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Improving Multi-Airport Capacity Utilisation in the Veneto Region in  
Italy

Faculty of Engineering and Applied Sciences  
Air Transport Management

MSc Thesis  
Academic Year: 2024 - 2025

Supervisor: Richard Moxon  
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the degree of Master of Science

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## **ACADEMIC INTEGRITY DECLARATION**

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- the thesis submitted has not been previously submitted to this university or any other.
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## **ABSTRACT**

Multi-airport systems and their effective development can become a mechanism through which growing traffic can be accommodated and allocated as to maximise offering and capacity utilisation. The aim of this research is that of analysing the case study of the Veneto region and its three main commercial airports: Venice Marco Polo, Venice Treviso, and Verona Villafranca. This analysis arises following the loss of a coordinated plan for the traffic allocation across the three airports after the global Covid-19 pandemic.

Whilst Venice and Verona are undergoing infrastructural expansion to accommodate future traffic requirements, Treviso had its expansion plans blocked due to noise and emission concerns. Simultaneously, the low-cost traffic that once was handled primarily by Treviso, has now grown and spread across all three airports leading to significant overlap in both the destinations served and carriers handled. This presents an inefficiency and a risk to the system's capacity both at an airport and airspace level. Therefore, it is required to evaluate the airport system and assess potential optimisation solutions to improve capacity usage and prepare the airports for the future.

To understand a possible future, a new traffic forecast was required to analyse hypothetical future scenarios that envisioned the co-existence of the three airports. These scenarios appraised differing traffic distributions in each airport and established that it is no longer possible to allocate traffic to each airport solely by carrier type (low-cost, full-service). The results also suggest that despite there being sufficient capacity for future travel demands, there is a need for a rationalisation of the network and for non-aviation investments like intermodal transport. This optimisation would allow for future organic growth without compromising current infrastructure investments as well as increase value-creation for all airport stakeholders.

Key words: Multi-Airport System, Italy, Air Traffic Distributions, Traffic Forecast, Air traffic demand

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I desire to acknowledge and thank Gruppo SAVE for my past experience that stimulated the vision and creation of this thesis. My intention is for this research to fuel the improvement of air transport in the region and increase awareness of the role that aviation plays in my home country.

Lastly, and most importantly, a special thank you goes to family for always being there for me and supporting my dreams.

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## LIST OF ABBREVIATIONS

|       |                                         |
|-------|-----------------------------------------|
| ACI   | Airport's Council International         |
| ATM   | Air Transport ATMs                      |
| BGY   | Milan Bergamo Airport                   |
| BLQ   | Bologna Guglielmo Marconi Airport       |
| BZO   | Bolzano Airport                         |
| ENAC  | Ente Nazionale per l'Aviazione Civile   |
| EU    | European Union                          |
| FBO   | Fixed Base Operator                     |
| FSC   | Full-Service Carrier                    |
| GA    | General Aviation                        |
| GDP   | Gross Domestic Product                  |
| IATA  | International Air Transport Association |
| KM    | Kilometres                              |
| LCC   | Low-Cost Carrier                        |
| LIN   | Milan Linate Airport                    |
| MAC   | Multi-Airport Cities                    |
| MAP   | Million Annual Passengers               |
| MAR   | Multi-Airport Region                    |
| MAS   | Multi-Airport System                    |
| OEM   | Original Equipment Manufacturer         |
| PPMR  | Passenger-Per-Movement Ratio            |
| SME   | Small-to-Medium Enterprise              |
| SQM   | Square Metres                           |
| TEN-T | Trans European Network-Transport        |
| TRS   | Trieste Airport                         |
| TSF   | Venice Treviso Airport                  |
| VCE   | Venice Marco Polo Airport               |
| VRN   | Verona Villafranca Airport              |

# 1 INTRODUCTION

## 1.1 Research Background

The Veneto region, located in the North-east of the Italian peninsula, is the 4<sup>th</sup> most populated region in Italy and the one with the highest number of tourists. Over the last 50 years, it has been the setting for significant economic development thanks to specialised small-to-medium enterprises (SMEs). Alongside this development, tourism has flourished due to its diverse offering: from hiking and skiing in the Dolomites, lake Garda, the hills in the Padova province, to the beaches in the province of Venice. With a yearly population of around 4.8 million, Veneto accommodated 72 million tourist overnight stays in 2023 in its 18.399 square km (ISTAT, 2025).

Because of the high non-resident tourism demand (70%), travel to-and-from the region has directly stimulated the need for air-transport infrastructure. Already in the 1960s, Venice Marco Polo airport (VCE) was opened as a premium airport, attracting full-service carriers (FSCs) (Resini, 2008). After realising the potential for the region, this airport was renovated numerous times and is still undergoing infrastructural expansion to this day. In 2025, it managed 11.6 million annual passengers (MAP) (Assaeroporti, 2025)

Simultaneously to VCE's construction and development, Verona airport (VRN) was a WWII military base that was converted into a civil airport in the 1960s and was mainly responsible for charter services. As of 2025, it has remained primarily a leisure and charter airport with 3.7 MAP (Assaeroporti, 2025).

As the two airports grew, passenger demand also kept on growing, especially with the rise in popularity of low-cost carriers (LCCs) by the end of the century. Gruppo SAVE (n.d.) (VCE operator), in collaboration with Aer Tre (TSF operator), decided to capitalise on this opportunity and open a new airport terminal in 2007. Treviso (TSF) was an ex-military base and aero club that became part of the north-east multi-airport system (MAS) in 1996. This small airport operates mainly LCCs with some general aviation (GA) traffic, managing just over 3 MAP (Assaeroporti, 2025; OAG, 2025b).

In the history of the Veneto region's aviation sector, a former post-WWI and WWII military base was also attempted to be converted to a civil airport in Vicenza. This airport, after changing owners since 1921, ceased operations in 2008 (GDV, 2008).

Until the COVID-19 pandemic in 2020, the traffic distribution between the airports of VCE, TSF and VRN remained clear: VCE focused on FSCs whilst TSF dealt with LCCs and VRN handled charter and leisure destinations. During the pandemic, with the closure of the two latter airports, LCCs were welcomed in VCE and many like Wizz Air and Ryanair based their aircraft there. In 2025, there is no clear distribution of traffic, with the only unchanged aspect being the LCC presence in TSF. (OAG, 2025b).

## **1.2 Research Scope**

The scope of this research includes the three main airports located in the Veneto region. Despite there being other airports like the one in Padova (QIP) that is reserved for GA and flight schools, the focus is on VCE, TSF and VRN as they satisfy the criteria for a MAS seen in Chapter 2. VCE and TSF are currently considered as a MAS from both the airport operator Gruppo SAVE (n.d.) and from airlines that market the LCC-focused TSF as "Venice-Treviso". This research will focus on the three airports being considered as one single regional MAS. This is possible given the ownership of the airports: Gruppo SAVE (n.d.) operates both VCE and TSF, whilst being a 40% shareholder of VRN. More specifically, the scope entails the evaluation of the regional airport system and how its capacity, both current and planned, will be able to meet future air transport demand. In order to achieve this, the factors influencing the MAS will be evaluated at various levels (airport, airline, access, etc.) and their impact on the traffic will be assessed. Once established, future demand will be projected, and different scenarios of airport coordination will be developed.

## **1.3 Research Problem**

As the aviation sector expects to fully recover from the COVID-19 pandemic in 2025 (ACI, 2023), airports must return their focus to development plans regarding

meeting future travel demand by increasing capacity, or by readjusting their business models to regain financial sustainability. This is particularly relevant to the Northeast of Italy and to the Veneto region. During the pandemic, this MAS operated solely from Venice, with the two others being closed (Crepaldi, 2020). In a post-pandemic world, the original traffic distribution across the three airports was altered and did not return to its pre-pandemic arrangements. In 2016 FSCs operated around 60% of the departing seats, after the pandemic in 2025, FSC seats decreased to 46% of the market (OAG, 2025b).

Because of this, as Xiao et al. (2025) discover, the MAS involving TSF and VCE became “weakly complementary” in terms of the route overlaps and the carrier competition between them. When considering all three airports, around 50% of destinations were overlapped per airport. In terms of carriers, one third of those operating in VCE and two thirds of those in VRN overlapped, with no unique carriers operating at TSF (OAG, 2025b). Since both TSF and VCE are level 3 (slot coordinated) airports, and VRN is level 2 (slot facilitated), capacity in both the primary airport and one of the two secondary airports of the MAS is a scarce resource (Assoclearance, 2025). With a lack of coordination and numerous overlapped routes, there is a risk that the Veneto MAS will not be able to effectively meet growing passenger demand, potentially negatively impacting various key stakeholders. Signs of this poor coordination and competition can be identified with the closure of the easyJet base in 2025 (Zicchiero, 2024).

## **1.4 Aim and Objectives**

With respect to the scope, the aim of this study is to analyse how and why the traffic is distributed across the Veneto MAS and attempt to provide a coordinated plan for the efficient coexistence and development of the three airports involved. In order to achieve the aim of the thesis, the following objectives have been arranged:

1. To identify the importance and role of the Veneto region's air transport market and its main features.
2. To analyse the MAS strengths, weaknesses, opportunities and threats

3. To develop and evaluate possible future scenarios of the MAS with differing traffic distributions.

## **1.5 Thesis Structure**

There are nine chapters in this thesis. The first chapter outlines the key choices that shape this research: from the background and the scope to the research problem and how the aim is supported by the objectives to potentially provide a solution to such issue. The second chapter provides a literature review of the topic of MAS, its defining characteristics, their development, their traffic distribution and potential challenges. The third chapter details the methodology chosen to approach this research. The selected scope and methods are outlined alongside those that were rejected and the reasoning behind such choices.

Chapter four introduces the region, providing economic and demographic information to set the context. This is developed through an analysis of the transport networks connecting the provinces with its three main airports. Each of the airports is individually analysed in chapter five. This includes the traffic handled and the markets served, their catchment area and subsequent accessibility, and the current and future infrastructure. The sixth chapter addresses the airports as a MAS through the analysis of the passenger, cargo and GA traffic. Additionally, the MAS's network is evaluated in terms of its destinations and carriers. A SWOT analysis concludes this section.

The seventh chapter provides a future outlook through existing forecasts, and an author conducted one. These forecasts are then used to present a selection of scenarios where traffic is distributed across the system and its impact evaluated. The ninth and last chapter offers potential recommendations alongside the main findings of the research. The thesis is concluded after the limitations of the study and potential future research are discussed.

## **2 LITERATURE REVIEW**

The second chapter introduces the concept of a MAS, defining it and depicting its main characteristics like the history, traffic trends and distributions, as well as their challenges.

### **2.1 MAS Characteristics**

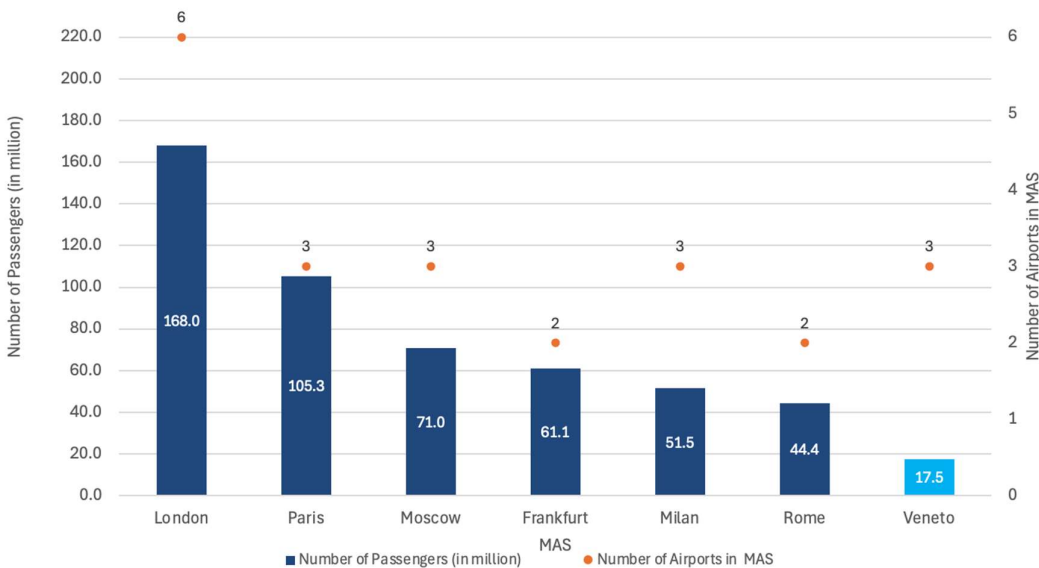
Neufville (2020) provides an initial definition of a MAS as the set of significant airports that serve the commercial transport of a designated metropolitan region. More modern definitions include the concepts of multiple-airport cities (MAC) and multiple-airport regions (MAR) to address areas that include multiple airports within a single metropolis (New York) and regions where multiple airports are present in separate urban areas that do not constitute a metropolis (Xiao et al, 2025). The latter is especially necessary for the thesis's case study of the Veneto MAS. The definition utilised respects the following considerations:

1. Airports are only considered if the primary purpose is that of passenger and cargo transport, thus excluding original equipment manufacturers (OEMs), military bases, and air show settings
2. It focuses on a regional scale, thus involving multiple metropolitan areas that may or may not be connected socially and economically (Johnson-Webb, 2005).
3. It is irrespective of airport ownership despite the airports involved being allowed to be managed by a single operator.
4. Airports considered serve a minimum of two million annual passengers to avoid airports contributing an insignificant proportion of traffic (Sun et al., 2017).

Different studies have concluded a varying number of MASs worldwide due to the varying definitions and different constraints utilised to define what constitutes as a MAS. Despite these inconsistencies, the latest studies confirm a number around 60. O'Connor and Fuellhart (2016) suggest there are 67 MARs worldwide whilst Xiao et al. (2025) concluded 58 MAS are present, made up of 138 airports. The number of airports within a MAS varies across examples, with the majority

of cases involving two-to-three airports like Milan and Istanbul. Exceptional cases are present with MASs involving only one airport like Atlanta, or up to six airports like the widely studied London MAS (Moxon, 2016). Figure 1 presents the largest MASs in Europe alongside the Veneto MAS.

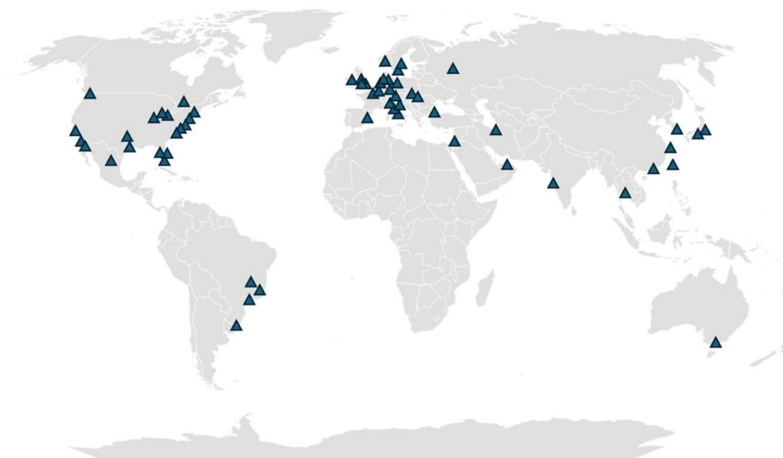
**Figure 1- Largest European MAS and Veneto MAS in 2023**



(Source: Airport Annual Reports 2023)

As several studies are collated, MASs are distributed across the globe with concentrations in Europe, North America and East Asia (Map 1).

**Map 1 – MAS in the World**



(Source: Author)

MASs are impactful in shaping the air transport industry. Not only do they contribute to 80% of total yearly passengers (Neufville and Odoni, 2013), but also to 50% of cargo (Xiao et al., 2025). This corresponds to 3,54 billion passengers and almost 70 million USD worth of cargo revenues in 2023 (IATA, n.d.).

MASs are popular due to their ability to improve regional accessibility, fostering economic growth and increasing employment (Hou et al., 2025). All these effects are crucial to meeting the increasing demands of an interconnected world and growing passenger numbers (Sun et al, 2024). Aside from economic benefits, MASs also provide opportunities for capacity constraints to be tackled with secondary airports. This implies the existence of “primary” and “secondary” airports which has been addressed by Nefuville (2020) as those that serve 20% or more of the MAS traffic and those between 1% and 20% respectively.

## **2.2 MAS Development**

As the benefits of MASs are discovered, their development increased through the years. MAS development arose due a number of reasons ranging from political to technical, as well as across a period of time. The multitude of factors and length of time is necessary for the effective implementation of MAS given the involvement of a large variety of stakeholders (Zietsman and Vanderschuren, 2014). The literature regarding the factors related to MAS can be summarised as follows.

Infrastructure both in terms of existing capacity and geographical constraints directly impacts an airport’s expansion opportunities. Similarly, political factors involving regulatory bodies both within and outside the industry decide the reality of airport development (Bolgeri et al., 2008). Thirdly, economic factors including market entry and development, catchment area changes, and overall regional accessibility induce market forces on the airport environment (Bonnefoy, Neufville, and Hansman, 2010).

More precisely, infrastructural factors can be separated into three different processes. The first revolves around the need for secondary or alternative airports to accommodate growing demand. New York is an example of this as

both the city grew alongside its airports, new airports ought to be constructed as those already built became entrenched by the metropolis and the bodies of water. Secondly, for regions like the Middle East and Asia where urban density is less propagated, newer and larger airports are built. As these airports are built, temporary MASs can be created as a result where both airports operate simultaneously. Dubai's airports of DXB and DWC are an example of this, where the former is expected to close in the near future as the latter has already commenced operations with carriers slowly moving operations (Wilson, 2025). The last process, popular in Europe, sees the conversion of military bases into commercial airports as capacity is reached in nearby airports. A recent example of this is Naples and Salerno airport, the latter, a former Italian air force base, opened for commercial service in 2024 to aid the region's commercial demand (GESAC, n.d.).

When it comes to political and regulatory factors, these are centred around the recent aspirations to make the sector more environmentally friendly in terms of noise and air pollution. Airports like Amsterdam Schiphol have been capped by the government due to emission constraints (Reuters, 2023). This is part of a wider trend that observes older airports require a MAS to support traffic growth as they combat increasing policy (Dobroszkes et al., 2021). Differently, politics can also drive airport construction from a national pride perspective to incentivise and facilitate growth as shown by the Saudi Vision 2030 (n.d.).

In economic terms, with the introduction of new markets ranging from LCCs to leisure airlines operating alongside FSCs, the role of primary and secondary airports has developed, especially following the COVID-19 pandemic (Jimenez and Suau-Sanchez, 2020). The key discovery of researchers is that as LCCs strive to drive prices down through lower costs, differentiated offerings, and less time-intensive operations; smaller secondary airports have become the ideal environment for their expansion (Graham, 2013). Ryanair is the primary example in Europe with its strategy of operating from secondary airports, often far from the final destination. Examples include Paris Beavais, Brussels Charleroi, and Hamburg Lübeck airports. Parallel to the different market segments, the effects

of market deregulation have directly increased airport capacity requirements due to new market entrants and the developments in existing carrier's networks (Barrett, 2000). Airports either compete for this additional traffic or join forces in developing a MAS.

With the three factors described above, MAS nowadays not only are present in large numbers worldwide but include a large number of airports within a single MAS. Cities like London and New York operate MASs with six airports each, whilst many others operate three or more airports per MAS.

## **2.3 MAS Traffic Distribution**

As different markets lead to the development of MASs, those same markets also lead to the distribution of traffic within those MAS. Key airport stakeholders like airlines and passengers have consequentially displayed preferences between airports (Neufville, 2020). Both the development and preferences directly influence traffic distribution at a MAS through the following factors: airline business model and its network strategy, airport fares, and type of passengers and traffic.

From the airline's perspective, both the carrier type and their network strategy influences the airport from which they operate. For example, LCCs are the dominant carrier type in Paris Beauvais whilst FSCs are more popular at Paris Charles de Gaulle. LCCs have been discovered to prefer secondary airports (Dziedzic and Warnock-Smith, 2016). This allocation is also evident in New York with FSCs preferring the John F. Kennedy airport and LCCs focusing on Stewart (CAPA, n.d.). In terms of airline network structure, a clear example is British Airway's London airport strategy with its hub-and-spoke strategy in Heathrow and a point-to-point model operated out of Gatwick.

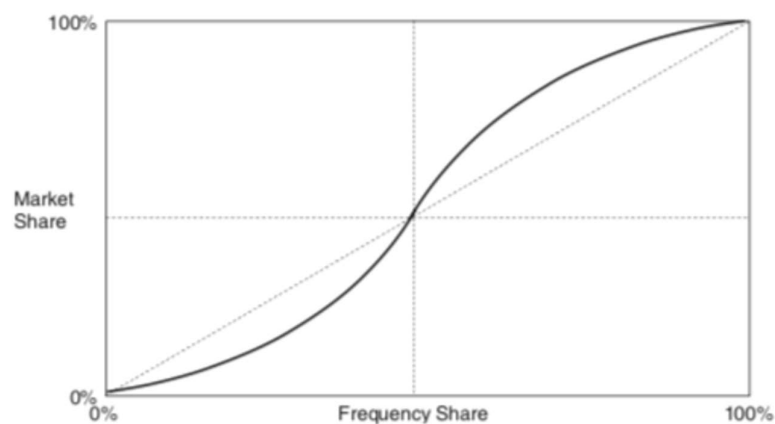
Moving onto the passengers, different types of passengers better suit certain airports. Neufville (2020) discovers that connecting traffic favours larger airports with a greater number of destinations. Departing and arriving passengers prefer an airport as close or well-connected to their final destination as possible to minimise the airport-to-door time (Hou et al., 2025). Similarly, city airports like

Milan-Linate and London-City better suit business travellers due to their location and size, whilst airports like Paris-Orly target a leisure-focused offering.

Lastly, airport fares including landing fees influence the carrier type and passengers attracted. Firstly, the absolute value of the fare impacts the cost base for an airline, meaning LCCs prefer lower fares clearly portrayed by Aéroport Paris Beauvais (n.d.) landing fees being around 75% of those charged at Paris Charles de Gaulle (Paris Aéroport, 2025). Secondly, in the recent years, airports like London-Heathrow (Gorman and Norman, 2015) and Paris-Orly have commenced to use noise and emission-weighted charges favouring airlines with younger, more fuel-efficient fleets, meaning primary airports tend to be preferred by more environmentally and cost-conscious airlines. This has caused LCCs like EasyJet to consider primary airports over secondary airports as charges like these present unprecedented market opportunities.

To measure the market share of airlines within an airport and how it shapes the traffic distribution the s-curve is widely used in the literature (Hansen and Liu, 2015). This curve relates the number of frequencies operated by a carrier against its respective market share (Figure 2). The trend argues that the higher the the number of frequencies operated by a carrier, the higher its market share. As airlines prefer an airport in a MAS, that airport will adapt to the dominant carriers and markets served (Huderek-Glapska and Nowak, 2016).

**Figure 2 – Traffic S-curve**



(Garrow, 2010)

## 2.4 MAS Challenges

Airports alone are complex in nature to operate as numerous stakeholders interact, in a MAS this complexity significantly increased. Research and examples show how already in the initial and growth phases of MAS developments, challenges arise. Whether it is the uncertainty related to the existence of demand as experienced by London Stansted airport (Hart and Mccann, 2000), or the imprecise planning regarding the need for expansion as discovered by the Ciudad Real airport in Spain envisioned as an alternative to Madrid Barajas (BBC, 2015). Additionally, even when airports do get built in a MAS, passenger preference still impacts traffic feasibility, possibly hindering the intended passenger numbers and distribution (Kalakou and Moura, 2021).

Even when airports in a MAS reach their full operational status, additional challenges present themselves. Specifically for secondary airports that are dependent on LCC traffic, infrastructure planning suffers from uncertainty as LCCs are always trying to find the most cost-efficient operations (Neufville, 2020). This can be observed in Hamburg Lübeck airport and Ryanair's entries and exits through the years (CAPA, 2024). Furthermore, as traffic grows within a MAS, a shortage in airspace capacity can occur simultaneously to the terminal or runway capacity being reached, adding further complexity to growth plans as experienced by the London airspace (Wang et al., 2023). This difficulty in planning infrastructure projects and, more generally, traffic projections can be explained by the capacity utilisation across the airports in a MAS. Czerny and Fukui (2024) discover that different approaches to the coordination of traffic between airports has had varying results and requires a constant balancing act from traffic rules to a more liberalist approach. Lastly, MASs, as components to the international air travel market, remain susceptible to economic booms and recessions due to air travel's two-way relationship with the global economy (Zhang and Graham, 2020).

The latter point about traffic allocation and the responsiveness to economic cycles is exactly what this thesis will explore in the Veneto region. MAS have been analysed to a certain degree in the literature from large MAS like London

and Milan (Molinari, 2018) to smaller case studies like the south of Italy (Fasone, Giuffrè, and Maggiore, 2012). Despite the research, the case of the Veneto region has not been evaluated. This is surprising due to its unique response to the pandemic: Wu et al. (2023) discover that despite the economic recession caused by the COVID-19 pandemic, MAS in Europe and the US have remained stable in terms of traffic distribution and airline market share. This was not the case with the Veneto MAS: LCCs commenced operations and based aircraft in VCE after mainly operating from TSF (OAG, 2025b). Furthermore, the changes in traffic distribution led to coordination issues between the airports which eventually lead to the loss of a based carrier in easyJet (Zicchiero, 2024).

### **3 METHODOLOGY**

To achieve the aim, the three objectives represent the structured approach, each with its own methodology and sources of information. Overall, the general methodological structure is adapted by similar academic works on Italian airport infrastructure and its interaction with the surrounding region (Molinari, 2018; Fasone, Giuffrè, and Maggiore, 2012).

#### **3.1 Scope Choice**

Before delving into the objectives, the focus of this study and its reasoning must be defined. As anticipated by the scope, the choice was made to focus solely on the three main airports of the region. This is because of two key aspects. The first is that, as Ma, Cui, and Xu (2023) discover, airports with a similar ownership are more likely to display organisational responsiveness. In turn, this increases the likelihood of the implementation of the outcomes of this study. Secondly, the scope required narrowing down because of the number of Italian airports: Assaeroporti (2025), the association for Italian airport operators, recognises 41 commercial airports in country. This choice is in line with previous works on the topic, focusing on three-to-four airports (Ontanon, 2021).

#### **3.2 Objectives**

In terms of the first objective, this is where the case study is contextualised: the region surrounding the scope is analysed in terms of its defining characteristics, including its demographics, tourism, business environment, etc.. This is achieved through the collection and summary of secondary data from national and governmental institutions as well as consulting reports and company annual reports. Zayadin et al. (2020) stresses the importance of developing an articulate knowledge of a national, regional and local setting for the effective undertaking of business activity. After covering the key areas of the region, the three airports are evaluated individually and as a MAS in terms of their traffic and infrastructure. In terms of the traffic, the analysis will cover passenger numbers, Air transport movements (ATMs) and cargo. The key sources for this include industry-specific databases (e.g. OAG, CAPA, Assaeroporti). Differently, the infrastructure will be

evaluated through the airport itself, including the terminal, runways, parking lots, but also through its accessibility through different travel modes. Lastly, existing infrastructure development plans will be summarised to understand the link between the current and future capacity. To inform these aspects, individual airport masterplans and airport operator annual reports will be the core secondary data (Wells and Young, 2004), supported by national institutions and associations (e.g. ENAC, ENAV, Assoclearance).

Furthermore, catchment area analysis is undertaken to understand airport choice in the MAS and identify competing airports outside the region that may cause passenger leakage (Fuellhart, 2007). To achieve a relevant picture of these alternatives, a driving catchment area of 60 and 90 minutes is applied alongside rail connections for similar timings. The choice reflects Airport Council International's (ACI) (2023) standards for European regional airport systems (60 minutes), and a reduction to Lieshout's (2012) maximum access time of 2 hours arising from the numerous airports surrounding the region. Esri's (n.d.) ArcGIS software alongside the national rail service providers (public and private) schedules and reports will form the secondary data for this section. Catchment area analysis is common in similar works (Donche, 2013; Ontanon, 2021).

The principal aim of the second objective is the effective summary of the findings of the previous one, where the external and internal environment of each airport interacts to output a strategy. This strategy exhibits both strengths and weaknesses that, in turn, raises opportunities and threats that each airport and the MAS as a whole ought to consider. Despite its simplistic nature, a SWOT (strengths, weaknesses, opportunities, and threats) analysis allows for the reconciliation of the extensive factors influencing the airports to define their current existence in a specific environment (Benzaghta et al., 2021). A SWOT analysis is thus conducted for each of the three airports, and for the MAS as a whole to define the base scenario, from which the forecasting activity can begin (Lindgren and Bandhold, 2009). Donche (2013) demonstrates the efficacy of SWOT analysis in reconciling past and present information.

For the last objective, having established the current scenario, an attempt to forecast the future is made to effectively plan the airport's coordination. Since every forecast is systematically wrong (Skaburskis and Teitz, 2010), to achieve a practical forecast, a mixture of different methodologies will be used. There will be two types of forecasts informing the expected passenger (and cargo) figures: existing forecasts and an author conducted one. For the existing forecasts, due to the limited availability of post-covid forecasts for airport traffic, pre-pandemic forecasts are postponed and adapted to allow for the pandemic and its recovery to occur. This assumption is made because the Italian aviation sector has officially fully recovered from the Covid-19 recession since the end of 2024, meaning 2025 is the first year of net growth on 2019 traffic (Eurocontrol, 2025). This postponement of forecasts from 2030 to 2035 has also been conducted by the Italian aviation authority (ENAC, 2022).

In terms of the author forecast, this will be conducted using time-series forecasting methodology. More specifically, Microsoft (n.d.) Excel's 'Forecast.ets' tool is used, designed to forecast consumer patterns. This methodology utilises the sequence of past observations at specific timestamps to predict future values (Brockwell, 2010). The excel function utilises exponential triple smoothing to ensure historical values, trends and seasonality are accounted for. Despite this methodology being a popular choice for operational and budgeting decision-making, it is widely used to analyse markets that are already established (Hopfe, Lee and Yu, 2024; Marazzo, Scherre and Fernandes, 2010). This methodology will be used to forecast future passengers, cargo tonnes, GA ATMs, and the passenger-per-movement ratio (PPMR).

Once the creation of a forecast for traffic is completed, this will then be allocated across the three airports. Lindgren and Bandhoud's (2009) "scenario cross" provides a simple and effective tool to achieve the allocation of traffic, having satisfied various criteria implemented in different scenarios. These scenarios vary by the traffic distribution choices and rules. The objective will be complete once an internally coherent view of the role and responsibility of each airport is defined with respect to the other airports (Porter, 1985).

### **3.3 Rejected Methods**

Aside from the methodology described above, there are various methods that have been rejected from this study due to a number of reasons.

Firstly, a financial analysis of the individual airports and the MAS could not be undertaken due to a lack of publicly available data. Consolidated financial statements of the operator are available, although the consolidation includes up to five airports with no per-airport breakdown. Despite the importance and relevance of financial aspects, as demonstrated by Roslan (2008), this study ought to be conducted without this analysis, but rather an industrial one.

Secondly, multi-factor regression was not chosen as the forecasting method following a lack of regional past and future data that would be required for the appropriate granularity of the forecast. This is a common disadvantage of economic-based methods (Hopfe, Lee and Yu, 2024)

Thirdly, this thesis is not aimed at rationalising the airport's networks, that is to find the most efficient allocation of resources to minimise costs and maximise revenues, subject to investment (Gordon and Neufville, 1977). Instead, the aim of this study is to develop a sustainable co-existence of airports in a region that does not necessarily involve the closure and/or drastic changes to airports and their infrastructure. This choice reflects the commercial scope that excludes political factors like employment, regional pride and historical heritage.

Lastly, with the commercial focus of this study, interviews as a research method were discarded because of the sensitivity of the topic and potential lack of willingness to speak by ideal interviewees (Qu and Dumay, 2011). Additionally, there is sufficient publicly available information to complete this study without primary data.

### **3.4 Ethics**

Despite this study being conducted purely from the analysis of secondary data, there is a risk that the conclusions arising from the thesis may contradict or challenge the airport operator's strategies and objectives. Whilst the latter is not

the intention of the study, this risk may arise. To mitigate this risk, Cranfield University's guidelines are followed. As shown in Appendix A, ethical approval was granted for this thesis on the 2<sup>nd</sup> July 2025.

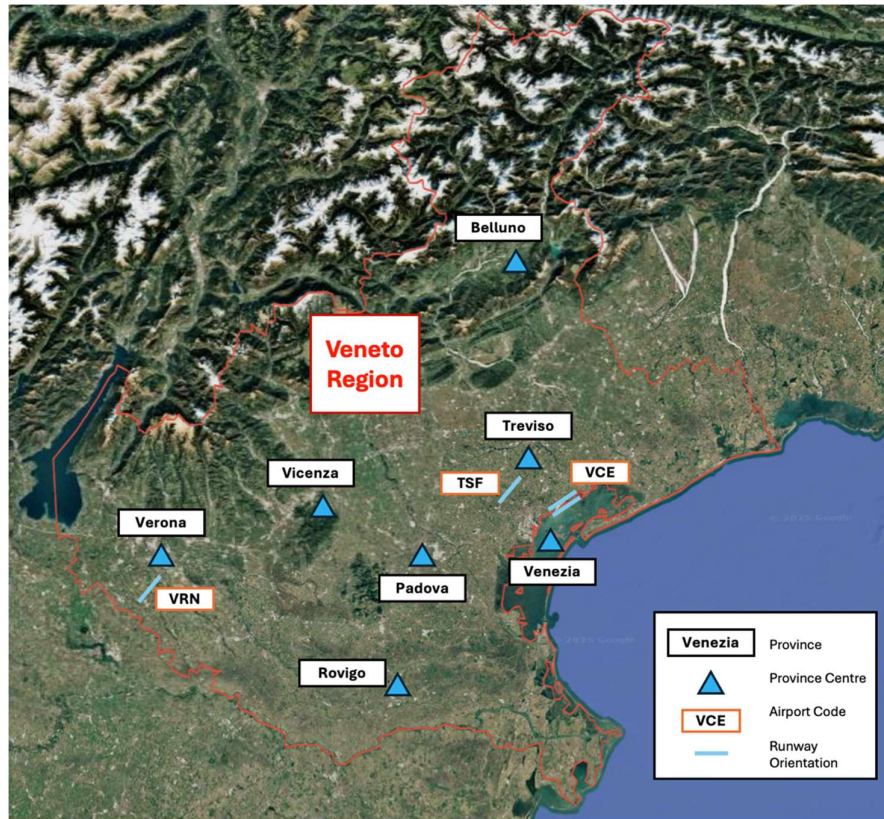
## 4 THE VENETO REGION

The fourth chapter identifies the characteristics of the region in which the thesis is based to reveal the national importance of the region and its value-creating potential.

### 4.1 Characteristics

The Veneto region is located in the Northeast of the Italian peninsula and is made up of 7 provinces and 563 municipalities, in which three main airports operate (Map 2). It was the third highest contributor to the national gross domestic product (GDP) in 2023 with €197.1 billion or 9% of the total (ISTAT, 2025).

**Map 2 - Veneto Region**



(Adapted from Google, 2025)

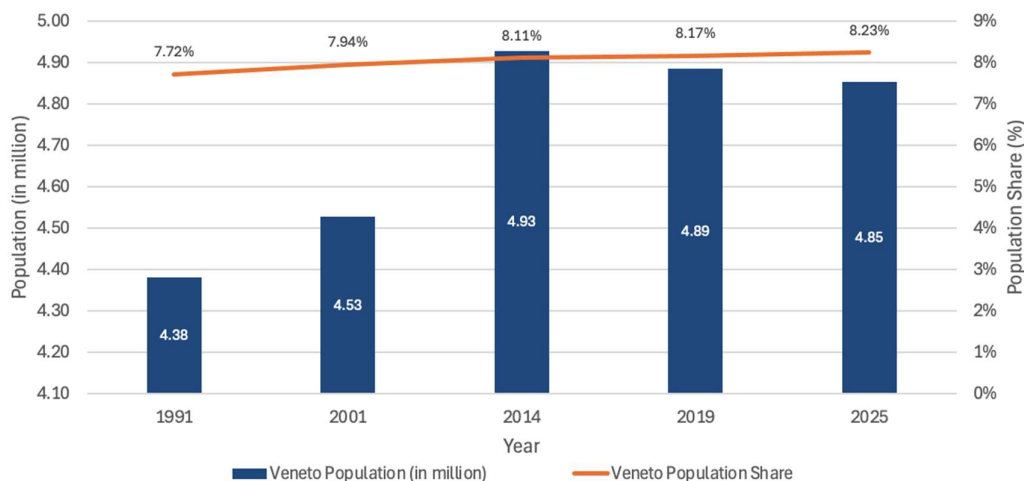
The characteristic that sets this region apart from other regions in Italy like Lombardy, is the fact that instead of being focused on an established metropolitan centre like Milan, the population and its businesses are distributed across the

provinces. This structure has favoured the development of small-to-medium enterprises (SMEs) that drive the regional economy. Due to its success, this economic arrangement has been denominated as the “competitive peripheries” (Buciuni and Corò, 2023).

### 4.1.1 Population Demographics

With a population of 4,851,851 in 2025, Veneto is the 4<sup>th</sup> largest region in Italy by residents that make up a relatively stable share of the national population (ISTAT, 2025). Despite a marginally increasing share through the years, its absolute values have started decreasing since 2014. These figures are in line with the changing Italian demographic where deaths out-number births alongside non-permanent residents and immigrants increasing in numbers (Nicoletti, 2024). From 1961 to 2008 the ratio of elder population to youth has more than trebled (Treccani, n.d.).

**Figure 3 - Veneto Population and National Share**



(ISTAT, 2025)

As of the latest regional census in 2022, the most populated province was that of Padova followed by Verona and Treviso, each with around 25% of the share (ISTAT, 2025). Statistics show that despite regional numbers have been fluctuating between growth and decline, the trend for these provinces remains in growth as if a population redistribution were happening.

#### **4.1.2 Regional Economy**

The Veneto regional economy is one of the most important and influential in Italy. As the 4<sup>th</sup> region for active businesses and 3<sup>rd</sup> for the most exports, its value generating abilities are extensive. As mentioned above, this ability is primarily fuelled by the 400,000 companies operating in the region, each within its own specialist sector (Treccani, n.d.):

- Verona: textiles and clothing for the fashion industry;
- Venice: shoes and glassmaking workshops, alongside metallurgic and mechanical industry;
- Belluno: eyewear specialists;
- Padova: pharmaceutical and chemical sector, agricultural machines and sciences;
- Treviso: sportswear and fashion brands, artisan furniture;
- Vicenza: sports accessories and materials, light machinery for textiles.

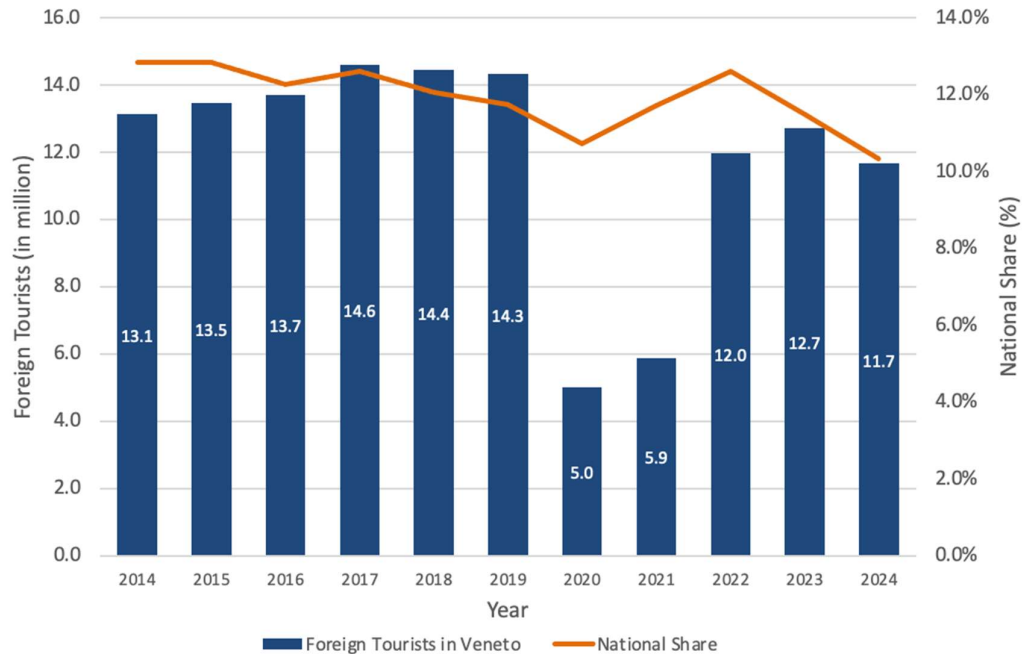
These specialist SMEs are suppliers and headquarters to several industry leading companies and groups like Luxottica and De'Longhi. In fact, the region is responsible for almost 20% of the Made in Italy fashion industry (Veneto Confindustria, 2024). It is noteworthy that despite the agricultural sector becoming a minority in terms of workforce and value-added, it remains of international importance for high-quality produce, an example being its wine production, the largest in Italy. Veneto is predominately financed by its tertiary sector and its tourism with its almost 200,000 businesses (Eurostat, 2024). With €103bn generated in 2022, 64% of the regional value-added arises from the 21 million tourist stays that year (Regione Veneto, n.d.).

Veneto is the number one region in Italy for the number of tourists, attracting around 10% of yearly foreign tourists (Figure 4). Despite the Covid-19 pandemic has reduced the absolute values, 2023 displayed a sharp recovery.

In 2025, the return to pre-covid levels for the regional economy was influenced by growing international uncertainty based on the wars in Ukraine and the

Middle East. This had a knock-on effect on the multi-nationals operating in the region, in particular on their specialist suppliers (Banca d'Italia, 2025).

**Figure 4 - Number of Foreign Tourists in Veneto and National Share**



(Banca d'Italia, 2025)

In 2024, unemployment in the region was 3%, down 1.3% from the previous year and below of national average of 6.6% (ISTAT, 2025). In the last 5 years, unemployment has constantly fallen with the exception of the Covid-impacted 2020. This is aided by the highly ranked universities in the region, Padova and Venice Ca' Foscari, with the latter being in the top 3% of universities worldwide (QS, 2025). This is also favoured by the increase in the number of jobs created with 2024 seeing 28,500 new jobs being created (Veneto Lavoro, 2025). As with value-added, over 60% of the region's employment and new hires are in the tertiary sector, compared to the 21% in production firms (Eurostat, 2025).

#### 4.1.3 Extraordinary Events

Veneto, and, in particular, Venice is famous for hosting international events. From the annual Venice film festival that attracts a number of celebrities (La Biennale, n.d.) to unique events like Jeff Bezos's wedding (Rossi and Jones, 2025), the

region is a popular setting for extraordinary events. Furthermore, the winter Olympic games in 2026 are confirmed to be in Milan and Cortina, the latter being in the Belluno province (Olympics, n.d.). This event is expected to generate around €1bn of investment and GDP contribution to the regions involved (Ca' Foscari, 2019). With such events ongoing, the demand for air transport to-and-from the region is sustained for both commercial carriers and GA.

## **4.2 Transport Networks**

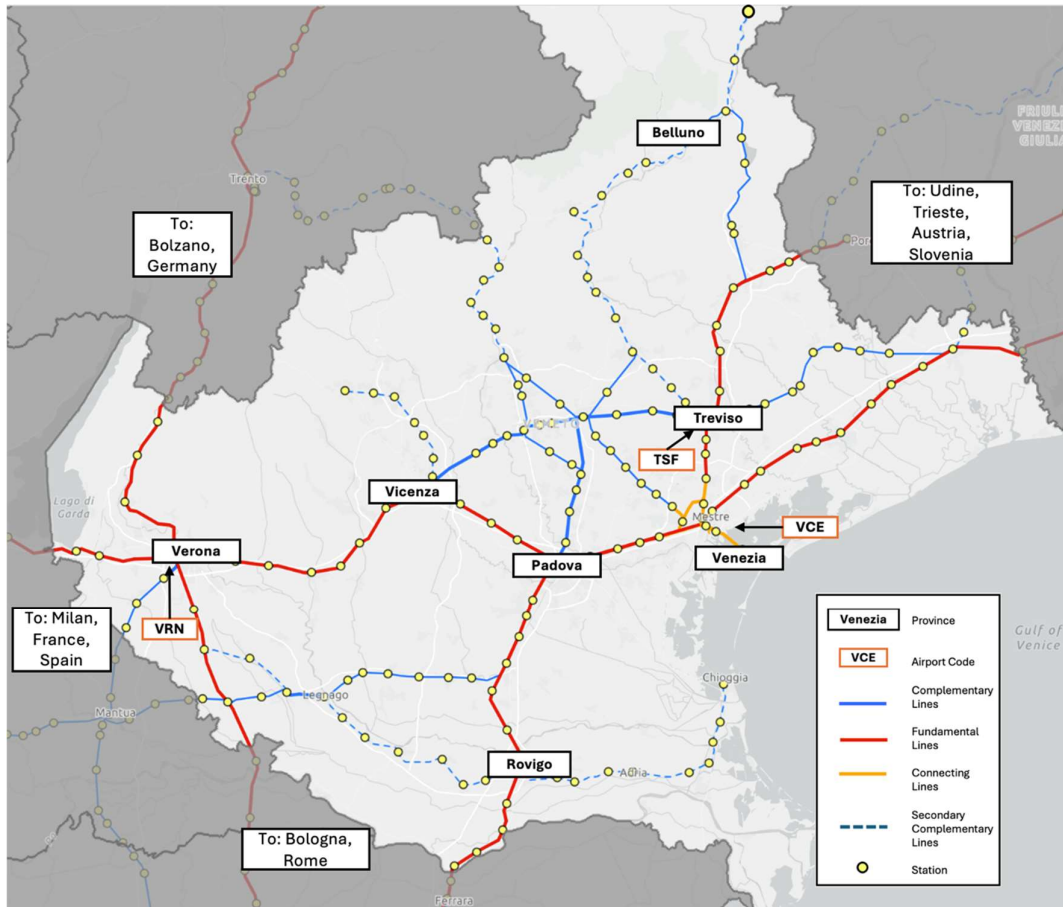
### **4.2.1 Railway Network**

The region's railway system, despite its ever-developing nature, has yet to directly connect its airports to the main cities. As of 2025, none of the three airports has a direct railway connection. VCE will be the first to experience this intermodal connection once the project, that started construction in 2023, will be completed in 2026 (FS Italiane, n.d.). This project is part of 14 ongoing and 16 planned projects to modernise and develop the Italian and European railway network.

This continuous development is crucial for the region's success but also for the whole continent's development. Veneto is part of the Trans-European Transport Networks (TEN-T): a European Union (EU) initiative to drive transport decarbonisation, multimodality and resilience (RFI, n.d.). More specifically, stations in the region are part of the Core Network of such initiative that have a completion deadline in 2030. These lines include the Mediterranean line that runs from the south of Spain to Ukraine and the Baltic-Adriatic Sea line running from northern Europe to the south of Italy.

The TEN-T initiative also stimulated high-speed rail (HSR) in Italy, with the Milan-Venice line expected to be completed by 2026 (FS Italiane n.d.). As of 2025, the region benefits from 1,799km of rail, of which 450km are fundamental to the rail network and 26km are for HSR, connecting the 7 provinces (Map 3). (FS Italiane, n.d.).

**Map 3 - Veneto Region Rail Network**



(Esri, n.d; RFI, n.d.)

#### 4.2.2 Road Network

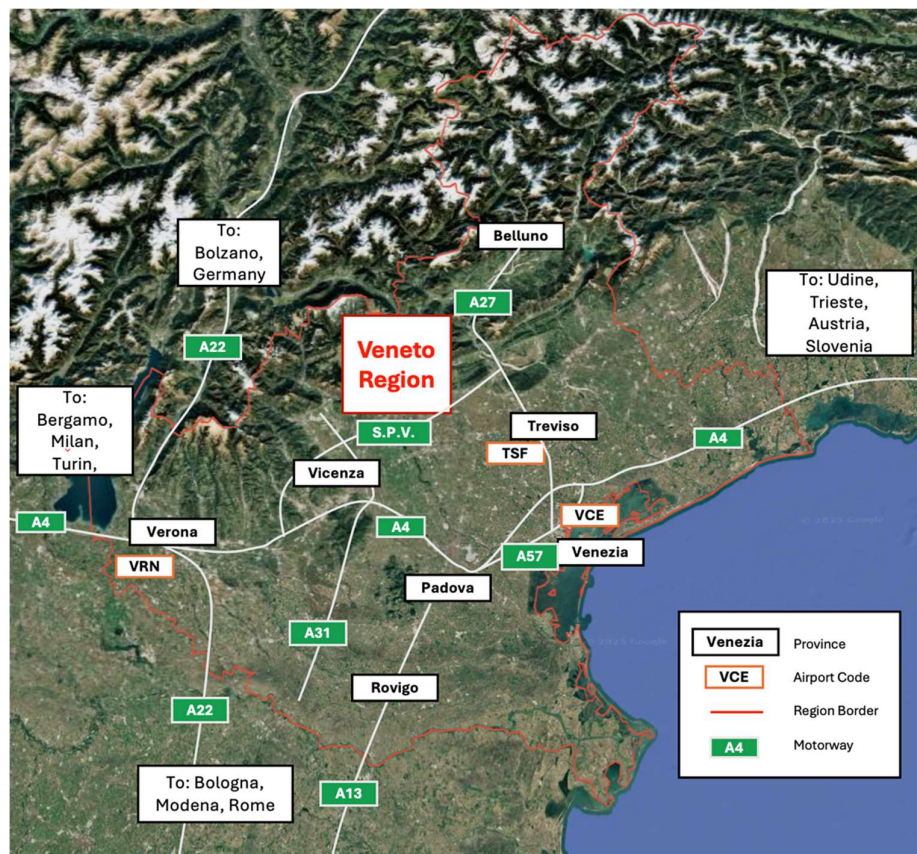
The Veneto region is best connected by road, with an extensive network of 7 motorways (Table 1) connecting the 7 provinces with each other, the country and Europe. Additionally, these motorways are supported by an intricate and encompassing network of suburban and bypass roads to ensure a full coverage of the region (Map 4)

**Table 1 - Veneto Motorways**

| Motorway | Description                                     |
|----------|-------------------------------------------------|
| A4       | Turin-Trieste (part of E70, Spain-Turkey)       |
| A13      | Bologna-Padova                                  |
| A22      | Modena-Austria (part of E45, Sicily-Norway)     |
| A27      | Venice-Belluno                                  |
| A31      | Rovigo-Piovene                                  |
| A57      | Padova-Venice (part of E55, Sweden-Greece)      |
| S.P.V.   | Superstrada Pedemontana Veneta, Vicenza-Treviso |

(Source: Author)

**Map 4 - Veneto Motorway Network**



(Source: Author)

### 4.2.3 Maritime Network

The Veneto region is served by two ports, Venice and Chioggia (Map 5). The Venice port serves both passenger (cruise) and cargo traffic, whilst Chioggia is cargo-only. Additionally, Venice is a primary port of the TEN-T network, making it a key intermodal node for the country's 40% share of international trade that travels by ship (Regione Veneto, n.d.; Costa, 2023). The latter handled 5.5m tonnes of cargo in Q1 2024 and achieved a yearly tonnage increase of 3.5% compared to the 2023. Chioggia is a smaller port, handling only 0.16m tonnes in Q1 2024 (Porto di Venezia, 2024).

On the passenger side, the Venice cruise terminal (VTP - Venice Terminal Passeggeri) handled 634,000 passengers in 2024, with 644,000 expected in 2025. With around 50 ships expected yearly, Venice is a popular cruise destination in the Mediterranean (VTP, 2025). Furthermore, given Venice is composed by 119 islands connected by over 400 bridges, the main transport mode of the city is by boat (Ca' Foscari, 2025). This includes a water bus service made up of 21 lines serving the whole city with a dedicated direct connection to VCE airport, "Alilaguna" (AVM, n.d.).

**Map 5 - Veneto Maritime Features**



(Source: Author)

#### 4.2.4 Airport Network

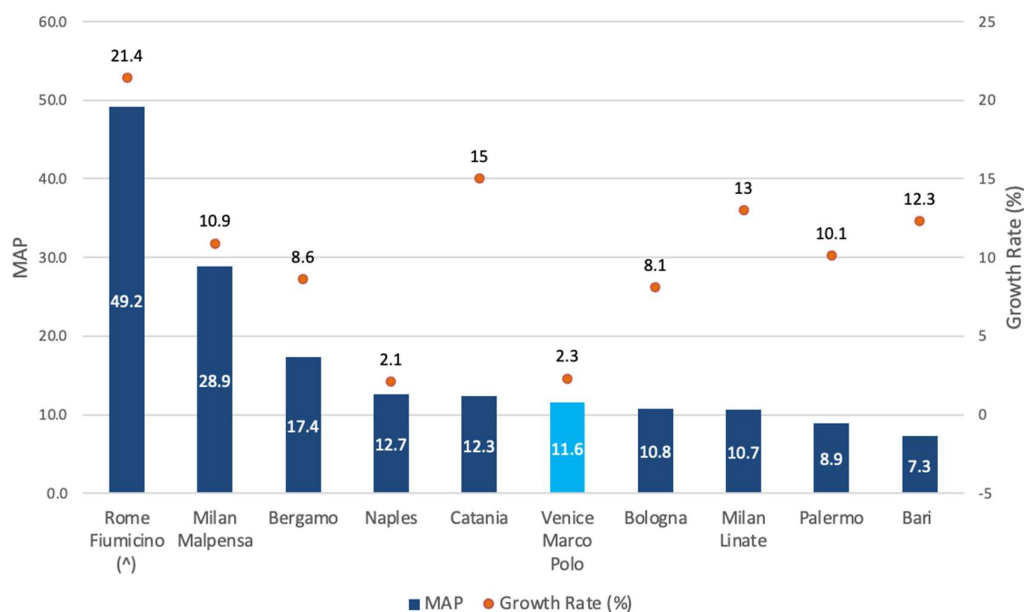
The Italian civil aviation authority, ENAC (2020), identifies three commercial airports in the Veneto region:

- Venezia Marco Polo (VCE), strategic airport and intercontinental hub, located in the province of Venice
- Treviso Antonio Canova (TSF), airport located in the province of Treviso
- Valerio Catullo di Verona Villafranca (VRN), airport located in the province of Verona.

The airports are all part of the TEN-T project, of which two (VRN and TSF) are comprehensive, and one (VCE) is core. All three contribute to the regional economy in its development and connection to Europe and the world.

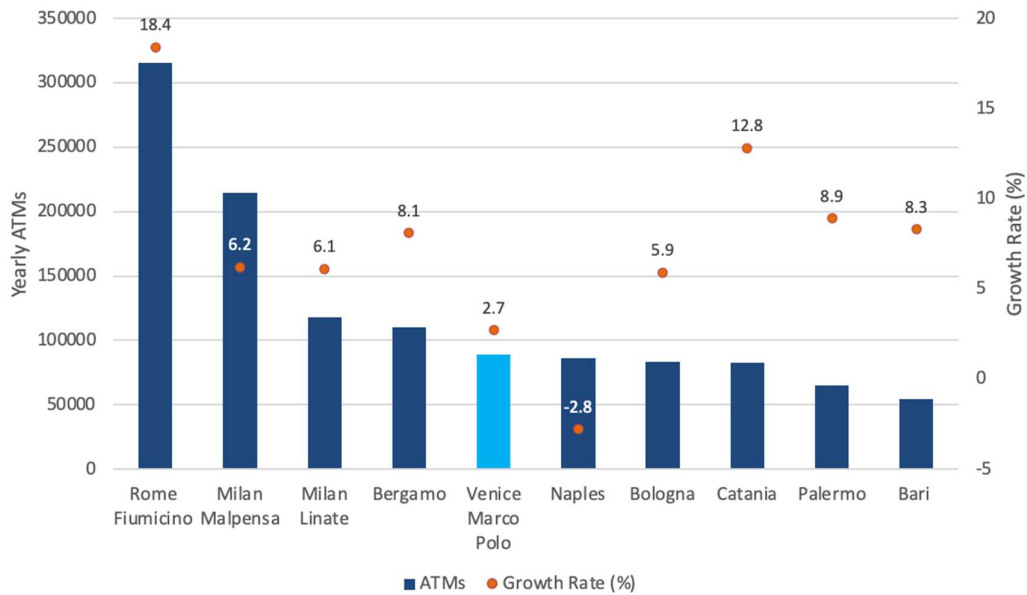
In terms of the Italian airport network, they are sixth, sixteenth, and nineteenth by passengers carried. When it comes to ATMs and cargo, VCE raises the ranking in fifth and third respectively with sustained growth, confirming its national importance. (Assaeroporti, 2025) (Figures 5,6,7).

**Figure 5 - Top 10 Italian Airports by Passengers 2024**



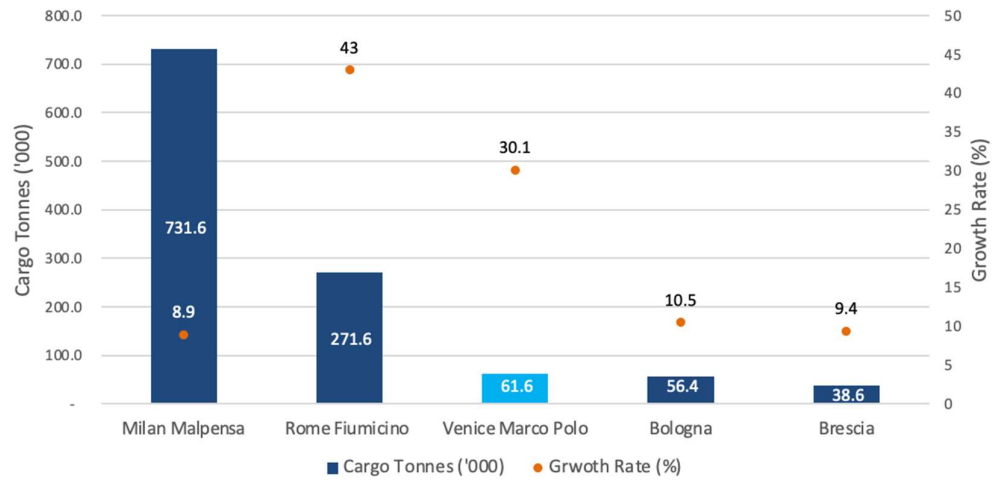
(Assaeroporti, 2025)

**Figure 6 - Top 10 Italian Airports by ATMs 2024**



(Assaeroporti, 2025)

**Figure 7 - Top 10 Italian Airports by Cargo Tonnes 2024**



(Assaeroporti, 2025)

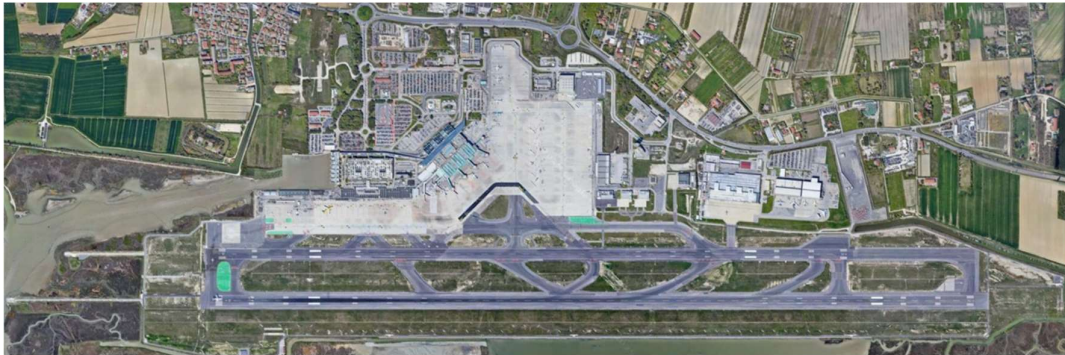
## 5 AIRPORT DETAILS AND TRENDS

In the fifth chapter, the three airports mentioned previously (VCE, VRN, and TSF) are each analysed in terms of their traffic, infrastructure and accessibility.

### 5.1 Venice Marco Polo (VCE)

VCE (Map 6) is the largest airport of the region in terms of traffic and infrastructure and the third intercontinental airport in Italy

**Map 6 – VCE Airport**



(Google, 2025)

#### 5.1.1 Traffic Trends

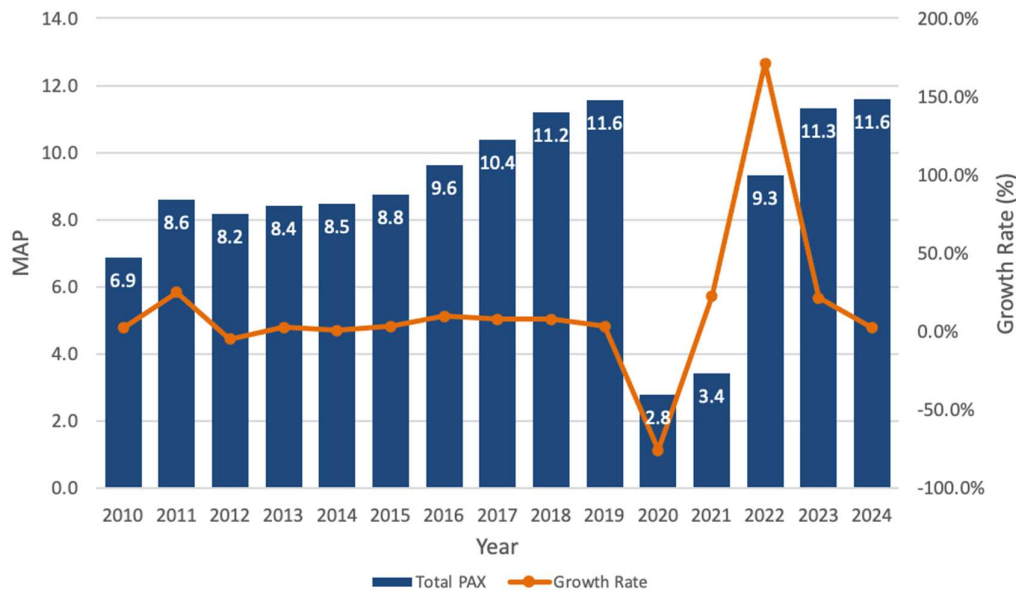
As the busiest airport in the MAS, VCE handled 11,590,356 passengers in 2024, a 2.3% increase from the previous year arising from almost 90,000 ATMs. This increase was higher than the 1.2% increase in seats for the same year. In 2025, 55 carriers are expected to operate from the airport serving 84 passenger destinations and 3 cargo-only routes (Appendix B) (Assaeroporti, 2025, OAG, 2025b).

To understand how the traffic reached almost 11.6m passengers in 2024 (Figure 8), it is crucial to contextualise the airport in its economy and align passenger numbers with global trends and events.

Ever since its inception, VCE was envisioned to be a premium international airport that is served mainly by FSCs. Despite crises, pandemics and other events affecting the world, this vision has remained the same until the Covid-19

pandemic. Given the correlation between air travel and the economy, the shape of the last 14 years of the airport's history is quickly verified.

**Figure 8 - VCE Passenger Traffic and Annual Growth**



(Assaeroporti, 2025)

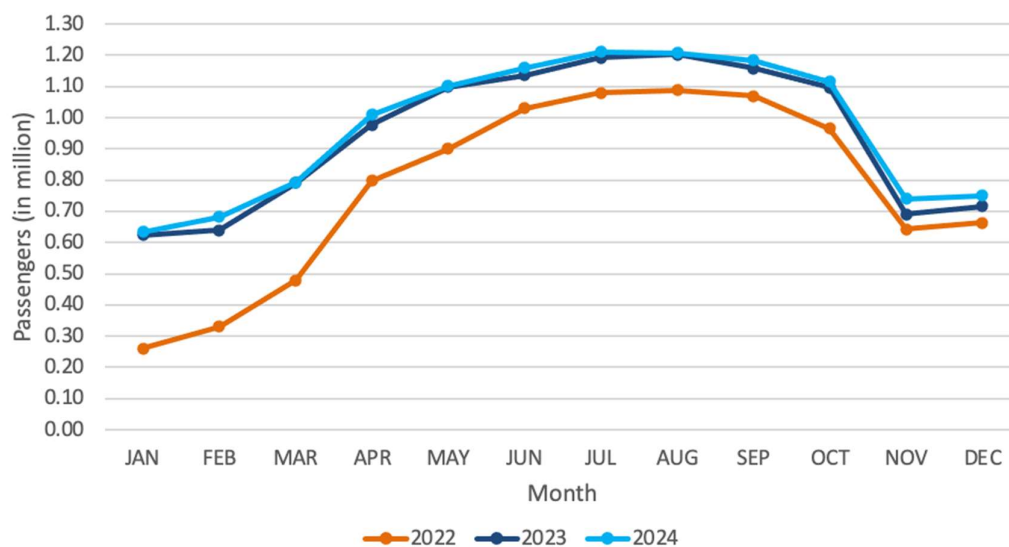
2010 was the first year of recovery from the global financial crisis in 2008 and 2009 (CFI, n.d.). This was followed by another period of crisis in Italy and the Eurozone (Banca d'Italia, 2015). 2015 passenger numbers recovered and surpassed 2011 values. The period from 2015 to 2019 was the one with the steadiest growth of 6.5% per year in seats and 7.3% in passengers (OAG, 2025b). During this period, LCCs identified the substantial market potential of the city and its airport and began operating flights, retaining a 29% market share. EasyJet even based their aircraft as early as 2016 given its strategy to operate an LCC model from primary airports (Stefanato, 2016).

In March 2020, this changed as Italy went into lockdown and only VCE remained open in the MAS, the remaining traffic was shifted there. The number of seats fell by 76% until the loosening of regulations and end of the lockdowns in 2022. After another year of recovery, 2024 was the first year where new record passengers were achieved (OAG, 2025b, Assaeroporti, 2025). Despite this recovery, the LCC

market share now took up almost 50% of the airport's traffic with 2 new based LCCs: Wizz (Gruppo SAVE, n.d.) and Ryanair (2021).

In terms of seasonality (Figure 9), VCE experiences an IATA summer season with around double the number of passengers compared to the winter season. With the peak numbers around July and August, inbound tourism is the driving factor behind this seasonal difference. The lowest month is January due to the unappealing winter weather.

**Figure 9 - VCE Traffic Seasonality**



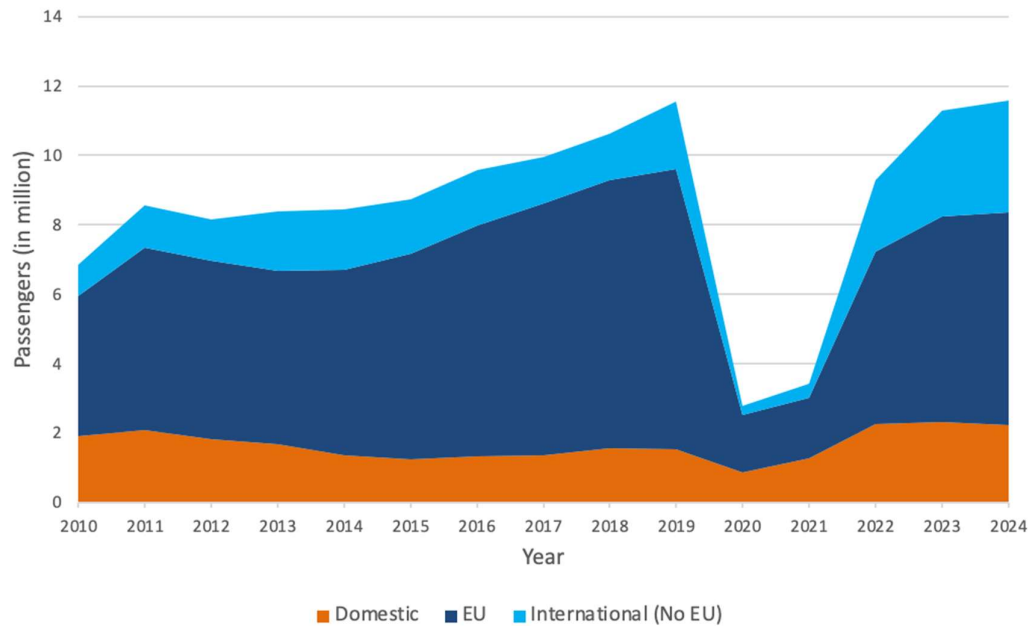
(Assaeroporti, 2025)

### 5.1.2 Traffic Segmentation

Venice's role as a premium airport meant that its traffic focus would be international with a minor domestic presence. Figure 10 confirms this idea where the EU market is largest segment followed by the international one and the domestic one. The shift in traffic from the pre-pandemic to the post-pandemic period is noteworthy (Assaeroporti, 2025). Up until 2020, international and domestic passengers would exchange role as the second largest segment. After the pandemic, domestic passengers are the smallest segment due to the substantial increase in foreign traffic and the numerous transatlantic and Asian route openings (OAG, 2025b). Lastly, with the increased LCC presence in the

airport, the EU share has slightly decreased as Italian passengers revert to flying instead of taking the train due to the lower fares and development of new domestic routes.

**Figure 10 - VCE Passenger Traffic Segmentation**



(Assaeroporti, 2025)

### 5.1.3 Carriers and Markets

When looking at markets served, 80.7% of seats are international, serving mainly western Europe (90,000 seats) and North America (15,000 seats). The top destinations served are Spain, the UK and Germany. In 2025 VCE experiences a an almost equal shift of airlines operating, 50.5% of commercial passenger ATMs are LCCs whilst 45.1% are LCCS, with the rest is composed by cargo and regional carriers (CAPA, n.d.). Despite this split, in terms of seats offered, the top 4 airlines are LCCs lead by Ryanair with 24% of the annual seats, followed by EasyJet (9%) and Wizz Air (6%) (OAG, 2025b). The first FSC is British Airways with 285,032 seats (4% share) in 2025 (OAG, 2025b). In the last few years VCE has seen the entry of numerous FSCs including Saudia, American Airlines and the return of Qatar Airways, this has maintained the split between the carriers to retain the vision of the operator, SAVE Group.

### 5.1.4 Current Infrastructure

VCE operates two parallel runways, one passenger terminal and dedicated cargo spaces. The details of the operation are displayed in Table 2.

**Table 2 – VCE Current Infrastructure**

| Feature    | Details                                                                                                                                                                                                                                                                   |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airport    | IATA:VCE, ICAO: LIPZ                                                                                                                                                                                                                                                      |
| Runways    | Dependent, Parallel<br>04R/22L: 3,300m x 45m<br>04L/22R: 2,780m x 45m<br>Capacity: 32 movements/h                                                                                                                                                                         |
| Terminal   | Area: 110,000 SQM (2018)<br>Check-in: 113<br>Gates: 25<br>Departures Cap: 3,200 pax/h (2,050 Schengen, 1,300 extra Schengen)<br>Arrival Cap: 4,050pax/h (2,250 Schengen, 1,800 Extra Schengen)<br>Apron: 391,758 SQM<br>Stands: 49 (10 M.A.R.S. stands, 8 contact stands) |
| Car Park   | 6,000 (for passengers and staff combined)                                                                                                                                                                                                                                 |
| Operations | 24/7                                                                                                                                                                                                                                                                      |

(Assoclearance, 2025; Gruppo SAVE, n.d.)

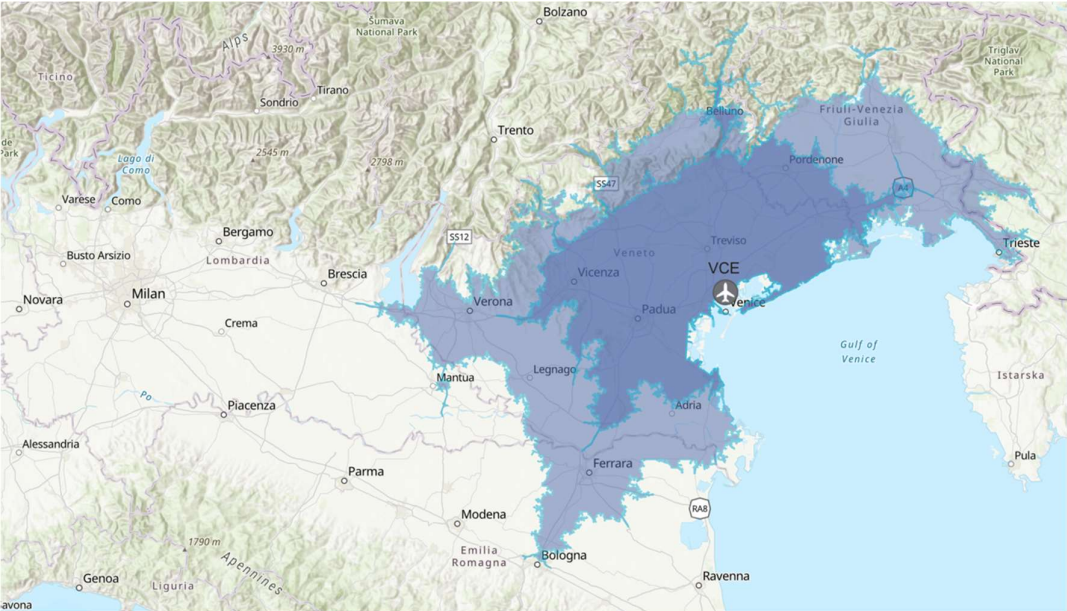
### 5.1.5 Accessibility

VCE is reachable, as of 2025, by road and by water. The A57 motorway arriving directly to the airport from the extensive motorway network easily connects the region to its primary airport and the SS14 road connects the nearest city of Mestre, 6km away (Google, 2025). In terms of water, the Alilaguna boat runs a timetabled service to various parts of Venice, with water taxis as an alternative.

Solely from its road network, VCE can be reached by 3,486,731 people driving up to an hour and 5,638,908 people driving for 90 minutes (Map 7). This catchment area includes a purchasing power per capita of over €22,000. In VCE's 90-minute driving isochrone, four competing airports are present (Trieste (TRS),

TSF, VRN, Bologna (BLQ)), of which two are in a different region and one (BLQ) competes on international destinations like Dubai.

**Map 7 – VCE 60' and 90' Driving Time Catchment Area**



(Esri, n.d.)

When it comes to public transport, only buses are available to the nearest train station in Mestre (11km away) where trains serving the north and centre of Italy are present. For example, Milan and Florence can be reached within 2.5 hours, and all the provinces in Veneto can be reached in under one hour. In terms of travel to and from Venice city centre, Table 3 summarises the options available.

**Table 3 - VCE Surface Access**

| Travel Mode | Time    | Cost            |
|-------------|---------|-----------------|
| Car         | 20 mins | €7 (fuel)       |
| Bus         | 30 mins | €10 lowest fare |
| Taxi        | 20 mins | €50 fixed price |
| Water Bus   | 40 mins | €18 one-way     |
| Water Taxi  | 20 mins | €150            |

(ACTV, n.d., Google, 2025)

It must be considered that until the train connection to Mestre opens, the train as an option for the city of Venice is not a viable option due to its complexity (bus and train) and uncompetitive timings and prices.

Overall, given the extensive road network and available parking, domestic outbound travellers prefer travelling with their own car to the airport, whilst tourists tend to favour the water options to Venice given the scenic route. All other destinations in the region are served by public transport.

### 5.1.6 Future Plans

The Masterplan for VCE's development was drafted by 2021 and addresses the airport's investments until 2037. Within the Masterplan, projects are divided into three categories, terminal expansion, sustainability and intramodality.

In terms of the terminal expansion, this is expected to occur in two phases, despite it being delayed by COVID. Table 4 depicts these phases and their details.

**Table 4 - VCE Terminal Expansion**

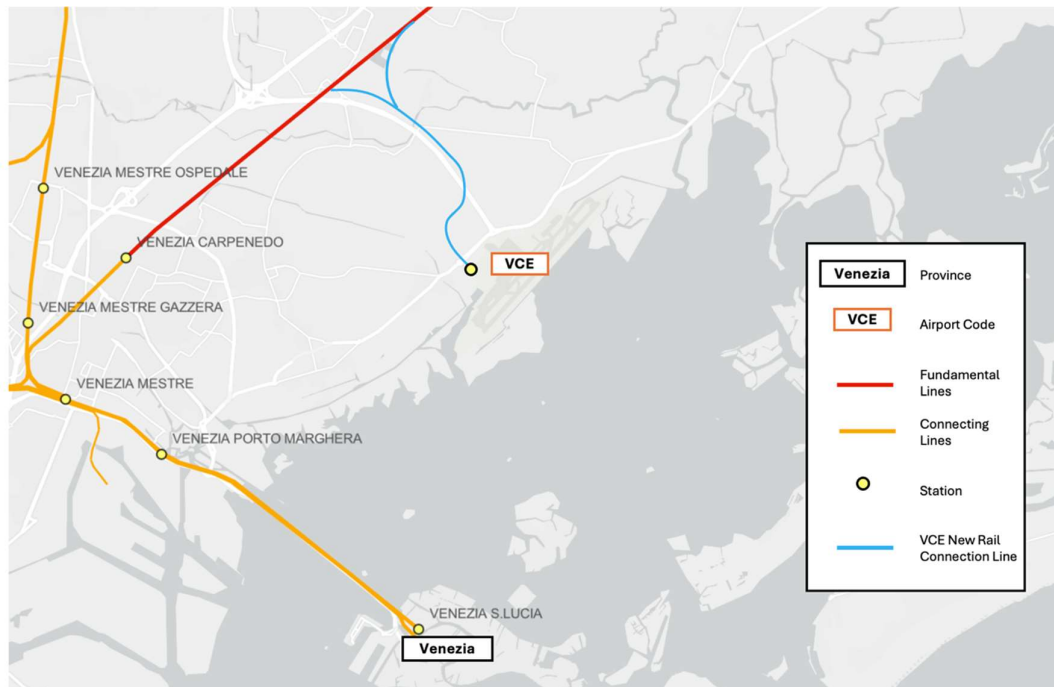
| LOT | Concept                                                                             | Details                                                                                                                                                                                                                             |
|-----|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   |  | <ul style="list-style-type: none"> <li>- Base Terminal</li> <li>- 110,000 square metres</li> <li>- Capacity= 10.3 MAP</li> </ul>                                                                                                    |
| 2A  |  | <ul style="list-style-type: none"> <li>- Planned 2024 , Expected 2026</li> <li>- 2025 only south (left) side complete</li> <li>- 2030 capacity= 15 MAP</li> <li>- 14,300 square metres extension</li> <li>- 10 new gates</li> </ul> |
| 2B  |  | <ul style="list-style-type: none"> <li>- Planned 2027 (without pandemic adjustment)</li> <li>- 2037 capacity = 20 MAP</li> <li>- 116,300 square metres extension</li> <li>- 45 new gates</li> </ul>                                 |

(Venezia Airport, n.d.; One works, n.d.)

In the terminal expansion lots, smaller projects are included to support the sustainability pillar of this masterplan. Projects include a new recycling centre and a new water management station (Gruppo SAVE, n.d.).

Lastly, as previously mentioned, the development of a rail connection is currently underway to connect the airport with Mestre station by train, to facilitate onward travel to the region and beyond (RFI, n.d.) (Map 8).

**Map 8- VCE New Rail Connection**



(RFI, n.d.; One works, n.d.)

## 5.2 Venice Treviso (TSF)

Treviso Antonio Canova airport (TSF) (Map 9), located 5km from Treviso city centre, serves as the secondary airport in the Venice MAS, and is advertised as a low-cost alternative to VCE. It does not support cargo transport.

**Map 9 – TSF Airport**



(Google, 2025)

### 5.2.1 Traffic Trends

TSF is the smallest of the three airports in Veneto, having handled 3,048,943 MAP in 2024, 0.5% higher than 2023 and served by 21,685 ATMs . In the first quarter of 2025, it registered 698,473 passengers, a 5.4% increase on the same period of the previous year (Assaeroporti, 2025). As the secondary airport of the Venice MAS, it is subject to increased pressure to retain LCC's with the recent development of hybrid carriers that operate from primary airports. Furthermore, due to its more homogenous traffic segments, traffic is more responsive to economic factors and changes in travel demand. In fact, as seen in Figure 11, the changes in MAP due to Covid are exacerbated relative to VCE with a 85.8% fall in passengers in 2020.

**Figure 11 - TSF Passenger Traffic and Annual Growth**

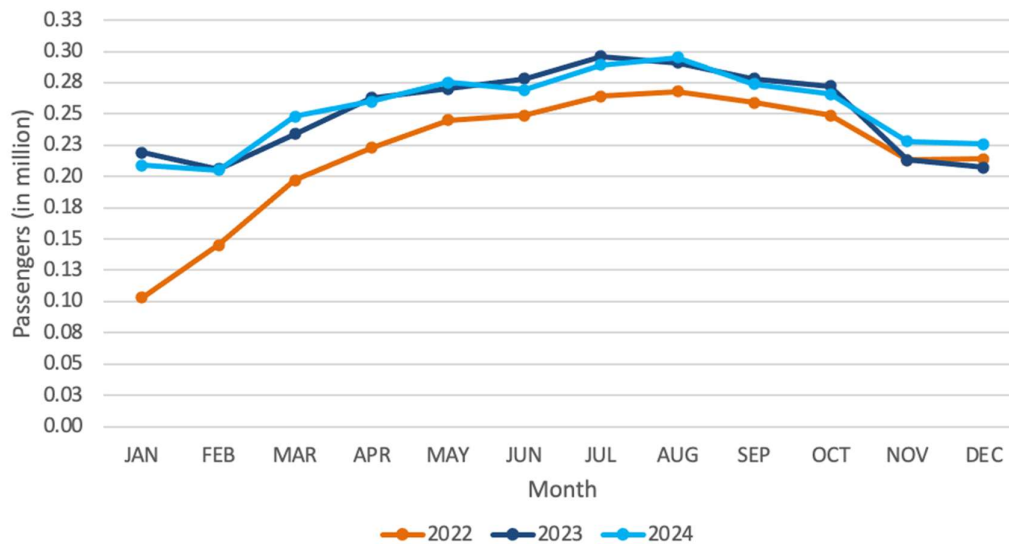


(Assaeroporti, 2025)

Since its commercial opening in 1953, it represented the point of connection for the region with few domestic and international flights that were then replaced by connections to VCE once it opened in the 1960s. After a history as a private aero-club and military base that simultaneously operated to the remaining commercial flights it was implemented in the Venice airport system in 1996 with a supporting role (Treviso Airport, n.d.). In fact, there are many cases in which its traffic was moved to VCE: in 2011 the airport closed for 6 months for the runway to be rebuilt, and in 2020 to 2021 it closed due to the fall in travel demand arising from the pandemic. Due to its proximity to successful enterprises in the region, it is often favoured over VCE for select flights. Simultaneously, the airport was subject to critique from the local population for its proximity to the city and a national park (Loschi, 2022).

Because of the airport's proximity and target low-cost segment, it does not experience as significant seasonality with a monthly passenger standard deviation of 0.03 in 2024 (Assaeroporti, 2025) (Figure 12).

**Figure 12 - TSF Traffic Seasonality**

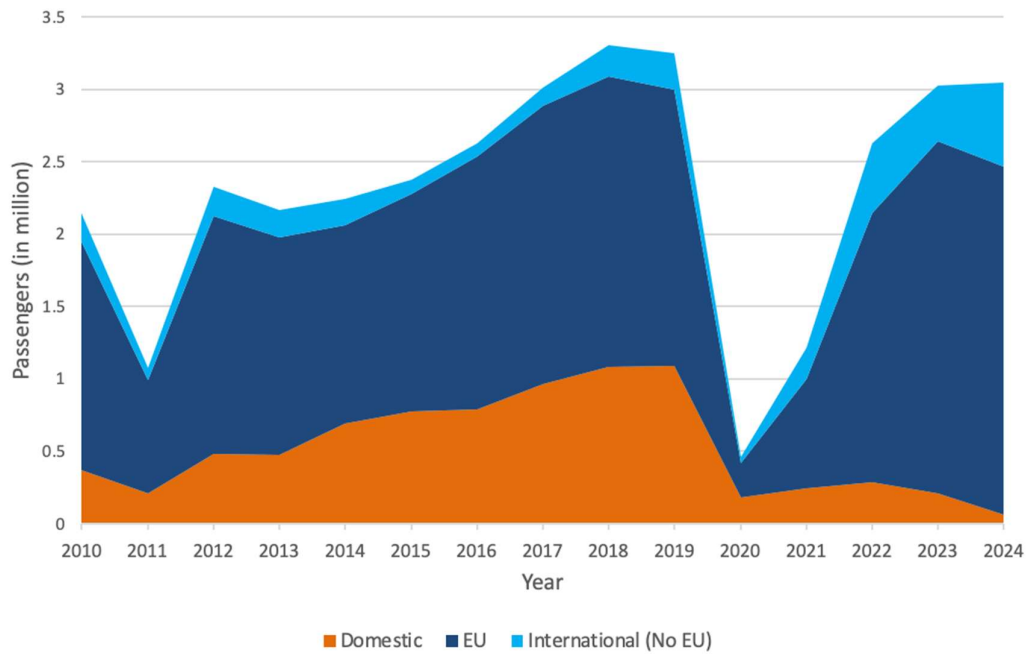


(Assaeroporti, 2025)

### 5.2.2 Traffic Segmentation

The traffic segmentation at TSF can be analysed in two separate periods: from the global crisis in 2010 up to the lockdown in 2020, and a post-pandemic world (Figure 13). In 2011, the airport remained closed for half the year due to the runway's reconstruction and maintenance. After that, from 2012 to 2019, the airport experienced a period of steady growth in the domestic and EU segment, a 125% and 16% respective total increase. This achieved 1 million domestic and 1.9 million EU passengers in 2019. In a post-pandemic context, with the transfer of a significant proportion of LCC traffic to VCE, the routes that remained at TSF were primarily those to eastern Europe and popular destinations (Appendix B). In fact, the domestic travel followed domestic LCC routes to VCE and EU travel became TSF's focus. This is confirmed by the top three destinations by country being Spain, Albania and Romania, with 17.4%, 15.4% and 14.5% of the departing seats (CAPA, n.d.). The visual increase in international traffic can be attributed to the United Kingdom's exit from the EU, adjusting the segments.

**Figure 13 - TSF Passenger Traffic Segmentation**



(Assaeroporti, 2025)

### **5.2.3 Carriers and Markets**

TSF operates with two principal carriers: Ryanair and Wizz Air, the former having 82% of the ATMs (CAPA, n.d.) and being the only based carrier. Air Albania operates negligible traffic (0.2% of seats). These two LCCs primarily serve 2 regions: eastern and western Europe, each with around 50% share of the seats.

## 5.2.4 Current Infrastructure

Table 5 – TSF Current Infrastructure

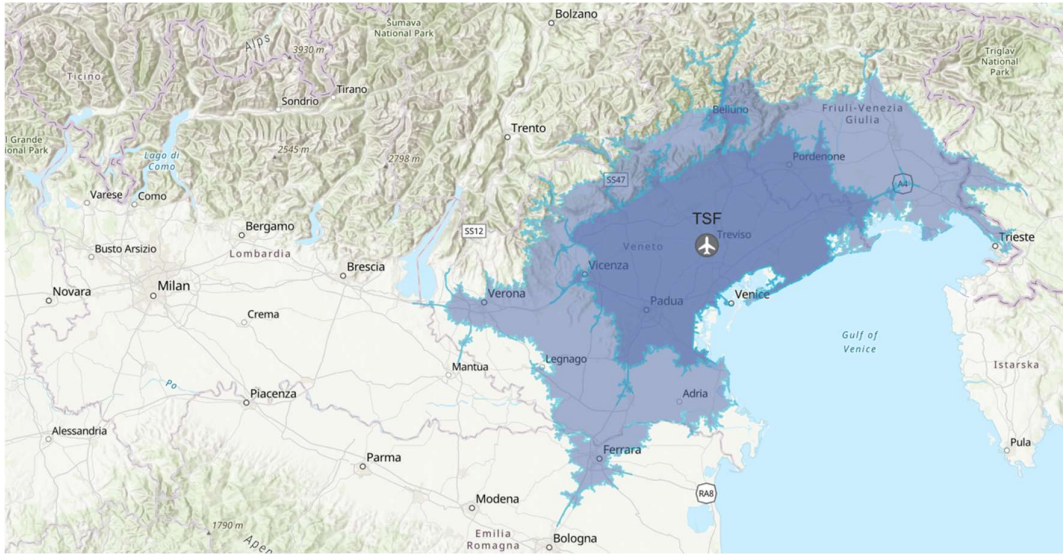
| Feature    | Details                                                                                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airport    | IATA:TSF, ICAO: LIPH                                                                                                                                                          |
| Runway     | 07/25: 2,420x45m<br>Capacity: 6 movements/h                                                                                                                                   |
| Terminal   | Area: 8,000 SQM<br>Departures Cap: 700 pax/h (350 Schengen, 350 Extra Schengen)<br>Arrival Cap: 700 pax/h (350 Schengen, 350 Extra Schengen)<br>Stands: 17 (1 M.A.R.S. Stand) |
| Operations | 07:00-21:55                                                                                                                                                                   |

(Assoclearance, 2025; Gruppo SAVE, n.d.)

## 5.2.5 Accessibility

TSF, 25km north of VCE is directly served solely by the road network. With the SR53 road passing next to the terminal and connecting the airport to the closest motorway, the A27, 20km away making TSF well-connected to the road network. In fact, thanks to this network, 3,092,180 people are able to reach the airport within one-hour's drive, whilst 5,301,713 people can do the same in 1.5 hours (Map 10). Furthermore, in the latter driving isochrone, there are three airports present VCE, VRN and TRS, with the latter a principal gateway to both northeast of Italy and Slovenian and Croatian passengers.

## Map 10 – TSF 60' and 90' Driving Time Catchment Area



(Esri, n.d.)

In terms of public transport, the local bus connects the airport with the local train station, 17 minutes away. To get to the name destination (Venice), the combination of bus and train is the preferred option with alternative bus routes available, Table 6 summarises these options.

**Table 6 - TSF Surface Access**

| Destination: Treviso city centre |         |                             |
|----------------------------------|---------|-----------------------------|
| Travel Mode                      | Time    | Cost                        |
| Car                              | 10 mins | €3 (fuel)                   |
| Taxi                             | 10 mins | €15                         |
| Airlink Bus                      | 14 mins | €4 lowest fare              |
| Local Bus                        | 17 mins | €1.50 online, €3 on the bus |
| Destination: Venice city centre  |         |                             |
| Travel Mode                      | Time    | Cost                        |
| Car                              | 35 mins | €10 (fuel+toll)             |
| Taxi                             | 35 mins | €80                         |
| Direct Bus                       | 50 mins | €12 one-way                 |
| Train + Bus                      | 45 mins | €8.90                       |

(Treviso Airport, n.d.; ATVO, n.d.)

Without publicly available information on the passenger selected mode share, a prudent assumption is made regarding the non-domestic, low-cost passengers preferring the cheaper bus options and forming the majority share. The remaining international and domestic passengers choose a more personalised service and their own car respectively.

### **5.2.6 Future Plans**

Included in TSF's masterplan until 2021, infrastructure investments were planned for the re-allocation of the control tower and the fuel farm, among others, to allow for the milestone of 22,500 yearly ATMs to be achieved. These ATMs, supported by developments in the terminal building, would allow TSF to consistently handle over 3 MAP (Treviso Airport, n.d.). These projects have been blocked by the TAR (regional authority) due to environmental concerns and the requirements for feasibility studies to be re-conducted (Maschietto, 2025). It is currently unclear what the airport's future will look like given the absence of an alternative masterplan and no passenger forecast.

## 5.3 Verona Villafranca (VRN)

Verona Villafranca airport (VRN) is a commercial airport in the north of Italy (Map 11) that also serves as the military base for the Aeronautica Militare with the 3<sup>o</sup> Stormo.

**Map 11 – VRN Airport**



(Google, 2025)

### 5.3.1 Traffic Trends

VRN is the second largest airport in the Veneto MAS in terms of passengers, ATMs, and cargo. VRN handled 3,704,582 MAP in 2024 with 29,188 ATMs, a respective increase of 7.8% and 5.2% on the previous year (Figure 14). With a robust Q1 in 0225 with 262.291 passengers and a 21.2% growth on Q1 2024, this year is set to be a successful one for VRN.

Over the course of its history, initially as a military base, to then become a commercial airport and operate both types of traffic, it oversaw a number of traffic adjustments.

VRN has been historically responsible for charter and leisure flights, closely tied with travel agencies and their carriers like TUI. In the last 15 years it experienced alternating years of growth and decline subject to international events and carrier entries and exits (OAG, 2025b). Ryanair exited in 2012 due to regulatory disputes and led to a decrease in traffic the following years, that was then recovered with the carrier's re-entry in 2015 (CAPA, 2012; Comunità del Garda, 2014).

Differently, Transavia and Air France alternated their service offerings to the airport as charter flights were replaced by regular services. Overall, with the latter process being stimulated by the increasing demand for air travel, VRN continues to grow and expand. It was briefly interrupted by the pandemic in 2020 and closed for almost a year. Similarly to VCE, it quickly recovered to pre-pandemic traffic, setting a new MAP record in 2024 (Assaeroporti, 2025).

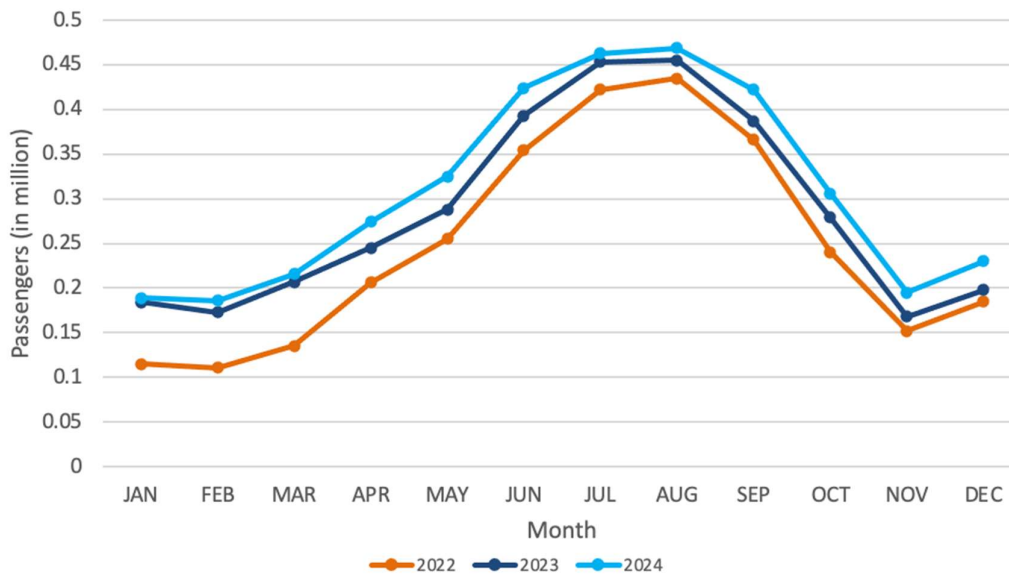
**Figure 14 - VRN Passenger Traffic and Annual Growth**



(Assaeroporti, 2025)

Due to VRN’s traffic being focused on organised holidays and travel agencies, its seasonal variance is pronounced (Figure 15): June and July handle more than twice the passengers of February and November. With peaks around 450,000 monthly passengers and valleys under 200,000, the airport’s capacity planning results complex. With the implementation of additional routine services, this seasonal gap marginally reduces, although, even in 2024, the difference remains significant.

**Figure 15 - VRN Traffic Seasonality**

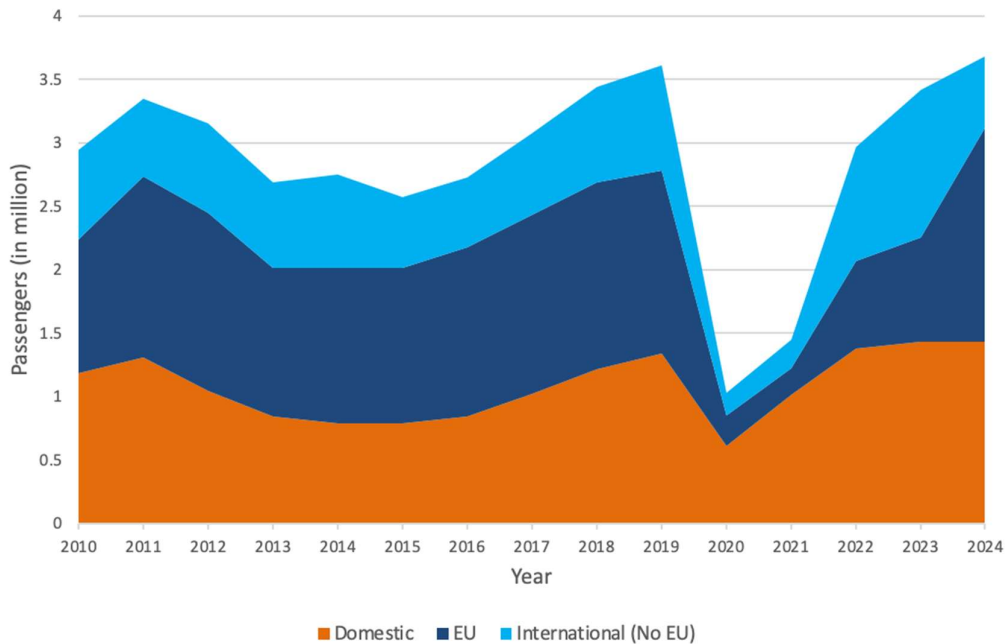


(Assaeroporti, 2025)

### 5.3.2 Traffic Segmentation

The three main traffic segments in VRN have retained a relatively stable share in the last fifteen years (Figure 16). With domestic passengers maintaining a 30-40% share, EU 40-50% proportion and the remaining 20-30% attributed to international passengers; VRN handles a balanced passenger mix during “normal” times, that is excluding the pandemic. This distribution can be attributed to the leisure departing traffic forming a solid domestic passenger base supported by 35.3% of domestic destinations. Differently, the EU and international traffic is primarily formed by inbound tourist traffic to the region, serving both the historical city and the nearby Lake Garda.

**Figure 16 - VRN Passenger Traffic Segmentation**



(Assaeroporti, 2025)

### 5.3.3 Carriers and Markets

VRN's recent shift to more routine services is verified by the carrier distribution with 64.1% of seats being LCCs, followed by 28.6% of FSCs and the remaining 7.3% shared between charter and regional services (CAPA, n.d.). These carriers primarily serve western and eastern Europe, with North Africa as the third most served region.

Ryanair leads the ranking for departing seats at with 1,448,882 equal to 30% of the total. Leisure carrier Neos follows with 19% and precedes Volotea (15%). The first FSC in the ranking is British Airways (sixth) with 3% of the seats. The robust LCC presence alongside seasonal traffic makes the top 3 nations served as the UK, Germany and Spain where extensive inbound and outbound traffic is present (CAPA, n.d.).

### 5.3.4 Current Infrastructure

VRN is equipped with one runway and two terminal buildings, one for departures and one for arrivals. The details of the infrastructure are outlined in Table 7.

**Table 7 – VRN Current Infrastructure**

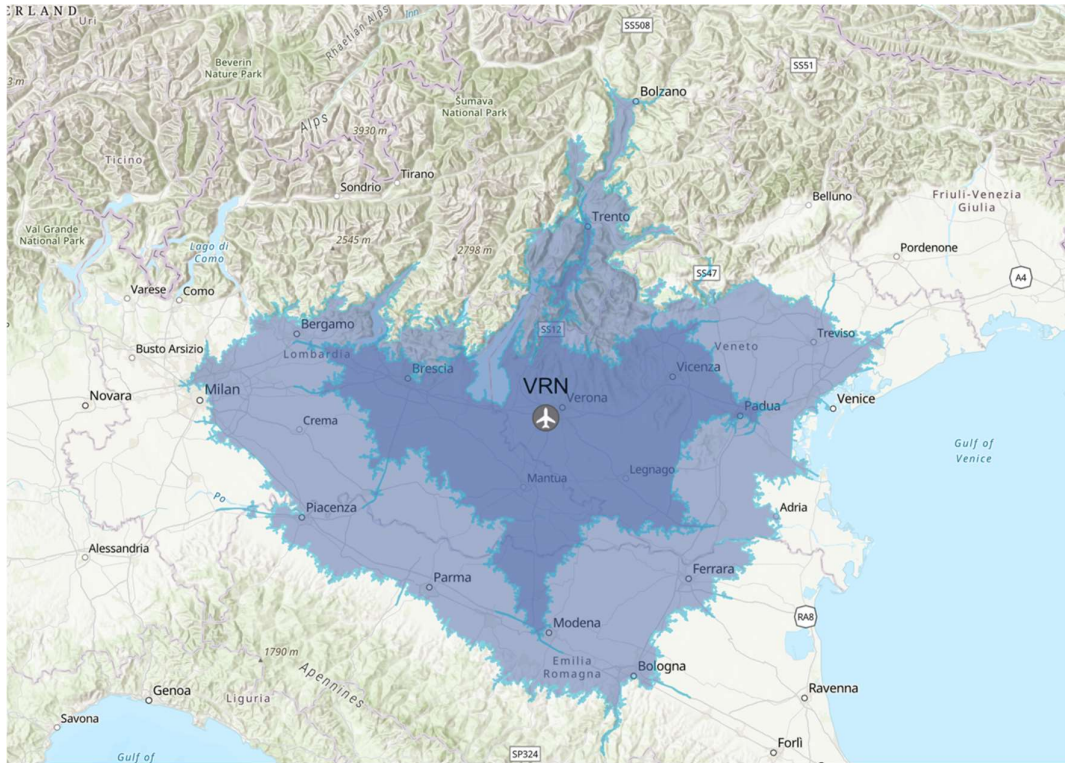
| <b>Feature</b>     | <b>Details</b>                                                                                                                                                                                                      |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Airport</b>     | IATA: VRN, ICAO: LIPX                                                                                                                                                                                               |
| <b>Runway</b>      | 04/22: 3,067m x 45m<br>Capacity: 16 movements/h (with country specific requirements)                                                                                                                                |
| <b>Terminal</b>    | Area: 24,840 SQM<br>Departures Cap: 1,900 pax/h (1,900 Schengen, 720 Extra Schengen)<br>Arrival Cap: 1,500 pax/h (1,500 Schengen, 940 Extra Schengen)<br>Check-In: 40<br>Gates: 13<br>Stands: 21 (3 M.A.R.S. Stand) |
| <b>Car Parking</b> | 4,300 spaces for passengers and 200 spaces for drop-off                                                                                                                                                             |
| <b>Operations</b>  | 24h with night-time restrictions (23:00-6:00)                                                                                                                                                                       |

(Assoclearance, 2025; Gruppo SAVE, n.d.)

### **5.3.5 Accessibility**

VRN terminal building is less than 1km away from the intersection between the E45 (A4 Turin-Trieste) and E70 (A22 Modena-Austria). The central location and proximity to a European motorway intersection makes VRN's catchment area the largest of the Veneto MAS (Map 12): 3,643,361 people can reach the airport in one hour and 11,717,467 people can drive to the airport in 90 minutes. Furthermore, it is also the richest driving isochrone with a purchasing power per capita of €23,751.

**Map 12 – VRN 60' and 90' Driving Time Catchment Area**



(Esri, n.d.)

A large catchment area also means increased airport competition, especially in Italy. In the larger catchment area, 6 competing airports (VCE, TSF, BLQ, Milan (LIN), Bergamo (BGY), and Bolzano (BZO)) and 1 cargo-only airport (VBS) are present. Despite two being in the Veneto MAS, competition is high in the area, especially as two of the three Milan airports are present, potentially creating passenger leakage from the Veneto to Lombardy given Milan's popularity.

In terms of the connections to the city and the region, only the local bus connects the airport to the city centre and the train station from where other regional destinations can be reached. The only other alternative is the taxi unless a passenger has a car. VRN appears poorly connected for non-resident passengers (Table 8).

**Table 8 – VRN Surface Access**

| Travel Mode | Time    | Cost      |
|-------------|---------|-----------|
| Car         | 20 mins | €7 (fuel) |
| Bus         | 35 mins | €7        |
| Taxi        | 20 mins | €30       |

(ATV, n.d.; Google, 2025)

The distribution of the three modes is unknown, although a similar assumption can be made to TSF where the resident population would drive there and inbound LCC tourists preferring the bus, with a select minority opting for the taxi.

### **5.3.6 Future Plans**

At the heart of the airport's masterplan from 2015 to 2030 is Project Romeo, an infrastructure investment in combining and improving the two terminal buildings. This includes an 11,500 SQM expansion alongside 6 completely new gates and a 580 SQM lounge. These investments aim to equip VRN with a capacity of 5 MAP by the end of its construction in 2026 (Verona Aeroporto, n.d.)

# 6 VENETO MAS

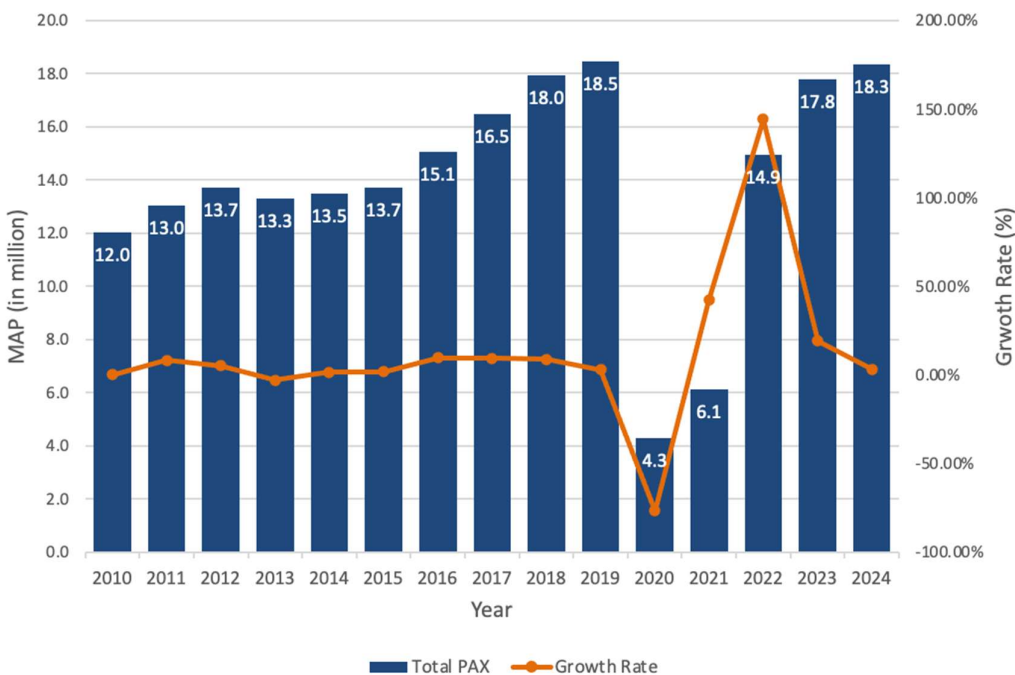
The sixth chapter will evaluate the regional MAS as a whole through key metrics and a SWOT analysis.

## 6.1 Traffic

### 6.1.1 Passenger

The Veneto MAS handled 18.3 MAP in 2024, the second highest year in its history after 2019 with 18.5 MAP (Figure 17). In fact, two of the three airports have fully recovered from the Covid-19 pandemic, explaining the 200,000-passenger gap between the two years.

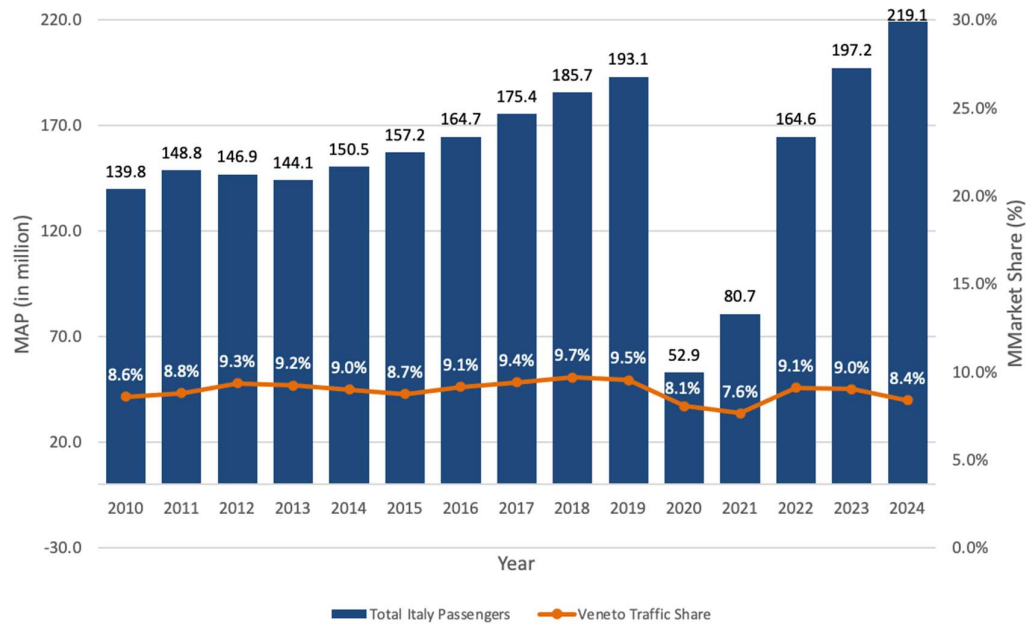
Figure 17 - Veneto MAS Passenger Traffic and Annual Growth



(Assaeroporti, 2025)

When the MAS is contextualised in Italy, it represented on average 9% of the total market in the last 15 years (Figure 18). As the Italian market recovered more quickly than the Veneto MAS in the post-pandemic period, in 2024 Venetian airports accounted for 8.4% of the total passengers, that had now surpassed 200 MAP.

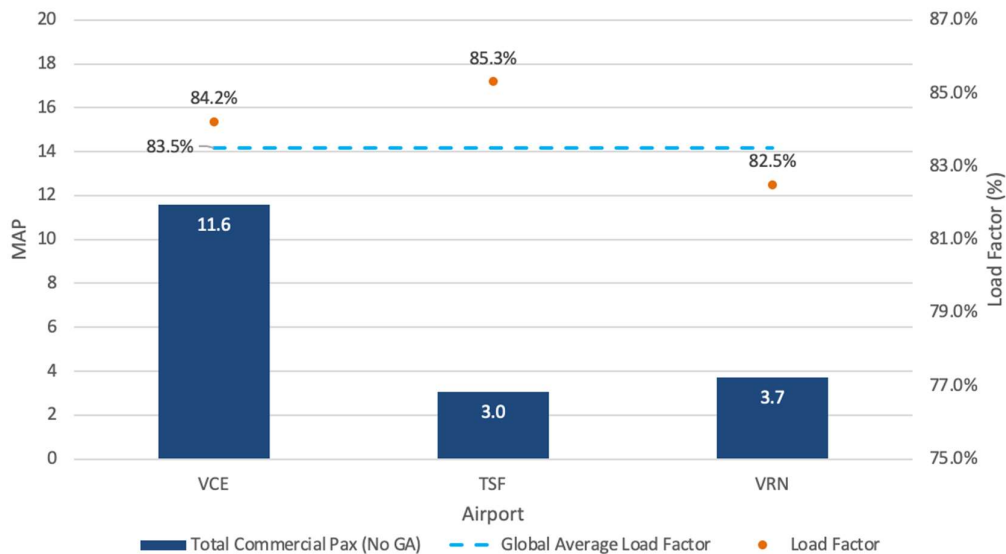
**Figure 18 - Veneto MAS Passenger Market Share in Italy**



(Assaeroporti, 2025)

When the Veneto passengers are evaluated with respect to the airline's capacity, their load factor results in line with global and continental averages (Figure 19). The highest is TSF'S at 85.3% in 2024, higher than the world and European average of 83.5% and 84.8% respectively (IATA, 2025). The airport's LCC only strategy supporting the difference to VCE's and VRN's results, marginally lower.

**Figure 19 - Commercial Passenger Traffic and Load Factor 2024**

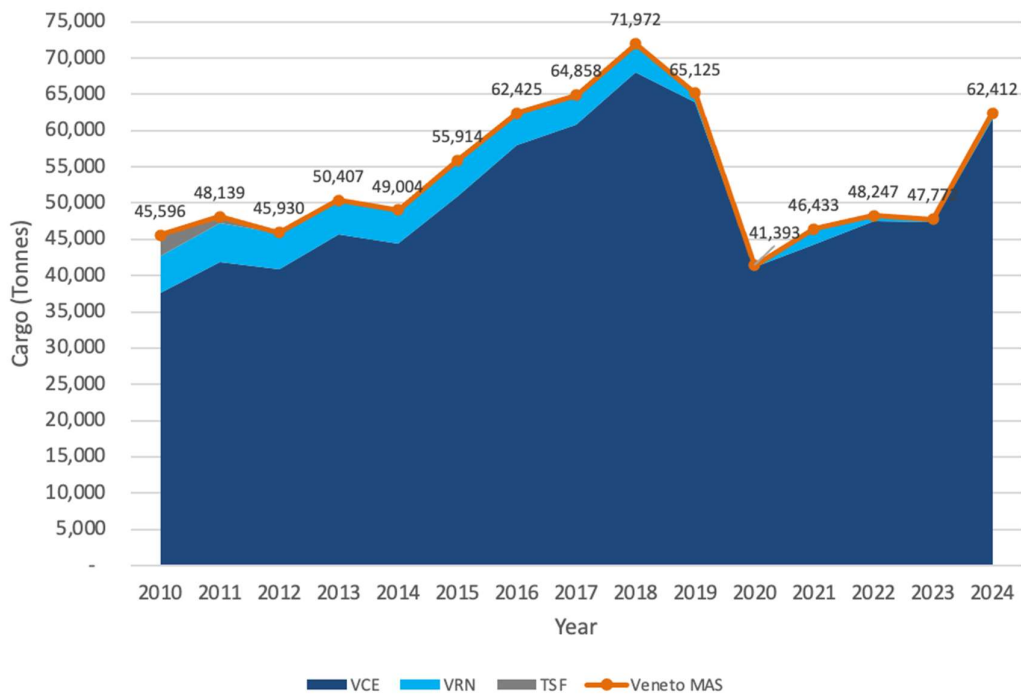


(Assaeroporti, 2025; IATA, 2025, OAG, 2025b)

### 6.1.2 Cargo

The Veneto Mas handled 62,412 tonnes of cargo in 2024, a 30.1% increase on the previous year. The highest year was 2018 with 71,972 tonnes (Figure 20). The cargo traffic is primarily driven by VCE with VRN and TSF handling minor amounts. With the opening of cargo hubs in VCE by DHL and UPS, cargo was focused on the venetian airport and away from TSF. VRN's cargo was gradually phased out by Brescia airport (VBS) that, having shifted its Ryanair flights to VRN, started operating as a freight-only airport. TSF cargo figures are now only driven by extraordinary events thus not deeming the airport a cargo hub.

**Figure 20 - Veneto MAS Cargo Traffic**

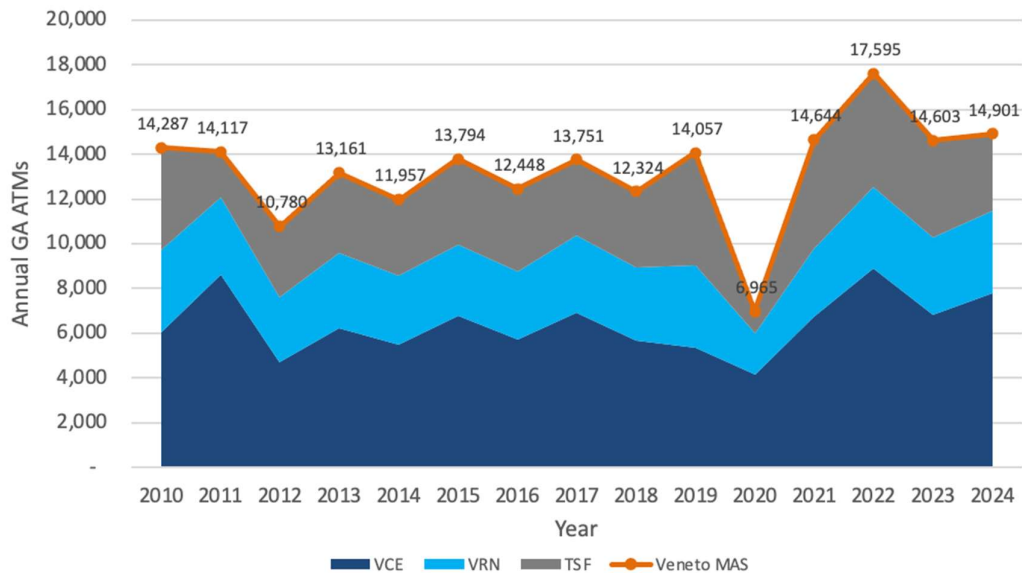


(Assaeroporti, 2025)

### 6.1.3 General Aviation

With the extensive luxury brands operating in the Veneto region alongside the various extraordinary events that occur on a yearly basis, the MAS experiences substantial GA traffic. The MAS recorded 14,901 ATMs in 2024 and a record year in 2022 with 17,595. The role of GA in the Veneto MAS is confirmed when the ATM share is identified: in 2024, GA traffic represented 10.7% of the total MAS ATMs. Furthermore, this traffic is not concentrated in one airport, it is distributed across the three despite their differences in size and capacity. Over the last 15 years, VCE has handled 50% of this traffic with VRN and TSF both experiencing 25% each (Figure 21).

**Figure 21 - Veneto MAS GA Traffic**



(Assaeroporti, 2025)

## 6.2 Network

Having analysed the traffic of the MAS, the carriers and the network they operate is now evaluated to identify any overlap between the airports.

Starting with carriers, Table 9 and 10 summarise the distribution of carriers across the three airports and their overlap in 2024.

**Table 9 - Veneto MAS Shared Carriers**

| Number of Shared Carriers | Airport | TSF | VCE | VRN |
|---------------------------|---------|-----|-----|-----|
|                           | Unique  | 0   | 38  | 12  |
|                           | 2       | 1   | 18  | 19  |
|                           | 3       | 2   | 2   | 2   |
|                           | Total   | 3   | 58  | 33  |

(OAG, 2025b)

**Table 10 - Veneto MAS Carrier Airport Overlap**

| Shared Carriers between two select airports | Airport | TSF | VCE | VRN |
|---------------------------------------------|---------|-----|-----|-----|
|                                             | TSF     |     | 2   | 3   |
|                                             | VCE     | 2   |     | 20  |
|                                             | VRN     | 3   | 20  |     |

(OAG, 2025b)

VCE, as the third intercontinental airport in Italy and the primary airport of the MAS, operates the highest number of unique carriers, mainly FSC's including United, Delta, Qatar, Emirates, etc.. Despite this, there is a significant overlap with VRN in those European FSCs and LCCs like British Airways, Air France and Ryanair. VRN's unique carriers in this case are those charter and leisure carriers including Neos that serve the travel agency market. Lastly, TSF has lost its LCC uniqueness by operating with carriers that operate in both the other airports.

In terms of what this means for the MAS, it can be concluded that on a surface level there is apparent coordination with certain carriers operating from specific airports, although the overlap across the airports, primarily for LCCs, outlines an overlap and suggests an inefficiency.

The latter is verified when the airport networks are analysed. Tables 11 and 12 evaluate the city destinations served, whilst Tables 13 and 14 identify the airports that serve those destinations.

**Table 11 - Veneto MAS Shared City Destinations**

| Number of Shared City Destinations | Airport | TSF | VCE | VRN |
|------------------------------------|---------|-----|-----|-----|
|                                    | Unique  | 21  | 38  | 40  |
|                                    | 2       | 19  | 47  | 42  |
|                                    | 3       | 18  | 18  | 18  |
|                                    | Total   | 58  | 103 | 100 |

(OAG, 2025b)

**Table 12 - Veneto MAS City Destination Overlap**

| Shared City Destinations across two select airports | Airport | TSF | VCE | VRN |
|-----------------------------------------------------|---------|-----|-----|-----|
|                                                     | TSF     |     | 29  | 26  |
|                                                     | VCE     | 29  |     | 52  |
|                                                     | VRN     | 26  | 52  |     |

(OAG, 2025b)

At a city destination level, the overlap between the airports is highlighted. One third of TSF's destinations overlaps with 20% of VCE's and VRN's. Less than half of the destinations served by each airport is unique with VRN leading the ranking for most unique destinations, consequence of its leisure and charter market. Destination overlap is not uncommon in MAS with city destinations served by numerous carriers and airports allow for more affordable and differentiated offerings to similar places. This enables larger market segments to be captured. The coordination issue becomes apparent when the airports served within those city destinations are analysed.

**Table 13 - Veneto MAS Shared Airport Destinations**

| Number of Shared Airport Destinations | Airport | TSF | VCE | VRN |
|---------------------------------------|---------|-----|-----|-----|
|                                       | Unique  | 24  | 44  | 40  |
|                                       | 2       | 20  | 50  | 48  |
|                                       | 3       | 14  | 14  | 14  |
|                                       | Total   | 58  | 108 | 102 |

(OAG, 2025b)

**Table 14 - Veneto MAS Airport Destination Overlap**

| Shared Airport Destinations across two select airports | Airport | TSF | VCE | VRN |
|--------------------------------------------------------|---------|-----|-----|-----|
|                                                        | TSF     |     | 25  | 23  |
|                                                        | VCE     | 25  |     | 53  |
|                                                        | VRN     | 23  | 53  |     |

(OAG, 2025b)

At an airport level, the numbers do not vary significantly, signalling that there potentially is product and segment overlap between the MAS's airports. A clear example of this is the London market: both VRN and VCE operate flights to Stansted and Gatwick with Ryanair, EasyJet and British Airways. Luton is only served by TSF and Heathrow only connects to VCE. There are cases where the distribution can be deemed more complementary like the case of Brussels where VRN and TSF serve Charleroi and VCE connects Brussels (BRU). The key conclusion here is that the network of the MAS displays a mixture of complementary and competitive routes which, according to the literature and industry, can lead to inefficiencies like airspace crowding and capacity saturation (Xiao et al, 2025; Liu et al, 2025).

These two analyses suggest the following:

1. Airports in the MAS provide passengers with a wide range of destinations and airports serving them
2. Passengers can fly a variety of airlines from their airport of choice
3. Airports appear to be in conflict for key destination (airport level) markets
4. Traffic is not as distributed as the airline and airport strategies suggest

### **6.3 SWOT**

Having analysed the Veneto MAS in 2025 and its defining characteristics, a SWOT matrix (Table 15) is constructed to identify and summarise the MAS's key features and its future possibilities.

**Table 15- Veneto MAS SWOT**

| Strengths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Weaknesses                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Veneto MAS</b></p> <ul style="list-style-type: none"> <li>- Substantial inbound traffic demand driven by tourism, trade and events (international appeal).</li> <li>- Regional geographical coverage with airport catchment area.</li> <li>- Similar ownership structure simplifies decision making process.</li> </ul> <p><b>VCE</b></p> <ul style="list-style-type: none"> <li>- Third Intercontinental airport in Italy and primary international gateway for the north-east.</li> <li>- Resilient infrastructure with two runways.</li> <li>- Balanced mixture of LCC and FSC traffic.</li> <li>- Ongoing infrastructural development.</li> <li>- Robust global tourism brand.</li> </ul> <p><b>TSF</b></p> <ul style="list-style-type: none"> <li>- Affordable alternative to VCE.</li> <li>- Small terminal simplifies and expedites passenger experience.</li> <li>- Quick turnarounds and low fees ideally suit LCC traffic.</li> </ul> <p><b>VRN</b></p> <ul style="list-style-type: none"> <li>- Strategic central geographical location between Veneto and Lombardy, two rich regions.</li> <li>- Sustained seasonal demand for mountain, lake and cultural holidays.</li> <li>- Mixed traffic distribution (LCC-heavy, some charter and FSC).</li> <li>- Military Base (increases civil security and provides 24h operation).</li> <li>- Lower peak-time congestion than Venice or Milan.</li> </ul> | <p><b>Veneto MAS</b></p> <ul style="list-style-type: none"> <li>- Lack of formal coordination between the airports.</li> <li>- Significant disparity in infrastructure and .passenger/movement numbers</li> <li>- Substantial network and carrier overlap.</li> <li>- Minimal airport-to-airport connections.</li> <li>- Insufficient intermodal transport (first train connection in construction).</li> </ul> <p><b>VCE</b></p> <ul style="list-style-type: none"> <li>- Peak-time capacity constraints</li> <li>- Vulnerability to adverse weather (fog, thunderstorm ) due to proximity to the lagoon.</li> <li>- Costly expansion possibilities (proximity to the sea).</li> <li>- Lack of formal post-covid strategy regarding traffic distribution (LCC, FSC).</li> </ul> <p><b>TSF</b></p> <ul style="list-style-type: none"> <li>- No full-length parallel taxiway</li> <li>- Limited terminal, apron and runway capacity.</li> <li>- Often confused with Venice (VCE).</li> <li>- Poor public transport connections to the Veneto region.</li> <li>- Two airlines operating. Over-reliance on LCC traffic and on based-carrier Ryanair.</li> <li>- No expansion possibilities (proximity to national park and the city).</li> </ul> <p><b>VRN</b></p> <ul style="list-style-type: none"> <li>- Reduced international appeal compared to VCE.</li> <li>- High seasonal traffic causes severe underutilisation during off-peak season.</li> </ul> |

| Opportunities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Threats                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Veneto MAS</b></p> <ul style="list-style-type: none"> <li>- Unified regional airport strategy to increase resilience and environmental/financial sustainability</li> <li>- Network and slot coordination to optimise traffic distribution</li> <li>- Development of intermodal links (airport-to-airport, airport-to-region)</li> </ul> <p><b>VCE</b></p> <ul style="list-style-type: none"> <li>- Expansion of international connections especially during low season (e.g. A321XLR can allow some summer routes to operate in winter).</li> <li>- Potential for development of air-cruise offering.</li> <li>- Growth in premium travel demand.</li> <li>- Develop North-European offering.</li> </ul> <p><b>TSF</b></p> <ul style="list-style-type: none"> <li>- Differentiate strategy through increase in GA demand making the airport a dedicated regional FBO.</li> <li>- Alternatively develop European LCC market with additional carriers.</li> </ul> <p><b>VRN</b></p> <ul style="list-style-type: none"> <li>- Strengthen integration with VCE as an overflow airport.</li> <li>- Expand as leisure and charter hub for northern Italy exploiting inbound and outbound tourist demand.</li> <li>- Capture spillover traffic from Milan/Bergamo.</li> <li>- Invest in full-length taxiway and expand to increase MAS resilience as a VCE alternative.</li> </ul> | <p><b>Veneto MAS</b></p> <ul style="list-style-type: none"> <li>- Lack of unified governance retaining network inefficiencies.</li> <li>- Community resistance/backlash for traffic redistribution and expansion.</li> <li>- High-speed rail connection to Milan causing passenger leakage to MXP, LIN and BGY.</li> <li>- Passenger leakage to catchment area airports like BLQ for international routes.</li> <li>- Airline industry consolidation limiting airport-level competition/coordination.</li> </ul> <p><b>VCE</b></p> <ul style="list-style-type: none"> <li>- Over-tourism in Venice capping inbound tourist numbers.</li> <li>- Strategic drift arising from traffic segment imbalances (LCC, FSC, GA)</li> <li>- Peak-hour and peak-season infrastructure saturation (terminal, apron, runway)</li> </ul> <p><b>TSF</b></p> <ul style="list-style-type: none"> <li>- Risk of base closure or route cuts by dominant LCCs</li> <li>- Vulnerability to traffic shifting to VCE and VRN as LCC traffic expands</li> <li>- Tightened noise and emission regulations further restricting airport traffic (proximity to Treviso)</li> </ul> <p><b>VRN</b></p> <ul style="list-style-type: none"> <li>- Intense competitive rivalry with BGY for the LCC and short-haul leisure segments.</li> <li>- High vulnerability to seasonal fluctuations and holiday trends.</li> <li>- Risk of being overlooked by carriers consolidating and larger hubs.</li> </ul> |

(Source: Author)

## 7 FUTURE TRAFFIC

Chapter 7 aims to generate and evaluate the Veneto MAS's future traffic performance. Through the evaluation of published forecasts and an author conducted one, future passengers, ATMs and cargo are estimated.

### 7.1 The Need for a Forecast

Of the region's airports, both TSF and VCE are approaching their capacity limits. VCE handled 11.6 MAP in 2024 which is 92.8% of its current declared capacity of 12.5 MAP (CAPA, 2023). TSF currently faces no space for expansion with increasing passenger numbers. With two airports being constrained and a robust yearly tourist and passenger demand growth, it becomes obligatory to understand how the Veneto MAS capacity ought to change to accommodate additional passengers. Simultaneously, this additional capacity ought to be sustainable for the environment, the local community and the airport operators. A solid forecast would enable to inform the airport operator; the regulator and government authorities of the requirements needed to optimise the existing capacity and effectively prepare for future travel trends.

### 7.2 Published Forecasts

There appears to be little published forecasts on the Veneto MAS, there are only two relevant sources: ENAC and the airport operator (Gruppo SAVE). The former ends in 2025 with projected traffic summarised in Table 16 and compared to 2024 numbers.

**Table 16 - ENAC Forecast**

| Airport    | Passenger Traffic (in million) |                    |                    |                    |                  |
|------------|--------------------------------|--------------------|--------------------|--------------------|------------------|
|            | 2008<br>(Actual)               | 2015<br>(Forecast) | 2020<br>(Forecast) | 2025<br>(Forecast) | 2024<br>(Actual) |
| VCE        | 6.86                           | 8.15               | 9.69               | 11.50              | 11.59            |
| TSF        | 1.70                           | 2.45               | 2.90               | 3.43               | 3.05             |
| VRN        | 3.38                           | 5.22               | 5.91               | 6.50               | 3.70             |
| Veneto MAS | 11.95                          | 15.82              | 18.5               | 21.43              | 18.34            |

(ENAC, n.d.)

Although ENAC's forecast terminates in 2025, it can be deemed accurate in forecasting VCE's and TSF's passenger traffic values despite the unforeseen COVID-19 pandemic. In terms of VRN, the forecast is less precise although understandable given its high volatility as a leisure airport and the numerous changes it experienced over the years.

The other forecast arises as a capacity expectation by respective airport operators in the published masterplans. These are reconciliated in Table 17.

**Table 17 – Airport Masterplan Forecast**

| Airport    | Passenger Traffic (in million) |                 |                 |
|------------|--------------------------------|-----------------|-----------------|
|            | 2025 Capacity (Actual)         | 2030 (Forecast) | 2037 (Forecast) |
| VCE        | 12.5                           | 15              | 20              |
| TSF*       | 3.5                            | 3.5             | 3.5             |
| VRN        | ~4                             | 5               | 5               |
| Veneto MAS | 19.3                           | 23              | 28              |

*\*No available masterplan passenger capacity projection*

(Venezia Airport, n.d.; Verona Aeroporto, n.d.)

As outlined in Chapter 5, VCE expects its terminal capacity to increase through its three infrastructure development phases, terminating in 2029 (2027 plus 2-year pandemic delay). This investment is justified by the expectation of 15 MAP by 2030 and 20 MAP in 2037 at the end of the masterplan: a 3.7% and 4% cumulative annual growth rate (CAGR). VRN, through its project Romeo expects to handle around 5 MAP following the completion of the works in 2026.

### 7.2.1 Perplexities on Published Forecasts

Alongside the lack of detailed forecasts, the published forecasted numbers by both ENAC and the airport operators raise doubts regarding their efficacy:

1. The ENAC forecast uses 2008 as a base year, a period fuelled by economic crisis and uncertainty. Additionally, 15 years on from the base year many changes in the context of the airports have occurred.

2. The airport operators do not provide justification on their forecasted values in terms of the origin of the additional traffic, travel trends and CAGR.
3. Regarding VCE, a doubling of its passenger traffic in a 12-year period appears extensive given its historic traffic trends.

As neither forecast appears trustworthy, the first lacks relevance and the second appears unfounded, the decision is taken to conduct an author forecast.

### **7.3 Author Forecast**

In order to reach a satisfactory traffic forecast, the aim of the forecast ought to be established as well as the necessary steps to achieve it.

The aim of this forecast is that to produce annual passenger, ATM, and cargo forecasts for the Veneto MAS for the period 2025-2035. The quantitative forecasting is based on a time-series forecast for each of the three airports in the Veneto MAS using historical passenger, ATM and cargo data. The cargo forecast will be conducted solely for VCE because of its position as the third Italian cargo hub, with TSF and VRN handling insignificant amounts of cargo as of 2025. To achieve this, the following steps are followed:

1. Identification of the limiting factor (passenger, ATMs or cargo) in the Veneto MAS that drives necessary infrastructural investment.
2. Production of a time-series forecast for the limiting factor.
3. Identification of a PPMR based on historic trends.
4. Verification of feasibility of forecasted traffic through cross-check with the non-limiting factor (e.g. if passengers are forecasted, the respective ATMs are compared with the airport's ATM capacity).
5. Production of time-series forecast for cargo and GA.

There are three aspects that must be noted regarding the conduction of the time-series forecast. The first is the removal of the covid-19 pandemic years for the passenger forecast given their nature as outliers in the development of traffic. Secondly, as per statistical rules, for every year for which the data is forecasted, two years of historical data are required. Therefore, given the availability of data since 2000 and the omissions of the years 2020-2023, the forecast will cover the

future period until 2035. Thirdly, as to increase the robustness of the forecast, an upper and lower bound will be calculated as a 95% confidence interval of the forecasted values. The percentage was chosen as part of a statistical standard that utilises 95% and 99% as values. Lastly, a weakness of the forecasting methodology must be acknowledged: ATM figures are available as inclusive of all types of traffic (passenger, cargo, GA) meaning that PPMRs for airports are susceptible to being positively skewed, resulting in less accurate and comparable values.

### 7.3.1 Limiting Factor

To determine the limiting factor, actual capacities are compared with actual values. In terms of passengers, the airport's MAPs are compared with the stated capacity. For ATMs, Assoclearance's (2025) ATM capacities (ATMs per hour) are calculated for a year subject to the airport's operating hours (equation 1).

#### Equation 1- Maximum Available ATMs

$$\text{Maximum Available ATMs} = \text{ATMs per hour} \times \text{Airport Operating Hours} \times 365$$

To establish the limiting factor, cargo has been excluded given that, as seen in Chapter 6, both TSF and VRN nowadays operate an insignificant tonnage.

**Table 18 - Veneto MAS Limiting Factor**

| Airport | MAP      |        |                      |                    | Air Traffic Movements |        |                      |                    |
|---------|----------|--------|----------------------|--------------------|-----------------------|--------|----------------------|--------------------|
|         | Capacity | Actual | Capacity Utilisation | Standard Deviation | Capacity              | Actual | Capacity Utilisation | Standard Deviation |
| VCE     | 12.5     | 11.6   | 92.8%                | 2.6                | 280,320               | 81,050 | 28.9%                | 18,938             |
| TSF     | 3.5      | 3.1    | 88.5%                | 1                  | 32,850                | 18,236 | 55.5%                | 4697               |
| VRN     | ~4       | 3.7    | ~92.5%               | 0.6                | 140,160               | 25,337 | 18.1%                | 7374               |

(Assoclearance, 2025; Assaeroporti, 2025)

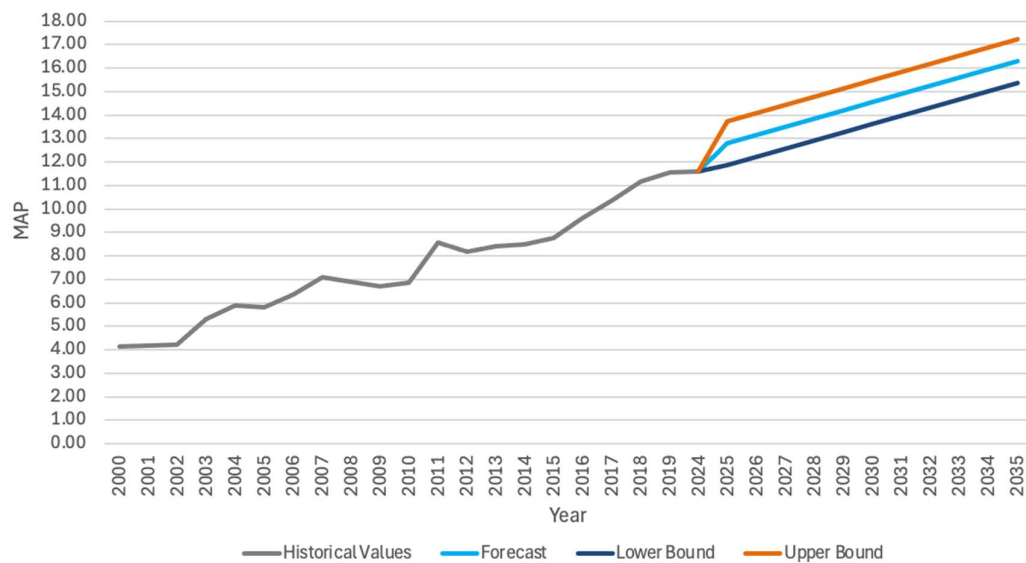
As seen on Table 18, all three airports operate close to and over 90% of their terminal passenger capacity whilst operating well below their yearly ATM cap, deeming passengers as the limiting factor.

### 7.3.2 Passenger Forecasts

Having established the limiting factor being yearly passengers, this section will proceed to produce a MAP and PPMR forecast for each airport, including a total forecast for the region.

Starting from the largest airport in the MAS, Figure 22 displays the time-series forecast for VCE.

**Figure 22 - VCE MAP Forecast**



(Source: Author)

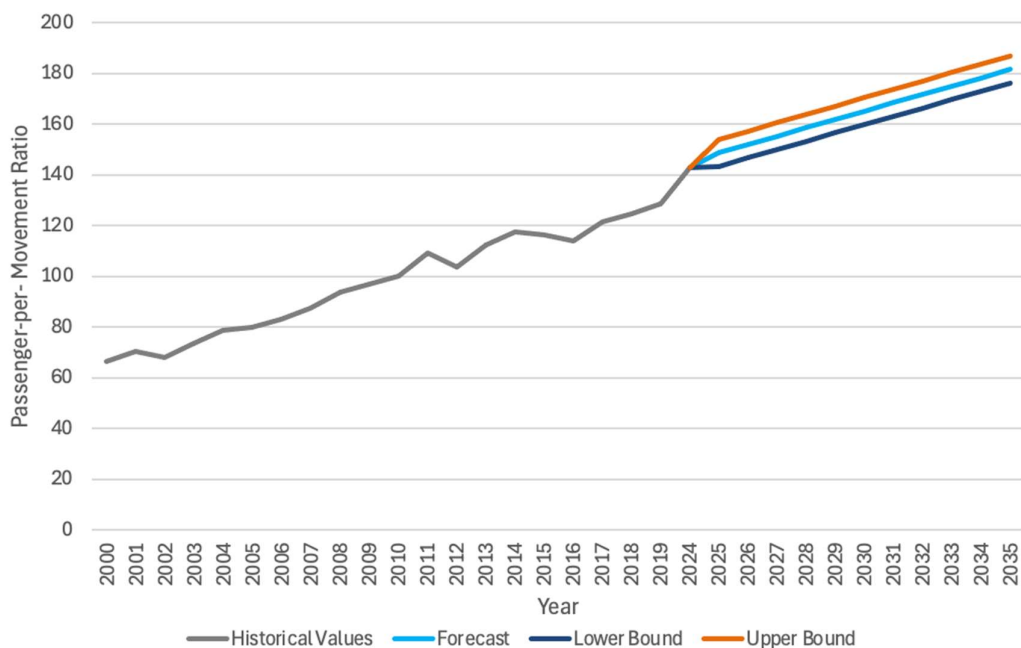
The available historical data since 2000 experiences a CAGR of 10.6% up until 2024. Venezia Airport's (n.d.) projection of 15 MAP in 2030 is confirmed by the forecast in 2032, and as early as 2029 with the upper bound. The figure of 20 MAP in 2037 remains far-fetched with the upper bound reaching 17.2 MAP in 2035, almost 3 MAP short of the masterplan's view. Aside from this inconsistency, the expectation that the terminal capacity will be able to handle such MAP figuratively "future-proofs" the airport.

IATA (n.d.) expects a 4% CAGR for the Italian market up to 2034. Despite this value being less than half of VCE's, the higher growth can be explained by two factors. The first is the saturation of the airport's intra-European connections that will attract increasing international routes that on average involve larger aircraft.

The second supports this international market development with the US-Italy market being the 6<sup>th</sup> largest international market by passenger numbers. Lastly, given VCE's role as the primary airport in the Veneto MAS, it is not improbable that flights are shifted to this airport following strategic shifts or unexpected events to TSF or VRN.

In terms of how the passengers relate to the ATMs, Figure 23 displays the PPM ratio for VCE.

**Figure 23 - VCE PPMR**



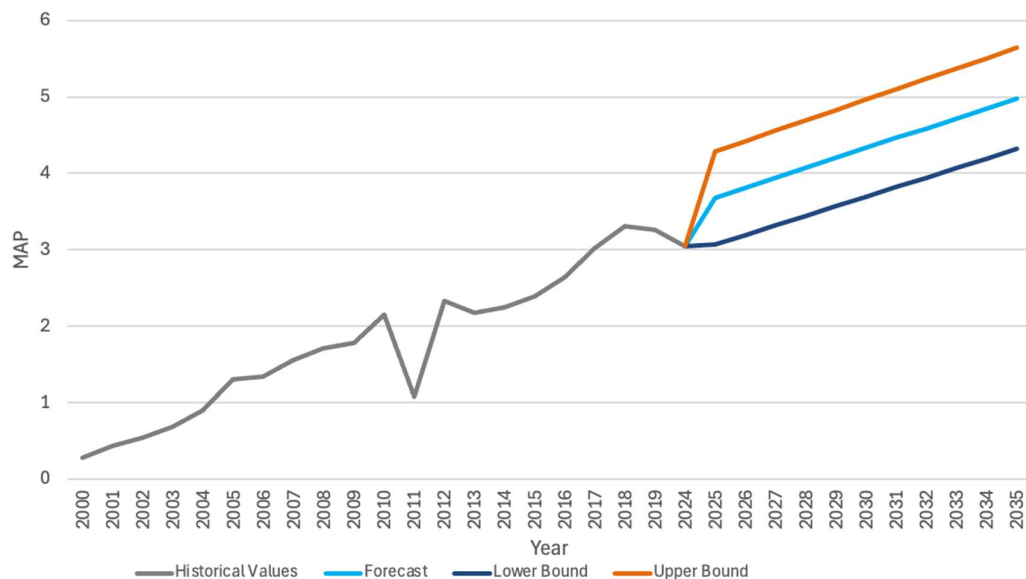
(Source: Author)

VCE experienced a PPM Ratio of 143 in 2024, after cumulatively growing 38.3% in the last 10 years. This value is projected to increase up to 160 in 2030 and around 180 in 2035. This increase is in line with the ongoing development of long-haul, widebody routes to the airport, with the latter being the Dallas to Venice route with American Airline's Boeing 777-200 (Venezia Airport, n.d.). Furthermore, this trend is in line with the wider aviation industry where airlines operate larger capacity aircraft as a response to congested airports, pilot shortages and cost increases (Josephs, 2023). It must be acknowledged that

despite VCE handling heavier traffic than TSF and VRN, the significantly larger presence of cargo and GA flights skews the PPM ratio to being lower than the other two airports in the system.

Moving onto Venice-Treviso airport, TSF, this airport is directly connected to VCE as its secondary airport and its traffic trend reflects this dynamic, as expected for this type of airport,. Figure 24 forecasts the growth in MAP.

**Figure 24 -TSF MAP Forecast**



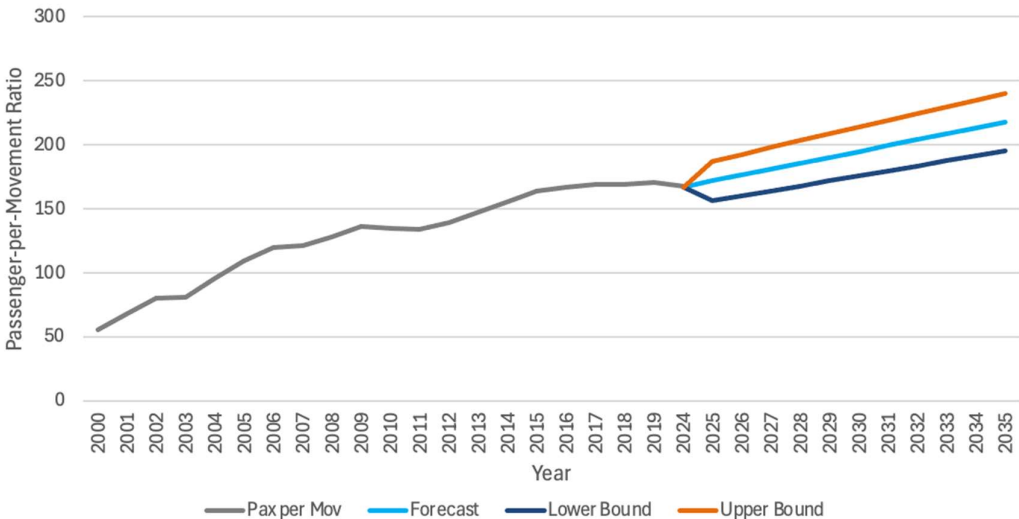
(Source: Author)

As per MAP growth, TSF has experienced a 3.1% CAGR in the last 10 years bringing the airport up to its current capacity of 3 MAP. During this period, the impact of market changes and international events has led to the visually identifiable peaks and troughs that characterise secondary airports. The forecast conducted assumes that the airport can keep growing at a similar rate, close to IATA's (n.d.) forecast of 4%. With this rate, TSF would surpass 4 MAP in 2028 and peak at 5 MAP in 2035. The lower bound reaches 4.3 MAP in 2035 with the upper 5.6 MAP.

Regarding the PPMR (Figure 25), this grew by 0.7% in the last 10 years and is projected to grow around 2% in the next 10-year period. This percentage arises

from the full historic data since 2000. In 2024, the PPMR was 167 with a projected increase to 218 in 2035. The likelihood of this increase can be traced to the up gauging of aircraft by LCCs: Wizz air's (2025) strategy is centred around the larger A321neo and XLR rather than the smaller A320neo. This increase, though plausible, will not change the PPMR extensively, especially with only Ryanair and Wizz operating at the airport.

**Figure 25 - TSF PPMR**

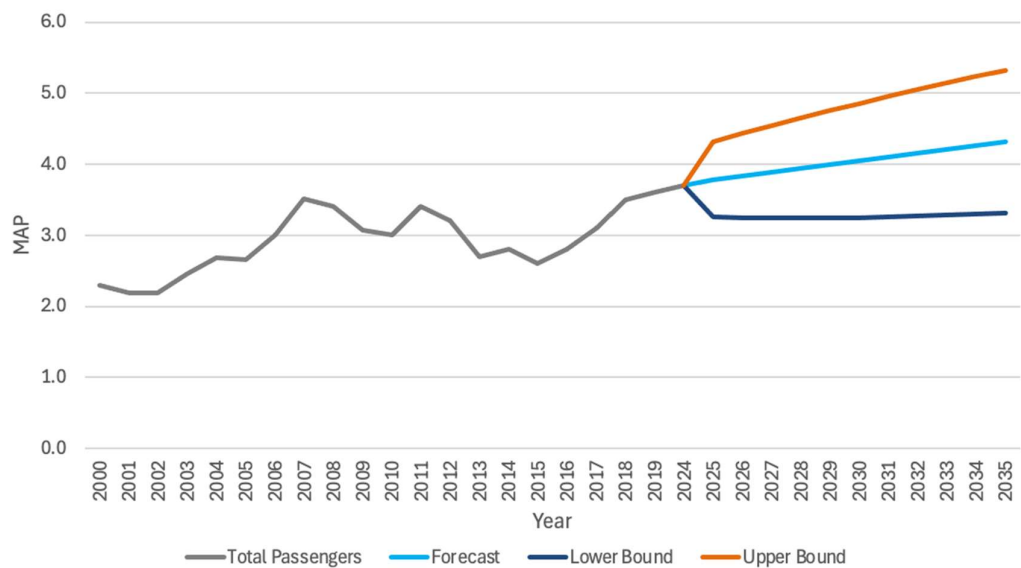


(Source: Author)

Moving onto VRN, the historical time-series highlights a 2.8% MAP CAGR in the last 10 years brining the airport to 3.7 MAP in 2024 (Figure 26). Being the airport with the highest year-on-year passenger variation, there is significant spread between the upper and lower bound of the forecast. Following historical trends VRN is expected to reach 4 MAP in 2029 with 4.3 reached in 2035. The lower bound assumes no growth after a decline until passenger numbers stabilise around 3.3 MAP, whilst the upper bound projects traffic above 5 MAP after 2030. In this case the upper bound of the forecast best resonates with project Romeo of the airport's masterplan, with a projected capacity of 5 MAP. It is unlikely that VRN experiences no growth given its role as the leisure airport of the region and that with expansion possibilities.

In terms of the airport's PPMR, this measure also is subject to high volatility year-on-year. Having experienced a 3.5% CAGR in the last 10 years, it alternated periods of marginal growth (108 to 109 from 2015 to 2016) to periods of substantial increases (140 to 146 from 2023 to 2024). This is attributable to the changes in charter traffic and the leisure market's changes in destination type (city breaks suit higher frequencies with smaller aircraft whilst island vacations favour larger aircraft with lower frequencies).

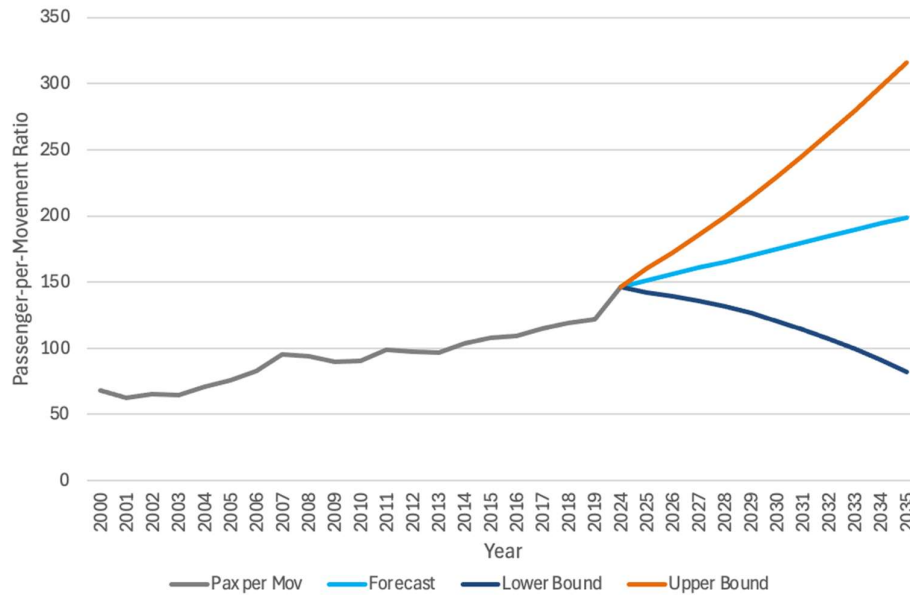
**Figure 26 - VRN MAP Forecast**



(Source: Author)

Overall, VRN's PPMR reached 146 in 2024 with forecast outputs around 200 for the time-series trend, 80 with the lower bound and over 300 for the upper bound. Specifically for this airport, a mean figure of 200 can be deemed appropriate to adjust for the spread in both passenger and PPMR forecasts.

**Figure 27 - VRN PPMR**



(Source: Author)

### 7.3.3 Passenger Forecast Verification

Having conducted the time-series forecasting and evaluate the potential factors influencing the outputs and their likelihood, a summary (Table 19) is produced to reconcile the most likely forecasted values per airport. The feasibility of those values is further cross-checked with the ATM capacity available per airport (equation 2). The figures reported in the table follow a number of conclusions drawn on the three airports:

1. Without a regulator-approved expansion plan and with constrained expansion possibilities, TSF is only expected to grow organically up to its passenger capacity limitations.
2. VCE and VRN continue to grow organically and through infrastructure investments, though slower than forecasted due to potential mismatches between expected capacity and construction completion delays
3. PPMRs marginally grow with respect to industry and historical trends, although remain susceptible to the forecast's lack of traffic segmentation.
4. Further future infrastructural investments and plans are ruled out given the masterplan's vision ending in 2037 for VCE and 2030 for VRN.

## Equation 2- ATM Cross Check

$$\text{Available Airport Capacity (in movements)} > \text{MAP} \div \text{PPM Ratio}$$

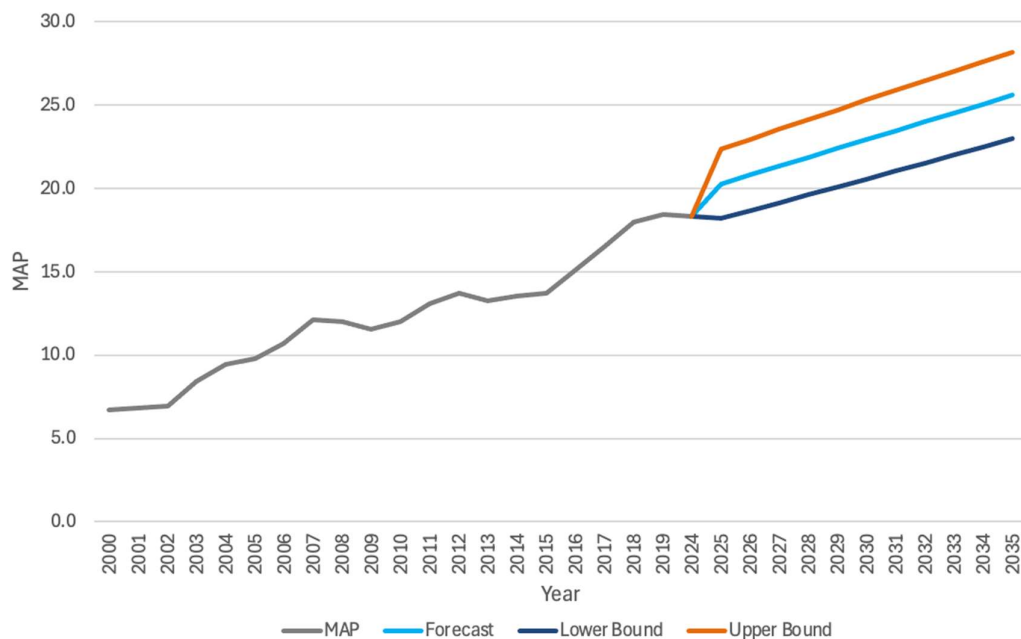
**Table 19 - Forecast Summary**

| Year                    | 2030    |         |         | 2035    |         |         |
|-------------------------|---------|---------|---------|---------|---------|---------|
| Airport                 | VCE     | TSF     | VRN     | VCE     | TSF     | VRN     |
| MAP Forecast            | 13-15   | 3.5-4   | 4-5     | 14-17   | 3.5-4   | 4-6     |
| PPM Ratio Forecast      | 160-180 | 170-190 | 150-190 | 170-200 | 170-190 | 150-200 |
| Movement Capacity Check | ✓       | ✓       | ✓       | ✓       | ✓       | ✓       |

(Source: Author)

With the individual airport forecasts completed and confirmed, the forecasts are then brought together to form a single Veneto MAS passenger forecast from which the future scenarios are derived (Figure 28 and Table 20).

**Figure 28 - Veneto MAS MAP Forecast**



(Source: Author)

**Table 20 - Veneto MAS Forecast**

| Year          | 2030    | 2035    |
|---------------|---------|---------|
| MAP Forecast  | 20.5-24 | 21.5-27 |
| PPMR Forecast | 150-190 | 150-200 |

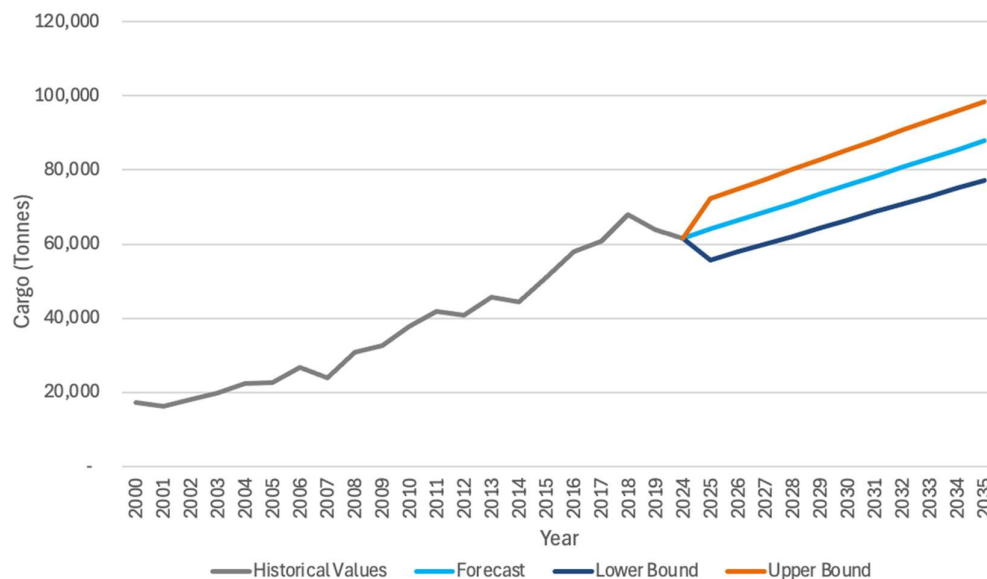
(Source: Author)

Similarly to the individual airport forecasts, the regional MAS, as a sum of the individual airports, appears less optimistic than the actual forecasts and the airport masterplans. Nonetheless it retains significant growth in passenger numbers. In chapter 8, these passengers will then be distributed as per the different scenarios.

### 7.3.4 Cargo Forecast

For the cargo traffic of the region, the decision was taken to produce only a time-series forecast for VCE. The reasoning behind this choice, as anticipated by chapter 6, is that VCE is the third airport in Italy for cargo and the main and only, as of 2025, cargo airport inside the region. Once again, with data available until 2000, the forecast projects cargo tonnage until 2035 (Figure 29).

**Figure 29 - VCE Cargo Forecast**



(Source: Author)

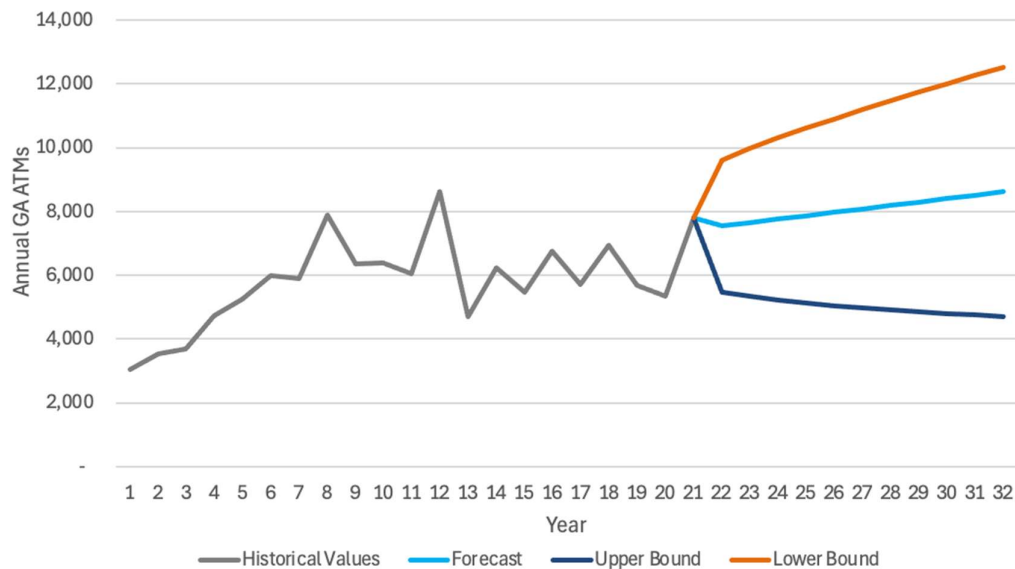
Cargo traffic has not yet fully recovered from the global health crisis in 2024 with 61,597 tonnes handled compared to the 68,029 tonnes in 2018. As economic growth continues to demand the speed of air cargo, international air cargo capacity is achieving new records with yields recovering from pandemic levels (IATA, 2025). With such positive outlooks, it is not unlikely that historical trends continue for VCE, securing its 3.32% 10-year CAGR. Furthermore, with new cargo infrastructure expected in the VCE masterplan, it can be assumed that capacity will not be of shortage at the airport. The predicted range of 80,000-100,000 tonnes from the forecast will be accommodated at the airport, supporting its role as a key transport hub for the region and the MAS.

### **7.3.5 General Aviation Forecast**

As identified in Chapter 6, GA traffic is a substantial component of the Veneto MAS with around 10% of yearly ATMs. Because of its importance, forecasting its future volume can be beneficial to the creation of scenarios where this traffic is allocated. To accurately project traffic in the future, airport-specific traffic must be individually forecasted as to account for province-level GA demand, subject to the various events and businesses running across the region. Individual airport forecasts are then summed as a regional MAS. Furthermore, given the insignificant PPMR in GA, the key metric used will be ATMs. As per forecasting coherence, the years 2020-2023 have been omitted due to the global health crisis.

Starting from the primary airport of the MAS, VCE used to be the secondary destination for GA after TSF in the 2000s, whilst nowadays it retains the primary status for GA traffic too. As seen in Figure 30, GA at any airport is highly volatile and subject to external factors like the success of specific companies, international-scale recurring events, and unique, one-off, occurrences (Hu, Yuan and Xue, 2025).

**Figure 30 - VCE GA Forecast**



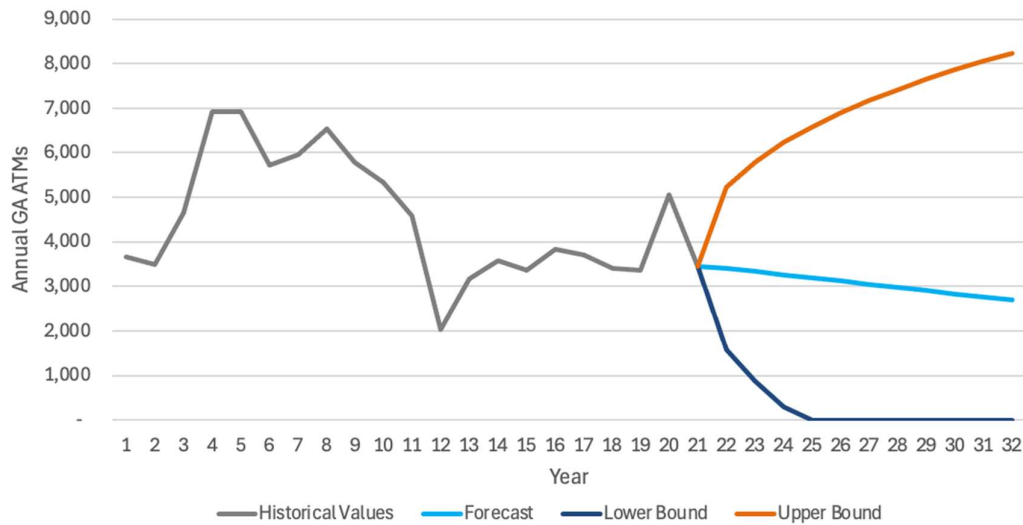
(Source: Author)

Due to the highly volatile nature of GA and the subsequent large spread in the forecast, the range between the bounds is as, if not more, important than the forecasted average. VCE experienced constant peaks and troughs whilst retaining a 3.5% CAGR in the last 10 years and handling 7,801 ATMs in 2024. Future events like the winter Olympics will continue to stimulate this demand and sustain traffic levels. The historical time series forecast suggests that VCE will handle an average of 8,000 GA ATMs in 2030 with peaks at 8,600 in 2035. The upper and lower bounds infer that traffic may be as low as 4,700 ATMs and as high as 12,500. Specifically for the upper bound, this value for 2035 would correspond to almost 15% of 2024's total ATMs. Clearly, not only is GA expected to continue being a noteworthy component of the airport, but it may continue to grow, potentially necessitating of dedicated procedures or traffic management strategies.

Moving onto TSF, the former GA preference and secondary Venice airport, this airport has experienced a net decrease in GA traffic over the last 15 years, -2.9%

CAGR (Figure 31). Aside from this traffic redistributing to VCE, the strategy of the airport as a LCC hub also contributed to this shift.

**Figure 31 - TSF GA Forecast**



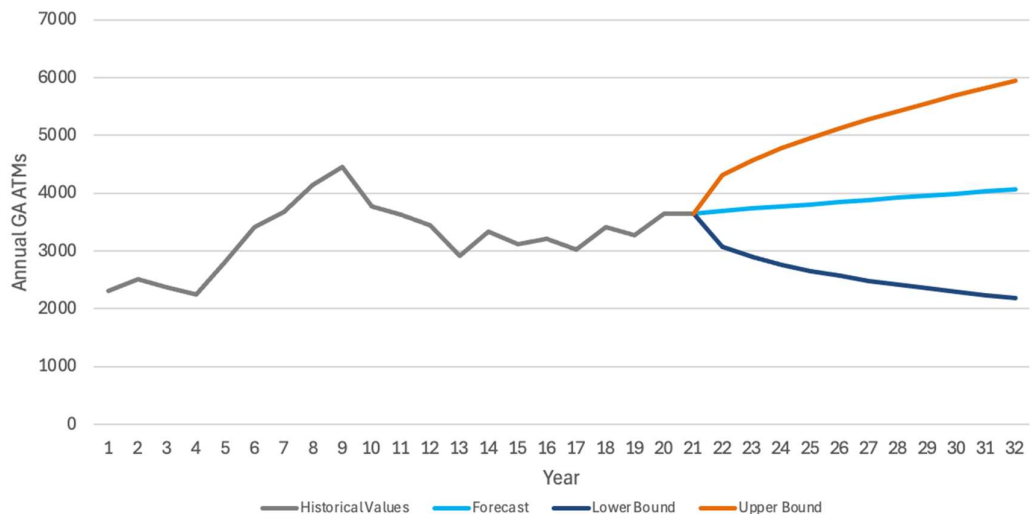
(Source: Author)

Due to the decreasing trend of the historical time-series, this forecasting method expects TSF's GA traffic to continue falling to 3,000 ATMs in 2030 and 2,600 in 2035. This decrease becomes fatal in the lower bound with no GA flights. Given the demand for travel to the region and the individual provinces, this complete stop in GA traffic can be deemed unlikely. This unlikely scenario may dispute the efficacy of the chosen methodology, although the large spread between the forecast and its upper bound retains credibility as they represent the common fluctuations in the historical values. In fact, a range between 3,000 to 8,000 ATMs allows for multiple scenarios to occur, with the average forecast a plausible indication. Furthermore, the peak in 2019 restores probability in the upper bound.

Despite the drawback of this methodology, one aspect remains undisputed, a traffic re-distribution has occurred causing the initial, significant, decrease in ATMs. This distribution will become the key opportunity discussed through alternative scenarios in the following chapter.

Lastly, VRN's GA traffic is forecasted (Figure 32).

**Figure 32 – VRN GA Forecast**

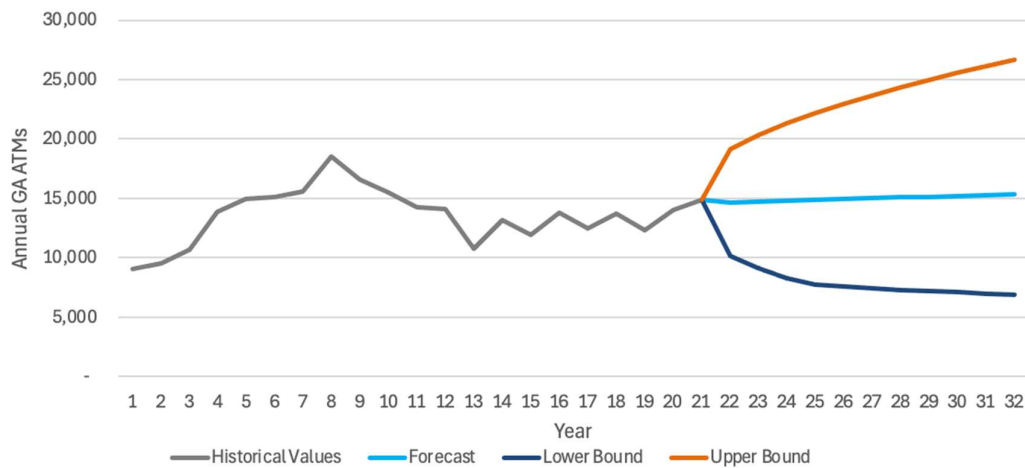


(Source: Author)

VRN exhibits a less volatile and fluctuating traffic time-series. Despite a distinct peak in 2009 and subsequent trough following the global and Italian crises, it retains a 1.6% CAGR. This stable demand can be explained by the distance from VCE and the strength of the Verona province in its business ventures. With a more stable historical series, the forecast and its spread also result simpler in nature. After achieving 3,651 ATMs in 2024, VRN is expected to handle around 3,900 in 2030 and over 4,000 in 2035. The bounds surrounding these values range from 2,500 to 5,400 in 2030, and 2,200 to 5,900 in 2035. In VRN's case the forecasted average results plausible and the bounds adjust for possible shocks and resilience.

Overall, GA traffic is expected to increase in the region, mainly through VCE and VRN. Figure 33 summarises how the region is expected to perform as a sum of the individual airport's forecasts.

**Figure 33 – Veneto MAS GA Forecast**



(Source: Author)

Table 21 depicts the author's opinions on the most probable GA forecasts for the region and its individual airports, following these considerations:

1. TSF's traffic will continue to be re-distributed to VCE until the province-based demand will be reached, and there it will stabilise
2. VRN and VCE will continue to grow organically serving the GA needs of their catchment areas with proximity being the allocating factor where overlap is present.
3. No traffic re-distribution occurs

**Table 21 – GA Forecast Summary**

| Year         | 2030         |             |             |               |
|--------------|--------------|-------------|-------------|---------------|
| Airport      | VCE          | TSF         | VRN         | Veneto MAS    |
| GA Movements | 4,500-10,000 | 2,500-6,000 | 3,000-5,250 | 10,000-21,250 |
| Year         | 2035         |             |             |               |
| Airport      | VCE          | TSF         | VRN         | Veneto MAS    |
| GA Movements | 5,000-11,000 | 2,000-6,000 | 3,250-6,000 | 10,250-23,000 |

(Source: Author)

## **8 FUTURE SCENARIOS**

In the eighth chapter, the previous chapter's knowledge, conclusions and assumptions are taken forward to outline possible future traffic scenarios for the Veneto MAS. These scenarios are not evaluated to determine an ideal allocation of the MAS, but rather to proactively envision differing possibilities to support growing demand without encountering issues like airspace congestion and airport capacity saturation. For the aim of simplicity, the scenarios observed are at two static points in time, 2030 and 2035.

### **8.1 Assumptions**

Before delving into the three scenarios, the assumptions driving them are clarified. These are related to creating a consistent baseline as to reduce complexity in scenario creation and evaluation. They are:

1. VCE, as the primary airport, is preferred over VRN and TSF;
2. Passenger, cargo and ATM numbers will continue growing in the future as to follow historical trends;
3. Capacity and service growth are essential to retaining and effectively developing demand, therefore physical infrastructure requires continuous development;
4. Traffic, networks and carriers are mobile, that is they can freely be re-allocated to other airports of the system;
5. Existing construction projects are delayed by the number of years of the pandemic (3 years) on original plans;
6. Regional traffic is airport-specific and thus regional carrier networks are not re-allocated;
7. Capacity share equals passenger share, thus load factors are the same for all airlines.

### **8.2 Traffic Rules**

Because in the scenarios traffic will be allocated and shifted between airports, a rule must be adopted as to how that distribution happens. As mentioned above, the preference is for VCE with VRN as the first secondary airport and TSF to

follow. With this in mind, Equation 3 portrays the allocation methodology, subject to the scenario's context.

### Equation 3 – Veneto MAS Traffic Rules

| VCE is preferred                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $P(VCE) \propto C(VCE)$ $P(VRN) \propto C(VRN)$ $P(TSF) \propto C(TSF)$ $P(VCE) = k$ $P(VRN) = D(Veneto) - P(VCE)$ $P(TSF) = D(Veneto) - P(VCE) - P(VRN), \text{ or } P(TSF) = k,$ $\text{or } P(TSF) = D(Veneto) - P(VRN)$                                                                                                 |
| <p><b>Where:</b> <math>P(VCE)</math> = VCE MAP; <math>C(VCE)</math> = VCE capacity; <math>P(VRN)</math> = VRN MAP;<br/> <math>C(VRN)</math> = VRN capacity; <math>P(TSF)</math> = TSF MAP; <math>C(TSF)</math> = TSF capacity;<br/> <math>D(Veneto)</math> = Total regional passenger demand; <math>k</math> = constant</p> |

(Source: Author)

The constant (k) expressed above, is related to the scenario rule in place and varies across each scenario and each year. Lastly, it must be noted that for each scenario, as one airport reaches its capacity, the next airport in order of preference takes over in absorbing traffic, until the demand of the region is fully allocated. This may lead to the last airport in order of preference to experience capacity shortage/surplus.

## 8.3 Scenarios

Having established the assumptions and the traffic distribution rules for the airports, below are the four scenarios explored:

1. No change (base scenario)
2. GA only at TSF
3. Largest market at the largest airport (LCC only at VCE)
4. FSC only at VCE

### 8.3.1 Scenario 1 - Base Scenario

The first scenario assumes no change in the traffic distribution of the Veneto MAS, that is, traffic grows in each airport as forecasted in chapter 7. As seen in Table 22, as traffic grows so does capacity for VCE and VRN. As expected the masterplan investments provide capacity for traffic growth with extra capacity for additional traffic. TSF, instead, experiences a capacity shortage in both 2030 and 2035 as the airport reaches its current capacity. This is related with its blocked infrastructural expansion plans and must be dealt with, as to avoid terminal congestion in 5- and 10-years' time.

**Table 22 - Traffic Allocation Scenario 1**

| Scenario 1 | Passengers (in million) |        |        |        |        |        |        |           |        |
|------------|-------------------------|--------|--------|--------|--------|--------|--------|-----------|--------|
| Year       | C(VCE)                  | P(VCE) | C(VRN) | P(VRN) | C(TSF) | P(TSF) | C(Tot) | D(Veneto) | C(Sur) |
| 2024       | 12.5                    | 11.6   | 4      | 3.7    | 3.5    | 3      | 20     | 18.3      | 1.7    |
| 2030       | 15                      | 13.6   | 5      | 4.1    | 3.5    | 3.7    | 23.5   | 21.4      | 2.1    |
| 2035       | 20                      | 15.3   | 5      | 4.3    | 3.5    | 4.3    | 28.5   | 23.9      | 4.6    |

*C()= Capacity, D()= Demand, P()=Passenger Traffic, C(Tot)= Total Capacity, C(Sur)= Capacity Surplus, Green number indicates increase in capacity, Red number indicates a capacity shortage, Pink cell indicates re-allocated traffic*

(Source: Author)

Given the capacity shortage in Scenario 1, Scenario 1A provides a possible traffic re-distribution where VCE, as the primary and preferred airport, absorbs the surplus demand (Table 23).

**Table 23 - Traffic Allocation Scenario 1A**

| Scenario 1A | Passengers (in million) |        |        |        |        |        |        |           |        |
|-------------|-------------------------|--------|--------|--------|--------|--------|--------|-----------|--------|
| Year        | C(VCE)                  | P(VCE) | C(VRN) | P(VRN) | C(TSF) | P(TSF) | C(Tot) | D(Veneto) | C(Sur) |
| 2024        | 12.5                    | 11.6   | 4      | 3.7    | 3.5    | 3      | 20     | 18.3      | 1.7    |
| 2030        | 15                      | 13.8   | 5      | 4.1    | 3.5    | 3.5    | 23.5   | 21.4      | 2.1    |
| 2035        | 20                      | 16.1   | 5      | 4.3    | 3.5    | 3.5    | 28.5   | 23.9      | 4.6    |

*C()= Capacity, D()= Demand, P()=Passenger Traffic, C(Tot)= Total Capacity, C(Sur)= Capacity Surplus, Green number indicates increase in capacity, Red number indicates a capacity shortage, Pink cell indicates re-allocated traffic, Orange number indicates system is at capacity.*

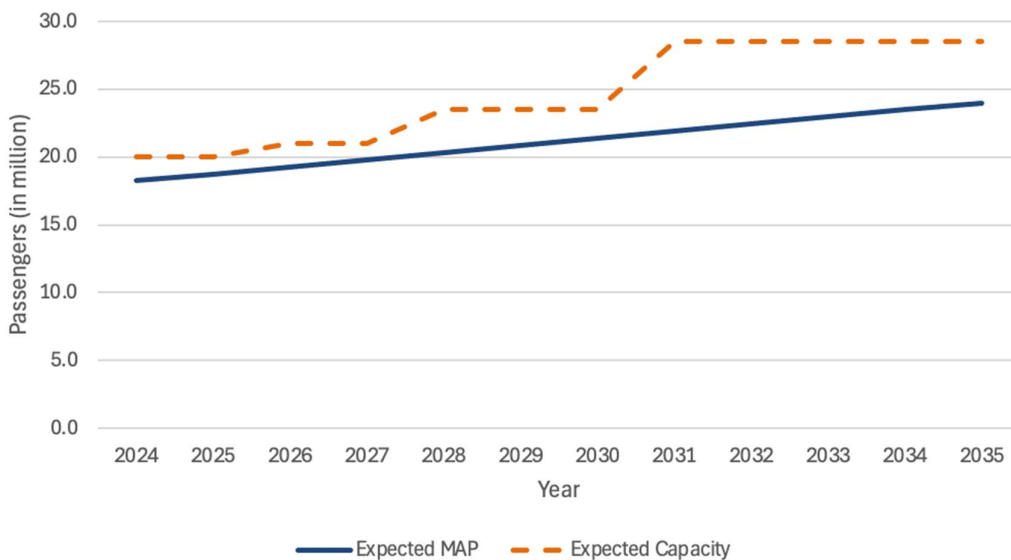
(Source: Author)

VCE is able to handle the extra traffic with margin thanks to its infrastructural investments. In Scenario 1A traffic was re-allocated as to bring TSF to its capacity, although with the capacity surplus present in the system in VCE and

VRN, the traffic re-allocated can be adequately chosen to allow all three airports to retain a safety margin.

Despite the capacity shortage at TSF, the Veneto MAS is prepared for future traffic growth and has spare capacity to allow for positive and negative deviations from the forecasts (Figure 34).

**Figure 34 – Veneto MAS Base Scenario**



(Source: Author)

### 8.3.2 Scenario 2 – GA at TSF

The second scenario arises as a response to the blocked infrastructural investments in TSF due to environmental and noise concerns. In this scenario, commercial traffic from TSF is distributed to VCE and VRN whilst simultaneously all the region’s GA traffic is brought to TSF (Table 24). Effectively, TSF would become the region’s dedicated fixed base operator (FBO) and specialise in GA traffic. This change would marginally reduce the number of ATMs at the airport: in 2024, total regional GA ATMs were 14,901 compared to TSF’s ATMs of 18,236. This reallocation could possibly benefit the province at an emission and noise level, although it would require private aircraft owners to travel further to operate.

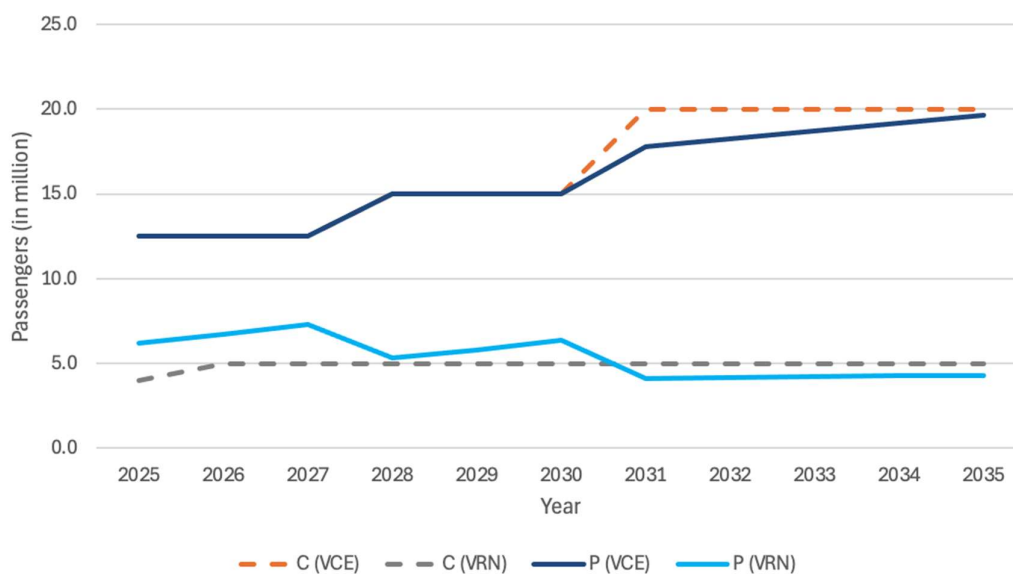
**Table 24 - Traffic Allocation Scenario 2**

| Scenario 2                                                                                                                                                                                                                           | Passengers (in million) |        |        |        |                  |        |        |           |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------|--------|--------|------------------|--------|--------|-----------|--------|
| Year                                                                                                                                                                                                                                 | C(VCE)                  | P(VCE) | C(VRN) | P(VRN) | C(TSF)           | P(TSF) | C(Tot) | D(Veneto) | C(Sur) |
| 2024                                                                                                                                                                                                                                 | 12.5                    | 11.6   | 4      | 3.7    | 3.5              | 3      | 20     | 18.3      | 1.7    |
| 2030                                                                                                                                                                                                                                 | 15                      | 15     | 5      | 6.4    | General Aviation |        | 20     | 21.4      | -1.4   |
| 2035                                                                                                                                                                                                                                 | 20                      | 19.6   | 5      | 4.3    |                  |        | 25     | 23.9      | 1.1    |
| C()= Capacity, D()= Demand, P()=Passenger Traffic, C(Tot)= Total Capacity, C(Sur)= Capacity Surplus, Green number indicates increase in capacity, Red number indicates a capacity shortage, Pink cell indicates re-allocated traffic |                         |        |        |        |                  |        |        |           |        |

(Source: Author)

This scenario initially appears complex because it causes VCE to reach capacity and the remaining traffic allocated to VRN surpasses the latter's capacity (Figure 35). Overall, the system would lose 3.5 MAP capacity and encounter a capacity shortage in 2030. As VCE further expands with its Lot 2B of the masterplan, the surplus capacity is now covered, and the system returns to having a 1.1m capacity surplus in 2035. The initial lack of capacity and further reduction in spare capacity may reduce the system's resilience. Nonetheless this scenario remains a viable option for the future existence of TSF as an airport in the system, and a possibility to justify further investment at VCE and VRN.

**Figure 35 – Veneto MAS Scenario 2**

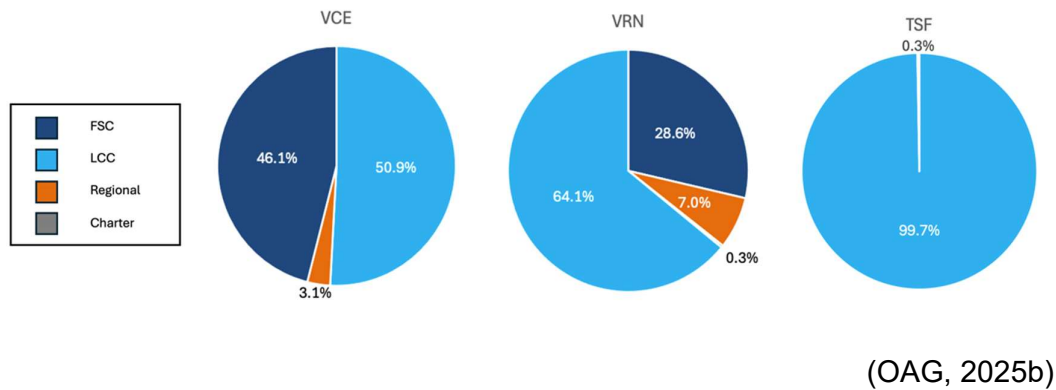


(Source: Author)

### 8.3.3 Scenario 3 – Largest Market at the Largest Airport

Scenarios 3 and 4 are more theoretical in nature and are experimentally developed to diagnose traffic segment opportunities in the system. Figure 36 summarises the passenger segments by share of departing seats explored in chapter 5.

**Figure 36 – Airport Carrier Share**



LCC traffic is the largest market in each airport and the Veneto MAS, accounting for 71,6% of departing seats. With this in mind, the third scenario assumes VCE, as the airport with the largest capacity, would specialise in the LCC segment with VRN and TSF handling other traffic segments (Table 25).

**Table 25 - Traffic Allocation Scenario 3**

| Scenario 3 | Passengers (in million) |        |        |        |        |        |        |           |        |
|------------|-------------------------|--------|--------|--------|--------|--------|--------|-----------|--------|
| Year       | C(VCE)                  | P(VCE) | C(VRN) | P(VRN) | C(TSF) | P(TSF) | C(Tot) | D(Veneto) | C(Sur) |
| 2024       | 12.5                    | 11.6   | 4      | 3.7    | 3.5    | 3      | 20     | 18.3      | 1.7    |
| 2030       | 15                      | 13.7   | 5      | 5      | 3.5    | 2.7    | 23.5   | 21.4      | 2.1    |
| 2035       | 20                      | 15.3   | 5      | 5      | 3.5    | 3.6    | 28.5   | 23.9      | 4.6    |

*C()= Capacity, D()= Demand, P()=Passenger Traffic, C(Tot)= Total Capacity, C(Sur)= Capacity Surplus, Green number indicates increase in capacity, Red number indicates a capacity shortage, Pink cell indicates re-allocated traffic*

(Source: Author)

Whilst this scenario appears feasible until 2030, FSC passenger growth makes this traffic distribution problematic in 2035. In 2030 VRN has already reached capacity whilst TSF retains a margin of 0.8m. 5 years later, a 0.1m capacity shortage replaces the margin in TSF. Differently, in VCE this scenario allows for

an appropriate capacity buffer to exist in 2030. In 2035 the excess capacity may signal poor planning and a market inefficiency.

### 8.3.4 Scenario 4 – FSC Only at VCE

The fourth and last scenario follows the opposite allocation criterion to the third: VCE only handles FSC traffic whilst VRN and TSF handle LCCs. This allocation reflects the original operator view on the Veneto MAS, with VCE handling premium FSC traffic and TSF operating the leisure and low-cost segment. In Table 26, FSC traffic is all allocated to VCE whilst LCC traffic is initially absorbed by VRN and the remainder is allocated to TSF.

**Table 26 - Traffic Allocation Scenario 4**

| Scenario 4                                                                                                                                                                                                                           |        | Passengers (in million) |        |        |        |        |        |           |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------------|--------|--------|--------|--------|--------|-----------|--------|
| Year                                                                                                                                                                                                                                 | C(VCE) | P(VCE)                  | C(VRN) | P(VRN) | C(TSF) | P(TSF) | C(Tot) | D(Veneto) | C(Sur) |
| 2024                                                                                                                                                                                                                                 | 12.5   | 11.6                    | 4      | 3.7    | 3.5    | 3      | 20     | 18.3      | 1.7    |
| 2030                                                                                                                                                                                                                                 | 15     | 7.8                     | 5      | 5      | 3.5    | 8.6    | 23.5   | 21.4      | 2.1    |
| 2035                                                                                                                                                                                                                                 | 20     | 8.7                     | 5      | 5      | 3.5    | 10.2   | 28.5   | 23.9      | 4.6    |
| C()= Capacity, D()= Demand, P()=Passenger Traffic, C(Tot)= Total Capacity, C(Sur)= Capacity Surplus, Green number indicates increase in capacity, Red number indicates a capacity shortage, Pink cell indicates re-allocated traffic |        |                         |        |        |        |        |        |           |        |

(Source: Author)

Unsurprisingly, allocating the largest market of the system to the two smallest airports causes a large capacity shortage at TSF (5.1m and 6.7m) alongside a large underutilisation of VCE's capacity (7.2m and 11.3m). The LCC segment has grown extensively in the last 5 years and is expected to continue to grow, it no longer forms a supplemental share of the system, but rather the driving market segment.

Overall, scenarios 3 and 4 depict the limiting factors of the system and outline the reasons why the original Venetian traffic distribution has been disrupted by the growth of LCC traffic in recent years. Furthermore, despite their hypothetical approach and simplistic nature, they both confirm the need for a mixed segment approach for the primary airport and a reconsideration of traffic allocation rules.

## **9 CONCLUSIONS AND RECOMMENDATIONS**

This chapter presents the main findings of the objectives specified in chapter 1 as to serve the aim of the thesis. Additionally, recommendations and limitations arising from the study are summarised.

### **9.1 Key Research Findings**

#### **9.1.1 Veneto MAS Air Transport**

The region's aviation traffic has steadily increased in the last 20 years, despite the global crises creating peaks and troughs. This traffic was primarily driven by EU traffic followed by international, long-haul routes. This drive has occurred primarily through VCE with North American and Asian destinations, with a contribution by VRN. Furthermore, with the entry and settlement of LCC operations (flights and bases) in all three of the MAS's airports, foreign markets have been rendered more accessible and have substantially expanded the market base. Overall, the Veneto MAS remains a crucial air transport hub in Italy and, through VCE, will continue to drive intercontinental travel to the region.

#### **9.1.2 Future Traffic**

Positive historical traffic trends are likely to continue as tourism intensifies and potentially develops in the winter season. With a cautious approach to over-tourism and the potential implementation of city-tourist caps, the region will benefit from improved inter-modality and different traffic segments, especially international traffic and GA. Without an official published forecast for the next 10 years, an attempt was made to produce a traffic projection until 2030 and 2035. It is predicted that in 2035 the Veneto MAS will handle upwards of 25 MAP, 125,000 ATMs (of which 15,000 to 20,000 will be GA), and 80,000 tonnes of cargo. This forecast, though, comes with a concern for the potential need for traffic re-distribution to accommodate passenger numbers.

#### **9.1.3 Airport and Airline Plans**

VCE and VRN both have masterplans that foresee terminal, apron and other expansions in the next 5-10 years, while TSF's masterplan is under regulatory

and environmental scrutiny and has been stopped. If traffic distribution remains as it is today, the latter will become the setting for capacity saturation and will encounter issues if no intervention is conducted. For VRN and VCE, their infrastructure investment is expected to be followed by new airlines entering and new routes being served: Saudia started operating from Venice to Riyadh and Jeddah from the 13<sup>th</sup> of June and Condor is expected to enter VCE's network in 2026 (Gruppo SAVE, n.d.).

#### **9.1.4 Potential Scenarios**

To evaluate alternative future possibilities for the MAS, four scenarios were assessed in their likely positive and negative impacts. The third and fourth scenarios are the most theoretical with the other two being more realistic. It's clear that the building of the scenarios was finalised at identifying potential changes and providing considerations for an uncertain future. Nonetheless, some aspects like the specialisation of TSF as a GA hub can truly lead to paradigm shifts for the airport operator's strategy and the region's traffic distribution. Other ideas like traffic caps for select market segments (e.g. LCC market share at VCE < 40%) can prove useful without drastic shifts. What becomes clear through the analysis is that VRN and VCE ought to operate with all types of carriers. TSF instead, can play either a support role or can specialise in one market segment.

### **9.2 Recommendations**

#### **9.2.1 Need for Capacity Optimisation**

Despite prospects for traffic growth, once the current infrastructure investments are completed, capacity development does not become the immediate need. With significant overlap in destinations and carriers across the system, there appears to be a need for network rationalisation as to improve slot availability and free more capacity without further physical expansion. Furthermore, with a common airport operator present in all three airports, alternative goals to capacity and traffic development can become fruitful to improve value-creation. Examples can include improved car traffic flow in-and-out of the airport, increased multimodality, new offices in the terminal extensions, re-purposing of spaces, etc.

Furthermore, it must be noted that there is substantial unused capacity in each airport, with the ATM cap never reached even during the peak summer season. This over-capacity in ATMs presents challenges and may suggest the need for an airport closure, if such airport is not embedded effectively in the system. The general recommendation is that airport operators, alongside the national authorities and transport stakeholders, can develop value-creation in a constructive and gradual manner through the re-allocation of resources and capabilities, without necessarily, resorting to increased traffic.

### **9.2.2 Traffic Diversification**

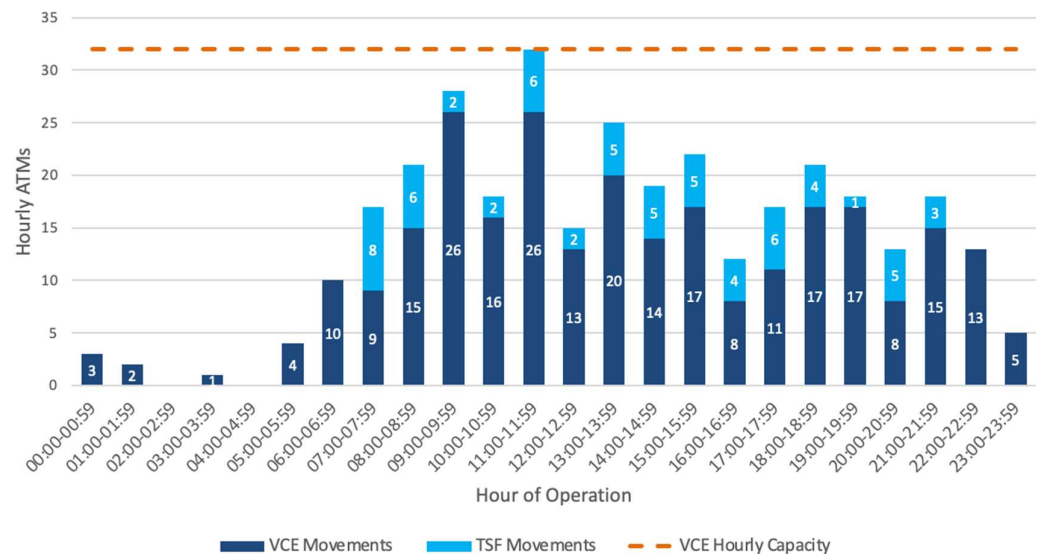
As mentioned in chapter 2, MAS have provided an opportunity for traffic to-and-from a region to be segmented across primary and secondary airports as to alleviate pressure from the airspace, the terminal buildings, and the respective aprons. The effective development of a MAS, in fact, is the mechanism by which a region can safely and efficiently accommodate traffic volumes. With this in mind, it can be beneficial for this traffic segmentation to occur and be respected in the Veneto MAS. Considering the research conducted, this segmentation would appear as follows:

- VCE: primary airport, both FSCs and LCCs with hub-and-spoke model, cargo hub, select GA traffic
- VRN: secondary airport, both FSCs and LCCs with point-to-point model, charter traffic
- TSF: specialised secondary airport, LCC only or GA only

TSF would avoid its current capacity constraints through a fully specialised strategy with its overflow flying to VCE and VRN. The latter two would focus on their market segments by specialising their offering. VCE would automatically increase its traffic as it absorbs TSF's partial (or full) commercial ATMs and further establish itself as the third airport in Italy, finally outperforming more regional airports like Catania and Napoli.

The full traffic re-allocation from TSF to VCE is hypothetically possible thanks to the large hourly ATM capacity provided (Figure 37). Clearly, when flights are also allocated to VRN, the shift's feasibility increases.

**Figure 37 – VCE and TSF Hourly ATMs 28/07/2025**



(FlightRadar24, 2025)

### 9.3 Research Limitations

The research was conducted after a period of deeply rooted uncertainty raised by the global COVID-19 health crisis. 2024 was the first year where passenger traffic recovered from these times with cargo tonnage still not recovered. Most airlines resumed service to the airports although major changes occurred during the pandemic and potentially require two-to-three years to fully reveal their impact. Moreover, limitations were present in the data gathering process where masterplans (TSF) and internal strategies were unpublished and confidential. Without appropriate time and contacts, interviews and surveys of various stakeholders became inaccessible. Clearly, the availability of insider information and unpublished material would have increased the quality and quantity of insights.

## **9.4 Future Study**

This thesis explored the Veneto MAS as a potential system where airports, by coordinating and complementing each other could potentially aid the system's offering and use. Further research could focus on the financial viability of each of the airports and the system as a whole. Alternatively, scenario implementation feasibility can be another intriguing aspect. Airport and business model preferences can also be explored to assess the airline perspective of the region, potentially involving market competitiveness frameworks.

Lastly, updating the research conducted in the next 5-10 years could evaluate the effectiveness of the investments made both at an air and intermodal transport level and determine whether access ought to be further facilitated and capacity further expanded.

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# APPENDICES

## Appendix A - Ethical Approval Letter



2 July 2025

Dear Mr Rotondi ,

Reference: CURES/25904/2025

Project ID: 29451

Title: Improving Multi-Airport Capacity Utilisation in the Veneto Region in Italy

We are pleased to inform you that you have successfully declared that your research project is a **Literature Review – based solely on openly available literature which is in the public domain, and you are undertaking desk-based research not involving any other form of data or information.**

You have also confirmed that your project **does not meet** any of the literature review specified exceptions, listed both within the relevant section of the CURES form and below:

1) Your supervisor has requested that you apply for approval through CURES because:

- The journals or data are in a sensitive area (please discuss this with your supervisor)
- The project will be embargoed i.e. **will not be publicly available via the Cranfield library immediately or longer term**

2) Approval is/will be specifically required by another external body e.g. journal publishers

Therefore, **you do not require ethical approval** and your CURES application will be automatically closed.

**Please keep a copy of this letter safe, if this exception is in relation to your thesis project, you will need to include a copy with your final thesis submission.**

If you have any queries, please contact CURES Support.

We wish you every success with your project.

Regards,

CURES Team

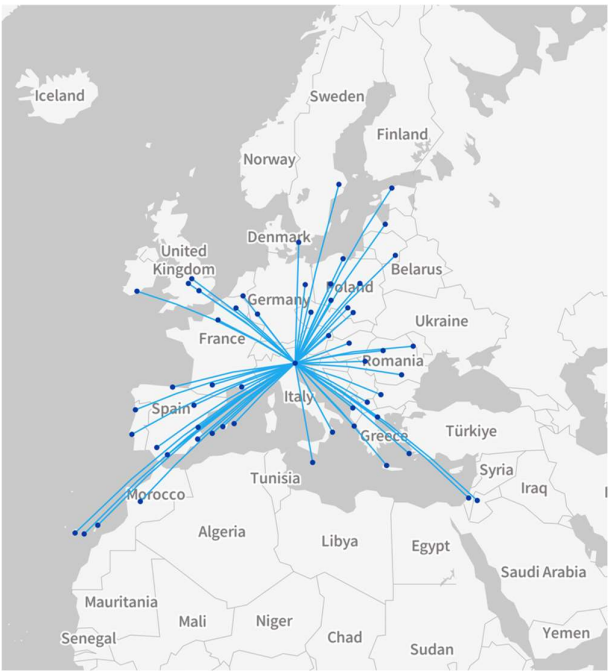
# Appendix B - Veneto MAS Networks

Map 13 – VCE Network 2025



(OAG, 2025a)

Map 14 – TSF Network 2025



(OAG, 2025a)

Map 15 – VRN Network 2025



(OAG, 2025a)