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IMPROVING SUPPLY CHAIN VISIBILITY AND TRUST: THE IMPACT OF DIGITALISATION IN LOGISTICS

Supply chain organisations are adopting innovative digital solutions facilitating real-time visibility and trust across networks. We forecast that there will be 700 million EoT-enabled devices by 2030 across supply chains.

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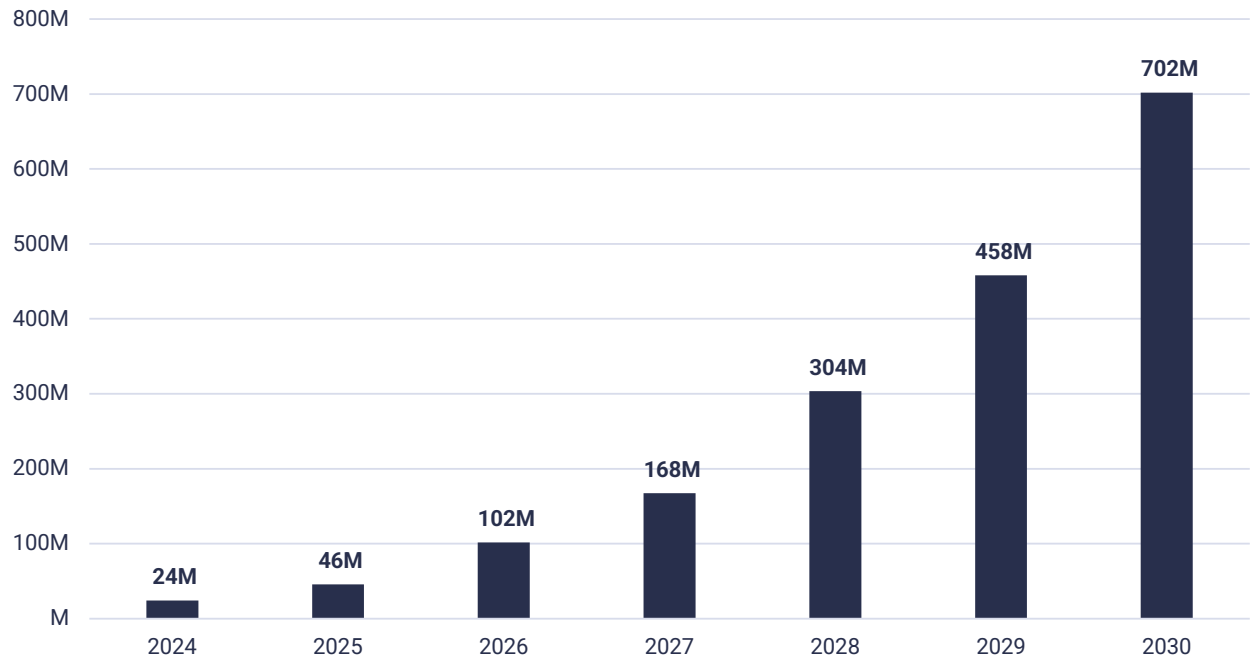
Executive Summary

The emergence of new technologies is enabling the logistics industry to transition away from utilising manual and paper-based processes to embracing innovative digital solutions to enable real-time collaboration and transparency across supply chains. For instance, transitioning from the internet of things (IoT) to the economy of things (EoT) enables the monetisation of data generated across the network of participating supply chain connected devices. In the supply chain context, this shift involves harnessing these devices not only to monitor and track assets but also to enable automated decision-making and to facilitate seamless transactions between stakeholders. STL Partners forecast that the EoT will reach an inflection point within the next five years and by 2030 there will be around 700 million EoT-enabled devices across supply chains worldwide. See Figure 1.

Figure 1: STL Partners' forecast of EoT-enabled devices in global supply chains, 2030



Source: STL Partners

Ensuring widespread digitalisation across the supply chain industry requires organisations to:

- **Embrace collaborative partnerships:** Seek to join trusted third-party platforms that can help facilitate real-time communication, data sharing, and collaboration with key partners.
- **Adopt a data-driven mindset:** Utilise the power of big data analytics to gain valuable insights into your supply chain performance to improve future operations.
- **Invest in highly secure solutions:** Establish strict security standards and protocols for data exchange and communication with external stakeholders.

Table of Contents

Table of Figures

Introduction

Supply chains are increasingly central to the operations and competitiveness of businesses worldwide. With the impact of globalisation and advances in technology, supply chains have evolved from simple logistical networks to complex, interconnected systems spanning many countries.

Trends impacting the supply chain industry

There are several key trends shaping the prorities of the logistics and supply chain industry:

- **Global disruption and supply chain resilience:** Events such as pandemics (COVID-19), geopolitical tensions (Russia-Ukraine War), natural disasters and trade disputes have underscored the importance of more resilient and agile supply chains. Businesses are looking to prioritise risk management and ensuring adequate flexibility to adapt to disruptions including diversifying supplier bases, increasing inventory buffers, incorporating trusted IoT solutions and developing contingency plans.

> ***"One of the biggest trends is to look at supply chain resilience as there have been several disruption events such as Covid, Brexit and the disruption due to conflicts globally. The industry is increasingly looking at what might be the next thing that might disrupt the supply chain and how we can minimise the impact."***
>
> *Philip Roe, President Logistics UK, ex CCO and COO, DHL*

- **Digital transformation:** Enhancement of current supply chain operations by leveraging new digital technologies such as IoT, blockchain and artificial intelligence (AI). For instance, blockchain can help create a secure and immutable record of every transaction, enabling a robust audit trail for supply chains and ensuring the integrity and traceability of transactions. Nearly 85% of supply chain leaders anticipate integrating AI and IoT technologies within the next five years, recognising the strong commitment to digital transformation.[1]

> ***"The supply chain industry is pretty carbon intensive at present with the majority of that coming from the consumption of fuel. The reality is that organisations are working hard to decarbonise their operations now. One of the highest impact measures you can employ is to increase vehicle utilisation."***
>
> *Philip Roe, President Logistics UK, ex CCO and COO, DHL*

- **Sustainability and green logistics:** Growing emphasis on environmental, social, and governance (ESG) considerations driven not only by regulatory requirements but also by evolving consumer preferences. For instance, in the UK, the government's

[1] 2024 MHI Annual Industry Report "The Collaborative Supply Chain – Tech-Driven and Human-Centric"

goal to achieve net-zero emissions by 2030 is driving increased pressure on supply chain organisations to act, particularly because supply chain functions account for 80-97% of a business's overall Scope 3 emissions.[2] Organisations must adopt eco-friendly practices, including ensuring visibility and reporting of carbon emission data throughout their supply chain to effectively identify strategies to mitigate their carbon footprint. Nearly 50% of supply chain companies have stated that they are facing increasing pressure to adopt a more sustainable supply chain approach in 2024.[3]

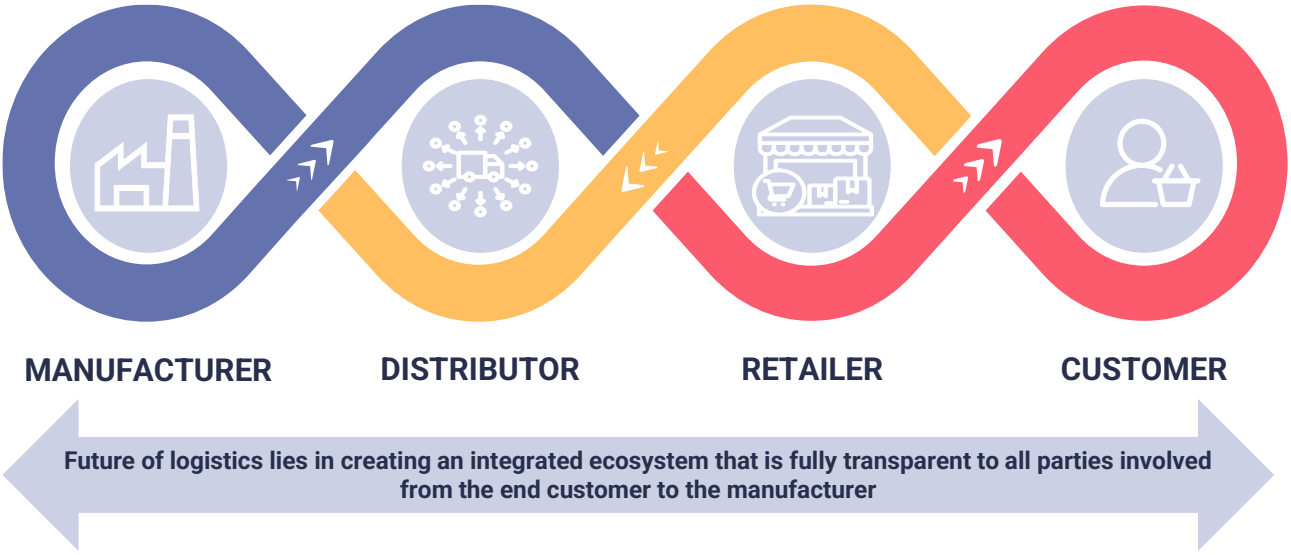
Adding to these pressures, of course, is the constant need for logistics companies to provide faster and seamless experiences for their customers (e.g., next day delivery moving to same day delivery) at a lower price point. They need to balance this with being more efficient and demonstrating a commitment towards carbon neutrality. One way to achieve these goals is to embrace supply chain digitalisation which is broadly defined as "the process of leveraging digital technologies to replace manual processes and streamline various aspects of supply chain management".

> ***"Most companies across the supply chain work in a siloed and fragmented environment. The lack of operational coordination across businesses leads to wide-scale inefficiencies. E.g. Goods vehicles arriving at a customer's delivery depot at an inconvenient time resulting in truck idling as it waits to be unloaded."***
>
> *Dr Amar Dhokia, Senior Product Manager, Digital Catapult*

Traditionally, supply chain approaches suffer from siloed data, fragmented systems, and limited transparency, leading to inefficiencies and increased costs. Supply chain digitalisation brings down those walls and can help transform future supply chains into an integrated ecosystem that is fully transparent to all the players involved. Figure 2 shows the transition to a fully transparent integrated supply chain ecosystem.

[2] The role of business in delivering the UK's Net Zero ambition
[3] 2024 MHI Annual Industry Report "The Collaborative Supply Chain – Tech-Driven and Human-Centric"

Figure 2: Transitioning to a fully transparent integrated supply chain ecosystem



Source: STL Partners

Supply chain industry must overcome challenges before full digitalisation

Implementing supply chain digitisation can be challenging, particularly since logistics companies are typically a low-margin business with limited scope to invest in innovative solutions. Key challenges organisations are facing include:

- **Ecosystem collaboration:** Supply chains involve multiple stakeholders, including suppliers, manufacturers, distributors, logistics providers, retailers, and customers. Collaborating with ecosystem partners and potential competitors introduces new risks and liabilities, including dependencies on external partners, shared responsibility for data security and potential disruptions in partner networks. Facilitating the move to a fully collaborative ecosystem will necessitate the creation of a trusted platform that enables the seamless tracking of assets across the logistics chain, ensuring transparency through comprehensive audit trails.

> ***"Every company operates independently and is inherently incentivised to prioritise its own interests first and foremost. This leads to a 'tragedy of the commons' situation within supply chains whereby companies collectively suffer from the same inefficiencies due to a lack of collaboration and coordination."***
>
> *Dr Amar Dhokia, Senior Product Manager, Digital Catapult*

- **Security concerns:** Supply chain stakeholders may be hesitant to share their data across the ecosystem due to concerns about data breaches or the potential misuse of their data by their competitors. Any interactions and transactions must be able to be tracked, authenticated, and verified to ensure that organisations can trust that any data-sharing complies with industry standards.

- **Workforce shortages:** Recruiting and retaining skilled professionals in the logistics industry with expertise in digital technologies, data analytics, and supply chain management is a challenge for an industry with a declining workforce.

- **Integration complexity:** Integrating digital technologies and systems across disparate supply chain functions, processes, and stakeholders is complex and costly, requiring interoperability between legacy systems and new digital solutions.

> ***"One of the realities across supply chains is segmentation as many parties need to collaborate to ensure effectiveness across operations. If you think about making it digital, you need to have common standards in trade and in documentation as well."***
>
> *Helena Lisachuk, Partner, Deloitte IoT Global*

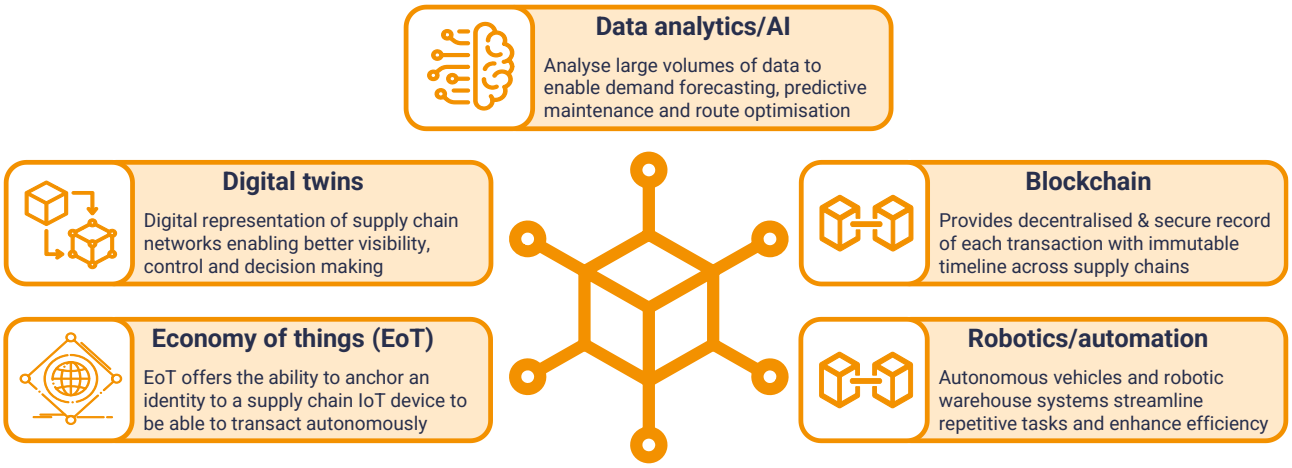
- **Regulatory compliance:** Digitalisation initiatives must comply with data privacy regulations (e.g., GDPR), trade laws, and industry standards (NIS2/CRA) especially in highly regulated industries such as healthcare, pharmaceuticals, and food/beverage.

Emerging technologies drive adoption

Despite these challenges, we are starting to see the emergence of new technologies and platforms that are beginning to fast-track the pathway towards supply chain digitalisation. The end goal is using these technologies to move towards full end-to-end supply chain visibility and efficiency. Improving supply chain visibility has been noted as the top priority for 55% of manufacturing-related businesses in 2023.[4] See Figure 3.

> ***"We have been poorly served by technology providers so far but want first mover advantage in our industry. We are working on things including a predictive model for demand predictions and IoT sensors for condition monitoring, for example."***
>
> *William McColgan, Director, McColgan's Foodhall*

Figure 3: Technologies enhancing supply chain visibility and efficiency



Source: STL Partners

Emerging technologies are helping to advance the existing technologies used across the supply chain ecosystem. For instance, moving from the internet of things (IoT) to the economy of things (EoT) within the supply chain industry has marked a significant evolution in the ability to use connected devices and data. Traditional IoT lacks the capacity to make the data collected across different systems and segments of the supply chain available to the stakeholders in a secure way; namely the IoT data insights are limited to the segment of the supply chain it belongs to and its operations.

> ***"Most technology has been created on an individual basis for supply chain organisations and their immediate networks. Systems that will work across different organisations and their networks is one of the major areas of opportunity."***
>
> *Philip Roe, President Logistics UK, ex CCO and COO, DHL*

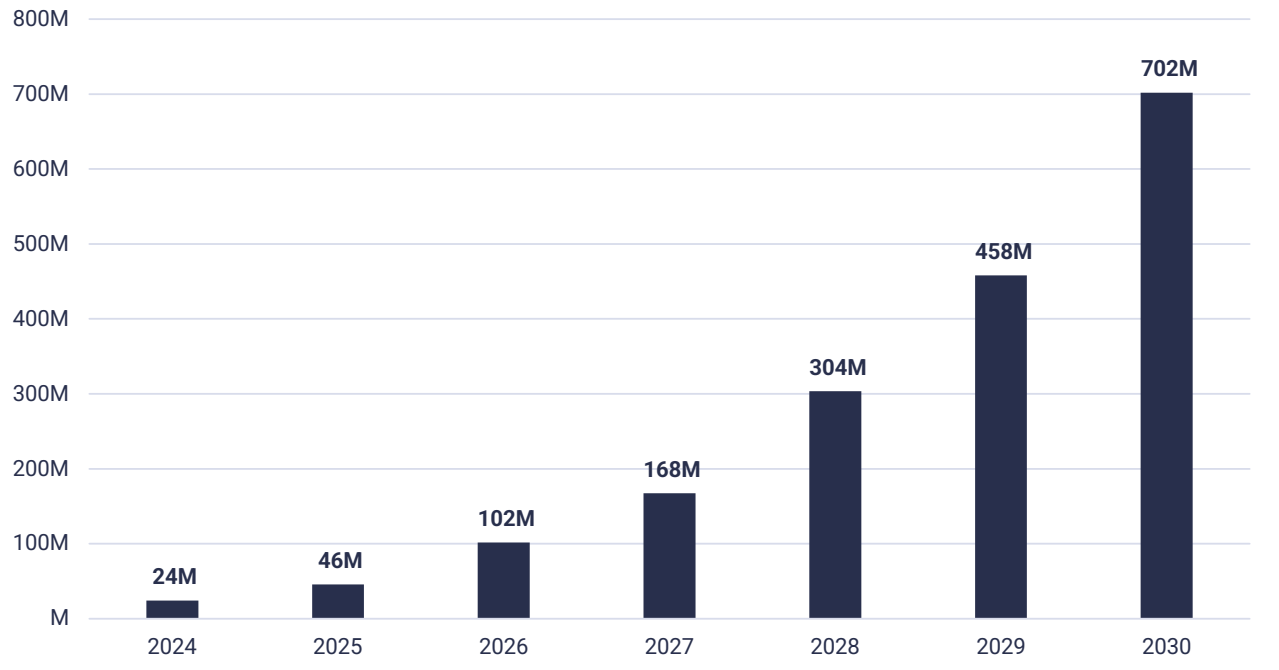
[4] 2023 State of Manufacturing Report

Find out more in this report: The Economy of Things: Unlocking the true value of IoT data.

EoT goes beyond mere connectivity and offers the ability to anchor an identity to an IoT device so that it can transact autonomously. In the supply chain context, this transition involves leveraging interconnected devices not only to monitor and track assets but also to enable automated decision-making, optimise resource allocation, and facilitate seamless and secure transactions between stakeholders. By 2030 we forecast that supply chain will be the third largest use case for the EoT with 0.7 billion enabled devices across all operations (see Figure 4). The real inflection point for EoT devices within the supply chain is expected from 2027 onwards, with an overall CAGR of 62% from 2024 to 2030. These numbers have been calculated based on the expected speed that existing and new IoT devices will be connected into blockchain ledgers.

> ***"Vodafone's Pairpoint EoT platform enables devices to autonomously transact throughout supply chains with high levels of trust, ensuring data integrity, device identity, interoperability and a tamper proof audit trail. We bridge the gap between logistics providers, last-mile supply chain companies, regulators and consumers creating a dynamic, trusted and transparent end-to-end ecosystem transforming the connectivity infrastructure into a route of trust at the edge."***
>
> *David Palmer, CPO, Pairpoint*

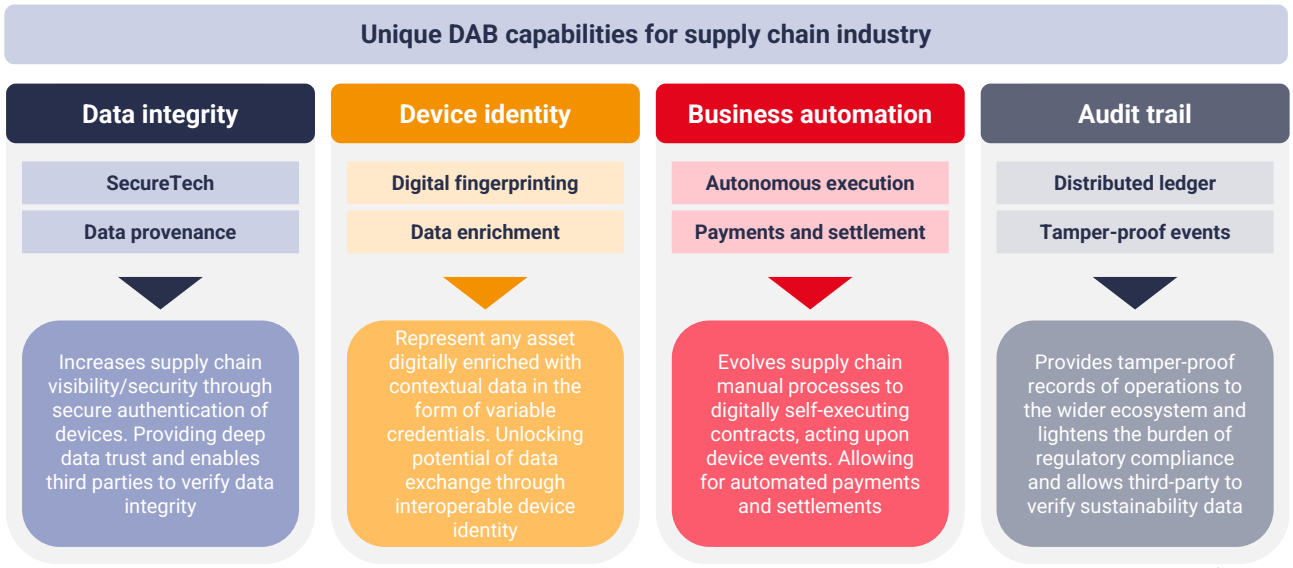
Figure 4: STL Partners' forecast of EoT-enabled devices in global supply chains, 2030



Source: STL Partners

Vodafone's EoT platform (DAB) for instance uses SIM technology to help create greater visibility and coordination across the supply chain. See Figure 5.

Figure 5: DAB platform has unique capabilities to enhance supply chain operations



Source: Vodafone DAB

Use cases revolve around enhancing end-to-end supply chain visibility and efficiency

> ***"The more informed you are of your route in transit and physically aware of what's in your containers, the better. From an insurance side of things, you could have high class items (medical drugs, luxury goods) inside your containers, so you need to be aware of every movement of your asset."***
>
> *Helena Lisachuk, Partner, Deloitte IoT Global*

Supply chain digitalisation enables a wide range of use cases revolving around improving end-to-end supply chain visibility and efficiency. These include spare fleet capacity, warehouse automation and environmental and condition monitoring (temperature, pressure, weight, etc.). See Figure 7. The value of these use cases can be demonstrated through the example of spare fleet capacity.

Trucking companies regularly contend with the dilemma of empty or partially filled trucks returning from deliveries, contributing to wasted fuel, increased emissions, and reduced profitability. With increased digitalisation, the experience would work as follows:

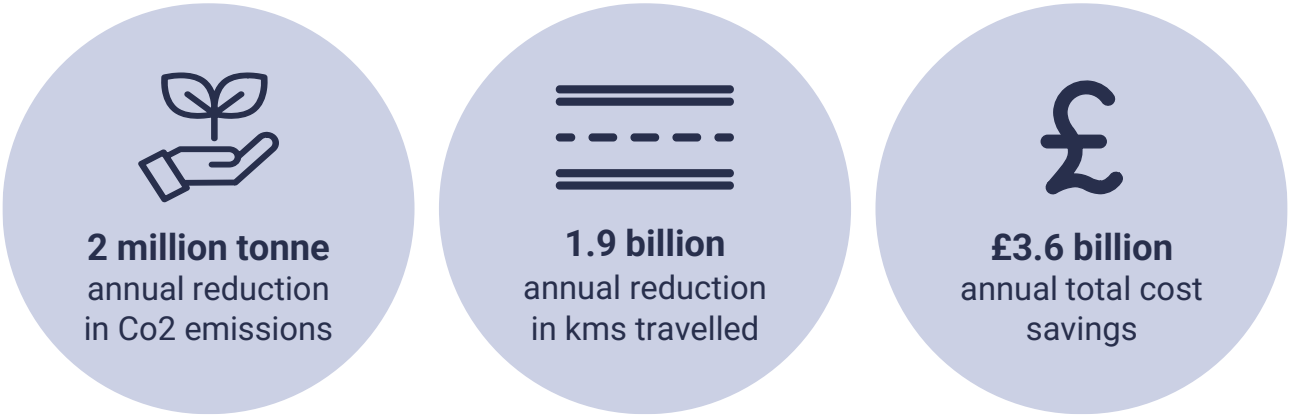
1. If a truck driver is running an empty or partially filled truck, IoT weight sensors could be used to identify spare capacity in real time.
2. This data can be shared automatically through an EoT platform informing ecosystem participants of the truck's location, available space, type of cargo and route.
3. The system will automatically trigger a "monetisable event" and create the opportunity for ecosystem participants to purchase the available space.
4. Based on the cargo requirements, a smart contract can be created, and the transaction can be carried out autonomously via blockchain technology. Location and condition data can be continuously fed back to the relevant party to track their goods in-transit.
5. In the future, AI algorithms can analyse historical data and other relevant factors to accurately forecast demand for spare fleet capacity.

> ***"We need to make supply chain operations more efficient and ensure there is better visibility. For example, optimising existing transport networks and ensuring that trucks are not running empty, and their loads can be fully optimised."***
>
> *Dr Amar Dhokia, Senior Product Manager, Digital Catapult*

Spare fleet capacity use case drives significant benefits for supply chain organisations

This use case has the potential to drive cost savings and help reduce carbon emissions for those involved across the value chain. For instance, in the UK currently 30% of trucks run empty resulting in wasted fuel and reduced profitability[5]. However, based on the growth rate of the emerging technologies involved (AI, IoT, blockchain), we forecast a CAGR of 35% from 2024 to 2030 for this solution resulting in the benefits shown in Figure 6 within the UK market:

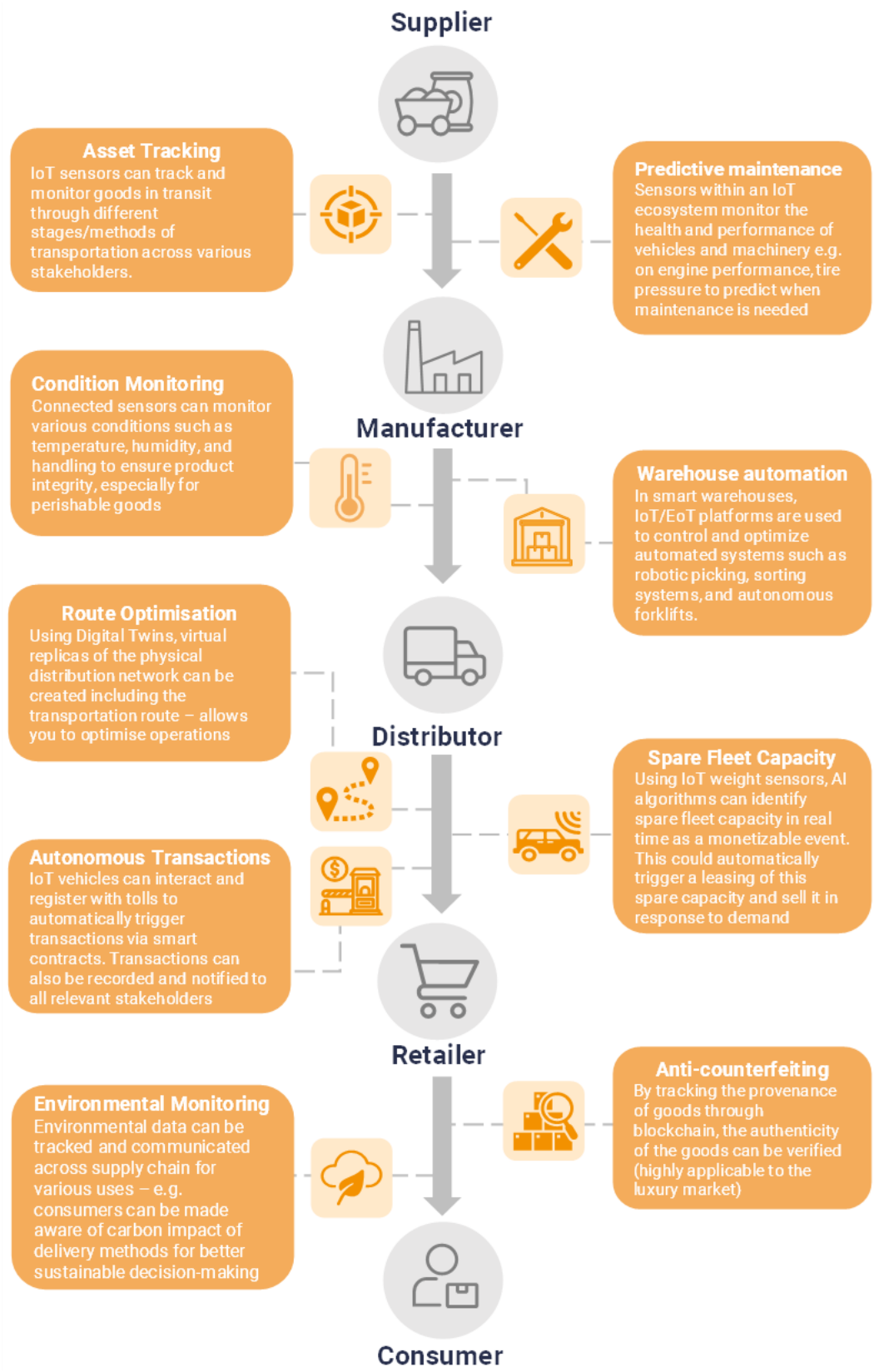
Figure 6: Forecast benefits for spare fleet capacity use case in UK, by 2030



Source: STL Partners, based on conversations with industry experts

[5] Department for Transport, Domestic Road Freight Activity

Figure 7: Leading supply chain use cases enabled by emerging technologies



Source: STL Partners

Future success fuelled by wider ecosystem collaboration

> ***"We want to be one of the leaders and not the followers in adopting emerging technologies and collaborating across the ecosystem – we are wide open to be a testbed and want to adopt AI where we can."***
>
> *Salli Deighton, Founder of LaundRe, responsible and circular denim finishing*

Transforming supply chains to become increasingly transparent, autonomous, efficient and agile requires the buy-in of multiple stakeholders across the ecosystem. For instance, manufacturers, distributors and retailers all need to actively commit to share (relevant) data amongst the wider ecosystem.

Telecom operators also can provide the essential communication infrastructure which enables the real-time data exchange between various stakeholders for the tracking and monitoring of shipments, inventory management, and coordination of transportation activities. We are also witnessing the need for dedicated neutral third parties to help enable collaboration across the supply chain ecosystem. These entities will need to have strong governance mechanisms in place alongside a secure network infrastructure to ensure trust between ecosystem participants for data sharing, enabling new monetisation opportunities in the logistics industry.

Conclusion: The future vision of the industry

Enabling technologies such as AI/machine learning, EoT and blockchain are starting to impact the supply chain industry ensuring visibility, efficiency and agility in every stage of the supply chain from sourcing raw materials to final delivery. The end goal will be to create a supply chain ecosystem where devices can transact with the highest levels of trust, ensuring data integrity, automate business processes and record interactions for a tamper proof audit trail for all ecosystem participants.

Recommendations

Supply chain organisations and their partners should focus on these immediate steps:

- **Embrace collaborative partnerships:** Supply chain organisations should actively seek out collaborative partnerships with key complementary stakeholders to their own supply chain based on the products they offer/transport. They should look to join trusted third-party platforms that can help facilitate real-time communication, data sharing, and collaboration amongst all key partners.

- **Adopt a data-driven mindset:** Ensure the creation of a data-driven culture within your organisation by promoting the use of data and analytics in decision-making processes. Harnessing the power of big data analytics will enable your organisation to gain valuable insights into performance and make informed decisions as to how you can best optimise your operations in the future.

- **Invest in highly secure solutions:** Extend security measures beyond your own internal systems to secure supply chain networks when collaborating with third-party partners. Establish strict security standards and protocols for data exchange and communication with external stakeholders and conduct regular assessments and audits to ensure compliance and mitigate risks.

A message from our sponsor

This report highlights the importance for businesses to digitalise their supply chains to improve operations, reduce costs and keep their competitiveness in a very challenging landscape. It is noticed that amongst the technologies supporting this digitalisation journey, the economy of things has a potential big role to play, with STL Partners market research forecasting that by 2030 there will be 0.7 billion enabled devices across all operations in supply chain use cases. Pairpoint Digital Asset Broker (DAB) platform is very well positioned to support organisations in the digital transformation of their supply chains, enabling IoT devices to become economic agents, able to make autonomous decisions and trigger financial transactions upon sensor, position or event-driven data. What is also clear from this report is the need for trusted and secure solutions such as DAB, harnessing collaboration and data sharing, as a key technical enabler for supply chains to achieve its maximum optimisation potential.

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