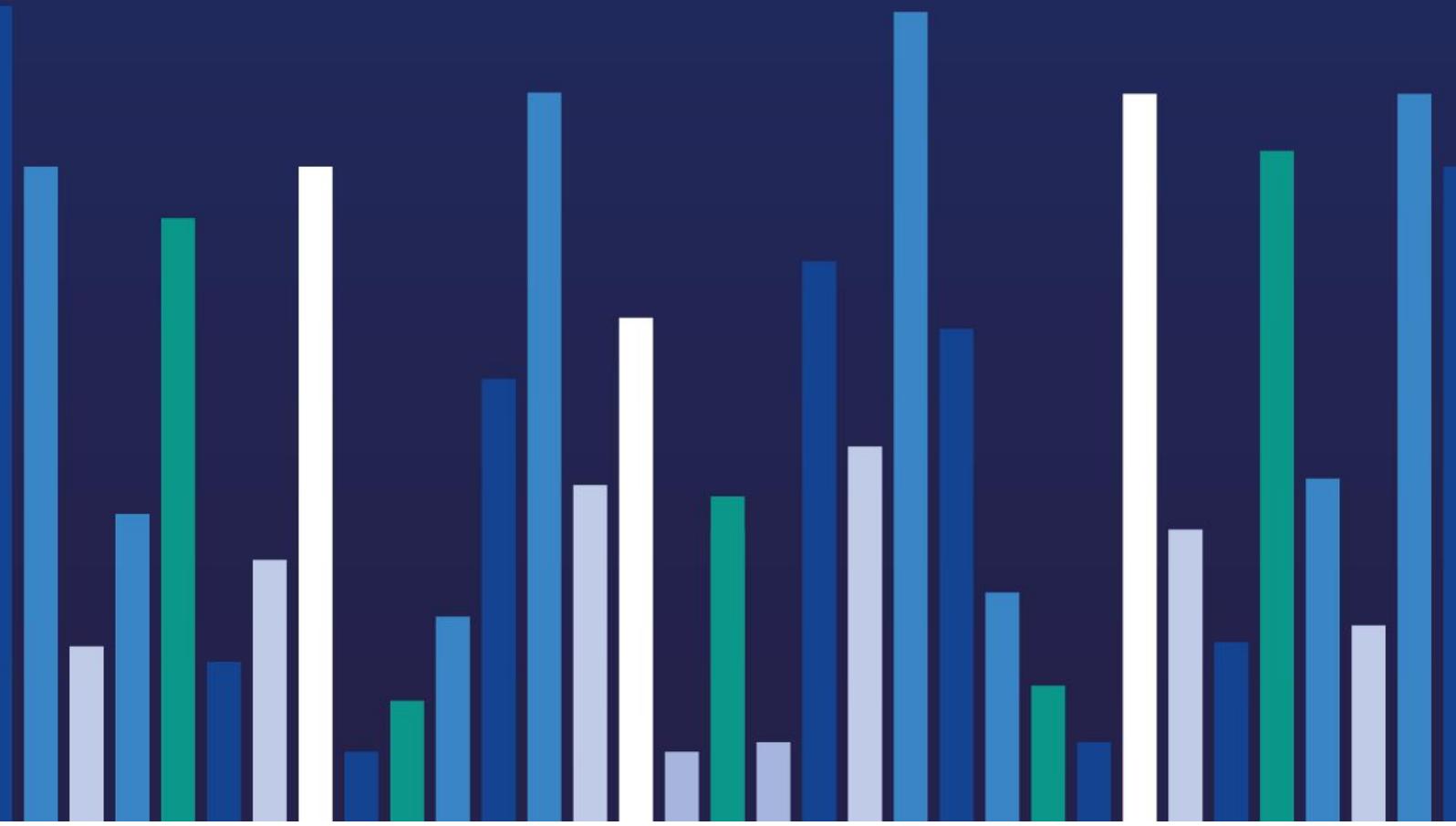CAPITAL ECONOMICS

THE ECONOMIC CONTRIBUTION OF THE INTELLIGENT TRANSPORT SYSTEMS SECTOR TO THE UK ECONOMY

A quantitative analysis of the economic footprint of ITS businesses across the UK

FOREWORD

Max Sugarman, Chief Executive, Intelligent Transport Systems UK

Transport technology is fundamental to the UK. It keeps our roads moving, helps passengers navigate public transport, enables goods to travel efficiently from port to consumer, and allows seamless journeys across multiple modes through integrated ticketing, journey planning and on-demand services, to name a few. Increasingly, it is also transforming how our networks operate — through connected and automated vehicles, digital twins, and data-driven systems.

As artificial intelligence and advanced digital tools reshape the economy, Intelligent Transport Systems (ITS) are at the forefront of that transformation. The sector improves safety, reduces congestion, cuts emissions and improves resilience. Yet while its societal benefits are widely recognised, its economic contribution has historically been harder to quantify.

For many years, ITS UK cited an estimate of £1.5 billion in total economic value. While indicative, that figure lacked the independent rigour needed to demonstrate the sector's full strategic importance to Government and policymakers. That's why in 2024, ITS UK commissioned Capital Economics to provide a comprehensive assessment of the industry's economic footprint.

The findings are clear and compelling. The ITS sector contributes £3.2 billion to the UK economy — more than double previous estimates — supports 45,000 highly skilled jobs, and generates over half a billion pounds annually in tax revenues. This is not a niche industry, but a sector of national significance.

The report also highlights a structural challenge. ITS spans every mode of transport and those working in the industry can be embedded within larger organisations, making it difficult to capture using existing Standard Industrial Classification (SIC) codes. As technology becomes increasingly central to economic growth, ensuring that its contribution is properly measured is vital. If the UK is to maintain its leadership in transport innovation, we must improve how we define, support and champion sectors like ours.

This report provides the robust evidence base we need to do exactly that. My thanks go to the Advisory Group, to those who contributed data and case studies, and, most of all, to the team at Capital Economics for their thorough and authoritative work. Together, we are strengthening the case for transport technology — and for the economic growth it enables.

ACKNOWLEDGEMENTS

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A report by Capital Economics for ITS UK

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KEY FINDINGS

- The ITS sector spans across a wide range of businesses, sectors and applications and is not well defined by official statistics. In this study we have estimated the size and contribution of the ITS sector based on revenues specifically linked to intelligent transport systems activities. In total, a conservative estimate of revenues related to intelligent transport systems is £3.1 billion in 2024.

- The economic contribution of the UK ITS sector is material, with more than £1.6 billion of gross value added (GVA) and around 21,700 jobs directly supported by ITS related activities. The ITS sector is a high productivity sector, generating an estimated £73,600 in gross value added per job compared to an average of £67,000 across all sectors.

- The impact of the sector is not limited to its direct activities. Spending on suppliers by the ITS sector supports around £905 million of GVA and 13,500 jobs in businesses through the supply chain.

- The spending of all employees whose incomes are supported by ITS related activities supports a further £730 million of GVA and around 9,400 jobs.

- Taken together, the overall impact of the ITS sector amounts to £3.2 billion of GVA and almost 45,000 jobs. This activity is spread across the UK with jobs supported ranging from 1,100 in Northern Ireland to over 10,000 in London.

- The ITS sector supports approximately £510 million in employee-related taxes and VAT generated through the spending of ITS-supported employment.

- Beyond the economic activity supported by the sector itself, there are significant and wide ranging economic and social benefits from the application of technologies developed and implemented by the ITS sector. It is beyond the scope of this report to fully quantify these catalytic effects, but they include:

    o Improved safety through real-time monitoring, collision-avoidance technologies and rapid incident response.

    o More efficient and reliable journeys through traffic management, adaptive signals, and optimised routing, resulting in shorter travel times, fewer delays and more reliable public transport services.

    o Environmental benefits through reduced fuel consumption thanks to lower congestion and electric vehicle charging infrastructure.

    o Improved user experience through better information and more integrated mobility services, such as real-time travel updates, simpler journey planning across modes, and more convenient access to shared mobility options.

1 WHAT IS THE ITS SECTOR?

1.1 Introduction to intelligent transport systems

Intelligent transport systems represent a transformative application of information and communication technologies to the mobility sector, spanning all four modes of transport: air, sea, rail and road.

By integrating advanced technologies into both infrastructure and vehicles, intelligent transport systems act as an enhancing layer that enables better movement of people and goods, improves network safety and efficiency, and reduces environmental impacts.

The roots of intelligent transport systems stretch back to the early 20th century, when electric traffic signals were first introduced. The 1960s saw the first computerised traffic management systems, while the 1970s saw the introduction of electronic tolling. But it wasn't until the 1990s that the term "intelligent transport systems" was first coined, with the first ITS World Congress being held in Paris on 30th November 1994[1]. Since then, the world of innovation applied to transportation has come a long way.

Today, the industry is at the forefront of mobility transformation. The rise of the Internet of Things (IoT), rapid advances in software, and the explosion of data availability have made intelligent transport systems increasingly multidisciplinary. Activities in the sector draw on expertise from information technology, telecommunications, transportation engineering, software development, and vehicle manufacturing. This convergence of technologies is reshaping how transport networks operate and how users experience mobility, making intelligent transport systems a cornerstone of modern, connected, and sustainable transport systems.

1.2 Definition and measurement

This report aims to quantify the size of the intelligent transport systems (ITS) sector in the UK, and to outline its wider economic footprint.

Measuring the sector is complex for a number of reasons. First, activities related to intelligent transport systems often make up only one component of an organisation's operations. This makes it hard to isolate in official datasets. Second, there is a challenge in categorising activities that are directly related to intelligent transport technologies but are primarily applications of those technologies. For example, ride-hailing services enabled by an app clearly incorporate intelligent transport components, but including all revenues from the service itself would make it hard to interpret the underlying value of the ITS sector. Third, the UK's Standard Industrial Classification (SIC), the method used by the Office for National Statistics (ONS) to categorise economic activity, was last updated in 2007 and does not fully capture modern data-driven and service-intensive intelligent transport activities.

Over the past decade, the intelligent transport systems sector has grown rapidly across multiple segments, driven by technological advances, emerging applications, and new innovations. Yet its fast-changing and multidisciplinary nature makes it hard to define and measure accurately. Official data provide only a partial view. This study is the first in the UK to collect primary data through a dedicated survey and combine it with standard economic methods to estimate the sector's size and economic impact.

To capture the breadth of sectors and players involved, we define the intelligent transport systems sector based on the services and products it delivers. The sector is multidisciplinary and intersects different types of organisations and functions. As such, the definition of intelligent transport systems used in this study includes a broad range of activities related to intelligent transport systems technologies including research, advisory, design, procurement support, construction & installation, operation & maintenance, reviews, improvements & decommissioning. It does not include revenues from consumer spending on services enabled by intelligent transport systems.

For the purposes of this report, these activities are grouped into three categories:

- Infrastructure, assets and operations

- Connectivity and technology integration

- User-centric services and technologies

Within and across these broad categories sit a diverse set of technologies, solutions and service offerings, reflecting the complex and evolving nature of the intelligent transport systems ecosystem. Table 1 provides an overview of the sector, including its core categories and associated sub-categories.

Table 1: Intelligent transport systems sector by category and sub-category

Category	Sub-category	Description
Infrastructure, assets and operations	Payments including congestion and low emission zones, tolling, EV charging and parking	Managing payment systems and infrastructure congestion charges, low emission zones, EV charging and parking.
	Traffic control, monitoring and information	Systems for monitoring and controlling traffic flow. Help manage congestion using AI and predictive analytics.
	Maintenance (inc. predictive)	Maintenance of infrastructure and assets, including the use of digital modelling to simulate, forecast, and optimise upkeep. This includes digital twin technology.
	Compliance and criminal enforcement	Ensuring compliance to laws and regulations, such as speed limits, toll compliance, or parking regulations.
Connectivity and technology integration	Data services and cloud	Cloud-based platforms for data storage, processing, and analytics for the transport sector.
	Internet of things and connectivity	Enabling connected systems for smart cities and mobility solutions.
	Telematics and navigation systems	Real-time vehicle data and navigation services.
	Connected and automated mobility	Vehicles equipped with technologies that enable automated driving and connectivity, allowing operation with reduced or no human input.
User-centric services and technologies	Passenger experience, journey planning and Mobility as a Service (MaaS)	Enhancing the travel experience through personalised, efficient planning tools and integrating various transportation modes into a unified, user-friendly platform.
	Ticketing and payments	Solutions for seamless payment and ticketing processes.
	Dynamic scheduling	On-demand services such as demand responsive transport. Technology that allows the route planning of public transport or micromobility or ride-hailing services.

Source: Capital Economics

1.3 Infrastructure, assets and operations

Infrastructure, assets and operations in intelligent transport systems refers to the operation, maintenance, and optimisation of the physical and digital assets that keep transport networks functioning safely and efficiently. It focuses on ensuring that core systems such as traffic control and roadside equipment work reliably, are upgraded as technology evolves, and support seamless day-to-day network performance.

Beyond basic functionality, intelligent transport systems in infrastructure, assets and operations underpin some of the long-term goals of sustainable and connected mobility, such as congestion reduction, improved safety and environmental sustainability. Digital twins and advanced monitoring

allow operators to anticipate maintenance needs, thereby minimising downtime and optimising an asset's lifecycle. Similarly, enforcement systems and tolling technologies help ensure compliance and manage demand effectively, while EV charging infrastructure supports the transition to cleaner mobility.

Key technologies include:

- *Tolling or road user charging:* systems for managing and operating tolls and usage fees; they are often integrated with dynamic pricing

- *Traffic management:* systems for monitoring and controlling traffic flow, reduce congestion and improve journey time reliability. They include AI-driven platforms and predictive analytics

- *Digital twins:* virtual models that simulate infrastructure performance, enabling predictive maintenance and scenario planning

- *EV and charging technology:* infrastructure for electric vehicle charging and support, integrated with grid systems

- *Enforcement:* automated systems for speed, toll and parking compliance. They improve safety and operational efficiency

1.4 Connectivity and technology integration

Connectivity and technology integration form the digital backbone of intelligent transport systems, enabling different components to communicate, share data, and operate as a cohesive ecosystem. This layer is critical for real-time information exchange and coordinated mobility services, linking vehicles, transport infrastructure, and cloud platforms through interoperable technologies. By ensuring seamless data flow, these solutions support predictive analytics, dynamic traffic management, and emerging applications such as connected and automated mobility (CAM).

The companies delivering these technologies are often global corporations active across multiple industries, meaning intelligent transport-related products and services typically represent only a fraction of their operations. Nevertheless, these capabilities are foundational to smart cities and next-generation transport networks, underpinning innovations in safety, efficiency, and sustainability.

Key technologies include:

- *Internet of things, 5G and connectivity:* enabling connected systems for smart cities and mobility solutions

- *Telematics and navigation systems:* real-time vehicle data and navigation services

- *Cooperative systems & connected and automated mobility (CAM):* facilitating vehicle-to-vehicle and vehicle-to-infrastructure communication

- ***Data services & cloud:*** cloud-based platforms for data storage, processing, and analytics for the transport sector

1.5 User-centric services and technologies

User-centric services and technologies represent the most visible layer of intelligent transport systems, where innovation directly shapes the traveller experience. This category encompasses tools, platforms, and emerging modes of transport that prioritise convenience, accessibility, and personalised mobility. These solutions not only improve day-to-day travel but also redefine how people interact with transport networks, supporting seamless multimodal journeys.

As digitalisation accelerates, user-facing technologies are becoming central to mobility strategies, enabling integrated services, real-time information, and frictionless payments. They also play a critical role in sustainability by encouraging a shift from private to public transport and shared mobility options.

Key technologies include:

- ***Autonomous vehicles:*** driverless vehicles capable of operating with reduced or no human inputs

- ***Passenger experience and journey planning:*** enhancing the travel experience through personalised and efficient planning tools

- ***Ticketing and payments:*** solutions for seamless payment and ticketing processes

- ***Mobility-as-a-Service (MaaS):*** integrating various transportation modes into a unified, user-friendly platform

- ***Demand responsive transport:*** flexible mode of transportation that adjusts routes, schedules, or vehicle assignments based on real-time passenger demand rather than operating on fixed schedules or predefined routes

2 BENEFITS OF INTELLIGENT TRANSPORT SYSTEMS TECHNOLOGY

2.1 Overview

Intelligent transport systems provide a wide range of benefits that improve safety, efficiency, sustainability, and user experience across the transport network. Some of the key benefits include:

- **Safety improvements**. Intelligent transport systems technologies such as real-time traffic monitoring, collision avoidance systems, and automated alerts help prevent accidents before they occur. In addition, rapid incident detection and integrated emergency response systems ensure that when accidents do happen, assistance reaches the scene quickly, reducing fatalities and injuries.

- **Traffic efficiency**. Intelligent transport systems enable dynamic traffic management through adaptive signal control, congestion monitoring, and route optimisation. These tools reduce delays, improve travel times, and make better use of existing infrastructure. For public transport, intelligent transport systems support real-time scheduling and passenger information systems, improving reliability and reducing waiting times.

- **Environmental benefits**. From an environmental perspective, intelligent transport systems contribute to lower emissions and improved air quality. By reducing congestion and idling, they help cut fuel consumption and greenhouse gas emissions. Furthermore, intelligent transport systems facilitate the integration of electric vehicles by supporting smart charging infrastructure and grid management, accelerating the transition to cleaner transport.

- **Economic benefits**. The economic benefits of intelligent transport systems are also substantial. Reduced congestion and fewer accidents lower costs for businesses and individuals, while improved reliability enhances supply chain efficiency. These factors contribute to higher productivity and competitiveness for the economy as a whole.

- **User experience**. For users, intelligent transport systems deliver a better travel experience through real-time information on traffic conditions, delays, as well as providing options for alternative routes. It also supports integrated mobility solutions, making it easier to combine different transport modes, such as cars, buses, trains, and bicycles into a seamless journey.

- **Policy and planning**. Finally, intelligent transport systems generate valuable data for policymakers and planners, enabling evidence-based decisions on infrastructure investment and transport policy. Predictive analytics derived from intelligent transport systems data allow authorities to anticipate traffic patterns and manage networks proactively, rather than reactively.

2.2 Infrastructure, assets and operations

This section summarises the evidence on the benefits of intelligent transport systems related to infrastructure, assets and operations and is structured by type of technology (See section 1.3.) The review focuses on those areas where the evidence base is strongest.

Traffic management

Inefficient urban transport networks impose substantial economic costs. According to the European Court of Auditors, congestion and inefficiencies across EU cities cost an estimated EUR 110 billion annually, over 1% of GDP.[2] Similarly, in the United States, congestion in 2017 caused urban travellers to spend an additional 8.8 billion hours on the road and consume 3.3 billion extra gallons of fuel, at a total cost of USD 166 billion.[3]

Against this backdrop, a wide body of international evidence shows that intelligent transport systems for traffic management can significantly reduce congestion and improve travel times, delivering broader economic and social benefits. A study from Russia found that optimising traffic flows and improving coordination between vehicles and infrastructure reduced congestion and cut travel times by 20–48%, enabling more efficient movement of goods and people, and boosting urban productivity.[4]

Comparable results have been observed elsewhere. Between 1999 and 2001, Los Angeles implemented an Adaptive Traffic Control System (ATCS) that dynamically adjusted signal timings using real-time traffic data. Evaluations showed average stop times fell by 31%, delays declined by 21%, and overall travel times dropped by nearly 13%. In the Netherlands, analysis of congestion data from 2005–2015 found that ramp metering and dynamic route information systems improved travel times by around 9%.[5]

Intelligent transport systems in traffic management also deliver safety benefits. Systems providing real-time warnings, such as pedestrian detection and incident alerts, have been shown to reduce collisions by 15–50% annually. In Philadelphia, Traffic Incident Management Systems (TIMS) reduced freeway incidents by 40%, cut closure times by 55%, and lowered incident severity by 8%, primarily through faster detection and rerouting.[6] Similarly, advanced incident detection in New York reduced average clearance times from 90 minutes to just 19 minutes, improving both network resilience and safety outcomes.[7]

Environmental impacts are also positive. On the UK's M42 motorway, variable speed limits reduced emissions by 4–10% and fuel consumption by around 4%, demonstrating how smoother traffic flow reduces idling and stop-start driving.[8]

Case Study 1: Infrastructure, Assets and Operations

The use of Plus+ Advantage in Birch Hill, Bracknell

Yunex Traffic

The Birch Hill roundabout on the A322 is a strategically important junction linking the M3 and M4 and providing access to Bracknell town centre. Yunex Traffic has delivered a full replacement of the life-expired 33-pole signal system for Bracknell Forest Council. The site's "hamburger" layout, with the A322 running directly through the centre, created significant challenges for maintaining traffic flow during construction.

Yunex Traffic's Plus+ Advantage solution offers a transformative approach to delivering complex traffic signal upgrade schemes. Traditional methods often require temporary traffic management, lane closures, temporary signals, and extensive cabling, all of which increase cost, prolong construction programmes, and cause significant disruption and congestion. Plus+ Advantage removes the need for separate temporary systems by using the permanent Plus+ equipment throughout construction.

Using Plus+ Advantage, Yunex Traffic installed the permanent Plus+ controller and signal equipment from the outset, deploying temporary poles in temporary bases and utilising existing ducting for all cabling. This avoided the extensive ducting replacement that a traditional ELV system would have required. The temporary Plus+ system maintained full UTC operation throughout the three-month construction phase, ensuring the junction remained fully functional even during major civil works.

As construction progressed, the temporary equipment was transferred pole by pole into its permanent locations with minimal signal downtime. This approach shortened the programme by over four weeks, eliminated the need for third-party temporary traffic management, and delivered major sustainability benefits: more than 1.7 km and 350 kg of copper cabling was avoided, saving over 1,400 kg of embedded CO_2. -by-pole into its permanent locations with minimal signal downtime. This approach shortened the programme by over four weeks, eliminated the need for third-party temporary traffic management, and delivered major sustainability benefits.

Tolling and road-user charging

Road user charging schemes are widely recognised as effective tools for reducing congestion and improving environmental and health outcomes. The literature shows that charging drivers for road use, especially in busy urban areas, leads to fewer car trips, cleaner air, and safer streets.

A major review focusing on health impacts finds that road pricing reduces air pollution, traffic injuries, and noise, with clear public health benefits. The authors also note that equity outcomes depend on how revenues are used, for example to improve public transport or support lower-income travellers.[9]

Evidence from central London, where the Congestion Charging Scheme was introduced in February 2003, also demonstrates notable environmental gains. Between 2002 and 2003, greenhouse gas emissions fell by an estimated 16%, while NOx and PM10 levels declined by 18% and 22% respectively between 2002 and 2004. By 2006, congestion itself was 26% lower than in 2002, indicating persistent gains when road pricing measures are maintained and updated.[10] These outcomes emphasise how pricing instruments, supported by intelligent transport systems for enforcement, billing, and analytics, can shape travel demand, improve air quality, and enhance overall network efficiency.

Enforcement technologies

Enforcement intelligent transport systems are primarily focused on safety and risk management. Camera systems and speed-monitoring equipment encourage compliance with speed limits and other regulations by collecting and feeding back vehicle data in real-time, which can deter risky driving behaviours.

The enforcement literature is extensive and largely convergent in its conclusions: automated enforcement technologies significantly improve road safety outcomes, particularly by reducing speeding and crash severity. Speed cameras, red-light cameras, and intelligent speed enforcement systems operate primarily through behavioural deterrence, increasing perceived enforcement certainty rather than relying on physical traffic calming.

A comprehensive international review by Thomas et al. found that fixed and mobile speed camera programmes are associated with reductions of 20–25% in injury crashes, with particularly strong effects on fatal and serious collisions. The review emphasises that well-designed evaluation studies consistently show positive safety outcomes across jurisdictions.[11]

Public health literature further corroborates these findings. A landmark review published in Injury Prevention reports sustained reductions in vehicle speeds and crash injuries following camera deployment.[12]

Overall, the literature positions enforcement technologies as low-cost, high-impact interventions that complement infrastructure-based safety measures and deliver measurable reductions in fatalities and injuries when deployed at scale.

Case Study 2: Infrastructure, assets and operations

Bristol City Council – Clean Air Zone Transformation

Intelliscape

Bristol City Council launched its Clean Air Zone (CAZ) initiative with a clear mission: reduce harmful nitrogen dioxide emissions, improve local air quality, and create a healthier environment for its residents. The initiative targets older, higher-polluting vehicles by requiring non-compliant drivers to pay a daily charge when entering the designated zone. All revenue generated is reinvested into sustainable transport and infrastructure, ensuring the programme delivers both immediate and long-term benefits.

The council faced several key hurdles in delivering the CAZ effectively including: reducing emissions from older, non-compliant vehicles contributing to poor air quality; implementing reliable monitoring and enforcement, ensuring the scheme operated fairly and consistently; and deploying a scalable, future-ready system capable of adapting to evolving environmental and regulatory needs.

To meet these challenges, Bristol required an enforcement solution with high accuracy, strong reliability, and seamless integration with its existing systems.

The council partnered with Intelliscape to deploy 49 Roadflow Fusion cameras across the city. These advanced Automatic Number Plate Recognition (ANPR) units automatically identify vehicles in real time and cross-reference each number plate with emissions compliance data.

Key features included:

Real-Time ANPR Accuracy: Automated identification ensures every vehicle entering the CAZ is assessed consistently and fairly.

High Versatility: The cameras operate reliably in all weather and lighting conditions, providing uninterrupted coverage.

Third-Party Integration: Seamless connectivity with payment providers and Penalty Charge Notice (PCN) processors supports smooth enforcement and payment collection workflows.

The introduction of the Clean Air Zone, supported by Intelliscape's technology, has enabled Bristol to take a major step toward reducing pollution and reshaping travel habits. The reliable automated monitoring system ensures that emissions-heavy vehicles are identified consistently, encouraging residents and visitors to consider cleaner modes of transport.

As David Bunting of Bristol City Council noted, "The Clean Air Zone will not only reduce air pollution but also help people change how they travel, delivering a cleaner, greener and healthier city for years to come."

The CAZ is already strengthening public confidence in Bristol's commitment to sustainability and is laying the groundwork for future improvements in mobility and air-quality management.

2.3 Connectivity and technology integration

This section summarises the evidence on intelligent transport systems related to connectivity and technology integration and is structured by type of technology. (See section 1.4.) The review focuses on areas where the evidence base is strongest.

IoT, 5G and connectivity

Connectivity solutions applied to the transport sector allow vehicles, infrastructure and users to share information and data in real-time, and include an increasingly large number of technologies that enable real-time hazard detection and incident response. Both materially improve safety.

A wide range of studies of vehicle-to-everything applications show that by warning drivers of risks they cannot see or foresee, connectivity reduces crashes.[13]

A study of vehicle-to-pedestrian (V2P) systems in Montreal indicates that ~60% of highway incidents could be prevented if drivers receive warnings seconds before a potential conflict, and blind spot alerts for approaching pedestrians can reduce accident rates by a similar margin.[14] In New York, integrated CCTV, highway advisory radio (HAR), variable message signs (VMS), and dedicated hotlines cut incident clearance times from 1.5 hours to 19 minutes, limiting secondary crashes and restoring capacity quickly.[15]

Case Study 3: Connectivity and technology integration

Stoneferry Corridor Integrated ITS Scheme – Hull

Clearview Intelligence

The Stoneferry Corridor is a strategic arterial route in Kingston upon Hull, connecting the northern part of the city with the Port of Hull, the city centre and eastern districts. The corridor serves significant industrial and HGV traffic alongside residential, retail and educational areas. Hull City Council identified safety, congestion and infrastructure resilience challenges that were affecting network performance and local communities.

Three key issues were identified:

Cyclist safety at junctions – Vehicles turning or changing lanes were crossing the path of cyclists, creating conflict points and reducing confidence in active travel along the corridor.

Bridge strikes – A low rail bridge on Stoneferry Road was being struck by over-height vehicles approximately six times per year, causing costly recovery operations, local congestion and disruption to the rail network.

Congestion and limited network intelligence – The absence of reliable journey time data meant operators were unable to proactively manage congestion or communicate effective diversion routes, contributing to delays and emissions.

Hull City Council worked collaboratively with Clearview Intelligence to design and implement an integrated intelligent transport solution addressing these issues.

At five junctions, cyclist detection and classification technology was deployed to identify approaching cyclists. Detection triggers Illuminating Intelligent Road Studs, providing dynamic visual warnings to drivers while reinforcing safe positioning for cyclists. This targeted intervention addresses conflict risk at the point of greatest vulnerability.

Journey Time Monitoring sensors were installed along the corridor, with data integrated into Clearview's Insight Data Management platform. Real-time journey time information is communicated directly to 18 Variable Message Signs (VMS) and to the council's network management team. This enables proactive congestion management, improved incident response and informed route choice by drivers.

To prevent bridge strikes, five infrared over-height vehicle detection sensors were positioned upstream of the low bridge. When an over-height vehicle is detected, VMS warnings direct drivers to alternative routes, intercepting vehicles before they reach the structure.

The scheme reduced collision risk at key junctions, improving safety for cyclists and pedestrians. It lowered congestion and improved journey time reliability for freight, commuters and businesses. And it reduced infrastructure damage and associated costs linked to bridge strikes. Ultimately, this also meant improved air quality through smoother traffic flow and reduced stop-start conditions and strengthened resilience of a key industrial corridor supporting access to the Port of Hull.

2.4 User-centric services and technologies

This section reviews evidence on user-centric intelligent transport systems and is structured by type of technology. (See section 1.5.) The review focuses on areas where the evidence base is strongest.

Demand-responsive transport

Demand-responsive transport uses real-time data to match passengers with vehicles, adjusting routes dynamically and optimising for user preferences. Its most widespread application is ride-sharing. While ride-sharing is not a traditional roadside intelligent transport system, its digital dispatch, real-time matching, and data feedback mechanisms share the information-centric logic of intelligent transport systems. These features can complement public transport and road safety efforts, particularly late-night and in areas with limited conventional services.

Evidence on ride-sharing platforms and their impact suggests significant safety benefits. For example, a US county-level study (2007–2015) finds that Uber's entry is associated with lower DUI rates and, over sustained operation (four or more years), a reduction in fatal crashes between 17–40%.[16]

Beyond safety, demand-responsive transport systems can deliver operational and service improvements. A review of 65 studies and 20 deployments reports that it can reduce operating costs by 25–35%, increase ridership by up to 300%, enhance service reliability to 90–98%, and cut travel times by 35–50%.[17]

Moreover, flexible, on-demand transit services adjust routes, timing, and stops based on real-time demand. This flexibility reduces empty rides, lowers emissions, and enhances passenger convenience, particularly in underserved areas.[18]

Telematics, navigation systems, and journey planning

One of the benefits of intelligent transport systems applied to telematics, navigation systems and journey planning is that they optimise travelling and parking choices.

Evidence from Victoria, Canada, shows that cost-effective parking management supported by telematics can reduce parking demand by 20–40%, lowering both land use and capital costs[19]. Similarly, research from Baghdad suggests that integrated traffic management, including reduced parking search times and more rational trip planning, can cut emissions by nearly half under appropriate conditions.

Environmental benefits are also well documented. In Japan, personalised travel planning that guides users towards cleaner modes and routes achieved a 20% reduction in carbon emissions after implementation. In California, telematics-enabled eco-driving delivered fuel and CO_2 savings of 10–20%,[20] while a route guidance application tested in Buffalo, USA, reduced greenhouse gas emissions by 5–10%.[21]

Together, these findings show that relatively light-touch, information-based interventions can generate meaningful environmental gains without requiring extensive new infrastructure.

Case Study 4: Use-centric services and technologies

Pay-as-you-go ticketing

FAIRTIQ and Trainline

In the past six months technology companies like Swiss specialists FAIRTIQ and UK-based Trainline have launched the UK's first Digital Pay-As-You-Go (DPAYG) schemes. This app-based ticketing is incredibly easy for customers: simply swipe and travel, and the app does the rest.

While contactless and Smartcard-based PAYG schemes are well-established in the UK, app-based DPAYG is hardware-free because it utilises the GPS on travellers' mobile devices. This allows for multimodal journeys, with the app identifying the correct mode of transport from the data and charging appropriately. Today in the UK, DPAYG is deployed in several DfT-led rail trials with operators Northern Trains and EMR. In Europe, the technology is already thriving: FAIRTIQ operates multimodal ticketing in a dozen countries, including national schemes in Denmark, Switzerland and Austria. Over 350m trips have been made since the company launched in 2016; in Denmark more than two-thirds of all public transport journeys are now made using FAIRTIQ.

By eliminating the need for extensive hardware, DPAYG systems can be established rapidly and comparatively cheaply. The Danish scheme took just six months from contracts being signed to launching nationwide. Because it is infrastructure-free, DPAYG offers ticketing technology without borders. For example in the Meuse-Rhine region rail passengers can make journeys between Germany, Belgium and the Netherlands with just one swipe of the app – despite the different ticketing systems and fare structures in each country.

And app-based ticketing provides powerful commercial and communication benefits. GPS data provides a comprehensive 360-degree view of customer journey patterns, so personalised incentives can stimulate more travel while suspicious or fraudulent behaviour is easily spotted. The Occitanie region of southwest France has delivered the country's lowest rate of fare evasion through a combined approach, deploying rewards to incentivise users to travel more while inspecting 100% of journeys in back-office engines to flag possible fraudulent activity.

Digital Pay-As-You-Go stands out because it offers a unique combination of flexibility, ease of deployment, and an incredibly simple customer experience.
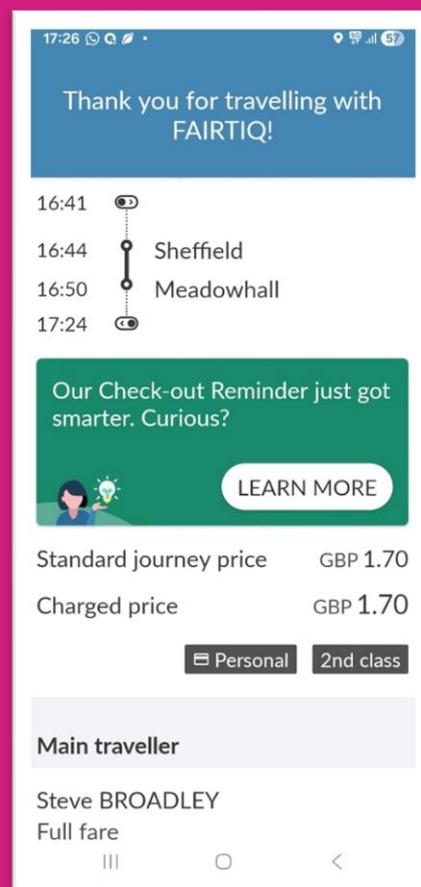
Case Study 5: User-centric services and technologies

Connecting Passenger Communication to Live Operations

National Express and Ridango

National Express operates the UK's largest scheduled coach network, running high-frequency services across hundreds of intercity and airport destinations. While passengers could already use onboard SMS feedback codes, these were primarily retrospective, supporting post-journey service follow-up rather than live operational response.

The issue was not a lack of feedback. It was the absence of operational visibility at the moment issues occurred. When passengers experienced delays, connection risks, onboard comfort concerns, staff conduct issues, or safety incidents, their messages did not connect to live service management. Feedback existed, but it sat outside operational workflows.

National Express integrated passenger SMS communication directly into Ridango Data Intelligence platform, embedding it within operational control and contact centre workflows. Passengers continue to text the onboard SMS number, but messages now arrive within Data Intelligence enriched with live operational and ticketing data.

This enables two complementary capabilities:

Reactive communication: In-journey concerns are automatically acknowledged and prioritised. Safety-related messages are flagged using keyword detection and surfaced as urgent. Teams can respond in real time, often while the journey is still underway, reducing uncertainty and escalation.

Proactive communication: Using ticket data, controllers can identify affected passengers during disruption and send targeted SMS updates. Rather than waiting for customers to chase information, National Express contacts them first — particularly in cases of connection risk or significant delay.

The partnership has had a considerable impact. 95% of on-the-day incidents now trigger proactive ticket-linked passenger contact. Meanwhile, customer satisfaction with punctuality increased 6.9% year-on-year and customer satisfaction with communication increased 5.4% in 2025 compared to the prior year.

3 ECONOMIC IMPACT OF THE ITS SECTOR

3.1 Methodology overview

The economic contribution of the UK ITS sector is estimated using revenue data from 77 firms and an input–output (IO) modelling framework.[1] Revenues related to intelligent transport systems were identified using an anonymised survey of ITS UK members and publicly available financial information, with adjustments applied to reflect firm diversification and data granularity. These revenues were then mapped onto UK input–output tables to estimate the direct, indirect, and induced impacts of the ITS sector on the UK economy. Further methodological detail is provided in the appendix.

3.2 Direct effects

Based on a survey of firms in the ITS sector combined with analysis of financial accounts and information from ITS UK, we estimate that the turnover of the ITS sector in the UK in 2024 was in the region of £3.1 billion. This is likely to be a conservative estimate given the assumptions made to fill in gaps in the survey data. (See methodology.)

Intelligent transport systems-related activities span multiple official industry sectors, including: i) Telecommunications; ii) Computer Programming, Consultancy & Related Activities; and iii) Construction, and therefore cannot be captured within a single industry classification. To reflect this, turnover from intelligent transport systems-relevant firms was mapped onto our UK input–output table based model, using firm level SIC codes.

Based on the turnover and its official sector disaggregation, we estimate that the gross value added (GVA) supported directly by ITS related activities is £1.6 billion. GVA measures the new value created by an industry through the use of labour and capital, accounting for production-related taxes and subsidies. So while turnover reflects the scale of an industry's activity, GVA represents its contribution to the economy.

Based on a review of physical locations of companies which represent over 90% of turnover in our estimate of the ITS sector, we have broken down the direct impact by region. More than one quarter of the direct impact of ITS activities is concentrated in London, with around £410 million of GVA supported. Outside London the largest direct beneficiaries of ITS activities are in the South West (£210 million), North West (£180 million), and West Midlands (£175 million). The direct effect of ITS

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[1] Note: As per standard industry practise, the analysis uses the latest (2023) UK input-output analytical tables published by the ONS.

sector activities in most regions across the UK ranges between £35 million and £140 million in GVA, with smaller contributions in Northern Ireland (£35 million) and Wales (£40 million). (See Table 2.)

In addition to its contribution to economic output, the ITS sector supports jobs across the country. Overall, we estimate that there are around 21,735 jobs directly working in ITS related activities. These jobs are spread across the country, ranging from 470 in Northern Ireland to 5,600 in London. Relative to their share of national employment, the South West, London and the West Midlands are disproportionately represented in ITS sector employment. (See Table 2.)

Workers directly employed in the ITS sector are more productive than the UK average, generating an estimated £73,600 in gross value added per job compared to £67,000 nationally.

Table 2: Direct economic contribution of the ITS sector in the UK by region

	GVA (million)	Jobs (number)
London	410	5,605
South West	210	2,885
North West	180	2,480
West Midlands	175	2,405
South East	140	1,905
Scotland	125	1,700
Yorkshire and The Humber	100	1,335
East of England	65	865
North East	60	830
East Midlands	50	690
Wales	40	565
Northern Ireland	35	470
Total	**1,600**	**21,735**

Sources: Capital Economics, Companies House, anonymised survey, various company annual reports. Numbers are rounded to the nearest 5; totals may not add up due to rounding.

3.3 Indirect effects

Businesses and organisations in the ITS sector spend money to procure goods and services as inputs to their ITS related activities, boosting incomes of their suppliers, who in turn spend part of that income on their own suppliers. The resulting impact on activity through the supply chain is known as the "indirect effect". Using the direct effects estimated above as inputs, indirect effects are calculated using our UK I-O model. This uses the observed input structure of the economy to estimate how output in one industry impacts production, value added and employment throughout the supply chain. Indirect effects are then distributed across the UK regions in line with regional economic structures.

We estimate that the ITS sector supported over £900 million in GVA and around 13,500 jobs through this channel in 2024. While indirect effects are largest in London, with around £195 million in GVA supported, just under 80% of the indirect GVA boost is felt outside the capital. The ITS sector supports between £70 million and £125 million of activity in each of the South East, North West, Yorkshire and the Humber, the East of England, South West and West Midlands. (See Table 3.)

ITS spending on suppliers supports more than 1,000 jobs in seven of the UK regions. Once again, London sees the largest impact, with more than 2,880 jobs indirectly supported, while the South East and the North West each benefit from around 1,825 and 1,620 jobs respectively. (See Table 3.)

Table 3: Indirect economic contribution of the ITS sector in the UK by region

	GVA (million)	Jobs (number)
London	195	2,880
South East	125	1,825
North West	105	1,620
East of England	75	1,105
Yorkshire and The Humber	75	1,105
West Midlands	70	1,025
South West	65	1,005
Scotland	65	910
East Midlands	50	750
Wales	35	490
North East	25	400
Northern Ireland	25	355
Total	**905**	**13,475**

Sources: Capital Economics, Companies House, anonymised survey, various company annual reports. Numbers are rounded to the nearest 5; totals may not add up due to rounding.

3.4 Induced effects

Employees in the ITS sector earn income through their employment, and when they spend part of their earnings on domestic goods and services, this supports further economic activity across the economy. The resulting impact is known as "induced effect". Using the labour income generated by the direct effects as inputs, induced effects are estimated using a UK I-O model that uses observed household spending patterns to calculate how consumer expenditure supports production, value added, and employment across the economy.

Throughout 2024, it is estimated that this channel supported around £730 million in GVA and close to 9,400 jobs across the UK. (See Table 4.)

Around 45% of the induced effects supporting GVA, or around £330 million, are concentrated in London, the South East and the North West. This is reflected in the number of jobs supported. An additional £290 million of induced GVA is distributed roughly evenly across Yorkshire and The Humber, East of England, West Midlands, South West, and Scotland. (See Table 4).

Table 4: Induced economic contribution of the ITS sector in the UK by region

	GVA (million)	Jobs (number)
London	160	1,665
South East	100	1,260
North West	70	1,050
East of England	65	840
South West	55	805
West Midlands	65	775
Yorkshire and The Humber	55	755
Scotland	50	730
East Midlands	45	630
Wales	25	365
North East	20	275
Northern Ireland	20	250
Total	**730**	**9,395**

Sources: Capital Economics, Companies House, anonymised survey, various company annual reports. Numbers are rounded to the nearest 5; totals may not add up due to rounding.

3.5 Overall contribution

Our estimates suggest that, including direct, indirect, and induced effects, the ITS sector in the UK supported around £3.2 billion in GVA and almost 45,000 jobs across the country in 2024.

Around £1 billion of GVA supported by ITS, or 30% of the total, is in the ICT sector. Just over £485 million of GVA supported is in the professional services sector, followed by manufacturing at £300 million and real estate at £265 million. (See Table 5.) The sectoral breakdown of employment shows that the largest number of jobs supported by the ITS sector are in the ICT and professional services sectors. Together, these two sectors make up just under half of all jobs supported.

Table 5: Economic contribution of the ITS sector in the UK by economic sector

	GVA (million)	Jobs (number)
ICT	1,030	10,155
Professional services	485	9,755
Wholesale & retail	235	5,010
Administrative services	175	3,820
Manufacturing	300	3,655
Transport	110	2,565
Hospitality	50	1,875
Construction	120	1,805
Finance	185	1,060
Other personal services	40	995
Public Admin & Defence	70	880
Education	35	730
Health & Care	25	635
Real estate	265	615
Recreation	20	550
Agriculture & mining	20	255
Utilities	70	250
Total activity supported by ITS	**3,235**	**44,605**

Sources: Capital Economics, Companies House, anonymised survey, various company annual reports. Numbers are rounded to the nearest 5; totals may not add up due to rounding.

The ITS sector supports economic activity across the UK regions. Even in the North East, Wales and Northern Ireland, where ITS has a relatively smaller presence, the sector supports around £80-£110 million in GVA annually. Just over 45% of GVA supported by the ITS sector is concentrated in London, the South East and the North West, with the capital alone accounting for 24% of the total. In the remainder of the UK regions, ITS supports between £145 million and £335 million in GVA. (See Table 6.)

ITS spending supports a substantial number of jobs across the UK. London accounts for the largest share, with over 10,150 jobs supported, reflecting its key role as a major centre for transport technology and professional services. But the sector also supports significant employment across the rest of the UK: in the North West, South East, South West, and West Midlands, ITS spending supports more than 4,000 jobs in each region, highlighting the importance of ITS in major industrial and urban hubs. (See Table 6.)

In Scotland, Yorkshire and the Humber, East of England and the East Midlands, ITS spending supports more than 2,000 jobs each. (See Table 6.)

Table 6: Economic contribution of the ITS sector in the UK by region

	GVA (million)	Jobs (number)
London	765	10,150
North West	355	5,145
South East	365	4,990
South West	335	4,695
West Midlands	310	4,205
Scotland	240	3,345
Yorkshire and The Humber	225	3,195
East of England	200	2,810
East Midlands	145	2,070
North East	110	1,505
Wales	100	1,420
Northern Ireland	80	1,080
Total activity supported by ITS	**3,235**	**44,605**

Sources: Capital Economics, Companies House, anonymised survey, various company annual reports. Numbers are rounded to the nearest 5; totals may not add up due to rounding.

In addition to its contribution to output and employment, the ITS sector also supports the UK's public finances through employee income tax and consumption taxes generated by household spending of employees supported by the industry. Across the economy, jobs supported by ITS activities are estimated to generate around £370 million per year in employee-related taxes, including income tax and National Insurance Contributions. Moreover, VAT revenues generated by the spending of the employees supported by the sector is approximately £140 million per year. Taken together, this implies that the ITS sector supports around £510 million per year in employment and spending related tax revenues. (See Table 7.)

Table 7: Public finances contribution of the ITS sector in the UK

	Tax revenue
Income	370
Consumption	140
Total tax supported by ITS	**510**

Sources: Capital Economics, ONS, anonymised survey. Numbers are rounded to the nearest 5; totals may not add up due to rounding.

4 APPENDIX

Methodology

This appendix sets out the methodology used to estimate the economic contribution of the UK ITS sector. The approach combines primary survey evidence, financial accounts data, sector expertise and a structured adjustment framework to estimate revenues related to intelligent transport systems activities, which are subsequently allocated across industries and used within an input–output based model to quantify wider economic effects.

In summary, the methodology involved:

- Identifying and categorising the main firms operating in the UK ITS sector

- Collecting and standardising firm-level revenue data;

- Estimating the share of revenue attributable to intelligent transport systems activities through a primary survey, analysis of financial accounts and expert input; and

- Mapping related revenues to intelligent transport systems activities into a bespoke I-O model to estimate direct, indirect, and induced economic impacts.

Each step is described in more detail below.

Firm identification, categorisation and data collection

ITS UK provided Capital Economics with a list of firms identified as the 'main players' in the UK's ITS sector. Of these, revenue data were obtained for 77 firms. Though 19 firms responded to an anonymised survey of ITS UK members, 16 responses contained information on revenues related to intelligent transport systems activities, while sufficient financial information for a further 61 firms was available from Companies House filings and published annual reports.

All firms were assigned to one of seven intelligent transport systems categories reflecting their primary economic activity, including hardware manufacturing, software and digital mobility platforms, general and intelligent transport-specific professional services, transport operations, and mobility data and analytics providers. These categories were designed to capture differences in business models and the typical intensity of intelligent transport systems activity across firms.

Revenue data were identified on a UK basis where available. Where firms reported revenue at a broader geographic level (for example, Europe or globally), assumptions were applied to estimate the UK share, informed by company disclosures and sector context. Revenues reported in foreign currencies were converted to pounds sterling using appropriate average exchange rates. This ensured that all revenue inputs were standardised to a consistent UK revenue basis.

Estimation of ITS-related revenue

For the 16 survey respondents who provided sufficient revenue data, the proportion of total revenue attributable to intelligent transport systems activities was calculated. Within each intelligent transport systems category, the average intelligent transport systems-revenue share across survey respondents was then computed. These category-level averages were applied to the revenue base of firms that did not respond to the survey, generating an initial estimate of intelligent transport systems-related revenue for each firm.

To ensure estimates were conservative and realistic, a structured adjustment framework was applied to the financial accounts data of all firms for which we did not receive a survey response. Adjustments reflected three factors:

- Revenue granularity, capturing how closely the identified revenue base aligned with intelligent transport systems activities

- Firm scale and diversification, capturing the extent to which intelligent transport systems are central to the firm's overall business

- Expert insight from ITS members

The revenue of firms with broad or highly diversified revenue bases received larger downward adjustments, while intelligent transport systems-specialist firms were subject to smaller adjustments. Each firm was classified along both dimensions and mapped to an adjustment factor lookup table, which was applied to the initial estimate of revenue from intelligent transport systems activities. Those adjusted revenues were then aggregated across all firms.

The estimates account for potential double counting within the sector – for example, where revenue from one ITS firm may be captured indirectly through its supply chain transactions with another ITS firm. To account for this we determined that approximately 45% of supply chain spending went into sectors that potentially included firms within the sample. As such, we assumed approximately one third of this was inter-ITS sector spending and applied a downward adjustment of 15% to total sector revenue.

Mapping to input–output tables and economic impact modelling

To estimate the wider economic impact of the ITS sector, revenues related to intelligent transport systems activities were mapped into Capital Economics' bespoke input output (I-O) model, which is based on the Office for National Statistics' input-output tables. The I-O model simulates the interactions between 104 sectors of the economy and estimates how final demand in one sector impacts output, GVA, employment and spending in other sectors.

The IO framework requires final demand to be allocated by industry, based on standard industrial classifications (SICs). To disaggregate our revenue estimate into these sectors each firm was assigned one or more SIC codes based on Companies House records and business descriptions. Where firms reported multiple SIC codes, their revenue related to intelligent transport systems activities was distributed evenly across the relevant codes. This pragmatic approach reflects the multi-activity nature of many firms while avoiding over-precision.

The resulting industry-level final demand vector was then used within the I-O model to estimate:

- direct effects, reflecting activity within the ITS sector itself;

- indirect effects, reflecting supply-chain impacts; and

- induced effects, reflecting consumption impacts arising from labour income.

This framework ensures that the estimated economic contribution of the ITS sector captures both its direct footprint and its wider linkages across the UK economy.

To estimate the regional impact of ITS sector spending, we allocated revenues related to intelligent transport systems activities across UK regions based on the geographical presence of the largest spending organisations. Geographical presence was determined using annual accounts, headquarters and office locations, and desk research. While it was not feasible to cover all 175 ITS UK member organisations, our analysis included companies representing over 90% of estimated spending related to intelligent transport systems activities nationwide.

The regional allocation of spending on intelligent transport systems activities was only used to allocate *direct effects* across regions. For indirect and induced effects, given a lack of information from the survey, estimates of the impacts were based on official employment statistics on regional economic structure.

Employee-related taxes, including income tax and National Insurance Contributions, supported by the ITS sector have been estimated by first calculating the average wage of ITS-supported employment using the UK I-O model, and then applying the corresponding income tax and social contribution rates to that wage. This average tax contribution per employee is then multiplied by the total number of ITS-supported jobs to obtain an overall figure.

Consumption taxes generated by the spending of ITS-supported employment have been estimated applying the effective average tax rate on household consumption of approximately 12% to total domestic consumption spending of ITS-supported employment. Savings and spending on imports have both been excluded from domestic consumption spending.

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