority setting through target-based planning. Participation in the program aligns respective states toward assuring greater air safety and security levels and commitment across the industry.

181. An aligned aviation industry lifts the reputation of individual countries among the aviation community itself and, more importantly, demonstrates the states' willingness to participate in safe and efficient global air travel that benefits tourism and national economies. The GASeP program is one of several initiatives underway to create a safer and more secure operating environment for both the aviation industry and global tourism.

182. To progress the GASeP plan, strong political support will be required across CAREC member countries. A lack of capacity to employ risk management approaches and the resources needed for effective capacity building are recognized as risks by ICAO,[29] together with making objectives and targets as attainable as possible for members.

183. Timely and responsive security systems are essential to manage real-time validation of travelers across aviation networks and flight path routings. This can only be achieved through harmonized and collaborative sharing of data to authenticate and identify individual travelers, together with potential threat levels and risk management. Efficient technology and data sharing makes it possible to access authenticated passport data 24/7 and this requires the replacement of isolated and inflexible security measures with new harmonized systems and data access to manage authenticity of passports and individuals intending to travel by air.[30]

184. An initiative with direct relevance for CAREC member countries is the ICAO global initiative for Public Key Directory (ICAO PKD). This program manages the storage repository of passports and their authenticity as part of the validation process of e-passports. Validation certificates enable state border control authorities to determine authenticity of passport and travel documents, and whether biographic and biometric information on the chip has been altered after being issued, or if the document has been revoked. The PKD initiative provides greater security and faster identity verification during the border control process.

185. The ICAO PKD is required for efficient implementation of the overall ICAO Traveler Identification Program Strategy, which requires coordination at national and international levels, and establishes appropriate mandatory and global interoperable standards and specifications for passenger travel movement records, such as advance passenger information and passenger name records for bookings made in airline reservation systems and exchanged with border control

[28] ICAO SECRETARIAT. Study on the Safety and Security Aspects of Economic Liberalization. Presented to the Council on 1 June 2005. https://www.icao.int/sustainability/Documents/SafetySecurityStudy_en.pdf.
[29] S. Lefoyer. 2017. Global Aviation Security Plan. Presented at the Ministerial AVSEC Conference, Sharm El Sheikh. 22–24 August 2017. https://www.icao.int/Meetings/AVSEC-RMC-Egypt/Documents/PPTs/session2-1.pdf.
[30] IATA. Policy: Safety and Security. http://www.iata.org/policy/consumer-pax-rights/safety-security/Pages/index.aspx.

authorities. Several CAREC member countries are members of ICAO PKD; however, others have yet to join the initiative.[31]

186. Recommendations: CAREC member countries may wish to consider participation in the GASeP forum to align with global security standards. Under GASeP, CAREC member countries would be encouraged to identify resource constraints, training needs, and capability development required to meet standards and adherence to protocols and initiatives. CAREC member countries should also be encouraged to join the ICAO PKD initiative to improve passport security and validation at border control points for overall aviation security within the CAREC region.

D. e-Cargo

187. The principal advantage of air transport for cargo is its time savings. Air transport dominates the cargo industry for both high-value goods and perishable goods. Modernizing the purchase, tracking, and receipt of air cargo shipments across national borders provides greater efficiency and security for consumers and national authorities to manage and process increasing volumes of goods and services offered by air cargo.

188. Acceptance and delivery delays due to customs and other cross-border controls weaken the business case for air cargo, and consumer confidence can be irreparably undermined. Slow air cargo processing also impacts overall economic efficiency, particularly for time-sensitive products such as perishable agricultural exports, urgent high-tech parts and spares, and essential pharmaceutical goods. In many CAREC member countries, the handling of the average air shipment may involve the processing of over 30 documents, as illustrated in the Figure 4. Airports and regions that adopt modern, paperless systems create a competitive advantage that enables the realization of lucrative air cargo hubs.

189. Global organizations such as IATA are working with airlines, freight forwarders, and government agencies to bring paperless efficiency and speed of transaction processing to the air cargo industry. In a recent report, over 50% of the global air trade relied on paper-based processes in 2016, with each shipment producing up to 30 paper documents. The air cargo shipment process by air still reliant on human intervention[32] and antiquated processes, especially when compared to other industry systems and data exchanges, such as the online retail and banking sectors, and even passenger airfare and bookings now available online from any location. As shown in Figure 4, the processing of a typical air shipment may involve producing and handling over 30 different documents, which acts to delay and impede the advantages of air cargo.

190. The volume of air cargo in 2016 for the CAREC region, including the PRC, was 22.4 billion metric-ton kilometers according to World Bank data sources.[33] Adjusting the PRC's air cargo volumes for transactions only with other CAREC member countries (an estimated 2% of total PRC airfreight), total CAREC airfreight is approximately 612,000 metric tons for 2016. With an average journey distance of 2,500 km per metric ton-kilometer to reach markets outside of the region, CAREC air cargo revenues are estimated at $1.61 billion (see Table 12).[34]

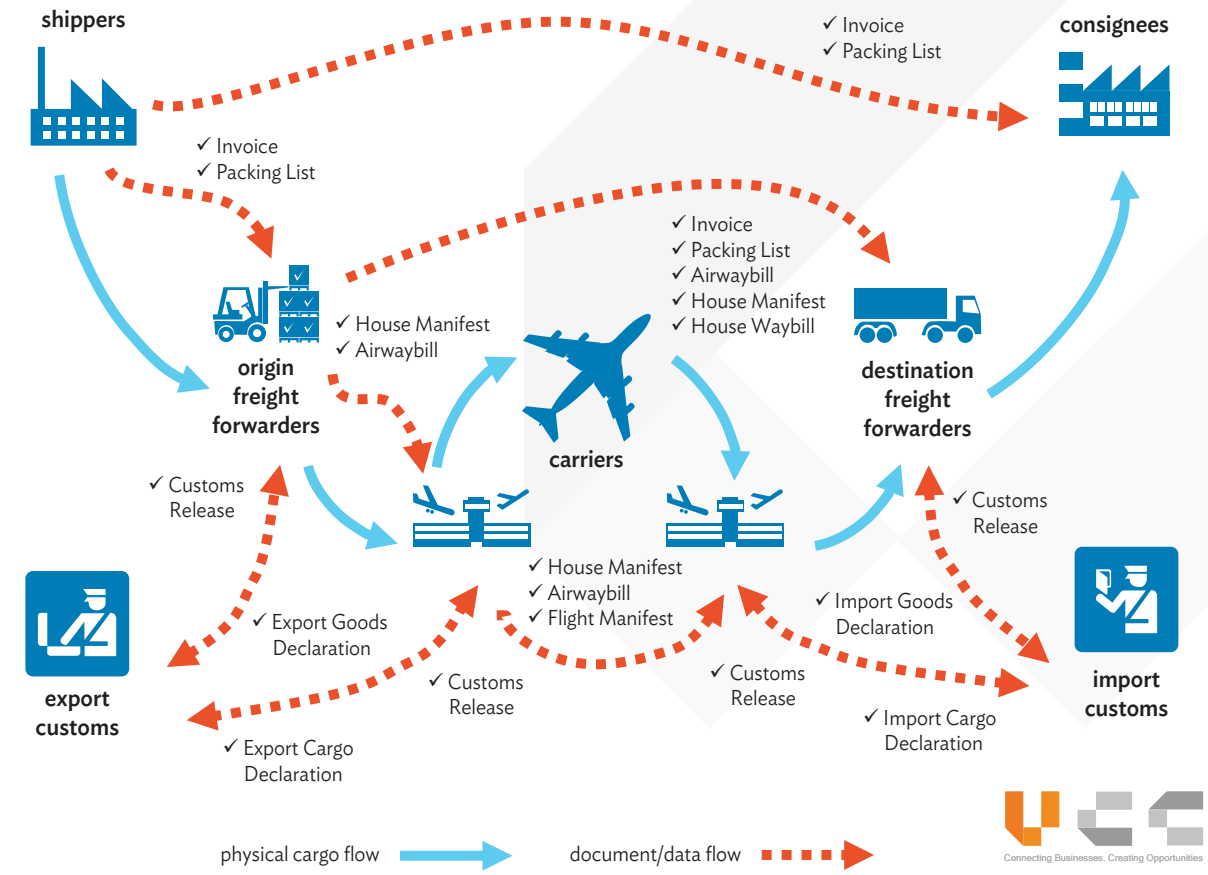
[31] OSCE. 2016. International Civil Aviation Organization Public Key Directory (ICAO PKD) in the OSCE Region. 14 October. http://www.osce.org/secretariat/; and ICAO ePassport issuing States Participants in Public Key Directory (PKD): A Story Map. http://gis.icao.int/epassport/.

[32] D. Sauv. IATA. e-AWB: Implementation Playbook. February 2018. http://www.iata.org/whatwedo/cargo/e/eawb/Documents/e-awb-implementation-playbook.pdf.

[33] World Bank Open Data. https://data.worldbank.org/ (accessed September 2017).

[34] C. Livingston. 2017. *Drewry East–West Airfreight Price Index through July*. Air Cargo World. 23 August. http://aircargoworld.com/allposts/drewry-east-west-price-index-continues-climb-through-july/.

Figure 4: Processing Flowchart of a Typical Air Shipment



Source: vCargo Cloud Pte Ltd. Presented at the CAREC Aviation Workshop. Singapore. 6–7 April 2017.

191. IATA is working with airline and freight forwarders to move to electronic airwaybills (e-AWBs) to speed throughput of air cargo at transit points and for arrival and departure processing by border agencies. To implement use of the e-AWB as a contract of carriage between the "shipper" and the "carrier" requires government authorities to recognize and accept e-AWBs for carriage on feasible trade lanes.

192. Feasible trade lanes are when country of origin and country of destination ratify the same ICAO treaty: either the Montreal Protocol No. 4 of 1975 (MP4) or Montreal Convention of 1999 (MC99). Six of the 11 CAREC member countries are signatories of MC99 (Azerbaijan, Georgia, Kazakhstan, Mongolia, Pakistan, and the PRC),[35] with two of 11 CAREC member countries in MP4 (Azerbaijan and Uzbekistan[36]).

[35] ICAO. 1999. Convention for the Unification of Certain Rules for International Carriage by Air. Montreal. 28 May. https://www.icao.int/secretariat/legal/List%20of%20Parties/Mtl99_EN.pdf.

[36] ICAO. 1975. Protocol No. 4 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air. Signed at Warsaw on 12 October 1929, as amended by the protocol done at The Hague on 28 September 1955. Montreal, 25 September. https://www.icao.int/secretariat/legal/List%20of%20Parties/MP4_EN.pdf.

Table 12: Air Cargo Volumes and Value for CAREC

Country Name	Country Code	Airfreight Volume for 2016 (million metric-ton km)	Estimated Metric-Tons	Rate per Metric-Ton ($)	Air Cargo Market Value ($)
		Average air travel distance: 2,500 km		Average airfreight cost: $2.64/kg	
Afghanistan	AFG	29.0	11,604	2,640	30,635,490
Azerbaijan	AZE	732.8	293,116	2,640	773,825,981
Georgia	GEO	0.2	72	2,640	190,616
Kazakhstan	KAZ	38.9	15,558	2,640	41,072,550
Kyrgyz Republic	KGZ	0.1	35	2,640	93,290
Mongolia	MNG	8.1	3,228	2,640	8,522,146
Pakistan	PAK	175.5	70,190	2,640	185,300,966
People's Republic of China	CHN	21,304.6	8,521,834	2,640	22,497,641,866
Turkmenistan	TKM	6.0	2,381	2,640	6,286,942
Tajikistan	TJK	1.5	618	2,640	1,630,243
Uzbekistan	UZB	112.3	44,913	2,640	118,569,507
Total		22,379.9	8,951,945		23,633,134,108
A. Total excluding the PRC			**430,111**		**1,135,492,242**
B. PRC only to and from CAREC			**170,437**	**2%**	**449,952,837**
Estimated CAREC volume and revenue			**600,547**		**1,585,445,080**

CAREC = Central Asia Regional Economic Cooperation, kg = kilogram, km = kilometer.

Sources: Drewry East–West Airfreight Price Index. July 2017. http://aircargoworld.com/allposts/drewry-east-west-price-index-continues-climb-through-july/; and World Development Indicators (accessed 8 February 2017).

193. CAREC is ideally positioned to act as a transit hub and freight forwarding intermodal logistics center for East–West and North–South air cargo. Air routes from North America to Asia and Europe to Asia and Australasia mean that CAREC is positioned for road or rail transfer of locally produced goods such as perishable foodstuffs and agricultural produce (e.g., cut flowers, fresh fruit) to airfreight services across the globe. The World Bank identifies increasing airfreight growth from integrated multimodal supply chains that balance cost and time priorities for cargo shipments.[37]

194. CAREC has an opportunity to create a "center of excellence" for urgent, high-value air cargo shipments if the necessary infrastructure is established for both physical warehousing and airport transfer facilities. However, to make such a center of excellence function, it is necessary to realize streamlined electronic processing of airwaybills for customs processing and efficient quarantine declarations.

195. IATA describes the benefits of the e-AWB technology and processing methods as:

(i) elimination of the slow manual process for completing and filing paper airwaybills;

[37] World Bank. 2009. *Air Freight: A Market Study with Implications for Landlocked Countries*. http://www.worldbank.org/en/topic/transport/publication/air-freight-study.

(ii) visibility of shipment contents and journey time for border management authorities through advanced electronic information systems;
(iii) real-time access to airwaybill data for all authorized staff at each location on the journey;
(iv) reduction in processing costs by removal of paper airwaybill;
(v) improvement in visibility and accuracy of airwaybill data for shipments; and
(vi) reduction in handling delay occurrences for air cargo due to missing or illegible paper airwaybills.

196. The PRC is one of the principal countries to implement the e-AWB, with IATA reporting 52% penetration as of July 2017. Major airlines such as Air France/KLM Group, Cathay Pacific Group, Emirates, Lufthansa Cargo, Qatar Airways, and SIA Cargo report between 38%–81% penetration of e-AWBs on their overall route network. Flydubai reported 100% e-AWB penetration as of July 2016.[38]

197. **Recommendations:** For all CAREC member countries to jointly move toward paperless e-cargo systems, the following actions are suggested:[39]

(i) implementation of electronic processing systems, such as e-AWBs and e-Freight;
(ii) creation of policy toward "single window" processing;
(iii) coordination of border agency procedures to reduce duplicative controls;
(iv) implementation of risk management controls in conjunction with e-cargo systems to combat illicit activities and facilitate compliant traders; and
(v) activation and implementation of processes to approve release of shipments in advance of their actual arrival.

E. Facilitation

198. Facilitation refers to key arrival and departure processes that enhance airport efficiency and ultimately affect passenger and freight-hauler satisfaction. CAREC member countries have an opportunity to stimulate growth in tourism—and, hence, air travel—by easing visa requirements and making it easier for visitors to enter and exit international airports.

199. Regional tourism is a particularly promising segment and goes together with improved connectivity within CAREC. Most tourists visiting CAREC member countries are from outside the region. CAREC member countries would be able to attract more visitors from other CAREC member countries if air connectivity improved, taxes were reduced, and visa requirements were eased. CAREC member countries would also benefit if more outside visitors traveled around the region, stopping in multiple CAREC member countries.

200. Several CAREC member countries have eased visa requirements in recent years. However, CAREC member countries often exclude citizens of other CAREC member countries from their new or expanded visa-free lists.

201. Kazakhstan began a pilot program in 2014 offering visa-free entry for citizens of 10 countries. The initial list included six CAREC member countries, but as the program was extended, initially in 2015 and again at the beginning of 2017, none of the other CAREC member countries were added.

[38] IATA. e-AWB International Monthly Report. July 2017. http://www.iata.org/whatwedo/cargo/e/eawb/Documents/e-awb-monthly-report-r17.pdf.
[39] IATA. 2016. Value of Air Cargo: Air Transport and Global Value Chains. Final Report. 6 December. https://www.iata.org/publications/economic-briefings/value-of-air-cargo-2016-report.pdf.

Kazakhstan now offers visa-free entry for over 50 countries, but four CAREC member countries are still excluded.

202. The Kyrgyz Republic similarly offers visa-free entry to citizens of more than 50 countries, but only five of the other CAREC member countries are included in the scheme.

203. Georgia offers visa-free entry to citizens of nearly 100 countries. However, only five of the 10 other CAREC member countries are currently included in the scheme (with a sixth, the PRC, in the process of being added). For citizens from countries not on the visa-free list, an e-visa is available for $20. Georgia successfully stimulated tourism growth, leading to the fastest traffic growth in air traffic among CAREC member countries (see the case study on Georgia in Appendix 1).

204. Azerbaijan significantly liberalized its visa policy at the beginning of 2017, introducing an e-visa system for nearly 100 nationalities. The e-visa costs only $23 (including a $3 service fee). Azerbaijan offers visa-free access to citizens of five CAREC member countries, while another four CAREC member countries are eligible for e-visas. Only four non-CAREC member countries enjoy visa-free access to Azerbaijan.

205. Tajikistan has a similar visa policy, offering visa-free access to citizens of nine countries (all from the former Soviet Union), including four CAREC member countries and an e-visa for five of the other six CAREC member countries. Tajikistan implemented its e-visa program in 2016. The e-visa costs $50 and is issued within 2 working days.

206. The other six CAREC member countries generally have somewhat more restrictive visa policies. Mongolia has visa-free access to citizens of about 20 countries, but only two CAREC member countries. It does not offer an e-visa program.

207. Uzbekistan has visa-free access to citizens of nine countries, including four CAREC member countries. Uzbekistan was planning to extend visa-free access to another 27 countries in April 2017. However, implementation of the extended visa-free list was delayed until the beginning of 2021 and no CAREC member countries are included in the list.

208. Turkmenistan has a stricter visa policy and it is necessary for citizens of all countries to obtain visas. The only exception is citizens of neighboring Iran, Kazakhstan, and Uzbekistan can enter visa-free if they live in areas bordering Turkmenistan. There is no e-visa program in Turkmenistan and tourist visa holders must be accompanied by a guide.

209. Afghanistan requires citizens of all countries to obtain visas, both within and outside CAREC. Pakistan and the PRC offer visa-free entry for citizens of a limited number of countries, none of which are CAREC member countries. On average, each CAREC member country currently only permits citizens from three CAREC member countries to enter without a visa.

210. Visa restrictions and costs are a major barrier to air travel growth between CAREC member countries. Tourism and international trade benefit when visa restrictions are waived or eased with modern, electronic e-visa services. Actions by governments and industry stakeholders to reduce barriers to entry make it easier to persuade airlines to open new routes and invest in new air services. E-visa programs and lower barrier to entry for business travelers and tourists have been successfully implemented in some CAREC member countries and provide a model for other CAREC member countries.

211. The opening of air traffic rights between CAREC member countries will not have much meaning unless there is more freedom of movement. ASEAN countries agreed in 2006 to adopt a uniform visa exemption policy in deciding to pursue limited

Table 13: Offering Visa-Free Travel between CAREC Member Countries

Country	Number of Visa-Free CAREC Member Countries (as of September 2017)
Kazakhstan	6
Azerbaijan	5
Georgia	5
Kyrgyz Republic	5
Tajikistan	4
Uzbekistan	4
Turkmenistan	2 (limited to select provinces)
Mongolia	2
Afghanistan	0
People's Republic of China	0
Pakistan	0

CAREC = Central Asia Regional Economic Cooperation.

Source: Asian Development Bank.

open skies. Visitor numbers between ASEAN countries have surged. Appendix 3 provides a case study on the market opening between Malaysia and Singapore.

212. ASEAN airports also offer a special line at immigration for ASEAN passport holders. CAREC member countries should consider offering a separate CAREC line at immigration. Expedited clearance at immigration and customs for citizens of CAREC member countries would minimize the inconvenience of air travel within the region, further increasing the attractiveness of CAREC destinations.

213. A reduction in customs and immigration processing time at CAREC airports would also make travel within the region more appealing. Queues of over an hour are common due to a lack of resources. Some of the CAREC member countries surveyed by ADB for this report acknowledged average processing times for arriving passengers of more than 40 minutes for customs and immigration (see the survey results in Appendix 4). Lifting visa restrictions and other liberalization initiatives would lead to a surge in passenger traffic, potentially exacerbating the problem of long queues at customs and immigration. CAREC member countries need to invest in resources, including more customs and immigration officers, to ensure their international airports are capable of processing more international arriving passengers from both within and outside the region. Investing in new technologies such as automated passport control kiosks should also be considered.

214. **Recommendations:** CAREC should consider introducing a uniform visa-free policy to facilitate travel between member countries. CAREC member countries should work to reduce processing time at immigration and customs, particularly for visitors from other CAREC member countries.

CHAPTER 6

Enabling Factors

215. This Scoping Study's recommendations and suggestions represent a broad transformation of the CAREC aviation market. Accomplishing this vision will require support and coordination from a range of stakeholders involved, including those regulating the industry, those providing the air services, and those consuming its products. This section reviews the enabling factors that will support a more efficient vision for CAREC aviation:

(i) stakeholders and partnerships,
(ii) institutional structures,
(iii) training and capacity development,
(iv) gender diversity through aviation, and
(v) financing and funding (including PPP structures).

A. Stakeholders and Partnerships

216. CAREC aviation conditions are unique, as the regulatory, technical, climatic, and political landscapes of the region provide their own contexts. Nevertheless, the experiences of other countries, regions, and stakeholders can be instructive even with the varying base conditions. The CAREC program can thus facilitate knowledge exchanges that will enable member countries to make informed decisions about the future direction of national and regional aviation.

217. This Scoping Study benefited significantly from cooperation with ICAO, which is a United Nations specialized agency established by states in 1944 to manage the administration and governance of the Convention on International Civil Aviation (Chicago Convention). ICAO works with its 191-member states and industry groups to reach consensus on international civil aviation standards and recommended practices. ICAO also produces databases, publications, and knowledge events that can be useful to CAREC member countries in modernizing their aviation systems. ICAO's global perspective and local outreach makes it a useful partner for the CAREC program.

218. This study also benefited from knowledge and programs provided by IATA. In particular, IATA's work on e-cargo systems and air safety are especially relevant to CAREC member countries, and participation in IATA-sponsored programs and training events are recommended. IATA also publishes relevant knowledge products on these topics.

219. Likewise, officials from CAREC member countries will benefit from additional interactions with other prominent international organizations, such as the Airports Council International (ACI) and CANSO. Establishing knowledge networks through attendance at international forums can benefit CAREC aviation decision makers. Such participation will likely help bring CAREC member countries closer to international standards and practices.

220. Regional aviation groupings often possess the most relevant insights on local conditions. Since CAREC member countries are situated at the nexus of Asia, Europe, and the Middle East, understanding these markets can provide a strategic advantage. Associations based in these regions include the Asia Pacific Airlines, Airlines for Europe, and Arab Air Carriers' Organization.

221. Perhaps the most important stakeholders are the actual users of aviation services.

Figure 5: International Civil Aviation Organization's Regional Presence

Source: International Civil Aviation Organization.

Air transport would not exist without the demand generated by domestic and international passengers as well as businesses using air cargo services. Interaction with the flying public through user satisfaction surveys and other forms of feedback can help identify areas requiring further attention by national authorities.

B. Institutional Structures

222. Institutional structures for regulating, administrating, and operating airports and air services vary between countries and regions. Typically, direct regulatory and management control falls to a Civil Aviation Authority with guidance from the national Ministry of Transport. For investment decisions, national budgetary planning and coordination with the national Ministry of Finance is typically required.

223. In many cases, CAREC country development and administration of aviation is hampered by a lack of human resources within the relevant aviation entities. With only a handful of staff, many roles cannot be adequately filled. Moreover, the lack of expertise and required skill sets in many positions means that support with training and capacity development is a real need.

224. The extent that private sector operators participate in the structure also varies. To date, CAREC member countries tend toward an institutional and business model with a primary role of government control and government restrictions. However, this type of structure inhibits the full potential of a country's aviation market. Outsourcing certain activities to private sector actors can free up government decision makers to focus on the core elements of strategy and quality control. Partnerships with the private sector will improve cost efficiency, bring together necessary skill sets and expertise, and raise professional standards that will ultimately benefit both governments and passengers.

C. Training and Capacity Development

225. Across the various subsectors of transport, CAREC has played a role in the provision of training for improved capacity development. Aviation officials in CAREC member countries could likewise benefit from an investment in training support.

226. CAREC member countries particularly highlighted training needs in the survey completed for this Scoping Study. CAREC member countries identified the following priority areas for training and capacity development:

(i) regulatory and policy enhancement, including open sky agreements;
(ii) management skills for civil aviation authorities;
(iii) airport management;
(iv) air traffic control systems;
(v) maintenance and ground services; and
(vi) commercial aviation expertise.

227. The international financing partners under the CAREC program should consider possible support of CAREC aviation training. A range of organizations are already in place to prepare and deliver such training. Tertiary and academic institutions providing such support include: Cranfield University, United Kingdom; Massey University Aviation School, New Zealand; Embry-Riddle Aeronautical University, United States; Singapore Aviation Academy (offering programs in association with Civil Aviation Authority of Singapore as well as Cranfield University and Embry-Riddle Aeronautical University), Singapore; University of New South Wales School of Aviation, Australia; and Purdue University School of Aviation and Transportation Technology, United States.

Training and capacity development. CAREC country aviation representatives benefited from a visit to the training center at the Singapore Aviation Academy in April 2017 (photo by the CAREC Secretariat).

228. CAREC has also been effective in generating knowledge products as defined by the member countries' needs. To date, knowledge guidance documents have been produced on topics such as road asset management and road safety. Based on CAREC aviation officials' requests, knowledge products could be quite useful for the following aviation topics: (i) market liberalization, (ii) efficient facilitation processes (customs and immigration), and (iii) e-cargo systems.

D. Gender Diversity through Aviation

229. Aviation is a key employer of women in skilled and higher-than-average paid work. Predominantly employed in the airline sector, women have highly sought airline jobs as a career choice. The aviation sector typically pays higher than other paid work,[40] as well as provides social mobility through skilled employment and opportunities to experience international travel and associated learning opportunities outside of the primary country of residence.

230. An increasing number of airlines around the world are methodically and deliberately leading the balance of gender across their own workforce and influencing other areas of aviation to shift to greater equality. Several examples include:

(i) EasyJet, United Kingdom. EasyJet has developed a framework to enable the company to achieve greater gender equality at work, especially for recruitment, promotion, wages and salaries, and staff retention. As of 2015, approximately 30% of the Board of EasyJet were women, including the chief executive. The executive team is 50% women, with 23.1% being in senior management and 33.4% being in middle management. The workforce, as of 31 October 2015, was 45.4% female.[41]

(ii) Emirates Airline, UAE. Emirates has an ethnically and gender diversified workforce with women comprising almost 44% of its workforce of more than 29,000 employees. Approximately 18,000 employees work as flight attendants. Women make up almost 2.5% of the management roles, and this figure is growing. Emirates also has a progressive program to hiring more women as pilots, with the current female pilots ranging in age from 20 to 59 years old and originating from 24 different countries.[42]

231. Aviation is a key enabler for skilled employment of women, and also a key enabler for poverty reduction among disadvantaged and remote communities through (i) improved connectivity, (ii) options for employment in skilled and well-paid work, and (iii) improved access to markets for products and services.

E. Financing and Funding

232. This Scoping Study identified both soft (e.g., policy reform and market liberalization) and hard (e.g., airport development and upgrades) investments that can transform aviation in CAREC.

[40] EasyJet PLC Airline Company. Equality and Diversity. http://corporate.easyjet.com/corporate-responsibility/our-people/equality-and-diversity.

[41] I. Oxborrow. 2017. *Youngest Emirati female pilot flies A380 as Emirates turns attention to women – video.* The National (Business). 6 March. https://www.thenational.ae/business/youngest-emirati-female-pilot-flies-a380-as-emirates-turns-attention-to-women-video-1.20645.

[42] ATAG. Aviation Benefits Beyond Borders: Powering Global Economic Growth, Employment, Trade Links, Tourism and Support For Sustainable Development through Air Transport. July 2016. https://aviationbenefits.org/media/149668/abbb2016_full_a4_web.pdf.

For each of these investment needs, tailored financing and funding solutions can help CAREC member countries move forward on a progressive aviation agenda. CAREC member countries should fully explore the financial tools available for aviation investments.

Public–Private Partnerships

233. Both public and private financing sources are relevant to aviation. Private investment through PPP structures are used in air transport, especially where there is sufficient passenger or cargo demand to underpin return on investment. As noted earlier, private sector actors can provide airport services in airport management, catering, baggage handling and other ground services, and retail shops. In exchange for a concession for such services (and the related income), the private firm could provide up-front investment into airport infrastructure and equipment.

Airport groups such as Dublin Airports Authority, Changi Airport Service, and Flughafen München GmbH (Munich Airport Group) have all provided management services to airports outside their home countries. Flughafen München GmbH supported the implementation of the new terminal 2 at the Ashgabat International Airport.

234. The new terminal 2 at the Turkmenistan's Ashgabat International Airport benefited from a partnership with Flughafen München GmbH (photo courtesy of Polimeks).

235. PPP structures work best when certain key conditions are realized:

(i) sufficient passenger and cargo demand to allow return on investment;
(ii) open, transparent, and competitive tendering processes;
(iii) all risks identified at the outset and clearly defined for each entity;

Public–private partnerships. The new terminal 2 at the Turkmenistan's Ashgabat International Airport benefited from a partnership with Flughafen München GmbH (photo by Polimeks).

(iv) extensive financial analysis performed to ensure viability;
(v) contract includes provisions and incentives for performance-based outcomes; and
(vi) capacity of contracting government agency to oversee and monitor performance.

236. PPP structures without these characteristics may produce unsatisfactory outcomes, either by failing to attract competent bidding firms or in the quality of the services provided. PPP structures are not a panacea for quality planning, especially if the underlying business conditions do not support the right incentives and outcomes.

237. Aircraft fleet procurement is a particular area where private investment is appropriate and often preferred. For privately held airlines, business conditions for a particular route can enable fleet procurement decisions. Access to commercial lending will vary depending on the local financial environment and the relative strength of the business case. Many development banks also possess a private sector lending option, which may be relevant if the investment is producing positive developmental outcomes, such as providing services to a previously disadvantaged region. As noted previously, both aircraft leasing and aircraft ownership are options. While leasing tends to improve affordability, the trade-off may be the quality and age of the aircraft.

238. Nationally owned airlines are often constrained in its financing resources for fleet procurement. Through the CAREC aviation survey conducted for this Scoping Study, the most requested funding requirement was for financing fleets. Given the various developmental needs of most CAREC member countries, investment in aviation is a difficult decision when compared to pressing needs in other areas, such as education, health care, and other infrastructure needs. In this context, aviation investment is often secondary. For nationally owned airlines with commercially viable routes, access to loans and the use of leasing structures can be a solution to fleet renovation and growth.

▲ **Sovereign public investments.** ADB is providing financing support to assist Papua New Guinea become a regional aviation hub (photo by Eric Sales, ADB).

▲ **Sovereign public investments.** The ADB-financed sustainable transport project in Vientiane, Lao People's Democratic Republic was successful in attracting grants from two international sources. The project includes a bus rapid transit system connecting the city's historical core to the airport (rendering by ADB).

Sovereign Public Investments

239. In many instances, conditions may require partial or complete sovereign investment from national, provincial, or local governments. Public investment may be particularly relevant in the case of secondary cities or isolated portions of a country, where air transport investment can be a key to local economic development, especially for tourism. ADB has provided investment to smaller market airports in countries such as Bhutan, Nepal, and Papua New Guinea. Such investment can be quite important for providing connectivity for isolated communities and, thus, delivering benefits such as emergency services, delivery of critical goods, and economic development.

240. For CAREC cities, current demand in most instances may be insufficient to realize adequate rates of return for purely private entities. However, as these aviation markets open, investment from the private sector may become increasingly viable.

241. Financing sources for public investments include both domestic and international options. National, provincial, and local public funding are all possible with the infrastructure and equipment components of airports, especially when public interest presents a compelling case. Lending from international financing institutions (IFIs) can be a cost-effective option, especially in mitigating the risks associated with large-scale investments such as airports. IFIs bring not only concessional loans and grants, but often knowledge in the form of technical assistance and specific expertise.

Among the relevant IFIs for the CAREC region are ADB, European Bank for Reconstruction and Development, European Investment Bank, and World Bank, among others.

242. To encourage investments toward more sustainable options, both national and international organizations offer grant funding. Grants are typically tied to introducing measures considered innovative and environmentally sound. The reduction of GHG emissions is a principal objective behind grant resources offered through the Global Environment Facility and Green Climate Fund. These funds particularly look for innovative project components that lead to GHG reductions with the potential for replication. Potential project types relevant to aviation that could be successful in accessing grant funding include

(i) public transport systems providing connectivity to airports;
(ii) accessibility improvements, such as pedestrian and cycling infrastructure (targeting either airport employees or connecting transit services);
(iii) energy-efficient building technologies;
(iv) renewable energy technologies at airports; and
(v) alternative fuel technologies.

243. The ADB-financed Vientiane Sustainable Urban Transport Project in Vientiane, Lao People's Democratic Republic, receives grants from both the GEF and the EU Asian Investment Facility. The Vientiane project features a BRT line that connects the city's international and domestic airport to the city center.

244. Smaller-sized grant opportunities often support feasibility studies and small-scale demonstrations. Among the funds that provide this type of support are:

(i) Cities Development Initiative for Asia,
(ii) Japan Fund for Poverty Reduction,
(iii) ADB Urban Resilience Trust Fund,
(iv) EU Asian Investment Facility, and
(v) EU Mobilize Your City.

While grant sources are often small in nature relative to total investment size, the contribution is often catalytic both to making a project happen and to introducing innovative features.

CHAPTER 7

Findings and Conclusions

245. This Scoping Study has identified recommendations and findings for the aviation sector which can significantly benefit CAREC member countries and the region as a whole. A safe, reliable, and efficient aviation sector can be a pivotal component in driving economic growth. A more open CAREC aviation market will reduce transport costs and travel times, leading to direct benefits to governments, the private sector, and consumers.

246. A phased approach to opening the CAREC aviation market is a principal recommendation of this study. Such gradual market liberalization will attract investment in infrastructure and opportunities for aviation service providers such as airlines, ground handlers, catering, maintenance, and cargo operations while at the same time not disrupt the existing market.

247. The phased transition toward a more open aviation sector model for the region should initially focus on opportunities within the CAREC region and regulatory harmonization:

(i) CAREC member countries begin to offer Fifth Freedom rights for CAREC airlines operating within the CAREC region.
(ii) CAREC member countries encourage and support cross-investment for airlines in the region and the establishment of airline groups with airline subsidiaries based in multiple CAREC member countries.
(iii) CAREC member countries work toward greater regulatory harmonization (pilot licensing, engineer licensing, aircraft registration, etc.).

248. CAREC should also facilitate investment in critical missing infrastructure links in the aviation sector, including airport facilities and equipment at both international hubs as well as secondary cities. Such investments will benefit from the early engagement of potential financing partners as well as the encouragement of private sector involvement through PPPs.

249. Another key recommendation is the adoption of a uniform visa-free policy and more efficient facilitation processes to make travel within the region more seamless. Member countries are encouraged to reduce and standardize taxes and charges on international flights between CAREC member countries to stimulate growth in air travel within the region.

250. From the survey conducted of CAREC member countries for this study, the consistent message supported

(i) infrastructure and equipment development to support economic growth and asset utilization including runways, terminals, and air navigation;
(ii) airline investment to modernize fleets, develop route networks, and professionalize management capacity; and
(iii) capability building and training on topics of regulatory and policy enhancement, aviation management skills, air traffic control, maintenance and ground services, and commercial aviation expertise (for both airlines and airports).

251. To enable further growth and investment in the region and individual countries, independent assessment of development opportunities will assist in attracting investment. Feasibility assessments are a crucial and essential first step to evaluating the needs and size of various opportunities that this study has identified. Preparing a list of feasible and bankable investments benefits both the country concerned and provides a level of assurance to external parties that qualified potential exists to attract a further level of activity and participation.

252. International financing and development partners can assist CAREC member countries by coordinating the provision of

(i) knowledge products on key topics such as market liberalization, efficient facilitation processes (customs and immigration), and e-cargo systems;
(ii) support to build capability and access training; and
(iii) feasibility studies to analyze opportunities for
- infrastructure and equipment investment and
- new aircraft investments and existing fleet efficiency and utilization.

253. With assistance from international financing and development partners, CAREC member countries can gain access to world-class tertiary institutions and aviation industry bodies and consultancies. Examples of such industry stakeholders and supporting organizations may include

(i) civil aviation authorities, such as Civil Aviation Authority (CAA) of Singapore, CAA UK, Australia's Civil Aviation Safety Authority, US Federal Aviation Administration, and Transport Canada;
(ii) world aviation organizations, such as ICAO, IATA, CANSO, and ACI;
(iii) regional aviation organizations, such as AAPA, AACO, and A4E;
(iv) tertiary and academic institution support, such as Cranfield University, Massey University Aviation School, Embry-Riddle Aeronautical University, Singapore Aviation Academy, University of New South Wales School of Aviation, Purdue University School of Aviation and Transportation Technology; and
(v) specialist aviation consultancies and feasibility experts, such as Eagle Aviation Consulting, CAPA, IATA Aviation Consulting Services, and ICAO Assessment and Consultancy, that can develop strategy, policy, performance improvement, and market development for airlines and airports.

254. To proceed further and capitalize on the recommended next steps from this report, a number of immediate actions would include

(i) coordinated field visits to CAREC member countries to provide an overview of this report and key findings with direct relevance for individual member states and the region—these sessions are intended to update and inform aviation industry stakeholders, providing a dialogue to assess future requirements and a platform for knowledge;
(ii) assessment of e-cargo constraints and initiatives that could simplify the air cargo process and maximize benefits for air cargo hub creation in the region;
(iii) feasibility studies on infrastructure development needs, especially for secondary cities;
(iv) feasibility studies on aircraft fleet upgrades and purchase requirements to meet growth potential at a national and regional level (where collaboration is possible);

(v) assessment of airport commercialization opportunities and concession potential to lift performance and sustainability through the growth and mix of aeronautical and commercial revenues;
(vi) identifying specific training needs, following on from the requests made in the CAREC survey, and provide training and capability development; and
(vii) guidance documents on phased market transition, e-cargo systems, and efficient facilitation processes.

255. The CAREC region is well-placed to oversee significant aviation market growth together with infrastructure development and the realization of air service agreements. A safe, reliable, and efficient aviation sector will catalyze economic growth and maximize development. This study concludes that the CAREC program can play a substantial role realizing an open and competitive vision for quality and profitable aviation services in the Central and West Asia region.

Georgia Case Study

A Strategic Market Opening for Economic Development

Georgia has been the fastest-growing aviation market among Central Asia Regional Economic Cooperation (CAREC) member countries, highlighting the benefits of its recent liberalization.

Passenger traffic in Georgia more than tripled over the last 6 years, from just 920,000 in 2010 to 2.84 million in 2016. Traffic has grown by at least 10% every year, but the rate of growth has accelerated significantly the last 2 years. Passenger traffic in Georgia was up 26% in 2016 and by a staggering 48% the first 8 months of 2017 (to 2.7 million).

Among the main CAREC cities, Tbilisi has been the fastest growing. Tbilisi International Airport traffic was up 22% in 2016 to 2.3 million and by 43% in the first 8 months of 2017 to 2.1 million. Virtually all traffic in Georgia is international as it has limited domestic services.

Georgia's other two international airports, at Batumi and Kutaisi, have grown even faster but are relatively small. Batumi grew by 38% in 2016 to 312,000 and by 56% to 342,000 in the first 8 months of 2017. Kutaisi grew by 48% in 2016 to 271,000 and by 83% to 283,000 in the first 8 months of 2017.

Benefits of open aviation markets. Georgia has recently been the fastest-growing aviation market among CAREC member countries (photo by Lloyd Wright, ADB).

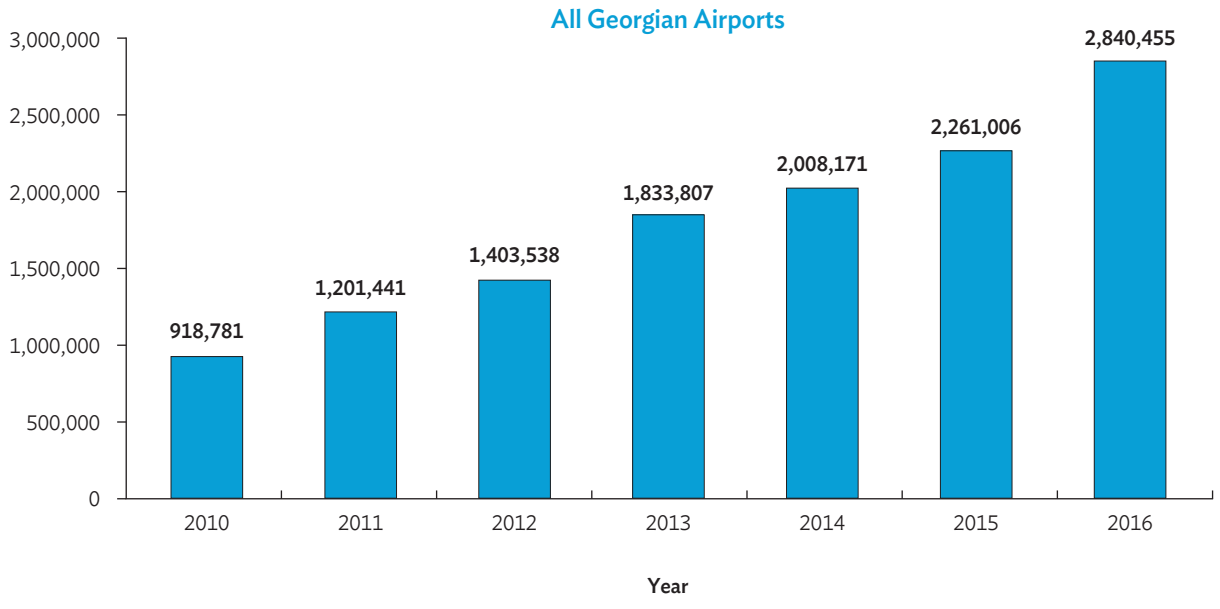
Georgia positioned Kutaisi as a low-cost airport—the first of its kind in the region. Kutaisi grew rapidly since the opening of a base by the European low-cost carrier (LCC) group, Wizz, in 2016. Wizz now has more than 10 routes from Kutaisi. LCCs account for more than 20% of traffic in Georgia, an unusually high figure among CAREC member countries.

The rapid growth in Georgia over the last several years was driven by a liberal aviation policy initially adopted in 2005 that essentially provided an unlimited number of third and fourth freedom rights to foreign airlines, as well as some fifth freedom rights. The number of foreign airlines serving Georgia has consistently increased and the country is now served by nearly 50 foreign airlines, including six LCCs. Georgia is served by more foreign airlines than any CAREC member country, except the People's Republic of China (PRC)—an impressive achievement given that Georgia has the second-smallest population (after Mongolia) among the 11 CAREC member countries.

A liberal visa policy enabled Georgia's inbound market to grow rapidly and attract new services from a multitude of foreign airlines. Visitor arrivals by air were up 40% in 2016 to 1.07 million, according to Georgia Tourism Administration data. Visitor growth by air accelerated further in 2017. For both July and August 2017 (the peak summer months), visitor arrivals by air were up 47%.

Georgia's outbound market is also growing, boosted by the implementation in 2017 of a new European Union (EU) policy waiving visa requirements for Georgia citizens. However, Georgia is a much larger inbound market with overseas visitors accounting for three-quarters of all passenger traffic.

Figure A1: Growth in Georgia's Annual Aviation Passenger Traffic from 2010 to 2016



Source: Georgia Civil Aviation Authority. Number of Passengers Served. http://gcaa.ge/eng/regular.php.

Tourism has become a critical part of Georgia's economy, accounting for over 7% of gross domestic product (GDP). This could not have been achieved without liberal aviation and visa policies. Georgia now provides visa-free access to citizens of approximately 100 countries, including half of the CAREC member countries. An e-visa system was implemented for other countries, providing a simple and inexpensive option with visas granted within 5 days for only $20.

The rapid growth of tourism and aviation in Georgia is a testament to its relatively open policy approach. However, virtually all the growth so far has been generated by markets outside CAREC. Most visitors entering Georgia by air are from Europe. Currently, only 45 scheduled weekly flights are from Georgia to other CAREC member countries, including 21 to Azerbaijan, 21 to Kazakhstan, and three to the PRC. Routes linking Georgia and other CAREC member countries account for only 7% of Georgia's total passenger traffic, and a large portion of this traffic is originating or heading to destinations outside CAREC.

Georgian Airways, which has only a 10% share of traffic in its home market, does not have any scheduled services to other CAREC member countries. Georgian Airways is fully privately owned and does not benefit from any protective policies. The growth Georgia achieved by opening its market to foreign airlines highlights how a small country can prosper from not having to protect local airlines.

Only four airlines from other CAREC member countries operate scheduled passenger services to Georgia: Air Astana, Azerbaijan Airways (AZAL), China Southern, and SCAT. AZAL serves Tbilisi from Baku (using its low-cost brand, Buta Airways), China Southern serves Tbilisi from Urumqi, Air Astana serves Tbilisi from Almaty, and Astana and SCAT serve Aktau in western Kazakhstan from all three of Georgia's international airports (Tbilisi, Batumi, and Kutaisi). Qatar Airways also operates between Tbilisi and Baku with fifth freedom traffic rights.

There is a huge opportunity for traffic growth between Georgia and other CAREC member countries. With the right policies, visitors from

Toward an open market policy. Georgian Airways is a privately-held airline providing a limited number of domestic and international flights (photo by Lloyd Wright, ADB).

CAREC member countries now enduring long travel times to Georgia via land borders can become air passengers and new traffic can be stimulated.

The Georgia–Azerbaijan market grew rapidly over the last several years, benefiting from the open skies status. Traffic initially surged after Qatar Airways began serving the Tbilisi–Baku market in early 2012. In recent months, AZAL has grown in the Tbilisi–Baku market, using its new low-cost brand, Buta Airways, to reduce fares and stimulate demand. Return fares between Tbilisi and Baku now start at only $100 and are the lowest among any international route within CAREC. Taxes are also lower than any international route within CAREC, at only slightly more than $20.

There are opportunities for further growth in the Tbilisi–Baku market, as well as new routes connecting other cities in Georgia and Azerbaijan. There are more than 1.5 million annual Azerbaijani visitor numbers to Georgia and more than 500,000 annual Georgian visitors to Azerbaijan, but nearly all these visitors continue to cross by land. The road journey from Tbilisi to Baku is nearly 600 km and takes over six hours. More flights by low-cost operators would attract traffic that now must travel for long hours.

Of the nine CAREC member countries that do not share borders with Georgia, less than 10,000 visitors in 2016 were from seven. The two exceptions, Kazakhstan and the PRC, are the only CAREC member countries with air links to Georgia along with neighboring Azerbaijan.

There were approximately 50,000 Kazakh visitors to Georgia in 2016 and less than 15,000 PRC visitors. Both markets are growing rapidly and could support more services, particularly if fares can be reduced (a likely outcome if competition increases). Return fares from Georgia to Kazakhstan currently start at over $300 despite the short flight length.

Georgia is CAREC's newest member, having joined in 2016. As economic ties increase, inevitably there will be more traffic. There is no reason Georgia cannot become a popular tourist destination for residents of other CAREC member countries just as it has grown in popularity among Europeans. Growth in Georgia–CAREC traffic could accelerate if Georgia extends its visa-free policy to all CAREC member countries and if other CAREC member countries follow Georgia in adopting liberal aviation and visa policies.

List of Selected IATA Airport Codes by CAREC Member Country

AFGHANISTAN

CCN = Chaghcharan Airport
KBL = Hamid Karzai International Airport
KDH = Kandahar International Airport
HEA = Herat International Airport
MZR = Mazar-i-Sharif International Airport
ZAJ = Zaranj Airport

AZERBAIJAN

GBB = Qabala International Airport
GYD = Heydar Aliyev International Airport
KVD = Ganja International Airport
LLK = Lankaran International Airport
NAJ = Nakhchivan International Airport
ZTU = Zaqatala International Airport

GEORGIA

BUS = Batumi International Airport
KUT = Kutaisi International Airport
TBS = Tbilisi International Airport

KAZAKHSTAN

AKX = Aktobe Airport
ALA = Almaty International Airport
AYK = Arkalyk Airport
CIT = Shymkent International Airport
DMB = Taraz Airport
GUW = Atyrau Airport
KGF= Sary-Arka Airport (Karaganda Airport)
KOV = Kokshetau Airport
KSN = Kostanay Airport
KZO = Kyzylorda Airport
PLX = Semey Airport (Semipalatinsk Airport)
PPK = Petropavl Airport (Petropavlovsk Airport)
PWQ = Pavlodar Airport
SCO = Aktau Airport
TSE = Astana International Airport
UKK = Oskemen Airport (Ust-Kamenogorsk Airport)
URA = Oral Ak Zhol Airport (Uralsk Airport)

KYRGYZ REPUBLIC

FRU = Manas International Airport
OSS = Osh Airport

MONGOLIA

AVK = Arvaikheer Airport
BYN = Bayankhongor Airport
COQ = Choibalsan Airport
DLZ = Dalanzadgad Airport
HVD = Khovd Airport
LTI = Altai Airport
MXV = Moron Airport
UGA = Bulgan Airport
ULG = Olgii Airport
ULO = Ulaangom Airport
UUN = Baruun-Urt Airport

PAKISTAN

BHV = Bahawalpur Airport
CJL = Chitral Airport
DBA = Dalbandin Airport
DEA = Dera Ghazi Khan International Airport
DSK = Dera Ismail Khan Airport
GWD = Gwadar International Airport
ISB = Islamabad International Airport
JIW = Jiwani Airport
KHI = Karachi Jinnah International Airport
LHE = Lahore Allama Iqbal International Airport
LYP = Faisalabad International Airport
MJD = Moenjodaro Airport
MUX = Multan International Airport
PEW = Peshawar Bacha Khan International Airport
PJG = Panjgur Airport
PSI = Pasni Airport
PZH = Zhob Airport
RYK = Shaikh Zayed International Airport
SDT = Saidu Sharif Airport
SKT = Sialkot International Airport
UET = Quetta International Airport

PEOPLE'S REPUBLIC OF CHINA

AKU = Aksu Airport
AAT = Altay Airport
CIF = Chifeng Yulong Airport
DSN = Ordos Ejin Horo Airport
HLD = Hulunbuir Hailar Airport
HLH = Ulanhot Airport
HMI = Hami Airport
HTN = Hotan Airport
KCA = Kuqa Qiuci Airport
KHG = Kashgar Airport
KRL = Korla Airport
KRY = Karamay Airport
TGO = Tongliao Airport
URC = Urumqi Diwopu International Airport
WUA = Wuhai Airport
XIL = Xilinhot Airport

TAJIKISTAN

DYU = Dushanbe International Airport
KQT = Qurghonteppa International Airport
TJU = Kulob Airport

TURKMENISTAN

ASB = Ashgabat International Airport
KRW = Turkmenbashi Airport
MYP = Mary Airport
TAZ = Dashoguz Airport

UZBEKISTAN

BHK = Bukhara International Airport
NCU = Nukus Airport
SKD = Samarkand International Airport
TAS = Tashkent International Airport
UGC = Urgench International Airport

Malaysia–Singapore Case Study

Open Skies and Low-Cost Carriers Lead to Rapid Market Growth

Central Asia Regional Economic Cooperation (CAREC) member countries have an opportunity to significantly grow traffic with other CAREC member countries by liberalizing air services. There are several examples of rapid traffic growth between two countries following the adoption of open skies or bilateral agreements with unlimited traffic rights. One of the best examples is Malaysia and Singapore, which implemented open skies in late 2008.

Passenger traffic between Malaysia and Singapore increased by 70% in December 2008, the first month following the implementation of open skies. Malaysia–Singapore passenger traffic has since grown at an annual average rate of 14%.

In 2016, there were 420,000 to 470,000 passengers per month in the local Malaysia–Singapore market (excluding transit passengers flying beyond Kuala Lumpur or Singapore). Prior to liberalization in 2008, only 100,000 to 150,000 passengers per month flew between the two countries.

There are currently over 500 weekly flights from Malaysia to Singapore compared to approximately 200 weekly flights prior to open skies. Nine airports in Malaysia are now linked with Singapore and a 10th will be served starting early 2018. Prior to liberalization in 2008, only five airports in Malaysia were served from Singapore.

Kuala Lumpur–Singapore has become the world's second-largest international city pair after Hong Kong, China–Taipei,China.

The Kuala Lumpur–Singapore market (that includes two Kuala Lumpur airports) is now served with approximately 350 weekly flights and over 100,000 return seats.

Malaysia Airlines and Singapore Airlines previously had a duopoly on the Kuala Lumpur–Singapore route. The Kuala Lumpur–Singapore market is now served by four Malaysian carriers and three Singaporean carriers. Over the last decade, several airlines from outside the region also competed in the Kuala Lumpur–Singapore market with fifth freedom rights, including Uzbekistan Airways (which currently has one weekly Kuala Lumpur–Singapore flight).

New entrants, including low-cost carriers (LCCs), were previously blocked from entering the Malaysia–Singapore market because of the bilateral restrictions. LCCs and hybrid carriers now account for 60% of capacity between the two countries.

The legacy network airlines which exclusively served the Malaysia–Singapore market back in 2008, now have a 40% share of capacity. Malaysia's AirAsia, which launched low-cost operations in 2001, but was not able to access the Malaysia-Singapore market in its first 7 years, is now the market leader with nearly a 30% share of Malaysia–Singapore capacity.

Fares between the two countries plummeted as competition increased. Affordable airfares, which in many cases are not much more expensive than bus fares, stimulated demand.

Low taxes at both ends also ensure affordability of air travel between Malaysia and Singapore. Return fares between Kuala Lumpur and Singapore

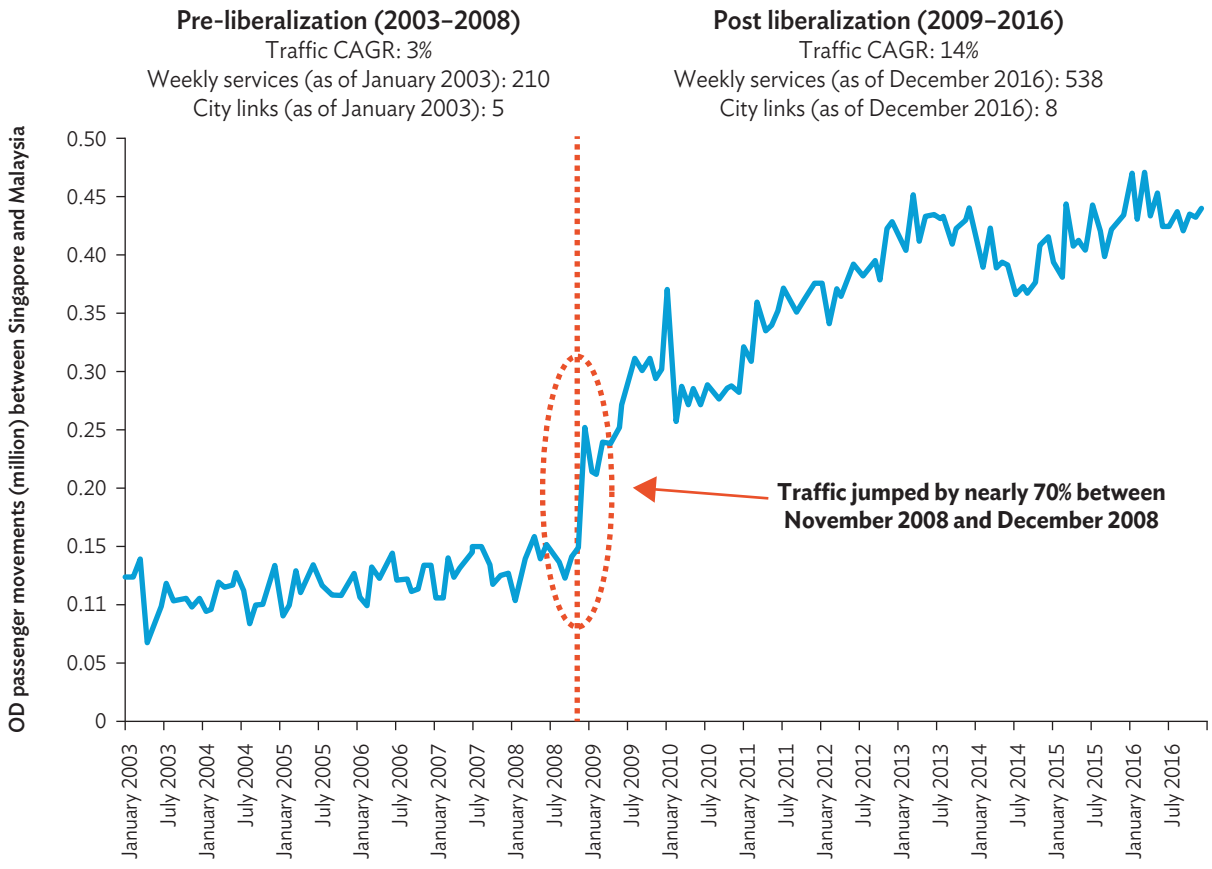
now start at less than $50, including taxes. Even last-minute travel return fares are often below $100, including taxes. Many passengers choose to return in the same day.

There are several city pairs within CAREC that can similarly be connected by air in one hour or less. However, generally these routes do not have enough frequencies to enable same day travel. Fares and taxes are also significantly higher compared to fares and taxes on Malaysia–Singapore flights.

A short international flight between CAREC member countries costs several times more than an average Malaysia–Singapore ticket. However, the current cost within CAREC is not much higher than what an average Malaysia–Singapore ticket cost prior to liberalization in 2008.

The economic benefits of liberalizing air services between neighboring countries are undeniable. Business links improve as connectivity improves, leading to economic growth. Lower fares lead to tourism growth, which also drives economic growth.

Figure A3: Singapore–Malaysia Passenger Growth before and after Liberalization



CAGR = compound annual growth rate, OD =Origin - Destination.

Source: Civil Aviation Authority of Singapore. Air Services Liberalisation: The Singapore Experience. Presented at the CAREC Aviation Workshop. Singapore. 6–7 April 2017.

Open skies and market growth. The open skies between Malaysia and Singapore is one of many reasons why Singapore is developing its new terminals 4 and 5 (photo by the CAREC Secretariat).

Even if taxes are reduced, the additional volume of passengers generated more than offsets the lower tax rate.

However, it is important to recognize that liberalization is only an initial step and alone does not guarantee rapid growth. New airlines (particularly LCCs) must be prepared to take advantage of the newly available traffic rights, resulting in more capacity and a higher level of competition. Otherwise, fares will remain high and growth will not be achieved.

For example, Azerbaijan and Georgia have had open skies for a decade, but for several years there was no growth in air travel and fares remained high. Qatar Airways began competing in the Baku–Tbilisi market in early 2012 with fifth freedom rights, leading to lower fares and increased traffic. However, Qatar Airways had a relatively limited impact as it only operated the route with one daily flight and fares remained relatively high.

The Baku–Tbilisi market experienced a much more significant change in September 2017, when new low-cost competitor, Buta Airways, began serving the route. Buta Airways is now operating two daily flights on the Baku–Tbilisi route with return fares as low as $100. This new low-cost option already led to rapid traffic growth as the low fares stimulated demand, persuading passengers previously traveling between the two cities by car, bus, or train to fly instead. The Buta Airways schedule for the first time also enables same day travel between Baku and Tbilisi because previously the two competitors on the route (AZAL Azerbaijan Airlines and Qatar Airways) each had one daily flight only.

AZAL launched Buta Airways as part of a government effort to reduce fares in Azerbaijan and drive air travel growth. Lower fares enable a larger portion of the local population to fly and also boosts inbound tourism. Azerbaijan now also has low taxes and airport passenger charges (as does Georgia), making the total cost flying between the two countries affordable. Taxes and airport charges in most other CAREC member countries are significantly higher.

Buta Airways will likely add more flights on the Baku–Tbilisi route to meet the growing demand. Demand for the cheap fares Buta Airways has offered since launching the route far exceeds supply. It may also launch flights to Georgia's two other international airports, Batumi and Kutaisi.

Baku–Tbilisi is currently the only route between Azerbaijan and Georgia. With low fares and taxes, there should be sufficient demand to make several routes between the two countries viable as well as support several daily flights on the main Baku–Tbilisi route.

The Baku–Tbilisi route will never be as big as Kuala Lumpur–Singapore. The combined population of Baku and Tbilisi is only approximately 3 million compared to a combined 13 million for the Kuala Lumpur metropolitan area and Singapore. Gross domestic product per capita is also much higher in Kuala Lumpur and Singapore. However, there is a huge opportunity for air travel growth between Baku and Tbilisi. There are currently 17 times more flights from Kuala Lumpur to Singapore than there are from Baku to Tbilisi.

▲ **Low-cost carriers.** The emergence of Buta Airways in Azerbaijan catalyzed fare reductions and market growth, especially for services between Azerbaijan and Georgia (photo by Buta Airways).

Baku–Tbilisi is the first of several potential routes within CAREC that could see a huge surge in traffic under a more liberal and competitive environment. Azerbaijan and Georgia is now virtually the only CAREC country pair with open skies. It is also virtually the only CAREC country pair with low taxes and a low-cost carrier option. Buta Airways does not currently serve any other destination in CAREC. The only other low-cost airline based in CAREC, Bishkek-based Air Manas, also has just one destination within CAREC—Urumqi with return fares starting at about $200, including taxes.

Dozens of routes within CAREC could experience the kind of growth rate that Baku–Tbilisi is now experiencing—and that Kuala Lumpur–Singapore has experienced since 2008. However, a liberal approach toward air rights as well as the launch of more LCCs are required.

CAREC Aviation Survey Results

As part of the process to produce this Scoping Study, the Central Asia Regional Economic Cooperation (CAREC) Secretariat surveyed the CAREC member countries to get a better understanding of the region's aviation industry and requirements. In this section, an analysis of the results is provided along with summary tables.

Level of Market Openness in CAREC

The ultimate establishment of a single aviation market with open skies would be a long-term objective that would boost CAREC cohesion and economic development. However, at the moment, relatively few open sky agreements are in place in the region. Of the eight countries participating in the survey, five do not have any open skies agreements and two listed only one open skies partner.

Georgia is the exception with more than 10 open skies agreements. However, it has just one open skies agreement with another CAREC country—Azerbaijan. There are no other known open skies agreements within CAREC.

Shared airspace is also relatively uncommon in CAREC despite the obvious benefits of joint airspace management. Only two of the CAREC member countries surveyed reported jointly operating airspace with other CAREC member countries.

CAREC member countries have bilateral air service agreements with most, but not all, other CAREC member countries. Of the eight countries surveyed, seven have bilateral agreements in place with at least six and as many nine other CAREC member countries. Afghanistan is the most common missing link.

While relationships are generally in place within CAREC, it seems overall policies for air services are not liberal enough to support a potential pan-regional open skies agreement. Several CAREC member countries could benefit from training on the benefits of market openness.

CAREC member countries have relatively strict regulations on airline ownership, although they are generally open to the launch of new local airlines if they meet their ownership and regulatory requirements. Most of the CAREC member countries do not subsidize any of their local airlines.

None of the CAREC member countries surveyed allows majority foreign ownership of local airlines. Most of the countries allow minority ownership of up to 49%. Of the eight countries participating in the survey, only Turkmenistan and Uzbekistan and do not allow any foreign ownership of local airlines. CAREC member countries should consider relaxing their airline foreign ownership regulations as it would facilitate investment, including investment from airlines in other CAREC member countries. Most CAREC member countries have small aviation markets, making it difficult for local airlines to achieve economies of scale and compete effectively with much larger foreign airlines.

The eight countries surveyed all have international markets consisting of less than 5 million annual passengers and only three of the countries have more than 2 million annual international passengers. Only two countries have a significant domestic market (at least 1 million annual domestic passengers).

Liberal foreign ownership regulations could lead to mergers between CAREC airlines, resulting in more efficient and stronger local competitors. It is also important for CAREC member countries to promote competition in other related areas to ensure the costs airlines incur for accessing airports and providing services are reasonable.

A lack of competition in the ground handling sector is of particular concern. Almost all the countries surveyed have just one ground handler at each international airport. Some of the countries, but not all, are open to having a second ground handler.

Ending ground handling monopolies is necessary for operating costs to become reasonable. CAREC member countries should be open to having two ground handlers at each main airport and should try to encourage new suppliers entering the market. Multiple suppliers in other areas such as fuel and aircraft maintenance would also be beneficial.

Many airports in CAREC also have landing fees, fuel prices, facility charges, and taxes significantly higher the global average. There is a wide range of landing fees and fuel taxes in the eight countries participating in the survey. Only three of the countries do not assess a tax on jet fuel. The tax rate is 18% in one country and 15% in another country. Such high fuel taxes significantly impact the overall cost structure of an airline and makes it difficult to provide low fares.

Passenger facility charges and ticket taxes also impact demand, although they are passed on directly to passengers. Charges and taxes vary significantly depending on the country. In some cases, high charges and taxes on international passengers impact demand as it makes regional travel within CAREC expensive and unaffordable.

Five of the countries surveyed do not regulate airfares and local airlines are free to set fares. Three of the countries have regulated or partially regulated airfares. While deregulated fares are encouraging, deregulation alone is often not enough to stimulate growth. Several CAREC member countries have limited competition, enabling airlines to set high fares on short flights to other CAREC member countries. The adoption of more open policies that lift barriers to entry and permit foreign airline ownership could lead to high level of competition and lower fares.

All of the CAREC member countries reported they are planning to upgrade their airports with a wide range of projects including new terminals, runways, control towers, maintenance facilities, navigation equipment, communications equipment, and safety equipment. It is encouraging that countries recognize the infrastructure shortfalls at their airports, which can impede air transport growth. It is important that capital is secured for all these projects and they proceed without any significant delays.

Most of the countries said they do not have sufficient human resources to meet demand over the next decade for multiple aviation industry professions. All the countries also said they wish to have additional training resources in multiple areas. The most common areas needing more training among CAREC member countries is aviation agency management, regional and/or bilateral agreements, air safety, and airport management.

CAREC's aviation industry has huge potential, but a multifaceted effort will be required to realize this. CAREC may wish to consider a unified, more open policy toward air rights. Such a policy would lead to more flights between CAREC member countries and lower fares as competition increases. More open airline ownership policies—perhaps in the form of new regulations permitting cross-ownership of airlines within CAREC while not opening ownership to investors outside the region—would help airlines become more competitive, leading to a further increase in air services.

CAREC member countries also have a lot to potentially learn from each other as they have different strengths and deficiencies. Member countries should jointly work toward establishing or appointing schools and improving aviation standards in the region.

Human resources and training requirements can be more easily met if all the countries can pool their resources. For example, pilot training numbers are low, varying from only five to 40 pilots trained per annum for each of the surveyed countries.

Weighted Results with Tables and Charts

Eight countries responded to the aviation scoping survey: Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Tajikistan, Turkmenistan, and Uzbekistan.

Survey question responses were weighted using a Likert scale, with 0 being high government control and low liberalization of airfares, ownership, bilateral reach, and route authorization. A scoring of 5 was used to indicate higher liberalization, high number of signed bilateral agreements, with little or no government intervention in pricing and route selection, and open skies agreements.

Results were tabulated and a table (see Table A4.1) was created to identify where current gaps may exist.

Most of the responding countries highlighted training needs and support as required. The level of aircraft operating in each country tends to be low on an aircraft per capita basis, with both low volumes domestically and internationally when compared with other similar sized countries for either population or geographic size.

Table A4.2 summarizes each country's core aviation statistics.

Figure A4 illustrates the weighted response scores for each of the six countries, and where gaps exist by country and at CAREC level. The left side of the chart highlights overall low aircraft fleet, domestic and international passenger volumes, and low pilot training outputs across the group. On the right, level of foreign ownership for airlines, bilateral reach, and acceptance of open skies is generally low.

Many of the survey respondent countries indicated they had a national aviation strategy, which is an important building block toward identifying connectivity, and alignment of the local aviation industry. Further analysis of the national aviation strategy for each country may assist in determining the level of cooperation expected within CAREC member countries, and where further work on alignment could contribute to efficiency of the respective aviation sectors for each country.

Bilateral agreements between CAREC member countries range from low to high, and depend on geography, population size, and whether a hub in a neighboring state provides access to the wider CAREC group.

Table A4.1: CAREC Aviation Scoping Survey Results

Component	Azerbaijan	Georgia	Kazakhstan	Kyrgyz Republic	Mongolia	Tajikistan	Turkmenistan	Uzbekistan
National aviation strategy	5	0	0	5	5	5	5	5
Route approvals	5	5	3	0	2.5	1	0	3
Setting of airfares	4	5	5	5	3	5	2	3
Foreign ownership	3	4	4	4	4	4	0	0
International bilaterals	3	3	3	2	3	2	4	4
CAREC region bilaterals	3	1	5	5	2	3	5	3
Open sky agreements	2	4	0	0	0	0	0	1
Airspace collaboration	0	0	0	4	0	0	1	0
Airport facility upgrades	4	2	4	4	4	3	2	2
Investment required	5	1	3	5	5	3	4	1
Training needs	5	3	3	3	5	5	5	3
Pilot training capacity	2	2	2	0	0	0	0	1
Cargo volumes	4	2	2	1	0	0	1	3
Domestic pax volume	2	0	3	1	2	0	4	1
International pax volume	3	3	3	2	1	1	1	1
Aircraft fleet capacity	3	3	5	1	2	3	2	2
Fuel tax	5	5	1	5	1	0	1	1
Ground handling firms	4	2	4	5	2	5	0	0

0 = high level of government restrictions, 3 = mixed, 5 = open and unconstrained market, CAREC = Central Asia Regional Economic Cooperation, pax = passenger.

Source: Asian Development Bank.

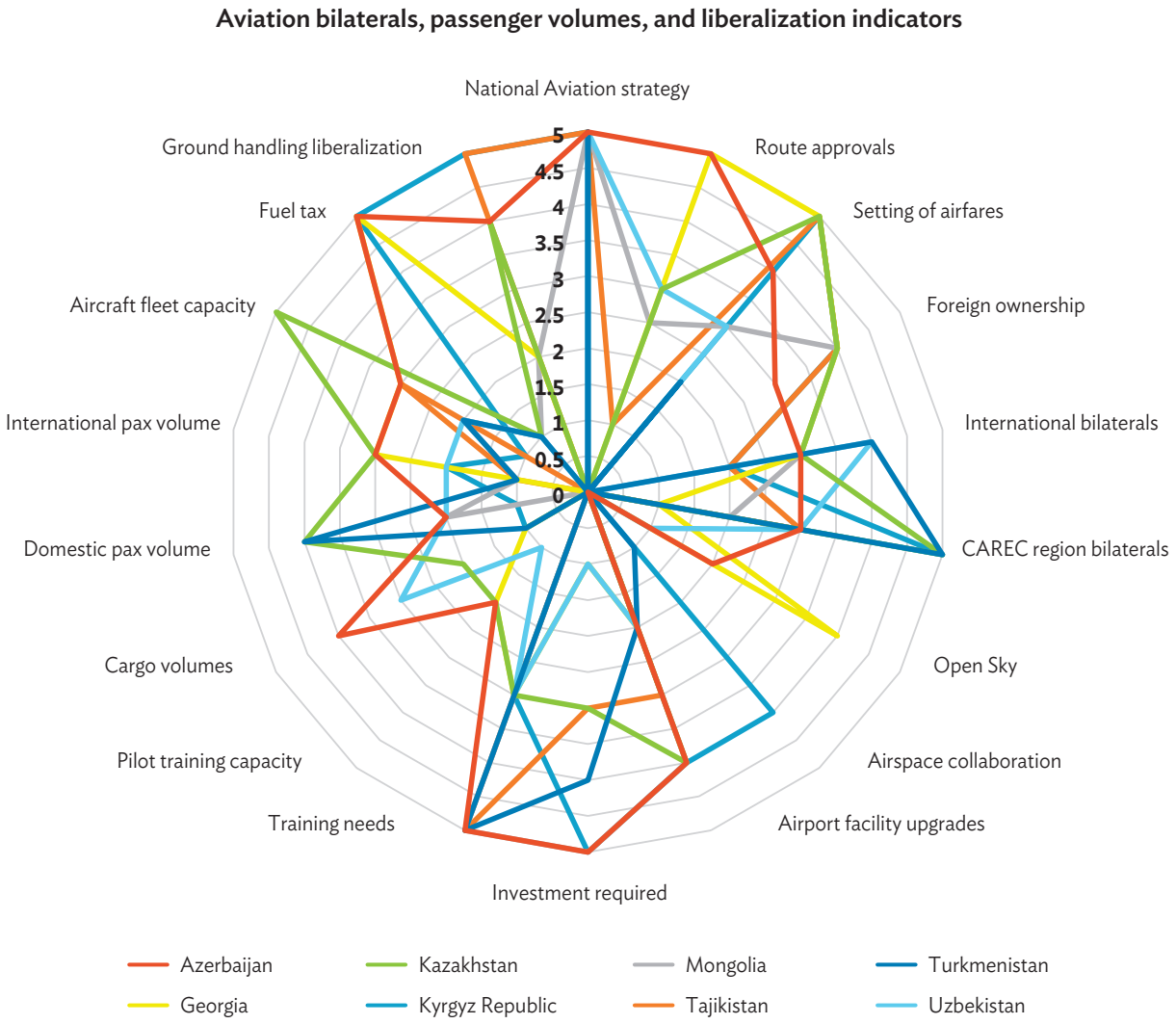
Table A4.2: Statistical Summary

Component	Azerbaijan	Georgia	Kazakhstan	Kyrgyz Republic	Mongolia	Tajikistan	Turkmenistan	Uzbekistan
Aircraft	54	34	228	17	17	26	33	29
Domestic passengers 2016	534,607	6,316	6,000,000	1,009,438	232,586	36,286	2,922,846	513,411
International pax arriving 2016	1,395,048	1,400,000	2,025,000	1,025,002	388,619	839,334	448,286	949,591
International pax departing 2016	1,364,022	1,400,000	2,027,900	1,048,491	401,840	865,310	461,274	920,599
CAREC pax arriving 2016	102,946	122,385	No data	No data	134,360	86,299	No data	102,489
CAREC pax departing 2016	125,505	80,875	No data	No data	142,737	86,029	No data	101,154
Cargo volume in tons	144,529	34,000	69,576	25,230	4,409	3,577	20,911	53,819
CAREC signed bilaterals	6	7	10	9	6	8	10	7
Fuel tax	0%	0%	12%	0%	10%	18%	15%	No data
Total airports	6	7	18	8	24	18	6	11
Total international airports	5	3	17	5	6	4	6	11
Total air traffic controllers	222	113	962	150	186	120	77	No data
Number of registered pilots	476	121	2327	200	126	160	261	No data
Training capacity for pilots	35	40	45	10	10	5	No data	No data

CAREC = Central Asia Regional Economic Cooperation, pax = passenger.

Source: Asian Development Bank.

Figure A4: Weighted Response Scores from CAREC Aviation Survey



CAREC = Central Asia Regional Economic Cooperation.
Source: Asian Development Bank.

Aviation and the Role of CAREC

A Scoping Study

CAREC was created to foster connectivity. Air transport connectivity facilitates economic development. This Scoping Study seeks to begin to define a potential role for the CAREC program to enhance the region's effectiveness of aviation. The study provides an analysis of the CAREC region's current state of aviation, and is structured around three principal components of aviation development: policy and regulation, infrastructure and equipment, and operations. It also describes enabling factors necessary to realize the aviation enhancements CAREC member governments seek. The study provides conclusions and outlines a possible way forward on CAREC aviation to assist in shaping action items and capacity-building activities that underpin aviation's role in economic development.

About the Central Asia Regional Economic Cooperation Program

The Central Asia Regional Economic Cooperation (CAREC) Program is a partnership of 11 member countries and development partners working together to promote development through cooperation, leading to accelerated economic growth and poverty reduction. It is guided by the overarching vision of "Good Neighbors, Good Partners, and Good Prospects." CAREC countries include: Afghanistan, Azerbaijan, the People's Republic of China, Georgia, Kazakhstan, the Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.

About the Asian Development Bank

ADB is committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific, while sustaining its efforts to eradicate extreme poverty. Established in 1966, it is owned by 67 members—48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

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