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THE ECONOMIC IMPACT OF THE SHANNON AIRPORT GROUP

SEPTEMBER 2023

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September 2023

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EXECUTIVE SUMMARY

The Shannon Airport Group (SNNGroup) is a primary catalyst for economic growth in Ireland and the Mid-West. SNNGroup owns and operates Shannon Airport as well as a substantial commercial property business. The aviation and property activities facilitated by SNNGroup supports businesses and livelihoods across Ireland. Shannon Airport is a national strategic asset providing essential air connectivity that supports the economic growth of the island nation. The property portfolio of SNNGroup further supports both indigenous firms and Foreign Direct Investment (FDI) across the region.

SNNGroup commissioned Oxford Economics to quantify its economic contribution to the Irish economy. The economic footprint of SNNGroup incorporates the impact of the Airport and the businesses located across the SNNGroup's business parks, which support thousands of jobs and contribute billions to GDP.

THE ECONOMIC IMPACT OF SNNGROUP

The core economic impact of SNNGroup contributed €3.96 billion of GVA to Ireland's GDP in 2022 and facilitated 20,330 jobs across the Irish workforce. SNNGroup's economic footprint is concentrated in the Mid-West. In 2022, the core impact contributed approximately €3.29 billion to the Mid-West economy—equivalent to around 6% of the region's GVA—and 15,710 jobs.

The core economic impact comprises the direct activities of SNNGroup and the aviation and property activities facilitated by SNNGroup, the indirect activity supported along the supply chain, and induced activity through wage consumption, as illustrated in Fig. 1 on page 2.

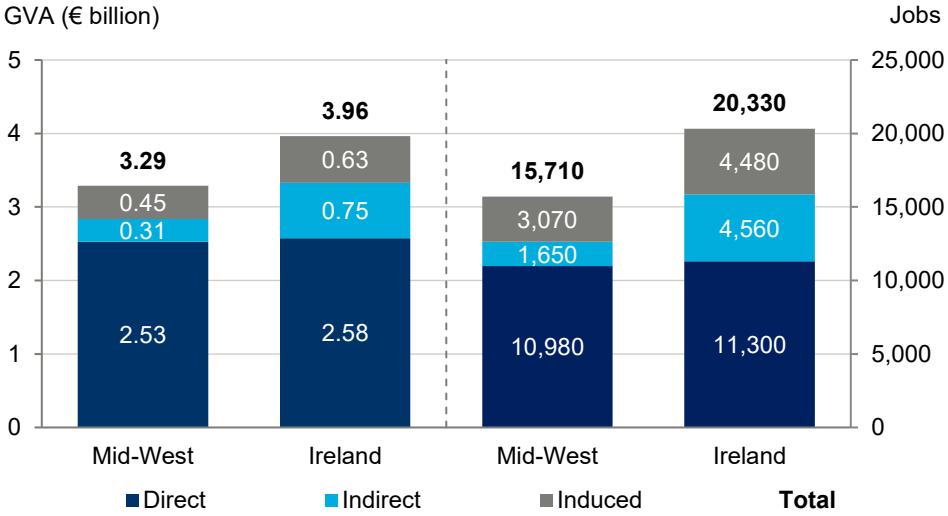
The direct economic impact of SNNGroup contributed €2.58 billion in GVA to Irish GDP in 2022 and 11,300 jobs.[1] The economic contribution is concentrated in the Shannon Campus, which contributed an estimated €2.32 billion or 90% of direct GVA and over 10,000 jobs.

The indirect economic impact contributed approximately €753 million of GVA to Irish GDP and 4,560 jobs. This accounts for the broader impact of SNNGroup, beyond the direct economic contribution of its firms, which 'ripples' through the regional and wider Irish economy. At the centre of a complex network of supply chains, SNNGroup and the aviation and property activities facilitated by SNNGroup enable further economic activity throughout the Mid-West and broader Irish economy. Based on the typical purchasing patterns of Irish firms, we estimate that the €1.19 billion spent on procurement by the hundreds of firms across SNNGroup with domestic suppliers, and the associated supply chain effects.

[1] Our estimates of the core economic impact of SNNGroup cap the sectoral productivity (average contribution to GDP per job) to limit the effects of distortions to national and regional data arising from profit-sharing of multinational firms.

The induced economic impact generated a further €634 million GVA contribution to Irish GDP and 4,480 jobs. The induced impact accounts for spending by employees across SNNGroup and along its supply chains which provide an invaluable contribution to the local consumer economy.

Fig. 1. The core economic impact, SNNGroup, Mid-West and Ireland, 2022



Source: Oxford Economics. Note: may not sum due to rounding.

€3.96 billion

SNNGroup's GVA contribution to Irish GDP in 2022, and 20,330 jobs.

In addition to the core economic footprint, Shannon Airport provides a range of catalytic benefits to the Irish economy.[2]

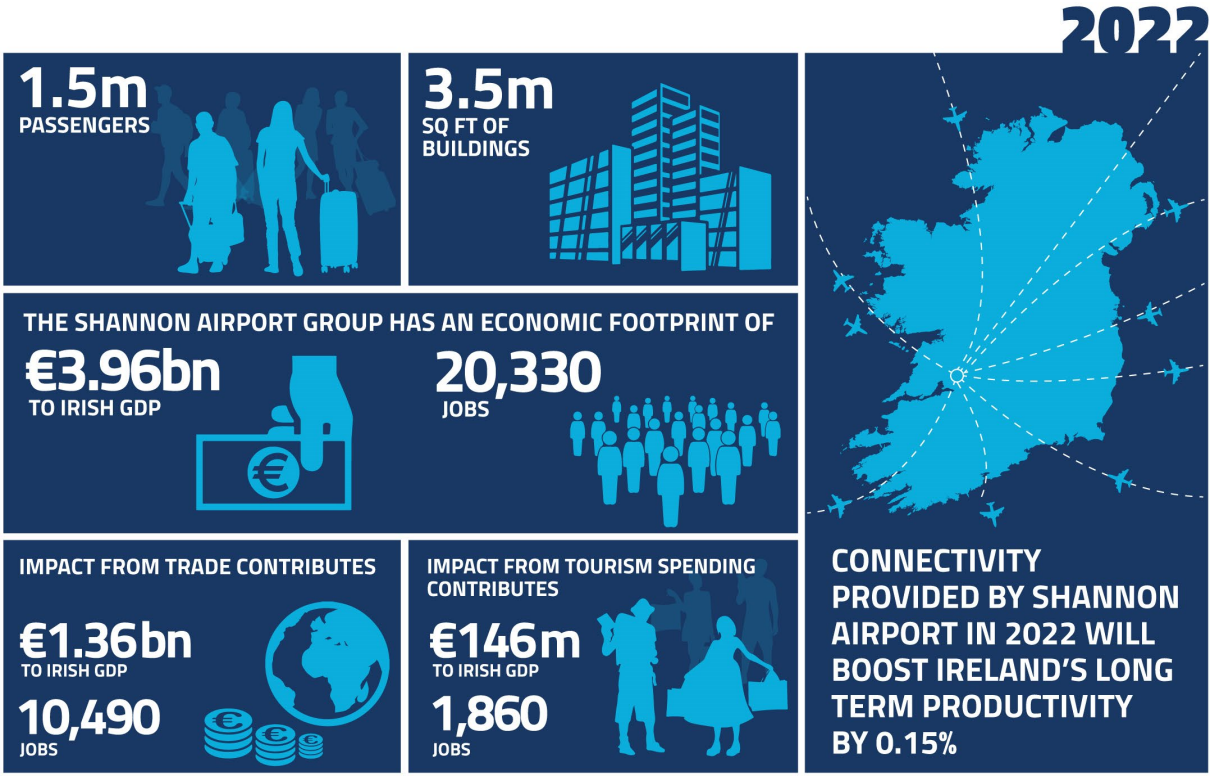
The flights that Shannon Airport provide boost Ireland's long-term economic potential, through linking Irish firms to airports and therefore markets across the globe. The provision of these transport services involves far-reaching interactions between businesses at the Shannon Campus, across the Mid-West, and the rest of the Irish economy. We estimate that the connectivity provided by Shannon Airport in 2022 will **boost Ireland's long-term productivity by 0.15%**, meaning that Irish firms can produce goods and services more efficiently over time. Shannon provides access to foreign markets which enables trade and investment, enabling Irish firms to adopt new technologies and ideas, and leading to greater innovation and a more highly-skilled workforce. The connectivity provided by Shannon Airport represents a positive contribution to improving productivity, which is a key determinant to enable the nation to become richer over time, allowing businesses to grow more profitable, living standards to improve, and governments to spend more on infrastructure and public services.

[2] Please note that the different channels of impact through the core and catalytic (connectivity, tourism, and trade) channels are not additive. For example, many of the connectivity benefits, or tourism- and trade-facilitated activity, are realised by firms operating across SNNGroup, whose economic impact is measured through the core channel.

Moreover, Shannon Airport plays an **enabling role for Ireland's tourism sector.** Despite the travel restrictions in place due to Covid-19, the Airport handled over 1.5 million passengers in 2022 (including transit traffic). We estimate that Shannon Airport accommodated 376,000 international visitors in 2022, whose spending across the Irish economy contributed €146 million to GDP and 1,860 jobs.

The Airport is also an **enabler of trade** in the economy. The facilitation of goods imports and exports through Shannon Airport contributed €1.36 billion to Irish GDP and 10,490 jobs in 2022.

Fig. 2. The economic impact of SNNGroup



Source: SNN Group, Oxford Economics

THE ECONOMIC OUTLOOK

The Mid-West economy has recently experienced notable economic growth, leading to comparatively high GVA-based measures of economic performance. In 2022, the Mid-West had higher GVA per job (productivity) and GVA per capita than the national economy, although the substantial recent growth in economic output is largely a distortion caused by the profit-sharing of multinational firms.

The Mid-West economy is characterised by a concentration of manufacturing activity—facilitated in part by high-tech activity across SNNGroup—which amounts to almost two-thirds of economic output. However, despite strong recent performance, our baseline forecast indicates that Mid-West faces a weaker growth outlook than Ireland as a whole, with growth expected to be strongest among eastern regions.

Despite the disruption caused by the Covid-19 pandemic, the Irish tourism sector is expected to continue to thrive into the future. Prior to the Covid 19 pandemic, tourism was thriving. The overall number of inbound arrivals to Ireland increased from just under five million in 2011 to over 8.6 million in 2019, driven primary by an expansion in leisure tourism. As a consequence, overall spending also rose. And while the pandemic has caused a temporary dip in tourism arrivals, our forecasts indicate that growth will continue through the rest of the decade, driven primarily by leisure visitors.

Tourists will in part contribute to an overall growth across the Irish aviation sector through the remainder of the decade. According to Tourism Economics' baseline forecast, passengers across Ireland are expected to exceed their pre-Covid 19 level in 2023, increasing to 39.7 million. This trend is anticipated to continue through the remainder of the decade, reaching 51.3 million passengers in 2030.

POLICY ENVIRONMENT AND STAKEHOLDER CONSULTATION

While the outlook for growth in the aviation sector is positive, Ireland's aviation sector is one of the most concentrated in Europe. Dublin Airport forms a higher share of aviation activity than across comparator European nations and has captured almost all of the recent growth in passengers across Ireland. It may be that this is partly due to the aviation and economic policy decisions made by the Irish Government, such as excluding regional airports serving more than one million passengers from financial support provided under the Regional Airports Programme and decisions by the Commission for Aviation Regulation to fund continuous capacity expansion at Dublin Airport without consideration of the impact this has on national infrastructure and regional balance.

Rebalancing passengers to regional airports, such as Shannon, will bring a range of benefits to the Irish economy. A strong regional airport assists in building a more vibrant business environment, helping to unlock growth. If a country has an excessive reliance on a single airport, any disruptions, such as labour shortages, natural disasters, or technical failures, could cause a significant impact on the tourism sector, as well as the economy as a whole.

Supporting regional airports will also enable the Government's wider regional growth objectives, as set out in Project Ireland 2040. However, our baseline forecast indicates that the desired spatial rebalancing of economic growth is unlikely to materialise without substantial intervention, with population and employment expected to continue to be concentrated across the Eastern & Midland region (including Dublin).

The National Aviation Policy predates the Project Ireland 2040 development strategy, and a review of aviation policy is needed to accommodate the Government's ambitions for rebalancing regional growth across Ireland. There would also be a series of environmental benefits that would support the Government's efforts to tackle climate change, such as reducing noise in residential areas or pollution from large-scale expansion projects in Dublin Airport.

However, despite the economic and environmental benefits, Irish aviation policy has to date failed to create a level playing field for its regional airports to flourish. While EU guidelines allow for state aid to be granted to airports with fewer than three million passengers, the Regional Airports Programme does not provide state aid to state owned regional airports, such as Shannon. This makes it harder for Shannon to compete with larger and more profitable airports, who find it easier to attract suitable financing due to greater profitability. The recent rise in the price cap on passenger charges also helps Dublin Airport to continue to expand and invest, whereas regional airports are forced to lower prices to compete with Dublin, limiting their ability to invest.

To better understand the role of SNNGroup as an organisation contributes to the Mid-West economy, we spoke to stakeholders in the region. Participants unanimously recognised the paramount role of Shannon Airport in supporting the economy, attracting FDI, facilitating exports, and driving tourism. They also raised concerns about congestion and centralisation of economic activity in Dublin, highlighting the need for balanced regional development and a comprehensive aviation policy. Finally, stakeholders highlighted opportunities for growth, emphasising the importance of enhancing connectivity to continental Europe, including major hubs like Amsterdam and Frankfurt, and better inclusion of Shannon Airport in tourism promotion.

1. INTRODUCTION

1.1 THE SHANNON AIRPORT GROUP

The Shannon Airport Group (SNNGroup) owns and operates Shannon Airport as well as a substantial commercial property business. SNNGroup's operations are centred on its Shannon Campus, comprising Shannon Airport, West Zone, East Zone, Knockbeg, and Smithstown. The Shannon Campus is home to the largest multi-sectoral business park in Ireland outside of Dublin, accommodating businesses in a broad range of sectors, from aviation and aerospace to information services and health. SNNGroup's property portfolio spanning 3.5 million square feet of buildings also includes additional smaller business parks in Clare, Tipperary, Kerry, and Limerick.

Shannon Airport is the largest airport on the west coast of Ireland. Prior to the Covid-19 pandemic, over 1.7 million passengers flew through the Airport each year.[3] However, due to lockdown measures introduced in response to the Covid 19 pandemic, passenger numbers declined dramatically, with just 352,000 and 380,000 people flying via Shannon Airport during 2020 and 2021 respectively.[3] Last year passenger numbers grew significantly with a boost to demand and easing of Covid-related restrictions, reaching 1.5 million passengers (including transit traffic), 88% of its pre-pandemic size.[3] There are six airlines operating from the Airport, three of which are flying to 35 unique destinations—to the UK, continental Europe, the United States, and three scheduled cargo operators.

SNNGroup commissioned Oxford Economics to quantify its economic contribution to the Irish economy. Our analysis reflects the direct, indirect, and induced contribution that it makes through its own activities, and the activities of firms operating in the Shannon Campus and SNNGroup's other business parks in the Mid-West and South-West of Ireland.[4] In addition, we consider the catalytic benefits of Shannon Airport to the Irish economy, through connectivity, tourism, and trade.

[3] Shannon Airport Statistics.

[4] The Mid-West statistical region consists of Clare, Limerick City and County, and Tipperary.

1.2 INTRODUCING ECONOMIC IMPACT ANALYSIS

The economic impact of a company or industry is measured using a standard means of analysis called an economic impact assessment. This consists of two parts.

First, we quantify the three 'core' channels of impact that comprise the organisation's 'economic footprint', consisting of:

- **Direct impact**, which relates to the activities of the Airport and the businesses located across the SNNGroup's business parks;
- **Indirect impact**, which encapsulates the activity and employment supported along the supply chain, as a result of the procurement of goods and services by firms across SNNGroup; and
- **Induced impact**, comprising the wider economic benefits that arise when workers across SNNGroup and the associated supply chains spend their earnings, for example in regional retail and leisure establishments.

Using these pathways, the economic footprint of SNNGroup is presented, using three key metrics:

- **Gross Domestic Product (GDP)**, or more specifically, the gross value added (GVA) contribution to GDP;
- **Employment**, as the number of people employed, measured on a headcount basis; and
- **Tax revenues**, measured in terms of the corporate, employment, and indirect taxes generated.

Second, we examine the '**catalytic**' effect that Shannon Airport's services have in boosting or enabling economic activity elsewhere in the economy.

The catalytic impact of Shannon Airport represents the wider benefits that the government, consumers, society, and other industries gain from the services the Airport provides. For an airport, these are primarily captured in the contribution that increased air connectivity makes to wider economic potential. Research has demonstrated how greater **air connectivity** raises the productivity of an economy by opening up new business opportunities and stimulating innovation and competition.

The impact of higher connectivity benefits all parts of the economy, but one of the important observable outcomes is the **tourism** facilitated by the activities of the Airport. Therefore, as well as quantifying the overall connectivity impact, we also measure the economic footprint of tourism in Ireland enabled by Shannon Airport. We also consider the economic impact of goods **trade** facilitated by the Airport, and its contribution to the national economy.

Drawing on historical and published data, this report estimates the economic contribution of SNNGroup in the 2022 calendar year. All values are presented in constant 2022 prices unless otherwise stated.

1.3 STRUCTURE OF THIS REPORT

This report is structured as follows:

- **Chapter Two** presents our estimates of the economic contribution that SNNGroup made to the Mid-West and Irish economies in 2022;
- **Chapter Three** considers the broader economic environment within which SNNGroup operates, exploring recent performance and the outlook for economic growth, passengers, and tourism;
- **Chapter Four** explores the current policy environment and its implications for Ireland's economic development in the context of aviation. It also presents the findings of our consultation exercise with stakeholders;
- **Chapter Five** provides conclusions and recommendations on how the Irish Government can help to maximise SNNGroup's economic contribution;
- **Appendix A** provides a glossary of terms; and
- **Appendix B** describes our approach.

2. THE ECONOMIC IMPACT OF THE SHANNON AIRPORT GROUP

2.1 INTRODUCTION

This chapter investigates the contribution that SNNGroup made to the Irish economy in 2022.

Shannon Airport provided crucial transport services for 1.5 million passengers in 2022 (including transit traffic).[3] The provision of these transport services involves far-reaching interactions between businesses at the Shannon Campus, across the Mid-West and the rest of the Irish economy.

Moreover, through its property portfolio, SNNGroup provides commercial property solutions to hundreds of companies, who generated substantial economic activity throughout the west of Ireland. The vast majority of these companies are located at the Shannon Campus, and either support the activities of the Airport or are located at the campus due to the connectivity provided by the Airport and the high standard of property product offered by SNNGroup. In this chapter we quantify the economic contribution that these firms made to the Irish economy in 2022.

Thousands of jobs are sustained across SNNGroup, with many more supported across the country. The procurement expenditures that businesses across SNNGroup make with local and other domestic suppliers supports activity throughout Irish supply chains, stimulating economic activity across the country. Further activity is stimulated through workers at the Airport and the companies in the business parks, and those employed along the supply chain spending their wages and stimulating a further round of economic impact.

In this chapter we explore each of these effects, before turning to the catalytic benefits enjoyed by the Irish economy as a result the operations of Shannon Airport. In particular, we explore Shannon Airport's contribution to *connectivity* through its role in linking Irish firms to airports and therefore markets across the globe, the contribution of *tourism* arising from the economic footprint of international visitors arriving in Ireland via Shannon, and the economic footprint of logistics activity to facilitate *trade* through the Airport.

The sources, methods, and assumptions that underpin the impacts set out in this chapter are presented in Appendix B.

2.2 THE CORE ECONOMIC IMPACT OF SNNGROUP

2.2.1 Direct impact

The economic footprint of SNNGroup can be quantified in terms of its GVA contribution to Irish GDP, the employment it supports, and the tax revenues it generates for the Irish Government. The modelling for this study maps the complex and interwoven supply chains of the businesses that trade at Shannon Airport and across SNNGroup's business parks. This allows us to quantify the full contribution of its activities, including how they spread throughout the Mid-West and national economies.

We estimate that SNNGroup—the company itself and firms operating across the Shannon Campus and other business parks—contributed €2.58 billion of GVA to Irish GDP in 2022 and 11,300 jobs.[5] [6] The economic contribution is centred on Shannon Campus, which contributed an estimated €2.32 billion or 90% of direct GVA and over 10,000 jobs.

SNNGroup supports a diverse range of activity across a variety of sectors of the economy. Manufacturing was the most prevalent sector across the business parks, contributing €1.56 billion to GVA in 2022—equivalent to three-fifths of the overall direct contribution—and 5,150 jobs. The manufacturing activity tends to be in more technologically intensive industries.[7] Many manufacturing firms specialise in the production of machinery & equipment; these firms generated around a quarter of the GVA created across the manufacturing sector.[7]

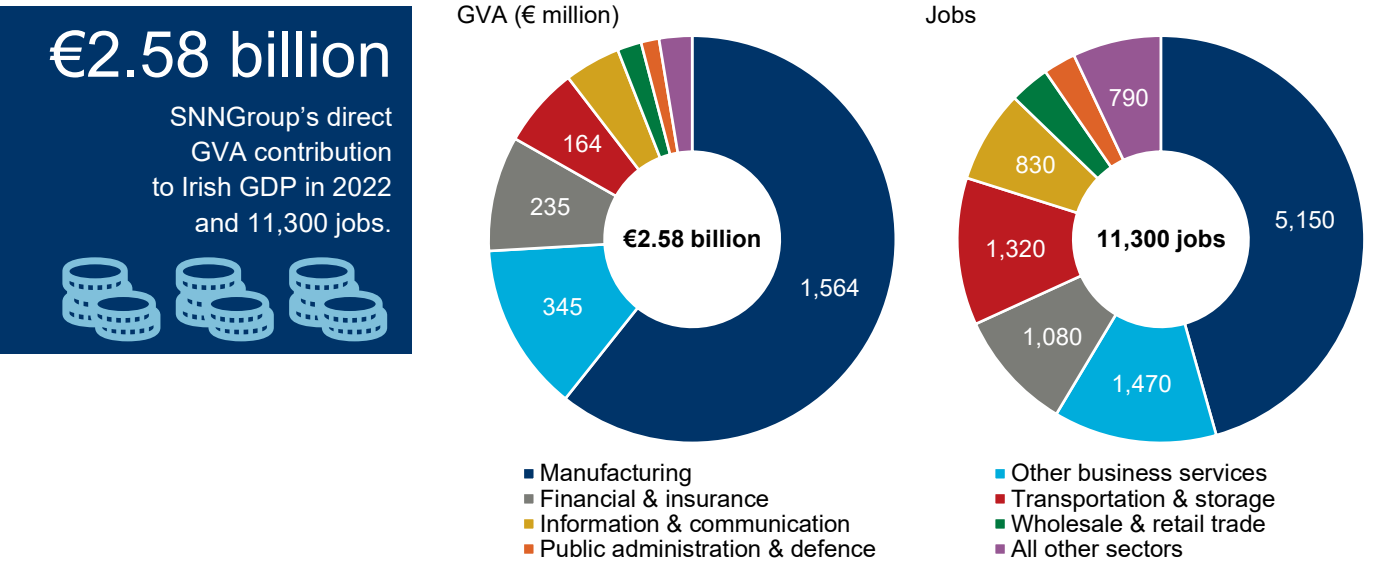
Although not classified within formal sectoral definitions, the characteristics of firms operating across SNNGroup's business parks indicates the presence of a substantial life science sector. Around a sixth of direct GVA is also generated in the manufacture of computer, electronic & optical products sector, producing medical products. This sector includes a series of small- and medium-sized enterprises (SMEs), both in manufacturing and other related industries, such as service activities including healthcare consulting and clinical support.

[5] As explored further in section 3.2, the Mid-West and Irish economies have demonstrated substantial GVA/GDP growth in recent years, part of which is due to profit sharing by multinational firms. This has the effect of distorting economic data to demonstrate a high average contribution to GDP per job (productivity) across many sectors. To reduce the risk of overstating the core economic footprint of SNNGroup, we therefore adjust our estimates of productivity to ensure that no industry is more than 50% more productive than the region within which it operates.
[6] Employment is measured on a headcount basis. This means that full- and part-time employees (and contractors) are counted as the employment of one person.
[7] Eurostat, "High-tech classification of manufacturing industries", accessed 2023. Eurostat define the manufacture of machinery and equipment and the manufacture of computer, electronic and optical products as medium-high and high technology activities, respectively.

In addition to their substantial economic contribution, the strong presence of life sciences companies in several sectors suggests that there is the potential to gain from clustering effects. The advantages of agglomeration—in shared ideas, and in the proximity of investors and entrepreneurs—appears particularly strong across life sciences.[8] These clustering benefits reflect the agglomeration effects of proximity to other activity in life sciences, including opportunities for networking, information spillovers, and knowledge transfers.

Manufacturing related to aviation products is also prevalent.[9] Almost half of the companies operating in the business park can be linked to the aviation sector. Our research indicates that aviation companies operating within the Shannon Campus trade significantly with each other. This symbiotic relationship between the business park and the Airport creates a mutually beneficial ecosystem that drives economic growth and enhances regional development.

Fig. 3. Direct GVA and employment by sector of activity, SNNGroup, 2022



Source: SAG, Oxford Economics. Note: may not sum due to rounding.

The level of economic output across SNNGroup supports a large direct tax contribution. Considerable sums of labour taxes are collected as a result of the thousands of workers employed across the Airport and business parks. Moreover, these firms pay corporation tax on their profits and pay taxes on both products and production.

We estimate that this direct activity generated €403 million in taxes for Ireland's public finances. The largest share of this contribution is an estimated €236 million raised through taxes on labour. In addition, a further €84 million was generated on taxes less subsidies on products and production, and €83 million in corporation taxes.

[8] Powell & Grodal, "Networks of Innovators", 2005, accessed 2023.

[9] Owing to the structure of sectoral classification, this includes activities related to aircraft leasing.

TESTIMONIAL: EI ELECTRONICS

Founded in 1988 and 100% Irish owned, EI Electronics is a global leader in the design and manufacture of Home Life Safety Devices for the Connected Home. With 1,250 employees worldwide, 1,000 of whom are based in Shannon it is one of the most significant employers in Ireland's Mid-West. 100% of global manufacturing is centred in its Shannon Campus and all key business functions are co-located there; R&D, Sales and Marketing, Manufacturing, Customer Service, and Finance & Admin. Annual turnover is in the region of €400 million, 90% of which is accounted for by exports, primarily to European markets.

"The Shannon Airport Group is very important to our business operations in Ireland, providing connectivity through Shannon Airport as well as innovative property solutions across the Shannon Campus. The recent work undertaken by SNNGroup in upgrading the Campus has ensured that the business park is at the forefront of sustainable development.

Shannon Airport provides vital connectivity for our business operations. With overseas subsidiaries in the UK, Germany, France, Australia, and the USA, having access to key hubs from Shannon is vital to us. It is also critical for our diverse employment base, ensuring that they have easy access to international connections for visiting family and friends.

Continued growth of SNNGroup will further assist our business growth and expansion ambitions."

Mick Guinee, Founder, Chairman and CEO. EI Electronics.

2.2.2 Indirect impact

Firms operating at Shannon Airport and across SNNGroup's business parks, purchase billions of Euros worth of inputs. The firms sit at the centre of a large and complex network of supply chains, stretching from the sites throughout the Mid-West region, across Ireland, and further afield.

To assess the extent and distribution of these supply chains, we used two main sources. First, SNNGroup shared data with Oxford Economics detailing the sums it spent with its supplier businesses, along with the registered locations of these suppliers. For the other firms operating across the Airport and business parks, we drew on survey data and Irish supply-use tables to estimate the locations and purchases of their supply chain spending, respectively.

We estimate that the hundreds of firms operating across SNNGroup—the company itself and firms operating at the Airport and across its business parks—spent €1.19 billion on intermediate inputs from Irish suppliers in 2022.[10] Irish manufacturing firms were the largest beneficiary of domestic procurement spending (€309 million), reflecting the propensity for most sectors of the economy, including other manufacturers, to purchase goods and services from this sector.

[10] In order to avoid double-counting, this sum excludes the money that tenant firms spend with one-another, or SNNGroup company, as these revenues form part of the direct impact detailed in section 2.2.1.

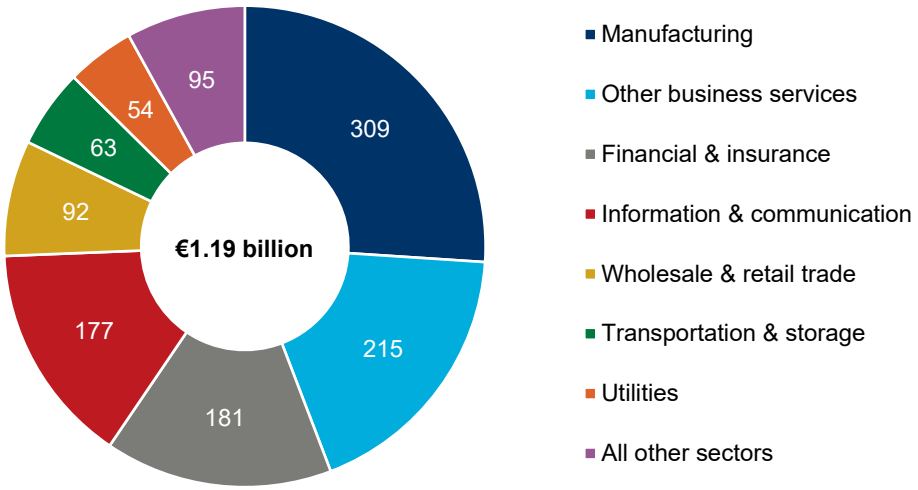
Other larger beneficiaries include other business services (€215 million) and financial & insurance (€181 million).[11]

Fig. 4. Domestic procurement spending of firms by sector of supplier, SNNGroup, Ireland, 2022

€1.19 billion

Domestic procurement spending across SNNGroup in 2022.

€ million



Source: SAG, Oxford Economics. Note: may not sum due to rounding.

These purchases represent the first stage in the supply chain network. The companies supplying goods and services will in turn make their own purchases, stimulating activity along the entire supply chain. The supply chains stimulated across SNNGroup—the company itself and firms operating across the Shannon Campus and other business parks—contributed an estimated €753 million to Irish GDP through 2022.

In generating this degree of economic activity from its supply chains, SNNGroup also supports employment across Ireland. Using average rates of productivity observed within the sectors and regions of the Irish economy, it is possible to quantify the supply chain employment facilitated by the supply chain.[5] **Our modelling suggests that 4,560 jobs were supported across the length of the Irish supply chains.**

The sectoral composition of indirect GVA is broadly similar to the pattern of procurement, with manufacturing the largest beneficiary of indirect GVA, accounting for almost a quarter of the total (€179 million), although the relatively high productivity across this sector leads to a comparatively modest contribution to employment, of 700 jobs.

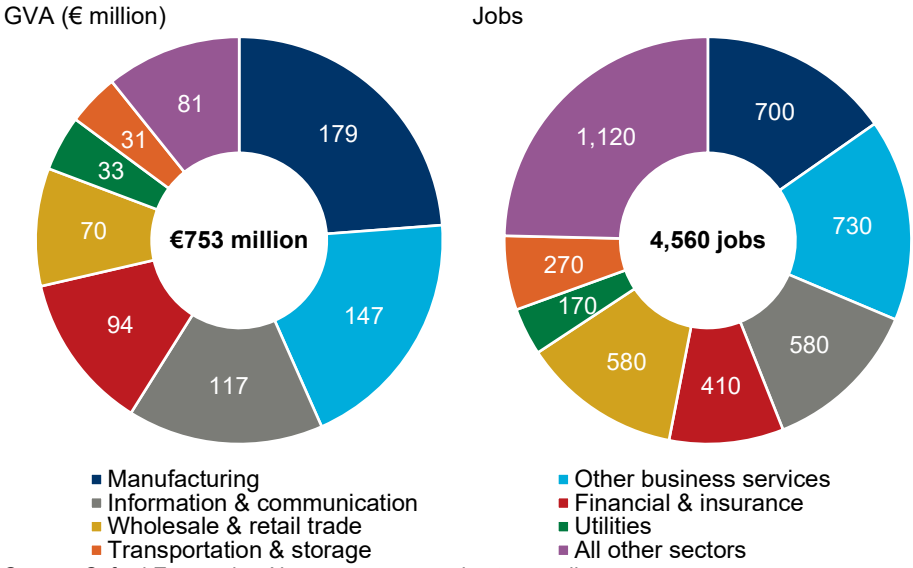
Other sectors that benefit most from indirect GVA include service activities, such as other business services (€147 million)[11]—which sustained 730 jobs, the most of any sector across the supply chain—information & communication (€117 million), and financial & insurance (€94 million).

[11] Other business services consists of professional, scientific & technical activities and administrative & support services that are typically provided by firms operating in the private sector.

€753 million

Supply chain (indirect) contribution to Irish GDP in 2022, and 4,560 jobs.

Fig. 5. Indirect GVA and employment impact by sector of activity, SNNGroup, Ireland, 2022



Source: Oxford Economics. Note: may not sum due to rounding.

The output and employment supported along the supply chain network also give rise to a further tax impact. By purchasing supplies, employing workers, and accruing profits, the supply chain generated around €132 million in tax revenues. The largest share of this contribution is an estimated €86 million raised through taxes on labour. In addition, a further €24 million was generated through corporation taxes, and €22 million was generated on taxes less subsidies on products and production.

TESTIMONIAL: JLR

JLR is a global automotive company which established a software engineering centre in Shannon in 2019. The Shannon Facility is the hub of their autonomous and next generation vehicle projects focused on R&D activity relating to the delivery of key components to support connected car, advanced driver assistance system technologies and future automated driving features.

"The Shannon Campus was an ideal location for JLR to set up a base here in Ireland. Working with The Shannon Airport Group allowed us to ensure that our property solution was designed to fit our specific requirements whilst also affording us the opportunity to grow further in the Campus, if needed. We also had access to the talent pool from Galway, Limerick, and Cork which is vitally important for us as we attract employees from across a number of locations. Of course, having Shannon Airport on our doorstep allows us to have quick access to our UK headquarters and to access markets in Europe and beyond which has been critical as we have grown our business."

John Cormican, General Manager, Global Product Engineering, JLR.

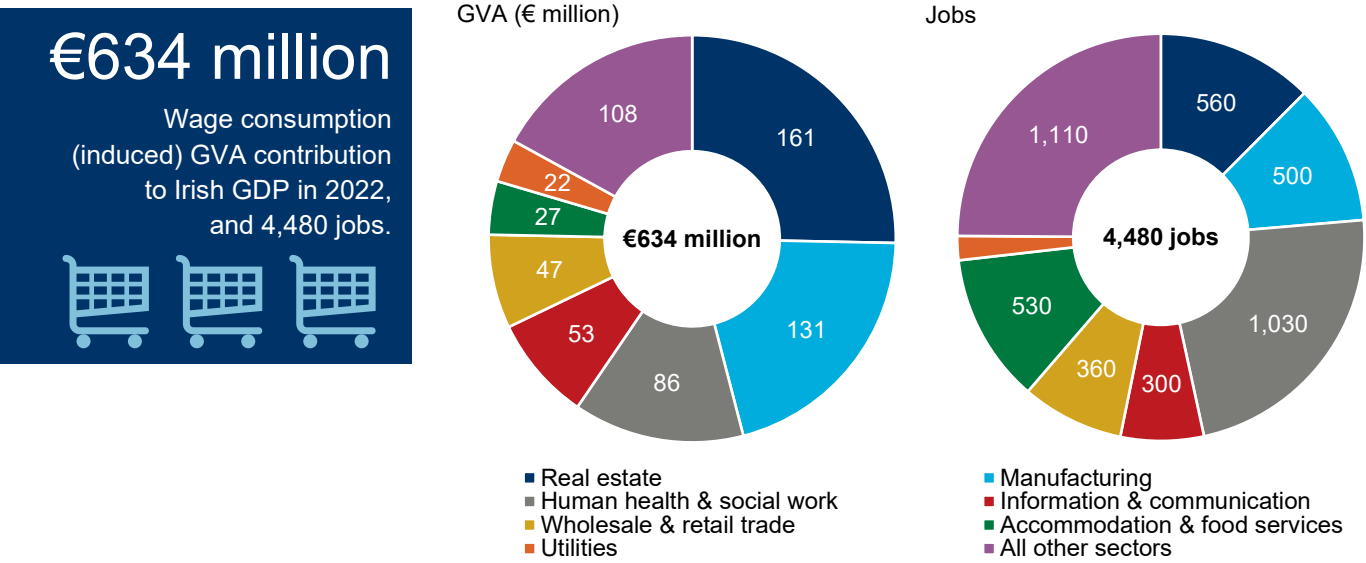
2.2.3 Induced impact

The direct and indirect activity linked to SNNGroup sustain thousands of jobs. The spending of wages by those employed, and along the supply chains, represents the final channel of economic impact.

Through estimating the proportion of GVA that is typically captured by labour, through employment costs, and mapping the extent to which earnings tend to be consumed, and the types of goods and services purchased by households across Ireland, we can quantify the induced impact on the Irish economy.

In total, the consumption stimulated by SNNGroup contributed an estimated €634 million to Irish GDP in 2022 and almost 4,500 jobs. Real estate was the largest beneficiary in GVA terms, accounting for a quarter of the induced contribution to the Irish economy (€161 million), although this is largely a reflection of housing costs—the real estate sector made a comparatively modest contribution to employment (560 jobs). Manufacturing (€131 million) and human health & social work (€86 million) formed the next-largest contributions to Irish GDP through the induced effect, with the latter also the largest beneficiary of any single sector in employment terms, sustaining more than a thousand jobs across the Irish workforce.

Fig. 6. Induced GVA and employment by sector of activity, SNNGroup, Ireland, 2022



Source: Oxford Economics. Note: may not sum due to rounding.

In supporting this consumption effect, SNNGroup is estimated to contribute a further €108 million in tax revenues to the Irish Government. The largest share of this contribution is an estimated €69 million raised through taxes on labour. In addition, a further €20 million was generated through corporation taxes, and €19 million was generated on taxes less subsidies on products and production.

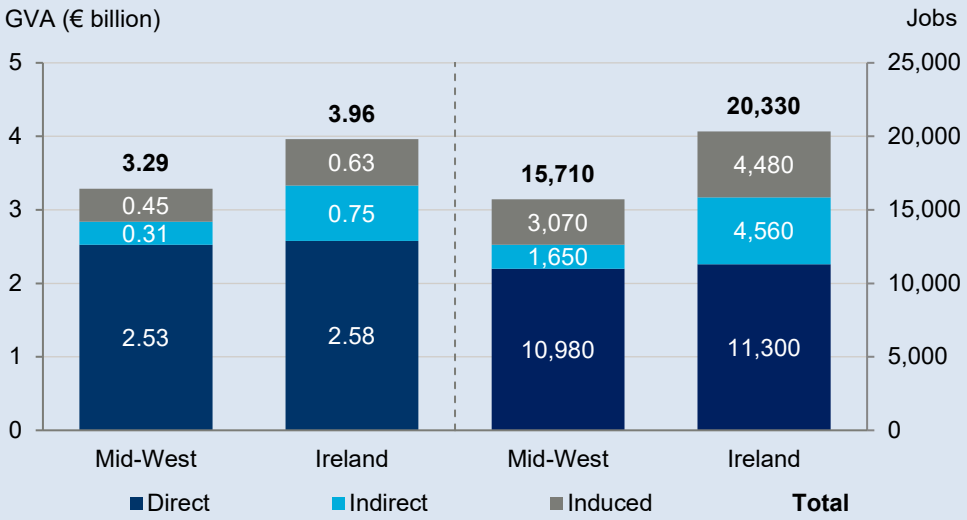
THE CORE ECONOMIC IMPACT OF SNNGROUP IN 2022

Combining the direct, indirect, and induced impacts provides the core economic contribution that SNNGroup—the company itself and firms operating across the Shannon Campus and other business parks—makes to the Mid-West and Irish economies.

In 2022, the core channel contributed €3.96 billion to Ireland's GDP in 2022, equivalent to approximately 0.78% of national GDP.[12] This represents a multiplier of 1.54: for every €100 of GDP created directly, a further €54 is created elsewhere across the wider Irish economy, through business and household spending. The core economic footprint also supported 20,330 jobs across the Irish economy and contributed €643 million in tax revenues to the Irish Government in 2022.

The economic footprint was heavily concentrated in the Mid-West region, where the majority of direct activity took place. In 2022, the core channels of impact generated €3.29 billion of GVA across the Mid-West economy, equivalent to almost 6% of its total GVA.[12] The core economic footprint supported the employment of 15,710 jobs across the Mid-West in 2022, equivalent to 6.2% of all employment.

Fig. 7. The core economic impact, SNNGroup, Mid-West and Ireland, 2022



Source: Oxford Economics. Note: may not sum due to rounding.

[12] As set out in section 2.2.1, we adjust our estimates of sectoral productivity to avoid overstating the direct GVA, procurement spending, and employee compensation associated with SNNGroup. As a consequence, the core economic footprint is lower than if estimated solely on the basis of published data and Oxford Economics' forecasts for regional productivity by sector, without this adjustment. This therefore represents a conservative estimate of SNNGroup's economic footprint as a share of both national GDP and regional GVA.

2.3 THE CATALYTIC IMPACT OF SHANNON AIRPORT

The economic contribution Shannon Airport makes to Ireland through its operations is substantial, but its impact on the country extends beyond this. Shannon Airport provides vital links that connect Irish residents and firms to destinations around the world, enabling business integration, facilitating foreign investment, and encouraging tourism and trade. Together, these interlocking benefits reflect how Shannon Airport catalyses activity in the Irish economy, boosting productivity and ultimately increasing long-term GDP.

This report considers three forms of catalytic impact:

- The long-term boost to Irish productivity enabled by **connectivity** from Shannon Airport;
- The boost to the Irish economy of **tourism** facilitated by Shannon Airport; and
- The boost to the Irish economy through facilitating import and export **trade** at Shannon Airport.

2.3.1 Connectivity

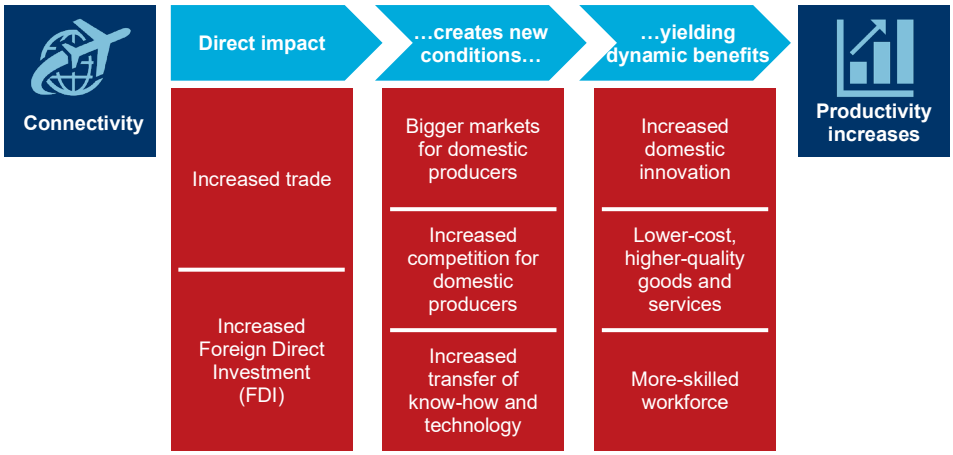
In addition to the core economic footprint, the flights that Shannon Airport provides boost Ireland's long-term economic potential. When people fly, they meet business partners, attend conferences, gain qualifications, invest, and foster long-term connections. Generally, people exchange information and know-how when they travel, and this sharing boosts their productive potential.

Over the long run, these benefits combine to create new conditions within the Irish economy. Producers can reach more customers in larger markets, and they benefit from increased knowledge and technology sharing—whether directly from trading partners, or indirectly through viewing other products that are now available, or by the movement of skilled staff between companies. Firms are also forced to innovate as they are exposed to greater levels of competition. The ultimate outcome from the connectivity provided is an increase in productivity within the economy, which raises Ireland's productive potential.

There are many ways to measure the extent and importance of an aviation network, but the degree to which it connects a country with the rest of the world economy is among the most important. This concept of connectivity is quantified by measuring how easy it is for passengers to reach other economic centres from a particular airport, city, or country. This study measures Shannon's connectivity with an Air Connectivity Index. This approach is based on a methodology developed by the World Bank, for which further details are provided in Appendix B.[13] The method is grounded in network analysis and gravity modelling that are frequently used in international trade studies.

[13] Arvis & Shepherd, "The Air Connectivity Index: Measuring Integration in the Global Air Transport Network", 2011, accessed 2023.

Fig. 8. How air connectivity increases productivity



Source: Oxford Economics

The advantage of this approach is that it accounts for the hub-and-spoke nature of global air transport in a way that aggregating flights or seats data would not. This measure of connectivity is global and aims to capture relationships between all network nodes even when there is no direct flight connection between them. Further, using GDP as one of the factors in the model accounts for changes in connectivity due to changes in the economic strength of the origin or destination.

Within our Air Connectivity Index, countries score highly when they are connected to other highly connected or economically larger countries. However, other countries with the same number of flights but to less connected or economically smaller countries will record lower scores. This means, for example, a flight from Shannon to a hub like JFK will add more to connectivity than a flight to a smaller, less well-connected airport in a smaller economy.

There are short-run and long-run impacts on labour productivity as a result of changes in connectivity. This study conducts a novel econometric modelling exercise to investigate how each country's Air Connectivity Index interacts with its labour productivity, controlling for other factors such as each country's level of openness, corruption, investment, and educational attainment. It finds that an increase in air connectivity is associated with an increase in labour productivity, both in the short- and long-run.

Based on this relationship, we estimate that the level of connectivity provided by Shannon Airport in 2022 will boost Ireland's long-term productivity by 0.15%.[14] This represents a positive contribution to improving productivity, which is a key determinant to enable the nation to become richer over time, allowing businesses to grow more profitable, living standards to improve, and governments to spend more on infrastructure and public services.

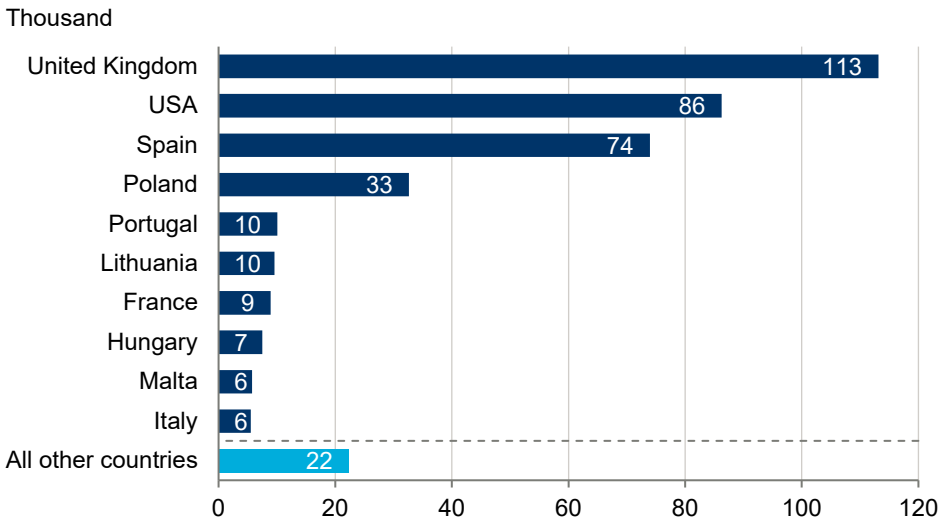
[14] Note that the catalytic impact of connectivity is measured as an uplift to GDP, rather than in monetary terms. This is because connectivity can lead to forward linkages—for instance to tourism, logistics, and business travel—can have dynamic economic effects, leading to a reallocation of resources and structural changes to the Irish economy. By contrast, the other economic impacts detailed in this report deal with static effects at a point in time, and utilise an input-output framework which is methodologically different to this calculation.

2.3.2 Tourism

While connectivity benefits are estimated using conceptual models of the economy, the impact of spending by visitors arriving in Ireland at Shannon is one aspect of the Airport's catalytic impact that can be more directly measured. Shannon Airport plays an enabling role for Ireland's tourism sector, providing it with consumers, and facilitating export earnings as overseas visitors spend their money in the Irish economy.

Shannon Airport facilitated approximately 1.5 million passengers in 2022 (including transit traffic), despite the travel restrictions imposed by Covid-19.[3] Just under 700,000 of these passengers were arrivals, of which an estimated 376,000 were international visitors to Ireland. Our analysis, which draws from data on passenger origins by routes served by Shannon Airport, indicates that four countries accounted for 306,000 of these visitors, more than four-fifths of the total.[15] The UK is the most common origin of international visitors, with 113,000 people visiting in 2022, followed by the USA (86,000), Spain (74,000), and Poland (33,000). European countries form nine of the top-10 origin countries with the USA the sole exception.

Fig. 9. International visitor arrivals by origin, Shannon Airport, 2022



Source: OAG, Oxford Economics. Note: may not sum due to rounding.

376,000
Estimated international visitors to Ireland via Shannon Airport in 2022.

These international tourists contribute spending to the Irish economy. And this spending also has a subsequent, wider economic impact, as further GDP and additional jobs are sustained in the tourism sector's supply chains. Shannon Airport makes a valuable contribution to Ireland's tourism sector by facilitating the economic footprint of these visitors.

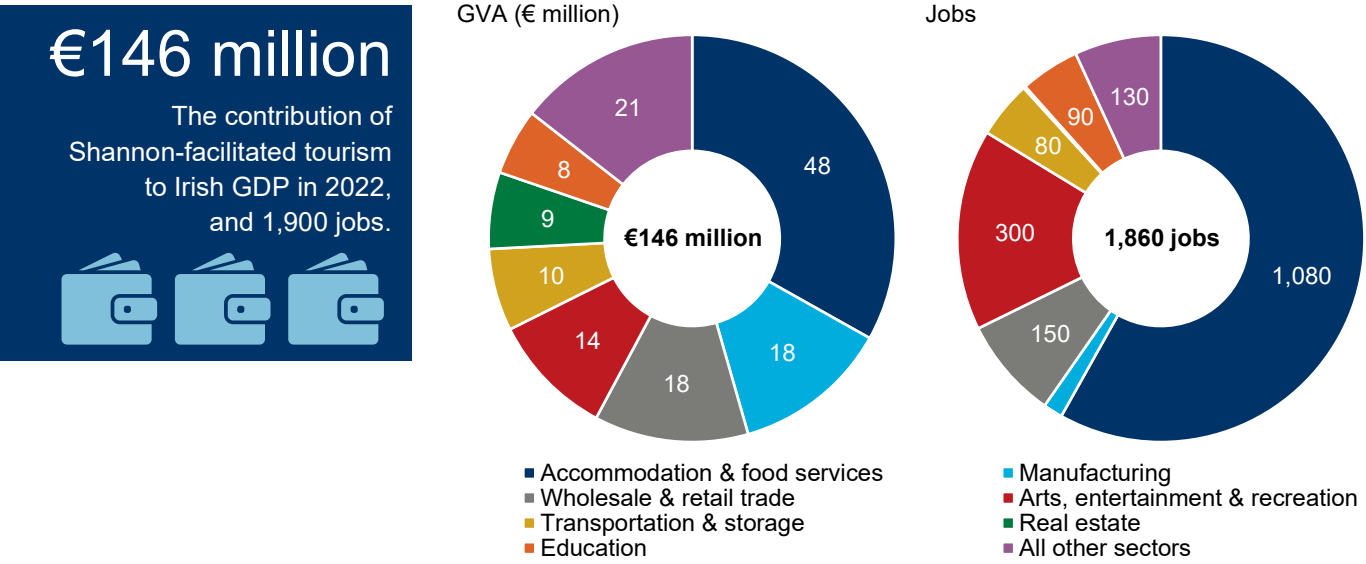
[15] Passenger origin data are sourced from OAG. These measure passenger arrivals by origin airport, but also disaggregate the countries in which these tickets are purchased. This point-of-sale nation (which is not necessarily the country of the departure port) is assumed to reflect the usual place of residence—and spending tendencies—of the arriving traveller.

Through mapping the spending of these visitors to the products and services that inbound tourists to Ireland typically purchase, we use our input-output models to trade the associated indirect and induced output.[16]

We estimate that Shannon-facilitated tourism contributed €146 million to Irish GDP in 2022.[17] This is made up of a €93 million direct impact, within businesses that receive tourists' expenditure, such as hotels, restaurants, retail outlets, and cultural venues. A further €26 million contribution emerges from the tourism supply chain, with €27 million resulting from wage-financed household consumption of those employed in the tourism sector and its supply chains. The economic contribution of Shannon-facilitated tourism is spread across a broad range of industries.

In addition, 1,860 jobs are estimated to have been sustained by inbound tourists passing through Shannon Airport. The majority of employment is in the accommodation & food services sector, facilitating almost 1,080 jobs across Ireland. Shannon-facilitated tourism also supports a further 300 jobs in the arts, entertainment & recreation sector, and 150 jobs in wholesale & retail trade.

Fig. 10. Total economic contribution of Shannon-facilitated tourism by sector of activity, Ireland, 2022



Source: Oxford Economics. Note: may not sum due to rounding.

[16] We estimate that the average inbound tourist to Ireland via Shannon Airport spends approximately €450 per visit.

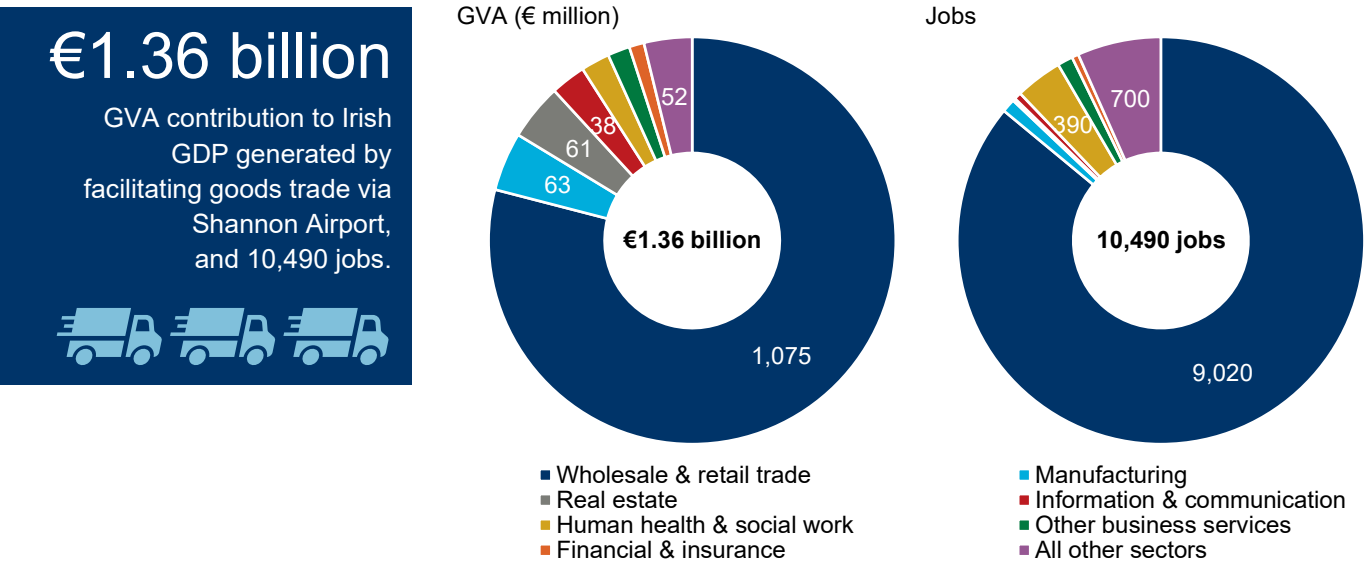
[17] Note that Shannon-facilitated tourism impacts do not seek to capture spending on air fares.

2.3.3 Trade

Flights to and from Shannon Airport brought approximately 17,200 tonnes of imports and exports to and from Ireland in 2022, with an estimated combined worth of approximately €13.3 billion. This calculation draws on CSO and National Aviation policy data to estimate the value of imports and exports through Shannon.[18] [19] The process of moving goods that arrive at Shannon to the final consumer, and from domestic producers to the Airport to be exported, facilitates economic activity across a broad network of wholesalers, distributors, and logistics providers. The CSO's supply use tables report the typical margin received by wholesalers, distributors, and logistics -providers.[20] The firms involved in these activities generate their own GDP and employment contributions, stimulating their own supply chains and multiplier effects.

The imports and exports which passed through Shannon Airport facilitated a €1.36 billion contribution to Irish GDP, along with 10,490 jobs, when including multiplier effects. A substantial majority of this economic contribution—€1.08 billion of GVA and 9,020 jobs—is in the wholesale & retail trade sector. This reflects the activity moving goods to and from the Airport, alongside retail and logistics services purchases made along the supply chain and as a consequence of household wage consumption.

Fig. 11. Total economic contribution of Shannon-facilitated trade by sector of activity, Ireland, 2022



Source: Oxford Economics. Note: may not sum due to rounding.

[18] CSO, "Goods Exports and Imports February 2023", 2023, accessed 2023.
[19] Department of Transport, Tourism and Sport, "A National Aviation Policy for Ireland", 2015, accessed 2023.
[20] CSO, "Supply and Use Tables for Ireland 2019", 2019, accessed 2023.

TESTIMONIAL: IDA IRELAND

IDA Ireland is Ireland's Investment Promotion and Development Agency. IDA partners with multinational companies to win and develop foreign direct investment, providing jobs, economic impact, and opportunity for the people of Ireland.

"IDA partners with multinational companies to win and develop foreign direct investment, providing jobs, economic impact, and opportunity for the people of Ireland. The Shannon Airport Group is a valued partner for IDA Ireland and our clients in the greater Shannon region. Shannon Airport's direct connectivity and customs & border pre-clearance to the US, along with daily flights to UK and Europe are an important asset to multinational companies. The property solutions The Shannon Airport Group develop assist in the attraction of investment and are utilised by a number of IDA clients including Lufthansa Technik Turbine Shannon, Meira GTx, and Jaguar Land Rover amongst others. Shannon Airport Group is a valued partner in attracting FDI to the Mid-West and beyond."

Will Corcoran, Regional Manager, Mid-West, IDA Ireland.

2.4 SUMMARY

Fig. 12 below summarises the estimated economic contribution of SNNGroup to the Irish economy in 2022, bringing together the key findings of this chapter.[21]

Fig. 12. The economic impact of SNNGroup, Ireland, 2022

Channel	Variable	Ireland
Core economic impact		
Core economic impact	GDP (€ billion)	3.96
	Employment (jobs)	20,330
	Tax (€ million)	643
Catalytic economic impact		
Connectivity	% productivity uplift to GDP	0.15
Tourism	GDP (€ million)	146
	Employment (jobs)	1,860
Trade	GDP (€ billion)	1.36
	Employment (jobs)	10,490

Source: Oxford Economics

[21] Please note that the different channels of core and catalytic impacts are not additive. For example, many of the connectivity benefits, or tourism- and trade-facilitated activity, are realised by firms operating across SNNGroup, whose economic impact is measured through the core channel.

3. THE ECONOMIC OUTLOOK

3.1 INTRODUCTION

This chapter explores the recent performance and future outlook for Shannon Airport.

This chapter considers three factors that will influence the Airport's future economic contribution. First, we consider the characteristics and performance of the Mid-West economy, exploring its growth outlook. Second, we consider the recent performance of Ireland's tourism sector, and its outlook into the future. Finally, we consider recent trends in passenger numbers at Shannon Airport, including the impact of the financial crisis and the Covid-19 pandemic, alongside forecasts for passenger numbers provided by Tourism Economics, Oxford Economics' sister company.

The forecasts presented in this chapter draw on Oxford Economics' suite of integrated forecasting models. Our approach relies on a combination of macroeconomic and regional economic forecasts, local historical trends, and fundamental relationships between economic variables. As such, it represents a 'policy-off' scenario: the forecast does not account for future changes or plans that represent a substantial divergence away from underlying economic trends.

3.2 THE MID-WEST ECONOMY

Shannon Airport is located in the Mid-West sub-region, consisting of the counties of Clare, Limerick City & County, and Tipperary.[22] In 2022, the Mid-West economy generated €56.1 billion of GVA, contributing around a tenth of Ireland's economic output. The Mid-West economy supported 226,600 jobs and was home to almost half a million residents.

In the period preceding the global financial crisis, the Irish economy underwent a transformation, shifting from a closed and protectionist approach to a more open and export-driven one. While this change proved to be a success, with GDP per capita aligning with that of Europe, it also led to a period of unsustainable domestic growth, primarily centred around the housing market.

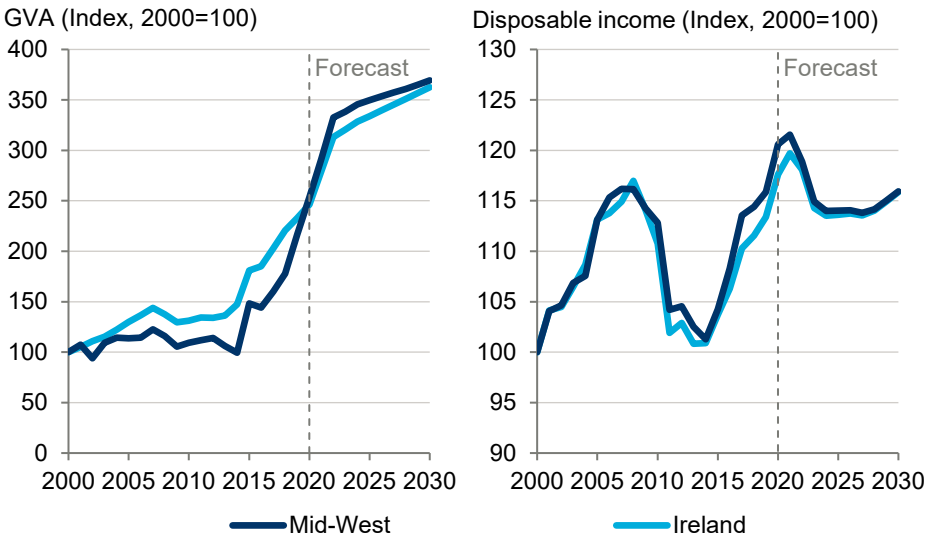
The unravelling of consumer confidence and demand in the construction sector and the wider global downturn during the financial crisis led to a prolonged period of economic stagnation across both the Mid-West and Irish economies. Indeed, in 2014, both economic output (measured in GVA) and employment across the Mid-West remained below their levels at the beginning of the century.

[22] Eurostat, "Statistical regions in the European Union and partner countries NUTS and statistical regions 2021", 2022, accessed 2023. For statistical purposes, Ireland is made up of three Nomenclature of Territorial Units for Statistics (NUTS) 'basic' (or NUTS2) regions: Northern & Western, Eastern & Midlands, and Southern. These regions can be further disaggregated into eight 'small' (or NUTS3) sub regions: Border, Dublin, Mid-East, Midland, Mid-West, South-East, and South West. The Mid-West is located in the Southern region, alongside the South-East (Carlow; Kilkenny; Wexford; and Waterford City & County) and the South-West (Cork City & County and Kerry).

Economic data suggests a considerable uptick in economic fortunes from this point onwards. However, the true extent of the economic recovery is masked by data issues related to profit shifting by multinational firms, causing difficulty in interpreting underlying trends, both across the Mid-West economy and nationally. For instance, the Mid-West economy has experienced a more than three-fold increase in total GVA since 2014, and we estimate that the economy continued to grow through 2020 and 2021, despite the substantial disruption caused by the Covid-19 pandemic.

As a consequence, the Mid-West economy appears to perform comparatively well among GVA-based measures of economic performance. In 2022, the Mid-West had a higher GVA rate, both on a per job (productivity) and per capita basis, than the national economy. The Mid-West ranked second- and third-highest among the eight Irish statistical regions by these measures, respectively.

Fig. 13. GVA and disposable income per household, Mid-West and Ireland, 2000 to 2030

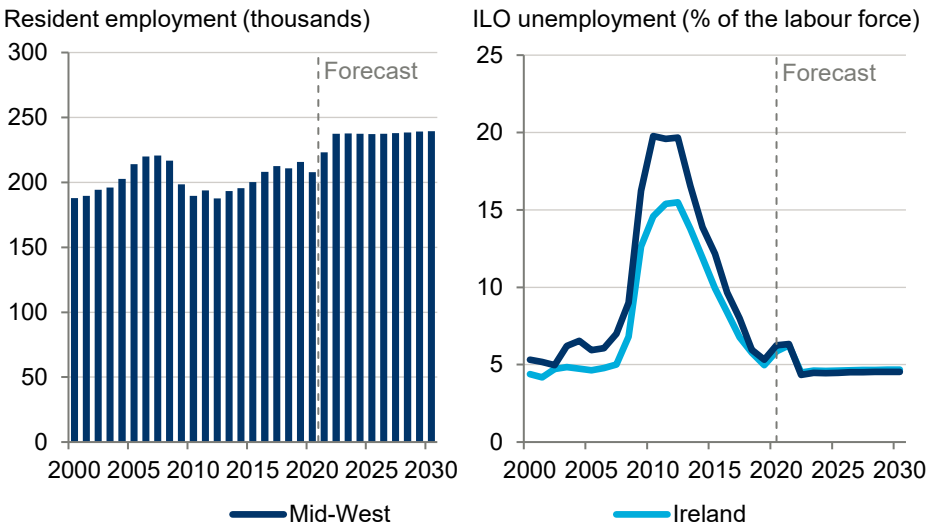


Source: CSO/Eurostat, Oxford Economics

> According to headline economic data, the Mid-West economy has seen a more than three-fold increase in size since 2014, although the true extent of the economic recovery is distorted by the profit-sharing of multinational firms.

The profile of the Mid-West labour market implies that the substantial recent increase in economic output is at least partly a reflection of the improving economic performance of the local economy, and not solely due to the distortion to GDP figures. While unemployment spiked sharply through the financial crisis, peaking at around 20% of the labour force at the start of the 2010s, improving employment prospects stimulated by growth and investment in the regional economy has enabled a steady rise in resident employment, and fall in the unemployment rate.

Fig. 14. Resident employment and unemployment, Mid-West and Ireland, 2000 to 2030

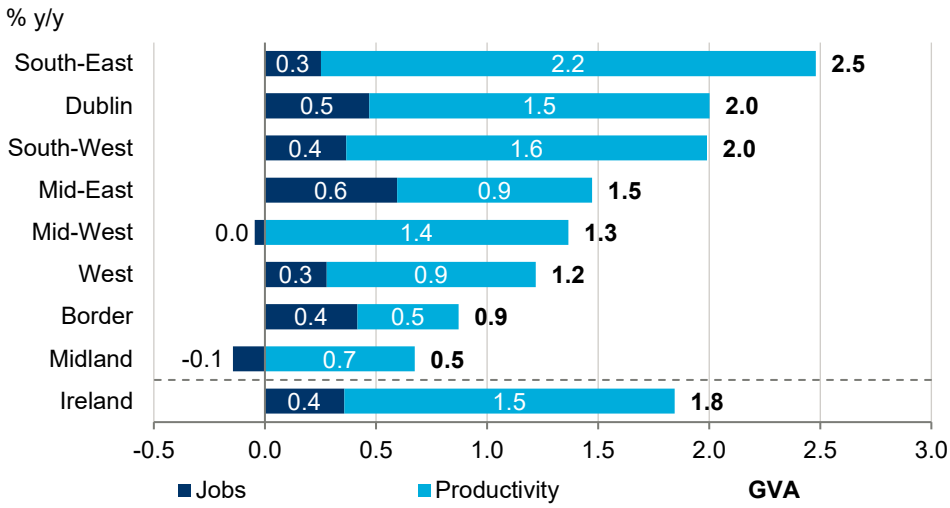


Source: CSO/Eurostat, Oxford Economics

Improving employment prospects stimulated by growth and investment in the regional economy has enabled a steady rise in resident employment, and fall in the unemployment rate.

Looking forward, our baseline forecast suggests that the Mid-West economy will continue to grow through the rest of the decade, although underperforming the national economy. We expect GVA across the Mid-West to expand by an average of 1.3% per year to 2030, lagging the national economy by 0.5 percentage points (1.8% per year). While employment has increased across the Mid-West historically, and particularly in the post-financial crisis recovery through the latter half of the previous decade, we anticipate little overall change in the size of the Mid-West workforce for the remainder of the decade. This is despite continued employment growth across the national economy through the rest of the decade, averaging 0.4% per year. Indeed, this weaker outlook for employment is somewhat of an outlier: Midland is the only other region to experience no overall increase in the employment over this period.

Fig. 15. Components of GVA growth, Ireland's NUTS3 regions, 2022 to 2030



Source: Oxford Economics. Note: may not sum due to rounding.

1.3%

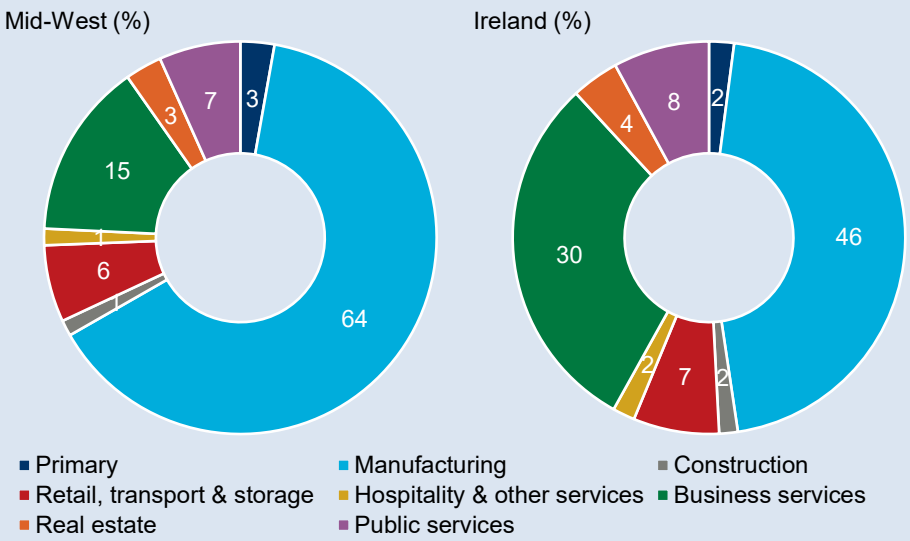
Average annual GVA growth across the Mid-West, 2022 to 2030.

THE MID-WEST ECONOMY: SECTORAL COMPOSITION AND GROWTH OUTLOOK

The economic outlook for the Mid-West economy, presented on page 25, is partly a reflection of the sectoral composition of the Mid-West economy.

Manufacturing is by far the largest sector of the Mid-West economy, accounting for almost two-thirds of economic output (measured by GVA), compared to just under half across Ireland. While manufacturing is expected to continue to expand into the future, it will do so largely through automation, resulting in an overall loss of jobs in this sector.

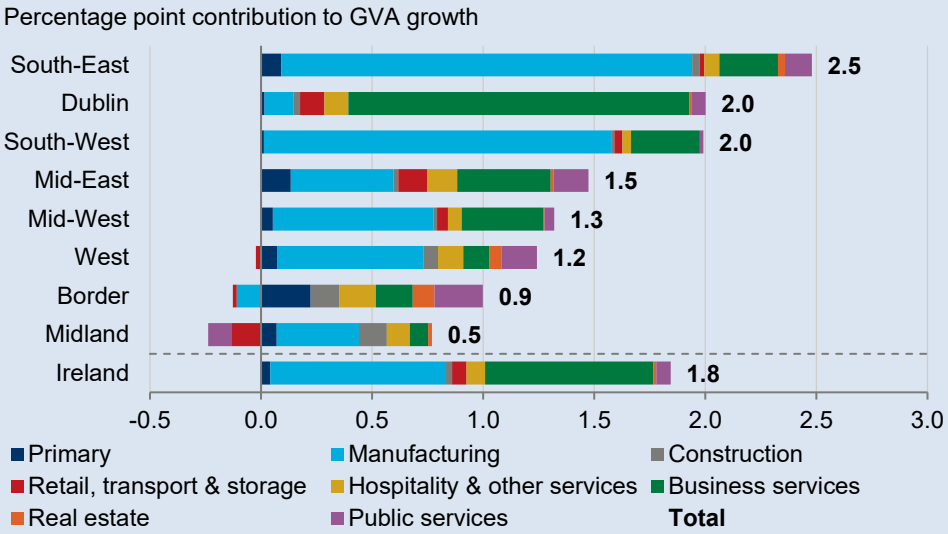
Fig. 16. GVA by sector, Mid-West and Ireland, 2022



Source: CSO/Eurostat, Oxford Economics. Note: may not sum due to rounding.

The Mid-West also has a lesser concentration of activity in business services sectors—which are expected to be another substantial contributor to overall economic growth across the Irish economy—particularly in the information and communication sector.

Fig. 17. Composition of GVA growth by sector, Ireland's NUTS3 regions, 2022 to 2030



Source: Oxford Economics

TESTIMONIAL: TECHNOLOGICAL UNIVERSITY OF THE SHANNON (TUS)

The Technological University of the Shannon (TUS) is located in six campuses across the Midlands and Mid-West, and like the Shannon River, links communities across its catchment area. With 15,000 students and over 2,000 staff members, TUS offers a rich array of sporting, cultural and educational events and facilities and has a proud record of achievement across all faculties.

TUS is very proud of its industry focussed programmes embodied, for example, in undergraduate, postgraduate, flexible learning and research. Our close-to-industry teaching, learning and research is delivered in a manner that allows students to participate in the workplace and develop their professional skills easily.

"Being located closely to Shannon Airport has many benefits to the University and therefore to the region. International connectivity is very important to us, for the industries we work closely with and for our student population. Because of the Airport, the region has a cutting-edge industrial base that is growing every year; the knowledge economy is significantly enabled by having access to US, UK, and mainland Europe centres of economic activity. The continued growth has manifested as an opportunity for TUS to engage with our partners in industry and to develop focussed programmes to facilitate this growth further. A good example is the aviation programme that runs in Shannon at the Atlantic Air Adventure facility, whereby the local aviation service industry specifically collaborated with Atlantic Air Adventure and TUS, to create industry-developed and delivered micro-cred modules at the centre of aviation service activity."

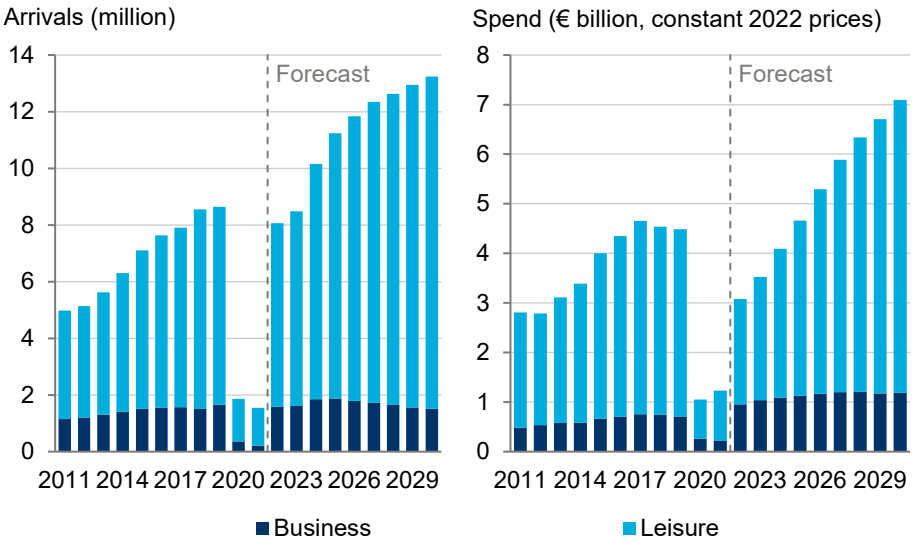
Professor Vincent Cunnane, President, Technological University of the Shannon.

3.3 TOURISM

The future economic contribution of Shannon Airport will also depend on the outlook for Ireland's tourism sector. Prior to the Covid-19 pandemic, tourism was thriving. The overall number of inbound arrivals to Ireland increased from just under five million in 2011 to over 8.6 million in 2019, driven primary by an expansion in leisure tourism. As a consequence, overall spending also rose. While the Covid-19 pandemic led to a sharp contraction in both leisure and business arrivals through 2020 and 2021, the easing of restrictions and an uptick in demand led to arrivals almost recovering to its pre-pandemic level in 2022 of 8.1 million.

Looking forward, Tourism Economics' forecasts indicate that Ireland's tourism sector will return to its pre-pandemic upward trajectory through the remainder of the decade. Growth in arrivals will be wholly driven by leisure arrivals, which will increase to 11.7 million in 2030, contributing to 13.2 million overall arrivals—over five million more than in 2022. Growth in the average spend per visitor, as a consequence of improving macroeconomic conditions, will lead to overall spending increasing to €7.1 billion in 2030, driven mostly by leisure visitors (€5.9 billion).

Fig. 18. Inbound arrivals and spend, Ireland, 2011 to 2030



Source: IMF, UNWTO/Fáilte Ireland, Tourism Economics

€7.10 billion

Spending by inbound visitors to Ireland in 2030.

3.4 PASSENGERS

Shannon Airport is the third-largest airport in Ireland, after Dublin and Cork. According to CSO data, which excludes transit traffic, over 1.4 million passengers departed from or arrived at Shannon Airport in 2022, forming 4.4% of the 32.5 million departures and arrivals across Ireland.[23]

Unsurprisingly, the Covid-19 crisis also caused significant damage to Ireland's aviation sector, with total passenger numbers falling from an all-time high of 38.1 million in 2019, to just 8.3 million in 2020 and 9.1 million in 2021. According to CSO data, 270,000 people flew via Shannon Airport during 2020, and approximately 320,000 during 2021.[23]

The disruption caused by the Covid-19 pandemic to the aviation sector masks two broader trends in Irish passenger numbers. First, Ireland has seen a sizeable increase in the overall number of passengers travelling through its airports. Taking the period from 2011—the first full year post-Open Skies—Ireland saw an 8.9 million increase in passengers prior to the Covid-19 pandemic, from 23.7 million in 2011 to 38.1 million in 2019.[24] This represents a more than 60% increase. The growth in passengers is a result of various factors, including thriving economic performance and a growing tourism sector, discussed elsewhere in this chapter.

"Dublin Airport alone accounts for all of the net increase in Ireland's passengers between 2011 and 2022."

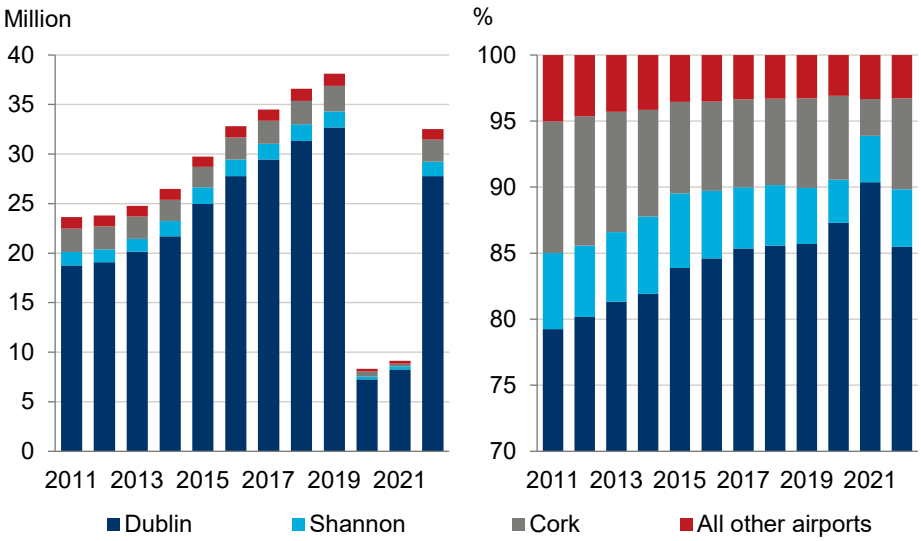
However, Dublin Airport has formed an increasing proportion of Ireland's passengers over this period. In 2022, Dublin Airport accounted for 85% of passengers, up from 79% in 2011.[3] Indeed, Dublin Airport alone accounts for all of the net increase in Ireland's passengers between 2011 and 2022. As a consequence, Shannon Airport has seen its market share gradually decline, from 5.8% of Ireland's passengers in 2011, to 4.4% in 2022.

[23] CSO, "Aviation Statistics", 2023, accessed 2023.
[24] U.S. Department of State, "U.S.-EU sign 'second stage' air transport agreement", 2010, accessed 2023.

1.4 million

Passengers travelling through Shannon Airport in 2022 (excluding transit traffic), 4.4% of the Irish total.

Fig. 19. Passengers by airport, Ireland, 2011 to 2022



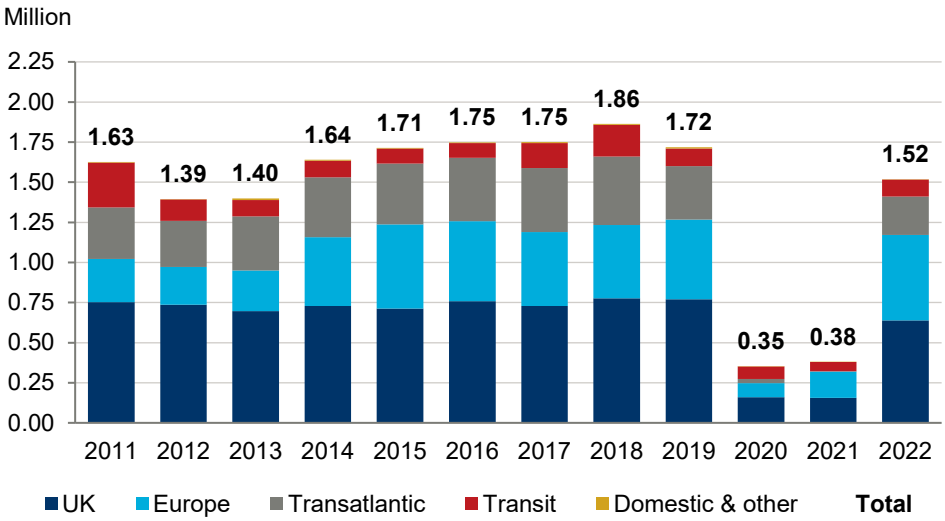
Source: CSO, Oxford Economics

Data on routes served by Shannon Airport demonstrates the changing composition of arrivals from and destinations served by the Airport. In 2022, flights to and from the UK formed over two-fifths of passenger traffic (638,500 passengers). In 2022, a sizeable share of flights to and from the UK served London airports, including Heathrow (194,300 passengers), Stansted (192,000 passengers), and Gatwick (109,100 passengers). Historically, the UK has consistently accounted for the largest proportion of passengers, and prior to the Covid-19 pandemic, Shannon served around 700,000 or more passengers to and from the UK in each year from 2014 onwards.

In addition, a further 532,000 passengers, more than a third served by the Airport, flew commercially to 20 European destinations, with popular countries including Spain (183,000 passengers), Poland (114,400 passengers), and Hungary (32,700 passengers).

A further 239,200 passengers flew on transatlantic routes in 2022, with flights operating to JFK in New York, Newark Airport in New Jersey, and Boston. Transatlantic passengers form a smaller share of Shannon's passengers than historically: transatlantic routes served between a fifth and a quarter of Shannon's passengers through the 2010s. This may be partly explained by the disruption caused by the Covid-19 pandemic and the associated travel restrictions, although Shannon also saw a drop in the number of transatlantic passengers in 2019, due to the grounding of the Boeing Max series and associated loss of routes with Norwegian Airlines and Air Canada.

Fig. 20. Passengers by route, Shannon Airport, 2011 to 2022[25]



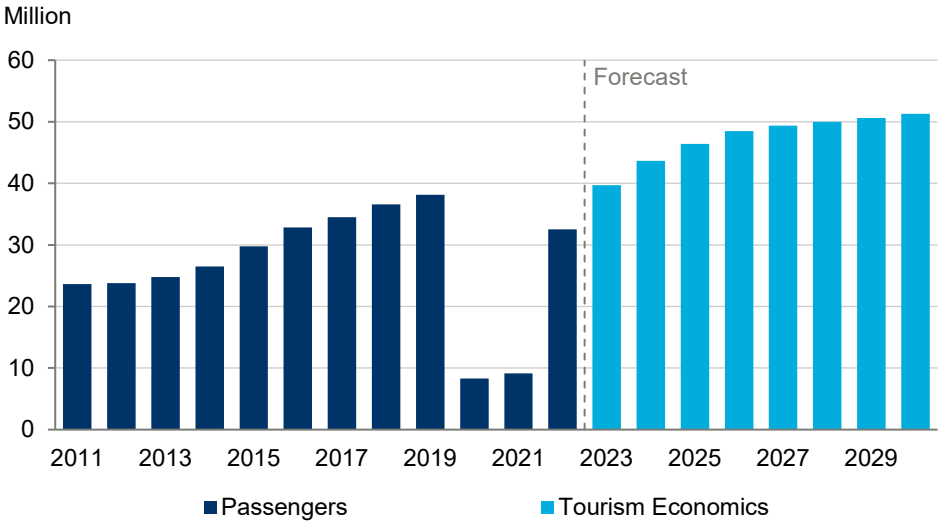
Source: The Shannon Airport Group, Oxford Economics

638,000

The UK was Shannon's largest origin and destination of passengers, accounting for more than two-fifths of all passengers in 2022.

Looking forward, Tourism Economics' baseline forecast of passenger numbers indicates a relatively optimistic outlook for the Irish aviation sector. Passengers across Ireland are expected to exceed their pre-Covid 19 level in 2023, increasing to 39.7 million. This trend is anticipated to continue through the remainder of the decade, reaching 51.3 million passengers in 2030—a 18.8 million or 58% increase on total passengers in 2022.[26]

Fig. 21. Passengers, Ireland, 2011 to 2030



Source: CSO, Tourism Economics

51.3 million

Baseline forecast for total passengers across Ireland in 2030, an increase of 18.8 million on 2022.

[25] Note that these data are provided by SNNGroup, and the total passenger numbers do not necessarily align to official aviation statistics due to the inclusion of transit traffic.

[26] Climate risks may represent a potential downside risk to Tourism Economics' long-term passenger forecasts.

TESTIMONIAL: UNIVERSITY OF LIMERICK

University of Limerick (UL), is located in the Wild Atlantic Gateway city of Limerick on the west coast of Ireland. With over 18,000 students, including more than 3,300 internationally mobile students each year, UL is an independent research-led university offering undergraduate and postgraduate programmes across Arts, Humanities & Social Sciences, Education & Health Sciences, Science & Engineering, and the Kemmy Business School.

With strong links to business and industry, UL excels at translational research, which aims to accelerate the practical application of academic research to benefit society. Furthermore, UL's Cooperative Education programme—one of the largest of its kind in the EU—places over 2,000 students in work experience in industry, business, and the professions across the globe. In conjunction with the four faculties, UL offers a range of online programmes co-designed with industry to enable upskilling and reskilling for professional development. UL also houses some of the most innovative and successful research centres in Ireland. As one of Ireland's foremost universities, UL is recognised for its dedication to an outstanding student experience, commitment to graduate employability and its research with societal impact making fruitful an extensive network of partnerships with industry government and communities, nationally and internationally. With the largest Erasmus+ programme in Ireland it is Ireland's European university with international reach.

"The Shannon Airport Group plays a vital role and allows University of Limerick to continue to build vibrant exchanges, partnerships, and collaborations around the globe. The international transport connectivity from Shannon Airport strongly supports our internationalisation strategy including student, researcher, academic, staff mobility and recruitment. The Airport augments our relationships with industry as well as the hosting of major conferences, sporting and cultural events, and tourism activities. A thriving Shannon Airport and indeed the wider Group is interconnected with UL's continued growth. UL has a long history of engagement with aviation and the wider sector and this has recently given rise to the creation of the Irish World Aviation Academy with our partners AirNav Ireland. A world first in both education and aviation, the academy will be a flagship for the future of embedded learning in aviation, offering executive learning and leadership capability development. We look forward to working with The Shannon Airport Group as this venture continues to develop and take shape and to work closely together on building aviation capacity in the region into the future."

Professor Kerstin Mey, President, University of Limerick.

4. POLICY ENVIRONMENT AND STAKEHOLDER CONSULTATION

4.1 INTRODUCTION

Regional airports provide an array of benefits to local and regional economies, however the Irish aviation market is highly concentrated. Whilst a rebalancing of passenger flows could support national economic and environmental policy, current aviation policy favours the expansion of Dublin Airport which will only exacerbate the level of concentration and make achieving wider policy objectives more challenging.

In this chapter we provide an overview of these issues and provide insights from our consultations with local stakeholders.

4.2 ECONOMIC BENEFIT OF REGIONAL AIRPORTS AND MARKET CONCENTRATION

Research has shown that there is a strong link between airport infrastructure and regional economic development.[27] In addition to the strong GVA, jobs, trade, and tourism effects we quantified earlier in this report, there are other benefits an airport like Shannon can bring to a regional economy, including spurring innovation and foreign direct investment, as well as enhancing a region's image and reputation.[27] Airports facilitate face to face contact which for advanced economies trading high-value added goods and services is particularly important. It is also important for multinational companies and those with markets overseas. Furthermore, as Pot & Koster (2022) highlight *"the presence of an airport may have a more intangible effect, as it signals a vibrant regional business environment"*.[28]

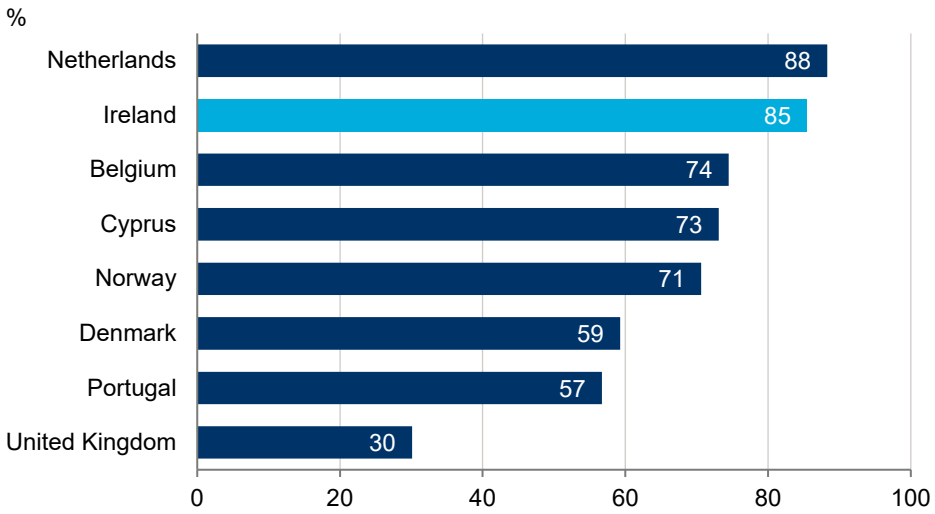
The positive impact of regional airports to its surrounding areas has been extensively studied and is well documented.[29] [30] A recent study found that the presence of regional airports on economic activity in the EU is positive, and ranges between 2% and 6%—although the wide range of estimates demonstrates the range of factors, including the size and nature of regional economies, that influence the economic contribution of airports.

[27] Journal of Economic Geography, "The role of major infrastructure in subregional economic development", 2015, accessed 2023.
[28] Journal of Transport Geography, "Small airports: Runways to regional economic growth?", 2022, accessed 2023.
[29] University of Manitoba, "Airport infrastructure as an instrument for regional economic development", 2010, accessed 2023.
[30] Acuity Analysis, "Economic and social importance of UK's regional airports", 2020, accessed 2023.

Moreover, it found that they can also lead to an increase in population of between 1% and 3%, and boost employment by around 2%.[31] The study also found that each additional one million passengers boost GDP by between 2% and 3%, which implies that if an airport boosted its untapped potential, it would yield significant benefits to the local economy.

Despite notable growth in passenger numbers, Ireland's regional airports including Shannon have stood still or indeed lost market share at the expense of Dublin Airport. Ireland's aviation sector is one of the most concentrated in Europe. An analysis of market share of the largest airport across a range of comparable European economies shows that only the Netherlands' largest airport has a larger share of total passengers (88%) than Ireland's Dublin Airport (85%). By contrast, in other European countries with a single dominant airport the market concentration ranges from 57% in Portugal to 74% in Belgium, while the United Kingdom's largest airport, Heathrow, represents just 30% of market share.

Fig. 22. Market share of the largest airport, selected countries, 2019



Source: CSO, International Airports Review, Statistia, Oxford Economics

85%

Ireland's aviation sector is one of the most concentrated in Europe: only the Netherlands has a higher share of passenger traffic concentrated at one airport.

Recently, the Dutch government demonstrated a willingness to reduce dependency on a single airport by announcing it would cap the number of flights at Amsterdam Airport Schiphol, the country's largest, to address emission issues whilst also recognising the potential for other airports (Lelystad) to contribute to the connectivity growth.[32] The decision has since been challenged in the courts, but it nonetheless demonstrates a willingness by government to tackle the problem of excessive market concentration, and the challenges that this creates.

[31] University of Duisburg-Essen, "Regional airports and economic growth: evidence from the Single European Aviation Market", 2022, accessed 2023.
[32] Airport Technology, "Netherlands cap Schiphol capacity next year to cut pollution", 2022, accessed 2023.

By contrast, Dublin's market share is set to continue to grow with the immediate plans to expand capacity to 40 million passengers by 2030. This expansion is part of a wider masterplan of expanding the Airport's capacity to 55 million passengers per year. This increased capacity could bite into the passenger share of Ireland's other airports (including Shannon). Due to improvements in Ireland's transport infrastructure, the catchment areas of the airports have begun to overlap, making direct competition more extreme. In addition, history has shown that Dublin Airport consistently over-performs against its passenger targets, thus making it more challenging for Shannon Airport to maintain or indeed grow passenger numbers in the future.

CASE STUDY: DENMARK

The Aviation Strategy for Denmark offers a potential allegory for the opportunities and advantages for Ireland's regional airports.[33] At almost six million residents, Denmark has an only slightly higher population than Ireland, with Copenhagen like Dublin acting as the major urban hub. Copenhagen Airport dominates the aviation landscape, and as demonstrated in Fig. 22 on page 33, it captures almost three-fifths of passenger traffic. However, Denmark's regional airports play a much greater role in contributing to connectivity.

The Aviation Strategy for Denmark highlights the crucial role that its regional airports play *"for both connectivity and national cohesion"*. The Strategy cites the example of the route between Aalborg Airport and Amsterdam Schiphol, which contributes around 1.6% of Denmark's overall connectivity, even when considering the negative effect on domestic connectivity between Aalborg and Copenhagen. It suggests that the significant connectivity *"follows from the fact that this specific direct connection to one of Europe's major hubs give access to a comprehensive network of routes to the rest of the world with one stopover"*.

The Strategy also identifies a range of economic benefits of new routes from Denmark's regional airports. It suggests that the *"socioeconomic value of new international routes from regional airports is…of such a volume that Denmark will suffer a loss if the development of Copenhagen Airport happens at the expense of regional airports"*, while new routes or additional departures from regional airports *"support significant value creation for Denmark"*, particularly to European hubs.

4.3 REGIONAL GROWTH OBJECTIVES

Rebalancing passenger flows would support the Government's wider regional growth objectives as laid out in Project Ireland 2040, the Government's long term national strategy.[34] [35] One of the Government's key objectives is to *"target a level of growth in the country's Northern and Western and Southern Regions combined, to at least match that projected in the East and Midland Region"*. It seeks to accommodate 25% of growth among the four largest cities outside of Dublin, two of which—Galway and Limerick—are primarily served by Shannon Airport.

[33] Government of Denmark, "Aviation Strategy for Denmark", 2017, accessed 2023.
[34] Department of Public Expenditure, NDP Delivery and Reform, "National Development Plan", 2021, accessed 2023.
[35] Government of Ireland, "National Planning Framework", 2018, accessed 2023.

To achieve the Government's growth objectives, the report estimates that of Ireland's total population growth between 2016 and 2040, 16.4% will need to be in the Northern & Western region, 34.5% in the Southern region, and 49.1% in the Eastern & Midland region. However, Oxford Economics' baseline forecasts—which represent a scenario where there are no policy changes and does not account for future changes or plans that represent a substantial divergence away from underlying economic trend—indicate that this spatial composition is unlikely to materialise without intervention. The baseline forecast suggests that the distribution of population growth will be more uneven, with population in the Southern region expanding by just 28.0%—6.5 percentage points less than required.

The outlook for the spatial distribution of additional employment is similar. Project Ireland 2040 acknowledges that employment growth will play a key role in rebalancing growth among Ireland's regions: it estimates that of Ireland's total employment growth between 2016 and 2040, 17.4% will need to be in the Northern & Western region, 34.1% in the Southern region, and 48.5% in the Eastern & Midland region. However, Oxford Economics baseline forecasts suggest employment in the Southern region will expand by just 27.7%—6.4 percentage points less than required. Employment growth across the Northern & Western region is also expected to fall short: according to our forecasts it will expand by 14.0%, compared with Project Ireland's objective of 17.4%.

Fig. 23. Distribution of the changes to population and employment, Ireland's NUTS2 regions, 2016 to 2040

Source: CSO, Government of Ireland, Oxford Economics. Note: may not sum due to rounding.

28%

Oxford Economics' forecast for the Southern region's share of population growth, below the Project Ireland 2040 target (34.5%).

Given the evidence, it is clear Government support for regional airports would help achieve their spatial growth objectives. In effect, the National Planning Framework highlights the important role of Shannon and Cork's airports for the region's future and acknowledges that Shannon Airport has untapped potential to drive future growth. The Government's plan is to achieve its employment and population objectives by boosting growth in cities (Limerick in particular) to benefit from agglomeration effects and act *"as effective complements to the economic strength of Dublin".* There are several studies that prove that airports are an effective policy lever to boost cities.[36]

A further reason to rebalance airport market share is that it can help build a more vibrant business environment. If a country has an excessive reliance on a single airport, any disruptions, such as labour shortages, natural disasters, or technical failures, could cause a significant impact on the tourism sector, as well as the economy as a whole.[37] By relying on more than one airport, the country can distribute the load and reduce the risk of disruption to a single point. Moreover, it would encourage competition between airports, forcing them to offer better services to their clients, and lead to lower prices and increased efficiency.

TESTIMONIAL: REGIONAL CHAMBERS OF LIMERICK, SHANNON, ENNIS, AND GALWAY

The Regional Chambers of Limerick, Shannon, Ennis, and Galway represents a wide array of businesses across the Mid-West and West regions. Collectively, they represent approximately 800 companies and 80,000 employees from indigenous exporters to Multinational Corporations and those operating in the tourism industry.

"Our diverse membership bases incorporate large multinational companies and indigenous SMEs, all of whom cite the importance of SNNGroup to their business operations, either from a property development perspective or from the connectivity provided by Shannon Airport.

As a small economy, international openness is one of the key drivers of economic growth. The connectivity provided by Shannon Airport to the US and Europe is vital to our regions, supporting the inbound tourism industry, enabling indigenous companies to trade globally and attracting FDI. Shannon Airport has been citied consistently as a key factor by FDI companies in their investment decisions in the region.

The ongoing development of SNNGroup will be key to enabling businesses across our regions continue to grow and develop. Furthermore, given that regional connectivity is a core part of Project Ireland 2040, the continued growth of SNNGroup will be key to achieving Balanced Regional Development for Ireland".

Limerick, Shannon, Ennis, and Galway Chambers.

[36] Journal of Geography, "Airports, access and local economic performance", 2019, accessed 2023.
[37] The Irish Times, "Bank holiday travellers face one-hour queue to get through security", 2022, accessed 2023.

4.4 CLIMATE AGENDA AND SUSTAINABILITY

In addition to the economic benefits that would arise from rebalancing some of the traffic from Dublin Airport to other airports in Ireland, there would also be a series of environmental benefits that would support the Government's efforts to tackle climate change. In line with EU and global targets, Ireland has committed to reducing emissions, with the Climate Action and Low Carbon Development (Amendment) Act 2021 setting a legally binding target of net-zero emissions no later than 2050, and a cut of 51% by 2030 compared to 2018 levels.[38]

To achieve these goals, reducing emissions from the aviation sector will be crucial, as transport is one of the most polluting sectors in Ireland.[39] Spreading passengers across Ireland's regional airports would reduce the need to develop additional capacity at Dublin Airport. Expanding an airport leads to increased emissions due to the need to build new infrastructure, such as terminals, runways, and parking lots, all of which require considerable amounts of material and energy. In addition, the production and transportation of these materials result in carbon emissions, which contribute to the carbon footprint of the airport expansion project.

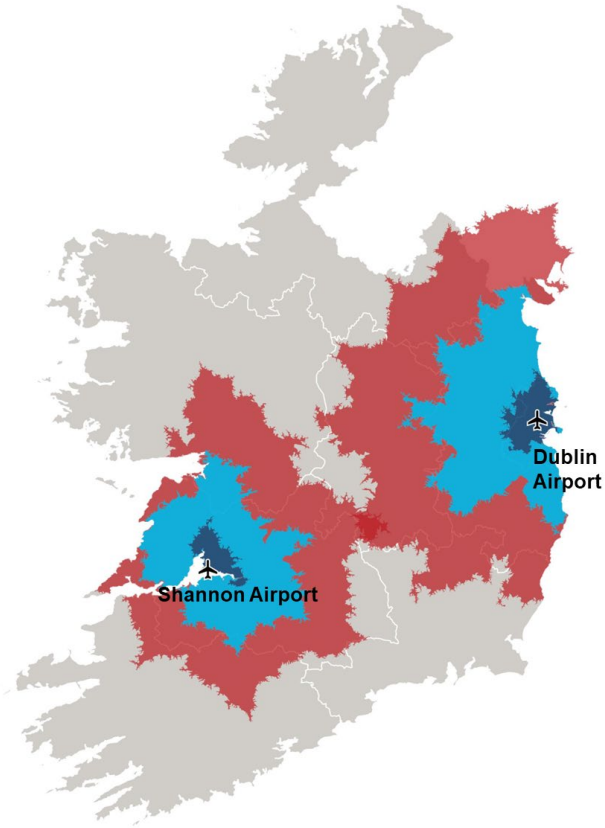
Instead, utilising the existing spare capacity of Shannon, Cork, or other regional airports would be a more climate-friendly alternative due to the huge rise in emissions new infrastructure projects inevitably bring.[40] Moreover, increasing capacity across Ireland's west coast could lead to more sustainable travel patterns. Rebalancing air traffic to Shannon Airport could reduce the travel time for those living in the west of Ireland, who currently need to travel to Dublin for certain unserved routes, helping with the Government's climate agenda.[41]

A more even spread of passenger numbers would also help reduce noise pollution in residential areas, too. Studies have found that distributing the air traffic across multiple airports helps spread out noise pollution, leading to better quality of life for residents.[42]

Noise is one of the most important problems linked to aviation: it can lead to health issues, as well as to negative social and economic effects. Big airports often face complaints when expanding their operations, as they tend to be in close proximity to urban and/or residential areas.

[38] Government of Ireland, "Climate Action Plan 2021", 2021, accessed 2023.
[39] Sustainable Energy Authority of Ireland, "CO2 Emissions", accessed 2023.
[40] Dublin Airport, "Towards Net Zero Carbon Emissions", 2021, accessed 2023.
[41] For short-haul flights, the catchment area is 90 minutes, while for long-haul flights it is two hours.
[42] European Parliament, "Impact of aircraft noise pollution on residents of large cities", 2020, accessed 2023.

Fig. 24. Catchment areas by travel time, Shannon and Dublin Airports



Source: Travel Time, Oxford Economics

4.5 POLICY ENVIRONMENT

Despite the economic and environmental benefits, Ireland's aviation policy has to date failed to create a level playing field for Ireland's regional airports to flourish.

4.5.1 State aid

Ireland's aviation policy is maintained and controlled nationally. However, as a member of the EU, Ireland is bound by EU aviation policy and legislation regarding competition, passenger rights, safety, and security.[43] The guidelines on state aid allow aid to be granted to airports with fewer than three million passengers; the underlying assumption is that smaller airports face greater difficulties in becoming financially viable than larger airports.[44]

[43] European Union Law, "State aid-guidelines on aid to airports and airlines", 2019, accessed 2023.
[44] Florence School of Regulation, "Competition Law Perspective", 2022, accessed 2023.

The Irish government however has shown little appetite to reduce Dublin's high market concentration, as demonstrated in part by its decision not to provide state aid through the Regional Airports Programme to the country's two largest regional airports, Shannon and Cork, and by allowing Dublin to expand further.[45]

This has made it harder for Shannon to compete with Dublin Airport for two main reasons. First, due to increased pressure to update infrastructure and systems and remain compliant, Shannon has had to suffer higher expenditure in proportion to their revenue than Dublin Airport.[46] A study by the European Parliamentary Research Service found that regulatory and operational requirements have weighed more heavily on regional airports,[47] with airports having to absorb these costs, reducing their competitiveness.

Second, smaller airports like Shannon have greater challenges in competing with larger and more profitable airports such as Dublin, who find it easier to attract suitable financing due to greater profitability, particularly in an environment that is increasingly competitive.

Evidence suggests that regional airports which provide connectivity to the economic core and which cater for business travel coincide with economic growth in their hinterland.[48] Given that Shannon Airport offers connections with major economic hubs such as London and New York, and that Project Ireland 2040 aims to rebalance regional growth, there is a strong argument for providing state aid to Shannon Airport.

4.5.2 The passenger price cap

In Ireland, the Dublin Airport price cap is set by the Commission for Aviation Regulation (CAR), which acts under the Irish Aviation Regulation Act 2001 and in accordance with the EU Airport Charges Directive. The recent rise in the price cap on passenger charges will help fund Dublin Airport's expansion and help to exacerbate the market concentration.[49] With the higher charges, Dublin Airport can invest in expanding capacity and improving its services.
To compete with Dublin, Ireland's regional airports may be forced to lower prices which would limit their ability to invest and erode their competitiveness.

[45] Copenhagen Economics, "Assessment of aviation policy as a driver of economic development in the West and Mid-West of Ireland", 2019, accessed 2023.
[46] University College Cork, "The influence of EU aviation policy on Irish airports", 2021, accessed 2023.
[47] European Parliament, "Current challenges and future prospects for EU secondary airports", 2015, accessed 2023.
[48] Allroggen & Malina, "Do the regional growth effects of air transport differ among airports?", 2014, accessed 2023.
[49] The latest price cap decision, released in July 2022, rules that Dublin Airport will be able to charge airlines €8.68 per passenger in 2023, a 7% increase on 2022. For 2024, CAR has proposed a cap of €9.23, rising to €10.30 in 2025 and €11.73 in 2026. Dublin Airport had originally sought to increase passenger charges from an existing cap of €8.24 to a higher range of €13.04 to €14.77 to meet increasing costs.

CAR estimate that the proposed price cap would allow Dublin Airport to collect €2.8 billion in revenue over four years, which will enable it to make significant investments to boost its capacity. Both Limerick Chamber and Galway Chamber objected to the proposed price cap, claiming the CAR did not adequately consider the Government's Climate Action Plan and the balanced regional development plan outlined in Project Ireland 2040.[50] [51] Moreover, they claimed that the National Aviation Policy (NAP) emphasises the importance of considering climate change impacts of future policy decisions, to argue against further expansion at Dublin Airport.[52]

4.5.3 Redistributing future passenger growth in Ireland

As noted, Dublin Airport's 'Capital Investment Programme 2020+' sets out its investment plans for increasing capacity to cater for 40 million passengers per year by 2030.[53] This is part of a wider masterplan for expanding capacity to 55 million passengers. Although passenger numbers are forecast to grow over the period to 2030, their remains substantial unused capacity in Ireland's aviation sector. This spare capacity mitigates against the need to continue to expand Dublin Airport beyond the 40 million capacity target.

4.6 STAKEHOLDER CONSULTATION

To better understand the primary role of SNNGroup company in the Mid-West, we spoke to several key stakeholders in the region, including private companies, chambers of commerce, and local governments, about the importance of SNNGroup as an organisation in the region, and their view on government policy.[54]

The stakeholders we interviewed unanimously recognised Shannon Airport's paramount role in supporting the performance of the Mid-West's economy, describing it as one of the most critical pieces of economic infrastructure. The Airport brings essential economic benefits to the Mid-West, including attracting Foreign Direct Investment (FDI), supporting export-oriented companies, and driving tourism.

[50] Limerick Chamber, "2022 Interim Review of the 2019 Determination Limerick Chamber", 2022, accessed 2023.
[51] Galway Chamber, "Galway Chamber submission on the Draft Decision", 2022, accessed 2023.
[52] Department of Transport, Tourism and Sport, "A National Aviation Policy for Ireland", 2015, accessed 2023.
[53] Dublin Airport, "Capital Investment Programme 2020+", 2019, accessed 2023.
[54] Through May and June 2023, we conducted 16 semi-structured interviews with key stakeholders across a range of organisations.

Regarding regional growth and government policy, most raised concerns about the concentration of passengers in Dublin Airport, as they said it has led to congestion and noise complaints, as well as a broader concentration of economic activity around the capital. Stakeholders stressed the need for a mindset change in broader economic and spatial policies to promote balanced regional development. Some participants questioned the lack of a comprehensive national aviation policy and emphasised the opportunity for Shannon Airport to help alleviate pressures in Dublin Airport. Additionally, when discussing the Government's broader regional strategy, there were calls for increased investment in infrastructure, particularly in improving connectivity between conurbations.

We also discussed important areas where SNNGroup as a company has the opportunity to support the economy more. Stakeholders unanimously stressed the need to strengthen connectivity to continental Europe, with a focus on strategically important routes. They also emphasised the importance of establishing permanent connections to major European hubs such as Amsterdam (Schiphol) and Frankfurt—with emphasis on the need for early-morning outbound flights to facilitate onward movements for business travellers. Access to these two European hubs is particularly important for export-oriented companies, as they are a point of entry to important Asian markets.

4.6.1 Role of SNNGroup Company in the Mid-West

All the stakeholders we spoke to were unanimous in highlighting the importance of the Airport to the region, labelling it as "*the most critical piece of economic infrastructure for the economy*". The key economic benefits that the Airport brings to the Mid-West include attracting FDI, supporting export-oriented companies, and tourism:

- **FDI:** Ireland's membership of the EU, the widespread use of English as a business language, and the Mid-West's location at the doors of the Atlantic Ocean make the region perfectly positioned to attract FDI inflows from the US. But that is not enough for FDI. The presence of the Airport enables the FDI to be realised: stakeholders emphasised that having direct connectivity is essential for winning FDI projects, as "*you don't win FDI if you're two flights away*". Many companies are headquartered in the USA, so direct routes to destinations such as Boston and New York allow for efficient business travel and facilitate the daily operations of multinational companies.
- **Exports:** the companies in the region we spoke to are export-oriented, and they all stressed that reliable airport connectivity is crucial to obtain the inputs they need, and to ship their products abroad, and so without Shannon Airport they would have to set up elsewhere. Moreover, the participants highlighted that the region has developed manufacturing clusters in sectors such as life sciences and electronics, for whom the need for good connectivity is particularly important in order to attract further investment and for businesses to thrive.

- **Tourism:** Shannon Airport is a key enabler of tourism in the region. Its proximity to popular tourist destinations makes it an ideal entry point for visitors planning to visit Galway, Limerick, and explore the Wild Atlantic Way.

Moreover, according to some participants, the business parks engage very closely with the educational community, helping retain talent in the region and helping the important enterprise clusters thrive.

TESTIMONIAL: NORTHERN TRUST

Northern Trust is a global financial institution that provides asset servicing, investment management and wealth management services for institutions, high-net-worth individuals, and families. Northern Trust established its Limerick operations in 2007 with 19 people. Today over 1,400 people are employed at two Limerick locations.

"Northern Trust would not have been able to grow from 19 people to over 1,400 people without The Shannon Airport Group. The decision to locate in Limerick was partly due to its proximity to Shannon Airport. The connectivity provided by the Airport, coupled with the ease of access to Shannon and the availability of US Pre Clearance, make the Airport essential to our business operations. Continued growth at Shannon Airport will enable us to access key business markets and further grow our business here in Limerick, which in turn will support the economic development of the surrounding regions."

Catherine Duffy, Senior Vice President, Northern Trust.

4.6.2 Regional growth and government policy

Most stakeholders expressed concerns about the increasingly large concentration of passengers at Dublin Airport. They noted this concentration has led to issues of congestion and noise complaints. Participants felt that given the issues facing Dublin Airport, the country could utilise other airports like Shannon more than it currently does. They emphasised the need for a mindset change in broader economic and spatial policies to address the current overheating of Dublin and to promote balanced regional development. It was also noted that the absence of a comprehensive aviation policy by the Government was an issue.

Beyond air connectivity, the participants also expressed a view that too much public investment is directed towards Dublin. Concerns were raised about the Government's lack of support for infrastructure development, particularly in terms of improving connectivity among towns. A particular piece of infrastructure that would go a long way in improving connectivity in the area is a motorway from Limerick to Cork; because Cork doesn't have transatlantic flights, it's very hard to get there if you fly into Shannon, so a motorway would shorten the travel time significantly.

Two significant areas of future potential growth for the Airport identified was offshore wind energy and sustainable airports. One participant, specialising in economic development, emphasised the importance of investing in offshore wind infrastructure. This was echoed by other participants in both the public and private sector. The Mid-West region is strategically located along the Atlantic coast, where strong and consistent winds offer great potential for harnessing renewable energy. Investing in offshore wind energy infrastructure would enable the generation of clean and sustainable energy, reducing the region's dependence on fossil fuels and contributing to Ireland's renewable energy targets.

Shannon Airport is poised to play a pivotal role in supporting the development of the offshore wind sector on the west coast of Ireland, due to its strategic location on the Shannon Estuary and the connectivity and property solutions provided by SNNGroup. The strategic location of Shannon Airport provides convenient access to the vast offshore wind potential in the region, and as Ireland continues to make significant strides in renewable energy, Shannon Airport's connectivity and infrastructure will make it an attractive gateway for international investors looking to capitalise on the emerging offshore wind market.

Additionally, some stakeholders recognised the importance of working towards making Shannon Airport a more sustainable airport. As the aviation industry faces increasing scrutiny over its environmental impact, airports worldwide are seeking ways to reduce their carbon footprint and operate in a more sustainable manner. Shannon Airport plans to reduce greenhouse gas emissions by over 50% by 2030 and net zero by 2050.[55] Achieving these aims will be paramount to ensure that the Airport thrives in the future.

4.7 SUMMARY

Despite the economic policy objectives and the strong body of evidence on the economic benefits that can arise from regional airports, it would appear the Irish Government's aviation policy favours growth of Dublin Airport. But there are tools available to promote competition and prevent excessive reliance on a single airport, in particular relating to state aid and passenger price caps. Although the fortunes of Ireland's regional airports will be partly governed by market forces outside of the control of policy, opportunities exist to encourage a rebalancing of air traffic across Ireland, which in turn could contribute to the country's efforts to tackle climate change, help achieve regional growth objectives, and build a more vibrant business environment.

[55] SNNGroup, "The Shannon Airport Group", 2022, accessed 2023.

5. CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

SNNGroup make a substantial contribution to the Mid-West and Irish economies. Through activity across Shannon Campus and other business parks run by SNNGroup, and the associated supply chain (indirect) and wage consumption (induced) effects stimulated by this activity, SNNGroup contributed €3.96 billion to Irish GDP in 2022. This was equivalent to 0.78% of national GDP, and included €3.29 billion across the Mid-West, equivalent to 6% of the regional economy. This core economic footprint also facilitated 20,330 jobs across the Irish workforce, including 15,710 jobs across the Mid-West.

In addition to the core economic impact, Shannon Airport provides a range of catalytic benefits to the Irish economy. We estimate that connectivity provided by Shannon Airport in 2022 will boost Ireland's long-term productivity by 0.15%. The 376,000 international visitors to Ireland contributed an estimated €146 million to GDP and 1,860 jobs. Further, we estimate that activity to facilitate goods trade through the Airport contributed €1.36 billion to Irish GDP and 10,490 jobs in 2022.

However, our analysis of forthcoming trends, which have drawn on Oxford Economics and Tourism Economics forecasts, a review of the policy environment, and a stakeholder consultation, have identified a range of potential future challenges for the Airport. While the outlook for passenger demand across Ireland is positive, recent growth has almost entirely been at Dublin Airport, and the concentration of air traffic into a single airport creates risks for the economy. Any disruptions, such as labour shortages, natural disasters, or technical failures, could cause a significant impact on the national economy. Looking forward, our baseline forecasts for regional growth demonstrate that Ireland is expected to underperform the redistributive spatial growth targets set out in the Project Ireland 2040, with the Eastern & Midland region expected to continue to outpace growth across the rest of the Irish economy.

5.2 RECOMMENDATIONS

To maximise the contribution that SNNGroup makes to the Mid-West and Irish economies, we have identified a series of recommendations for SNNGroup company and the Irish Government.

Recommendation One: The Irish Government should update the National Aviation Policy. The previous National Aviation Policy published in 2015 will soon be a decade old,[56] and as our analysis in chapter three has shown, both the aviation sector and the Irish economy has seen much change since the publication of this document.

The aviation sector has seen faster-than-expected growth. While the previous National Aviation Policy planned for 33 million passengers per year in 2020, Ireland achieved more than 38 million passengers in 2019,[23] and as the aviation sector recovers from the Covid-19 pandemic, passengers are expected to increase further through 2023 and beyond.

Moreover, the previous National Aviation Policy does not account for the long-term growth targets set out in Project Ireland 2040.[34] A revision of the National Aviation Policy should explore the compatibility of different passenger growth scenarios with its wider economic development policy. Shannon is the primary airport serving both Limerick and Galway, two of the four cities that Project Ireland 2040 hopes will collectively accommodate 25% of national growth, with a target for population and jobs to increase by more than 50%. Our consultation exercise highlighted the crucial role that Shannon Airport plays in attracting and retaining FDI across the Mid-West and beyond, which brings into question the extent to which these growth targets can be achievable without supporting the Airport.

An update of the National Aviation Policy may wish to consider the socio-economic value of potential new routes to and from Irish airports. As highlighted in our case study on Denmark, the Danish Government committed to inter-ministerial collaboration to promote routes that are not only of commercial interest to airlines, but also socio-economic interest to the nation as a whole. As highlighted throughout this report, connectivity provided by regional airports enable a range of benefits to regional economies, and the socio-economic implications should be among the key metrics by which any future aviation scenarios across Ireland should be assessed.

Ireland's passenger traffic is highly concentrated at a single airport, and the Netherlands—the only nearby comparator country with an equivalent concentration—is seeking to cap flights from Amsterdam Airport Schiphol on environmental grounds, while recognising the role that regional airports can contribute to accommodating demand. Utilising existing capacity across Ireland's regional airports could accommodate passenger growth in a more environmental advantageous way than through the creation of further infrastructure required to facilitate additional capacity at Dublin Airport.

[56] Department for Transport, Tourism and Sport, "A National Aviation Policy for Ireland", August 2015, accessed 2023.

Recommendation Two: The Irish Government should review its decision to exclude regional airports above one million passengers from state aid within the Regional Airports Programme. Ireland has among the highest concentrations of passengers in a single airport, and yet through the policy decisions made by the Government, Ireland supports a large overall number of airports for both the size of the population and travel times across the nation. Many of these smaller airports serve a handful of destinations and may lack the critical mass to attract new routes to boost Ireland's overall connectivity.

The Government has the opportunity to review its current approach to offering state aid to airports servicing fewer than one million passengers. While EU state aid rules allow for support up to 50% of eligible costs for airports with an average annual passenger traffic of one to three million, the Regional Airport Programme 2021 to 2025 sets a threshold of support to airports with fewer than one million passengers, thereby denying both Shannon and Cork airports financial support, despite these airports supporting more than three-quarters of passenger traffic outside of Dublin.[23]

SNNGroup company should continue to advocate for financial assistance to help Shannon Airport remain competitive against larger airports and to invest in necessary infrastructure improvements.

Recommendation Three: The Irish Government should commission research exploring the economic and environmental impacts of scenarios to rebalance passenger growth across Irish airports. In order to facilitate a broader public discussion on the future of Irish aviation, and the opportunities available to Government to utilise policy levers to influence the spatial distribution of passenger growth, the Irish Government should expand the evidence base on the economic and environmental consequences of different growth scenarios.

This report highlights the role that Shannon Airport and the aviation sector more broadly can play in enabling growth and investment, and the evidence base for future aviation policy development should consider the consequences for different passenger scenarios on the spatial composition of economic development and coherence with the National Development Plan.

Recommendation Four: The Irish Government and pan-Irish tourism boards should further promote Shannon Airport as the gateway to the Wild Atlantic Way. Shannon Airport sits at the heart of the Wild Atlantic Way, and a common theme of our stakeholder consultation exercise is the relative ease of travel, both through the Airport and onward to other destinations. This is a clear aspect that differentiates Shannon's offer to prospective visitors from that of Dublin, which is more prone to congestion.

While SNNGroup company proactively seeks to emphasise these benefits, passenger data implies that a vast majority of international visitors to the west of Ireland still travel through Dublin. Recent campaigns run by Tourism Ireland marketing direct access from the US to Shannon have been well received. Alongside government, both Fáilte Ireland and Tourism Ireland can play a positive role in showcasing Shannon Airport as a convenient and less congested alternative to Dublin, which can in turn allow the Airport to attract more international visitors to the west of Ireland.

Recommendation Five: As a crucial piece of regional infrastructure, SNNGroup company should continue to collaborate with institutions and businesses to enhance the economic opportunities arising from potential future growth at the Airport. Our consultation exercise has highlighted the crucial role that Shannon Airport plays in attracting growth and investment to the Mid-West economy, and SNNGroup company can play a considerable role in collaborating with local institutions to advocate for regional economy as a place to live, work, and invest. SNNGroup company should continue to foster and enhance collaboration and partnerships between Shannon Airport and the local business community, exploring opportunities for joint initiatives, such as business forums, networking events, lobbying efforts, and promotional campaigns.

APPENDIX A: GLOSSARY OF TERMS

Catalytic impacts: refer to the activity in the economy enabled and/or stimulated by aviation services. In this report, the impacts of air connectivity are measured by boosting ***productivity***, the economic impact of ***tourism*** spending arising from international visitors arriving to the UK via the Airport, and the economic impact of facilitating goods import and export ***trade***.

Compensation of employees: gross wages of employees in employment (excluding the self-employed), including the value of employees' and employers' social contributions.

Connectivity: measures how well-connected a country is to the global air transport network. Defined as the number of seats available from an airport or country, weighted by the importance of the destinations served. The weights reflect how "connected" each nation's aviation network is in terms of potential onward connections.

Core impacts: the economic 'footprint' of a company or sector within an economy, as measured by the activity relating to the operations and capital spending of the relevant company or sector. The metrics used in the measurement are usually ***GDP*** and ***employment***.

Direct impact: the economic activity that relates to a company or entity's own operations. In this study, the direct impact is taken to be all activity undertaken by firms operating across SNNGroup.

Employment: the number of people employed, measured on a job or headcount basis.

GDP, or Gross Domestic Product: the total value of final goods and services produced in the economy within a given time period. The contribution of an individual producer, industry or sector to GDP is measured in terms of gross value added, or GVA. GDP is GVA plus product taxes (like VAT) minus product subsidies.

GVA, or Gross Value Added: measures the value of goods and services produced in an area, industry, or sector of an economy. Can be understood as either: 1) the value of output (goods or services) less the value of intermediate inputs used in the production process; or 2) the sum of *compensation of employees* (gross wages) and *gross operating surplus* (profits).

Gross operating surplus: profits, defined as earnings before interest, taxes, depreciation, and amortisation (EBITDA).

Indirect impacts: the economic activity generated by the procurement of inputs of goods and services from suppliers.

Induced impacts: the economic activity supported in the economy by on-airport staff (direct employment) and those employed in all the Airport's company's indirect supply chain spending their wage income, for example at retail and leisure outlets throughout the country.

Labour productivity: the ratio of GDP per person employed.

Tourism/visitors' spending: consumer spending by foreign visitors, principally on accommodation, catering, recreation, retail, and other tourism-related goods/services.

Visitors: in the study visitors are foreign tourists or business travelers who are not normally resident in the country in question.

APPENDIX B: APPROACH

CORE ECONOMIC IMPACTS: DIRECT CHANNEL

In order to assess the direct economic impact of Shannon Airport, this study utilises separate methods for SNNGroup company itself, and tenant firms operating across SNNGroup.

For SNNGroup company, the estimate of GVA is the sum of its gross profit (EBITDA) and gross staff costs. This is a standard method consistent with the principles of national accounting.[57] Direct employment at the Airport is also provided by SNNGroup company.

For tenant firms, the starting point for estimating their direct economic contribution are estimates of direct employment and the nature of activity, provided by SNNGroup company. In addition, we undertook an online business survey to derive further detail on the levels and composition of turnover, GVA, procurement, and the residence of the workforce. While only a partial coverage, we draw on these data to calculate the economic contribution of these respondents. For firms that did not respond to the survey, we estimate their direct economic contribution through applying average productivity across the region in which they operate by sector.

CORE ECONOMIC IMPACTS: INDIRECT AND INDUCED CHANNELS

The first stage of the indirect impact calculation involved obtaining detailed information provided by SNNGroup company detailing the registered names and locations of their suppliers, and the sums spent with them. This was converted into an industrial breakdown, in order to put the procurement data into a form consistent with Oxford Economics' input-output (I-O) models. We also draw on data on the labour costs (compensation of employees) associated with SNNGroup's workforce.

For tenant firms, this study draws on the results of the business survey to determine the amount of goods and services procured as a proportion of each firm's turnover, and the spatial composition of this spending—regionally, nationally, and through imports. For non-respondents, we draw on the Irish input-output tables to calculate the typical amount and sectoral composition of procurement spending for the level of economic output (turnover) generated by a firm in a given sector.[58] We also utilise this input-output framework to estimate the typical labour costs (compensation of employees) for tenant businesses.

To estimate the indirect impact of SNNGroup, this study draws on two input-output models. An input-output model is a detailed representation of an economy, that shows the major interactions and spending flows between different industries, households, government, and the external sector. In essence an input-output model is a table which shows who buys what, and from whom, in the economy.

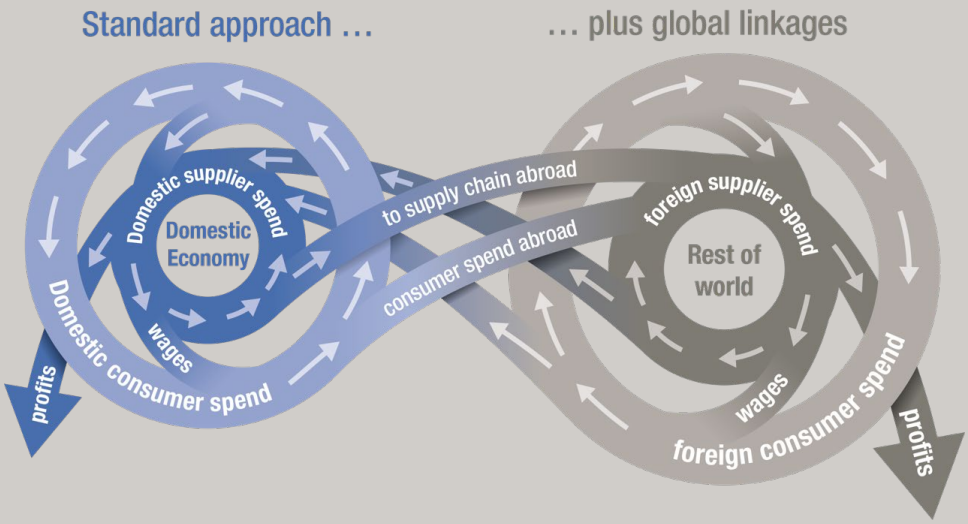
[57] United Nations Department of Economics and Social Affairs, "Links between Business Accounting and National Accounting", 2000, accessed 2023.
[58] OECD, "OECD Inter-Country Input Output (ICIO) Tables", 2021, accessed 2023.

It is important to capture the full range of transactions that might happen both within Ireland and outside of the Irish economy (some of which may feed back into Ireland). For example, a goods manufacturer in Ireland may use components sourced from Germany, that in turn may draw on goods and services provided by Irish firms. Demand for the Irish manufacturer's output supports an economic footprint that flows into Germany, and back into Ireland. But in an individual country's input-output model based on domestic activity only, considering (in this example) the impact of the Irish manufacturer, the purchase of imports from Germany is a 'leakage' and lost from the model. The subsequent supply chain will not be captured, even though it re-enters Ireland at a subsequent stage. Consequently, such an impact assessment would fail to fully measure the activity supported by the manufacturer across the Irish economy.

To capture these spending flows, this study draws on Oxford Economics' Global Sustainability Model. This model covers 96 countries and accounts for 97% of global GDP, and also includes a 'rest of the world' category. Each country's economy is split into 36 industries that are defined by the ISIC Revision 4 classification.[59]

The model takes advantage of techniques originally developed by the Nobel Laureate economist Wassily Leontief. These techniques allow us to trace supply chain and consumer spending within countries and across their borders.[60] Because money cycles through the economy via multiple levels of supply chain relationships, our model reveals what is commonly called a 'multiplier effect' for a given spend impetus.

Fig. 25. Our bespoke Global Sustainability Model captures spending within countries and across their borders



Source: Oxford Economics

[59] United Nations, "International Standard Industrial Classification of All Economic Activities (ISIC) Rev.4", 2008, accessed 2023.
[60] Wassily Leontief, "Input-output Economics", 1986, accessed 2023.

However, the Global Sustainability Model considers the economic impact of activity across national economies. To calculate the economic contribution that SNNGroup makes to the Mid-West economy, this study also developed a bespoke subnational input-output model for Ireland. This model utilises a sectoral breakdown of supply chains drawn from the supply-use tables for Ireland.[58] We use subnational economic data from our proprietary databases and forecasting services to adjust these tables in order to reflect the industrial structure and productive capacity in the regional economies across Ireland. Our method utilises 'Flegg-adjusted Location Quotients', which are consistent with the latest approaches and evidence in regional input-output (I-O) modelling and regional science.[61] These I-O models quantify the impact of procurement demands over the entire length of its supply chain, including its suppliers' suppliers, and so on.

CATALYTIC ECONOMIC IMPACTS: CONNECTIVITY

The approach for measuring the connectivity using an Air Connectivity Index is based on the approach followed by Arvis & Shepherd (2011).[62] The Arvis & Shepherd (2011) approach is grounded in network analysis methods and is based on a gravity-like model commonly used in international trade studies.[63]

The advantage of this approach is that it accounts for the hub-and-spoke nature of global air transport in a way that aggregating flights or seats data would not. Our The measure of connectivity is global and aims to capture the relationships between all network nodes even when there is no direct flight connection between them.

The main limitation of the Air Connectivity Index produced by Arvis & Shepherd (2011) is that it is based on weekly data from June, a month where tourism flows in the early summer period in the northern hemisphere might bias the connectivity scores. Our measure updates the Arvis & Shepherd (2011) analysis by using annual data for the five-year period from 2015 to 2019. Using annual data avoids biases due to seasonality as well as any one-off events that may increase or decrease connectivity for a limited time period (such as special sporting events). Further, using GDP as one of the factors in the model allows for accounting of changes in connectivity due to changes in the economic strength of the origin/destination.

This study takes a two-step approach to creating an Air Connectivity Index:

Step 1: Estimating the connectivity value of each country as an origin and as a destination

Using econometric analysis, this study determines the connectivity value of each country as an origin and as a destination. Each country's connectivity value is a function of its economic size, distance from other countries, and special characteristics (e.g., historic links between commonwealth countries). This approach isolates any non-systematic factors that may have caused an increase in flights in some years (e.g., the Olympics).

[61] Flegg & Tohmo, "Estimating Regional Input Coefficients and Multipliers: Working Paper", 2013, accessed 2023.
[62] Arvis & Shepherd, "The Air Connectivity Index: Measuring Integration in the Global Air Transport Network", 2011, accessed 2023.
[63] The name "gravity" comes from the fact that in its nonlinear form, the model resembles Newton's law of gravity. The gravity model of trade considers exports to be directly proportional to the exporting and importing countries' economic "mass" (GDP), and inversely proportional to the distance between them. The gravity model predicts that larger country pairs would tend to trade more, and countries that are further apart would tend to trade less, perhaps because transport costs between them are higher.

The econometric model uses data between 191 origin and destination countries over a five-year period from 2015 to 2019. The model specification is set out below:

$$Seats_{i,j,t} = \beta_0 + \beta_1 * GDP_{i,t} + \beta_2 * GDP_{j,t} + \beta_3 * Distance_{i,j} + \varepsilon$$

In the equation above, $Seats_{i,j,t}$ is the number of seats between origin country *i* and destination country *j* at time *t; GDP_i* and GDP_j represent the GDP of the origin and destination country respectively in year *t* and $Distance_{i,j}$ is the distance between the two countries.[64] The βs represent the econometric coefficients that indicate the weight of each of respective variables on the right-hand side of the equation in explaining the number of seats. The ε captures the non-systematic factors that may influence the number of seats in a particular year.

The Poisson pseudo-likelihood regression (implemented using the *ppmlhfe* command in STATA) is used. The regression results are presented below.

Fig. 26. Econometric regression outputs

Variables	Coefficients
GDP (origin)	1.0740***
	(0.2408)
GDP (destination)	1.0711***
	(0.2408)
Distance	-0.0007***
	(0.0000)
Constant	-5.6367**
	(2.3721)
Observations	24,085

Source: Oxford Economics. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Step 2: Combining the connectivity values into an Air Connectivity Index

The estimated connectivity values are combined into an Air Connectivity Index for each country as an origin and a destination in a way that accounts for:

- The connectivity values of all other countries it is connected to; and
- The overall increase in connectivity between other countries.

Calculations to estimate the Air Connectivity Index are identical to those in Arvis & Shepherd (2011). The scores are then normalised across years using the five-year moments as the basis for normalisation.

Results

The best-connected countries are the USA, UK, France, Canada, Germany, China, the Netherlands, Spain, the UAE, and Turkey. The connectivity score is highly correlated with economic size as well as the degree of connectivity. This is why, for example, the UAE scores highly despite having a relatively smaller economy.

[64] This study chooses seats as our preferred measure as it indicates capacity. However, the results are similar when using flights or passengers.

The findings are largely consistent with those from the Arvis & Shepherd (2011) study after accounting for changes over time (which sees emerging economies such as China and India rising in the rankings) and controlling for seasonality. For example, a number of European countries score very highly in the Arvis & Shepherd (2011) study due to increased travel during the summer months, especially in June, which is the month used as the basis for the Arvis & Shepherd (2011) calculations.

Estimating connectivity's impact on productivity

Several econometric approaches are used to estimate the impact of air connectivity on productivity. These are: pooled Ordinary Least Squares (OLS), Random Effect (RE), Fixed Effect (FE) and System/Difference Generalised Method of Moment (GMM).

The simple pooled OLS estimate of the coefficient on the lagged dependent variable is likely to be inconsistent and biased upward owing to the positive correlation between the lagged dependent variable and country fixed effects (Hsiao, 2003).[65] The FE estimator, Although the within group transformation gets rid of the country fixed effect element, the FE estimator produces the opposite, a downward bias with the extent of attenuation increasing when exogenous covariates are added (Nickell, 1981).[66] Bond, Hoettler & Temple (2001)[67] and Caselli, Esquivel & Lefort (1996)[68] suggest a bound for the coefficient on the lagged dependent variable: the observed biases in the OLS and the within group estimators are used as references to define upper and lower bounds for this serial autoregressive parameter. The RE model is also likely to be inconsistent.

The system or difference GMM appear to be the best estimators available as they deal with the joint problem of serial and spatial endogeneity and corrects for the potential endogeneity of other explanatory variables. The basic idea of the system GMM is to estimate each of the equations as a system of two equations. One is in first differences, which removes the fixed effects, and the other is in levels, which brings in the technical gains of additional level moment conditions and increased efficiency. Lagged first differences and lagged levels are used as instruments for equations in levels and for equations in first differences, respectively. The use of instrumental variables allows consistent estimation of parameters even in the presence of measurement error and endogenous right-hand-side variables. On practical grounds, the system GMM avoids the inversion of high dimension spatial weights matrix W and the computation of its eigenvalues as in the case of ML and QML, which involves accuracy problems when W is large. Furthermore, the Monte Carlo investigation in Kukenova & Monteiro (2008)[69] also recommends the application of system GMM to the joint problem of serial and spatial endogeneity.

Considering that the consistency of the system GMM estimator depends on whether a selected set of lagged level and first-differenced values of the explanatory variables are valid instruments in the regression, three sets of specification tests are employed. First, the overall validity of the instruments is tested by the standard Hansen's J -test of overidentifying restrictions, which analyses the sample analogue of the moment conditions used in the estimation process. Second, following the recommendations in Roodman (2009)[70], Difference-in-Hansen tests for the full set of instruments for the levels equation as well as for the subset based on the dependent variable are conducted. The number of instruments generated for the regressions is reported. Third, because significant

[65] Hsiao, "Analysis of Panel Data, 2nd edition", 2003, accessed 2023.
[66] Nickell, "Biases in dynamic models with fixed effects", 1981, accessed 2023.
[67] Bond, Hoeffler & Temple, "GMM Estimation of Empirical Growth Models", 2001, accessed 2023.
[68] Caselli, Esquivel & Lefort, "Reopening the convergence debate: a new look at cross-country growth empirics", 1996, accessed 2023.
[69] Kukenova & Monteiro, Spatial Dynamic Panel Model and System GMM: A Monte Carlo Investigation, 2008, accessed 2023.
[70] Roodman, "A note on the theme of too many instruments", 2009, accessed 2023.

second--order serial correlation of the first-differenced residuals indicates serial correlation in the original error terms and therefore misspecification of the instruments, this analysis also tests for first--order and second-order serial correlation in the first-differenced residuals. If the original error terms are not serially correlated, there should be evidence of a significant negative first-order serial correlation in differenced residuals and no evidence of second-order serial correlation in the first-differenced residuals. In addition to the validity tests, a finite-sample correction to the two-step covariance matrix as suggested in Windmeijer (2005) is implemented.[71] Based on our tests, the System-GMM is preferred to the Difference-GMM.

Econometric model results

Model specification:

$$Labour\ productivity_{it} = constant + Labour\ productivity_{it_{it-1}} + Log\ wage\ proxy_{it} + Investment\ per\ worker_{it} + Openness_{it} + Corruption_{it} + Years\ of\ schooling_{it} + Air\ connectivity\ index_{it} + error\ term$$

Fig. 27. Econometric modelling results

Labour productivity	
Constant	0.48594754***
Labour productivity lagged	0.90980659***
Log wage proxy	0.06981388***
Investment per worker	0.00280399***
Openness	0.00009417*
Corruption	0.00139421***
Years of schooling	0.00385308**
Air connectivity index	0.00979195***
Tests	
Nickel bias	Passed
Hanset test	Passed

Source: Oxford Economics. * Significant at 10% level; ** significant at 5% level; *** significant at 1% level.

CATALYTIC ECONOMIC IMPACTS: TOURISM

The approach employed to estimate the impact of Shannon Airport-facilitated tourism involved three main steps. First, international inbound arrivals carried on inbound services were estimated, split by true origin. 'True origin' is the country in which the passenger is resident and is not necessarily the same as the departure point of the flight. Shannon Airport provided data on passengers to and from Shannon Airport. We then derived country-level true origins using OAG data, detailing bookings by their points of sale (i.e. the nations in which passengers purchased their flights to Shannon Airport).

The second step involved applying Tourism Economics data on inbound spending per international arrival in Ireland, by origin country.

[71] Windmeijer, "A finite sample correction for the variance of linear efficient two-step GMM estimators", 2005, accessed 2023.

The final step is to convert the tourism spend into GDP and employment impacts. This was achieved by breaking down total tourism spending into categories of spending, such as on accommodation, retail, and food and beverages, and allocating these to industry sectors, consistent with Oxford Economics' Global Sustainability Model. Through the Global Sustainability Model, we produce direct, indirect, and induced GDP and employment impacts, resulting from tourism spending.

CATALYTIC ECONOMIC IMPACTS: TRADE

The volume of trade which passed through Shannon Airport during 2022, split by imports and exports, was provided directly to Oxford Economics by Shannon Airport. To estimate the value of trade, this assessment draws on CSO data which provides data on the total value of goods trade to and from the Republic of Ireland.[18] It also draws on data published in the National Aviation policy for Ireland on air cargo's value.[19] These data are combined to create a value per tonne estimate for air cargo, which was applied to the volumes provided directly by Shannon Airport.

Assessing the GVA and employment facilitated and catalysed by the trade through Shannon Airport required first quantifying the typical margin received by each stage of the value chain. Margins received by logistics were found in the CSO's Irish supply-use tables.[20] The margins were then allocated to industry sectors, consistent with Oxford Economics' Global Sustainability Model. The Global Sustainability Model then produced estimates of the direct, indirect, and induced GDP and employment impacts resulting from the trade-induced activity. This approach is akin to the methodology adopted in the core impact analysis.

OXFORD ECONOMICS FORECASTING SERVICES

European Cities and Regions Service

Oxford Economics' European Cities and Regions Service provides detailed data and forecasts for 2,000 locations across Europe, including each of the eight NUTS3 regions of Ireland. Our forecasts are derived from a consistent set of global economic, industry and city models, and are updated regularly. Our in-house economists generate forecasts for a broad range of indicators, including GDP and employment by sector, population by age cohort, labour supply, unemployment, the income distribution of households, consumer spending by product and service, and retail sales.

Air Passenger Forecasts

The Air Passenger Forecast Service is the most comprehensive set of projections on how the airline industry will evolve over the coming decades. The service, which was created by Tourism Economics, an Oxford Economics company, in partnership with the International Air Transport Association (IATA), provides annual forecasts of air passenger flows for almost 4,000 routes and almost 800 major markets over the next 20 years, representing over 90% of all air travel in that time period.

This unique databank has been developed using a combination of historical trend data and by modelling long-term drivers of future air demand, such as forecasts of income growth, demographic shifts, and the price air travel, to provide the most accurate view of global passenger flows ever produced.

The data and forecasts in the Air Passenger Forecast Service will immediately inform pivotal investment and strategy decisions of airlines and airports, as well as related sectors such as financial services, tourism, and government.

Global Travel Service

The Global Travel Service (GTS) is the most comprehensive dataset of its kind, allowing clients to quickly analyse market trends and the outlook for travel and the economy around the world. The model is unique in its ability to reconcile demand (origin trips) and competitiveness-based supply (destination visits) for 185 global markets and 18 regional groupings. Destination forecasts are compiled with an understanding of overall source market demand growth, competitor trends and market share evolution.

This comprehensive databank includes over 100,000 indicators of tourism activity. Ten-year forecasts are developed based on the Oxford Economics Global Economic Model. The databank is updated quarterly with the latest travel data and key economic drivers.

The service covers 185 countries across all regions globally. The indicators include:

- Visits: destination forecasts for international and domestic, short/medium/long haul, trip purpose and mode of transportation.
- Average length of stay and number of overnights.
- Travel spending: inbound, outbound, and domestic spending by purpose and category.
- Departures: number of trips taken.
- Origin-destination flows: visits, nights and spend across major origin and destination pairs.
- Macroeconomic drivers: GDP, demographics, inflation, interest rates, exchange rates and more.

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