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Artículo de investigación

Análisis comparativo del transporte aéreo comercial doméstico de rutas, frecuencias y aerolíneas desde y hacia el Aeropuerto Internacional de Bogotá del 01 al 15 de agosto del 2022

Comparative analysis of domestic commercial air transport of routes, frequencies and airlines to and from the Bogotá International Airport from August 01 to 15, 2022

Análise comparativa das rotas, frequências e companhias aéreas comerciais nacionais de e para o Aeroporto Internacional de Bogotá de 01 a 15 de Agosto de 2022.

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Comparative analysis of domestic commercial air transport of routes, frequencies and airlines to and from the Bogotá International Airport from August 01 to 15, 2022

Resumen

El objetivo de este estudio es identificar la participación de mercado del transporte aéreo comercial doméstico por rutas, frecuencias y aerolíneas desde el Aeropuerto Internacional El Dorado durante un periodo de tiempo semanal del 01 al 15 de agosto del 2022. A través de una investigación cuantitativa de tipo descriptivo, que busca especificar características importantes del fenómeno de estudio, además de definir variables y medir conceptos, en este caso, la participación del mercado doméstico. Además, el proceso de obtención de resultados se refleja en el análisis expuesto acerca de la participación del mercado doméstico de las aerolíneas que atienden estas rutas en Colombia.

Palabras clave: Transporte Aéreo Comercial, operación doméstica, rutas, aerolíneas, frecuencias.

Abstract

The objective of this study is to identify the market share of domestic commercial air transport by routes, frequencies and airlines from and to the International Airport El Dorado during a weekly period of time from August 1st to 15th, 2022. This has been achieved through a quantitative investigation with a descriptive type, which seeks to specify important characteristics of the phenomenon of study, in addition to defining variables and measuring concepts, in this case, the share of the domestic market. In addition, the process of obtaining results is reflected in the analysis of the exposed participation of the domestic market of the airlines that operate these routes in Colombia.

Key words: Tir Commercial Transport; Domestic Operation; Routes; Airlines; Frequencies.

Resumo

O objetivo deste estudo é identificar a quota de mercado do mercado do transporte aéreo comercial doméstico por rotas, frequências e companhias aéreas do Aeroporto Internacional de El Dorado durante um período semanal de 01 a 15 de Agosto de 2022. Através de uma pesquisa quantitativa de tipo descritivo, que procura especificar características importantes do fenómeno do estudo, para além de definir variáveis e medir conceitos, neste caso, a quota de mercado nacional. Além disso, o processo de obtenção de resultados reflecte-se na análise da quota do mercado doméstico das companhias aéreas que servem estas rotas na Colômbia.

Palavras-chave: Transporte Aéreo Comercial; Operação Doméstica; Rotas; Companhias Aéreas; Frequências.

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Introduction

Commercial air transportation has been considered both a driver and a result of global trade and connectivity since its inception. By enabling fast travel, reaching remote locations that cannot be accessed by other means, and generating high air connectivity, it has proven to be a fundamental factor for the tourism and international trade industry. In addition to improving business operations, investment, and innovation to maintain high standards of quality and safety (Sbarbati, n.d.).

Likewise, air traffic has experienced a significant growth in recent years, expressed in the "creation of new air routes and the incorporation of higher frequencies, the establishment of new airlines, low-cost airlines, and investment in airport infrastructure" (Sbarbati, n.d.). As pointed out by Beloba, Odoni, & Barnhart (2009 cited in Ribadeneira Páez & Cruz-Pierard, 2022), flight frequency is one of the most important factors for measuring an airline's market share, with a frequency above 40% being considered relevant, as indicated by Gonzales (2013 cited in Ribadeneira Páez & Cruz-Pierard, 2022). Sbarbati (n.d.) has also classified Latin America and the Caribbean as a growing market, which allows for greater expansion opportunities than in other regions of the world, demonstrated by the 93% increase in total traffic as the main driver of passenger air traffic growth for 2021. Colombia is among the countries contributing to this growth, with a 30% contribution to this progression. Furthermore, it is the country that achieved the best results during the year, recovering 90% of its domestic flights and two-thirds of its international flights after resuming its flights in September 2020.

According to the Latin American Civil Aviation Commission [CLAC] (2020) and León (2015), Colombia has been known as a pioneer in the aviation field since the creation of the first commercial air transportation company in 1919, the Sociedad Colombo Alemana de Transportes Aéreos [SCADATA], now Avianca, responsible for transporting mail and passengers in Colombian territory. This paved the way for the creation of the then-regulatory body for air activity, The Aviation Technical Commission was created in 1954 and in the same year, the Colombian Airport Company was established to build and improve airports. In 1960, the Civil Aeronautics Administrative Department was founded, which provided greater autonomy to the aeronautical authority, now known as the Special Administrative Unit of Civil Aeronautics.

Later, in 1929, LATAM was founded in Chile using the name LAN Chile as the commercial name for the country's flag airline. It was one of the founders of LATAM Airlines Group, the largest airline

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holding company in Latin America. In 1981, it launched its subsidiary, LAN Colombia, which is considered the second largest airline in Colombia (LATAM Airlines, 2022).

In 1962, the airline Satena began operating, providing service between Bogotá and certain regions of the country, such as Leticia, Tarapacá, El Encanto, and Puerto Leguízamo. In 2006, the low-cost regional airline Easyfly was founded, which began operations a year later to regions not served by other operators. In 2009, the low-cost airline Viva Air was founded and entered the market in 2012 with 9 domestic and 2 international destinations, to Panama and Ecuador (Ramírez, 2006).

In 2016, Wingo started operating in the country. It is a low-cost airline part of Copa Airlines and Copa Airlines Colombia, which offers flights from Bogotá to Cartagena and San Andrés Island, and from Barranquilla, Cali, and Cartagena to San Andrés. It also offers international flights to Quito, Guayaquil, Caracas, Panama, Cancun, and Mexico City (Wingo, 2022). In 2022, Ultra Air was inaugurated, another low-cost airline with flights from Bogotá to Medellín and San Andrés, and authorization to operate 29 domestic and 15 international routes (Las 2 Orillas, 2022).

Thus, the object of study for this research is to identify the market share of domestic commercial passenger air transportation by routes, frequencies, and airlines from the Bogotá International Airport during a weekly period from August 1 to 15, 2022. This research is based on a literature review as the theoretical foundation and the collection and analysis of data from a weekly period to measure market share.

Methodology

Through the collection of data based on numerical measurement and statistical analysis, this research used a descriptive quantitative research approach to specify important characteristics of the phenomenon under study, as well as define variables and measure concepts such as domestic market share. Additionally, the analytical-synthetic method was employed to help divide the parts that make up a whole in order to analyze the data obtained from the results. In this research, the review of secondary sources of information (bibliographical) was used as a technique to support the theoretical foundation of the research and the obtaining of quantitative data to numerically dimension the results. Therefore, the search, review, and selection of information to support the research was carried out based on data taken from official pages of airports, airlines, other research, and government agencies, which were validated and processed through bibliographical cards and criteria for information

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reliability.

Discussion and results

Next, the results obtained from data collection and analysis at El Dorado International Airport (2022) and José María Córdova International Airport in Medellín (2022) are presented and analyzed in relation to the studied variables. For a better synthesis of the data, the contraction graphs and tables use abbreviations corresponding to the codes established by the International Air Transport Association [IATA] for each city pair and airline.

Table 1: Domestic routes by frequency in the weekly cut-off of August 01 and August 15, 2022 at International Airports.

ROUTE	Avianca (AV)	Satena (9R)	Latam Airlines (LA)	Viva Air (VH)	Easyfly (VE)	Wingo (P5)	Ultra Air (OL)
BOG-AXM-BOG	36	0	18	0	0	0	0
BOG-BAQ-BOG	107	0	54	18	0	0	0
BOG-BGA-BOG	96	0	32	16	0	0	0
BOG-CLO-BOG	181	0	138	8	0	8	8
BOG-CTG-BOG	144	0	95	63	0	32	18
BOG-CUC-BOG	82	0	17	33	0	0	0
BOG-LET-BOG	11	0	11	10	0	0	0
BOG-MDE-BOG	226	54	137	54	0	0	20
BOG-MTR-BOG	56	0	28	14	0	0	0
BOG-PEI-BOG	83	0	20	20	0	0	0
BOG-RCH-BOG	18	0	0	18	0	0	0
BOG-ADZ-BOG	35	0	35	47	0	11	11
BOG-SMR-BOG	94	0	53	41	0	26	26
TOTAL	1169	54	638	342	0	77	83

Source: AXM: Armenia; BAQ: Barranquilla; BGA: Bucaramanga; CLO: Cali; CTG: Cartagena; CUC: Cúcuta; LET: Leticia; MDE: Medellín; MTR: Montería; PEI: Pereira; RCH: Riohacha; ADZ: San Andrés; SMR: Santa Marta

As shown in Table 1, there were no flights on routes from International airports to Bogota Airport for the Easyfly airline, since this airline only includes domestic air terminals with less infrastructure.

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Table 2: Domestic routes by airline weekly cut-off from August 01 and August 15, 2022 at international airports in Colombia

ROUTE	AV	9R	LA	VH	VE	P5	OL
BOG-HAY-BOG	0	6	0	0	0	0	0
BOG-APO-BOG	0	8	0	0	0	0	0
BOG-AUC-BOG	0	36	0	0	0	0	0
BOG-EJA-BOG	18	0	0	0	9	0	0
BOG-CZU-BOG	4	0	0	0	0	0	0
BOG-FLA-BOG	15	15	0	0	15	0	0
BOG-IBE-BOG	20	0	0	0	0	0	0
BOG-IPI-BOG	0	6	0	0	0	0	0
BOG-LMC-BOG	0	6	0	0	0	0	0
BOG MZL-BOG	0	0	0	0	38	0	0
BOG-MVP-BOG	0	6	0	0	0	0	0
BOG-NVA-BOG	20	0	20	0	38	0	0
BOG-PSO-BOG	43	0	11	0	0	0	0
BOG-PTX-BOG	0	8	0	0	0	0	0
BOG-PPN-BOG	17	0	0	0	17	0	0
BOG-PUU-BOG	0	19	0	0	19	0	0
BOG-PCR-BOG	0	12	0	0	0	0	0
BOG-PDA-BOG	0	12	0	0	0	0	0
BOG-LQM-BOG	0	2	0	0	0	0	0
BOG-UIB-BOG	0	14	0	0	14	0	0
BOG-SJE-BOG	0	6	0	0	6	0	0
BOG-TME-BOG	0	4	0	0	0	0	0
BOG-TLU-BOG	0	4	0	0	0	0	0
BOG-TCO-BOG	0	8	0	0	0	0	0
BOG-VUP-BOG	44	0	14	0	0	0	0
BOG-VGZ-BOG	0	6	0	0	0	0	0
BOG-VVC-BOG	10	0	0	0	0	0	0
BOG-EYP-BOG	18	0	18	0	34	0	0
TOTAL	209	178	63	0	190	0	0

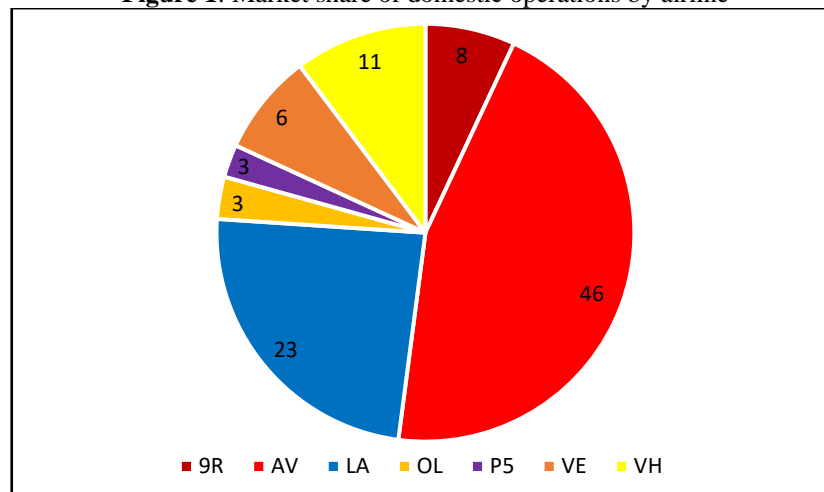
Source: APO: Apartadó; AUC: Arauca; TME: Tame; MZL: Manizales; PPN: Popayán; HAY: Aguachica; VUP: Valledupar; UIB: Quibdó; LMC: La Macarena; PDA: Puerto Inírida; SJE: San José del Guaviare; PTX: Pitalito; NVA: Neiva; VVC: Villavicencio; IPI: Ipiales; PSO: Pasto; TCO: Tumaco; LQM: Puerto Leguízamo; PUU: Puerto Asís; VGZ: Villagarzón; EJA: Barrancabermeja; CZU: Corozal; TLU: Tolú; IBE: Ibagué; MVP: Mitú; PCR: Puerto Carreño; EYP: Yopal; FLA: Florencia.

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Regarding the variables of airlines and frequencies, it was found that for the weekly cut-off from August 1 to August 15, 2022, the total number of domestic flights operated by the 7 airlines that provide this service was 3,000. Avianca, Latam Airlines, Satena and Viva Air have the largest number of operations on routes from Bogota to Medellin, Cartagena, Cali and Santa Marta. Avianca has a domestic operation of 1378 flights, Latam Airlines: 701 flights, Satena: 232 flights, Easyfly: 190 flights, Viva Air: 342 flights, Ultra Air: 83 flights and Wingo: 77 flights.

For this reason, the market share of each airline with respect to the total number of frequencies accounted for is shown below.

Figure 1: Market share of domestic operations by airline



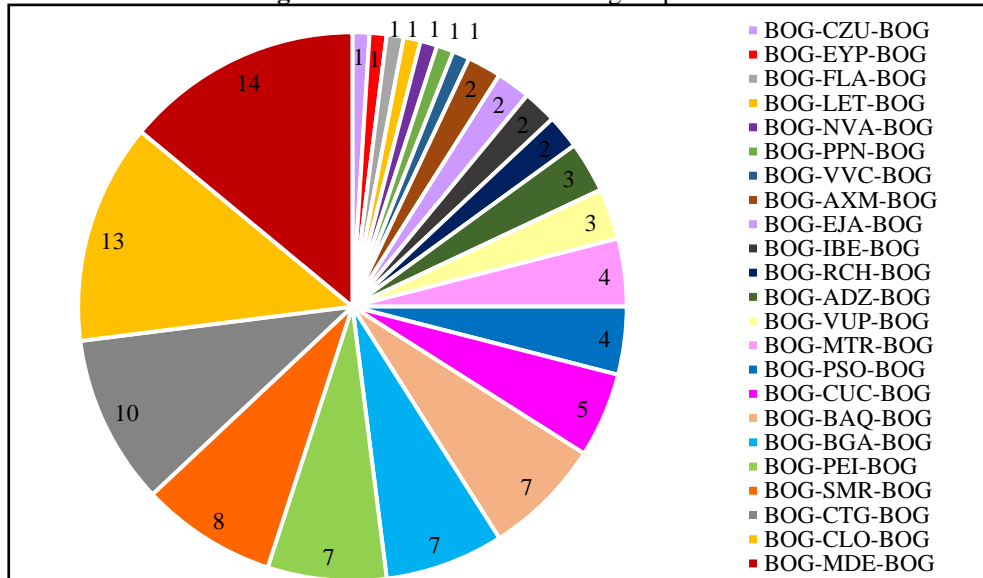
Source: Avianca: AV; SATENA: 9R; LATAM: LA; Viva Air: VH; Easyfly: VE; Wingo: P5, Ultra Air: OL

As shown in the figure above, Avianca is the airline that obtained the highest concentration of market share in domestic operations, representing 46% of the total number of frequencies accounted for the weekly cut-off from August 1 to 12, 2022. Latam Airlines ranked second with 23%, Viva Air with 11%, Satena 8%, Easyfly 6% and Ultra Air and Wingo with 3% each.

On the other hand, each airline is analyzed below with respect to the distribution of direct domestic flights of each one, thus exposing the most representative route of the total operated by each airline.

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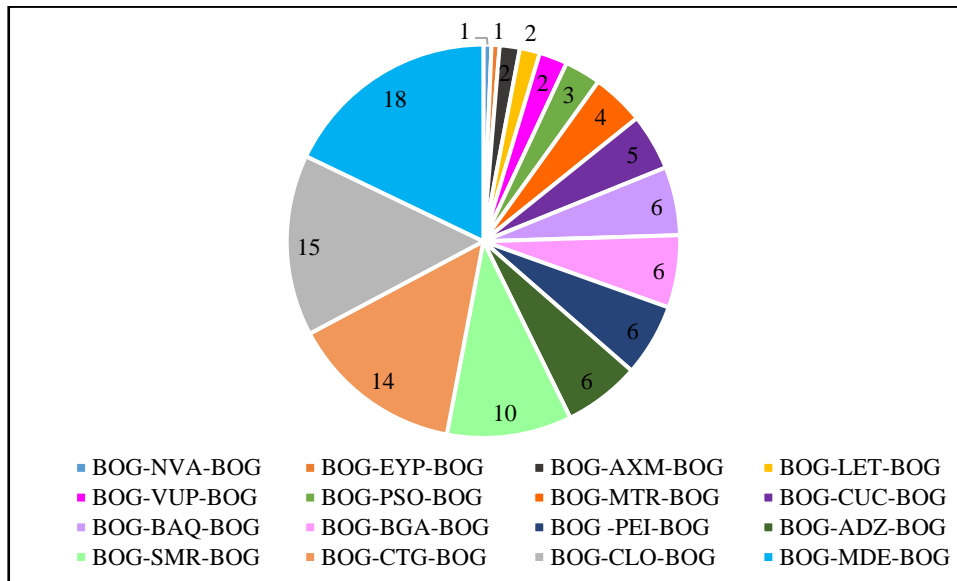
Figure 2: Avianca's domestic flight operation



According to the figure above, it has been determined that of the total number of flights operated by Avianca during the weekly cut-off from August 01 and 15, 2022, 14% of the domestic operations are the percentage representation of the 1378 frequencies accounted in Table 1 to the city of Medellin. In addition, it is observed that the next route with the highest operation performed by this airline is Bogotá-Cali-Bogotá with 13%, followed by Bogotá-Cartagena-Bogotá with 10%, Bogotá-Santa Marta-Bogotá with 8%. From Bogotá to Pereira, Barranquilla and Bucaramanga with 7%, Bogotá-Cúcuta-Bogotá with 5%, from Bogotá to Montería and Pasto with 4%, Bogotá-Valledupar-Bogotá with 3% and to Neiva, Riohacha Ibagué and Barrancabermeja with 2%.

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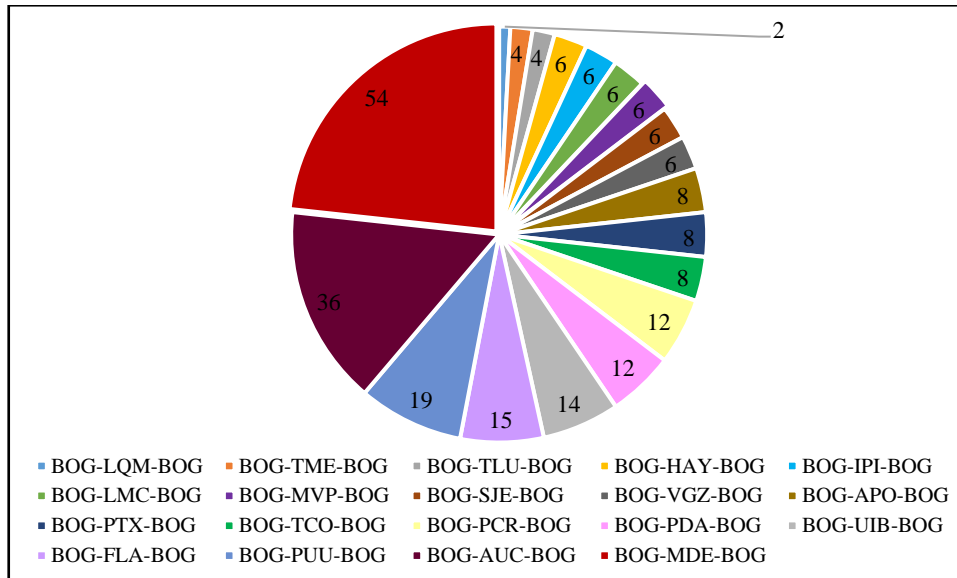
Figure 3: LATAM airline domestic flight operations



Thus, it has been determined that of the total number of flights operated by Latam Airlines during the weekly cut-off from August 01 and 15, 2022, 18% of domestic operations are the percentage representation of the 701 frequencies accounted for in Table 1 to the city of Medellín. In addition, it is observed that the next route with the highest operation performed by this airline is Bogotá-Cali-Bogotá with 15%, followed by: Bogotá-Cartagena-Bogotá with 14%, from Bogotá to Santa Marta and San Andrés Bogotá with 10% each, from Bogotá to Pereira, Bucaramanga and Barranquilla with 6% each and Bogotá-Cúcuta- Bogotá with 5%. Bogotá-Montería-Bogotá with 4%, Bogotá-Pasto-Bogotá with 3% and from Bogotá to Valledupar, Leticia and Armenia with 2% each. Finally, from Bogotá to Yopal and Neiva only 1% each.

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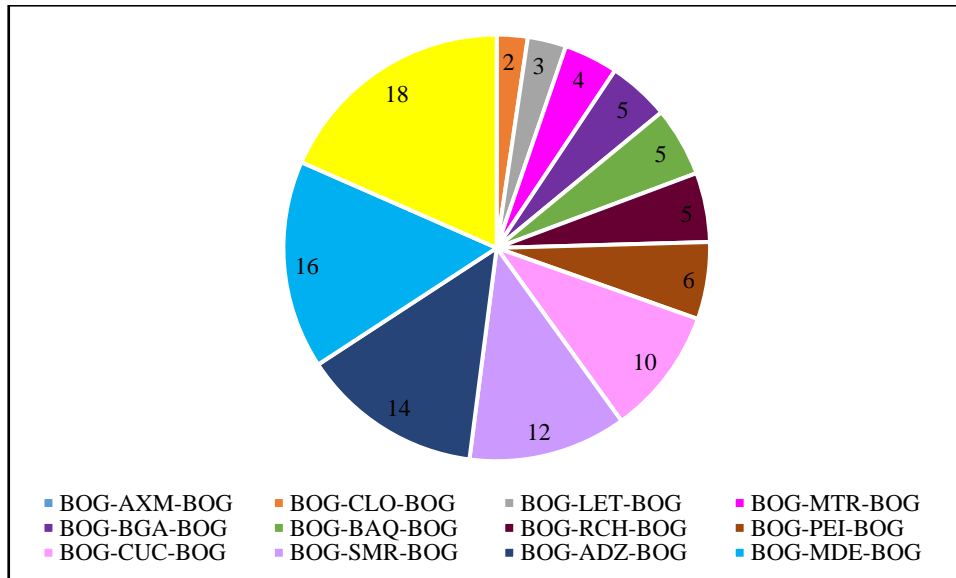
Figure 4: domestic flights of the airline Satena



Thus, it has been determined that of the total number of flights operated by Satena during the weekly cut-off from August 01 and 15, 2022, 54% of domestic operations are the percentage representation of the 342 frequencies accounted for in the table to the city of Medellín. In addition, it is observed that the next route with the highest operation performed by this airline is Bogota-Arauca-Bogota with 36%, followed by: Bogota-Puerto Asis-Bogota with 19%, Bogota-Florencia-Bogota with 15%, followed by: Bogotá-Quibdó-Bogotá with 14%, from Bogotá to Puerto Inírida and Puerto Carreño with 12%. From Bogotá to Tumaco, Pitalito and Apartado with 8% each, and from Bogotá to Villagarzón, San José del Guaviare, Mitú, La Macarena, Ipiales and Aguachica Bogotá with 6% each. From Bogotá to Tolú and Tame with 4% each and Bogotá-Puerto Leguizamo-Bogotá with 2%.

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Figure 5: Viva Air's domestic flight operation



Likewise, it has been determined that of the total number of flights operated by Viva Air during the weekly cut-off from August 01 and 15, 2022, 18% of the domestic operations are the percentage representation of the 342 frequencies accounted for in Table 1, to the city of Cartagena.

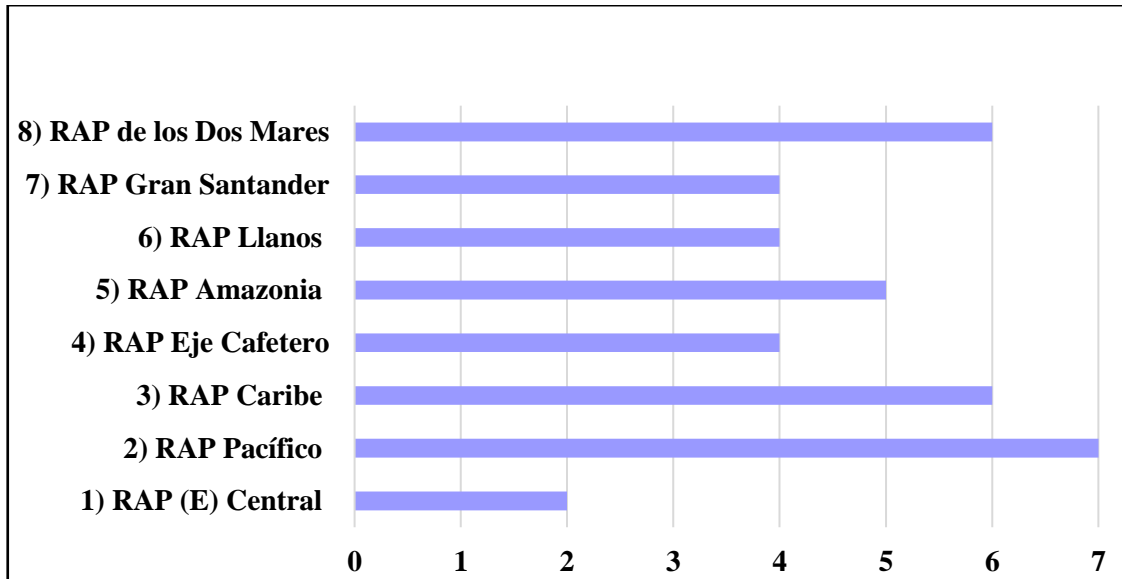
In addition, it is observed that the next route with the highest operation performed by this airline is Bogota-Medellin-Bogota with 16%, followed by: Bogota-San Andres-Bogota with 14%, Bogota-Santa Marta-Bogota with 12%, followed by: Bogotá-Cúcuta-Bogotá with 10%, Bogotá-Pereira-Bogotá with 6%, and from Bogotá to Riohacha, Barranquilla and Bucaramanga with 5% each. Bogotá-Montería-Bogotá with 4%, Bogotá-Leticia-Bogotá with 3% and Bogotá-Cali-Bogotá with 2%.

On the other hand, the Colombian Congress (2011), under the Organic Law of Territorial Ordering of Colombia, divides the country by Administrative Planning Regions [RAP] to facilitate its development, therefore, the following is presented and analyzed the scope of domestic operation taking into account the number of airlines operating per week during the cut-off from August 01 to August 15, 2022 in each of the 8 existing regions: RAP (E) Central (Boyacá, Cundinamarca, Meta, Tolima and the Capital District of Bogotá, Huila joined in 2019), RAP Pacífico (Cauca, Chocó, Nariño and Valle del Cauca), RAP Caribe (departments of Atlántico, Bolívar, Cesar, Córdoba, La Guajira, Magdalena and Sucre), RAP Eje Cafetero (Caldas, Quindío and Risaralda), RAP Amazonía (Amazonas, Caquetá, Guaviare, Guainía, Putumayo and Vaupés), RAP Llanos (Arauca, Casanare and

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Vichada), RAP Gran Santander (Santander and Norte de Santander) and RAP de los Dos Mares (Antioquia and Chocó).

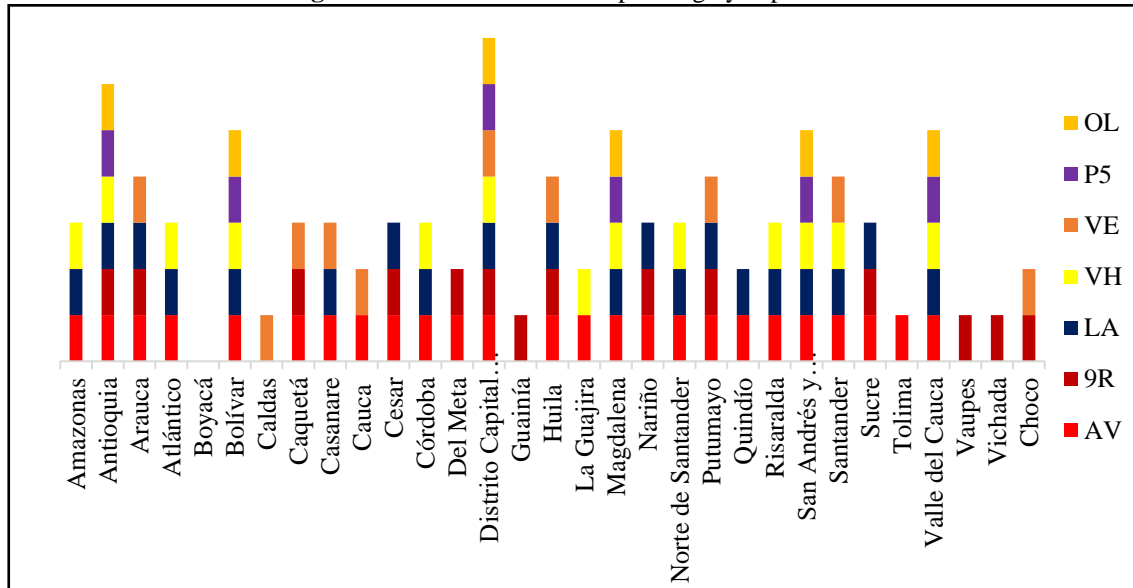
Figure 6: Number of airlines by Administrative Planning Regions [RAP].



Therefore, as shown in the figure above, according to the sample taken from the weekly cut-off of August 01 and 15, 2022. The Pacific Planning Administrative Region presents an operation by 7 airlines, the Caribbean RAP and the Two Seas RAP are served by 6 of the 7 airlines, the Amazon RAP with 5 airlines, the Gran Santander RAP, Llanos RAP and Eje Cafetero RAP with operation by 4 airlines and the Central RAP (E) with 2 airlines.

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Figure 7: Number of airlines operating by department



On the other hand, as shown in the figure above, the departments of Colombia that currently operate direct domestic flights from Bogota airport are: the department of Cundinamarca with 7 airlines, Antioquia with 6 airlines and the departments of Bolivar, Magdalena, San Andres y Providencia and Valle del Cauca with 5 airlines. The departments of Arauca, Huila, Putumayo Santander with 4 airlines, Amazonas, Atlántico, Caquetá, Casanare, Cesar, Córdoba, Nariño, Norte de Santander, Risaralda and Sucre with 3 airlines, the departments of Cauca, Chocó, Guaviare, La Guajira, Meta and Quindío with 2 airlines and the departments of Caldas, Guainía, Tolima, Vaupés and Vichada with the service of only one airline. On the other hand, the department of Boyacá has no domestic transportation operations according to the sample taken from the weekly cut-off of August 01 and 15, 2022.

Once the data has been presented and analyzed, we proceed to propose a discussion that agrees with what Sbarbati (s.f.) stated that, after the creation of new airlines, both low-cost and regular, the number of frequencies and the creation of new air routes increased, represented in the frequencies managed by Viva Air and Satena to Medellín and Cartagena, which leads to the growth of air traffic in this country.

As far as flight frequency is concerned, we agree with Beloba, Odoni, & Barnhart (2009 cited in Ribadeneira Páez & Cruz-Pierard, 2022) in evidencing that this factor plays an enormous role in measuring the market share of an airline, as can be seen in the difference between the number of

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routes operated domestically by each airline in relation to the El Dorado International Airport in Bogotá during the period from August 1 to 15, 2022. Furthermore, the study agrees with what Gonzales (2013 cited in Ribadeneira Paez & Cruz-Pierard, 2022) has shown that Avianca's results exceed 40%, both in number of routes operated and frequencies.

Conclusions

Based on the results obtained, it is concluded that of the seven airlines that operate domestic flights in Colombia, Avianca showed dominance in this market by routes and frequencies to and from Bogota Airport during the weekly cut-off from August 1 to August 15, 2022.

Regarding frequencies, it was identified that these are important factors for the measurement of market share by airline as represented by Avianca through the registration of the highest frequency in the total domestic operation of 46%, concentrating 14% of it in the Bogota-Medellin-Bogota route, which allows it to dominate the domestic market.

In the case of Latam airline, it appears in second place in the domestic market share by number of routes operated with 23%, which, like Avianca, concentrates its operation with 18% in the Bogotá-Medellín-Bogotá route.

Likewise, Satena also concentrated its operation on the route to Medellín, while Viva Air did so on the route to Cartagena, as did Wingo, Easyfly and Ultra Air in Neiva and Santa Marta respectively. The appearance in the market of Viva Air, Ultra Air and Wingo meant the opening of more routes to Medellín and Cartagena and other domestic destinations, highly demanded and also offered by traditional commercial airlines such as Avianca, Latam Airlines or even Easyfly, which was founded years before the other 3 low cost airlines. This indicates that the emergence of new low cost airlines may become representative within the domestic market share of commercial air transportation in Colombia.

As far as the Administrative Planning Regions are concerned, it is evident that the Pacific RAP is operated by all the airlines included in the research. It is inferred that one of the routes with operational representativeness is located within this zone (Bogotá-Cali-Bogotá), and is complemented by operations to other cities such as Quibdó, Tumaco, Popayán, Pasto and Ipiales.

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Finally, for the Colombian departments, Cundinamarca was identified as being served by the 7 airlines, since this is where Bogotá's El Dorado airport is located, which, being the capital, connects with all the other airports in the country.

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