TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

transport.gov.scot

Connecting Scotland – The Value of Transport

Contents

Ministerial Foreword **4**
Executive Summary **6**
Connecting Scotland – The Value of Transport 6
Introduction **15**
National Transport Strategy 16
Alignment with Scottish Government Priorities 18
Context **20**
An Economic History of Transport in Scotland 20
An Economic Framework for Illustrating How Transport Supports the Economy 23
A Guide to How Much Economic Activity Transport Supports 29
Transport Supporting a Growing, Inclusive Economy **35**
Economic Footprint of the Transport Sector 35
Increasing Productivity – 'Agglomeration' 38
Safety, Health and Wellbeing 44
Inequalities: Ensuring Accessibility for Those Without Access to a Car 54
Implications of Scotland's Geography 59
Decarbonisation: The Key Role Transport Needs to Play in Meeting Scotland's Climate Ambitions and the opportunities it offers **71**
Transport's Role in Scottish Emissions 71
The Financial Benefit of Decarbonising Sooner 72
The Economic Opportunity Offered by Addressing Climate Change 75
Ensuring a Just Transition 77
Constraints **79**
Financial Outlook 79
Other Challenges facing the sector 83
Policy Tensions **86**
Trade Offs Between Economy, Inequalities, Climate and Financial Priorities 86
The Role of NTS2 in Addressing These Tensions 88
Concluding Remarks **91**
Bibliography **93**
Overview 93
Annex A: Economic rationale for Government support of public transport and Inclusive Growth **104**

Ministerial Foreword

Everyday, everything that we do is underpinned by transport. Going to work, getting to school, accessing public services, buying goods and services in-person and online: every aspect of our lives depends on our ability as a nation to move people, goods and services around Scotland and beyond. It is something that we take for granted – until of course, things go wrong either due to weather, accidents and technical issues. The focus on those disruptions is understandable, especially when that creates issues for us personally, but it can also mean that we ignore the positives, and simply, just how important transport is to us, socially and economically. This paper seeks to set out just how valuable transport is to us all on a range of levels, and how critical transport is to helping us achieve our social, economic and environmental ambitions as a nation.

Transport was a foundation of the Industrial Revolution and Scotland played a key role in enabling it, with inventions like the steam engine, tarmacadam and the two stroke engine, helping to create the means of getting raw materials to developing industry and final products to consumers. In the quarter millennium since, Scotland has delivered a range of iconic transport projects that are renowned globally, including the Forth Rail bridge, Glenfinnan Viaduct, the Caledonian Canal, the Queensferry Crossing. Transport in its many forms is embedded within Scotland's history and culture, and has made a critical contribution to our nation's economic and social growth. We should rightly be proud.

That commitment to investment in national and local transport infrastructure has continued under this Scottish Government, bringing improvements to everyday travel and creating opportunities for people, businesses and communities all over Scotland. From my visits and engagement with communities, I am increasingly stuck by how local interventions can be what really improves lives and opportunities. One of the first things I did as Cabinet Secretary for Transport was attend the opening of the Levenmouth line and I was very pleased to learn about the ways in which that project was shaped by the people of the area in a way that met their needs across bus and active travel as well as rail.

Transport is still rightly viewed as a crucial part of the economy and a key contributor to growth. We all use some form of transport in all our economic activity, be it using the train from West Lothian to Edinburgh for work or shopping, the bus from the suburbs of Aberdeen to visit friends and family, using a ferry or plane to attend a hospital appointment, a goods vehicles restocking our supermarkets or a bicycle to make food deliveries. But it is so much more than that. Scotland's roads, paths, rails and ferries allow us all to do the important things that go beyond earning a living – to visit new places, interact with new people and to visit friends and family.

At the same time that it produces these economic and social benefits, transport presents both challenges and opportunities for the journey all of us must make towards our Net Zero vision. Scotland is world leading in terms of our ambitions and our geography and natural resources are a huge competitive advantage. Just like the way in which, in the 18th century and the first industrial revolution, canals and railways enabled a shift away from an agricultural to an industrial society, in the 21st century, sustainable, accessible and affordable transport will be vital to enabling the 4th industrial revolution and to transforming how we keep Scotland moving. This paper sets how important transport is to achieving that.

Executive Summary

Connecting Scotland – The Value of Transport

Introduction and Rationale for Producing this Paper

Scotland has a unique, rich and diverse geography. This geography has shaped our history, from acting as a natural defence from invaders to providing natural resources that influenced our economic development. Of course, Scotland's geography has also shaped our transport system and network. In many ways, it creates challenges and these challenges lead to transport playing a disproportionately large role in Scottish society. Our ferry network provides a vital link between our islands, and to the mainland, connecting communities and enabling a flow of value in both directions. Scotland's rugged terrain and sparsely populated geography away from our major cities mean that our trunk road network in particular acts as a key foundation upon which we both depend and derive tremendous value from. Getting transport right matters more in Scotland than it does in most countries in the world.

Scotland's geography and transport system have also had a significant impact beyond our borders. Dating back to at least the establishment of the Carron ironworks, near Falkirk, in 1759, transport has played a key role in the economic and social development of Scotland and Scottish innovations in the field have had a profound impact around the world, shaping the industrial revolution.

Today, the transport system continues to have a profound impact on our daily lives. In 2023, 64% of Scottish Household Survey respondents had travelled the previous day, with car being the most popular mode of transport – accounting for 51% of journeys. Although we do not know the total volume of journeys made, cars account for around 96.9 million vehicle kilometres per day. Approximately over 900,000 bus passenger journeys were made each day in 2023, as well as over 200,000 rail journeys and over 25,000 ferry journeys each day. Even when we're not making a journey ourselves, a lot of what we do depends on the transport network.

Of course, sometimes it can be easiest to notice our transport system when things are not going well – with disruption and delay causing us significant frustration. This paper is not an attempt to diminish or deflect from these frustrations. Instead it is an attempt to look at the Scotland's transport network from a different perspective – to take stock of the tremendous value that transport delivers for the people of Scotland

and to explore some of the issues that we face in maximising the positive impact that transport can have on our economy and on our lives. This involves discussing the ways that transport already influences and improves our lives. But it also involves looking at some of the constraints that we face, and the areas where transport could be delivering more value for our communities.

Too often, transport is viewed in isolation and seen as separate from the economy. Good transport is often not seen as central to our wellbeing in the same way as other key Government policy areas. This paper attempts to challenge that perspective and show that overlooking the impact that transport can have on our lives represents a tremendous missed opportunity – one that costs us both economically and socially. This stands out more when considering the context of a devolved government, which has powers over some, but not all, policy areas available at its disposal. Similar to our geography making transport more important to our lives than for other countries, the balance of devolved and reserved powers in Scotland means that transport should represent one of our key economic and social policy levers. This is even more true at a local or regional level within Scotland. It is hoped that this paper will show the importance of ensuring that transport always plays a key role in economic and wider social policy making, and that is aligned with, and can both influence and be influenced by, other key policy areas such as economic development and housing. Doing so will help us deliver better outcomes, grow the economy and improve our lives.

The Transport Sector Itself

Even when just considering transport in a narrow context – as a sector of the economy – it is clear that it is an economic powerhouse.

Analysis in this paper shows that the transport sector is estimated to support just over 150,000 full time equivalent jobs, and just under £10bn Gross Value Added (GVA). This represents between 6-7% of the total workforce and Scottish GVA.

Similarly, transport comprises a major part of the Scottish Government's economic toolkit. In 2025-26, the transport budget exceeded £4bn for the first time. The transport budget is larger than the economy budget, the Rural Affairs, and Reform and Islands budget, the Net Zero and Energy Budget combined. In fact, £6 in every £100 that the Scottish Government spends is spent on transport. This is much more pronounced when looking at the capital budget, which has a significantly important role in stimulating and shaping our economy. Almost £3 in every £10 of capital expenditure invested by the Scottish Government is accounted for by transport.

On this basis alone, the role that transport plays in our economy and our lives is hard to under-state.

The Role of Transport

Of course, simply thinking of transport in these terms will lead us to grossly underestimate the impact of the transport network on Scotland's economy. This impact is felt much more in terms of all the things that the transport network facilitates. It is almost impossible to imagine how our society could function without a modern transport system. On the few occasions when there has been a major disruption to our ability to travel – such as the recent Storm Éowyn – our lives have been limited in ways that would be unimaginably constrained if repeated with regularity.

Our ability to go to work, or to school, access services or see family and friends all relies on transport in a tangible way. Looking at commuting to work, the Scottish Household Survey (SHS) data tells us that 83% of workers commuted to work at least once per week in 2023, and 71% did so at least three days per week. This was done through a mix of modes: walking (12%), taking a car or van (68%), riding the bus (10%), cycling (3%) and taking the train (5%). Transport infrastructure is critical in our day-to-day lives – be that well-maintained road for private vehicles, accessible pavements or bicycle routes, or dependable bus or rail services.

Of course, we also rely on the transport network to deliver goods around the country so that our shops are stocked with food and clothes and other products. We rely on transport to support the growth of Scottish businesses. Scottish Transport Statistics show that the scale of trade supported by our transport network is substantial; be that commercial freight travelling to, within and from Scotland. In 2023, approximately 134 million tonnes of commercial freight was transported by UK Heavy Goods Vehicles (HGVs) on journeys originating in Scotland – 118 million tonnes travelling within Scotland, and 16 million tonnes to the rest of the UK. Exports through major Scottish ports totalled almost 23 million tonnes in 2023 and Scottish goods exports totalled £32.3 billion spread across the world.

Attempting to comprehensively cover all the avenues through which transport impacts on our economy and our lives is a daunting task. It also would likely represent an abstract exercise, and it is intended that this paper focus on more tangible ways in which transport impacts our lives. For this reason, the paper briefly discusses some frameworks for understanding how transport interventions can deliver economic benefits and improve our wellbeing – focussing on economic and social impacts but also externalities such as health and safety. It also discusses some of the empirical work that has looked at the link between macroeconomic growth and transport investment, which suggests that under-investment in transport can constrain economic growth. However, the focus of the paper is exploring specific ways in which transport can influence our economy and lives, and so the majority of the paper is made up of discussions or case studies around more specific issues.

Case Study: Agglomeration and Productivity

There is a well-established link between large urban areas and higher productivity. Generally speaking, the larger the size of a town or city, the more productive the people of that town or city will be. The increase in productivity is thought to be achieved by bringing people closer together and facilitating learning and the sharing of knowledge as well as creating deep labour markets and allowing for greater specialisation. This is referred to as 'agglomeration' by academics.

However, simply achieving a large population does not guarantee securing these benefits. Transport (as well as housing density and the interaction between the two) plays a critical role in changing the 'effective' size of a town or city. Where populations lack reasonable access to our cities and town centres, increases in productivity will not be achieved, and opportunities to increase economic growth will not be realised.

Outside of London, cities in the UK (and Scotland) miss out on some of the economic benefits that agglomeration can provide because of our transport infrastructure. Compared to many European cities for example, only relatively small areas and populations are served by public transport infrastructure that allows them to access key city districts quickly. Relative to many US cities, access by car is similarly lagging.

We have much to be proud of in Scotland over recent years, the construction of the Queensferry Crossing, the refurbishment of key railway stations in our major cities and the provision of concessionary bus travel to over 2 and a half million people. However there is also significant scope to boost productivity and achieve economic gains by further improving our infrastructure and other interventions.

Case Study: Safety and Health

Transport can improve our economy, as well as support wellbeing in terms of our safety and our health.

While transport does facilitate a huge amount of positive outcomes, it can also lead to injury and, tragically in some cases, even death. Clearly the costs to our society are huge – and the potential benefits of increasing our safety are sizeable. The World Bank estimates that reducing road traffic injuries can lead to substantial economic benefits. Reducing road traffic accidents has obvious and immeasurable benefits on a human level but also reduces burdens on our health service and reduces the risk that our lives are worsened through injury and we find ourselves unable to work. Critically, we know that with sufficient investment and with bold policy decisions, we can achieve reductions in road traffic accidents and also

achieve wider social outcomes – improving the places we live in: for example creating closer communities and allowing our children greater independence.

Another area where transport can improve our wellbeing and reduce pressures on public services is investment in active travel. Evidence shows that participation in active travel is strongly associated with improved health outcomes – replacing time that would otherwise be spent passively with physical activity and addressing one of the major health challenges we face in Scotland: physical inactivity. Increasing physical activity reduces risks of several chronic health conditions including cardiovascular disease, stroke, obesity, colon and breast cancer, type II diabetes, osteoporosis, depression and anxiety. In doing so, it is associated with reducing pressures on health budgets and reducing sick days at work. Shifting from car use to active travel can also achieve environmental benefits too in terms of air quality, as well as making the places we live safer. There is a clear rationale for further investment in active travel, with many project evaluations showing a strong social return on investment.

Case Study: Social benefits of addressing car dependency

Access to a car can unlock a lot of opportunities for individuals. 7 in every 10 people who travel to work do so mainly by car. The increased mobility it offers people helps them pursue employment opportunities that they may not otherwise have access to. Cars can also represent wonderful means of mobility and improves lives for a host of other reasons, with the car facilitating all sorts of journeys, and enabling people to live in all sorts of places.

However, access to car travel is not evenly distributed throughout our society. Owning a car is a significant cost in and of itself. Learning to drive can be prohibitively expensive, and for some driving a car is not a possibility at all, irrespective of cost. Transport Scotland statistics show that those who do not drive as frequently are more likely to be women, identify as disabled or are from non-white ethnic groups. Children obviously do not drive, and the relatively young (17-29) and old (80+) also drive far less than other age groups. Looking at socio-economic factors, those who are unemployed, permanently sick or disabled or unable to work because of a short term illness or injury are far less likely to hold a driving licence or drive regularly.

So while cars can grant people mobility and access to opportunities, a lack of access to car travel also disproportionately affects particular groups within society – often at times those who may benefit the most from the sort of accessibility that cars can grant to others. And, so while the health and safety benefits are one argument in

favour of reducing car dependency, another is around tackling inequalities and ensuring a greater equality of accessibility. As such, providing high quality public and active travel options is a key strand of Scotland's efforts to tackle inequality and deliver inclusive economic growth. There are also potentially large benefits for our communities, as reducing car dependency can reduce community fragmentation and increase the freedom and safety of children to travel.

Case Study: Opportunities of Decarbonisation

The transport sector is responsible for a higher total of greenhouse gas emissions than any other sector in Scotland. Huge investment, both public and private, needs to be made in order to decarbonise our transport network and help Scotland reach Net Zero. This investment is not so much a choice, but a necessity, not only as a moral responsibility, but also because the costs of not tackling climate change will massively outweigh the costs of decarbonisation.

In this context, it's absolutely essential that we take full advantage of the economic opportunities that the transition to a low carbon transport system presents. Part of that will be to ensure that public money is used to stimulate and leverage the private investment needed to transition our transport network to electric vehicles, with the Scottish Government already focussing policy around unlocking wider investment.

Another key part of maximising the opportunities we face is to look at opportunities to specialise and gain a competitive advantage in the industries that will play an increasingly important role as low carbon transport becomes more common both in Scotland and around the globe. Scotland is currently well placed to become a world leader in many key areas. Investment in areas such as electric vehicle and battery manufacturing, sustainable aviation fuel or construction of suitable infrastructure for road and rail could help foster areas of valuable competitive advantage for Scotland. Jobs could also be created in other industries via the benefits unlocked by decarbonisation, for example as electric vehicles become more efficient and operational costs of these vehicles decrease, this should open up significant economic opportunities. Similarly, developments in Vehicle to Grid technology could help reduce the demands for energy creation.

The transition to a low carbon transport system also offers significant social opportunities. The Scottish Government is committed to a just transition that will ensure economic opportunities reach those communities who most need it, either because they have lost out as a result of wider economic changes in the move to a low carbon economy or because of underlying structural reasons. Careful consideration of where and for whom support is provided can ensure that the transition leaves no one behind.

Case Study: Geography

Given that transport is about getting from one place to another, we must recognise the impact of our geography. Scotland features a densely populated area around the central belt but also far more sparsely populated areas to the North and South. We boast a diverse range of Islands with varying levels of access to people, goods and services. This geography is key to our identity and it provides us with huge advantages from attracting tourists to generating energy. From a transport perspective it also provides unique challenges. For example, the location of many of our smaller communities make them heavily dependent on car travel, and transport solutions that may work in the central belt are unlikely to work in these areas. Ensuring our island communities have the access they need to other islands and to the mainland as well as facilitating the flow of goods and services back and forth also presents entirely different challenges. The transport needs of these communities are crucial to our country, significantly more so than many other nations.

Over recent decades our transport system has adapted to economic changes and helped facilitate a population shift from the West to East of Scotland. Strategic investments have been made to boost the connectivity of our largest cities. We have also seen economic opportunities expand in the North of the country more recently, and looking forward it's likely that will continue with the opportunities offered by energy transition and the growth of renewables. Strategic investments are being, and must continue to be, made in order to ensure that transport can act as an enabler for these industries and that Scotland can take full advantage of the economic opportunities that they offer.

Constraints and Challenges

The above case studies have highlighted the benefits of transport as well as some of the complex issues we face, and the benefits that could be unlocked by resolving these. Before considering strategic and policy implications, it is worth also considering some of the challenges and constraints that we face.

In common with many advanced economies, we also face the challenges of adapting to the changes we expect to face as a result of an aging population. This has implications for what our transport system needs to look like in the future, particularly in terms of accessibility. Importantly, an ageing population poses a major fiscal challenge for governments as well: both in terms of generating revenues, and providing public services. For transport, it may also pose challenges in terms of an older population who are more reliant on public transport for their mobility and in providing concessionary travel for that population.

Even in the short term, the transport sector faces a challenging fiscal outlook. While transport capital investment in Scotland has typically matched similar levels in the UK, it is likely to have lagged behind Organisation for Economic Cooperation and Development (OECD) competitors (despite Scotland's challenging geography). An expected tight fiscal position with respect to capital budgets in the near term will make investment choices harder still in the future. At the same time, the transport sector is still dealing with the ongoing financial impacts of the COVID-19 pandemic, which saw public transport patronage (and therefore revenues) drop from pre-pandemic levels. In common with much of the rest of the public sector, there is also a pressure in terms of inflation on input costs and wage bills, with the associated cost of living crisis also affecting demand.

Prioritisation and Policy

It is clear that a strategic approach is needed in considering how transport is delivered in Scotland, both to take account of the (sometimes competing) impacts that transport can have, as well as to recognise the constraints that we face. While there will be some policies or projects that can deliver against all of our aims within an affordable budget, these will represent the easier decisions to make. The tensions and trade offs implicit within the discussion above will mean that difficult decisions will need to be made about Scotland's future transport system. This paper does not explore individual policy decisions, but does discuss the strategic frameworks in place to ensure that policy decisions are made intentionally and to achieve strategic goals. The National Transport Strategy (NTS2) sets out a vision for protecting our climate and improving lives, it is built on four priorities that are specific to transport but are also highly aligned with the 4 priorities of the First Minister and The Scottish Government. Beyond strategic frameworks, Transport Scotland also has a substantial institutional framework in place to ensure that the policy decisions that are made deliver on these priorities. The NTS2 itself is backed by a substantial monitoring and evaluation framework that tell us how well we're performing. Scottish Transport Appraisal Guidance (STAG) helps ensure appraisal takes account of our priorities while regular investment decision making decisions for all major projects mean that they are subject to numerous rounds of scrutiny prior to being approved. All of this contributes to achieving a vision of "*a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors*."

Conclusion

The transport sector itself is a huge part of our economy, helping support over 1 in 20 jobs and a similar proportion of all economic activity in Scotland. On this basis alone, it has wide and far reaching economic implications.

However, the impact that transport has on our economy and our lives is much larger still – with transport touching our lives every day, and being an essential foundation that supports most of the economic opportunities we pursue. This paper has attempted to both illustrate this overall impact, but also to explore some of the ways in which transport can benefit us, establishing how transport investments and interventions can boost our productivity, improve our health, tackle inequalities and help us take climate action.

As such, this paper is also an argument for a greater recognition of transport as one of our key economic and social policy levers at both a national, regional and local level, and something that should be celebrated for what it brings to our everyday lives.

Introduction

This paper provides a broad framework for both understanding and illustrating how the transport sector supports and improves our daily lives, and how it contributes to growing our economy.

Initially the paper introduces the National Transport Strategy (NTS) – Transport Scotland's overall framework for shaping strategic decisions about transport interventions.

It then moves on to focus on a brief economic history – how we got where we are today. The paper transitions to a conceptual model to trace the impacts of the transport network on Scotland's economy. By its nature, this is both high level and illustrative. After all, the transport sector will touch everyone in Scotland's life every single day – whether because we are travelling ourselves or because we rely on the transport network to facilitate events, deliver goods and services, etc. Indeed, it is all but impossible to imagine a functioning economy and society without a functioning transport network.

The paper moves on to look at some more applied examples of how transport supports the economy. Economic case studies are given to illustrate the economic footprint of the sector itself, as well as a more theoretical discussion of agglomeration and how transport can help boost productivity. Reflecting a focus on the economy beyond headline economic measure, the role of transport in terms of health, safety and wellbeing is discussed. Acknowledging that addressing inequalities is a key part of improving economic outcomes (and vice versa), the paper goes on to explore other key elements of the socio-economic role of transport. This is explored via the lens of access to different modes of transport, and both elements are explored in terms of the role of transport in overcoming geographical challenges. Of course, an important cornerstone of economic policy over the longer term is facilitating a just transition and de-carbonising the economy. The paper also discusses the opportunities and at times the challenges that this poses in a transport context.

The paper then shifts to focus more on the role of Transport Scotland. While transport has a huge role to play in delivering a more prosperous and fairer economy, it is vital to recognise and consider the challenges faced. A clear constraint is the scale of the fiscal challenge facing us. The paper looks both at the funding available and the pressures faced by the sector in terms of the impact of the pandemic and of anticipated demographic changes.

Finally, the paper concludes by looking at how Transport Scotland is addressing these concerns at a strategic level. Clearly some form of trade-off is required when

considering these issues and the wider factors involved, and so the paper offers a brief overview of how Transport Scotland works to deliver our National Transport Strategy, highlighting it's role in guiding policy and investment decisions.

National Transport Strategy

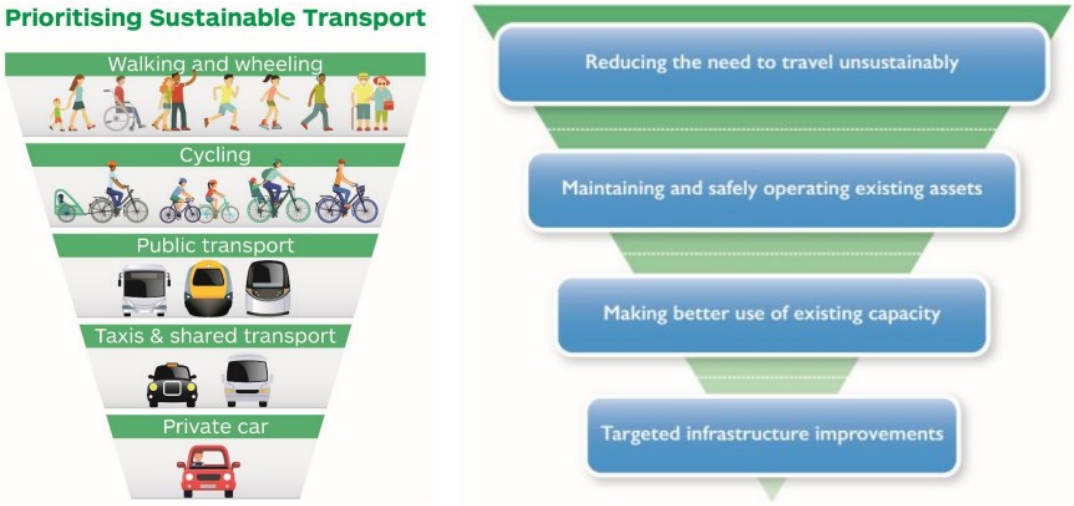
Scotland's National Transport Strategy (2), referred to here as NTS2 and published in February 2020, sets out an ambitious vision for Scotland's transport system for the next 20 years as well as the strategic framework for delivering on that vision. The vision is to have a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors. It is underpinned by four interconnected priorities: reduces inequalities, takes climate action, helps deliver inclusive economic growth and improves our health and wellbeing.

Figure 1.1 - The NTS2

In many cases, these priorities can be complementary and self re-enforcing. For example, increasing active travel can support all of the priorities. However, tensions will also occur and these tensions must be recognised and carefully managed. At the heart of delivering the NTS vision are the Sustainable Travel Hierarchy and the

Sustainable Investment Hierarchy. The two hierarchies are pictured below (figure 1.2).

Figure 1.2 - Sustainable Travel (left) and Investment (right) Hierarchies (NTS)



The Sustainable Travel Hierarchy promotes walking, wheeling, cycling, public transport and shared transport options in preference to single occupancy private car use for the movement of people in decision making. The Investment Hierarchy is focussed on implementing lower cost and higher impact investments if this is possible – with the first step being to assess whether the need to travel unsustainably can be reduced, and targeted infrastructure provision being a last resort. Prior to exploring new infrastructure provision, investment promoting a range of measures, including innovative solutions to make better use of existing capacity should be considered, ensuring that existing transport networks and systems are fully optimised. An obvious implication of the two hierarchies is the prioritisation of measures aimed to deliver widely accessible and low emission investments. Another implication is to prioritise low spend interventions over high spend interventions. In doing so, not only do the hierarchies clearly support the 4 priorities of the NTS, but they also ensure financial responsibility and help maximise the amount of impact that TS expenditure can have within a constrained fiscal environment. This is also broadly in line with the recommendations of the Scottish Infrastructure Commission (2020), the central recommendations of which were:

> *The Scottish Government should ensure that its new National Transport Strategy and Strategic Transport Projects Review 2, which are due to be published during 2020, fully reflect the need to deliver an inclusive net zero carbon economy and consider the infrastructure and the use of it as a holistic system. This should include:*
>
> - *Aligning strategic investment decisions to address fully the requirement for demand management, a substantial increase in the proportion of*

journeys made by active travel, and opportunities for shared mobility as well as a much greater role for public transport.

- *For such roads investment that is made as part of the above, a presumption in favour of investment to future proof existing road infrastructure and to make it safer, resilient and more reliable rather than increase road capacity.*

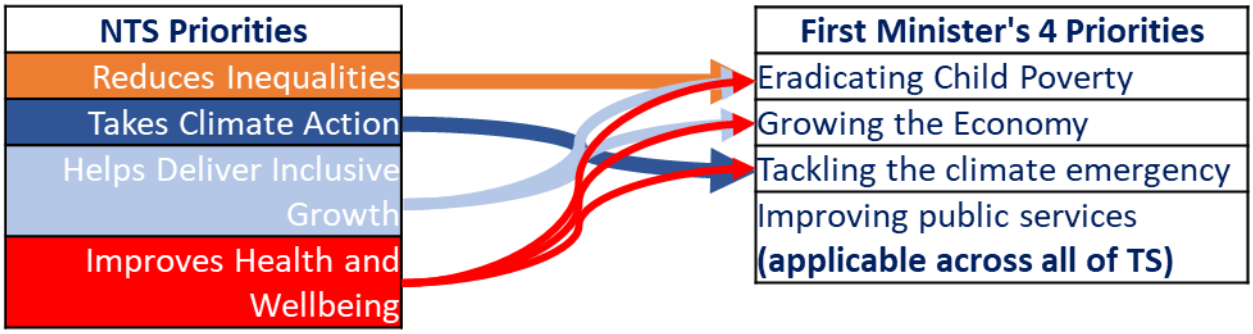
This illustrates the key elements of the NTS, and procedures put in place to ensure that these frameworks have an impact on strategic decisions.

Alignment with Scottish Government Priorities

Transport does not exist in a vacuum and needs to be seen as part of a wider system. It is therefore essential that transport interventions are part of a joined up approach across Government. This is discussed with respect to agglomeration and the requirement for cross sectoral packages of support being required to unlock transformational change. It is also true at the macro level, and so it's essential that transport priorities and strategy synergise with those of the rest of The Scottish Government. This section will briefly illustrate these links using the First Minister's 4 Priorities and the National Performance Framework as examples.

It is worth noting the high degree of overlap between the First Minister's 4 priorities for Scotland and the (pre-existing) 4 priorities within the NTS2, as outlined below (figure 1.3):

Figure 1.3 - Comparison of NTS2 and FM Priorities



There is an obvious and direct overlap between reducing inequalities and eradicating child poverty as well as taking climate action and tackling the climate emergency. Helping to deliver inclusive growth will primarily impact on both eradicating child poverty and growing the economy. Improving health and wellbeing should have a

direct impact on all of the First Minister's priorities outcomes discussed above. No link is drawn with improving public services as this cuts across all of Transport Scotland – with Transport Scotland having a role as a public services provider as well as a role in ensuring other public services are delivered effectively.

The four NTS2 Priorities, each with three associated Outcomes showcases the strong link between transport and the existing National Performance Framework (NPF). The NPF features outcomes and indicators – some of which are clearly transport focussed such as journeys by active travel. However, the NTS2 priorities and vision also support a wide number of broader NPF indicators such as economic growth, international exporting, carbon footprint and greenhouse gas emissions, quality of public services, access to green and blue space, visits to outdoors, cost of living, perception of local area, physical activity and far more. The link is likely to become stronger and clearer in future years. The National Outcomes for Scotland consultation that was laid before parliament in May 2024 notes that "*The evidence identified transport as a significant theme that should be more strongly represented across the National Outcomes*".

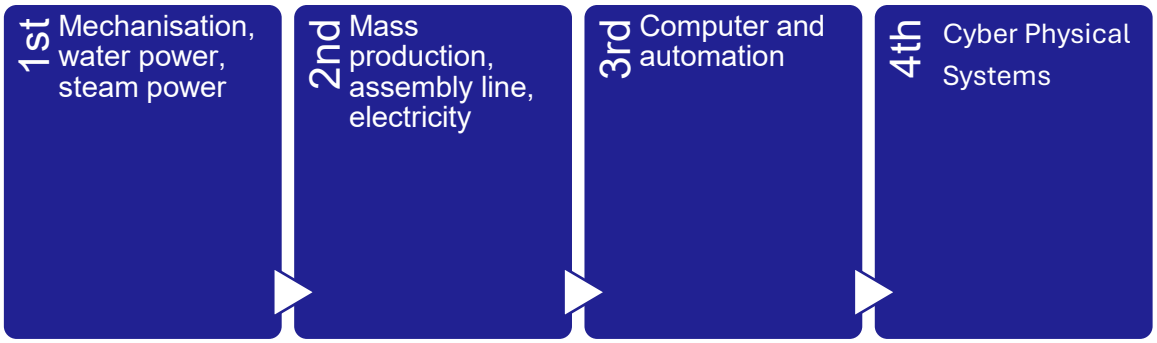
Context

An Economic History of Transport in Scotland

This section covers a brief overview of the economic history of transport in Scotland, and leads us into where we are today with the function and structure of our current transport network. It is useful to frame this thinking around the '4 Industrial Revolutions' (figure 2.1) – a concept used by Rodrigue (2024), to consider to what degree transport played, and plays, a role. The structure of the Scottish economy is a result of successive innovations, rather than a singular event. Each Industrial Revolution builds from the previous shifts, with industry becoming more advanced throughout history as we reach today.

While it is evident that transport was fundamental during both the first and second Industrial Revolutions, and remained significant during the third, it can be argued that the fourth, referred to as Cyber Physical Systems which is ongoing now, is location neutral. There remain key impacts from and on the sector, such as autonomous and electric vehicles, as well as the potential role of Artificial Intelligence (AI) in transport in the future. There remains a great deal of uncertainty around the impact of the fourth revolution on both transport and society as a whole. This uncertainty has only grown in the aftermath of the COVID-19 pandemic, which shifted travel patterns.

Figure 2.1 - The 4 Industrial Revolutions



The **First Industrial Revolution** is marked by the introduction of steam and water power, transitioning from entirely human labour to human labour aided by machinery. The implementation of the new technologies took a significant time, with the period typically referred to as being between 1760 and 1840. Scotland was at the absolute forefront of this.

The establishment of the Carron Ironworks near Falkirk in 1759 predated other, perhaps more widely known, developments. The works grew quickly and by the late 1760s was producing parts for James Watt's steam engine which greatly increased the efficiency of the existing Newcomen engine and, arguably, formed much of the basis for future developments from powering factories, the replacement of sails as the method of propulsion of ships and, of course, the development of railways. Steam turbines remain responsible for much electricity production today.

This adaptation of reliable power sources had transformative effects on textile manufacturing in the first instance, which adopted the changes quicker than other sectors. It went on to have impacts in sectors such as agriculture, mining and iron. The effects began reaching beyond these sectors and positively impacting wider society, enabling the UK to accelerate development.

The revolution that began in the UK was facilitated by improvements in transport technology, firstly through canals, and then railways. During the 18th century, the most common forms of transport were by road or sea. However, the increased production from the revolution called for a more efficient way to transport coal and iron, as these were heavy goods and the road conditions at the time could not tolerate the increased loads. In a Scottish context, the Union Canal was constructed in 1822 to connect Edinburgh with the Forth and Clyde Canal at Falkirk, enabling the transport of coal and minerals directly from Lanarkshire to the capital. The canal was later superseded by the construction of railways, notably the Edinburgh and Glasgow railway, opening in 1842. The railway network allowed for quicker transport connections between industrial centres and major cities.

The **Second Industrial Revolution**, commonly known as the Technological Revolution, is a period between 1871 and 1914. This saw installations of extensive railroad and telegraph networks internationally, paving the way for faster transfer of people, innovations and, crucially, electricity. Growing electrification allowed for factories to evolve the modern production line, with greater coordination between labour, machines and processes. The expansion of the railways allowed for greater, and quicker, access to markets for goods.

The **Third Industrial Revolution**, commonly known as the Digital Revolution, occurred after the end of the Second World War and was driven by advances in electronics, computing, and telecommunications. In terms of power sources, the advent of nuclear energy occurred during this period but this revolution was driven by the invention of the first semi-conductor transistors in the late 1940s followed by integrated circuits in the 1950s which led to the microprocessor revolution of the 1970s which in turn marked the beginning of more advanced digital developments. This sparked development of communication technologies, as well as extensive use of computer and communication technologies in the production process. Arguably these developments have reduced the role played by transport as they facilitated

greater use of non face-to-face interactions. However, moving raw materials and finished goods as well as getting people to jobs remained a key component of all economic activity.

This brings us to now, the **Fourth Industrial Revolution**, first described by Klaus Schwab in 2015. It is characterised by the fusion of technologies blurring the boundaries between the digital, physical and biological spheres. It is argued that the breadth, depth and pace of emerging technology breakthroughs are transforming entire systems of government, production and management. These breakthroughs are in areas such as artificial intelligence, nanotechnology, biotechnology, and autonomous vehicles.

Under usual circumstances, it is reasonable to assume transitions to new ways of working that are location neutral would be a lengthy process. However, proponents of the fourth industrial revolution suggest that change will be rapid, with variations of this phrase popular, "*technology has never changed so fast before, and will never change so slowly again in the future*". The predicted pace of the fourth industrial revolution is expected to be one of its defining features – previous industrial revolutions took decades, and caused disruption to workers when skills became outdated at the introduction of new mechanisms. A concern for the fourth is that the pace of change will be so quick that skills will continuously become obsolete, rather than retaining value through an individual's working life.

The COVID-19 pandemic certainly demonstrated to many organisations that the use of large central offices is not as important as previously assumed. A key determinant of future demand for transport, in terms of commuting at least, will be how workplaces change over the next few years. Changes will be driven by the attitudes of businesses and their employees, to changing working patterns.

However, it is worth considering that the pandemic also illustrated the importance of key workers for whom remote working is not possible: health workers, carers, transport workers, retail and delivery staff and others working in the service sector. Technology is already beginning to impact retail sharply, and is likely to impact on primary health care but there is greater uncertainty over how it will impact on those sectors such as personal care where the key component is the interactions between people.

These high-level ideas surrounding the fourth industrial revolution suggest a novel environment for transport. Technology is making some sectors location neutral, and will continue to evolve and change the environment further still. The impact and consequence of these changes on public transport, and private transport through electric and autonomous vehicles, is very uncertain.

Alongside the fourth industrial revolution, there will be developments that place extra demands upon the transport system. An example of this is the economic opportunities offered by energy transition and renewables. These sectors place specific demands on the transport network as they involve the movement and assembly of heavy components – often in the context of very remote locations. Both the industry specific requirements for resilient transport infrastructure and the knock on impact on where Scotland's population is located will have significant implications for transport – a topic covered further in the section on the implications of Scotland's geography.

In short, it's clear that throughout Scottish history, transport has played a vital role in economic and societal development, and will likely continue to do so.

An Economic Framework for Illustrating How Transport Supports the Economy

Transport provision, i.e. the ability to move from A to B, has obvious and important economic benefits. It is uncontroversial to suggest that ensuring that transport infrastructure is functional and efficient is a pre-requisite for a functional and efficient economy. In a similar way to the rule of law or educational standards, the transport system is a foundation upon which the economy relies in order to function. Put another way, without transport infrastructure there would be no viable economy to analyse.

However, this is not useful for thinking about transport spending, beyond highlighting the risks of not delivering key infrastructure or allowing existing infrastructure to deteriorate. The focus of this part of the paper is therefore largely on the impact of a change in the level of transport infrastructure provision. A central argument put forward is that providing more or better transport infrastructure is clearly a net positive for the economy. Furthermore, there is an argument that transport investment is essential for ensuring that wider government investment can deliver economic growth.

A broader point to make – which underlines why this is so important – is that transport provision is a key economic policy lever in the context of the powers available to The Scottish Government to influence the economy. As a devolved administration, key elements of economic policy are reserved to the UK Government and there is only limited scope for The Scottish Government to exert influence in these areas. All elements of monetary policy are reserved, as are powers over critical areas of economic decision making such as immigration, trade and industry, financial services, employment law, industrial relations and consumer protection. The Scottish Government does have powers over other important areas of economic

policy including education and skills, housing, tourism and economic development as well as significant powers in terms of tax and social security. But overall, the economic policy levers available to The Scottish Government are limited in comparison to national governments elsewhere. In this context, it is all the more important to recognise transport provision as a key economic policy lever. Transport makes up a significant portion of The Scottish Government's overall budget, and a very large element of its capital spending. It is also critical to ensuring benefits are realised in other areas of devolved policy, such as housing or education and skills. And of course it directly supports economic outcomes. This chapter hopes to get across this broad point, with subsequent chapters looking at specific ways in which transport and transport policy help support the economy and improve our lives – all of which supports the argument that transport is an absolutely key part of Scottish economic policy.

Empirical and International Evidence

This is not just a theoretical argument – in an important paper looking at how transport can impact economic growth, Venables et al. (2014) note that an evidence review suggests that if all other drivers of growth were to increase by 10% and transport infrastructure were to stay constant, then growth in income would be just 9% i.e. 1 percentage point lower (and 10% lower in practice) than it would have otherwise been with proportionate investment in transport. Essentially this means that not investing in transport will hold back the growth potential of other public investment. Venables et al explore the mechanisms through which transport can impact the economy in more detail, and some of these are covered later in this paper. This idea of transport investment being a requirement for growth is also consistent with more recent DfT (2023) research around the economic impact of transport investment. This work had two clear conclusions:

Firstly, that for all modes of transport, their impacts on productivity, wages and land values are generally significant and positive – with positive impacts on employment or land values varying somewhat and depending on other factors (such as displacement and population growth).

Secondly that for 'transformational benefits' to occur, transport needs to be part of a wider cross-sectoral package. While transport interventions can have large benefits in isolation, these can be even greater when coupled with complementary investments – which also reflects the complex needs of places.

The 2023 DfT work was followed up with a commission to look at the existing empirical evidence more deeply. The key findings include the fact that transport investment is often associated with employment growth and increased labour and firm productivity. However the paper cautions that there is a need to look at the

degree to which these economic benefits represent displacement from neighbouring areas. Empirical evidence also exists on how transport changes land use and land values. For example the International Transport Forum (ITF, 2024) find that transport interventions are associated with increases in land values of 7 to 10%. However when looking at specific geographies close to transport links, the estimated impact of transport and land values can vary substantially and may be higher for commercial land than for residential land – which is the type of land value most often assessed due to data availability. In the context of commercial land, increases in the value of land of up to 120% (offices, within 410m of transport links) and up to 167% (retail, within 70m) have been identified.

In addition to facilitating wider economic activity, transport investment itself can create economic advantages via fostering strong competitive advantages. For example, the OECD (2020) notes that *"over the past few decades, Spain has invested a large amount of resources in improving the provision of transport infrastructure. A large number of projects have been implemented and the Spanish authorities have developed strong technical capacities in project execution."* This has helped the Spanish economy in numerous ways. At a basic level, Spain has been able to produce rail (as well as other transport infrastructure) more cost effectively than competitor countries – with Ineco Impulsa (2023) estimating the cost per kilometre of high speed rail in Spain to be just €17.7m in 2022. This is significantly lower than most European and Asian competitors (by comparison the cost is estimated at €167.5m per km in the UK and €42.0m per km in China). This has fiscal benefits, but also environmental ones. Within Spain and elsewhere, the availability of high speed rail has significantly reduced demand for high emissions air travel on similar routes (Jiménez and Betancor, 2012), and Spain is now able to consider restricting some internal flights due to the availability of high speed alternatives(Txapartegi and Cazcarro, 2025). By developing this degree of specialisation, Spanish companies have been able to develop a presence in railway projects in over 80 countries worldwide, including design, construction, operation and maintenance of the Mecca–Medina high-speed line and trains in Saudi Arabia (Fortea, 2015). In this sense, investments in transport can also be thought of as part of broader industrial strategy – and the chapter on decarbonisation will come back to this issue through the lens of the economic opportunities that are likely to arise through decarbonisation.

Additionally, there is also substantial empirical evidence regarding the fact that tackling inequality and climate change can help boost economic performance. Scotland's National Strategy for Economic Transformation (Scottish Government, 2022) notes that "*A fair and equal society and a wealthier, greener economy are mutually reinforcing*", drawing on OECD econometric analysis (Cingano, 2014) which suggests that income inequality has a negative and statistically significant impact on subsequent growth as well as a wider economic literature (e.g. Ostry et al. (2014)

and Stiglitz (2012)). Furthermore, the OBR (2024) estimates the long-run damage to the UK economy of (not addressing) climate to be equivalent to around 3% lower GDP levels by 2074 in a below 2 degrees Celsius scenario. This increases to as high as a 5% reduction in real GDP in a below 3 degrees Celsius scenario. The OBR notes significant uncertainty around these estimates, but highlights that the risks are skewed to the downside, with the adverse outcomes more likely than benign scenarios, and additional direct damages from river and surface flooding, coastal flooding and heatwaves being foreseeable.

A good starting point for understanding how important transport is in relation to inequalities is thinking about impacts on poverty. To illustrate this the Poverty and Inequality Commission (2019) made the following points, drawing heavily on a substantial academic literature (for example Crisp et al. (2018), Oviedo Hernande (2014), and Lucas et al. (2019)).

- Transport matters in relation to poverty because of its potential impact on income, household expenditure and mitigating the impact of poverty. Good, affordable transport can enable people to access jobs, education and training. This can contribute to raising household income and preventing people from experiencing poverty or enabling people to move out of poverty.
- On the other hand, poor access to transport can lock people into poverty by limiting access to these opportunities to increase income. The cost of transport can put significant pressures on household budgets. This can include the cost of public transport, or the cost of needing to run a car. Transport costs can also prevent people from travelling entirely. Transport costs need to be weighed against earnings in making decisions about taking jobs, for example.
- Access to transport can also reinforce or lessen the impact of poverty. Being unable to access or afford transport can prevent people accessing services, reduce quality of life and lead to social isolation. This can increase inequalities linked to income, such as health inequalities.

It is clear that transport provision can both unlock economic growth and help address inequalities. The next section offers a framework for understanding how transport can affect these outcomes.

Theoretical Framework

Understanding the (many) ways in which transport can affect the economy and drive growth (or other outcomes, desirable or otherwise) is the subject of a large amount of academic/policy discussion – with significant volumes of literature proposing different avenues by which transport can impact the economy. There is no single ‘right’ way to conceptualise this, and it would be easy for the entire length of the

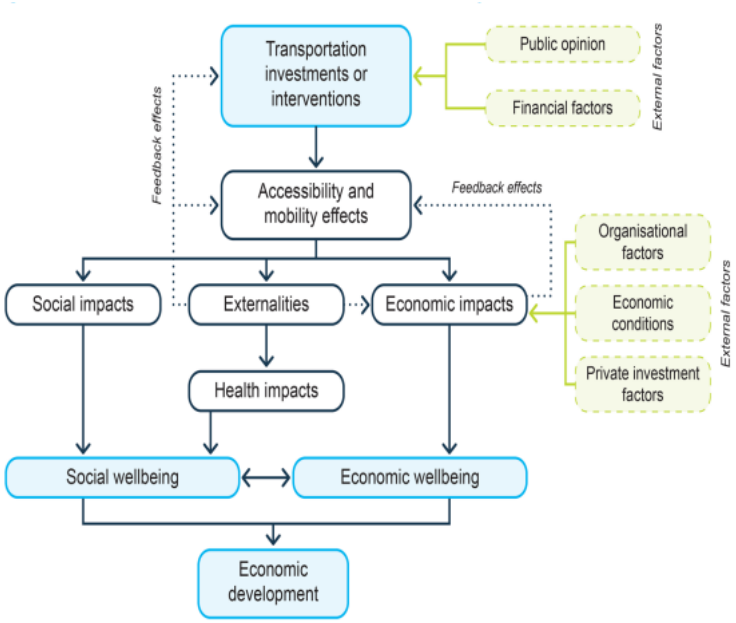
paper to discuss various ways in which transport can drive growth. For the purposes of this paper, two specific examples are used.

A seminal work on this is the SACTRA report (1998) and Transport and the Economy, which looked at the dynamic relationship between transport and the economy. It emphasised the need to see transport as part of an integrated economic development policy. Understanding transport as part of an 'economic toolkit' in this sense is absolutely essential, especially in a devolved context where transport is one of the areas where The Scottish Government has significant control of economic policy. Transport cannot be seen as an area divorced from the wider economy. It should be a key player within, and aligned to, wider economic policy.

The first work undertaken by Transport Scotland to visualise and understand the link between the transport system and the economy was completed in 2006, and focuses primarily on the impact of transport on the economy. It is summarised in Annex A. The approach taken here to concentrated on the impact of transport across land, labour and capital markets within the economy and the subsequent direct and productivity impacts on economic growth. This approach remains valid but does not include a wider social dimension to impacts and so is less useful now than it perhaps was nearly 20 years ago.

A second approach is shown below, in Figure 2.2. This is taken from a report by the New Zealand Ministry of Transport (2016) into the Contribution of transport to economic development. This represents a good lens to use for looking at the relationship between transport and the wider Scottish Economy. It is both relatively simple and highly relevant for the Scottish context, with both governments having a similarly broad understanding of how transport affects the economy. This includes realising the potential social and health benefits that a transport intervention can deliver – as well as understanding how inequalities can impact and be impacted by transport. Transport feeds into wellbeing in addition to just supporting classic 'economic impacts' such as an increase in output etc. This is, of course, far from the only model that could be discussed. Amongst alternatives for example, Greener Vision (accessed 2025) publish one that is far more focussed on how the policy cycle supports GVA growth and the OECD (2007) have one that focusses more on impacts via the specific lens of market access and the transportation of goods. However, for the reasons set out above, the New Zealand Ministry of Transport framework is both helpful and relevant for the purposes of this paper.

Figure 2.2 - Transport and Economic Development – key connections



The same paper eloquently describes some of this complexity: *"Transport investments have multiple over-lapping economic impacts, which can be assessed from several perspectives. The initial impacts of investments 'ripple' through the economy both spatially and over time, manifesting themselves through changes in residential and industrial location, property prices, changes in the supply and demand for labour, and differential effects on the economy in any given area/region relative to other areas/regions."*

A key point is therefore that context is particularly important when considering the value that an individual transport project may provide and that the impacts of an individual investment may be complex and vary over time. Rather than trying to summarise all of these arguments, this paper will aim to provide a series of more tangible explanations and case studies illustrating how the transport sector helps deliver growth and tackle inequalities.

A Guide to How Much Economic Activity Transport Supports

In more practical terms, the aim of this section is to help illustrate the amount of economic activity that Scotland's transport network currently facilitates.

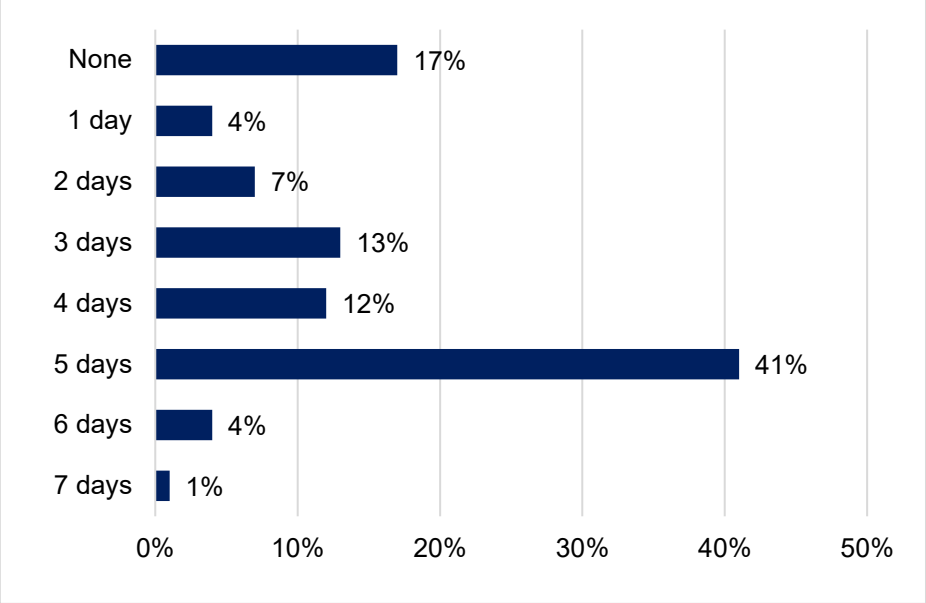
Travel makes up a significant part of our lives. 64% of people had travelled the previous day when asked as part of the 2023 Scottish Household Survey (respondents are 17+). The average number of trips per adult the day before their survey interview was 1.59. This is somewhat below pre-pandemic levels of travel (74% and 1.94 respectively).As in previous years, the car was the most popular mode of transport for journeys made in 2023, with 51% of journeys made as a car driver. Over 60% reported driving at least once per week and almost 35% drive each day. 66% of adults made a journey of more than a quarter of a mile by foot to go somewhere in the last seven days, 25% of adults used the bus at least once per week in 2023, and 9% used the train. In terms of volume, Scottish Transport Statistics shows that car traffic in Scotland reached 35.3 billion kilometres over the year, equating to an average of around 96.9 million vehicle kilometres per day. ScotRail usage was recorded at 81.2 million passengers annually, translating to an estimated 222,000 daily rail passengers. Ferry services carried 9.7 million passengers, averaging around 26,500 passengers per day. Furthermore, bus travel was the most widely used form of public transport, with 334 million passenger journeys made, roughly 916,000 daily bus passengers. This paper is written with recognition of the strong, diverse and well-utilised transport network that Scotland has, and the importance it holds to each of us.

Employment

Looking specifically at travel to work, there was a slight increase from 2022 to 2023 in the proportion of working people reporting travelling to work at least one day per week (from 80% to 83% compared to 80%). This remains lower than in 2019, when the figure was 95%. However, it is clear that a large majority of employment requires some degree of transportation.

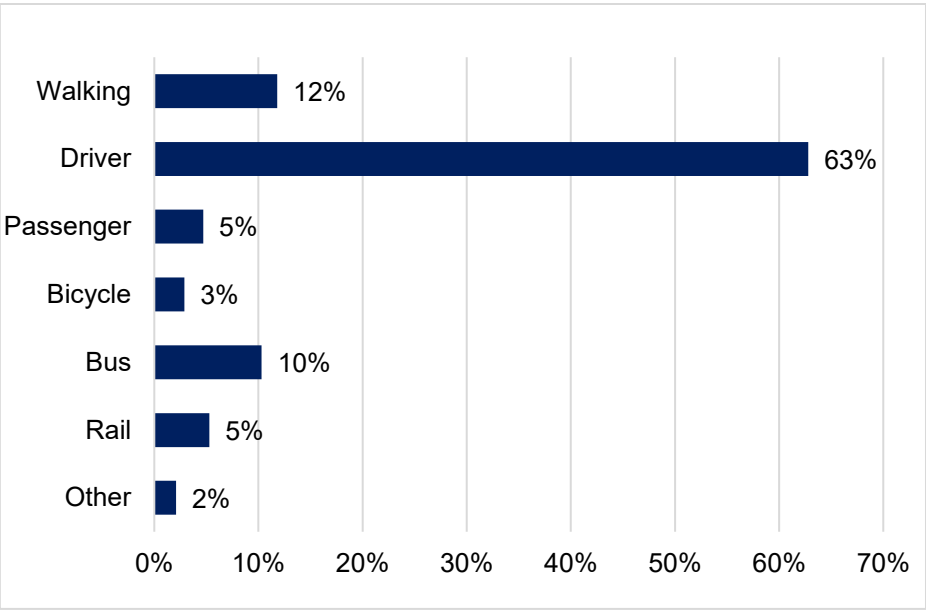
Figure 2.3 (below) looks at the number of days workers travelled to work per week – with a large majority (71%) travelling to work at least 3 days a week. Prior to the pandemic the numbers were higher still: as high as 90% in 2019. Only 17% of people reported travelling to work no days each week, and even in this case, transport is often necessary to facilitate efficient home working. As such, a large majority of employment in Scotland depends on transport, with the median worker travelling to work 4 times per week and the most common working pattern seeing individuals commute to work 5 times a week.

Figure 2.3 - Number of days working people travelled per week, 2023
Source: Transport and Travel in Scotland 2023



In 2023, two thirds of people who travelled to work (68%) usually travelled by car or van, making this by far the most popular mode of travel used to get to work. A full breakdown is given in figure 2.4, below.

Figure 2.4 - Method of travel to work, 2023
Source: Transport and Travel in Scotland 2023



Trade

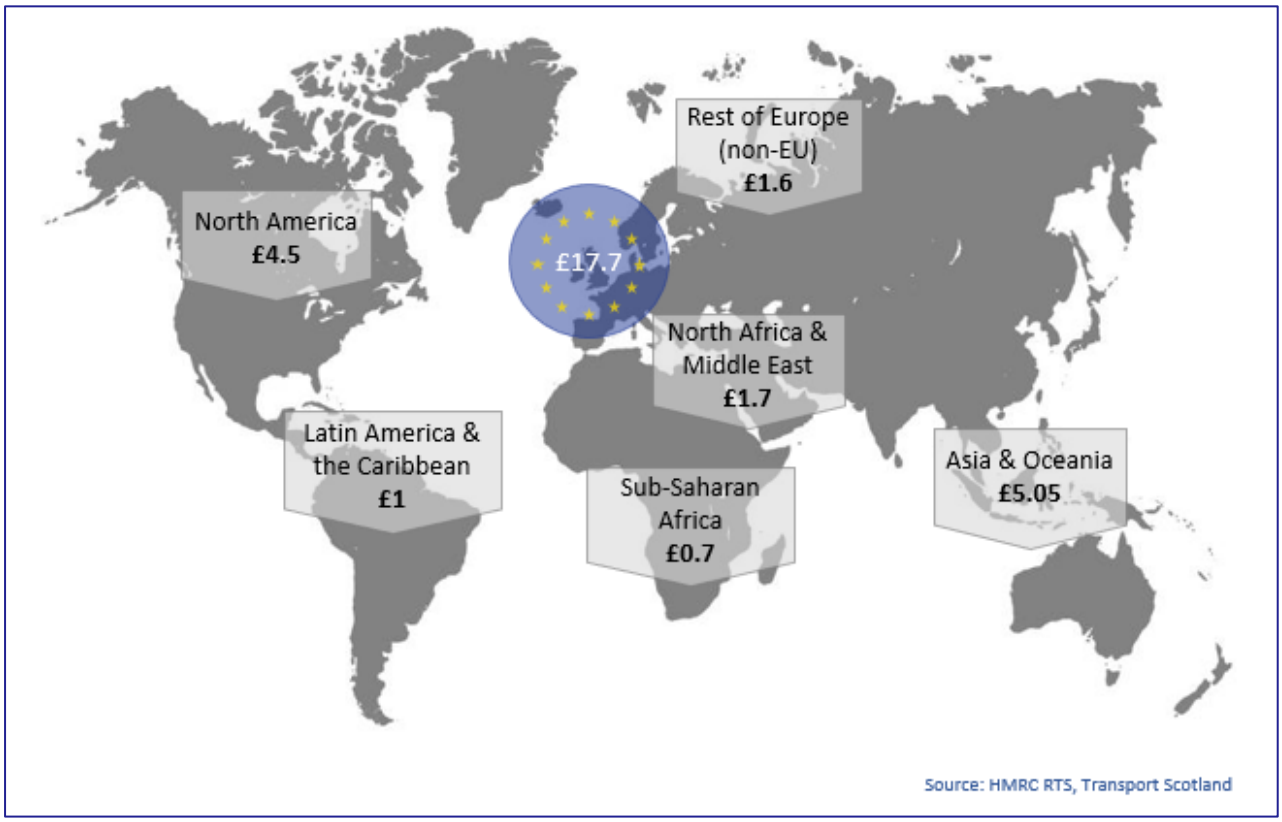
The transport network is absolutely essential to facilitating economic activity and trade, via the transport of goods – as Scottish Transport Statistics can show us. A huge amount of commercial freight travels to, within and from Scotland every year. Looking at Heavy Goods Vehicles in particular, approximately 134 million tonnes of

freight was lifted by UK HGVs on journeys originating in Scotland in 2023. A large majority of this freight had a destination within Scotland (around 118 million tonnes) with the other 16 million tonnes of freight going to the rest of the UK. The role of Scotland's road network in supporting the economy is discussed further in the Geography chapter later in this paper (page 61).

Looking specifically at international trade, some of this road freight travelled out with the UK (approximately 200,000 tonnes). However Scotland's primary transport mode for exporting goods remains shipping. Exports from Scotland's 11 major ports totalled almost 23 million tonnes in 2023 (with a further 47,015 tonnes of freight carried by air).

Transport is at the heart of ensuring that goods arrive where they need to be to facilitate economic activity, and almost all trade in goods (including exports) rely on the transport network. In monetary terms rather than in terms of weight, Figure 2.5 shows the value of Scottish international goods exports, by destination according to HMRC (2025) statistics. There were £32.3 billion (in current prices) worth of Scottish goods exported internationally in 2024, a slight decrease compared to 2023. Within this, the EU remains Scotland's largest export market, totalling £17.7 billion. EU exports make up a 55% share of total international exports, broadly in line with previous years.

Figure 2.5 - Value of Scottish international goods exports, by destination, £ billions, 2024



Tourism and Business

Transport is of course crucial in both facilitating visitors to Scotland, supporting the growth of Scottish businesses, and fostering international connections.

By definition, transport is a key aspect and facilitator of tourism. According to the Great Britain Tourism Survey (2025), there were over 75 million tourism day visits taken by Great Britain residents in 2024 with an associated spend of £4.0 billion. This facilitates economic activity, but also preserves a key social function too – with visiting friends or relatives as the most common reason for tourism day visits. And while the main destination for Scotland's tourists is to towns and cities, it also has an important impact across Scotland's whole geography. In the years preceding the COVID-19 pandemic, visitor spend in the Highlands and Islands region was worth around of £1.5bn and HIE (accessed 2025) notes that, in some areas, jobs in tourism represented up to 43% of the workforce.

Scotland is also a key global destination for tourism. According to the ONS' International Passenger Survey (IPS) (2024), sponsored by Visit Scotland, international travel to Scotland continued to strengthen following the COVID-19 pandemic in 2023. Visit numbers, nights spent and visitor spending were higher in 2023 than they were in both the previous year and pre-pandemic (2019). Scotland hosted a total of 4 million visitors, who stayed for 34.4 million nights and spent £3.6 billion, directly infused into the Scottish economy.

Looking at terminal passenger figures in Scottish airports, there was 26 million passengers in 2023, up from 21.5 million in 2022 and 7 million in 2021, pointing to continued recovery from the pandemic (Scottish Transport Statistics, 2025). Edinburgh was the busiest airport, with 14.4 million passengers. This is followed by Glasgow (7.4 million), Aberdeen (2.2 million) and Inverness (0.8 million). From Scotland's airports, there are connections to 55 countries (international, excluding rUK), and over 220 destinations directly. The International Passenger Survey highlights the range of international visitors Scotland receives. The most popular region of residence, in 2023, was Europe (2.3 million tourists), followed by North America (969,000). North American visitors accounted for 24% of all inbound visits and 39% of total spend by tourists.

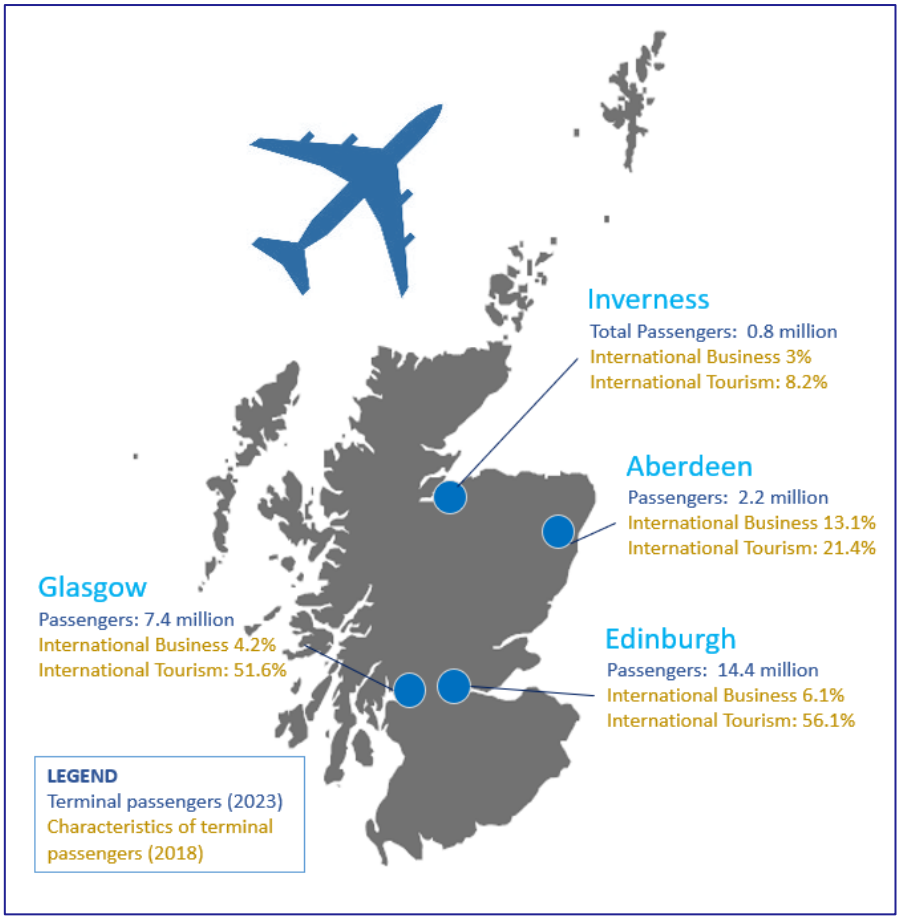
There is also data available on characteristics of terminal passengers from 2018, which, although dated, shows that patterns are broadly in line with 2013 and therefore suggests trends are relatively stable. As shown by Figure 2.6, Edinburgh had the highest proportion of international passengers (62.2% of total passengers), with 13.1% of all passengers travelling for international business, and 56.1% travelling for international leisure. Aberdeen has the largest proportion of international business passengers at 13.1%, double the proportion of Edinburgh.

Scotland's economy is driven by a large service sector (accounting for around three quarters of all economic activity – according to recent Scottish Government GDP estimates), so ensuring global connectivity for Scotland's businesses is hugely important.

Figure 2.6 (below) describes both of these data insights – although it should be noted that the total volume of passengers and the proportions involved in international business and leisure do not align due to the difference in time period for which data is available.

Figure 2.6: Terminal passenger numbers by airport (2023) and Characteristics of terminal passengers at selected airports (2018)

Source: Civil Aviation Authority



Scotland's international links are not limited to just tourism and business, but also play a key role in supporting other sectors. An obvious example is Scotland's universities, which represent one of our greatest assets and an area of competitive advantage. International students play a huge role in supporting these universities and in boosting the wider Scottish economy. Scotland's transport network is critical in facilitating international students to live and learn, bringing new cultures and experiences to our universities. Scotland's international education strategy notes that in 2022/23 more than 83,000 students from over 180 different countries came to

study at Scottish universities, and international students made up a quarter of the total student population. The net contribution in 2021-22 of international students in Scotland to the UK economy was estimated to be £4.21 billion (Scottish Government, 2024).

Transport Supporting a Growing, Inclusive Economy

This section will briefly deliver a series of five case studies to look at avenues via which transport affects the economy. Firstly through a productivity lens (recognising the key role of boosting productivity in supporting long term economic growth) and then broadening the definition of growth to look at safety, health and wellbeing. Finally, an equalities lens is applied (recognising the fact that tackling inequality and growth go hand in hand, meaning not only 'fairer' but also 'more' growth) to look at socioeconomic and geographic factors influencing transport outcomes.

Economic Footprint of the Transport Sector

This case study looks at the economic footprint of the transport sector. It will do so in terms of both a broader discussion of the makeup, characteristics and impacts of the sector and then look quantitively at these impacts, via The Scottish Government's Input Output tables - which can provide estimates of the direct, indirect and induced impact of the sector.

This represents an attempt to look at the sector itself (i.e. the firms operating in the transport sector), and not the economic activity that transport as a whole supports (i.e. mobility and accessibility that transport provides) – it is impossible to assign a value to the latter given that the ability to move people and goods is essential to most economic activity. Defining the former, the transport sector, is tricky and imprecise, but more achievable.

Direct Economic Footprint

Irrespective of definition, there are a wide range and diversity of firms operating within the transport sector. Businesses in Scotland (2023) statistics show that there were approximately 7,000 businesses in the 'Transport and Storage' Sector in Scotland in 2023, employing over 90,000 people. In general, the Transport and Storage sector is disproportionately made up by medium and large sized businesses (defined here as 50-249 and 250+ employees respectively). These account for 5.9% of transport firms, versus just 3.5% of all other businesses. Despite this, the footprint of the transport sector is more geographically diverse than many other sectors. Just 22% of employment within the Transport and Storage sector relates to firms in Edinburgh or Glasgow, compared to 31% for all other firms. Average turnover for these firms is similar to other businesses in Scotland (£1.6m per firm), but employee earnings within the sector are lower than for the economy as a whole, with median hourly pay of £15.08 in 2023 (compared to £16.63 for all industries in Scotland) and

mean hourly pay of £17.98 (compared to £20.21). However this masks significant variation. For example, the mean hourly pay of road (£14.16) or mobile machine (£14.29) driver significantly lags behind that of other drivers and transport operatives (£25.45) and Transport Associate Professionals (£32.79). (ASHE Tables 5 and 15).

At any given time the transport sector also directly supports a large volume of construction jobs. Scottish Transport Appraisal Guidance (STAG) notes that *"the net impact of construction jobs is not usually considered as a Wider economic impact of transport interventions. It is assumed that the expenditure would otherwise have been directed towards another project and hence supported construction or other jobs elsewhere."* However it should be noted that construction jobs can have a meaningful impact on local areas. Furthermore, the presence of a major transport project can involve an extremely large scale of impact that may challenge some of these assumptions. For example, over 15,000 people were inducted to work on the construction of the Queensferry Crossing, with Scottish firms awarded sub-contracts or supply orders totalling over £350 million (see Transport Scotland (2017)).

Indirect and Induced Impacts

It is commonly understood that the economic footprint of the firms within the transport sector goes far beyond their firm – primarily via 'supply chain' effects. A supply chain reflects the interconnected journey that raw materials, components, and goods take before their assembly and sale to customers. In the context of the transport sector in Scotland, it is clear that one firm will have a different supply chain to another. For example, one might reasonably expect a major component of the supply chain of a firm that operates buses to focus on inputs such as fuel and vehicle purchases. In turn a company that assembles buses may have a supply chain that draws far more on raw materials and manufactured components etc.

Some transport firms are large publicly owned bodies – meaning they should have policies in place to manipulate supply chains in order to generate positive outcomes. For example, Transport Scotland has a Corporate Procurement Strategy (2024), which aims to support The Scottish Government's goals and procurement priorities and publishes an annual procurement report (e.g. the most recent for 2023-24). Transport Scotland accounts for substantial amounts of annual spending – in addition to funding allocated by grants and subsidies, Transport Scotland's spend on procured contracts during 2023-24 was over £770 million. The Procurement Strategy ensures that this supports a wide range of community benefits being implemented into Transport Scotland contracts and procurements. This has a focus on delivering a wide range of employment and training opportunities, supporting young people, adults and businesses throughout Scotland. For example in 2023-24, community benefits reported by our suppliers during the period include the creation of 613 new entrants' positions, 36 apprenticeships, 72 graduate positions and 22 work

placements. However, this is obviously only a small part of the value generated via transport supply chains. Other key players within the sector also publish details about their supply chain impacts – for example CalMac recently commissioned CEBR to produce and publish a socio-economic value report (2022) which details supply chain impacts and overall economic footprint, and Scotrail are currently looking into updating a 2016 report carried out that looks at the rail industry in Scotland through a similar lens produced by Oxera and a recent KPMG report for CPT has also estimated the wider benefits of bus use as being £1,385m annually.

Overall estimate of the GVA and jobs supported by the sector

In order to look more rigorously at the supply chain and wider effects of the sector as a whole, it's possible to look at the transport sector via the lens of the input output tables. Broadly speaking, these tables can be used to look at individual parts of the economy (via Standard Industrial Classification or SIC codes) to identify key parts of the sector. These tables provide a complete picture of the flows of goods and services (products) in the Scottish onshore economy for a given year. They detail the relationship between producers and consumers and the interdependencies of industries.

The rest of this section will use the Scottish input output tables to look at the economic footprint of the transport sector in Scotland. For the purposes of this section, the transport sector will be defined as Rail Transport (SIC49.1-2), Other Land Transport (SIC49.3-5), Water Transport (SIC50), Air Transport (SIC51) and support Services for Transport (SIC52). Two further SIC codes are also used to describe 'Manufacturing related to transport' - Motor Vehicles SIC29) and Other Transport Equipment (SIC30).

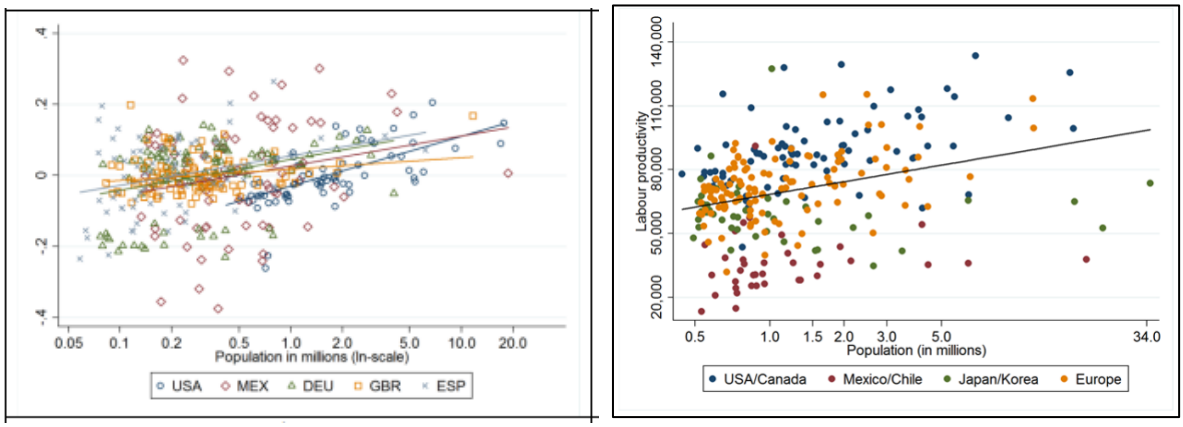
Using the latest Scottish Government Input-Output model of the economy, it is estimated that the Transport Sector, supports just over 150,000 full time equivalent jobs, and just under £10bn GVA. This represents between 6-7% of the total workforce and Scottish GVA. Roughly 60% of this activity is within the Transport and Communication Sector, with most (over 30%) of the remaining activity spread evenly across the Finance and Business, Manufacturing and Distribution and Catering sectors. These estimates include both direct, indirect supply chain and induced re-spending of wages effects.

Increasing Productivity – 'Agglomeration'

International Context

There is a wide body of evidence that large urban centres are associated with higher productivity than areas with a smaller population. For example, the figures below are taken from an OECD paper (Ahrend et al., 2014) highlighting this issue and show that population size of a town or city is positively correlated with productivity.

Figure 3.1 i and ii - relationship between productivity and population by city across different country/region samples



Note that the correlation is weakest for the UK (the yellow line on the lefthand chart). The OECD note that the UK is somewhat of an outlier in terms of the strength of correlation and discuss that this may be due to the role of London (and the proximity of other urban areas to London outweighing population size when considering productivity). UK cities are discussed in greater detail throughout this chapter.

The OECD explains how these increased productivity levels are achieved: *"the large theoretical literature on agglomeration economies/externalities (see the reviews of Rosenthal and Strange, 2004; Duranton and Puga, 2004; and Puga, 2010) tends to conclude that agglomeration benefits accrue through learning, through knowledge sharing, through specialization, and through deep labour markets"* .

There is lots of evidence that various transport interventions can help produce agglomeration benefits by expanding the number of people who can easily, and quickly, commute into an urban centre. This results in businesses having greater access to customers and suppliers, as well as a widening labour force scope (UTG, 2021). There are two types of agglomeration – static agglomeration occurs when transport directly leads to existing businesses increasing productivity, and dynamic agglomeration is when the area itself becomes attractive for business to locate, and

people to live. This in turn can change the land use and development, supporting new housing and business growth.

As discussed in the empirical evidence section (above), a recent evidence review of the economic impact of transport interventions found that transport investments are associated with increased levels of firm and labour productivity (DFT 2024). This is perceived as the primary benefit realised via agglomeration - although the paper did note the need to consider displacement when thinking about effects on the economy as a whole in case 'sorting effects' (less productive firms leaving an area after a transport intervention) are present. The paper suggests that future research could look to address this and confirm whether or not agglomeration has a net positive impact at a national, rather than more local, level.

Transport is not the only means of achieving agglomeration benefits. Factors such as housing density are important, as well as urban planning, perceived quality of life etc. However, transport does have a key role to play. Transport improvements can contribute in two main ways. The first is that by improving links between firms, the effective density of the city cluster rises. The second is that by relaxing constraints on access to the centre of the city, overall number of potential employees that can work in the area is increased.

Scottish Context

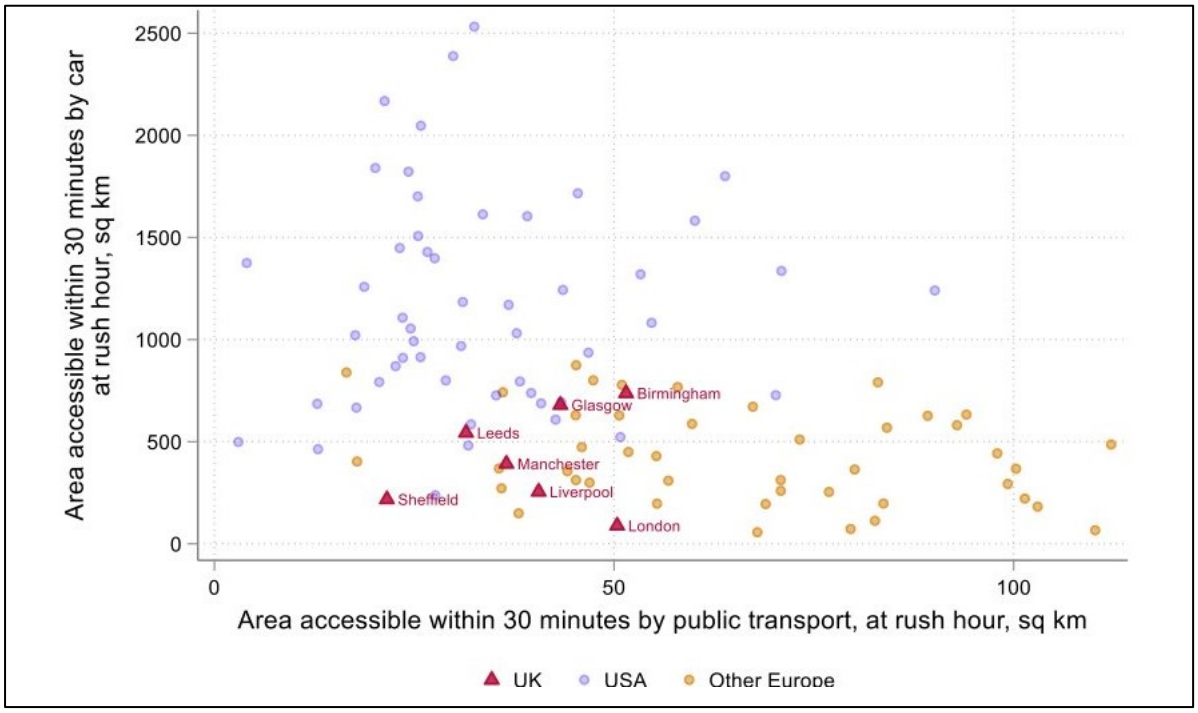
Within a UK and Scottish context, there is evidence that poor transport infrastructure is acting as a constraint on securing agglomeration benefits and therefore productivity growth.

For example, in a wide-ranging paper on inequality in the UK, Stansbury et al. (2023) note that *"Overall, the evidence collected above suggests that the UK's large non-London cities are constrained by their limited transport infrastructure. The UK's cities are less well-served by roads than US or Western European cities, and less well-connected by public transport than Western European cities. The limited scope of the UK's road and public transport networks makes the UK's cities outside London systematically smaller in terms of their "effective size" than peer cities with similar total populations. In several non-London cities, high congestion on roads, and a combination of high crowding and poor reliability on trains, suggest a high economic value of commuter travel, and therefore that improving road and rail infrastructure in congested cities would likely bring significant economic returns. These facts in particular make the case for intra-city transport improvements to enable greater commuting flows and increase effective city sizes".*

Figure 3.2 (below) from Conwell et al. (2022) looks at how well major UK cities compare in terms of area accessible by road (Y axis) and public transport (X axis).

Note that UK cities generally perform poorly in terms of accessibility – with amongst the worst performance across both axes. By contrast, cities in the USA tend to perform better in terms of areas accessible by car, and other European cities tend to perform better in terms of areas accessible by public transport.

Figure 3.2 - Area accessible by road and public transport – UK, US and Western European Cities



This analysis is based on quite broad measures of transport connectivity. However, it is worth noting that stakeholders in Scotland have reported similar experiences with the transport system in Scotland:

- Dr Liz Cameron CBE, Director and Chief Executive of the Scottish Chambers of Commerce noted that *"Instead of getting Scotland moving again, businesses and their employees continue to face frequent travel disruption and rising prices, finding it difficult or costly to get to and from their place of work, choosing not to travel because of cancellations, often resorting to the car which is also becoming increasingly expensive to run as fuel prices continue to rise."* Before concluding, *"Scotland's economic recovery and future success hinges on our collective ability to deliver an integrated, world class transport system that connects Scotland's businesses and people domestically and has unrivalled international links"* in an article in the Herald (2022).
- The Centre for Cities reported that 300,000 people were currently underserved by Glasgow's urban transport network in a 2023 report, with Andrew Carter, the Chief Executive of Centre for Cities noting that: *"Glasgow's economic underperformance is equivalent to the size of the entire nation's oil and gas sector, or 4.6 per cent of Scotland's GDP…. The relatively small size of the public*

> *transport network compared to similar cities in Europe is one of the key factors behind this lag…For people living in and around Glasgow, this means longer commute times with many residents struggling to access the city centre and all of the jobs and opportunities on offer there."* (Centre for Cities Press Release, 2023).

These perspectives chime with wider research. For example, a recent OECD (2020) report noted that, at a UK level, there is scope to significantly increase economic performance by increasing agglomeration benefits. In a study of 11 'core' cities (defined as "second tier" cities and excluding London), the paper notes that the UK enjoys less benefits in terms of productivity within its cities (relative to their size) than comparable European countries do. The OECD note that one particular feature of UK cities is lack of public transport that can allow residents quick access to the city centre. For example, the paper states that *"only 9 cities in the UK operate metro or light rail systems and several large Core Cities in densely populated regions do not have a metro or light rail system. By comparison, more than 60 cities in Germany do have a metro or light rail system"*. Wider research on metro or light rail systems has highlighted the manner in which they can deliver economic benefits. For example Pogonyi et al. (2019), find that the 1999 Jubilee Line Extension has had a significant positive impact on firm productivity surrounding JLE stations. Firms within walking distance (750 metres) have the largest benefit, with an estimated 15% increase in total value added (although this gradually decreases with distance, becoming statistically insignificant further out – suggesting a clustering of firms around transport hubs). The OECD (2020) paper also points to declining rates of bus ridership and a dependency on cars as holding UK cities back from realising the benefits of agglomeration. It concludes that the magnitude of underutilised potential is substantial and provides a scenario whereby achieving agglomeration benefits within these cities could permanently boost GDP by 1% (and noting that further benefits could come from higher productivity in mid-sized cities if agglomeration benefits were achieved in these cities too).

There are significant hurdles to overcome in terms of unlocking some of the benefits of agglomeration and boosting productivity – but the payoffs to doing so are potentially very large.

The benefits of making Scotland's' urban centres accessible is particularly important in the context of disabled people. Scottish Household Survey (2024) data shows that over 20% of people identify as disabled in Scotland. Amongst employed adults not working from home, disabled people are less likely to use driving as their main mode of travel to work than non disabled people (51% compared to 65%), and are more likely to use public transport or active travel (41% compared to 29%). Transport systems that limit the inclusion of a fifth of the population from urban areas would have serious negative economic consequences. The Accessible Travel Framework

(Transport Scotland, 2023) notes that an accessible transport network provides benefits for all of Scotland – and A Fairer Scotland for Disabled People: employment action plan (Scottish Government, 2018) notes that a key part of increasing employment rates can be achieved by addressing barriers caused by the lack of accessible public transport. This is particularly relevant for intercity transportation – with some people with disabilities choosing to not use public transport due to uncertainty regarding the consistency with which stops have been made accessible. Aarhaug and Elvebakk (2015) conclude that measures to improve accessibility should be analysed as part of the wider transport system, enabling reliable door-to-door accessibility rather than stop-to-stop.

One final point to note is that, while it may be intuitive to think that post pandemic trends of increased remote working may reduce agglomeration impacts, it is yet to be seen how much of an impact home working will have on agglomeration. In one sense, it is unlikely that agglomeration benefits will disappear. Home working (as opposed to hybrid) has increased from just under 6% before the pandemic, but remains relatively rare (11% as of June 2024), with hybrid working far more common (Felstead and Reuschke, 2020). Around 70% of UK workers commuted to a workplace each week in 2024 (Opinions and Lifestyle Survey). More detailed (but less timely – 2022) data from the same survey shows that hybrid working is far more common amongst high income individuals than those with lower incomes, and is highly dependent on employment type (with 'Managers, Directors and Senior Officials', 'Professional Occupations', 'Associate Professional Occupations' and Administrative and Secretarial Occupations' showing far higher levels of home working than other groups). Interestingly, the one area in the UK with the highest level of hybrid and home working is London, which is likely most associated with agglomeration impacts – this suggests that agglomeration may be resilient to increased home working, however this is an emerging area and further research will be needed to answer some of these questions. For example, DFT (2022) are yet to conclude whether and how agglomeration parameters should be changed to reflect post pandemic trends, but have highlighted the need for more research. It is likely that any impact will be felt in terms of changes in the magnitude of expected agglomeration effects, as opposed to questioning their relevance. For example, a recent OECD (2021, chapter 4) review notes *"a decline of cities is unlikely. Benefits from agglomeration economies will likely be a predominant factor to retain workers and firms in cities. A big exodus from cities would not be desirable for economic, social and environmental aspects. A decline in large urban centres would lead to a loss of economies of scale affecting national growth, efficiency in provision of public services and meeting environmental goals."*

This high level discussion of agglomeration should hopefully illustrate one avenue through which transport spend contributes directly to helping boost productivity and the opportunities this represents.

There are two important points to note in a Scottish context alongside these conclusions. Firstly, that this is a focus of transport projects in Scotland. For example, within the central belt, major investment in the M8 and the electrification of the three Glasgow to Edinburgh railway lines clearly contribute towards improving accessibility and widening the benefits of agglomeration. Secondly, this is not a problem or concept specific to the central belt. National Records of Scotland's mid population estimates (NRS, 2020) showed that 91% of Scotland's population lived in settlements or localities of 500 individuals or more – accounting for just 2.3% of Scotland's total land area. There were 514 settlements (comprising 662 localities) in Scotland in mid-2020. The population of Scotland living in settlements was 4,974,670. The population living outside settlements was 491,330. 84 of these localities are located in Highlands and Islands. Agglomeration is an urban phenomenon, but there is scope to achieve agglomeration benefits beyond just the Central Belt.

Safety, Health and Wellbeing

In this paper, the centrality of health and wellbeing has been discussed numerous times. For example, one of the four priorities of NTS2 is that our transport system "improves our health and wellbeing". Under this priority, it is understood that transport will be safe and secure for all, that it will enable us to make healthy travel choices and that it will help to make our communities great places to live. Health impacts were also at the centre of the economic framework presented in Figure 2.2 in Section 2 in this paper.

This brief section will discuss how transport investments are actively supporting these outcomes, taking a look at safety, health and wellbeing in turn.

Safety

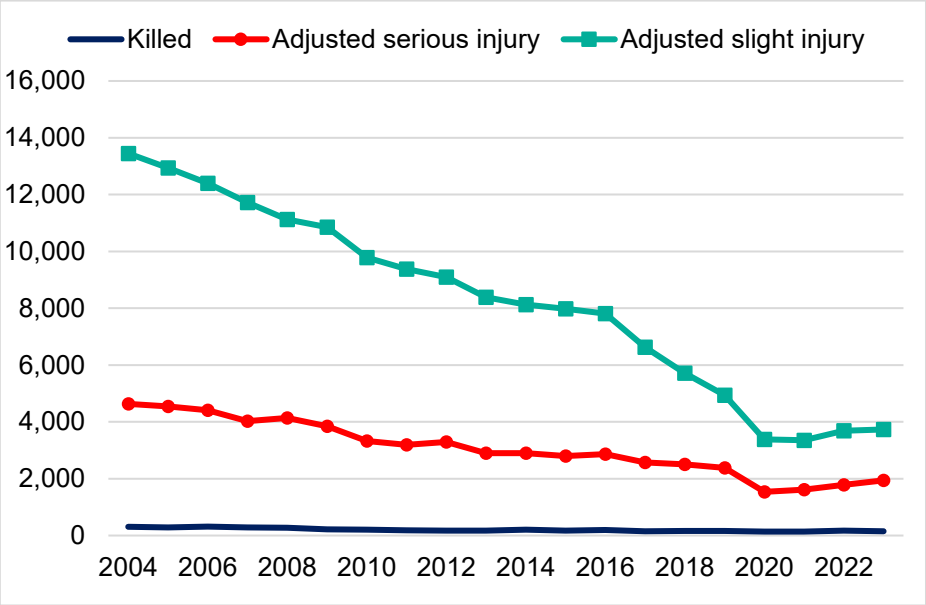
Discussions of safety within transport typically focus on road safety in the first instance. Worldwide, there is an increasing acknowledgement of the importance of road safety in travel interventions. For example, in the context of low and middle income countries, the World Bank (2017) estimate that traffic injuries have a substantial drag on economic growth, and that "*Reducing road traffic injuries in half could translate into an additional 15% to 22% of GDP per capita income growth over 24 years*". Additional growth is uncertain over the long term, but highest in countries such as China where Road traffic incidents account for 7.8% of all deaths in the 15-64 age group ranges. Indeed, the World Bank has increasingly shifted funding towards road safety financing in recent years – with levels in financial years 2019-20 and 2020-21 around 6% of the total World Bank Road and Urban Transport Financing budget, risking to over 14% in 2022-23 and 2023-24. For an example of effectiveness, the World Bank estimates that a Road Safety Support Project in Nepal may save as many as 3,400 lives over the lifetime of the investment. This reflects evidence that road safety investments can have a transformative impact in terms of preventing injuries and casualties (World Bank, 2024).

While the potential to improve road safety in low and middle income countries is often greatest, there is also strong evidence that road safety is a good economic investment in advanced economies – especially in terms of reducing pressures on the health system. For example, a European level systematic review of 29 road safety measures found that up to 25 of the measures are cost effective in Benefit Cost Ratio terms (Daniels et. al., 2019). Similarly an FIA Foundation Research Series Paper looked at the benefit cost ratio of two large packages of road safety measures in Australia – both expensive programmes delivering multiple infrastructure improvements such as roadside or median barriers, hazard removal and intersection treatments. The packages cost approximately $30m AUS and

$150m AUS respectively. Both projects delivered a positive benefit cost ratio (1.6 and 2.7) and the majority of lifetime benefits were felt in terms of reduced pressure on the health system (The FIA Foundation, 2016).

Within Scotland, Transport Scotland's Road Safety Framework to 2030 has a vision for Scotland to have the best road safety performance globally by 2030, with a long-term goal of no one seriously injured or killed on Scottish roads by 2050. This is underpinned by 5 outcomes: safe road use, safe vehicles, safe speeds, safe roads and roadsides, and post-crash response. As illustrated in figure 3.3, over the last 20 years road casualties in Scotland have been on a significant downward trend:

Figure 3.3 – Road Casualties in Scotland
Source: Key Reported Road Casualties Scotland 2023



Over the 20 year period to 2023, fatal casualties fell significantly from 308 to 155, a drop of 49.7%. Similarly, those with serious injuries fell 58% from 4,634 to 1,944, a drop of 58%. Despite this long term decline, there have been rises in casualties over recent years – likely reflecting the impact of the pandemic on traffic volumes.

Some of the improvements in road safety can be attributed to better constructed roads and safety improvements in cars themselves, with declines in casualties highest amongst car occupants (Fay, 2017). Wider factors also influence these statistics such as driver and road user behaviour, and advances in medical technology (Noland, 2004). Within a transport context however, investments in road safety measures or changes in road safety policies can make a substantial difference to outcomes achieved. For example:

- **Reducing Speed and/or Traffic:** As a recent OECD (2018) paper affirms, there is a well established link between speed and crash risks, estimating that

inappropriate speed is responsible for 20% to 30% of all fatal road crashes. Effective measures to limit speeds can therefore increase road safety. Within a Scottish context, a recent consultation on the National Speed Management Review (Transport Scotland, 2024) is currently being analysed, noting that "*Evidence indicates that these changes could significantly reduce injury collisions, while maintaining journey times and improving journey time reliability*". Similarly there is evidence that measures to reduce traffic levels, such as low traffic neighbourhoods have led to a reduction in road traffic accidents (Laverty et al., 2021).

- **Avoiding queues and unsafe conditions:** Intelligent travel systems (ITS) can help to reduce road injuries and also ease traffic and other adverse factors such as noise or air pollution. There is significant evidence on how ITS can impact on both personal safety and overall network resilience (Janusova and Cicmancova, 2016).
- **Safety Infrastructure:** The discussion above highlighted how infrastructure investments have a direct link to road safety via providing a direct safety function – such as barriers for larger roads, or improvements at intersections.

Road safety is not limited to areas where it is the primary purpose of a policy, it can and should also be considered as part of all road policy and decision making. The evidence is mixed on whether or not new roads – even those that are well designed and constructed – will reduce road casualties (Elias and Shiftan, 2011). However in the right circumstances, new infrastructure can route traffic away from hazardous areas and avoid queues. Within a Scottish context, a good example of this is the Maybole Bypass (Transport Scotland, 2022). Road safety played a significant part in the rationale for the recently completed (2022) Maybole Bypass for A77 traffic. Approximately 10% of vehicles using the A77 are heavy goods vehicles (HGVs) which often arrive in convoy from vessels. In order to accommodate this, the restricted footpath width along Maybole High Street has presented a significant risk to both pedestrians and vehicle users' safety. The bypass separates local and strategic traffic, relieving congestion in the town and improving safety, as well as safety and journey time reliability on the A77.

A final point to make is that reducing the dangers of roads can also have wider societal benefits. Any discussion of why road casualty statistics have dropped also needs to acknowledge behaviour change by non-car users of roads. For example, children or old people may start to avoid roads altogether as cars become bigger and move faster, rather than the roads themselves becoming safer (example – Hillman, Adams and Whitelegg, 1990). Evidence suggests that other countries (even those with limited hours of sunlight) achieve considerably better outcomes in terms of child independence than the UK typically does – and that this is associated with safer roads (Shaw et. al., 2015). Another example is possible impacts on crime, with emerging evidence showing that low traffic neighbourhoods may be associated with lower levels of street crime (Aldred and Goodman, 2021). Reflecting these points, it's

possible that by extending the focus of the discussion of road safety beyond casualty statistics, by also on focussing on how safe roads are perceived to be and the role they play in our community, can unlock wider benefits in addition to reducing the harm caused by accidents.

Looking beyond road safety, there are growing priorities to address personal safety concerns of those using or working in public transport. Existing data points to the fact that women use public transport more than men and that their use is conditioned and shaped by intersecting factors, such as income, parental status and membership of ethnic minority and gender diversity (European Parliament, 2021). Women consistently report unease or unwillingness to travel alone at night via public transport due to a fear of crime – nevertheless they may be 'transit captive' in that they do not have alternatives. There is evidence that women, whether they are transport workers or passengers, continue to experience public transport as less safe than their male counterparts (Gekoski et. al., 2015).

Despite using public transport more than men, there has been a persistent gap in the production and availability of consistent and reliable data measuring women's experiences (CIVITAS WIKI (2021) and OECD (2018)). However, more recently, questions around gendered experiences of safety for women and girls (including when using the transport systems) have received increased attention. The UN Women UK is the UK National Committee for the United Nations entity dedicated to gender equality and women's empowerment, and has a campaign called 'Safe Spaces Now'. This aims to make UK public spaces safer and more inclusive, which includes on public transport. Looking specifically at sexual harassment, they discuss a YouGov survey in 2020 of adults living in London that found 64% of women experienced harassment on the tube, 38% on the bus and 31% on trains. Furthermore, they note the significant underreporting of these issues, with only 2% of cases raised to transport staff or British Transport police.

Transport Scotland (2023) produced a report based upon a large qualitative research study to capture detailed personal testimony on the experiences of women and girls using public transport. In line with international studies reviewed, the report indicates that wider systemic change is required to maximise safety for women and girls on public transport, with women and girls currently bearing significant responsibilities to adapt their behaviour to feel safe and secure.

The report made 10 recommendations aimed at improving experiences of personal safety for women travelling and working on Scotland's Public Transport System. These ranged from introducing systems to monitor, upgrade and repair communication systems and lighting across all services, and a comprehensive review of staff training. The report brought Scottish-specific evidence to an existing evidence gap, and was well received by stakeholders:

British Transport Police Superintendent Arlene Wilson

"Women's safety on the rail network is a key priority for BTP. The findings from this research will support our aim of ensuring every woman and girl can travel on the rail network without fear of harassment or intimidation. We will use these findings to work with our partners to ensure that sexual harassment will not be tolerated on the network and we will always take reports of this behaviour seriously."

Kate Wallace, CEO of Victim Support Scotland

"Victim Support Scotland welcomes this focus on increasing women and girls' safety on public transport. While incidents are still too high, we welcome steps being taken to improve reporting and for complaints to be taken seriously."

This work was part of a wider a programme of research and activities the outputs of which can be accessed via a webpage on the Transport Scotland website.

Health – Benefits of Encouraging Healthy Travel Choices

In the discussion of safety above, the benefits of reducing harm were the primary focus. However, the rest of this section will focus more on the benefits that transport can have in a health and wellbeing context. In terms of our health, making healthy travel choices help us achieve better health outcomes and also reduce pressures on health budgets in the process.

This point was made more formally and robustly in a World Health Organization (2022) paper on Walking and cycling which noted that *"Numerous studies show that active travel translates into higher overall levels of physical activity. Thus, walking and cycling do not merely substitute for other forms of exercise, but rather, at least in part, replace passive forms of transport"*. By increasing physical activity levels, active travel can help reduce a wide range of bad outcomes that are associated with physical inactivity and improve our quality of life.

A literature review for Transport Scotland (2023) found substantial evidence of economic, health and environmental benefits. The review noted that health benefits comprise the majority of the benefits accrued from engagement in active travel. Within health benefits, evidence was found to be strongest for the heightened risk of several chronic health conditions, including cardiovascular disease (CVD), stroke, obesity, colon and breast cancer, type II diabetes, osteoporosis, depression and

anxiety. The review also identified ways in which individuals engaging in active travel can benefit the wider economy if numbers of active travellers increased substantially. For example, reduced pressures on the NHS and reduced numbers of sick days that employees take, thereby boosting productivity.

Similarly, according to the Sustrans Walking and Cycling Index (2023), every year walking, wheeling and cycling in Scotland's eight cities results in 4,251 serious long-term health conditions prevented, £1.1 billion in economic benefit for individuals and index cities and over £50 million savings a year for the NHS.

On an individual project level, there are also substantial benefits that can be unlocked by investing in active travel. For example, in a paper looking at a three year evaluation of investments in active travel infrastructure in Outer London, Aldred, Woodcock and Goodman (2021) found a health specific economic benefit of £724m resulting from interventions that cost just £80m. A key point is that often to increase active travel, it is necessary to reduce car travel with active travel being used as a substitute for, rather than complement to pre-existing car use. This mimics the behavioural discussion in the safety section above that a reduction in car use can create the conditions for achieving broader positive outcomes.

Much of this discussion focusses on the health benefits of active travel to those engaging in walking, wheeling or cycling. However, there may also be considerable environmental and broader benefits by a significant modal shift from car to active travel. An improvement in overall air quality for example would benefit all of those who reside or spend time in a particular locality - not just those actively engaging in active travel. In this regard, the WHO (2022) note that *"Most studies have shown small impacts on general population health, although more ambitious mode shift scenarios indicate that gains in population level health through air quality improvements could be substantial".* Similarly, a modal shift away from cars and toward active travel could be expected to increase traffic safety – with the WHO noting that *"comparing crash rates to levels of active travel also clearly demonstrates the strong relation between safety and higher levels of walking and cycling".* This could also help improve some of the 'behavioural' aspects of road safety discussed above.

Wellbeing

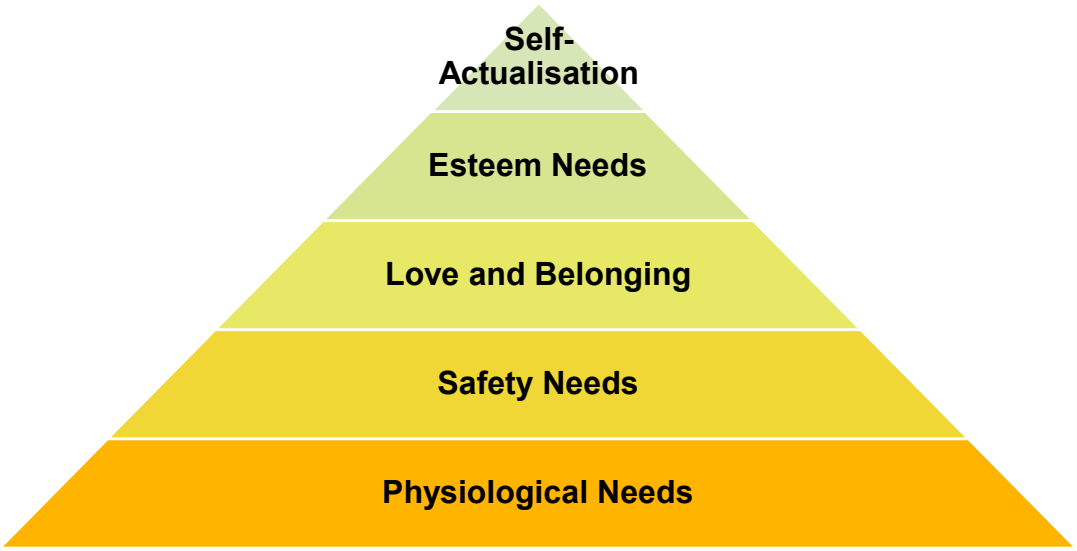
Introduction

Much of this paper focuses on evidence about how transport (in general, or in terms of a specific project) helps support the economy and improve our lives. However, the focus of this chapter is a bit different – looking at the role of transport (alongside

other policies) in impacting on our wellbeing. Measures of wellbeing typically extend beyond headline economic measures such as GDP or labour market statistics.

Wellbeing is a positive state experienced by individuals and societies. Wellbeing encompasses quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose. Focusing on wellbeing supports the tracking of the equitable distribution of resources, overall thriving and sustainability. A society's wellbeing can be determined by the extent to which it is resilient, builds capacity for action, and is prepared to transcend challenges. Wellbeing is not a binary concept; it's a spectrum or continuum, not just the absence of illness or disorder (WHO, accessed 2025). Therefore, a useful framework in considering wellbeing is Maslow's Hierarchy of Needs and how unmet needs can hinder it. Maslow's hierarchy can also be translated into the role that transport plays in people's lives – as illustrated in figure 3.4.

Figure 3.4 – Maslow's Hierarchy of Needs



Physiological needs refer to essentials like food, shelter, and water; without mobility these cannot be met. Safety needs include protecting our society from harm and are directly correlated to providing a safe transport system. Love and belonging needs are enabled by transport facilities by providing social connection. Developing comprehensive public transport systems that connect different communities can facilitate social interaction and build a sense of belonging. Esteem needs are focussed on the desire for respect, recognition, achievement and confidence in oneself. Having access to reliable transport can increase one's social standing and confidence, positively impacting esteem. The term "Self-Actualisation" is used within the Hierarchy of Needs to represent the desire to achieve one's full potential, pursue personal growth, and experience fulfilment. Access to transport enables individuals to pursue their passions, hobbies, and personal growth opportunities, contributing to personal fulfilment and well-being.

How our built environment influences wellbeing – and the role of transport

The built environment comprises a number of components of which transport systems are one alongside housing, urban design and other infrastructure. Each of these components of our surrounding environments impact on our wellbeing and can do this positively or negatively depending on how well they are designed (OECD, 2023). Clearly, the transport network itself influences our transport behaviours, which have knock on impacts on areas like our health and personal finances. However, the way that transport interacts with the rest of the world around us, including the built environment, the location of our services and of job opportunities, is often considered just as important (and arguable more so). This shapes the places that we live and the communities that we are members of.

Well planned places are integral to the wellbeing of our people and our society. Transport is not just the access it provides – it must encapsulate and consider the places we live, work and play. The opportunities for betterment in our communities are seen as an integral part of transport planning, as it is widely recognised that transport is an enabler as well as a disabler.

These concepts are recognised as abstract. Thus, to illustrate how transport can synergise with other key strands of policy making and impact wellbeing, examples are presented below:

International Example: The Netherlands is renowned for having extremely high levels of cycling – yet this was not always the case. In the 1970s, transport networks were dominated by cars, however, there was significant public sentiment against the impact of cars on people's safety and the environment (see for example, Thomas (2023) and Bruno et al. (2021)). Policy in the Netherlands has since taken a conscious decision to promote and protect cycling. In particular, the Dutch Ministry of Transport developed a national strategy for the promotion of cycling, the Dutch Bicycle Master Plan, in 1990 (ECMT ,2004). This was made up of over 112 projects – but also stimulating local government to develop similar strategies and establish cycling schemes as an integral part of their planning. Today, over a quarter of journeys in the Netherlands are made by bicycle (KiM NITPA, 2024) - and the Netherlands has achieved many of the benefits set out in the Health section above. More recent commentary has focussed on the link between transport choices and child wellbeing. Child wellbeing in the Netherlands is amongst the highest in the world (UNICEF Innocenti, 2020). This is likely driven, in part, by these changes in transport outcomes. There is a well-established link between traffic levels and reduced children's independence, for example a 2015 Policy Studies Institute report on children's independent mobility notes that *"traffic seeming to be the strongest*

factor affecting the granting of independent mobility" (Shaw et al., 2015) and notes the positive effects of policies designed at increasing child independence in Rotterdam. In this example, a specific programme was delivered to ensure desired outcomes developed into tangible results, by transforming parts of the built environment to make the city more child friendly (City of Rotterdam, 2022). Similarly, at a national level, many active travel advocates argue that cycling plays a key role in improving child wellbeing (Bruntlett, 2021). Indeed, cycling is one of the main factors UNICEF identify as being associated with higher levels of child wellbeing, and the Netherlands performs exceptionally well in terms of the proportion of children cycling to school when compared with other European countries (see Mobycon, 2019).

In a Scottish context, there is evidence of demand for similar benefits being secured. For example Sustrans (2025) recently published the first Children's Walking and Cycling Index. The report notes that children between the ages of 6 and 15 years old supported more traffic-free paths, quiet routes for walking and cycling, and the creation of more segregated cycle paths along roads.

There is also a significant amount of evidence of how transport impacts wellbeing in Scotland. Transport Scotland has recently published a series of evidence papers looking at the impact on wellbeing of key aspects of our public transport system in particular. For example, several survey respondents also suggested that the Young Persons' Free Bus Travel Scheme was beneficial for young people's mental health, and was seen as particularly supportive in this respect after Covid-19 and the related isolation (Transport Scotland, 2023):

- *"More activities to meet new people and socialise, really positive for mental wellbeing." (Follow-up survey)*
- *"I can go out and socialise with my friends more which has helped after Covid where we were stuck in." (Follow-up survey)*
- *"As a teen my child chooses to travel to meet her friends. I'm very grateful for the free bus travel. It gave kids more freedom after Covid and now a huge help during cost-of-living crisis." (Follow-up survey)*

Parents/carers (particularly of teenagers) who participated in the focus groups also spoke of their children/young people feeling less under scrutiny as a result of the Young Persons' Free Bus Travel Scheme, i.e. there were fewer concerns about parents dropping off or picking up and "spying" on young people, as they could travel to/from places with more privacy:

- *"I would say it's definitely given them more independence… realising that she can be dropped off at the cinema instead of relying on her dad, which is*

embarrassing if your friends are waiting… and I think it's encouraged her to be a bit braver too, and to be more resilient." (Parent/Carer of Scheme User)

As a result, there had been some unexpected benefits to the quality of relationships between parents and their children:

- *"I think our relationship has actually got better because she feels that we trust her and that she and her friends have their own time that is more relaxed and independent, that allows her to feel like a young adult." (Parent/Carer of Scheme User)*

And this mirrors more specific work undertaken by Public Health Scotland on Transport and Health. Of course, public transport can also have negative impacts on wellbeing, as noted by Transport Scotland (2023) particularly in the context of women and girls' safety:

- "*Alongside private vehicles, women and girls used mainly bus and train to travel, and public transport was seen as an essential and affordable way for many to achieve independent social mobility*."
- "*The main social impacts of women's and girls' personal safety concerns was extending or reducing their journeys, being selective in the type of public transport chosen based on the time of day/situation, using private instead of public transport to complete all or part of their journeys or restricting their travel to only familiar routes or travel at certain times of the day*."

It is hoped that this discussion helps reflect how transport forms a key component of the places we live in – and how the built environment we live in and the transport options available to us influence our wellbeing – both as individuals and as a society. This also has implications regarding the role that transport plays in decision making. Where transport is not a priority, or a consideration in wider infrastructure decision making and placemaking, opportunities to change our built environment will be limited. On the other hand, although it plays a key part of how we shape our built environment, far more can be achieved than just changing transport behaviours.

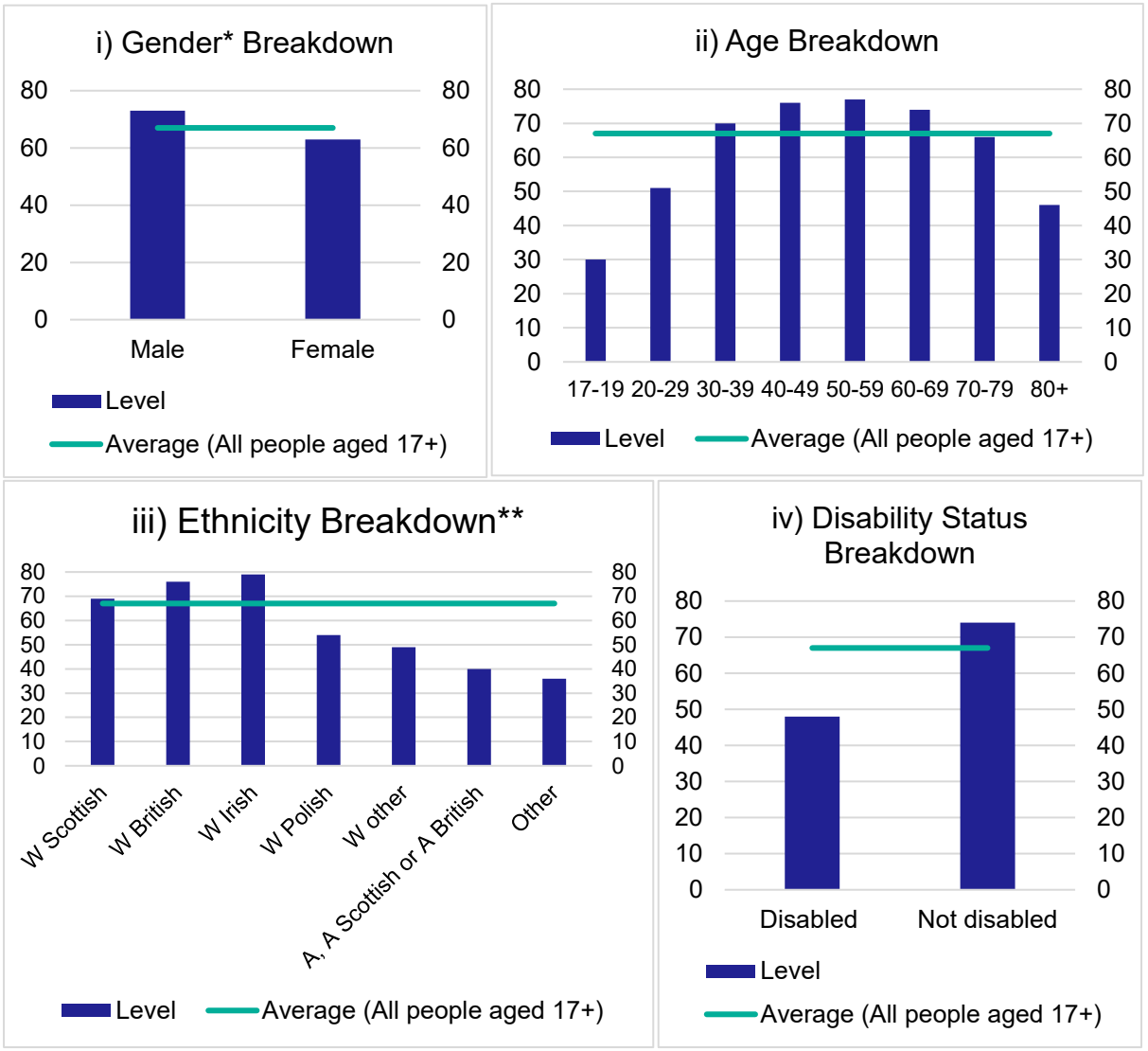
Inequalities: Ensuring Accessibility for Those Without Access to a Car

Scottish Household Survey data tells us a significant amount about our travel habits. For adults, travelling by car is arguably the key and most common type of day-to-day travel in Scotland. Cars represent the main mode of travel to work in Scotland for 68% of individuals (this compares to just 24% of main mode of travel to school, which is dominated by walking – 53% - with buses also playing a significant role – 18%).

On an individual level, travel to work is clearly essential. Taking advantage of employment opportunities and greater levels of accessibility and mobility can enable individuals to pursue employment that offers them a better standard of living. Despite being the main mode of travel to work, car travel is not available or affordable to all. Looking further at factors associated with car access will both help us understand this better and therefore understand the vital importance of providing alternatives (i.e. public and active travel) for those without access to car travel. Figure 3.5 (i-iv), below, looks at Scottish Household Survey data on how many people regularly drive a car across different protected characteristic groups.

Figure 3.5 (i-iv), % of those who regularly drive (once per month) by different protected characteristic groups

Source: Scottish Transport Statistics 2024



*_For gender, there are three response categories: Male, Female, Prefer not to say. In the data, prefer not to say is too small a sample size to be statistically significant.

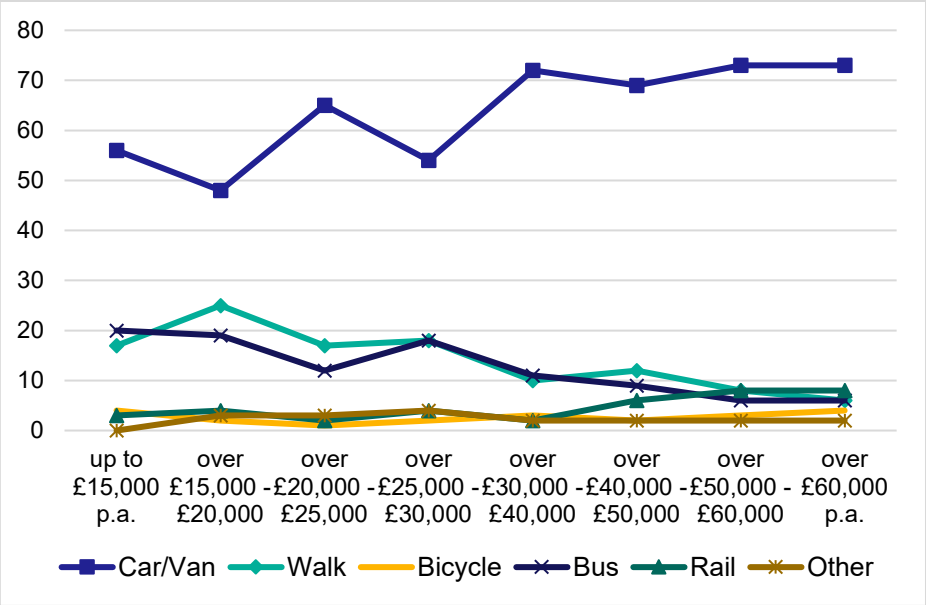
** Key for results – W: White; A: Asian; Other: all other ethnic groups.

Looking at the results, it is clear that driving is strongly associated with being male, white Scottish/British/Irish and being nondisabled. Females, individuals who identify as disabled and those whose ethnicity is either Asian or Other (as distinct from various categories covering White and Asian ethnicities) drive less frequently. Driving is also more common in middle age ranges (30-69) and far less common for younger (17-19) and older (80+) age groups.

For those in employment, the means by which they travel to work tends to be via a car, albeit for different income groups there are significantly different trends (see Figure 3.6):

Figure 3.6 - usual method of travel to work*, 2023, % of all respondents

Source: Scottish Transport Statistics 2024

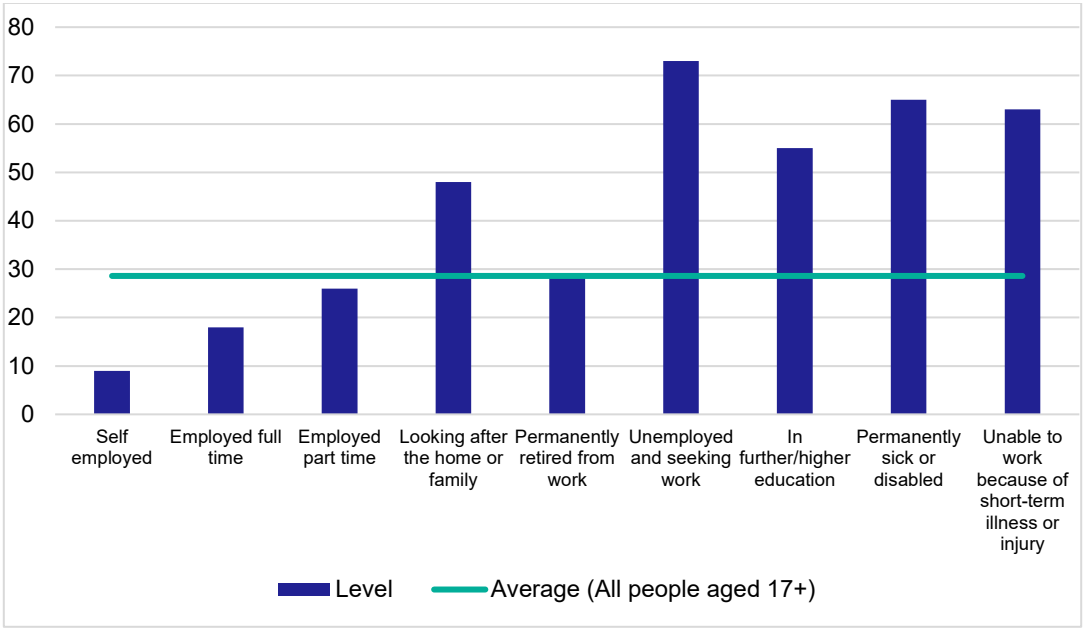


Walking and taking a bus are the most common alternative (i.e. non car) forms of travel to work but are disproportionately common among lower income groups. Conversely rail is a relatively unpopular method of travel to work, outside of higher income groups.

There is also a stark difference in the levels of access to car travel depending on employment status, as seen in Figure 3.5. The group most likely to not hold a driver's license are those unemployed and seeking work (73% of individuals in this group did not hold a driving licence, compared to an overall average of 28.6% amongst all people aged 17+). Those permanently sick or disabled (65%) and those unable to work because of short-term illness or injury (63%) are also more likely to not hold a driver's license. By contrast less than 10% of self-employed individuals and less than 20% of those in full time employment do not hold a driver's license.

Figure 3.7 - % of individuals who do not hold a driving licence - by employment status

Source: Scottish Transport Statistics 2024



Combining these pieces of information tells us a clear equalities narrative and has implications if we want to address inequalities and increase mobility for all groups of society. It is important to invest in alternatives to car travel if we want to reach all of these groups and essential for ensuring those not in work retain access to a larger pool of jobs as a means to help them join, or return to, the workforce. While this paper has focussed on inequalities at an individual level, it has key implications in terms of place and addressing clusters of geographic inequality as well. For example an paper from the OECD (2020) notes that *"While better connectivity will increase overall productivity levels (Duranton and Puga, 2004), the possibility to access jobs outside of one's own neighbourhood is vital in poorer neighbourhoods where employment options within the neighbourhood are limited (Mayer and Trevien, 2017). At the same time, residents in these neighbourhoods are especially likely to lack access to their own car and are therefore reliant on good public transport. More generally, public transport investments are essential elements of inclusive growth strategies, as they generate economic growth while benefitting especially low-income households."*

A lack of access to car travel has implications beyond travelling to work and accessing economic opportunities. The Urban Transport Group argues that transport must meet the four 'A's to ensure social inclusion (UTG, 2022). Those are available, accessible, affordable, and appropriate – when transport falls short of these criteria, groups are vulnerable to social exclusion. Therefore, effective transport is critical in facilitating social interactions and fostering connectedness.

Addressing inequalities is one of the four NTS2 priorities that were introduced in the context section of this paper. In line with this, a substantial amount of the activity that Transport Scotland does is aimed at addressing inequalities, most notably via trying to ensure that access to car travel is not an essential element of pursuing economic

opportunities. This includes better targeting of public funds towards supporting access to public transport for those who need it most and the delivery of concessionary travel alongside a wide range of other support. It also includes promoting active travel which can support delivery of a more equitable transport network, ensuring people can walk, wheel or cycle to access the public transport network, meaning children and their families are not denied access to services or amenities through want of car ownership. For a more detailed discussion of the wider policy landscape aimed at addressing transport inequalities, please see Transport Scotland (2024).

Implications of Scotland's Geography

Introduction

It is important to acknowledge the role of geography and the spatial distribution of Scotland's population when considering how Scotland's transport network has developed, and how it may change in the future.

Scotland is a relatively sparsely populated country. Looking at Scotland's Census (2022), Scotland had 70 residents per square kilometre (NRS, 2023), which is lower than EU averages (around 109 residents per square kilometre), and significantly lower than the rest of the UK as a whole (270), as well as much of mainland Europe (see Eurostat data). Scotland also has a diverse environment, with almost 100 inhabited islands, significant natural resources (including those found offshore) and a dramatic landscape in many parts of the country. These are tremendous assets, and shape both opportunities and challenges for our transport network. This section will first discuss Scotland's geography and population distribution and then move on to discuss some implications for transport in the context of rurality, inequality and car dependency, transport to, from and between the islands, the importance of the trunk road network and the impacts of changes in the distribution of Scotland's population. A key implication of this is that Scotland's geography makes it more challenging to deliver transport interventions, but also that those interventions deliver incredible value to our communities. In this respect, transport provision is arguably more important in Scotland than it is for many other countries – and confirms the important role transport provision plays in the context of the powers available to The Scottish Government (which was discussed in the context section of this document).

Scotland's Geography and Population distribution

Understanding how Scotland's population is distributed is essential to understanding the context in which our transport system must operate. Indeed, the overall population density levels discussed above mask significant regional variation, which in turn create unique local circumstances. Within our relatively lower population, some council areas have a much higher population density than the rest of Scotland, notably our major cities. The highest population density is found in the Glasgow Local Authority area (3,555 residents per square kilometre), followed by Dundee (2,477), Edinburgh (1,947) and Aberdeen (1,207). Despite these areas of high population density, a large majority of Scotland's land is classified as rural (98%), with only 17% of the population living there as residents (Scottish Government,

2021). This means that large parts of our country are sparsely populated. This is in stark contrast to other parts of the UK, as set out in figure 3.8 below.

Figure 3.8: Population density map, 2022, by local authority area, UK

Source: ONS Population estimates for the UK, England, Wales, Scotland, and Northern Ireland: mid-2022, available at (ONS, 2024)

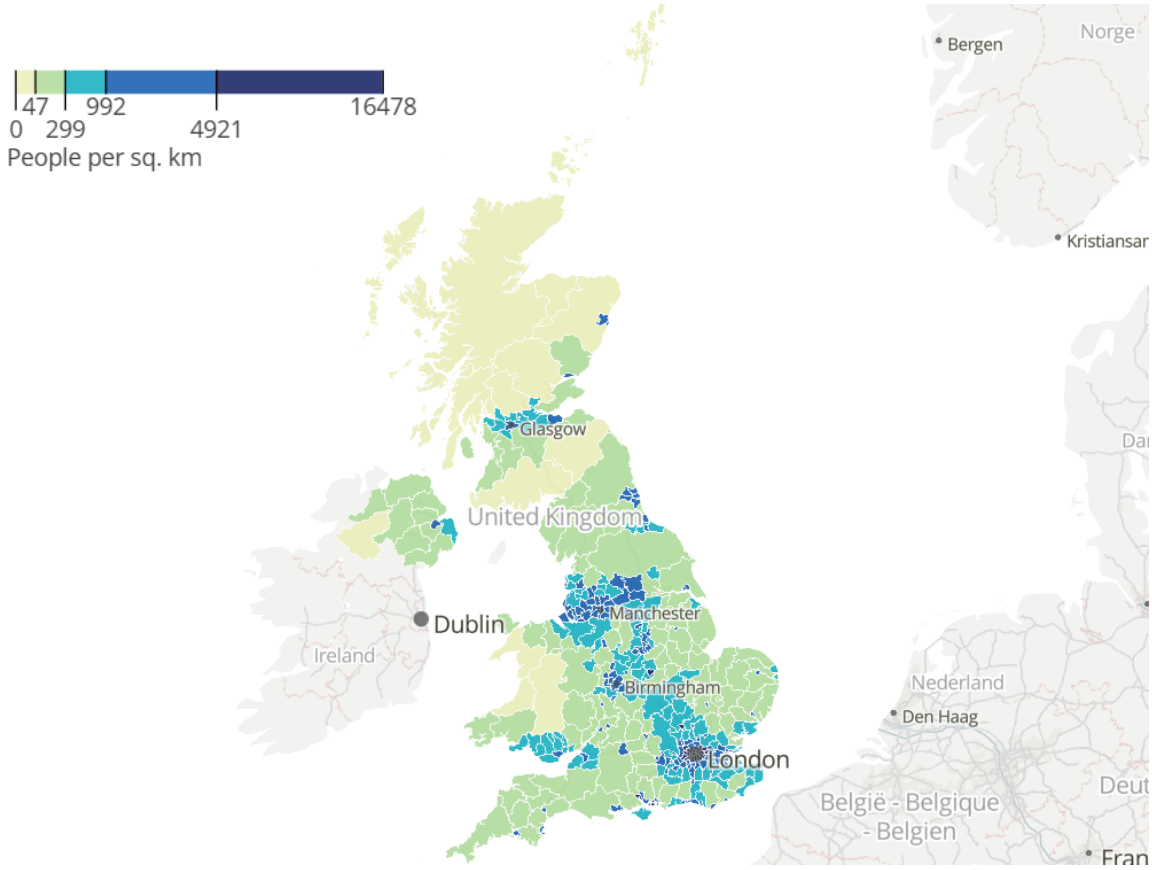


Figure 3.8 shows that a large number of Scottish Local Authorities (accounting for a large proportion of Scotland's land) have a population density below 47 residents per square kilometre. As a result, Scotland's transport network must cater for a large concentration of relatively densely populated areas – in particular around the central belt, but it must also serve a much larger geography of relatively sparsely populated areas. The challenge is considerable, and not at all equivalent to the one in England for example, where no single local authority has a population density of under 47 people per square kilometre. By contrast, a large majority of Scotland's geography falls within this category – including much of Southern Scotland, all of Scotland's Islands, the Highlands and large areas that are further from the central belt. In a further contrast to England, where a majority of the land is medium density (47-299 residents per square kilometre), Scotland has relatively few medium density regions such as Fife and Angus.

Population shifts within Scotland, similar to those in other advanced economies, have historically been driven by economic opportunities. This is a pattern likely to continue in the future. These dynamics can be dated back to the industrial revolution when areas with thriving industries like shipbuilding and textiles resulted in significant population growth in specific geographies. More recently, there has been a notable population shift from the West to the East of Scotland. Looking at National Records of Scotland (NRS) data from 1981 to 2023, there has been a 40% rise in Aberdeenshire's population, contrasted with a 22.6% decline in Inverclyde, which can, in part, be attributed to changing economic opportunities. Oil and gas exploration and exploitation has been a major activity in Scottish offshore waters since the late 1960s. The Draft Energy Strategy and Just Transition Plan (Scottish Government, 2023) notes that *"Of the 25,000 jobs directly dependent on offshore oil and gas production (2019 figures), 98% are located in Aberdeen and Aberdeenshire."* The resulting prosperity has benefited the area immensely, and Aberdeen is frequently referred to as Europe's 'oil capital'. Meanwhile, McIntyre et al. (2022) show that in Scottish regions that experienced high levels of industrial decline, it is common to find weaker labour market outcomes and higher levels of deprivation. Inverclyde, famous for its maritime infrastructure and shipbuilding history, faces significant challenges in this area (FAI, 2022). In a report by the independent Expert Advisory Group on Migration and Population (Scottish Government, 2020), it is also highlighted that underlying drivers of migration may be larger than statistics suggest, with an increasing population of workers commuting further rather than moving their residence. This results in increasing "travel to work areas" for Scotland's large cities (with obvious implications for the transport system).

Scotland's geography creates opportunities. The densely populated central belt is ideal for generating benefits that were discussed in the agglomeration chapter, for example, with high levels of connectivity between our two largest cities as well as the surrounding areas. The landscape of the Highlands and Islands is essential to Scotland's appeal as a tourist destination. They also give Scotland a rich competitive advantage in other sectors, such as oil and gas extraction, and the expanding renewables sector. The Highlands generates more onshore wind electricity than any other UK local authority according to Department for Energy Security and Net Zero (2024) statistics and the Highlands and Islands boast enviable renewables energy assets, especially in terms of offshore wind – with Scotland showing the largest generation from renewables per £ of Gross Value Added. The South of Scotland, full of natural beauty, is an important centre of production and trade, and a connector with our largest export markets in the rest of the UK. Its geography allows for specialisation in forestry and farming including cereals, sheep, beef, and large-scale dairy production as well as a wide diversity of other sectors.

However, Scotland's geography and the dispersion of our population can also create challenges, particularly for the transport sector. An obvious example is the challenge

of connecting island communities, and the need to utilise relatively expensive travel modes such as ferries and low-capacity aircraft to ensure mobility to, from and between these areas. Another challenge is the dependency upon car travel that relatively sparse population distribution creates - and the sheer distance that must be travelled to access employment or services, maintain connections and transport goods across many of Scotland's communities. The rest of this section focuses on how Scotland's transport system helps address these challenges, and the value that it provides for Scotland as a result.

Rurality, Inequality and Car Dependency

Scotland's geography results in particular areas experiencing extreme geographical inequalities – even if those areas do not necessarily underperform in terms of other key outcomes such as income and employment.

The Highlands and Islands as a region is recognised by the UK Government and European Commission as suffering from permanent disadvantage by virtue of its geographical remoteness and sparse population. The geographical difficulties that the Highlands and Islands face can be illustrated via Scottish Index of Multiple Deprivation (SIMD) data. Approximately 7% of Highlands and Islands residents live in a data zone that is in the 20% most deprived in Scotland when looking at 'overall' deprivation. However 55% of Highlands and Islands residents live in a data zone that is in the 20% most deprived when looking at the access domain, which looks at public transport and drive times required to access services (all 30 data zones are within the highlands).

This can be explored further via the Rural Scotland Data Dashboard. Due to longer distances between residents and services, many are left reliant on private transport. Adults in accessible rural (82%) and remote rural (75%) areas are significantly more likely to drive to education or work than adults in the rest of Scotland (60%). There is also a stark differentiation between people living within a 15-minute drive to a secondary school – only 63% in remote rural areas, far lower than accessible rural (91%) and the rest of Scotland (100%). The dashboard reports similar patterns in travel times to places of employment and GPs.

Another aspect covered by SIMD data are transport costs. In rural areas, transport costs are relatively high, particularly for working-age households and pensioners. Looking at travel costs in 2021, it is estimated single pensioners spent £54.10 per week in remote rural areas, compared to £15.42 in urban areas. Similarly, working age couples are estimated to have spent £144.78 per week, much higher than in urban areas (£86.65).

A further contributing factor to high private vehicle dependency is public transport availability in these areas. Demand for public transport in low population areas is relatively low compared to central belt operators, making it difficult for services to be commercially viable. This leads to a higher tendency to drive, in turn lowering demand and leading to higher fares and subsidies – a cycle that makes delivering viable services commercially an even bigger challenge for public transport operators. These conditions can act as barriers for young people accessing education, training, or potential employment, which can result in long-term out-migration to urban areas, exacerbating the situation. The Rural Scotland Data Dashboard indicates that residents in remote rural (44%) and accessible rural (53%) areas are the least satisfied with the quality of public transport in Scotland, compared with 78% satisfaction levels in large urban areas.

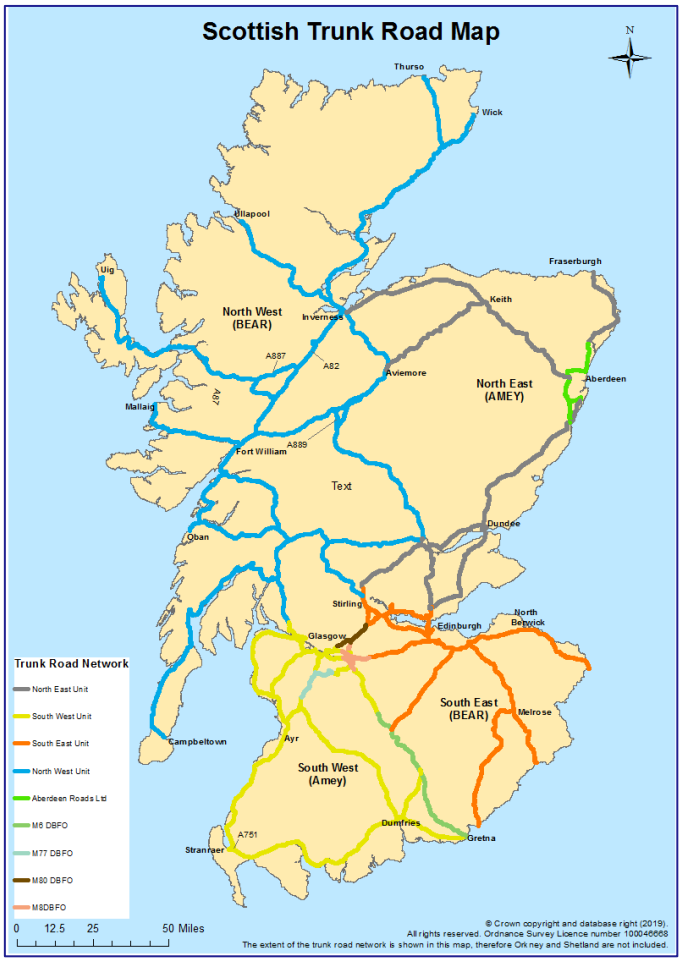
This is one illustration of the challenges that Scotland's geography creates in terms of ensuring mobility for all the population.

Transport modes such as light rail and active travel can deliver huge benefits and reduce car dependency in urban areas, but the scope to reduce car dependency via these routes in more rural areas is likely much less significant. While much of this section has discussed the concept of car dependency, it is also important to consider, especially in the context of our more rural communities, the vital role that the road network plays in overcoming our challenging geographies. The importance of car travel in these areas also reflects the immense value provided by our road network and in particular our trunk road network, which is discussed further below.

Scotland's Trunk Road Network

The trunk road network is one of Scotland's greatest assets. It connects all of Scotland's cities, towns, airports, and ports to enable movement of people, goods and services - ranging from as far North as Thurso, and as far south as Gretna. The trunk road and motorway network is 2,327 miles long, and has a net asset value of beyond £27.4 billion (See Transport Scotland 2023/24 Annual Audit Report). Approximately 40% of vehicle miles travelled on Scotland's' roads occur on the trunk road network.

Figure 3.9: Scotland's Trunk Road Map, 2023



The trunk road network provides tremendous value in terms of facilitating economic activity. This goes far beyond the discussion of travel to work and services above. In the material discussing the role of transport in supporting the economy, the role of freight was highlighted in terms of supporting the movement of goods and facilitating Scotland's international trade. The discussion there was primarily focused on Scotland's international trade. However, this does not come capture the full extent of the impact that the Trunk Road Network has in terms of the movement of goods and the economic activity facilitated as a result. Of the 134 million tonnes of freight lifted that originated in Scotland, over 117 tonnes (almost 90%) had a destination within Scotland (Scottish Transport Statistics, 2025). Much of this supports physical retail, but an increasing amount of freight will support the transition to an ever more 'on demand' economy. Consumer Scotland (2023) note that the UK is estimated the be the most advanced e-commerce market in Europe, with online retail accounting for 26.5% of total retail trade in 2022. It is estimated that UK consumers receive on average 75 parcels per person per year, with 162 parcels being delivered per second across the UK. Scotland also carries out a large amount of trade with the rest of the UK. Scotland's exports to the rest of the UK valued an estimated £48.6 billion in 2021 and accounted for over half (61%) of all Scotland's exports. The trunk road network is responsible for transporting a large majority of these goods to the rest of

the UK (Scottish Export Statistics, 2023), with a large majority destined for England and Wales.

The trunk road network plays an essential role in supporting our day to day lives and keeping large parts of our economy moving. This is especially evident when we see the network disrupted for extended periods of time – such as the recent events of Storm Éowyn, which featured a period when a red weather warning and advice against travel was issued (see Transport Scotland press release) for large parts of Scotland. The immediate impact included many individuals not being able to travel to work, impacting our economy in terms of lost inputs. The knock-on economic implications were also large. Losses will have been incurred where perishable goods could not be stored or delivered in time. Wider impacts were felt across Scotland in terms of deliveries not being made (whether for physical or online retail), causing significant disruption. This was only a brief pause in the operation of the network. Imagining how Scotland's economy would sustain itself through an extended disruption to the network would be difficult. Maintaining a functioning trunk road network is made all the more important by the nature of our geography and the number of communities dependent on the trunk road network for access to community, jobs and services as well as the delivery of goods.

A more detailed exploration of the benefits provided by the trunk road network is given in report by Abell et al. (2017) for Transport Scotland, which estimated that the Trunk Road Network generated employment for 31,000 people in Scotland, £358m in tax receipts and contributed 1.38bn in GVA to the economy (in 2016 prices). Benefits such as reduced road traffic accidents and emissions (versus a scenario where only local roads are used) are also modelled.

Islands – Ferries & Air

The islands themselves face further unique challenges both within the islands and in terms of accessing the mainland. There are 93 inhabited islands (out of 790), with communities reporting higher costs, a reliance on ferries, and lengthy distances from services. This, paired with depopulation, creates issues surrounding service provision and sustainability on the islands themselves. In turn, this builds a need for greater accessibility to mainland Scotland (Scottish Government, 2023).

The islands are strong economic contributors to Scotland's economy. They support various sectors on the mainland, as well as having obvious competitive advantages in areas such as fishing, whisky and renewables. In terms of Scotland's fishing sector, Shetland saw the second highest number of landings in 2023, bringing in over 64,000 tonnage (valued at £98.3 million) into Scotland (Scottish Sea Fisheries Statistics, 2024). Stornoway and Orkney were also significant contributors, with £13.9 million and £8.6 million landed respectively. Another significant sector being

supported is Whisky – there are 22 distilleries on Scottish Islands, with 10 in Islay alone. The importance of the whisky sector is well established, with Scotch Whisky production estimated to have generated £6.3 billion GVA in 2022, as well as providing local jobs and tourist attractions (Scottish Whisky Association, 2024). The area also has clear advantages and potential in terms of renewables. For example, the Scottish Energy Strategy notes that *"Orkney hosts not only the world's first grid-connected wave and tidal test centre (the European Marine Energy Centre) but also the world's largest tidal turbine (ScotRenewables), whilst the Pentland Firth is home to the world's largest planned tidal stream array (MeyGen)*" (Scottish Government, 2017).

Transport is crucial in maintaining the two-way-relationship that exists between supporting the islands and the islands supporting the mainland.

In 2023, Scottish ferries had 8.0 million passengers on routes within Scotland – and over 2.8 million vehicles (Scottish Transport Statistics, 2025). This was across a mix of routes subsidised by Scottish Government, local authority services and privately run services. The largest subsidised operator was Caledonian MacBrayne ferries which carried 5.1 million of these passengers, 1.45 million cars, and over 80,000 commercial vehicles and buses. Serco Northlink Ferries carried 440,000 passengers and over 90,000 cars.

Providing these essential transport links is extremely expensive. Transport Scotland Analysis for the Fair Fairs Review suggests that in terms of public expenditure per passenger km, ferry travel is 100 times more expensive that roads, ten times more expensive than bus, and over three times more expensive than rail (Transport Scotland, 2024). In 2025-26, Scotland's Ferry Services budget is set to exceed £500m for the first time, with ferries accounting for around £1 in every £8 of spend within the transport budget (see Scottish Government Budget 2025 to 2026).

Despite the levels of funding achieved, significant challenges remain, particularly in terms of islander's transport spend. A research report, 'The Cost of Remoteness' (Scottish Government, 2021) identified transport as the most fundamental difference between island and mainland household budgets. Island groups agreed all households need a vehicle for **intra-island** transport, increasing to one vehicle per adult in working age households with public transport reliance difficult given a lack of services reflecting low population density. This creates a dependency for private vehicles for day-to-day activities.

For travel to and from the mainland, a Scottish Government (2023) data overview highlights that only 19% of island residents think flights to and from the mainland are good value for money, and that they are dissatisfied with the cost and reliability of **inter-island** air services. This feeds into greater dependency on ferries services to uphold accessibility. This not only reflects islanders travel preferences, but also

commercial airport infrastructure, with some islands (such as Mull) left with no other options than ferry travel to access the mainland, and those with commercial flights are limited.

Ferries can help address but cannot overcome the challenges faced by island communities in terms of transport. Highland and Islands Enterprise (HIE) 'My Life in the Highlands and Islands' research (HIE, 2022) found that 45% of islander respondents were dissatisfied with ferry reliability. This rose to 50% amongst Outer Hebrides respondents and 64% amongst respondents in Argyll and the Islands. In response to the Consultation on the Islands Connectivity Plan (Transport Scotland, 2024), respondents reported having difficulties in attending medical appointments, social and family events, further/higher education and business appointments. Improving reliability was seen as key to building greater confidence among tourists and businesses, leading to increased economic activity and investment.

Similar to the value provided by the trunk road network (which is also extremely important for linking ports to destinations), the immense challenges and benefits of connecting Scotland's Islands are another major implication of Scotland's geography for our transport network.

Transport and the changing nature of Scotland's population and economy

This chapter has discussed the role of transport in addressing the challenges created by Scotland's Geography as well as by the spatial distribution of Scotland's population. However, it's also important to note that Scotland's' population distribution is not fixed, and that transport has a role to play both in terms of influencing and responding to population change.

Following on from the discussion of island communities and ferries above, one obvious point is the role of transport (in particular ferry, air and bus travel) in addressing population decline and ensuring a healthy, balanced population profile for Scotland's islands – the first Strategic Objective of Scotland's National Islands Plan (Scottish Government, 2019). During the consultation for this plan (which involved face to face engagement with over 1,000 people), transport was the issue that was brought up the most. This helps show the importance of transport itself in influencing population change.

An important determinant of the demands that the transport system will face over the coming decades will be the structural changes we are likely to see within the economy and its implications for Scotland's population. The West to East population movement discussed in the opening of this chapter has, of course, raised significant issues from a transport perspective. The concentration of economic activity within

Scotland's central belt has led to much of the focus of transport investment enabling this activity – boosting the connectiveness of Scotland's major cities and ensuring improvements in mobility across and to the central belt, as discussed in the agglomeration section of this paper.

There will continue to be a geographic element to future changes in economic activity. An example of this is likely continued movement from South to North, with Inverness in particular (but the Highlands and Islands more generally) set to be important area for key emerging industries. Inverness is already recognised as one of the fastest-growing economic areas in the UK. The population of Inverness increased by more than Highland and Scottish averages between 2010 and 2020, and significant population growth is expected out to 2041 (area profile, accessed June 2025). Success has been driven by factors such as the creation and expansion of the University of the Highlands and Islands and growth in the life science industry. Further economic opportunity and population increase is expected as a result of the energy transition and expansion of renewables and the role they play within the economy.

It is essential that the transport network can properly facilitate a growing renewables sector, with transport acting as a key enabler for almost all renewable technologies. Suitable transport provision is particularly important in terms of minimising upfront costs and the construction phase for many projects. It plays a key role in terms of getting people to remote work sites and the resulting shifts of population around the country will also have important transport implications. As such, investment in transport can help ensure that Scotland takes full advantages of economic opportunities offered by renewable energy, energy transition, carbon capture utilisation and storage.

In some cases, the emergent nature of renewables technology means that the implication for transport is still being understood, however it's clear that there will be large interdependencies between transport and renewables. Wind power, which is well established, is a good example to use to illustrate some of these issues. In a Baringa (2014) report for the Department for Energy Security and Net Zero (DESNZ), vessels and ports are identified as a "High" supply chain risk for offshore wind and transport as a "medium" risk for onshore wind.

The size of components required for offshore wind mean that specialised transport solutions are required. Vessels must be capable of installing extremely large foundations (which can exceed 3,000 tonnes). Globally there is expected to be a shortage of such vessels in the coming one to three years, with relatively few vessels on the market capable of carrying out this work. Furthermore, shortages are also expected for cable installation vessels, and there are other installation related supply chain risks. There are limited numbers of shipyards capable of producing these vessels, and lead times are long. The DESNZ report also notes that the UK has a

shortage of deep-water port capacity, which puts offshore wind asset deployments at risk, and that port capacity will also be required for other priorities such as decommissioning. Facilities such as the King George V Dock (2024), which reports it will have likely handled over a thousand offshore wind components (with a total weight of over 60,000 tonnes), are essential to enabling and facilitating offshore wind expansion.

Transport is also a key enabler for onshore wind. While onshore wind components are typically not as large as offshore ones, they will often need to be transported by road, which creates a different set of challenges. Large turbine components class as abnormal / large loads and must be transported at off-peak hours with a police escort for safety reasons. With wind turbines becoming increasingly larger, this complicates matters significantly and it is reported that transport costs can represent 7-10% of total project costs (Iberdrola, 2022). A particular issue is the extent to which Scotland's road network (both in terms of strategic and local roads) can withstand the weight of the loads being moved – with particular issues coming up where the roads are not designed to support such large weights (creating a need for increased maintenance or even upgrades). Structures, like bridges, cause particular problems. This is not only difficult in terms of constraints and costs for those moving these components but it also has a knock-on impact for other road users. Ensuring efficient and reliable transport for these projects can therefore greatly assist the sector.

More broadly than simply moving components themselves, it is also important that the transport network can ably support the industry, particularly if it requires a large number of people to be working on remote sites for extended periods, which could put extra strain on parts of the network that are not necessarily built with this capacity in mind (for example, increasing demands on particular ferry routes).

The economic shift towards the renewables sector (including but also beyond wind power) will also have implications for the distribution of Scotland's population, and the transport demands that places on the Transport system. Transport is a key enabler of these economic changes and also interacts with other key enablers (such as housing) in ways that both create the conditions for growth and change, and impacting centrally on the lives of people as they pursue new economic opportunities. Just as it was and is essential for transport to respond to West to East movements, it will be essential to respond to South to North movements. Indeed, a recent HIE (2025) report on regional transformation opportunities (RTOs) in the Highlands and Islands emphasises the role of transport: *"Transport is a critical enabler for all RTO sectors, and this extends across all major transportation modes including inter-island ferries. The scale of development means that across the road, rail, air and sea transport network there will be increasing demand for capacity to transport people, equipment, and materials."* Within this report, specific ongoing projects are discussed across all transport modes. In particular, major investments in

improving road infrastructure (arterial routes such like the A9 and the A96, as well as roads offering clustered benefits such as the A82, A83 and Rest and Be Thankful), renewing and upgrading the fleet of ferries operating in the region and investments in rail infrastructure to further electrify lines and replace rolling stock will be important for supporting the anticipated economic changes and population shifts.

The implications of population changes for transport go beyond strategic transport links.

The role of transport in contributing to well-planned places is particularly important where a population is expected to rapidly expand or decline. Within local decision making, transport decisions can shape and improve the places we live in. One example may be instances where there is a housing shortage – such as we currently see with increasing pressures around Inverness. Without transport contributing to well-planned neighbourhoods, we are likely to see an increase in car dependency and will not realise the benefits discussed in the health and wellbeing sections of the paper. Having transport as a key part of local decision making, aligned to other policy areas such as housing and economic development, is therefore hugely important.

The chapter started by suggesting that transport is more important in a Scottish context than it is for many other countries – and at times of significant change, this is likely to become increasingly true.

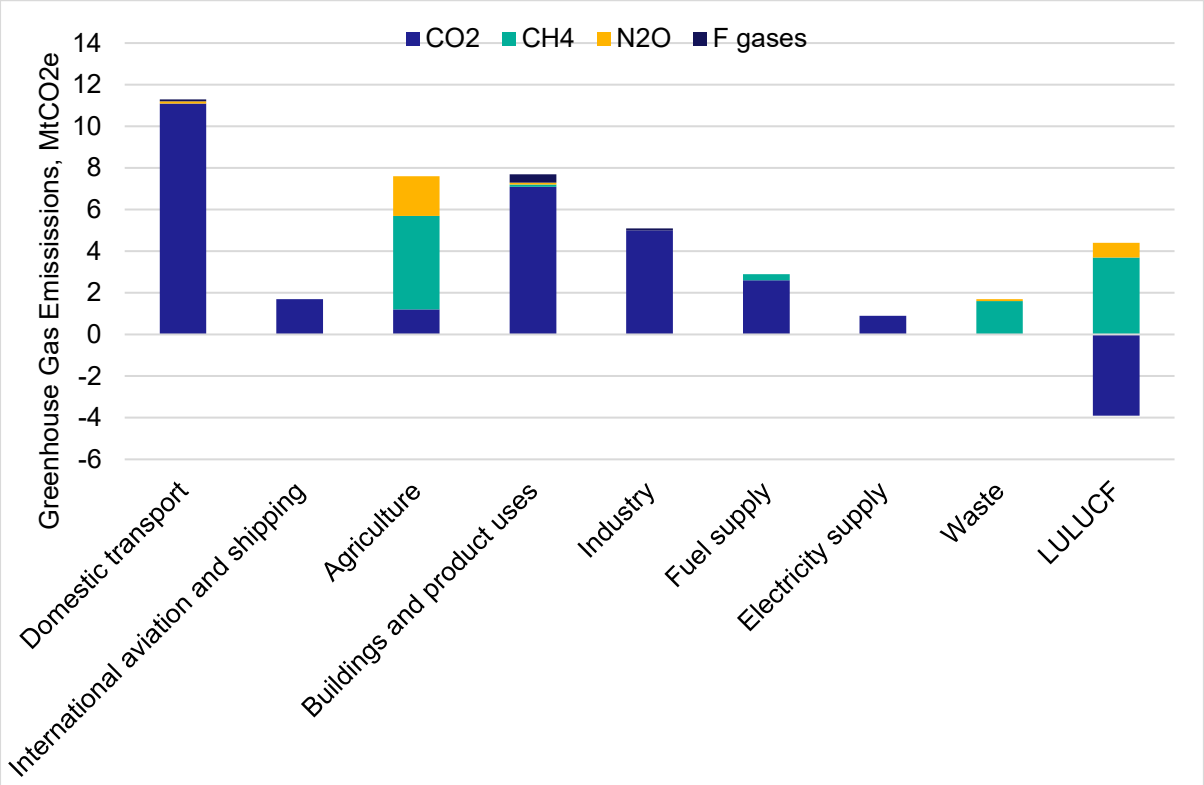
Decarbonisation: The Key Role Transport Needs to Play in Meeting Scotland's Climate Ambitions and the opportunities it offers

Transport's Role in Scottish Emissions

Transport is Scotland's largest source of emissions, as can be seen in the chart below which looks at emissions (in CO2 equivalent terms) from all of Scotland's major sectors, and across different emission types.

Figure 3 **- Scottish Greenhouse Gas Emissions by Gas and by National Communications Category, 2023 (Values in MtCO2e)**

Source: [Scottish Greenhouse Gas Statistics 2023]



In 2023, Transport including international aviation and shipping (IAS) accounted for around 33% of total Scottish emissions, making transport the largest emitting sector for the nineth consecutive year. This is a rise on recent years, in terms of share of overall emissions, but in line with pre pandemic averages.

The Financial Benefit of Decarbonising Sooner

A first principle to acknowledge in discussing the likely costs of decarbonisation is that while these financial costs are large, the costs of not decarbonising are significantly larger. The Stern review, a landmark study published in 2006, estimated that the overall costs of unmitigated climate change to be equivalent to 5-20% of global GDP each year (Stern, 2006). The Climate Change Committee, which has a purpose to advise the UK and devolved governments on emission targets, estimate that the significant investment required in infrastructure and technology will be more than offset by operational expenditure savings (CCC, 2020). They estimate a net benefit to UK consumers of £8 billion per year in 2035 (compared to a counterfactual of no abatement actions).

However, to get to the stage of reaping net benefits, significant initial and ongoing investment is required. For example, investment in vehicles and charging infrastructure from both the public and private sector. In some areas of transport, estimating a financial cost of these interventions at sufficient scale is difficult as the technology is still emerging. The IPPC (2022) note that *"There are few obvious solutions to decarbonising heavy vehicles like international ships and planes. The main focus has been increased efficiency, which so far has not prevented these large vehicles from becoming the fastest-growing source of GHG globally."* The CCC estimate the combined public and private annual capital cost of decarbonising transport in the UK will reach £12 billion per year in 2035.

Achieving the levels of funding required to address the climate crisis is not just a Scottish or UK specific challenge – nor is it specific to transport alone. There is still a need for both governments as well as businesses and individuals to invest significantly more in measures aimed at climate mitigation in order to achieve Net Zero at a global level. The Climate Policy Initiative (2023) estimate the requirement for climate finance to be US$6.2 Trillion by 2030 – with transport playing a significant part.

There is wide acknowledgement of a large gap in terms of financing for transport decarbonisation, but a general consensus that the additional funding required amounts to hundreds of US$ billions by 2030. For example, a range of US$244 to US$944 billion through 2030 is provided by Lefevre et al. (2016). More recent estimates also fall within this range - Transport and Environment (2024) estimate that *"Europe needs €310 billion each year by 2030 to deploy clean Technologies*" while the SLOCAT (2022) have estimated that "*There remains an estimated annual financing gap of around US$ 440 billion for transport infrastructure to meet the United Nations (UN) Sustainable Development Goals by 2030*." A critical point here

is that significant private as well as public investment is needed, with the Transport and Environment report noting that "*The bulk of the investment – 87% by 2030 – will come from private investors, including manufacturers, banks, and institutional investors*". As such, harnessing wider investment is absolutely key to financing decarbonisation in a transport context.

There has been positive progress in this regard, with at a global level a review by the UN Environment Programme (2016) noting that financial institutions were recognising the importance of supporting sustainable development and that financial regulators were acting to increase transparency and assist in the effective reallocation of capital towards sustainable investments.

Transport Scotland recognise that investment in active and public transport is vital for our climate ambitions by providing viable and sustainable alternatives to car use. In The Scottish Government's Budget 2025-26, nearly £2.9 billion (which includes resource, capital and non-cash funding) will support our bus, rail and ferry networks, low carbon programmes and active and sustainable travel. £54.4 million will be targeted at programmes to reduce the impact of transport on our environment to support low carbon, zero emissions and climate change and a further £188.7 million on Sustainable and Active Travel will increase our investment in walking, wheeling and cycling, and improve connections into the public transport network. Despite these considerable investments, the challenges of achieving the funding levels necessary (both in government and in the private sector) should not be underestimated.

The delivery of public electric vehicle (EV) charging underpins the adoption of EVs in Scotland and the phasing out of Internal Combustion Engine (ICE) vehicles – a key part of meeting Scotland's net zero targets, with cars and vans accounting for 17% of CO2 emissions in 2022. In 2011 the Scottish Government took the bold step of investing in public EV charging infrastructure ahead of demand to build confidence in the early adoption of EVs. In the early years of EV adoption, the vast majority of public charging infrastructure was funded by the Scottish Government and was largely free to use to incentivise early EV uptake. By the end of 2021, Scotland had close to 4,000 public charge points. However, research undertaken by the Scottish Futures Trust (2021) for the Scottish Government in the same year, suggested that if Scotland was to have a public charging network that met its future needs, then the scale and pace of investment in public EV charging infrastructure would need to be accelerated to meet growing demand and new delivery models, and enabling increasing private sector investment would be required.

Private sector investment has played a role in growing Scotland's public charging network since the first modern EVs appeared on Scotland's roads in the 2010s, however it was only when tariffs began to be introduced across the ChargePlace Scotland network in 2022 onwards that the scale of private sector investment

became increasingly significant. The Scottish Futures Trust estimates that the private sector invested approximately £25 million to £35 million in expanding public EV charging infrastructure in Scotland in 2023 and between £40 million and £55 million in Scotland in 2024 (see a Vision for world class public electric vehicle charging - Transport Scotland (2023), and the Draft Electric Vehicle Public Charging Network Implementation Plan - Transport Scotland (2024)). Today Scotland has over 6,800 public charge points and over two thirds of charge points have been funded and delivered by the private sector. However, private investment is geographically uneven and is largely being targeted towards areas of the strategic road network with higher traffic volumes and Scotland's towns and cities. To ensure a return on their investment, charge point operators and their investors target these high-utilisation locations and even then, it can take between seven to ten years for a public charging site to start to make a return on the initial cost of investment (KPMG for Transport Scotland, 2024). This risks leaving rural and island communities underserved for lack of private sector investment. For this reason, Scottish Government funding such as the £30 million EV Infrastructure Fund and the £5 million Rural and Island Charge Point Fund support the development of public EV charging in those areas of Scotland less likely to benefit from stand-alone private sector investment.

Another example of public/private sector collaboration is the Scottish Zero Emission Bus Challenge Fund (ScotZEB) which aims to support swift and substantial changes in the bus market. This fund is focussed on supporting innovative business models orientated around zero-emission buses and infrastructure – encouraging bidders to make arrangements with partners or collaborators. Phase 1 awarded £62 million and resulted in 276 zero-emission buses and associated charging infrastructure. Phase 2 sees public sector capital funding allocated to forward-thinking companies and supports a change in narrative to zero-emission vehicles becoming the default for operators. It also expanded eligibility to coaches and community transport providers. ScotZEB 2's collaborative approach to decarbonising the bus sector has seen success, with companies working together to maximise the benefits of infrastructure supported by government grants. A pan-Scotland charging network comprised of electrified bus and coach depots is being supported through the scheme, which will be open where possible to other members of the ScotZEB 2 consortium, and also to other road users. These open depots provide additional revenue streams to the operators who own them, as well as provide potential charging opportunities to other heavy duty road vehicles, which will help to provide confidence to that sector that transition at scale is possible.

Transport Scotland are working in partnership with Heriot-Watt University and haulage fleets to understand where energy infrastructure will be required for trucks on longer journeys. Haulage fleets have shared data enabling a better understanding of routes travelled and Heriot-Watt University's modelling identifies where en-route

charging and fuelling will be needed to unlock the transition in Scotland. This work explores both charging infrastructure and hydrogen refuelling and an initial iteration covering around 1% of Scottish trucks was published in September 2024. This work is also supporting investment planning by both electricity networks and commercial financiers as they develop business cases for supporting Scotland's heavy duty vehicle charging network, as well as of interest to road haulage fleets.

Adaptation to climate change represents another area where huge costs could be avoided by investing in ensuring the resilience of our transport network to the likely impacts of climate change. Impacts are already being felt across Scotland's transport network, perhaps most notably at the A83 Rest and Be Thankful. This is one of Scotland's most well-travelled (and famous) roads, but the route has become more prone to closures in recent years due to landslips, made more likely by the changing climate. This had led to an almost 100km diversion for many people. The proposed long-term solution - consisting of a 1.4km long debris flow shelter on the line of the existing A83, was announced in June 2023. It is estimated to cost a significant amount (between £405 million and £470 million, at 2023 prices), but the value of maintaining the resilience of a key part of Scotland's strategic road assets is also extremely large (see discussion of the Trunk Road Network within the Geography chapter for a further discussion).

The Economic Opportunity Offered by Addressing Climate Change

As discussed above, climate change investment is expected to bring net benefits to consumers and provides great economic opportunities. However, it is important to not only conceive of these benefits costs avoided – but also to look at the economic opportunities that decarbonising the sector offers. For example, looking at opportunities within the labour market, increasing demand for low-carbon, Net Zero goods and services has implications for workforce structure. The CCC (2023) paper 'A Net Zero workforce' estimates there are already 250,000 jobs generated in the transition process, with more opportunity for high-quality employment across Scotland and the UK. Looking at the extent to which jobs are at risk, it estimates that that there are significantly more UK workers who are employed in sectors that could be expected to grow as a result of Net Zero (10%) rather than in sectors where phase down is expected (0.3%).

The transition to Net Zero will have widespread implications for transport across the operation of the existing network, construction of new railways and roads, as well as vehicle and battery manufacturing, and sustainable fuel sources. At a UK level, the Climate Change Committee identify the following as sectors within transport likely to see employment growth:

- Rail Operation and Construction of Roads and Railways (expected growth)
- Electric Vehicle and Battery Manufacturing, and Sustainable Aviation Fuels (with the CCC noting these sectors are contingent on UK growth as well as industry and policy action).

Within a Scottish context, Scotland's draft Transport Just Transition Plan (Scottish Government, 2025) identifies three key opportunities for growth as part of decarbonisation, which differ somewhat from the CCC analysis at a UK level. The first relates to decarbonisation of heavy goods vehicles, noting that Scotland currently has a base of companies in the Heavy Duty and Niche vehicle manufacturing sectors. The second is Sustainable Aviation Fuel, due to Scotland's skills base, natural resources and existing infrastructure. The third area is charging and refuelling infrastructure with the report noting that *"as many as 15,000 new roles could be required to support the uptake of ULEVs by 2050, for services including maintenance and repair, production, and infrastructure installation".*

Outside of immediate employment in these core sectors, the effects of the transition to Net Zero within transport will also impact upon the wider economy. This is particularly true for electric vehicles (EVs). EVs are significantly more efficient than conventional fossil-fuelled vehicles. The CCC estimate initial investment will be offset by lower operational expenditure from around 2030 and operating costs savings will increase to £20 billion annually (ibid). Furthermore, electric vehicles will have transformative impacts on how our road network operates – they bring opportunities to redesign, operate and maintain our road network – with the potential to explore and move away from a network formed around fossil fuel distribution. Indeed there is scope for electric vehicles to become an important contributor to Scotland's economy while not in use – via the storage and generation of energy, with owners becoming 'prosumers' – producing and consuming via their EVs (Kühnbach et al., 2024).

Realising these economic opportunities will require both planning and investment. Ensuring that jobs are delivered will involve substantial retraining and skill development, while government will have to think carefully about the geographic risks and opportunities presented. For example, the CCC identify Grangemouth as a possible hub for hydrogen and Carbon Capture and Storage technology which will be clustered around particular geographies due to the nature of the infrastructure required. There may also be opportunities offered for job creation in island and rural locations in terms of construction e.g. wind farms. Beinarovica et al. (2024) forecast that the Highlands will account for a disproportionately large number of these Jobs by 2030. It is important that opportunities within transport are considered in this regard, but also that transport can support the development of growth industries in other areas – for example ensuring our road network is well equipped for the challenges of transporting large renewables or decommissioning equipment.

Ensuring a Just Transition

In addition to noting the challenges and opportunities that decarbonisation can pose to the economy, it is also important to consider how it will affect all of society, especially the most vulnerable. Any period of significant transition will have a substantial distributional effect – creating winners and losers. It is recognised internationally that *"the effects of climate change disproportionately affect those in poverty, and can exacerbate economic, gender and other social inequalities, including those resulting from discriminatory practices based upon race and ethnicity; the transition towards net zero will affect, most acutely, those in workforces in sectors, cities and regions relying on carbon-intensive industries and production"*. This is the text of a declaration by The EU and 10 Member States supporting the conditions for a just transition internationally (adopted at the 26th United Nations Climate Change Conference in 2021). It helps articulate why it is vital to identify those who may be negatively affected (e.g. individuals or communities that see job losses) and ensure there is a plan to address the 'losses' suffered.

One key element that needs to be considered is that of jobs – those lost, created and affected by climate change. The Climate Change Committee Net Zero Workforce Paper cited earlier has a substantial discussion of this aspect of the decarbonisation process. Looking back toward large economic transitions in the past such as the shift towards a service economy and the move away from coal, they conclude that *"even a relatively small number of job losses could result in significant and long-lasting negative impacts for local communities if they are economically dependent on that sector. For this reason, it is important to consider both absolute jobs in a given sector as well as the contribution to regional employment of a given sector"* (Ibid). The draft Transport Just Transition Plan discussed above also captures this point in looking at transport areas where jobs may be lost. It notes *"The employment facing the most serious impacts are likely to be vehicle repair and maintenance jobs – particularly at small local garages – and petrol station jobs"* (Ibid). Transport also has a significant role in cushioning impacts from other parts of the economy moving to Net Zero – and so integration with wider just transition and economic strategies is crucial.

The SLOCAT (Sustainable, Low Carbon Transport) Partnership (2023) emphasise the need to include workers within the sector in a *"social dialogue, incorporating the voice and knowledge of workers into policy and planning*" and also note the need for specific action on the gender and age (specifically young workers) dimension of transport jobs.

More broadly, there is also the issue of how the transport system is designed and how it meets the needs of its users. The International Transport Forum and FIA Foundation have highlighted that policies for decarbonising transport will impact women, other excluded groups, and men differently. They note the importance of

addressing gender inequalities within the transport sector as well as gender analysis of transport interventions. While typically seen as distinct areas, there is evidence that integrating gender analysis and increasing women's participation in the sector will increase the effectiveness of attempts to reduce emissions (Bassan and Ng, 2022). Similarly, authors writing for Changing Transport have highlighted specific aspects where progress could be made. Bernhard (2024) has highlighted the gender dimension, with focuses on the need for future transport planners to consider gender inclusive cities. Stutz and Vasquez (2024) have explored the benefits of feminist transport systems in terms of empowering communities and lowering emissions. This is an issue acknowledged in the draft Transport Just Transition plan, which notes that women make up just 18% of the transport workforce. With evidence of shortages in the workforce and an aging demographic of transport workers (40% are over the age of 50), there is a significant opportunity to address this gender imbalance.

In a Scottish Context, the Just Transition Commission (2021) has been established and has recommended that The Scottish Government should identify existing inequalities in addition to mitigating injustices that may arise because of climate change as part of efforts to achieve Net Zero. This will play a pivotal role in terms of shaping Scotland's approach and policies towards both climate change and the economy going forward. As part of efforts to ensure a just transition, Transport Scotland (2023) have acknowledged that our future transport system should become more equitable, making sure everyone's needs are met and helping to reduce existing inequalities. The draft Transport Just Transition Plan referenced throughout this section sets out in more detail some of the issues as well as positive action that The Scottish Government is committed to taking in this area (Scottish Government, 2025).

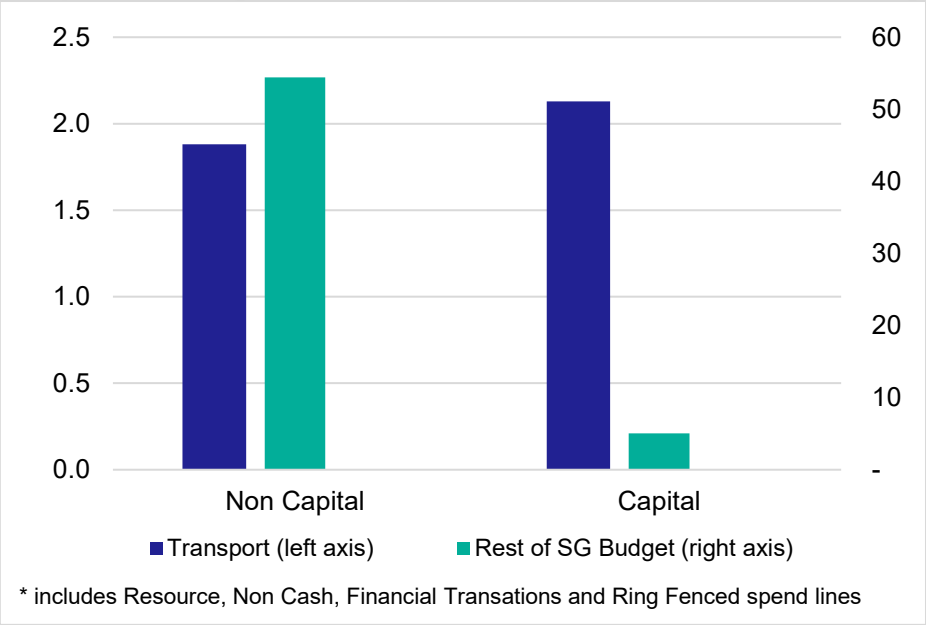
Constraints

Financial Outlook

This section will briefly go over the funding available to deliver Transport interventions in Scotland – another key constraint on what can be done.

In 2025-26, Scotland's Transport provisional budget has exceeded £4bn for the first time in history, an increase of over £150m based on the previous year's budget (see Scottish Budget, 2025-26). The portfolio's spending plans aim to help Transport Scotland develop and maintain a sustainable, safe, inclusive and accessible transport system, with more detail available in the Budget documents. Of the £4.009bn budget allocation for 2025-26, 53% of the budget (£2.128bn) is Capital funding. This is an unusual breakdown compared to other portfolios – and it means that the transport budget is highly dependent on the size of the overall Scottish Government capital budget from year to year. To illustrate this point, for all other areas of government, just 8% of the total budget allocation was accounted for by capital funding, with a large majority accounted for by fiscal resource funding. Figure 5.1 looks at the difference in budget profiles between Transport and the rest of the Scottish budget.

Figure 4 - Comparison of Capital and Non-Capital Budget Allocations (for FY 2025-26 as part of Budget 2025-26) - Transport and Rest of SG Budget (£bn)**

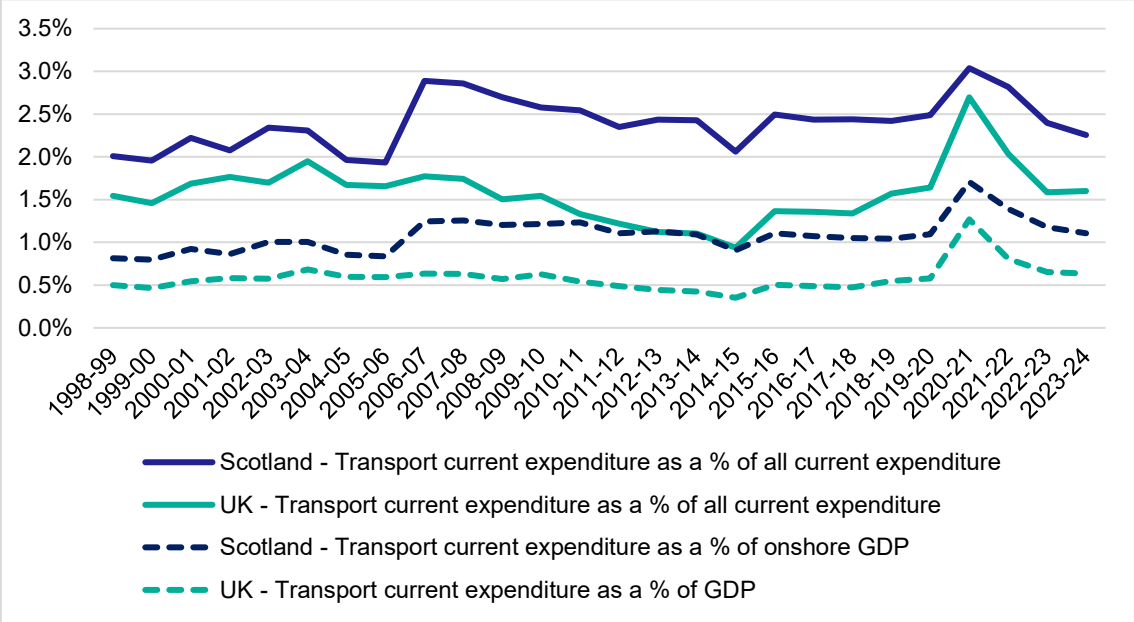


Moving away from Scottish Government Budget data and to Government Expenditure and Revenue Scotland (GERS, 2024) data, a reliable time series can be established to assess trends over a long time period (and provide a comparison to

the rest of the UK). GERS estimates the revenue raised in Scotland, the cost of public services provided for Scotland, and provides comparisons to the UK. It is therefore useful for fiscal analysis such as that contained in this chapter. The charts below show Transport spend (first current spend in Figure 5.2 and then capital spend in Figure 5.3) as a percentage of both total (current and capital) public sector expenditure and as a percentage of GDP for Scotland and for rUK.

In terms of current expenditure, we see that measures of expenditure relative to GDP and total spending were at similar levels in Scotland and the UK in the early years of the time series. Since 2006-07 Scotland has tended to have significantly higher prioritisation of transport spending than the UK. Scotland has a more generous funding arrangement than many parts of the UK, whether expressed as a % of total current spending or as a % of GDP. However, there are numerous other factors that help explain why higher expenditure levels might be expected in Scotland. Primarily these are the issues highlighted in the geography section of this paper: the need to spend significant amounts subsidising ferry travel (which is far less common in other parts of the UK) and lower population densities in Scotland (particularly compared to the South of England) mean there is a greater need to subsidise public transport (e.g. rail and bus operators) in Scotland. To a lesser extent, policy differences (such as greater generosity for free bus travel) may lead to different spending profiles.

Figure 5 **- Transport (Current) Expenditure in Context - Scotland and UK as a whole**

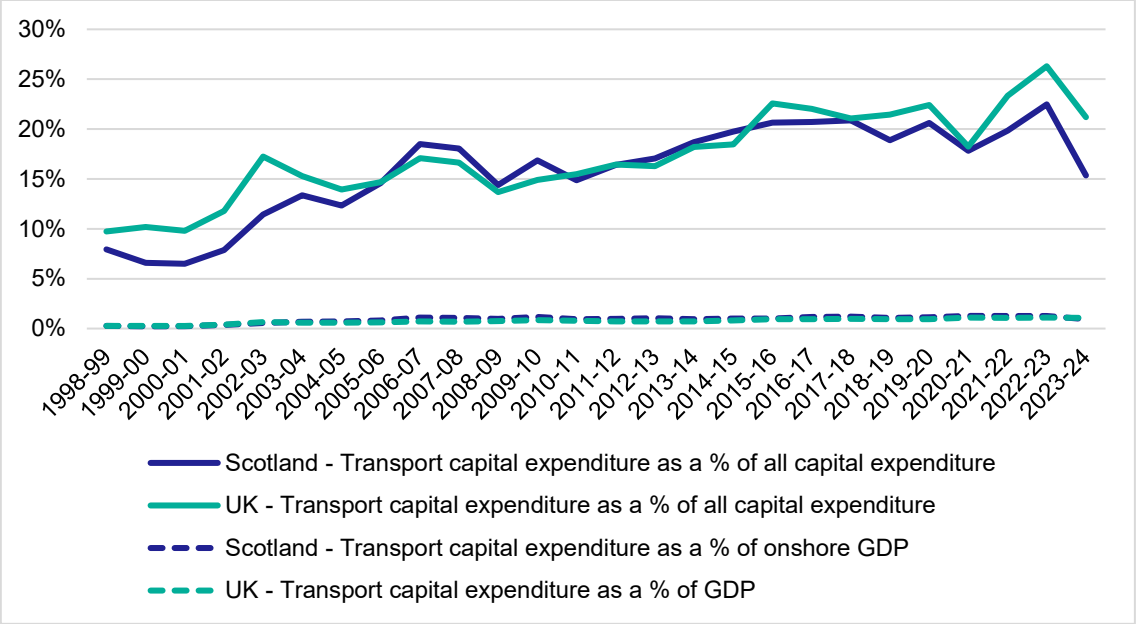


Current expenditure (in both the UK and Scotland) increased sharply over the pandemic, but it is important to note that this does not reflect an easing of financial pressures – but the reverse. Expenditure increases largely reflect the need to make up for revenue losses suffered as a result of changed travel patterns during the

pandemic, with statistics showing large declines in passenger numbers and revenue figures for Rail, Bus and Ferries over the pandemic period (Scottish Transport Statistics). This topic is revisited in the discussion of wider constraints below.

In terms of capital expenditure, Scotland and the UK have very similar spending profiles, despite these factors:

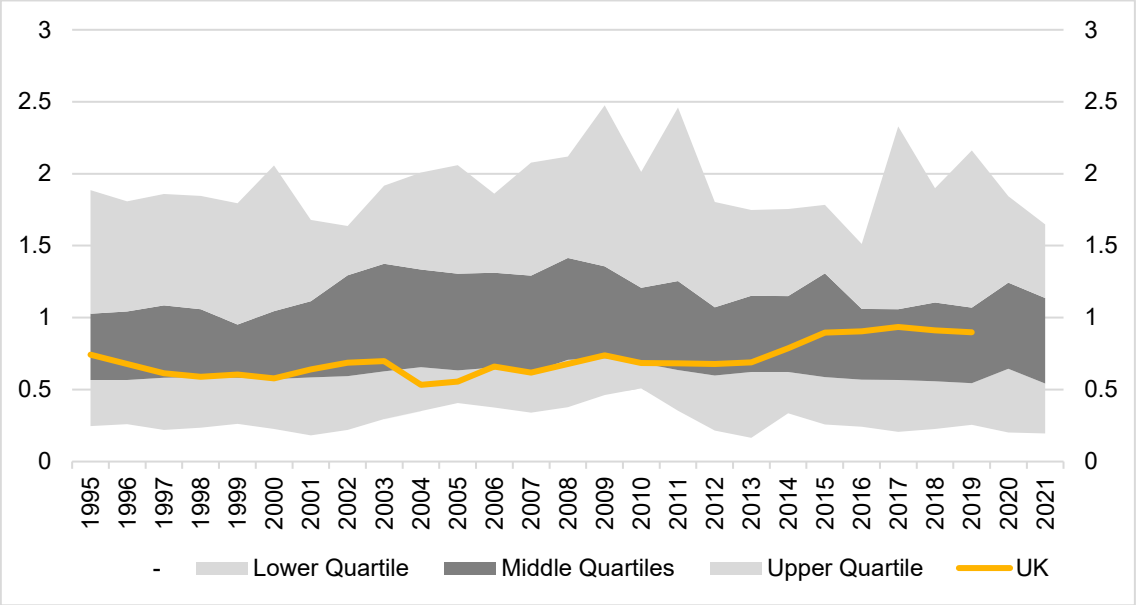
Figure 6 - Transport (Capital) Expenditure in Context - Scotland and UK as a whole



Capital expenditure in both countries has been prioritised more over the later parts of the time series, with transport capital spending accounting for a larger proportion of total capital expenditure in the period after 2005-06. The trends for both Scotland and the UK are similar over this time period, although it could be argued that Transport Capital was relatively low in Scotland in the period up to 2005-06.

It is somewhat difficult to establish how Scotland compares to other international comparators in terms of transport spending. However, it is possible to infer via looking at the UK. With a specific transport lens, the chart below (Figure 5.4) compares the UK to OECD averages in terms of inland transport infrastructure investment using OECD (accessed 2025) data - The OECD notes that *"Infrastructure investment covers spending on new transport construction and the improvement of the existing network. Infrastructure investment is a key determinant of performance in the transport sector. Inland infrastructure includes road, rail, inland waterways, maritime ports and airports and takes account of all sources of financing."* The UK has tended towards the lower quartile of OECD spending on transport infrastructure (expressed as a percentage of GDP) over the past 30 years – only catching up to the OECD average levels over recent years. This is broadly consistent with a message of long-standing under-investment relative to international competitors.

Figure 7 - UK Transport Investment (inland total), as a % of GDP relative to OECD trends



Looking forward, it is not possible to project transport capital budgets. However, it is notable that overall capital budgets are not expected to increase dramatically as a share of GDP. The most recent Office for Budget Responsibility (OBR, 2024) forecast of capital spending that is typically used in fiscal forecasting, shows that capital spending is due to remain at the same level (in terms of % of GDP) in 2029-30 as it stood in 2023-24, albeit growing in real terms for most years of the forecast. Note that this is based on "PSGI in CDEL" forecasts - a measure of capital spending in the UK public sector, where PSGI stands for public sector gross investment and CDEL stands for capital departmental expenditure limit. The Scottish Fiscal Commission are less optimistic, with a forecast of capital funding only increasing by 2 per cent between 2025-26 and 2029-30 – a real terms decline (SFC, 2024). Unless transport is prioritised over other areas, it is unlikely that performance with respect to transport infrastructure investment will improve relative to comparator countries.

While much of this discussion has focussed on 'investment', a very small proportion of the total transport expenditure in Scotland relates to provision of genuinely new transport infrastructure. A large majority of transport spending is not spent on new investments and improvements to the network but is spent either ensuring consistent service delivery from one year to the next or replacing the existing infrastructure. In one sense this is more about ensuring that we continue to deliver what is already being delivered, rather than delivering 'more'. Even where investment does take place, there is often an element of both 'replacing' and 'improving upon' existing stock, so that the two ideas are difficult to disentangle (e.g. replacing existing rail rolling stock or ferries with newer and more efficient stock). There are clear costs to reducing much of this spend. Most obviously this may be seen in reduced services. Day to day spend on areas with no clear service user also provides significant value

however. Taking the example of road maintenance, Abell et al. (2016) conducted a research project into the impact of changes in maintenance spend on roads in Scotland in 2012 over a 20-year period. The analysis found an overall disbenefit to society of reducing road maintenance spending. Not all costs in the analysis can be quantified, but for those that can, it shows that for every £1 reduction in road maintenance, there is a £1.50 cost to the wider economy. This helps explain why maintenance features so prominently in the investment hierarchy presented in figure 1.2 (page 16).

A final point to make on this subject is that transport investment requires a wider societal response beyond public funds. Stimulating private funding will also play a key role in delivering the outcomes that are required, as highlighted in a report from the Advisory Group on Economic Recovery: "*the importance of strategic public investment and more effective leverage of private investment into projects to provide public good could not be clearer*." (Scottish Government, 2020). Similarly, engaging all stakeholders in the transport system to support policy by contributing different perspectives and expertise can help improve the outcomes that policy achieves.

Other Challenges facing the sector

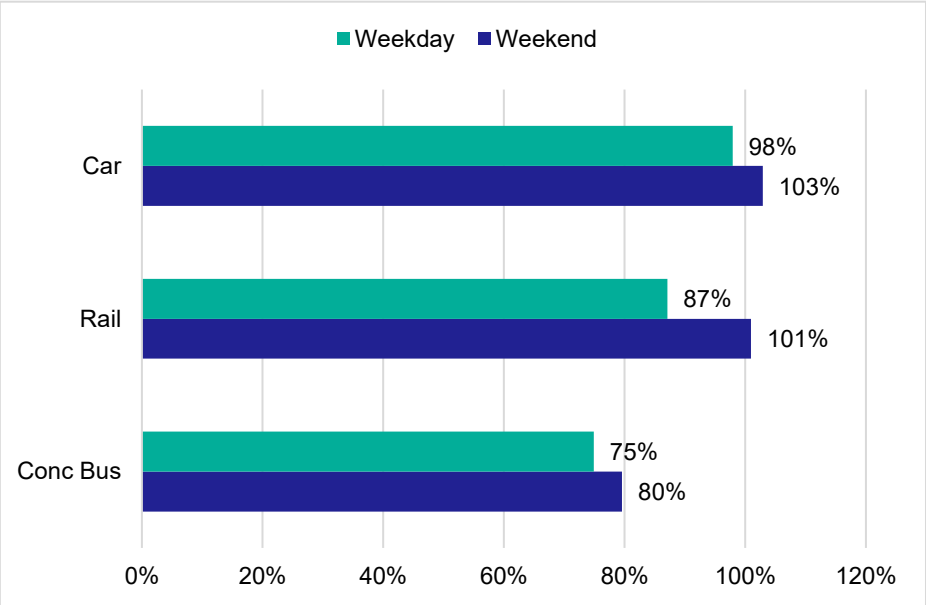
Patronage and Revenue Generation

The pandemic, and the response of commuters to the pandemic, has posed significant challenges to public transport providers. The rise in hybrid working has reduced the number of commuting trips taken across different modes. There has been an increase in trips for leisure purposes, and a reduction in journeys in what have traditionally been the peak periods for public transport. Other factors, such as shopping habits, inflation and strikes may have also affected demand (Urban Transport Group, 2023).

This can be seen in terms of weekly data on transport usage highlighted in Figure 5.5. Compared to its equivalent pre-pandemic point, car, rail and concessionary bus demand has recovered stronger on weekends than on weekdays. There are also distinct differences in the extent of the recovery across modes. While all weekday patronage falls short of their pre-pandemic levels, the recovery is strongest in cars (reaching 98% of pre pandemic levels), followed by rail (87%) and then concessionary bus travel (75%). Weekend travel for both car and rail were slightly above their pre-pandemic average, highlighting the increase in trips for leisure purposes, with concessionary bus travel still significantly below pre pandemic levels of patronage (80%). It should be noted that this chart focussed on data where a comparable time series can be assembled rather than capturing all forms of travel.

This explains the focus on concessionary bus travel rather than all bus travel as well as the lack of data on ferry journeys.

Figure 5.5: Changes in weekday and weekend demand by mode since the COVID-19 Pandemic, March – December.



Pre-pandemic trends are not expected to re-emerge. Indeed, the Patronage Growth Sub-Group of the Bus Taskforce have suggested that pre-pandemic baselines should no longer be used as a benchmark to understand current trends – reflecting the fact that a 'new normal' has likely emerged (Transport Scotland, 2024).

The changing patterns do create new pressures on the network. In the first instance, lower patronage creates significant problems in terms of revenue generation. When patronage drops, so too does ticket revenue, and this means that, in order to run a similar service level, a higher subsidy is required. This was explored specifically with the pandemic in Figure 5.2 (page 76) – showing a large spike in current expenditure at the time of the pandemic. A subtler impact is felt in terms of planning services and managing how supply should respond to a move away from weekday peak-time travel and more toward weekend and leisure travel than was previously the case. There is also considerable uncertainty regarding future trends, and this makes planning very difficult.

Demographic Changes

The population of Scotland was estimated to be 5,436,600 on Census Day 2022, according to data released by National Records of Scotland (NRS). This is the largest population ever recorded by Scotland's Census. The population of Scotland grew by 141,200 (2.7%) since the previous census in 2011. However, this is a slower

rate of growth than between 2001 and 2011 and was lower than growth seen in both England and Wales and Northern Ireland.

A primary challenge in the context of transport is the aging population. Census day data shows a population of over one million people aged 65 and over (1,091,000). There is considerable uncertainty (particularly with respect to likely trends in immigration) over the future age profile of Scotland's population. However, there is a broad agreement that the proportion of people in Scotland over 65 is due to increase substantially. For example, in a long-term assessment of Scotland's population and the fiscal impacts of population change, the Scottish Fiscal Commission (SFC) reports that Scotland's population could fall dramatically – to just 4.1 million in 2072. Furthermore, the ratio of people over 65 years old to those aged 16-64 could almost double from 31:100 in 2022 to 58:100 in 2072 (SFC, 2022). This would place considerable pressure on public finances.

There will also be a varied picture across the country. For example, Public Health Scotland projections highlight that expected population growth and decline varies dramatically with geography. Broadly speaking there is expected to be population growth within the Central Belt area, and depopulation in areas such as the Islands, Ayrshire and Arran and Dumfries and Galloway.

It is likely that dramatic changes will be seen in terms of the types of passengers that the transport system needs to deliver for as well as the types of journeys being made. Creighton and Holley Moore (2015) highlight key implications of an aging population for transport systems. They note that support for older people to driving safely for longer. Viable alternative transport options need to be made available for those who are unable to drive. In both cases, access to health services will need to be increasingly prioritised. Making public transport as well as walking infrastructure (e.g. road crossing) more convenient for older people will be important for maintaining mobility. Encouraging older people to engage in active travel more frequently (with the UK lagging other European countries in this respect) is also flagged as an opportunity – with obvious positive implications for health and reducing pressures on other services. There is also a significant financial aspect to consider. The impacts in terms of revenue generation via fares and requirements for concessionary travel are likely to create further pressures. Demographic changes will also have a broader impact on funding availability via the wider economy – primarily through the relative sizes of populations who are likely to be economically active versus inactive, and who are therefore contributing to public sector revenues via income tax (with the SFC document exploring this in much more detail).

Policy Tensions

Trade Offs Between Economy, Inequalities, Climate and Financial Priorities

As set out in Scotland's National Transport Strategy (NTS2), transport investment is a crucial aspect of meeting our goals of inclusive economic growth, reducing inequalities, and working toward our climate targets. There are, of course, interventions that can deliver on all aspects of the strategy, while remaining affordable in a tight fiscal environment. Moving ahead with these projects are relatively easy decisions for policy makers to take. More often than not, limited budgets will support projects that only deliver on some of these goals. Further projects still may involve direct trade-offs between these goals. For the benefits of transport investment to be maximised, significant consideration must be given to each area, which can be difficult to achieve without an unlimited budget to operate within. Thought must also be given to leveraging and stimulating private investment (as was discussed in the context of decarbonisation) on transport in order to increase funding and help achieve desired outcomes.

The transport network facilitates economic activity and growth through improving connectivity between businesses and consumers. Improvements in the network can help reduce travel times and providing a new service can reap significant benefits through higher productivity, increasing access to employment opportunities and improving market access. However, if focusing on economic benefits alone without consideration of the environmental and social effects of a policy, these issues can be intensified.

It is crucial to consider user affordability and accessibility to achieve the broader outcomes set out in NTS2. This includes concessionary fares for lower income groups who may not have private car access, designing services that everyone can use, investing in active travel infrastructure such as pathways and cycling infrastructure, supporting people to both choose and use active travel options, and investing in ferries for island communities to address the additional transport costs they face.

Furthermore, considering environmental factors is essential for adaptation to current climate change impacts, and to minimise emission generation in the future.

Prioritisation is not simple in this context. Often, prioritising one type of benefit or pursuit, such as economic growth may come at the expense of other outcomes, such

as equalities or climate. Pursuing these shared goals within a tight fiscal environment can be even more challenging, with the scope to invest being lower.

Illustrating these trade-offs: Car Travel

One obvious example to help illustrate these trade-offs is that of car travel. Car travel remains essential to employment and productivity in many industries. However, as we saw in the equalities case study, access to car travel is highly unequal. Furthermore, car travel is responsible for a very significant proportion of total Scottish emissions. And any interventions to reduce trends in car use tend to be extremely expensive, and create further financial pressure – for example, the costs associated with improving alternatives to car travel (especially in a non-urban contexts). As such, these trade-offs sit at the heart of many of the decisions Transport Scotland has to make that relate to Scotland's car travel.

Internationally, there is a substantial literature suggesting that travel demand and economic growth have gone hand-in-hand – or are 'coupled'. Generally speaking as the demand for travel has risen within a developed economy (as typically measured by vehicle miles travelled), the economy has also grown. There is a substantial academic literature on this area, including much discussion of the direction of causality – whether growth in travel demand increases economic growth or vice versa. Different studies have suggested a complex relationship and causality running in both directions. There has also been some discussion as to whether travel demand and economic growth have 'decoupled' over more recent years. A good overview of this discussion can be found in Millard-Bell and Schipper (2010).

A key point here is that regardless on the view of the direction and strength of causality in this relationship, there are clearly trade-offs when considering travel demand, economic growth, and climate goals together. Transport Scotland is unaware of a developed country that has ever simultaneously sustained a growth in the economy and a decline in vehicle traffic. Scotland could make huge progress toward climate goals by simply limiting transport demand (most obviously distance travelled by car) in a blunt manner but doing so would likely come with profound and serious negative economic consequences, especially given the essential role of the road network in helping address some of the geographic challenges that this paper has highlighted. Attempts to manage travel demand (i.e. reduce traffic) must therefore try and minimise the economic harm this could inflict.

This informs the sustainable travel and transport investment hierarchies discussed in Section 2 (figure 1.2) and their use to manage travel demand, remove unnecessary travel demand, and shift demand to active travel. These measures can only achieve so much in terms of emissions reductions. The next stage is to decarbonise the transport sector with investment in getting the whole vehicle fleet to be either ZEVs

or using sustainable net-zero fuels, which will require substantial investment and must be done quickly in order to address current climate goals (especially given the length of time involved in terms of the turnover of the vehicle fleet). There is also a lack of market-ready ZEV and sustainable net-zero fuels for vehicle markets other than cars, vans, rail and some short-hop larger vehicles. Beyond simply shifting existing journeys to low emission transport modes or investing in zero emission technologies, Transport Scotland recognises the need for emissions reductions through wider changes to how the system is planned. It is essential for transport to be seen as part of a wider system of access to employment, goods, services, leisure, etc. As set out in the route map for a reduction in car kilometres (Transport Scotland, 2022), *"Non-transport digital and place-based interventions are important to support people to reduce their need to travel and to enable them to choose more local destinations for work, shopping and leisure which are the three largest reasons for trips."* This is now known as Triple Access Planning where it is recognised that access is not only achieved by motorised mobility; but also by spatial proximity enabling travel by walking and cycling and epitomised in the concept of 20-minute neighbourhoods; and digital connectivity for those opportunities that can be accessed over the internet. This is just one example of a series of competing priorities that requires a clear and strategic response from Government.

The Role of NTS2 in Addressing These Tensions

NTS2 is the key strategic framework used by Transport Scotland to address some of these tensions and to help inform trade-offs that need to be made. It is important to note that there are no weightings applied to the Four Priorities, with none more important than the rest. They reflect both the increasing importance of addressing climate change and the growing agenda of progressive policies to reduce inequalities in Scotland. Furthermore, progress in one area often spurs progress in another: reducing inequalities is crucial for delivering inclusive economic growth, and improving overall health and wellbeing, through promotion of active travel for example, helps us tackle climate action. As such, there will be many cases where there is not an obvious tension and the priorities are complementary as opposed to competing.

Despite the synergies inherent in NTS2, it is clear from the discussion above that this will not always be the case. There will often arise tensions or trade-offs between achieving the different NTS2 priorities, especially within a tight fiscal environment where it is not possible to fund every attractive investment opportunity. In these instances, a clear strategy is all the more important.

The NTS2 helps address these tensions in two obvious ways.

In the first instance, NTS2 is used as a broad and overarching framework for decision making at a strategic level. The Investment and Sustainable Travel Hierarchies (see figure 1.2 - i and ii) guide overall decision making – both at a strategic and project level. NTS2 is a substantial strategic document that is backed by significant resources in terms of ensuring that it continues to inform decision making. This includes a monitoring and evaluation framework, under which regular monitoring and evaluation reports (For example the most recent is a baselining report, 2022) are published to ensure progress against strategic goals are regularly and transparently assessed, with annual delivery plans setting out which policies are being delivered under which of the NTS2 priorities. At a strategic level, this ensures alignment and gives the strategy the weight it needs to influence decisions and help achieve the right balance in terms of what outcomes our package of transport interventions deliver as a whole.

In the second instance, there is a substantial framework put in place to ensure that NTS2 priorities are reflected in decisions made on a project-by-project basis – including detailed appraisal for all 'major' projects. A major project is defined in Transport Scotland as "*Projects with an estimated total cost in excess of £50m and projects involving novel, contentious or otherwise politically sensitive proposals, regardless of their estimated cost*". Every major project in Transport Scotland requires a series of business cases to be produced in line with Scottish Transport Appraisal Guidance (STAG), the Scottish Public Finance Manual (SPFM) and wider HMT Guidance. These business cases will then be subject to approval by the Investment Decision Makers (IDM) board at specific points as the project progresses. This is described in Table 6.1 (below).

Table 6.1: Stages of IDM Process

Business Case Presented to IDM	Discussion Type	Decision made
Strategic Business Case	Strategic	Whether to develop further
Outline Business Case	Procurement	Whether to go to procurement
Final Business Case	Contract	Whether to sign contract

At the Strategic discussion level, projects are considered against the NTS2 investment and sustainable travel hierarchies – with the aim of filtering out projects or ideas that do not align with these frameworks at the earliest stage.

At every stage of appraisal and decision making, an analysis is made of how projects deliver against the 5 STAG Criteria of 'Environment', 'Climate Change', 'Health, Safety and Wellbeing', 'Economy' and 'Equality and Accessibility'.

STAG guidance acts a key way for Transport Scotland to ensure that NTS2 priorities are reflected in appraisals and therefore decision making. The STAG Managers

Guide was updated in 2022 in part to ensure consistency with NTS2 priorities and help ensure STAG appraisals would deliver against the ambitions set out in NTS2.

All of this means that while STAG supports the development of a Green Book style cost benefit analysis and a benefit cost ratio (BCR) or net present value (NPV) calculation, it also emphasises the need to clearly articulate benefits and costs that can't easily be quantified and monetised, and for project sponsors and decision makers to clearly analyse and articulate how projects deliver on the NTS2 priorities.

This hopefully clearly illustrates how NTS2, introduced at the start of this document, is embedded in the decision-making process to ensure that both the strategic direction and the path that specific projects take will align with the priorities that are set out in NTS2 as part of a rigorous decision making framework.

Concluding Remarks

Scotland's Transport Sector plays a critical role in our everyday lives. Be it through facilitating a journey, or via the network being used to deliver goods and services, almost everyone in Scotland is affected by transport every single day. Indeed, it is almost impossible to imagine a world without a functioning transport network.

Despite this, much of the attention that is paid to transport on a day to day basis focusses on disruptions to our lives. This is understandable in the context of these disruptions causing significant difficulties for us, as we rely on the transport system to go about our lives. This paper is not an effort to diminish or distract from these frustrations. However, while acknowledging these impacts, it is also worth noting the value that the transport system does deliver for the people of Scotland. Indeed in some cases frustration when things do not work well underlines the importance (and even necessity) of what the system delivers. The focus of this paper has therefore been to articulate these benefits.

The intention of the paper has been to discuss this from numerous perspectives:

- A broader conceptual discussion on how transport facilitates much of our economy and day to day lives to better understand the degree to which a well-functioning transport system is an essential foundation of a modern economy.
- A discussion of some specific ways in which the transport system helps deliver economic growth – with a focus on illustrating the considerable footprint of the sector itself, as well as looking at avenues through which a good transport system can deliver economic growth through avenues such as agglomeration and via helping improve our safety, health and wellbeing.
- Understanding the critical role that addressing inequalities face in generating growth, the paper also offered a look at some of the challenges presented in terms of how the transport system can help overcome inequalities, especially with the degree of inter-relatedness between some of these challenges (e.g. income, mobility and employability).
- Considering the role of geography in terms of some of the challenges that Scotland's geography provides from a transport perspective, but also the immense value that the network delivers as a result.
- Considering the critical role the sector will play in terms of helping Scotland address the climate challenge facing us, and the opportunities offered by decarbonisation both though growing industries and the opportunity to achieve a Just Transition as Scotland attempts to meet Net Zero ambitions.
- Set out some of the challenges facing the sector in terms of financing, but also revenue generation and the sustainability of services going forward.

There has also been an attempt to briefly articulate the Transport Scotland approach to helping shape the transport system in this complex and, at times, challenges set of circumstances:

- Highlighting the role of the National Transport Strategy, and helping articulate the measures that are in place to ensure that our ambitions are met by aligning activities and investments to the outcomes we want to achieve.
- Articulating that transport does not exist in a vacuum in terms of its impact on the economy, people's lives or the environment and showing how the approach that Transport Scotland is taking (via the NTS) aligns with the wider strategic approach of The Scottish Government.

As such, it is hoped that this paper has helped to provide a degree of oversight as well as some insight into these issues. While much of the consideration we may typically give to transport focuses on its shortcomings (and much media coverage of transport focuses on this), it is important to acknowledge the essential role it plays and how the system contributes to the wider economy. The transport sector itself delivers tremendous value to the Scottish economy. Furthermore, the primary benefits of investing in transport and improving the network are felt in terms of supporting economic activity in other sectors and facilitating our engagement in other aspects of life. It also contributes significantly to how people feel about the state of their lives and their country. This is why the NTS2 vision for a 'sustainable, inclusive, safe, and accessible transport system helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors' is essential for delivering the ambitions and priorities of The Scottish Government for Scotland as a whole.

Bibliography

Overview

References are organised into three categories: longer pieces of text, short articles and data sets.

Books, Journal Articles, Government Documents Etc

Aarhaug, J. and Elvebakk, B., (2015), *The impact of Universally accessible public transport–a before and after study*, *Transport Policy*, 44, pp. 143–150.

Abell, R, Booth, C, Palmer, D Peeling, J., (2017), *The Value of the Trunk Road Network to Society and the Economy in Scotland*, (Report for Transport Scotland by TRL).

Abell, R., Bradbury, T., Parkman, C. and Peeling, D., (2016), *Economic, Environmental and Social Impact of Changes in Maintenance Spend on Roads in Scotland: Summary Report*, (Report for Transport Scotland by TRL).

Ahrend, R., Farchyi, E., Kaplanisi, I. and Lembckei,, A. (2014), *What Makes Cities More Productive? Evidence on the Role of Urban Governance from Five OECD Countries*, OECD Regional Development Working Papers, No. 2014/05, OECD Publishing, Paris.

Aldred, R., Woodcock, J. and Goodman, A., (2021), *Major investment in active travel in Outer London: Impacts on travel behaviour, physical activity, and health*, Journal of Transport & Health.

Bose, D., Marquez, P. and Dutta, S., (2018), *The High Toll of Traffic Injuries: Unacceptable and Preventable*, Washing, D.C., World Bank Group.

Bassan, D., and Ng, W., (2022), *Gender Equality and the Role of Women in Decarbonising Transport*, International Transport Forum and FIA Foundation.

Beinarovica, J, Fagura, J, Morrison, M Schreib, S, Weir, I , (2024), *Mapping the current and future workforce and skills requirements in Scotland's onshore wind industry*, (CXC research for The Scottish Government).

Bruno, M., Dekker, H-J. and Lindenberg Lemos, L., (2021), *Mobility protests in the Netherlands of the 1970s: Activism, innovation, and transitions*, Environmental Innovation and Societal Transitions, Volume 40, p521-535.

CEBR, (2022), *The socio-economic impact of CalMac ferry services: Phase 2 Report*.

Cingano, F., (2014), *Trends in Income Inequality and its Impact on Economic Growth, OECD Social, Employment and Migration Working Papers*, No. 163, OECD Publishing, Paris.

Climate Change Committee, (2020), *The Sixth Carbon Budget - Surface Transport*.

Climate Change Committee, (2023), *A Net Zero Workforce*.

Climate Policy Initiative, (2023), *How big is the Net Zero financing gap?*.

Conwell, Eckert and Mobarak, (2022), *More Roads or Public Transit? Insights from Measuring City-Center Accessibility*, Economic Growth Centre Discussion Paper.

CPT, (2024), *Economic Impact of Local Bus Services*.

Crisp, R., Ferrari, E., Gore, T., Green, S., McCarthy, L., Rae, A., Reeve, K. and Stevens, M., (2018), *Tackling transport-related barriers to employment in low-income neighbourhoods*.

Daniels, S., Martensen, H., Schoeters, A., Van den Berghe, W., Papadimitriou, E., Ziakopoulos, A., Kaiser, S., Aigner-Breuss, E., Soteropoulos, A., Wijnen, W., Weijermars, W., Carnis, L., Elvik, R. and Perez, O., (2019), *A systematic cost-benefit analysis of 29 road safety measures*, Accident Analysis & Prevention Volume 133.

Department for Energy Security & Net Zero, (2024), *UK renewables deployment supply chain readiness study*, (carried out by Baringa).

Department for Transport, (2022), *Agglomeration under Covid*.

Department for Transport, (2023), *Understanding and Quantifying Transformational Impacts from Transport Interventions*, (carried out by ARUP).

Department for Transport, (2024), *Economic impacts of transport investment: Review of economic impacts resulting from transport interventions for the UK economy*, (carried out by Frontier Economics).

ECMT, (2004), *Implementing Sustainable Urban Travel Policies: Moving Ahead: National Policies to Promote Cycling*, (OECD Publishing, Paris).

Elias, W. and Shiftan, Y., (2011), *The safety impact of land use changes resulting from bypass road constructions*, Journal of Transport Geography, Volume 19, Issue 6, ISSN 0966-6923.

European Parliament, (2021), *Women and Transport*.

European Parliament, (2021), *Civitas, Gender equality and mobility: mind the gap!*.

Fay, (2017), *UK Road Safety – Seizing the Opportunities: Safer Vehicles*.

Felstead and Reuschke, (2020), *Homeworking in the UK: Before and During the 2020 Lockdown*.

FIA Research Series Paper, (2016), *Investing to Save Lives: An Impact Investment Case for Preventing Road Trauma*.

Fraser of Allander Institute (FAI), (2022), *Supporting Economic Recovery in Inverclyde, West Dunbartonshire & Argyll & Bute*.

Gekoski, A., Gray, JM., Horvath, M.A.H., Edwards, S., Emirali, A. and Adler, J.R., (2015), *What works' in reducing sexual harassment and sexual offences on public transport nationally and internationally: a rapid evidence assessment*, Middlesex University; British Transport Police; Department for Transport, London.

Goodman, A. and Aldred, R., (2021), *The Impact of Introducing a Low Traffic Neighbourhood on Street Crime, in Waltham Forest, London*., Findings.

Highlands and Islands Enterprise (HIE), (2022), *My life in the Highlands and Islands*.

Hillman, M., Adams J. and Whitelegg, J., (1990), *ONE FALSE MOVE… A Study of Children's Independent Mobility*.

Creighton, H. and Holley Moore, G., (2015), *The Future of Transport in an Ageing Society* (ILC-UK and Age UK).

Ineco Impulsa, (2023), *Efficiency of the Spanish sector in the development of high-speed railways*.

Infrastructure Commission for Scotland, (2020), *Phase 1: Key findings report: A Blueprint for Scotland*.

Intergovernmental Panel on Climate Change (IPPC), (2022), *IPPC Sixth Assessment Report: Mitigation of Climate Change*.

ITF, (2024), *Land-value capture and public transport funding", Background Paper, International Transport Forum*, Paris.

Janusova, L. and Cicmancova, S., (2016), *Improving Safety of Transportation by Using Intelligent Transport Systems,* Procedia Engineering, Volume 134, ISSN 1877 – 7058.

Jiménez, J. L., and Betancor, O., (2012), *When trains go faster than planes: The strategic reaction of airlines in Spain,* (Transport Policy, Volume 23, Pages 34-41).

Just Transition Commission, (2021), *Final Report from the 1st Just Transition Commission*.

Kühnbach, M., Klobasa, M., Stephan, A., Lux, B., Frank, F., Surmann, A., Kähler, J., Biener, W., Kamaci, Z. and John, R., (2024), *Potential of a full EV-power-system-integration in Europe and how to realise it.* (Study on behalf of Transport & Environment (T&E) Europe. Freiburg, Karlsruhe (Germany): Fraunhofer Institute for Solar Energy Systems ISE, Fraunhofer Institute for Systems and Innovation Research ISI).

KPMG for Transport Scotland, (2024), *EV Infrastructure Research – 2030, 2035 and 2040 EVCI forecasts*.

Laverty, A., Aldred R., and Goodman, A., (2021), *The Impact of Introducing Low Traffic Neighbourhoods on Road Traffic Injuries*.

Lefevre, B., Chaudhary, A., Yavrom, D., and Srivastava, A., (2016), *The Trillion Dollar Question II: Tracking Investment Needs in Transport*, Working Paper. Washington, DC: World Resources.

Lucas, K., Stokes, G., Bastiaanssen, J. & Burkinshaw, J., (2019), *Inequalities in Mobility and Access in the UK Transport System*, Foresight, Government Office for Science.

Millard-Ball, A., and Schipper, L., (2010), *Are We Reaching Peak Travel? Trends in Passenger Transport in Eight Industrialized Countries*, (Transport Reviews).

New Zealand Ministry of Transport, (2016), *Contribution of transport to economic development: Economic development and transport project*.

Ng, W.S and Acker, A., (2018), *Understanding Urban Travel Behaviour by Gender for Efficient and Equitable Transport Policies*, OECD, Discussion Paper, International Transport Forum, Paris.

Noland, B., (2004), *A review of the impact of medical care and technology in reducing traffic fatalities*, IATSS Research, 28 (2).

OECD, (2020), *Enhancing Productivity in UK Core Cities: Connecting Local and Regional Growth*, OECD Urban Policy Reviews, OECD Publishing, Paris.

OECD, (2020), *Supporting Better Decision-Making in Transport Infrastructure in Spain : Infrastructure Governance Review*, OECD Publishing, Paris.

OECD, (2018), *Speed and Crash Risk*, international Transport Forum.

OECD, (2023), *Built Environment through a Well-being Lens*, OECD Publishing, Paris).

OECD, (2021), *Implications of Remote Working Adoption on Place Based Policies*, OECD Regional Development Studies.

Office for Budget Responsibility, (2024), *Fiscal Risks and Sustainability*.

Office for National Statistics, (2023), *Characteristics of homeworkers, Great Britain: September 2022 to January 2023*.

Ostry, J., Berg, A. and Tsangarides, C., (2014), *Redistribution, Inequality and Growth IMF Staff Discussion Note*, IMF Staff Discussion Note.

Hernandez, D. O., (2014), *Transport and Poverty: A review of the evidence*.

Oxera, (2016), *What is the economic contribution of rail in Scotland?*, prepared for Transport Scotland and the Rail Delivery Group.

Pogonyi, C.G., Graham, D.J. and Carbo, J. M., (2019), *Metros, Agglomeration and Firm Productivity. Evidence from London*, SSRN Electronic Journal.

Poverty and Inequality Commission, (2019), *Transport and Poverty in Scotland*, prepared by the Commission's Transport working group.

Rodrigue, J.-P, (2024), *The Geography of Transport Systems*. Milton Park: Routledge.

SACTRA, (1998), *Transport and the Economy*.

Scottish Fiscal Commission (SFC), (2022), *Trends in Scotland's population and effects on the economy and income tax*.

Scottish Government, (2021), *The cost of remoteness - reflecting higher living costs in remote rural Scotland when measuring fuel poverty: research report*.

Scottish Government, (2023), *Draft Energy Strategy and Just Transition Plan*.

Scottish Government, (2017), *The future of energy in Scotland: Scottish energy strategy*.

Scottish Government, (2019), *The National Plan for Scotland's Islands*.

Scottish Government, (2020), *Internal migration in Scotland and the UK: trends and policy lessons*, (Publication - report by the independent Expert Advisory Group on Migration and Population).

Scottish Government, (2020), *Towards a Robust, Resilient Wellbeing Economy for Scotland: Report of the Advisory Group on Economic Recovery*, (Report from the independent Advisory Group established by The Scottish Government to advise on Scotland's economic recovery in the wake of the COVID-19 pandemic).

Scottish Government, (2022), *Scotland's National Strategy for Economic Transformation*.

Scottish Government, (2023), *Scottish island regions 2023: data overview*.

Scottish Government, (2024), *Consultation with Parliament in connection with the Review of National Outcomes*.

Scottish Government, (2024), *Scotland's international education strategy*.

Scottish Government, (2025), *Just Transition: draft plan for transport in Scotland*.

Scottish Government, (2018), *A Fairer Scotland for Disabled People: employment action plan*.

Shaw, B., Bicket, M., Elliott, B., Fagan-Watson, B., Mocca, E., Hillman, M. and Fagan-Watson, B. (2015), *Children's Independent Mobility: an international comparison and recommendations for action*, (London Policy Studies Institute).

SLOCAT Partnership on Sustainable, Low Carbon Transport, (2022), *Transport and Climate Change Global Status Report - 2nd edition*.

Stansbury, Turner and Balls, (2023), *Tackling the UK's regional economic inequality: Binding constraints and avenues for policy intervention*, Mossavar-Rahmani Center for Business & Government, Harvard Kennedy School.

Stern, N., (2006), *The Stern Review on the Economic Effects of Climate Change, Population and Development Review*, 32(4), pp. 793–798.

Stiglitz, J. E., (2012), *Macroeconomic Fluctuations, Inequality, and Human Development*, Journal of Human Development and Capabilities, 13(1), p31–58.

Transport and Environment, (2024), *Financing transport decarbonisation: Study on investments for sustainable transport in the EU*.

Transport Scotland, (2020), *National Transport Strategy 2*.

Transport Scotland, (2021), *Report on Public Electric Vehicle (EV) infrastructure in Scotland – Opportunities for Growth*.

Transport Scotland, (2021), *Scotland's Road Safety Framework to 2030*.

Transport Scotland, (2023), *Just transition for the transport sector: a discussion paper*.

Transport Scotland, (2023), Vision for world class public electric vehicle charging network.

Transport Scotland, (2024), *Draft Electric Vehicle Public Charging Network Implementation Plan*.

Transport Scotland, (2024), *The Fourth Delivery Plan for the National Transport Strategy*.

Transport Scotland, (2023), *Summary report - Women's and girls' views and experiences of personal safety when using public transport*.

Transport Scotland, (2023), *Literature review - Best practice in active travel and its associated benefits*.

Transport Scotland, (2023), *Summary report - Year 1 evaluation - Young Persons' Free Bus Travel Scheme*.

Transport Scotland, (2024) *Corporate Procurement Strategy 2024-25*.

Transport Scotland, (2024), *Bus Taskforce Summary Report*, Report summarising the findings of the Bus Taskforce.

Transport Scotland, (2024), *Analysis report - Consultation on the Islands Connectivity Plan: Strategic Approach & Vessels and Ports Plan*.

Txapartegi, Andoni & Cazcarro, Ignacio, (2025), *The economic and environmental impact of limiting air routes where there is a rail alternative: a case study of Spain*, Regional Environmental Change.

UN Environment Programme (UNEP), (2016), *The Financial System We Need – From Momentum to Transformation*.

UNICEF Innocenti, (2020), *Worlds of Influence: Understanding What Shapes Child Well-being in Rich Countries*, Innocenti Report Card 16, UNICEF Office of Research – Innocenti, Florence.

Urban Transport Group (UTG), (2021), *Leading Light: What Light Rail can do for City Regions*.

Venables, A., Laird J. and Overman, H., (2014), *Transport investment and economic performance: implications for transport appraisal*.

World Health Organisation, (2022), *Walking and cycling: latest evidence to support policy-making and practice*, Copenhagen: WHO Regional Office for Europe.

Articles and Press Releases

Bernhard, C., (2024), *Next Generation of Urban and Mobility Planners Commit to Building Gender-Inclusive Cities across the World,* Changing Transport.

Bruntlett, C., (2022), *Why are Dutch Kids the Happiest in the World?*, Presentation for at Healthy & Active Residents Conference, Dutch Cycling Embassy.

City of Rotterdam, (2022), *Rotterdam: city with a future - How to build a Child Friendly City*.

Emanuel, C., (2024), *Scottish renewables port on track for record year*, 4C Offshore.

Fortea, P., (2015), *The Spanish railway industry: a benchmark worldwide*, Article in Global Railway Review.

Highlands and Islands Enterprise, (2025), *Regional Transformational Opportunities in the Highlands and Islands*, prepared by ekosgen and commissioned on behalf of the Highlands and Islands Regional Economic Partnership (HIREP).

Highlands and Islands Enterprise, *Tourism Website*.

McIntyre, S., Roy, G. and Waite, D., (2022*), Levelling up: what might it mean for Scotland?*, Economics Observatory.

Schwab, K., (2015), *The Fourth Industrial Revolution: What It Means and How to Respond*, Article in Foreign Affairs.

Scotch Whisky Association, (2024), *Scotch Whisky's Economic Impact 2022*.

SLOCAT, (2023), *A just transition for transport workers: The foundation for sustainable and decarbonised transport pathways*.

Stutz, A., and Vasquez, M. G., (2024), *Feminist Transport Systems: The Key to a Low-Carbon and Inclusive Future*, Changing Transport.

Sustrans, (accessed May 2025), *Scotland Walking and Cycling Index*.

Sustrans (2025), *The Children's Walking and Cycling Index Scotland*.

Thomas, M., (2023), *How The Netherlands Built a Biking Utopia*, Article for Distilled.

Transport Scotland, (2022), *Maybole bypass opens*.

Transport Scotland, (2024), *National Speed Management Review Consultation – Impact Assessment*.

Transport Scotland, (2024), *Fair Fairs Review Supporting Paper 1 - Public Transport System Analysis*.

Urban Transport Group (UTG), (2022), *Equitable Future Mobility: Ensuring a just transition to net zero transport*.

UN Women United Kingdom, (accessed May 2025), *About Website*.

Urban Transport Group, (2023), *Changing travel habits and what they mean for future transport*.

World Bank, (2024), *A Decade of Saving Lives Through Road Safety Investments*.

World Health Organization, (accessed May 2025), *Promoting well-being*.

YouGov, (2020), *Most women have been sexually harassed on London public transport*.

Data Sets and Data Summaries

Department for Energy Security and Net Zero, (accessed May 2025), *Regional Renewable Statistics*, Accredited official statistics.

Highland Council, (accessed June 2025), *Inverness Area Profile*.

HMRC, *UK trade in goods statistics*, last updated April 2025.

KiM Netherlands Institute for Transport Policy Analysis (KiM NITPA), 2024, *Cycling facts 2023*.

National Records of Scotland (NRS), 2023, *Scotland's Census 2022 – Rounded population estimates*.

National Records of Scotland, (2022), *Mid-2020 Population Estimates for Settlements and Localities in Scotland*.

OECD, (accessed May 2025), *Infrastructure Investment Data*.

Office of Budget Responsibility (OBR), (accessed May 2025), *Economic and Fiscal Outlook*, last published October 2024.

ONS, (2024), *National population projections: 2021-based interim*.

ONS, (2024), *Population estimates for the UK, England, Wales, Scotland, and Northern Ireland: mid-2022*.

ONS, (2023), *ASHE – Annual Survey of Household and Earnings*.

ONS, (June 2024), *Opinions and Lifestyle Survey (OPN)*.

Scottish Fiscal Commission (SFC), *Scotland's Economic and Fiscal Forecasts – December 2024*.

Scottish Government, (2021), *Rural Scotland Key Facts 2021*.

Scottish Government, (2024), *Supply, Use and Input-Output Tables*.

Scottish Government, (2023), *Exports statistics Scotland 2021*.

Scottish Government, (2020), *Scottish Index of Multiple Deprivation 2020*.

Scottish Government, (2023), *Businesses in Scotland: 2023*, Business and Innovation Statistics.

Scottish Government, (2025), *GDP First Quarterly Estimate 2024 Q4 (October to December)*.

Scottish Government, (2024), *Government Expenditure and Revenue Scotland (GERS) 2023-24*.

Scottish Government, (2024), *Scottish Greenhouse Gas Statistics 2022*.

Scottish Government, (accessed May 2025), *National Performance Framework*.

Scottish Government, (2024), *Scottish Sea Fisheries Statistics 2023 - corrected March 2025*.

Transport Scotland, *Scottish Transport Statistics*, last published March 2025, with statistics covering the year 2023.

Transport Scotland, (accessed May 2025), *Accessible Travel Framework*.

Transport Scotland, *Transport and Travel in Scotland statistics*, including Scottish Household Survey data, last published November 2024, with statistics covering the year 2023.

Visit Scotland, (2024) *International Tourism Performance, International Passenger Survey*.

Visit Scotland, (2024), *Domestic Tourism Performance, Great Britain Tourism Survey*.

Annex A: Economic rationale for Government support of public transport and Inclusive Growth

At its most basic level, Transport has a direct economic impact in terms of jobs within the sector and the associated output but has a wider function in terms of being an enabler of other (arguably all) economic activity. Whilst some (recreational travel) may be for the simple pleasure of the activity itself, the vast majority of transport journeys are for some other purpose - delivery of freight, commuting to employment, literally accessing other markets or locations. Demand for transport, including public transport, is a derived demand and so has links throughout the economy and is a key determinant of economic activity.

Transport demand from individuals is derived from demand for other sectors of the economy (access to jobs, physical access to markets, access to services including leisure) and sits alongside demand from business to move people and goods (Another critical factor in determining demand is the level of taxation or subsidy clearly as this will affect individual transport choices).

Supply is affected by physical infrastructure but also firms' costs for utilising that infrastructure (vehicle acquisition and running costs, staff costs, etc.) which will be dependent on any government subsidy provided in the case of public transport. The interaction of this supply and demand results in an equilibrium level of transport provision. It is important to remember that this equilibrium is the result of significant feedback effects and iteration.

Basic economic analysis talks of the factors of production in an economy being land, labour and capital, being bound together by the entrepreneur. These three high-level ways of viewing the economy are linked directly but transport has a crucial role in how those linkages operate physically and how they operate economically.

The transport sector obviously contributes to GVA directly but the key point is that, additionally, transport improvements (through building infrastructure or through policy action) will have an impact on the economy as a whole, primarily through increases in the productivity of *the rest of the economy*.

The transport sector, i.e. logistics, haulage and rail, air, and ferry services, run by combinations of private firms and other institutions, contributes directly to GDP and employment. Like any other sector of the economy, changes in employment and output within the transport sector will have impacts on the rest of the economy, both directly and indirectly.

More widely, transport provision, i.e. the ability to move from A to B, obviously has important economic benefits. It would seem uncontroversial to suggest that transport infrastructure is a pre-requisite for industrial development. The industrial revolution in Britain coincided with the massive expansion of the canal system in the 18th century and economic growth was greatly boosted in the period of the introduction of railways from the 1820's onwards. There is an issue of causality here – did the improved transport infrastructure drive the industrial revolution or did the industrial revolution drive transport infrastructure improvements?

It can be argued that is likely to be almost impossible to reliably measure the impact, on the economy, of the transport infrastructure as a whole in an industrial or post-industrial economy as put simply, without transport infrastructure there would be no viable economy to analyse.

Excerpt from An Examination of the linkages between improvements in transport provision and the economy. Transport Scotland 2006

Simplistically, the transport market will have an impact on the labour market through commuting and migration effects on the supply of labour, on the capital market, in terms of the location and productivity of firms, and on the land market, in terms of the impact on land prices of increased transport provision. These impacts are complex and interlinked and affect both the supply and demand within each market. As an example, increased transport provision may cause a relocation of firms which will affect the demand for labour, whilst the increased provision may well affect the supply of labour in that area. Both of these impacts are likely to influence the land market through a change in commercial rents and/or house prices. And public transport will play a crucial part in this.

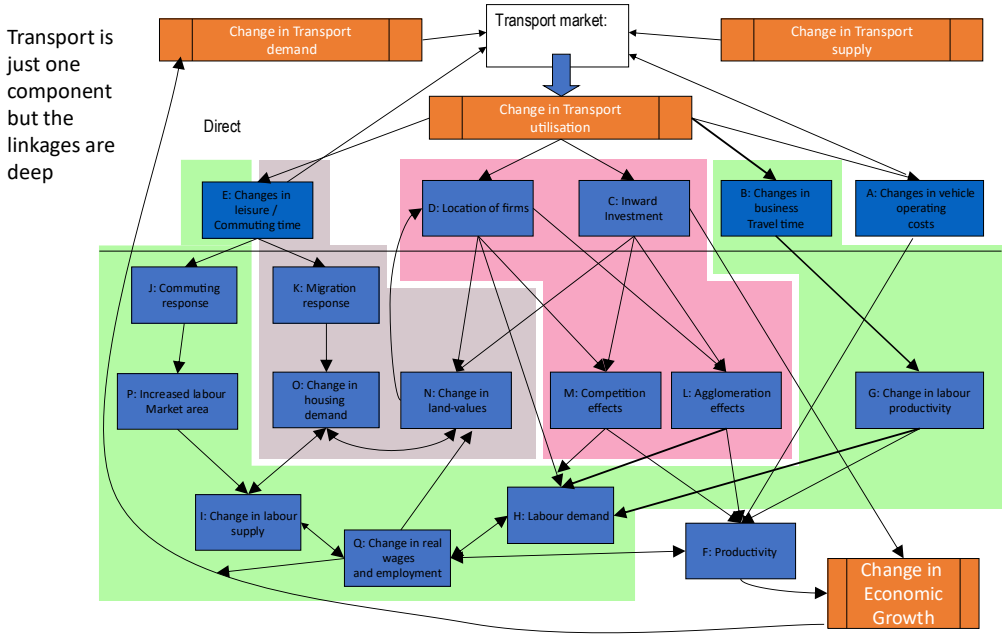
The next step is to follow through transport's impacts on factor markets to its impact on economic growth. A change in the level of transport utilisation will have five main physical impacts. These physical impacts feed through to potential impacts on economic growth

The 5 main ways, illustrated in **Figure** A1, in which a change in transport utilisation has a physical impact are:

- savings in vehicle operating costs;
- savings in business travel time;

- savings in leisure/commuting time;
- the location of existing firms;
- inward investment.

Figure A1 - Linkages between transport and economic growth



Of these factors, the direct impact savings in vehicle operating costs and changes in business/leisure/commuting time currently form the foundation of Transport Economic Efficiency analysis within Scottish Transport Appraisal Guidance.

Any change that impacts on productivity will influence economic growth:

- If a change in transport utilisation causes increased inward investment then there may be a direct boost to economic growth as the productive capacity of the economy will be increased.
- Reducing vehicle operating costs reduces the price of transport. Existing journeys will cost less and whilst there may be increased demand for journeys, all journeys will have a lower unit cost.
- Savings in business travel time will have an impact on labour productivity and hence labour demand by firms and overall productivity.
- Savings in leisure and commuting time will have an impact on the supply of labour through both a commuting and migration response. The commuting response will increase the relative size of labour markets whilst the migration response will change housing demand and impact on land prices more generally.
- The (re)location of firms and potential inward investment may increase economic performance directly or through agglomeration effects - increases in

productivity due to the spatial (time rather than distance) concentration of firms – or competition effects but will have an impact both directly and indirectly on labour demand and an indirect impact on labour supply through changes in land-values and hence house prices.

- Changes in labour supply and demand will result in changes in real wages and hence employment which affects productivity and economic growth.

The impact on the capital market is clearly important within this process but the effect on the labour market is central to the impact of transport on the economy as transport affects both labour supply through commuting and migration responses via the land-housing market, and labour demand through impacts on product markets.

Public transport plays a crucial role in this. The land-housing market is in turn affected by both the labour market and product markets from the location of individuals and firms. There is strong evidence that public transport availability has a particularly strong impact on land, and thus house, prices particularly within urban areas. Public transport is a direct factor in inward investment decisions, but crucially impacts everywhere due to the linkages between factors.

TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

Further copies of this document are available, on request, in audio and visual formats and in community languages. Any enquiries regarding this document/publication should be sent to us at info@transport.gov.scot.

Published by Transport Scotland, June 2025

Follow us:

transcotland

@transcotland

transport.gov.scot