Telecoms move beyond connectivity

Unlocking cross-industry value through IoT payment and data exchange platforms

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Key takeaways

IoT's potential is enticing to telecommunications CTOs, whose companies are striving to transform from "a telco to a techco."

■ **Telecoms can evolve beyond connectivity to help industries unlock the value of IoT data.**

They are well positioned to lead the transition to an Economy of Things, where devices do business with each other autonomously and companies turn data into dollars.

■ **A neutral, decentralized platform underpins the Economy of Things.**

Smart contracts on blockchain and decentralized identities provide the necessary foundation of trust.

■ **Cross-industry ecosystems can share data to realize radical new business models.**

Leveraging an Economy of Things platform, ecosystem partners can expand innovation opportunities exponentially.

Transitioning from things to transactions

As the Internet of Things (IoT) continues to explode, IoT devices are spawning mind-boggling amounts of data that hold tremendous—but mostly unrealized—worth. IDC estimates the number of connected IoT devices to increase to 55.7 billion by 2025, resulting in almost 80 zettabytes of data.[1]

IoT's potential is enticing to telecommunications CTOs, whose companies are striving to transform from a "telco to a techco." In the IBM Institute for Business Value (IBV) 2021 CTO report, nearly two-thirds (64%) of telecom CTOs said they expect IoT to deliver both short- and long-term benefits.[2]

Telecoms can seize this chance to evolve beyond connectivity and into technology companies that help industries unlock the value of IoT data. This begins by powering autonomous device-to-device transactions and expands exponentially to an even more revolutionary concept: AI-powered data-sharing marketplaces that finally turn data into dollars.

Deluged with data but lacking in lucrative insights, companies become buyers and sellers of services and data, with their IoT devices doing the work of detecting needs and completing transactions. For instance, if fleet operators joined such a platform, a payment-enabled IoT device within one operator's truck could identify and sell spare capacity through the marketplace to other operators or movers of cargo, efficiently expediting delivery of goods.

Together, telecoms and their cross-industry partners can realize radical new business models that monetize data for competitive advantage.

For more than a century, telecoms have provided the trusted, essential infrastructure that enables the world to communicate. They understand scale as they carry a significant share of data to and from IoT devices. And they already enable contactless cross-border payments. Their history and capabilities position telecoms to lead a transition from the Internet of Things to the Economy of Things—where virtually everyone can win.

Consumers gain improved service, personalized amenities, and near frictionless payment experiences. Together, telecoms and their cross-industry partners realize radical new business models that monetize data for competitive advantage while pioneering solutions that address current issues related to sustainability, smart cities, supply chain management, and more. Indeed, residing at the heart of entirely new market platforms that deliver and extend new transactional services across industries could be a profitable endeavor for telecoms. One projection anticipates revenue from the global data exchange platform services market will grow by a CAGR of 32.9% to $1.3 billion from 2021-2031.[3]

What is the "Economy of Things"?

As described by the IBM Institute for Business Value in a 2015 report, the Economy of Things represents the "liquification of the physical world," where physical assets—the "things" in the Internet of Things—become participants in digital markets.[4]

Similar to how today's applications monetize and deliver music, news, and weather, in the Economy of Things, the physical smart devices, sensors, and machines become liquified within marketplaces where they can be discovered, used, and monetized. This device transition from physical to digital amplifies their ability to make lives easier, transform businesses, and help societies thrive (see Perspective, "Imagine if").

Why now? First, the number of IoT-connected devices is surging in many industries, providing the critical backbone of industry data, with value growing greatly when shared.

Second, key technologies have matured in the last few years (see Figure 1). The expansion of cellular 5G connectivity across various geographies has been important because it enables edge computing and a secure link to Web 3.0 protocols. The emerging Web 3.0 technologies enable interoperable digital identities based on decentralized capabilities. The identities can be assigned to individuals and devices coupled with payment credentials that are stored in digital wallets.
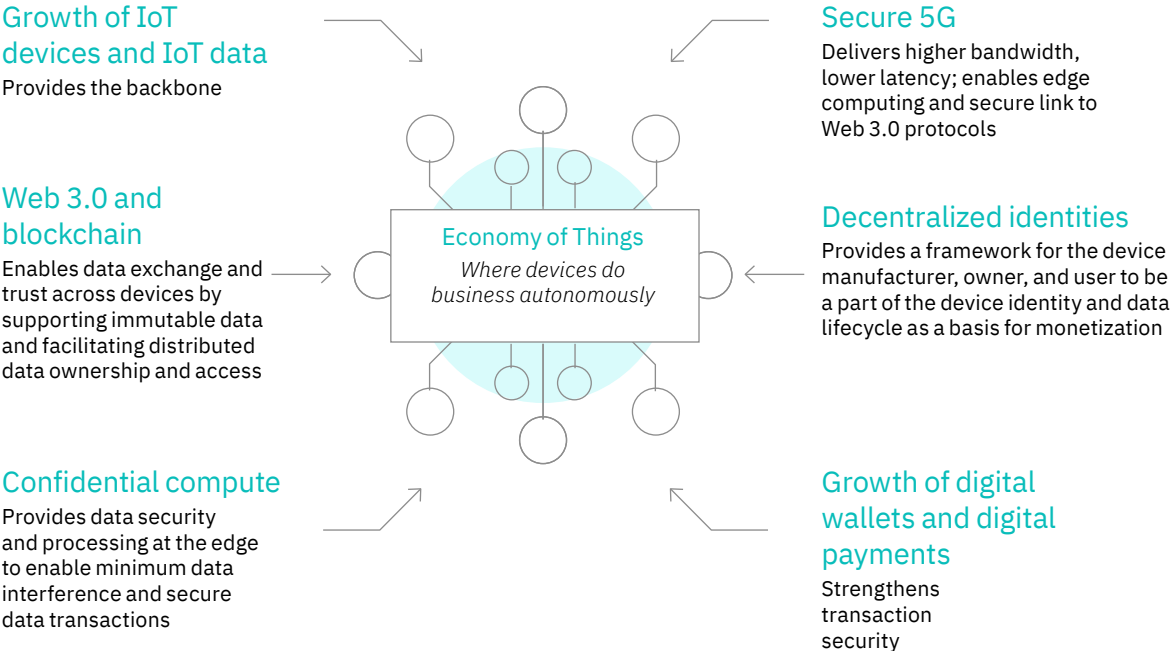
Another important element is distributed ledger technology, or blockchain, now an established way to execute contracts and move data not just within networks but beyond networks on marketplaces that connect consumers and producers.[5] Together, these technologies create a level of trust not possible before, opening the door to a new era of innovation.

The convergence of key technologies creates a level of trust not possible before.

A perfect storm

Technologies matured in parallel to enable the evolution of the Economy of Things and value generation.

Growth of IoT devices and IoT data
Provides the backbone

Web 3.0 and blockchain
Enables data exchange and trust across devices by supporting immutable data and facilitating distributed data ownership and access

Confidential compute
Provides data security and processing at the edge to enable minimum data interference and secure data transactions

Economy of Things
Where devices do business autonomously

Secure 5G
Delivers higher bandwidth, lower latency; enables edge computing and secure link to Web 3.0 protocols

Decentralized identities
Provides a framework for the device manufacturer, owner, and user to be a part of the device identity and data lifecycle as a basis for monetization

Growth of digital wallets and digital payments
Strengthens transaction security

Source: IBM internal

Imagine if ...

"Smart" takes on an entirely new meaning when devices are empowered to transact in the Economy of Things. Let your imagination roam.

What if:

– A vehicle automatically registers itself with toll administrators and pays tolls as needed?

– An electric vehicle (EV) automatically sells unused energy back to the grid?

– Traditionally competitive suppliers team up to use societal demand-sensing sources and then make surplus inventory readily available to whoever needs it?

– Your mobile device knows when you get on and off public transportation and automatically pays your way?

– Companies can automatically select and contract with the most carbon-neutral transporter to move their goods?

– Shipping containers can signal their entry to port and trigger an automatic payment for the goods?

When organizations across industries share data in pursuit of progress, the possibilities are practically limitless.

Behind the scenes of the Economy of Things

To propel the Economy of Things, telecom companies begin by building a platform: one that is neutral, decentralized, and scalable, underpinned by an interoperable infrastructure, common standards, and a connective fabric of trusted data and services provided by a cross-industry ecosystem of partners.

Let's break down the essential pieces using the Digital Asset Broker (DAB) platform, originally conceived by Vodafone, as an example (see Figure 2). Blockchain is the foundational technology. It brings neutrality and decentralization—attributes that are important to gaining the trust of the companies joining the platform. In other words, it's the ecosystem arbiter.[6]

IoT devices from businesses and consumers conducting business on the platform connect to the blockchain through their embedded SIM cards or other means of connectivity, such as dedicated hardware. Each device has a "passport," a unique digital identity anchored on the blockchain to enable decentralized authentication. The devices are equipped with encryption keys so they can sign data transactions with a unique digital signature. This enables each device to make trusted transactions with other parties on the platform.

The blockchain records an immutable, time-stamped verification of every transaction made on the platform, with smart contracts automating the execution of an agreement so all participants can be certain of the outcome without an intermediary's involvement or time loss. The platform's smart contract library enables

FIGURE 2

**Pulling back the curtain on the
Economy of Things**

Digital Asset Broker by Vodafone models the elements of
a cross-industry data brokerage platform.

*Source: Digital Asset Broker by Vodafone;
https://www.vdigitalassetbroker.com/*
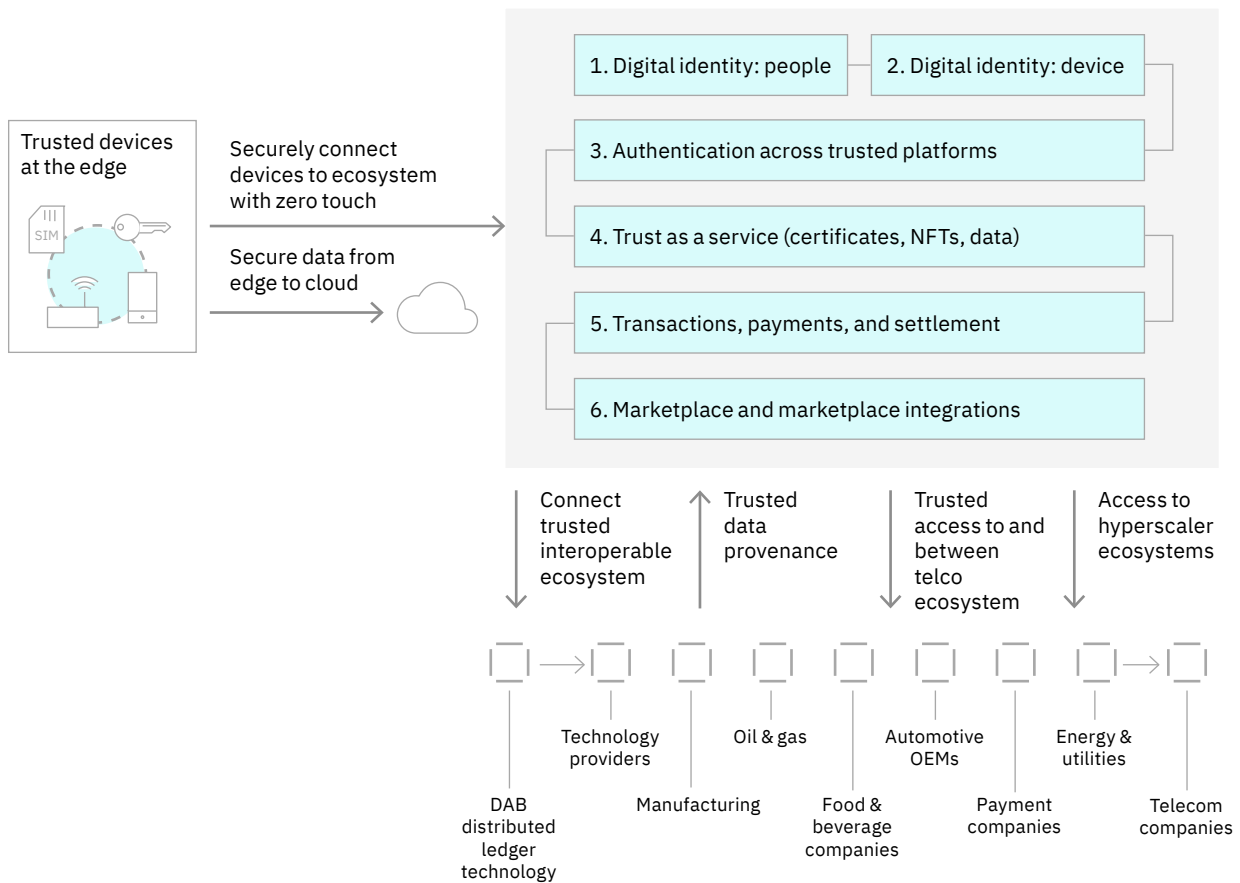
token, peer-to-peer, banking, or card payments only
when predetermined conditions are met.

The business these devices can conduct depends on
the next vital piece: the ecosystem. Inventive
solutions demand a team of cross-industry players—
an approach that has demonstrated results. An IBV
report on ecosystems and innovation noted that
businesses with high engagement in ecosystems
report 15% greater contribution to revenue from
innovation than businesses with low-to-moderate
ecosystem engagement.[7]

Ecosystem members connect to the platform through
assigned nodes with interactions being authenticated
using encryption. An interoperable infrastructure
built using open technologies enables participants
such as payment vendors, other blockchain networks
such as IBM Food Trust®, and other industry
partners—including other telecoms—to connect to the
platform.

Finally, the marketplace component brings the
Economy of Things to life. It connects the ecosystem
with the technology and provides data brokerage
services—designed to be secure and compliant—for
those who own the data, process the data, and
develop data-driven applications.

The ecosystem's imagination is essentially the only limit to ways data can be monetized on a marketplace platform.

The data exchange element is backed by a modern decentralized architecture such as a data fabric, which integrates ecosystem participants' data pipelines using data virtualization to connect to the different sources. Agnostic to data environments and removing the need to transfer data to the platform, a data fabric addresses both data governance and privacy at scale while strengthening compliance with data regulations.

Metadata tagging of the virtualized data facilitates self-service, on-demand access to data as well as helps ensure data quality and protection. Business rules imposed on the data sets help manage compliance with privacy and data sovereignty rules as well as inform the smart contracts for data buying and selling. Data buyers and sellers congregate in the marketplace portal to publish, discover, explore, download, and subscribe/buy data sets, data products, as well as data services.

The ecosystem's imagination is essentially the only limit to the use cases for monetizing data on such a platform. Vodafone jump-started the thinking with its Digital Asset Broker (DAB)-enabled electric vehicle (EV) charging initiative, where an EV can find a charging station and pay for charging autonomously (see case study, "First-gen Economy of Things platform simplifies electric vehicle charging").

But the real promise—and the vision for the future—lies in using AI to analyze real-time marketplace data and then empowering the devices to detect something of value and link the buyers and sellers to complete the transaction. Returning to the earlier fleet capacity example, the marketplace brings together all necessary entities in the ecosystem, while AI facilitates the identification and selling of spare capacity among truck operators on the marketplace.

From a business perspective, marketplace platform owners can set up subscription or revenue-sharing models for those leveraging their platforms. In exchange, the platform participants can develop and monetize applications and create new business models without having to build their own infra-structure for data exchanges and transactions. They can expand the value of their own data by tapping into that of other cross-industry ecosystem members—while managing compliance with data privacy and data sovereignty laws.

Vodafone's first-gen Economy of Things platform simplifies electric vehicle charging[8]

Vodafone transformed the Economy of Things vision into reality with the launch of its Digital Asset Broker platform in the spring of 2022. DAB was designed for verified devices, vehicles, and machines to transact seamlessly and securely without human intervention, but with full owner control. Vodafone's use of mobile SIM technology inherent in all devices, combined with the latest blockchain technology, meant all devices and machines on DAB have a unique digital identity, are verified as trustworthy, and are allowed to automatically exchange and trade data and money over secure, encrypted connections.

The platform's debut use case was Vodafone's trial for an electric vehicle, where the car's digital identity could interoperate with and trust the digital identity of a charging point in Newbury, UK, enabling communication and the exchange of funds. Built in partnership with Mastercard and Energy Web Foundation, this service was initially available as a mobile app with an integrated mobile wallet secured at the edge through cryptography in the SIM and digital identity. Motorists received real-time information on the status and compatibility of the nearest available charging point as well as the price. Then the motorist could authorize the vehicle to recharge, with the payment occurring automatically.

For the Vodafone fleet users, the DAB digital identity capabilities allowed multiple drivers' identities to be associated with an EV, and their charging credentials were verified by DAB, allowing them to use the fleet payment credential linked to the car identity, and eliminating the need to allocate multiple fuel cards to each driver.

The service delivered several benefits to motorists, such as reducing "range anxiety" and the need to install apps for each of the dozen or so EV charging stations available in the area. As an added bonus, motorists could choose renewable electricity providers thanks to the partnership with Energy Web Foundation, a not-for-profit focused on decarbonizing energy grids.

Vodafone envisioned extending the ecosystem to further serve fleet management companies, taxi firms, and road haulage firms as a tool for them to centralize their charging requirements and even pass on unused electricity to another employee or road user.

Critical considerations for developing an Economy of Things platform

According to IBV research, the success of a trusted marketplace depends on different entities such as market leaders, regulators, and industry bodies taking the lead to drive governance, encourage collaboration, and increase membership.[9] Moreover, several factors must be addressed properly to encourage open, meaningful ecosystem participation, which is essential to the growth of an Economy of Things platform.

Building trust

The value of the IoT data fueling the platform is amplified by the essential behavioral, usage, and interactions data generated by the device owners. But device owners overwhelmingly don't trust businesses with their data. In fact, in the Adobe 2022 Trust Report, 81% of consumers say having choices about how companies use their data is important.[10] Also, security by design is going to be critical for all businesses because of the increasing cloud-native development and edge technologies being used.

The telecom industry has a solid network security infrastructure that can be extended to the Economy of Things platform. This includes securing the data as it moves from the SIM, or embedded SIM, in the edge device through the wireless and core networks around the world, to the central management platform and the hosting data centers.

Additionally, using decentralized digital identities helps address data ownership issues while consent management helps confirm data is shared and used only with permission from the data owner themselves. Taking advantage of decentralized identifiers (DIDs)—a unique identifier that represents a person or a device across the internet—helps create trust in data ownership as well as the ability to link permissioned data to that individual or the device, which can then be anonymized and shared with relevant, permitted parties in the ecosystem.[11] DIDs and their credentials can be verified and stored on the blockchain where they are secured by cryptography.

Delivering business-ready data

In a recent IBV study that explored expanding global trade with blockchain, 76% of organizations focused on co-creating platforms on blockchain networks said having trusted data is important.[12] Wrong or missing data on a data brokerage platform could seriously damage its reputation. For the data to be of worth to the ecosystem, a proper governance framework is necessary to help ensure the data is accurate, current, compliant, and gathered ethically—in other words, business ready. Furthermore, ecosystem participants need transparency into the data consid-erations for the marketplace—who owns the data, what data can be shared, who can access it, what happens to data if a member leaves the network?

Building the marketplace component of the platform using a data fabric architecture can help. It includes key technology building blocks that provide knowledge of where data originated, what it is, who can access it, and when it should be retired. Capabilities include data cataloguing as well as automation of metadata generation, governance of data access and lineage, and application of regulatory requirements. The data fabric within the marketplace must also abide by privacy regulations such as General Data Protection Regulation (GDPR).

Promoting participation

How can businesses be motivated to join a marketplace platform and share their data? Show them how value will be created and what's in it for them. But in a first-of-its-kind platform, that is easier said than done. In fact, in the recent IBV study cited earlier, only 52% of organizations focused on co-creating platforms on blockchain networks said they would be willing to share proprietary data with business partners in exchange for value.[13]

A good starting point for encouraging membership can be to build a minimum viable ecosystem (MVE) where each participant sees clear stakes and value generation for their business in the solution, along with the governance mechanisms for the data that is shared in the marketplace. Forge strong relationships with the customer groups who can use the platform, taking the time to understand their needs and what's most important to them. This collaborative effort can pay off by enabling rapid expansion of real-life use cases based on collective value.

A minimum viable ecosystem helps each participant see clear stakes and business value.

Participants also need to know how the value of their data is determined. A value quantification service becomes an imperative for success. For example, algorithms can help identify and rank which data is most in demand, therefore assigning it a higher value. Over time, the marketplace could serve up the most popular data or recommended data based on trust-worthiness, age, and other attributes, similar to retail websites. Developers or data processors could even submit requests for the specific data needed for the applications they are building.

Other incentives can encourage participation as well, such as waiving joining fees, absorbing onboarding costs, or offering future discounts or rebates on transaction fees.

And finally, onboarding should not be cumbersome. These platforms require "plug and play" capabilities to accommodate participants' data and applications regardless of their source. A platform built on open technologies and aligned to standards facilitates this interoperability among the ecosystem members as well as the ability for the platform to scale as more partners join.

Encouraging confident collaboration

Successful, growth-oriented partnerships can overcome common challenges and create fresh opportunities; for example, Bell and TELUS built the LTE network together in Canada. But when multiple industry players come to the table to collaborate and not just compete, a strong governance structure is necessary to protect what differentiates each participant while fostering cooperation. This includes defining rules around the marketplace governance— the economic rules, network roles, legal requirements, and the like. Business, legal, and technical responsibilities must be addressed to foster co-opetition in such a marketplace.

Leveraging the existing trusted ecosystem of the telecom industry—such as technical providers, enterprise clients, and vendors—can offer an initial advantage. Industry associations such as GSMA, the global association for mobile operators, can also facilitate this structure, building on experience as the developer of roaming charging principles and technical specifications.

Action guide

Fostering purpose-driven, cross-industry collaboration

How can companies embrace the vision of collective value based on an ecosystem mindset, balancing the bottom line with progress for the greater good? A notion so complex cannot be done in isolation. Enterprises need to look at their own business, their industry, and their ecosystem partners and build use case examples for practical applications of the platform/technology.

This transformation requires a collaborative, growth-oriented approach and a deliberate focus on interoperability and exchange of fair value. Telecoms can usher in this new age with open, connected, and security-rich ecosystems of IoT devices, users, and cross-industry partici-pants. These capabilities, aligned with Web 3.0 principles and enabled through marketplaces with mutual, transparent incentive systems among participants, facilitate trusted transactions.

Review these steps to see how your business can drive breakthrough advancements.

01

Understand your organization's role in driving ecosystem value.

– Study cross-industry, end-to-end value chains and identify where your organization fits.

– Expand beyond your current industry perspective to look at ecosystem participation.

– Prioritize ecosystem participation where your level of connectedness and ability to add value is high.

02

Test and learn from cross-industry initiatives that advance open innovation platforms and collective value.

– Open discussions with potential partners within your own industry and across industries to align on common challenges, objectives, and purpose.

– Co-engineer MVPs and MVEs that drive initial open interconnectedness and deliver collective value.

– Derive core learnings on driving fair and equitable value across participants.

03

Set an organizational mindset to prioritize collective value and shift performance measurement to outcomes and impact-based metrics.

– Leadership should bias toward and adopt an infinite game mindset.

– Drive transparency of organizational performance, aligning targets to growth of ecosystem value and relevant United Nations Sustainable Development Goals.

– Report internally and externally on performance against communicated targets.

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About GSMA

The GSMA is a global organization unifying the mobile ecosystem to discover, develop, and deliver innovation foundational to positive business environments and societal change. Its vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organizations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Industry Services and Solutions, Connectivity for Good, and Outreach.

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