Located along the coast of Southern California, San Diego is renowned as a major tourist destination for its mild climate, expansive beaches, and must-see attractions, such as the San Diego Zoo, LEGOLAND, and SeaWorld. Close to 35.2 million tourists visit San Diego annually, spending approximately $11.6 billion in the region.[1] San Diego County is comprised of 18 cities. It is the southwestern most county of the U.S. and is adjacent to the Mexican border. With a population of over 3.3 million, it is the second largest county in California and the fifth largest county in the U.S.

San Diego County also has the largest military concentration in the world, as the headquarters of 16 stations of the U.S Navy, U.S. Marine Corps and U.S. Coast Guard. Recently, San Diego has become known as a healthcare, mobile telecommunications, and biotechnology development center, leading the way with technology-driven health innovation such as wireless health. Numerous research institutions are also based in San Diego, making it one of the research and development capitals in the U.S. With 98 percent of firms in the region being small businesses, 68 percent of San Diego's economy is comprised of local businesses.[2]

San Diego International Airport (SAN) offers close to 500 flights daily, with over 60 nonstop destinations across the U.S. and in Asia, Europe, Mexico, and Canada.[3] Prior to the pandemic, the airport handled a record of over 25 million passengers in 2019.[4] Majority of passengers (over 24 million) were domestic travelers, with the largest seat capacity growth accounted for by west coast markets.

The region is included as a case study because it is an FAA-defined large hub competing in an area with multiple airports. These are Los Angeles International Airport (LAX), which served more than 88 million passengers in 2019; John Wayne Airport (SNA) in Orange County, CA that handled nearly 11 million passengers in 2019; and Ontario International Airport (ONT) in San Bernardino County with over 5.5 million passengers in 2019.

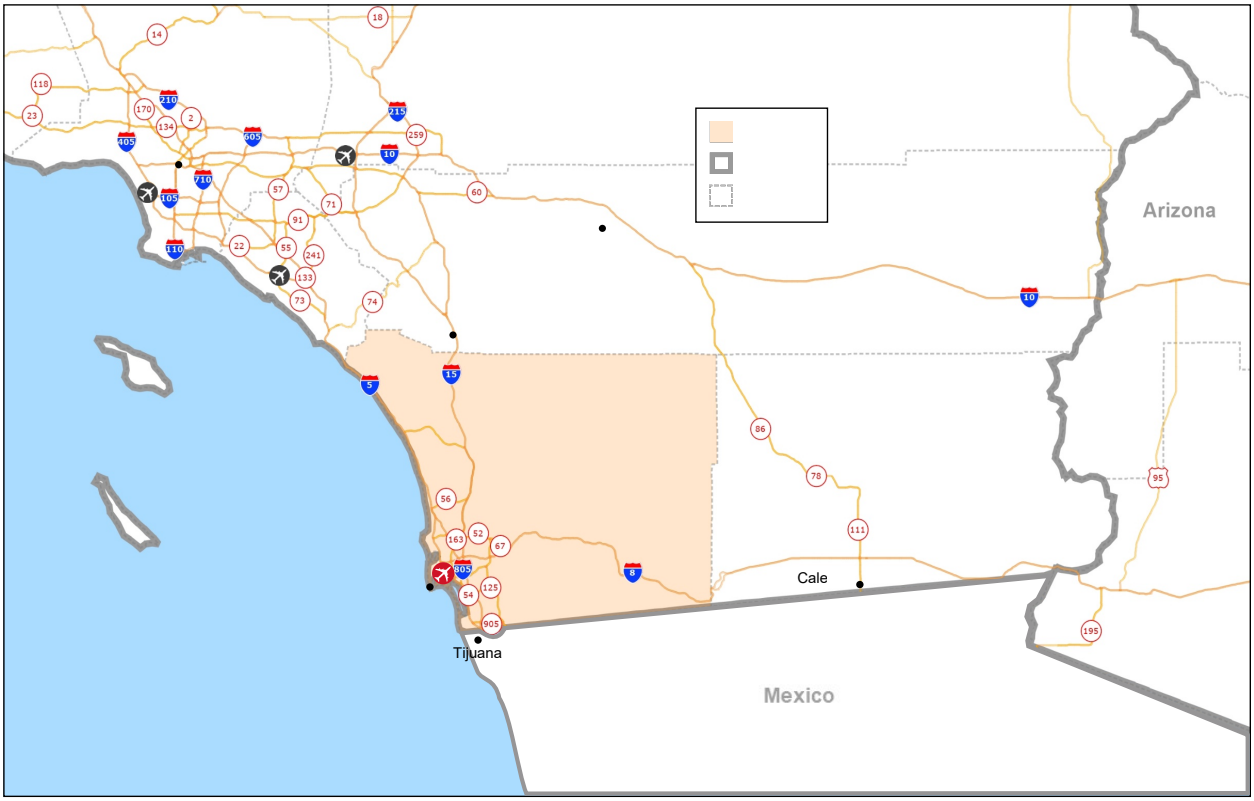
Overview of the Region and its Economy

San Diego County consist of the San Diego-Chula Vista-Carlsbad, CA Metropolitan Statistical Area. The region supports 1.39 million jobs and contributes over $250 billion in GDP.[5] Within the local economy, the largest industries are finance; real estate; insurance; professional, scientific, and technical services; and information. Comprising 13 percent of San Diego's economy, tourism in the region directly and indirectly supported 199,800 employees and generated almost $850 million in state and local transient

[1] https://www.sandiego.org/about/industry-research.aspx
[2] https://www.sandiegobusiness.org/research/regional-economy/
[3] https://www.san.org/Flights/Nonstop-Destinations
[4] https://www.san.org/Portals/0/Documents/Air%20Traffic%20Reports/2019_Year_in_Review.pdf?ver=2020-02-27-144247-470
[5] https://www.sandiegobusiness.org/research/regional-economy/

occupancy, sales, and property taxes in 2019.[6] Recognized as a leading high-tech hub in the U.S., the region's innovation cluster, which includes technologies in information and communications, aerospace and navigation, as well as biotechnology and pharmaceuticals, accounts for 9.7 percent of the regional economy. Defense makes up 9.1 percent of the regional economy, with over 60 percent of vessels of the U.S. Pacific Fleet stationed in San Diego. Between 2014-2018, approximately $15.6 billion in foreign direct investment was invested into the region, 70 percent of which was in the life sciences sector. Total exports from San Diego amounted to $20.2 billion in 2018.[7]

Figure 1: San Diego-Chula Vista-Carlsbad, CA Metropolitan Statistical Area Map



The region's population and employment have grown moderately since 2008. Table 1 summarizes the changes in key socio-economic characteristics for the period. As shown, from 2008 through 2019:

- Total population rose by 316,000 (10 percent). This is slightly faster than the growth for California as a whole, which increased by 8 percent.
- Total employment increased by over 320,000 (17 percent). This rate is slightly below the rate for California, which rose by 19 percent.
- Average per capita income (nominal dollars) rose from about $45,100 to $63,700 (41 percent). The region's 2019 per capita income was 4.5 percent less than the California average ($51,791).
- The number of establishments operating in the region also increased, rising by about 17,000 (17 percent).[8]

[6] https://www.sandiego.org/about/industry-research.aspx
[7] https://www.sandiegobusiness.org/wtcsd/
[8] The BEA uses data from the U.S. Census Bureau on "establishments," which it defines as "An establishment is a single physical location at which business is conducted or services or industrial operations are performed. It is not necessarily identical with a company or enterprise, which may consist of one or more establishments. …

Table 1: Change in Major Socio-Economic Factors: San Diego

	2008	2015	2019	Change 2008-15		Change 2015-19		Change 2008-19	
				#	%	#	%	#	%
Population	3,022	3,281	3,338	259	9%	57	2%	316	10%
Total Employment	1,883	2,030	2,204	147	8%	174	9%	322	17%
Private Non-farm Employment	1,526	1,684	1,839	157	10%	155	9%	313	20%
Gov't Employment	344	335	354	(9)	-3%	19	6%	10	3%
Income per Capita ($)	$45,131	$54,822	$63,729	$9,691	21%	$8,907	16%	$18,598	41%
Number of Establishments	96	101	113	5	5%	12	12%	17	17%

Note: Data are for the San Diego-Chula Vista-Carlsbad, CA Metropolitan Statistical Area. Government employment includes both military and civilian. All data are in 1,000s except for per capita income.
Source: BEA

Regional Economic Strengths

Among the largest industry sectors (those with at least 100,000 employees in 2019), data from the BEA shows that employment in government and government enterprises was the highest with approximately 353,500 employees. This was 3 percent more than employment in 2008. This is partly a reflection of the significant military presence in the area.

For private nonfarm industry sectors, the largest in terms of employment was professional, scientific and technical services (PST) with 233,000 employees, an increase of 21 percent over the 11 years. With a 52 percent change from 2008 to 2019, health care and social assistance is the third largest industry sector in terms of employment, with 214,900 employees in 2019. Transportation and warehousing experienced the highest growth of employment, with more than double the number of employees in 2019 (77,600 employees) than in 2008 (31,600 employees). Table 2 shows changes in employment for the largest industry sectors from 2008 to 2019.

Establishment counts represent the number of locations with paid employees any time during the year." The count excludes government establishments except for certain situations, such as state-operated retail liquor stores, local government-owned/operated hospitals, and federally-chartered credit unions.
https://www.census.gov/programs-surveys/susb/about/glossary.html

Table 2: Changes in Employment 2008-2019 for Largest Industry Sectors
(ranked by number of private nonfarm sector employees in 2019)

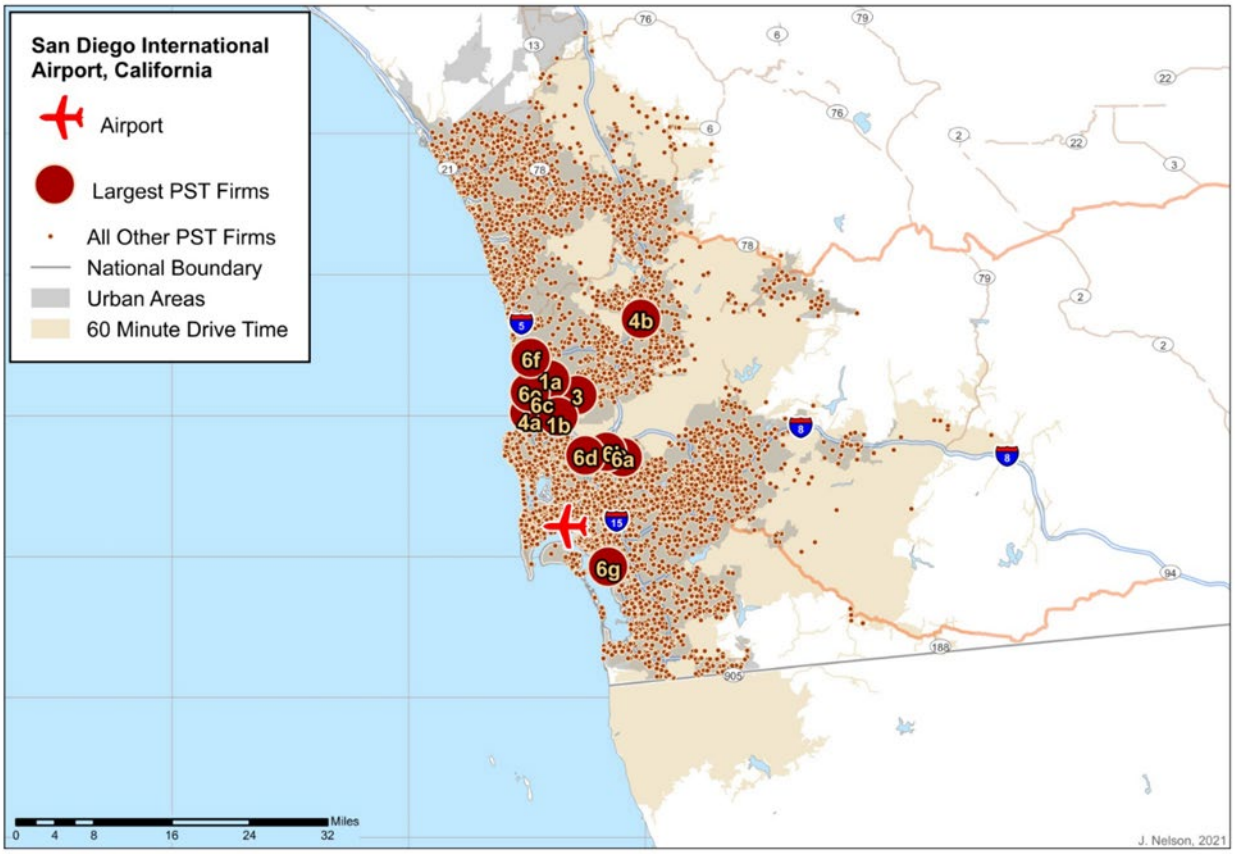
Industry Sector	2008	2015	2019	Change 2008 - 2019	
				Number	Percent
Private nonfarm employment					
Professional, scientific, and technical services	192,306	206,969	232,964	40,658	21%
Health care and social assistance	141,693	191,500	214,893	73,200	52%
Accommodation and food services	147,467	167,865	184,964	37,497	25%
Retail trade	178,039	183,272	182,524	4,485	3%
Other services (except gov't and gov't enterprises)	108,100	124,851	133,028	24,928	23%
Administrative and support and waste management and remediation services	121,067	125,910	130,570	9,503	8%
Manufacturing	110,329	114,463	124,439	14,110	13%
Real estate and rental and leasing	101,180	106,613	115,815	14,635	14%
Construction	104,089	97,239	112,793	8,704	8%
Finance and insurance	83,279	88,630	99,565	16,286	20%
Transportation and warehousing	31,608	47,068	77,608	46,000	146%
Arts, entertainment, and recreation	46,807	51,875	58,964	12,157	26%
Wholesale trade	55,967	61,050	54,620	(1,347)	-2%
Educational services	35,409	49,150	49,056	13,647	39%
Information	38,358	30,494	29,926	(8,432)	-22%
Management of companies and enterprises	17,144	24,203	27,144	10,000	58%
Government and government enterprises	343,937	334,997	353,501	9,564	3%
Grand Total (includes farm-related)	**1,882,625**	**2,029,956**	**2,204,327**	**321,702**	**17%**

Source: BEA data, San Diego-Chula Vista-Carlsbad, CA Metropolitan Statistical Area.

Drive Time Analysis

An alternative way to examine the region's economic base is to visualize business activity within a certain driving distance from the airport. Figure 2 illustrates a 60-minute drive time around SAN and the location of PST businesses within that area.

Figure 2: Spatial Distribution of Professional, Scientific, and Technical Service Firms (NAICS 54) in the SAN Airport One-Hour Drive Time Trade Area



Source: ESRI Business Analyst

Key highlights of socio-economic activity *within the 60-minute drive of the airport*:

- The total estimated 2019 population was 3.2 million. Of that, about 2 million (64 percent) were considered "working age" (between the ages of 18 and 64).
- The region supported over 135,000 businesses employing nearly 1.5 million. In terms of major industry sectors (defined by NAICS codes), the largest based on total employment was Professional, Scientific, and Technical Services (PST, with over 126,000 employees) followed by Manufacturing (almost 109,000 employees),and then Finance, Insurance, and Real Estate ("FIRE") with nearly 105,000.
- A large percentage of the total population is highly educated. Of the total population within the drive time, 24.3 percent held a Bachelor's degree and another 15.4 percent held a Graduate or Professional degree.

Traded Economic Clusters

The U.S. Cluster Mapping Project also highlights the region's economic advantages, noting particular strengths in aerospace and defense, biopharmaceuticals, Information technology and analytical instruments, marketing, and education. *Traded clusters*, which are groups of related industries that serve markets beyond the region in which they are located and therefore require some form of transport connectivity, make up 36 percent of San Diego's economy. The Cluster Mapping project noted great strength in five traded clusters in 2018, the latest data available:

- **Aerospace Vehicles and Defense:** This sector includes aircraft, missiles, and space vehicles, as well as search and navigation equipment. The region is ranked 6th nationally in its economic strength in aerospace and defense.
- **Biopharmaceuticals:** This sector includes biopharmaceutical products, diagnostic substances, and biological products. The region is ranked 7th nationally in its economic strength in biopharmaceuticals.
- **Education and Knowledge Creation:** This sector includes research organizations, colleges, universities and professional schools, training programs, educational support services and professional organizations. The region is ranked 11th nationally in its economic strength in education.
- **IT and Analytical Instruments:** This sector includes software publishers, medical apparatus, and audio and video equipment. The region is ranked 13th nationally in its economic strength in IT.
- **Marketing, Design and Publishing:** This sector includes marketing and advertising related services, as well as design services. The region is ranked 17th nationally in its economic strength in marketing.

The region also is ranked in the top ten nationally in two other traded industry sectors;

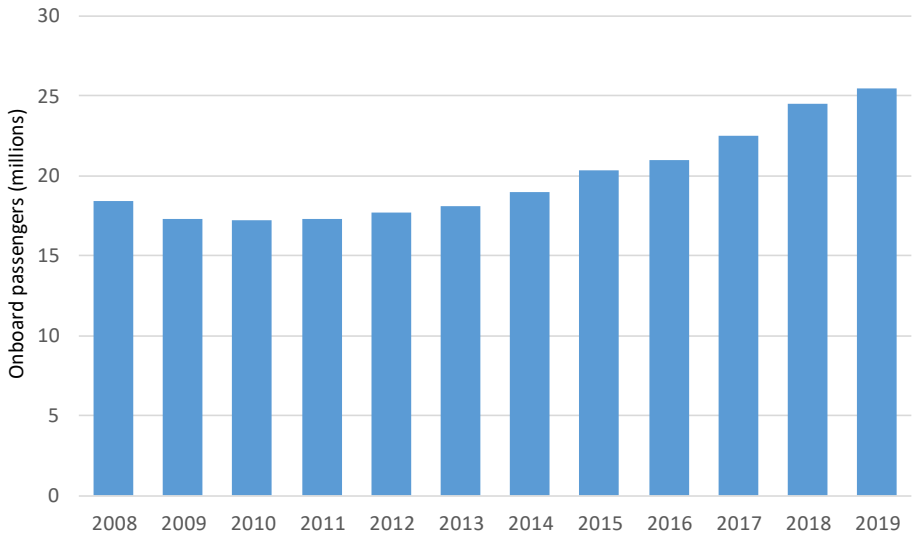
- **Hospitality and Tourism,** which includes accommodations, amusement parks, cultural and educational entertainment, spectator sports and other tourism attractions. The region is ranked 8th nationally in its economic strength in hospitality.
- **Water transportation**, which includes boat building and repair and marine transportation services. The region is ranked 9th nationally in this sector.

Overview of the Airport and Changes in Air Service

San Diego International Airport is managed and operated by the San Diego County Regional Airport Authority (SDCRAA). Established on January 1, 2003, the independent agency is governed by a nine-member Board, with three additional members serving ex officio. In addition to managing day-to-day operations, the airport authority is also responsible for overseeing the long-term air transportation needs of the region.

Passenger traffic at SAN has been increasing steadily since 2010, reaching the highest level of passengers handled at the airport of over 25 million in 2019. Since 2008, passenger traffic at the airport has grown with a compound average growth rate of 3 percent. Following recovery from the global economic downturn in 2008, the growth rate at the airport over the last five years has been 6 percent. Figure 3 shows the development of passenger traffic at SAN from 2008 to 2019.

Figure 3: Onboard Passenger Traffic at SAN, 2008-2019



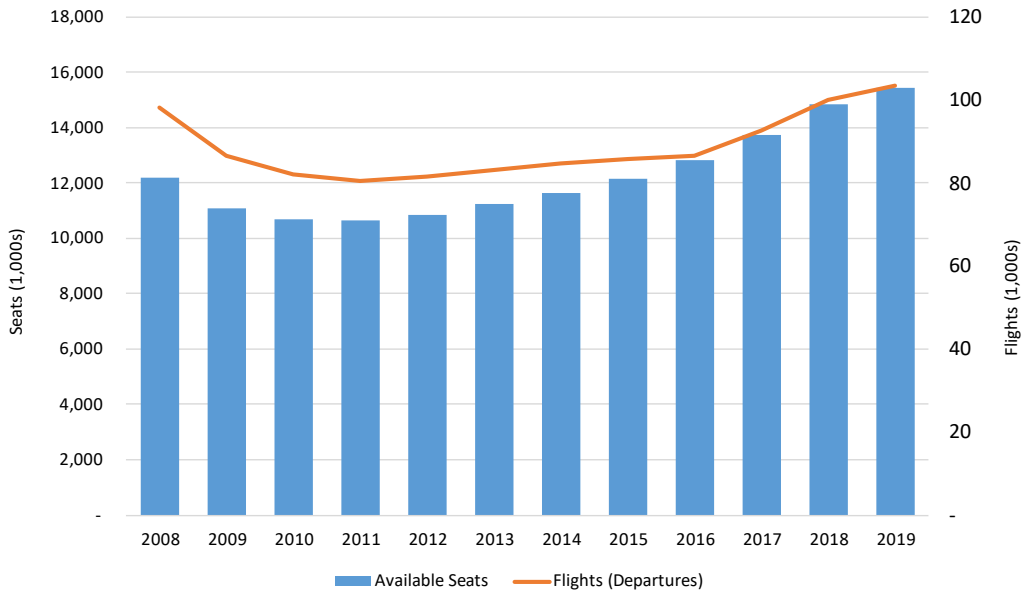
Source: T-100 data for Scheduled Passenger Service via Diio by Cirium

The total number of nonstop markets served by the airport, as well as number of flights to major markets, also grew from 2008 to 2019. In 2008, SAN offered service to 50 destinations.[9] In 2019, the airport had service to 60 destinations, an increase of 20 percent over the 11 years. Domestic markets made up majority of the destinations, but only had a growth of 8 percent from 2008 to 2019. San Francisco (SFO) continued to be the largest destination in terms of flights, followed by San Jose (SJC). International markets accounted for majority of the growth in services during this time period, increasing from two destinations in 2008 to eight destinations in 2019. As of 2019, SAN offered international services to three Canadian destinations – Vancouver (YVR), Toronto (YYZ), and Calgary (YYC); two Mexican destinations – Los Cabos (SJD), and Puerto Vallarta (PVR); two European destinations – London (LHR), and Frankfurt (FRA); as well as one Asian destination – Tokyo-Narita (NRT).[10]

The growth in the amount of capacity offered at SAN, in terms of both total flights and seats available for sale is shown in Figure 4. The number of available seats rose from over 12 million in 2008 to more than 15 million seats in 2019, an increase of 27 percent. This is equivalent to an additional 8,900 seats per day. Available seat capacity had a compound average growth rate of 2 percent over the 11-year time period. The number of flights at SAN also increased from more than 98,100 departures in 2008 to over 103,400 departures in 2019. The addition of nearly 5,300 flights, or growth of 5 percent, is equivalent to 14 more flights per day. The compound average growth rate of flights at SAN from 2008 to 2019 was 0.5 percent. Average aircraft size (seats per departure) rose from 124 to 149, an increase of 20 percent.[11]

[9] "Service" is defined by a minimum of 150 departures per year.
[10] Diio Schedules
[11] Diio Schedules

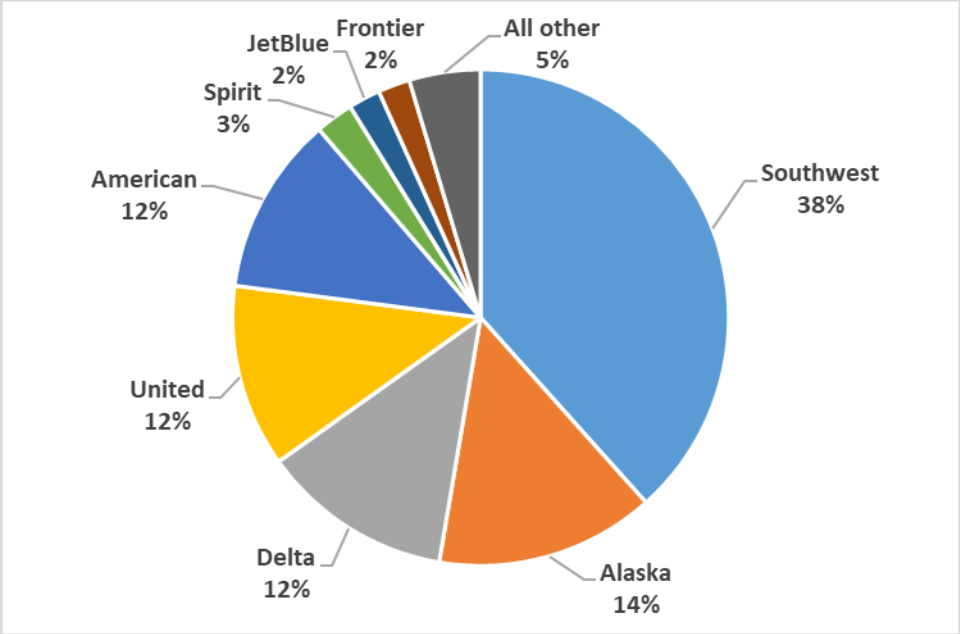
Figure 4: Changes in Capacity Offered 2008-2019



Source: Schedule data from Diio by Cirium

Six domestic carriers operate out of the SAN's Terminal 1, while 11 domestic and foreign carriers operate out of Terminal 2. Southwest Airlines is the largest carrier at SAN based on onboard passengers, accounting for nearly 38 percent in 2019, followed by Alaska Airlines with 14 percent. Delta Air Lines, United Airlines and American Airlines each with 12 percent. In 2019, scheduled seats at the airport reached nearly 31 million, with an estimated 82.8 percent load factor. Figure 5 shows airline market share at the airport in 2019, based on onboard passengers.

Figure 5: Airline Market Share at San Diego International Airport, 2019



Although passenger traffic levels at SAN in 2020 was impacted by the travel restrictions of the COVID-19 pandemic, airlines continued to announce new routes. In 2020, 12 additional routes were launched by Alaska Airlines and Allegiant to five new destinations each, as well as by JetBlue and Southwest to one new destination each. With a growth in seat capacity of 30 percent, Allegiant was the only carrier to experience an increase in 2020 compared to 2019. Despite a decrease in cargo tonnage handled as a result of reduced passenger operations, total cargo operations at SAN increased by 6.2 percent year-over-year with nearly 7,100 cargo operations in 2020.[12]

San Diego County is the primary catchment area of the airport, while nearby Imperial County is a secondary catchment area. The Northern Baja California region is also a secondary catchment area, with Mexican residents using SAN for U.S. domestic flights. With Los Angeles International Airport approximately 127 miles away and a 2.5-hour drive from SAN, there is leakage to the airport with passengers using LAX, in particular for international services, Mexico services to Tijuana, and domestic services where SAN is underserved. Two other airports nearby include John Wayne Airport in Orange County and Ontario International Airport in San Bernardino County, which also offer a range of nonstop domestic and international destinations. However, as mentioned, SAN has been able to capture passengers from Baja California, which was never able to support services to the U.S., as well as some traffic from southern Orange County. (In addition, SAN experiences unusual competition for flights to many locations in Mexico from Tijuana International Airport (TIJ), which has a unique cross-border passenger bridge. Using the "Cross Border Xpress" provides travelers with access to more than 35 destinations including cities such as Mexico City, Guadalajara, Monterrey, Querétaro, Puebla, Zacatecas,

[12] https://www.san.org/Portals/0/Documents/Air%20Traffic%20Reports/2020_Year_in_Review.pdf?ver=2021-01-27-141504-763

Morelia and beach destinations such as La Paz, San José del Cabo, Puerto Vallarta, Cancun, Ixtapa, and Loreto.) Table 3 summarizes the competition from the other nearby U.S. airports.

Table 4: Summary of Airport Proximity and Service

Airport	Distance (miles)	Drive Time (hrs.)	Avg. Daily Flights 2019	Markets Served 2019
San Diego International Airport (SAN)	---	---	283	60
Los Angeles International Airport (LAX)	127	2.5	864	162
John Wayne Airport (SNA)	87	1.5	125	24
Ontario International Airport (ONT)	115	2.5	66	19

Note: Drive times based on Google maps, estimates for mid-morning weekday. "Average daily flights" based on scheduled operations. "Markets served" based on a minimum of 150 annual departures and refer to unique airports. If two or more airlines serve the same destination (e.g., ORD), the "market served" is counted only once.

Connectivity

High quality transportation – of all modes – is a prerequisite for sustained economic growth and competitiveness for a region. Specifically, these factors of economic development are driven by productivity growth which is underpinned by trade, foreign investment, and innovative activity – all of which are facilitated by connectivity. "Connectivity" generally means the ability to reach a wide range of places in a short amount of time. Connectivity is not simply a matter of the number of routes or number of frequencies operated. Connectivity is fundamentally about access to markets and regions.

Connectivity can be quantitatively measured in a variety of ways; the figure below summarizes the growth in connectivity at SAN between 2008 and 2019 using a method developed by the International Air Transport Association (IATA). The IATA connectivity index estimates the quality of air service at an airport based on the degree of service to other airports with the largest and most diverse route networks, as a proxy for how accessible the local economy is to the rest of the world.[13] The change in SAN's connectivity index or score is charted below in Figure 6, by indexing the score against 2008 levels for comparison.

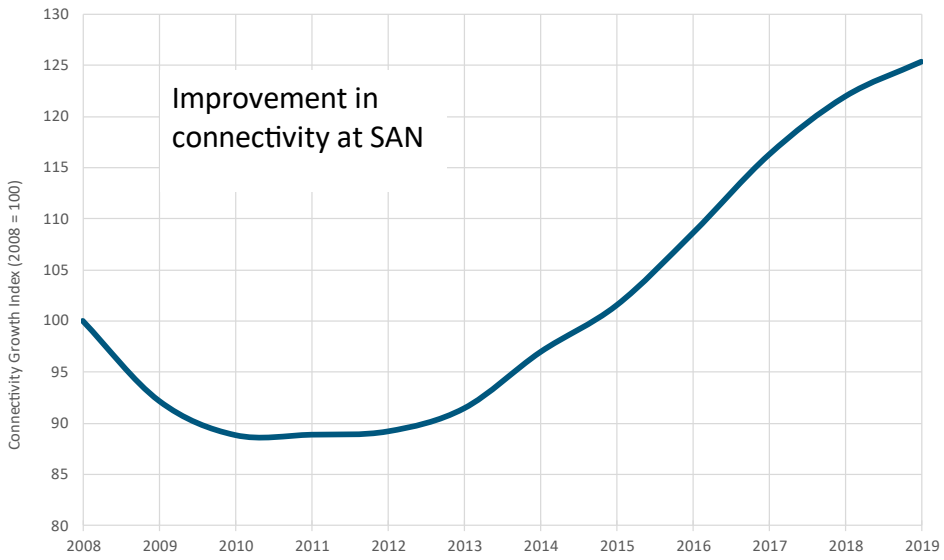
Connectivity at SAN in 2019 was 25 percent higher than 2008 levels, with continued growth in nonstop passenger services to key destinations over the years. All else being equal, each additional seat serving these routes will yield a higher level of connectivity than smaller airports with fewer onward destinations and service. Between 2008 and 2019, connectivity at the airport had a compound annual growth rate of 2.9 percent. As mentioned, passenger traffic at SAN was impacted by the Great

[13] The IATA connectivity index measures the number and size of destinations served, as well as the frequency of service to each destination and the number of onward connections available from those destinations. Service to airports with the highest total seat capacity (e.g. ATL) receive the highest weighting. Thus, the index recognises that connections to major global gateways provide greater global connectivity than connections to the same number of spoke ends. The formula for the index is as follows:

$$\frac{[\text{Number of destinations} \times \text{Weekly Frequency} \times \text{Seats per flight}]}{\textit{Weighted by the Size of the Destination Airport}}$$
$$\text{Scalar factor of } 1000$$

Recession, which impacted the airport's connectivity level. However, it returned to pre-recession levels of connectivity by 2015, then sustained continued growth in most years through 2019.

Figure 6: SAN Connectivity Growth Index (2008=100)



Note: Chart shows the IATA Connectivity Index for SAN, indexed against 2008 (2008 = 100).
Source: InterVISTAS analysis of Innovata schedule data from Diio Mi.

Changes in Air Service and Economic Activity

There is a high correlation between SAN's origin-destination traffic and total local employment. Figure 7 shows how changes in passenger traffic have aligned with changes in the regional economy, based on employment. The line demonstrates a simplified linear relationship between the two. As the regional economy develops through increases in employment, total passenger traffic also increases. The correlation coefficient between the two is close to 1 at 0.97, indicating a significant positive relationship. The chart does not demonstrate causation; that is, it is not evident whether rising total employment levels leads to more air traffic, or whether more air traffic leads to more total employment. However, the chart can show how changes in air service and economic activity move together.

Figure 7: Relationship between Regional Employment and Total Origin-Destination Passenger Traffic

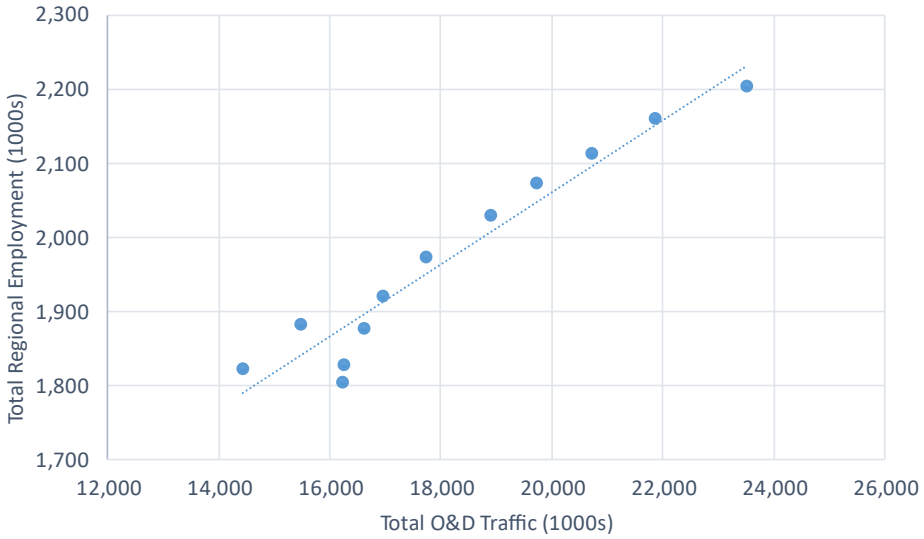
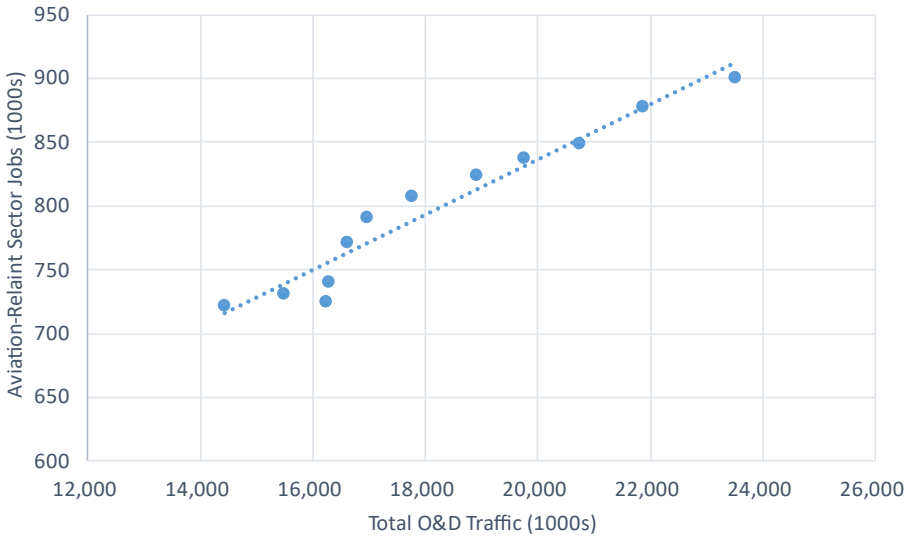


Figure 8 summarizes the relationship between the airport's total O&D traffic and the region's employment in "aviation-reliant" industry sectors. Those include information technology; finance, insurance, and real estate; PST; management of companies, administrative services, educational services, and health care. The correlation remains very high: 0.94. Again, the two variables move together: increases in one correspond with increases in the other. No causality is proven.

Figure 8: Relationship between Total Origin-Destination Passenger Traffic and Aviation-Reliant Industry Employment



Airport's Connections with Regional Economic Stakeholders

SDCRAA's Air Service Development (ASD) program is directly related to economic activity in the region. Comprised of two full-time staff members, the ASD team is currently focused on international growth, in particular hub operations to maximize load factors. In the past, SAN was able to introduce services to the U.K. through British Airways, and Asia through Japan Airlines. The next focus for the airport authority was Latin America. Within the U.S., the ASD team focuses on domestic markets with more than 100 passengers daily each way (PDEW). With consolidators trucking mostly to LAX, the airport's ASD program does not have specific air cargo or freight goals.

To obtain these goals, SAN uses passenger traffic trends and statistics to determine the next best option for them, or the next best hub to serve passengers one-stop. The airport looks at the number of passengers flying two-stops, which they would do one-stop for through a new hub. Businesses in the regional economy also influences ASD targets, as SDCRAA regularly reaches out to corporate businesses to see how they are travelling.

Regional stakeholders, including both the government and private sector, are extremely important. They are actively engaged with the airport's ASD team. The U.S Navy, Army and Marines have a natural connection with cities with sizeable bases, and with the large military concentration in San Diego, SAN has a strong relationship with military departments in the region. The airport authority also has frequent conversations with companies, such as ViaSAT – a communications company based in the City of Carlsbad within San Diego County, about the order of magnitude or size of the market. Qualcomm, a multinational corporation based in San Diego that manufactures semiconductors, has also attended meetings with an international carrier.

With the trifecta of the airport, tourism authority and economic council, SAN has been able to successfully attract non-stop services to strategic domestic and international markets. In particular, by working together, the airport has met its goal of obtaining air services to Europe and Asia. Key partners of the SDCRAA include the San Diego Economic Development Council and World Trade Center San Diego, San Diego Tourism Authority, and the Port of San Diego.

The SDCRAA is closely connected with the San Diego Economic Development Council (EDC), a non-profit and independently funded organization with a mission to "maximize the San Diego region's economic prosperity and global competitiveness."[14] The EDC works directly with local businesses and the airport to tie the global story to broader economic sectors developing in the region, providing services to companies that enable them to expand and increase employment in San Diego. The EDC's international affiliate, World Trade Center San Diego (WTCSD), specifically assists local small businesses with growing international exports and attracting foreign direct investment (FDI). By focusing on high growth industries in the region, the World Trade Center connects the region to key global markets.[15] Once or twice a year, the airport authority, EDC and WTCSD have a relationship upkeep meeting to ensure all groups are on the same page.

[14] https://www.sandiegobusiness.org/about-edc/
[15] https://www.sandiegobusiness.org/wtcsd/

The WTCSD's flagship program called MetroConnect assists small and medium businesses in exporting and growing internationally by providing them resources needed to participate in the global market. There have been 65 companies that have participated in the MetroConnect program. Since it started, the program has made a significant impact in the regional economy, with an $85 million net increase in exports, 18 new facilities established overseas, and 269 new jobs created in San Diego.[16]

Whenever an airline comes into town, a big marketing push is made by the airport and organizations to bring awareness in the market. Through these activities, and through airport connections, the EDC and WTCSD are introduced to the airline's business development representative. The EDC and WTCSD will meet with this individual, or team, to pitch to them potential ways to partner with them and grow their presence in San Diego. Some suggestions might include involvement in the MetroConnect program or outbound trade missions with business and elected leaders. The role of the EDC and WTCSD is to steward good relationships with the carrier and serve as the liaison between the carrier and local businesses. To further develop their presence in the region, the carrier may offer different incentives and packages for local businesses, such as flight discounts. The EDC and WTCSD will have a go-to contact for MetroConnect companies that want to make use of those discounted flights.

Communicating the Airport's Economic Impact

In June 2018, the airport authority released an Economic Impact Study of SAN prepared by CDM Smith. The technical report of the study can be found on the airport's website.[17] This latest study is based on airport operations in 2017. The study assessed the economic contribution of the airport, including onsite businesses and government organizations, off-site airport parking, and related air cargo facilities located off-airport. It also included an analysis of visitor spending and on-airport construction impacts.

The direct employment supported by SAN, including airport operations (onsite and offsite), visitor spending and on-airport construction, amounted to more than 67,800 jobs. Including multiplier impacts that are generated throughout the regional economy, total employment supported by the airport in 2017 reached nearly 118,000 jobs. This total employment comprises 5.7 percent of San Diego County's total number of employed persons in 2017, equivalent to 2.1 million employees. These airport activities generated close to $6.1 billion in direct economic output, and approximately $11.9 billion in total economic output when multiplier impacts are included.

The airport economic impact study has been used by the SDCRAA in their ASD initiatives, in particular when procuring international air services. It was also used by the airport authority when commencing new capital infrastructure projects, such as the construction of Terminal 1 and new Federal Inspection Station (FIS). Although the economic impact study was not necessary to justify these new services or projects, it quantified the value of SAN in economic terms. The study has been well received by stakeholders, with many organizations citing the study and results in their own newsletters.

[16] https://www.sandiegobusiness.org/wtcsd/metroconnect/
[17] https://www.san.org/Portals/0/Documents/Finance/Economic%20Impact%20Study/2017-01-06-economic-impact-study.pdf