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THE ECONOMY OF THINGS: UNLOCKING THE TRUE VALUE OF IOT DATA

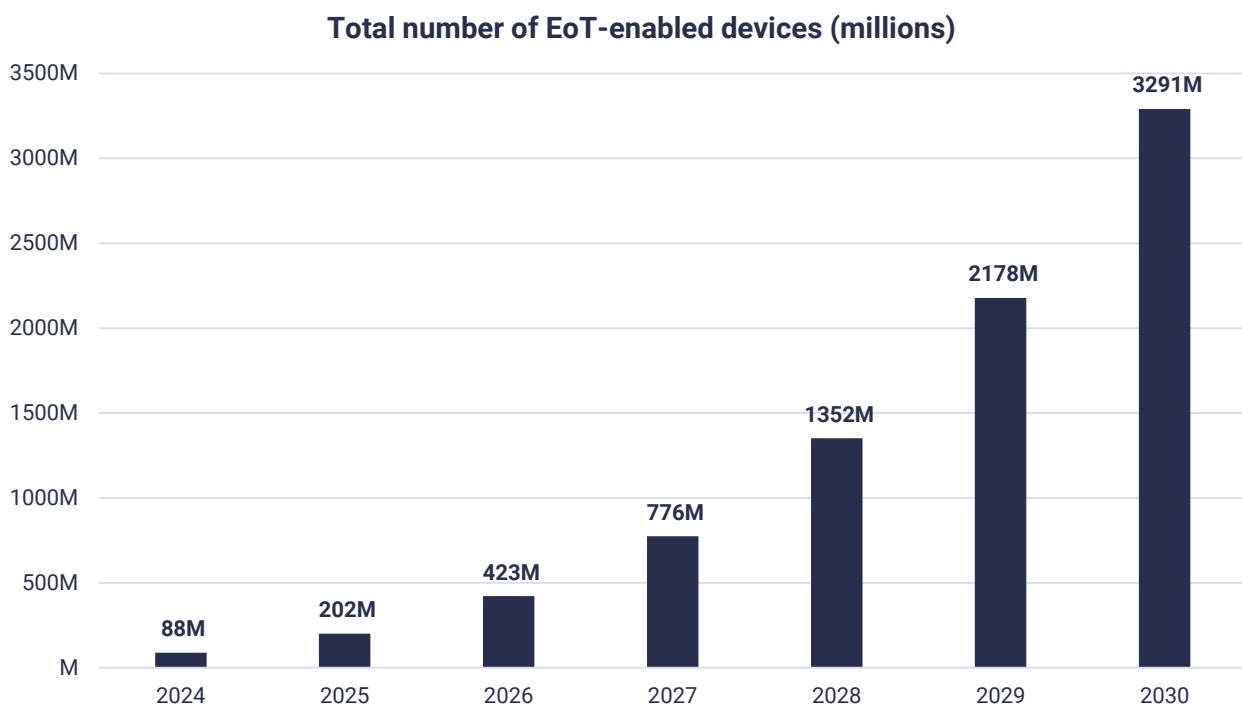
The Internet of Things (IoT) market is growing rapidly, but most of the data exists in proprietary siloes. The Economy of Things (EoT) represents a new way to share data across ecosystems, unlocking new monetisation opportunities. We forecast EoT will reach an inflection point within the next few years with over 10% of IoT devices being EoT-enabled by 2030.



Executive Summary

The value of Internet of things (IoT) data is not yet business enabled as the data generated cannot be shared across different devices and systems. The economy of things (EoT) will enable the monetisation of data generated across a network of participating connected devices that can interact, communicate, trade and transact with each other across multiple systems and environments. STL Partners forecast that EoT will reach an inflection point within the next five years and by 2030 there will be around 3.3 billion EoT-enabled devices worldwide, representing more than 10% of the overall IoT market.

Figure 1: STL Partners' forecast of EoT-enabled devices worldwide by 2030



Source: STL Partners

Our recommendations for enterprises wanting to capture the EoT opportunity:

- 1. Strategically evaluate the business outcomes of EoT over IoT:** Understand the additional value brought by the EoT over IoT to help achieve overarching business goals.
- 2. Establish rules around data sharing:** To monetise specific types of data using an EoT platform consider what rules, based on smart contracts, to put around data sharing.
- 3. Focus on specific use cases:** Determine where the earliest opportunities lie to unlock value with the EoT (connected vehicles, smart grid, supply chain).

4. **Evaluate and join an EoT marketplace:** Join trusted EoT platforms, such as the Vodafone DAB platform, that meet the key characteristics required around trust, regulation, security, openness and scalability.
5. **Understand that the “customer” of EoT data will rarely be a person:** Consider whether data that is shared via an EoT marketplace could be valuable for artificial intelligence which needs to be fed with large amounts of accurate/varied data to be trained.

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Introduction

The Internet of Things (IoT) has rapidly gained traction in the last decade. Many billions of IoT devices and machine-to-machine (M2M) applications have been developed creating efficiencies and enabling more intelligent, informed and automated decision-making in industries as diverse as manufacturing, healthcare, and transportation. Despite this, telcos are struggling to unlock significant IoT revenues today¹.

The unfulfilled potential of the IoT

The true value of IoT data today is unrealised and not business enabled. Today, data insights generated from IoT are typically focused on improving internal efficiencies within one organisation. In the future, IoT should both drive internal efficiencies and create new revenue opportunities through making some of the data available for external organisations to purchase.

The IoT data generated cannot be shared across different IoT devices and systems, missing a great opportunity to unlock wider collective value across a broad network of connected devices. Most IoT devices are closed command and control solutions where only the device and the manager of the device can communicate. This siloed approach means that opportunities are missed to combine data sources to create more contextualised insights with deeper value. For example, while a coffee company may know what coffee you order (data collected from your connected coffee machine), without sharing that data across a broader network (such as data also collected from your connected smart metre, fridge and car), they will lack the wider context of your other habits/likes/dislikes which limits the targeted advertising they can achieve. Device owners are also often unwilling to share their IoT data with other businesses citing concerns around data security and authorisation and the difficulty in providing an immutable track record of each transaction.

“IoT has always operated in siloes with devices only communicating within the domain of the supplier of the device. Frictionless interoperability between devices, people and sensors in the IoT domain and beyond provides an enormous monetisation opportunity.”

Jorge Bento, CEO of DAB, Vodafone

So, how can data generated from IoT devices be monetised and shared across the wider ecosystem?

¹ Why the consumer IoT is stuck in the slow lane

Economy of Things: The natural next step

The answer could lie in EoT. The term was coined by the IBM Institute for Business Value and represents the “liquification of the physical world” where physical assets (the “things”) in IoT become participants in digital markets². EoT signifies a network of participating connected “things” that can

“Around 75% of IoT data collected is not yet used today and the EoT is taking that data and ensuring that it is business enabled. This is of great importance for the emerging data economy.

*David Palmer, Head of Product Management
DAB, Vodafone*

” interact and communicate with each other to trade and transact autonomously. EoT offers the ability to anchor an identity to an IoT device to be able to transact autonomously. EoT provides true interoperability that can redefine the limits of a traditional IoT ecosystem.

Driving the transition from IoT to EoT relies on creating a platform that creates open participation and collaboration between a cross-

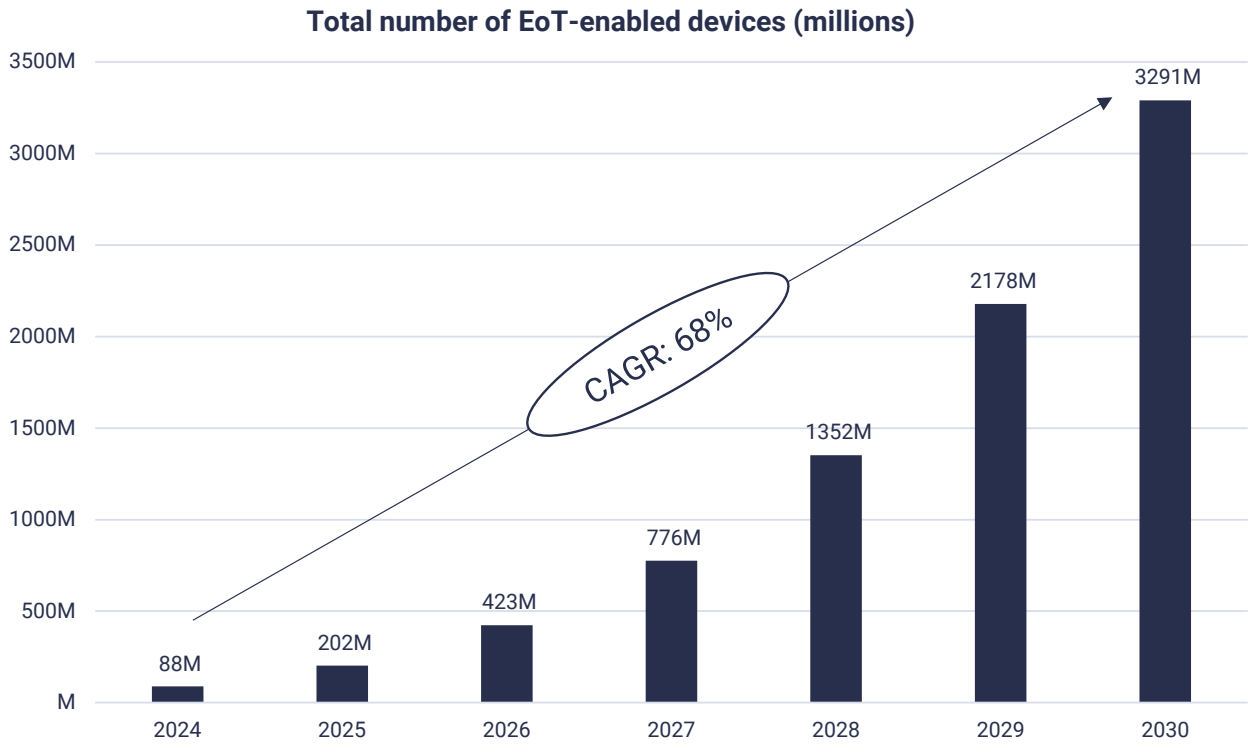
industry ecosystem of partners. This interoperable infrastructure helps bring EoT into reality, providing the fundamental brokerage of data products, services and IoT data across the platform.

We are expecting to see the inflection point by 2028 as businesses look towards the EoT to enable the monetisation of their IoT data. This inflection is partly being driven by the sheer number of connected IoT devices that exist today within close proximity to each other. Each are capturing transactional data that could be of value to the other, rather than from larger data sets from distributed sources.

We forecast that the number of EoT devices will grow at a compound annual growth rate of nearly 70% from 2024 to 2030, representing a up to 10% of total IoT devices by 2030. Of these EoT devices, up to 20% will be cellular connected devices by 2030. Vodafone’s EoT platform currently uses SIM enabled cellular technology to authenticate devices and verify their identity however we expect EoT solutions in the future to be able to address both the cellular and non-cellular market.

² [The Economy of Things Extracting new value from the Internet of Things \(IBM Executive Report\)](#)

Figure 2: STL Partners' forecast of EoT-enabled IoT devices worldwide by 2030³



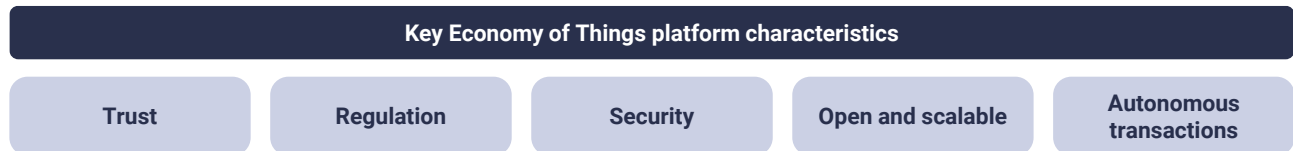
Source: STL Partners

³ Based on a percentage of the total number of forecast IoT devices across the leading five identified EoT use cases

Transitioning to the Economy of Things

Figure 3 outlines the five key characteristics which an EoT platform needs to meet in order to unlock collective value across the ecosystem.

Figure 3: Characteristics required for a successful EoT platform



Source: STL Partners

- Trust:** The value of an EoT platform heavily relies on access to data generated from devices owned by different organisations. Any interactions and transactions must be able to be tracked, authenticated, and verified to ensure that customers and enterprises can trust that any data-sharing complies with customer preferences. Blockchain is one way this trust can be built: each transaction can be stored in linked blocks to provide an immutable timeline enabling all transactions to be tracked by all platform customers. Using blockchain ensures devices on the platform are verified and trustworthy and all data exchanges are done with encrypted connections.
- Regulation:** A governance framework is required on the platform to ensure the data is accurate and gathered ethically. The roles of industry bodies are instrumental to make sure that the sharing of data and interactions between ecosystem players are compliant and not at the expense of anyone else.
- Security:** The platform needs to have a solid network security infrastructure to allow partners to voluntarily share their data generated from their IoT devices knowing that non-authorised parties cannot get access.
- Open and scalable:** The platform must have a focus on interoperability and creating an open, accessible, collaborative ecosystem to encourage more participants to get involved. Strong established relationships with potential customer groups and ecosystem players (payment vendors, blockchain vendors, regulators) will help in scaling the platform.

“The time is right for the transition to the EoT with an enormous amount of data being produced by smart intelligent devices. The key requirement to unlock this data is provided by a trusted, compliant, and decentralised platform.”

Ioannis Vlachos, Commercial Director EMEA, Energy Web Foundation

- **Autonomous transactions:** Many of the transactions that an EoT platform will support will be of relatively low monetary value and may need to occur in real-time. To support these microtransactions a cost-effective manner, an EoT platform will need to be highly automated.

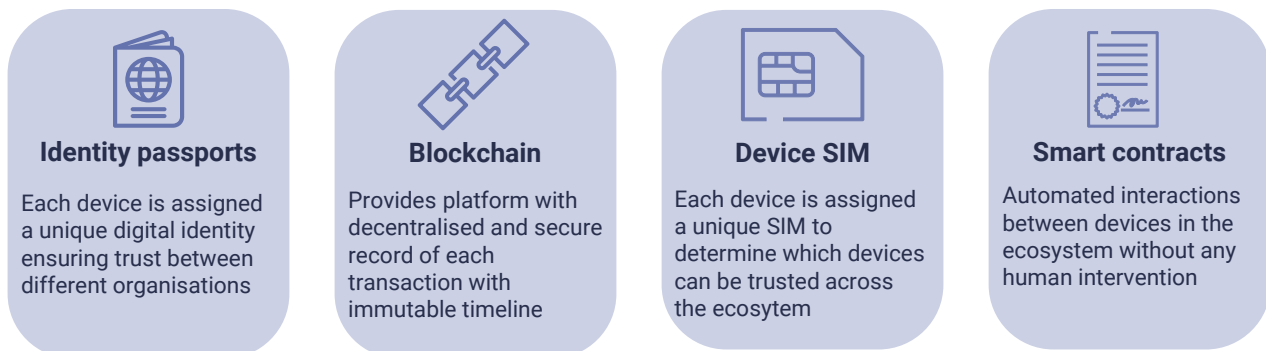
“The automation requirements and monetisation opportunity for real-time data exchange has the potential to drive the evolution of a smart contracts marketplace for the Economy of Things.”

Simon Wright, DAB Products Smart Contracts, Vodafone

Enter Vodafone DAB platform

As one of the leading telcos in the IoT market with over 159 million connected IoT devices in 190 countries, Vodafone has been at the forefront in enabling the IoT to EoT transition⁴. Vodafone launched its own EoT platform, the Digital Asset Broker (DAB) platform in 2022. Underpinned by blockchain technology, the DAB platform enables IoT devices to interact, authenticate and transact autonomously using a Vodafone-enabled device.

Figure 4: Characteristics of the Vodafone DAB platform



Source: STL Partners

“The eureka moment of the EoT is turning IoT devices and making them economic agents without them needing to redesign their product. I believe this is an opportunity for new protocols to develop to facilitate EoT transactions and payments”

Yakeen Prabdial, CTO DAB, Vodafone

The DAB platform assigns each connected DAB device with a unique digital identity, which then allows it to communicate and transact securely with other DAB devices using wallet and payment technology secured by the mobile SIM. The device does not need to be running on Vodafone’s network to leverage the DAB platform. To become EoT-enabled, the sensor manufacturers (OEMs) do not need to include additional hardware – only

a small piece of software needs to be downloaded. The DAB platform employs a decentralised digital identity system to track which devices are trusted and, therefore, able to interact between ecosystem players, providing guaranteed interoperability. The unique capabilities of Vodafone’s DAB platform establish an end-to-end trust model that ensures customers can rely on the authenticity of data sent to and received from IoT devices.

⁴ Vodafone IoT business statistics

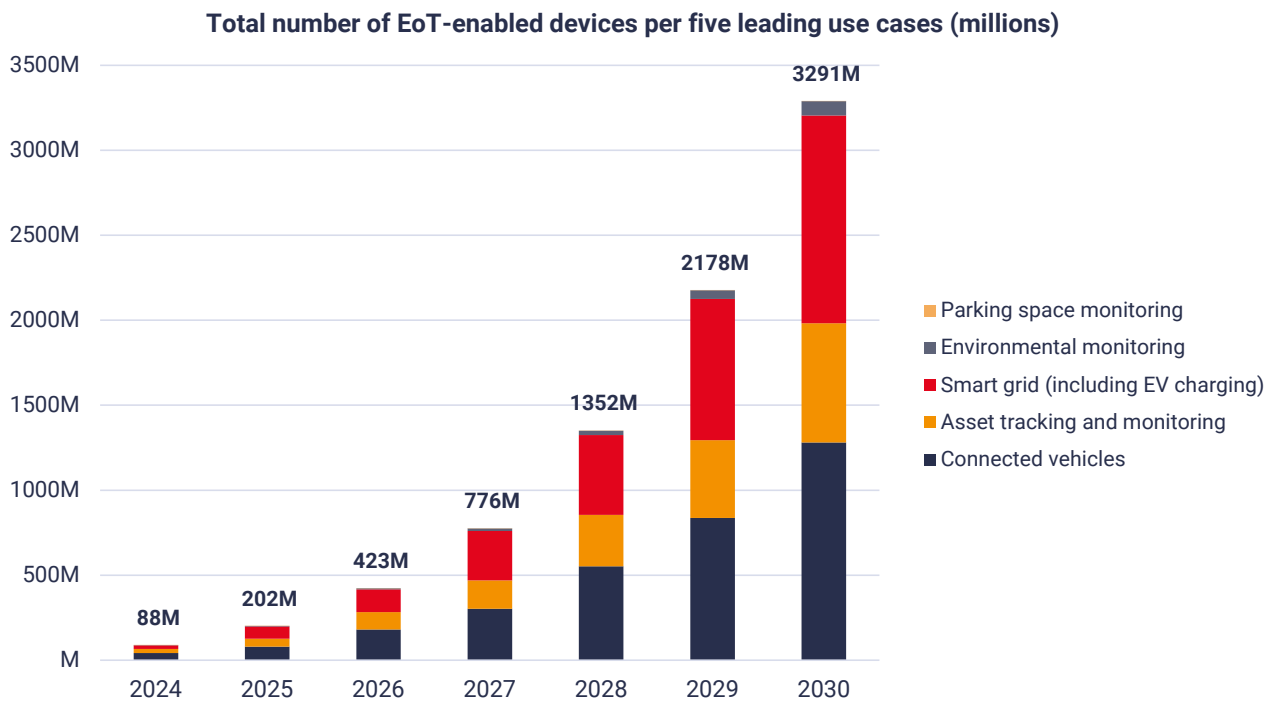
Initial EoT use cases focus on mobility

The industries where some of the earliest EoT opportunities lie are focused on mobility in use cases such as connected vehicles and asset tracking and monitoring. Connected vehicles is the use case we predict will have the most EoT-enabled devices by 2030, due to the relative maturity of vehicle telematics and the high value of the data collected by vehicles for others in the ecosystem (see Figure 5). The unique capabilities provided by EoT provides a means of communication and coordination between connected vehicles and smart infrastructure, such as EV charging points, parking space sensors and traffic lights.

“There are so many opportunities with the EoT so it is important to think about where it will progress fast in its first stages. There is a lot of interest and penetration in the motoring and EV worlds and will be a key starting point.”

Mark Williamson, Global Head of FX Partnerships & Propositions, HSBC

Figure 5: STL Partners forecasts over 1 billion EoT-enabled connected vehicle devices worldwide by 2030



Source: STL Partners

Vodafone debut use case: EV charging

Vodafone's debut electric vehicle (EV) use case represents one example of the EoT opportunity in connected vehicles. This example allows an electric vehicle to autonomously transact with a charging point. Through a single app with an integrated mobile wallet, drivers are notified of the availability and status of charging points nearby, as well as electricity prices, and could authorise the vehicle to recharge, with automatic payment through the DAB platform. Once plugged into the charging point, DAB establishes a secure connection, verifying the identity of both the vehicle and the charging point.

The use case provides several benefits:

- Motorists are notified of the real-time availability and status of nearby charging points, eliminating "range anxiety", the fear of running out of battery.
- The single app also removes the need for the multiple different apps required for different EV charging providers.
- For fleet management companies it provides a means to centralise and streamline their charging transactions across their company in a secure way – multiple identities can be associated with a particular EV and centralise the fleet payment credential.

STL Partners forecast that there will be over 1.2 billion EoT-enabled smart grid devices by 2030 (40% of the total opportunity forecast).

"The characteristics of successful use cases involve data that has value outside your organisation to other ecosystem players".

*Yakeen Prabdial, CTO DAB,
Vodafone*

The success and adoption of this EV charging use case relies on it bringing collective value for all parties involved across the ecosystem. Potential ecosystem creators therefore need to think about EoT outside their traditional B2B/B2C mindset as the success of the EoT will rely on use cases that benefit all players identified across the ecosystem (payment vendors, regulators, etc.).

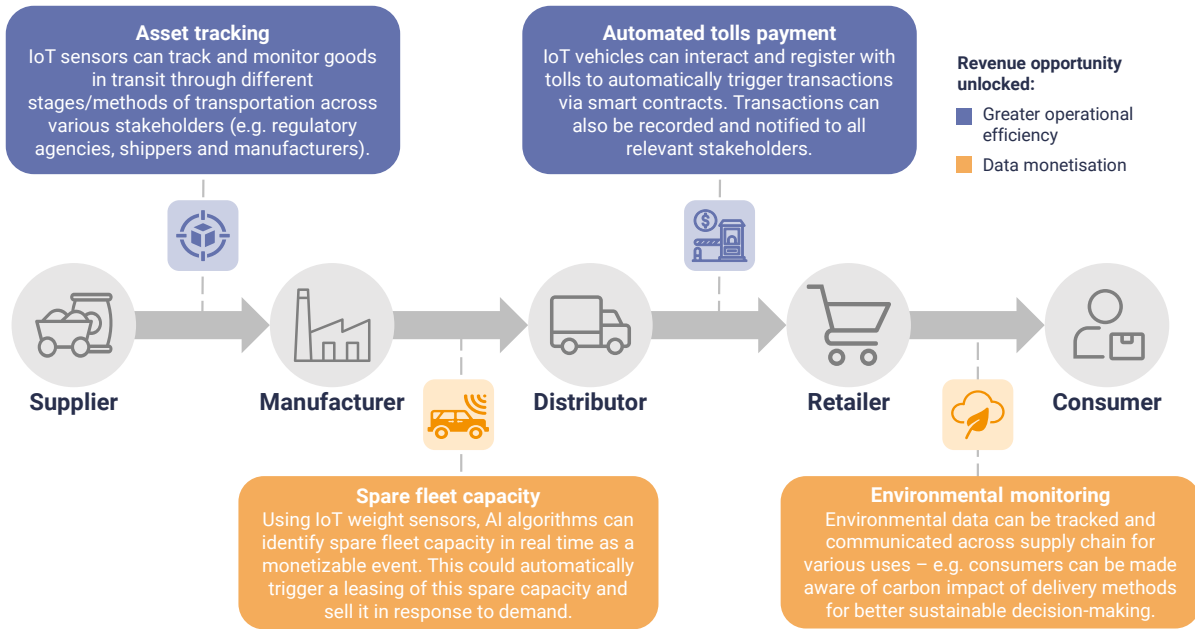
Supply chain monitoring is another leading EoT use case

The supply chain industry is another key vertical we forecast to benefit incrementally from the EoT, with 0.7 billion EoT-enabled devices by 2030, representing over 20% of the potential opportunity (see Figure 5). The benefits of IoT for supply chain management has been well established and accordingly, there has been a large amount of investment from organisations to transition toward supply chain 4.0. However, 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. The capabilities of an EoT platform DAB could create greater visibility and coordination for the different stakeholders.

“There will be many key use cases within logistics that tie in together with ESG goals. For example, with the DAB wallet, specific green credentials for the connected IoT device itself can be held, which enables the tracking of carbon impact across the value chain end-to-end and also at each handover point.”

Raquel Katigbak, Global Client Partner, Technology and Innovation, IBM

Figure 6: EoT facilitates greater coordination across supply chains



















Source: STL Partners

There are endless potential use cases

Efforts have been focused on the most promising opportunities such as connected vehicles and supply chains. However, there are many other examples of EoT's future potential, shown in Figure 7.

Figure 7: Examples of potential EoT use cases

Economy of Things use cases				Revenue opportunity unlocked
	Parking space monitoring	IoT sensors can track real-time parking space availability, notify drivers autonomously and trigger payments		Reduces need for parking attendants and enables capacity monitoring. Data can be used to enhance operational efficiency
	Preventative maintenance	IoT devices can collect operational data to predict faults and autonomously trigger schedule of repair		Data can be shared with relevant parties to verify compliance for sensitive machinery
	Smart grid	IoT device data can be analysed with AI to predict surges in demand for energy and sell spare capacity back to the grid		Greater energy demand insights enables optimisation of energy regulation for more competitive prices
	Energy marketplaces	Energy generated from solar panels can be provided between household IoT machines between households according to demand		Energy generated from solar panels can be monetised when sold to other households according to demand
	Contactless ticketing	IoT devices can communicate with ticket barriers to facilitate automated entry for events and public transport		Reduces need for ticket barriers and can provide rich and monetisable data insights regarding capacity at events/public transport
	Automated traffic control	Traffic light systems can be orchestrated according to real-time IoT traffic flow data		Data regarding traffic flow can be monetised to other relevant parties e.g. billboard companies can leverage data for new leasing models
	Inventory management	IoT data across retailers can be leveraged to predict inventory shortages to autonomously make relevant inventory available		Participating players have data insights for competitive advantage ahead of potential inventory shortages
	Personalised subscriptions	Smart household machines can order associated products autonomously according to usage e.g. coffee machines can order pods		Coffee machine manufacturers can operate new payment models by enabling a pay-per-cup model based on usage of coffee machine

Source: STL Partners

Primary revenue stream revolves around data monetisation

“The huge opportunity and primary source of revenue for the EoT comes from generating data from IoT devices and sensors in real-time, incorporating AI algorithms to generate monetisable events for subsequent transactions through smart contracts”

*David Palmer, Head of Product Management
DAB, Vodafone*

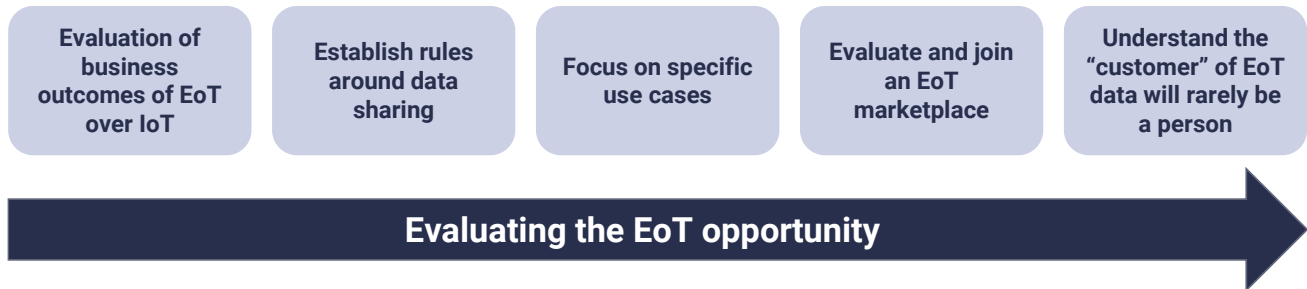
As shown in Figure 7, the revenue opportunities for these use cases revolve around operational efficiency and data monetisation. The unique and incremental value of EoT in comparison to IoT, however, revolves around data monetisation and the creation of “monetisable events”, for example, spare fleet capacity. EoT enables ecosystem members to develop and monetise applications without having to build their own infrastructure for their transactions.

Marketplace platform owners (like Vodafone in the case of DAB) could also access a revenues stream by setting up a subscription or revenue sharing model for those who are using the platform. Payment vendors (such as banks or companies like PayPal) can also gain revenue from receiving a transaction fee.

Recommendations for enterprises

Figure 8 identifies key guiding principles for those looking to successfully enter the ecosystem:

Figure 8: Recommendations for enterprises to evaluate the EoT opportunity



Source: STL Partners

1. **Strategic evaluation of business outcomes of EoT over IoT:** Enterprises must understand the additional value brought by EoT over and above the adoption of IoT and evaluate whether this will help them to achieve their overarching business goals. EoT is not limited to a specific use case, application or industry, as it would for a traditional IoT case, but can be something external across different industries. As EoT is based on collective value, enterprises need to see the value generation both for their business in the solution and for other ecosystem players before signing up.
2. **Establish rules around data sharing:** Enterprises looking to monetise specific types of data using an EoT platform should consider what rules they want to put in place around data sharing, based on smart contracts. For instance, an enterprise may collect very granular data about the condition of a road (temperature, humidity, vibrations, etc.) but only choose to share on the EoT platform less granular data which can be used by others to understand if the road is wet or dry. Or they may time-bound the data so that a requesting party can only see ten consecutive sensor readings. Enterprises need to weigh up ensuring the data they are offering is rich enough that others see value in buying it with ensuring that they do not share any data that may give others a competitive advantage over them.
3. **Focus on specific use cases:** Enterprises should determine where the earliest opportunities lie for them to unlock value with EoT. Alongside connected vehicles, supply chains and smart grid, we predict the opportunities will be based around the following
 - **High data volumes and value from IoT already generated:** Verticals that are collecting a lot of data are set to benefit from the data brokerage and monetisation aspect afforded by EoT. These verticals include transport and manufacturing which can benefit by the opportunity to securely share and monetise the data they are already collecting from other industries.
 - **Cross-industry collaboration:** There will be significant value for cross-industry solutions spanning multiple verticals. For example, data from consumer IoT devices can be shared

to players in adjacent verticals for better insights and resource management, e.g. household IoT machine data can be shared with energy players to optimise energy management based on demand. All data will be owned and controlled by the device owner to ensure there is no invasion of privacy.

- **Sustainability:** There is an opportunity to leverage the data being collected to inform internal sustainability practices and provide greater transparency across the value chain. For example, carbon emission data of different logistics providers can be provided to retailers to enable better sustainable decision making. Alternatively, logistics providers can provide fees to customers based on the distance and type of transport required for ordered goods.
4. **Evaluate and join an EoT marketplace:** Enterprises should join a trusted EoT platform, such as the Vodafone DAB platform, that meet the key characteristics required around trust, regulation, security, openness and scalability. The platform 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.
 5. **Understand that the “customer” of EoT data will rarely be a person:** Some enterprises will use data gained via an EoT marketplace to inform the decision making of an employee (e.g., to feed into a dashboard used by a marketing professional). However, the EoT will also have a transformative effect on artificial intelligence models which need to be fed with large amounts of accurate and varied data in order to be trained. Enterprises should ensure that they consider whether data that they share via an EoT marketplace could be valuable for this purpose too, and whether they have any algorithms themselves that might benefit from access to the data of others.

A message from our sponsor

The internet of things has been growing significantly both in terms of the number of connected devices in operation and the rate investment. Vodafone is a leader in Managed IoT Connectivity with over 160 million connections on our platform, and we are excited about the evolution of the Internet of Things to the Economy of Things. The recent launch of the Vodafone Digital Asset Broker (DAB) Economy of Things platform in 2022 was an important step, and this report provides important insights into the size of the opportunity and the areas of focus.



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