

Blockchain – Key to a New Age of Supply Chain Transparency and Trust

How organizations have moved from
blockchain hype to reality

Country summary - Germany

October 2018



Table of Contents



- 01** Research objectives, scope, and methodology
- 02** Organizations turn to blockchain to tackle their supply chain pain points
- 03** Blockchain applications that are gaining traction in each industry
- 04** Who is leading in the blockchain race?
- 05** Key recommendations for a resilient blockchain program



01

Research objectives, scope, and methodology



Research objectives

Main objectives



- To assess whether organizations are looking at blockchain to address their supply chain challenges
- To determine the blockchain applications that are gaining traction, and what differentiates organizations that are successfully deploying these applications

Key questions raised in the research



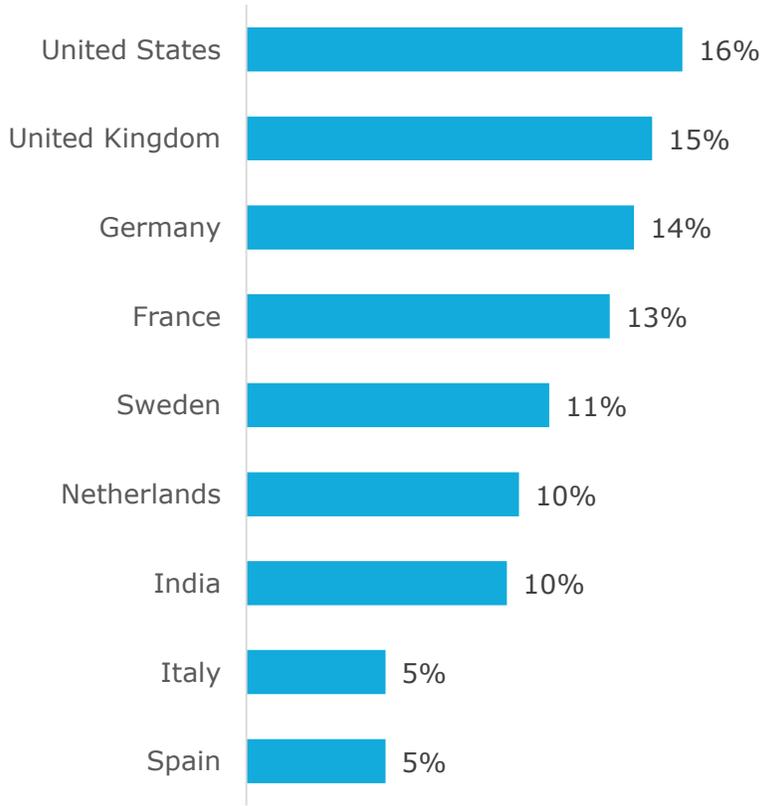
- Understand how the features of blockchain will resolve the pain points of supply chain
- Determine which blockchain applications are organizations working on in Consumer Products, Manufacturing and Retail industries
- Analyze what factors differentiate the high performing organizations from the rest and
- Provide recommendations for adapting a blockchain program



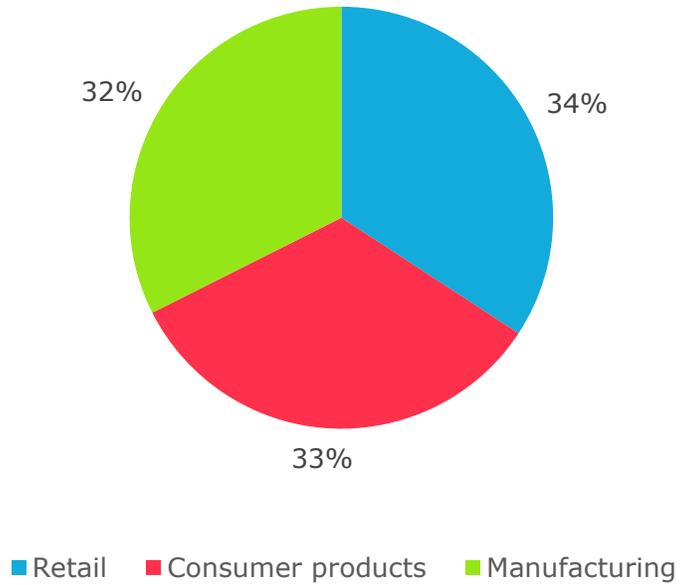
Research scope and methodology - Global

We surveyed supply chain leaders at Director level or above at 447 organizations that are *experimenting with or implementing blockchain in their supply chain*. Eighty one percent of companies had reported revenue of more than \$1 billion in FY 2017. The global survey took place from April to May 2018. We also interviewed blockchain experts and startups.

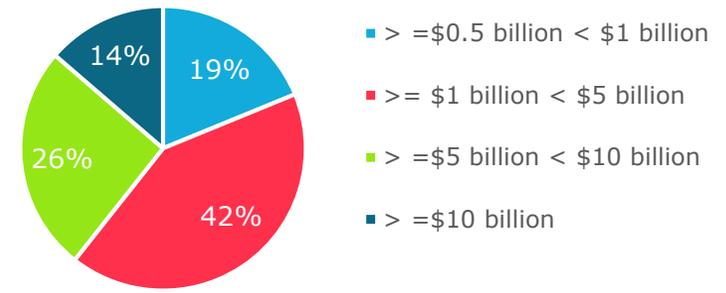
Organizations by country



Organizations by industry



Organizations by revenue



Respondents by supply chain awareness



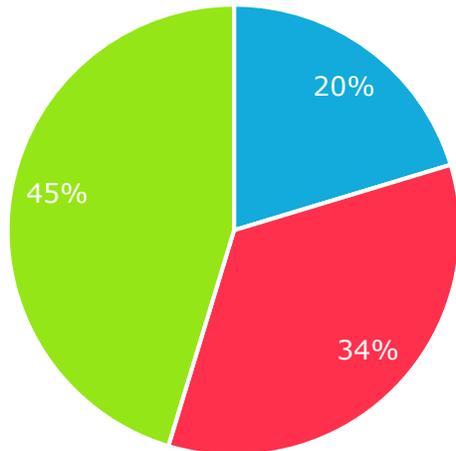
Source: Capgemini Research Institute, Blockchain Survey; April–May 2018, N=447 organizations.



Research scope and methodology - Germany

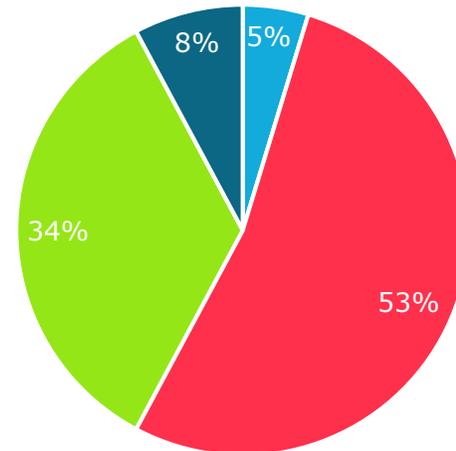
In Germany, we surveyed supply chain leaders at director level or above at 64 organizations. The global survey took place from April to May 2018.

Organizations by industry (Germany)



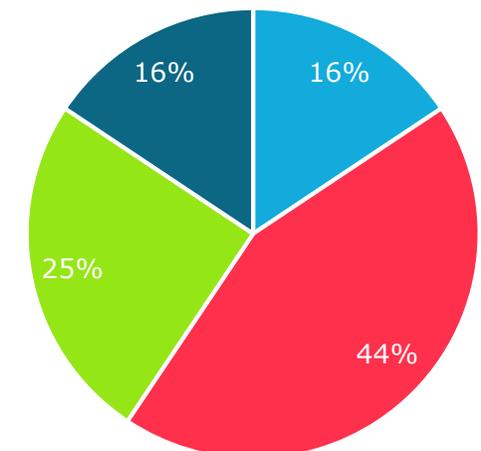
■ Consumer Products ■ Manufacturing ■ Retail

Organizations by revenue in USD (Germany)



■ >=\$0.5 billion <\$1 billion
■ >=\$1 billion <\$5 billion
■ >=\$5 billion <\$10 billion
■ >=\$10 billion

Respondents by supply chain awareness (Germany)



■ I'm leading a supply chain initiative
■ I'm actively involved with supply chain activities
■ I have monitored / am currently monitoring supply chain activities
■ I have considerable knowledge on my organization's supply chain activities

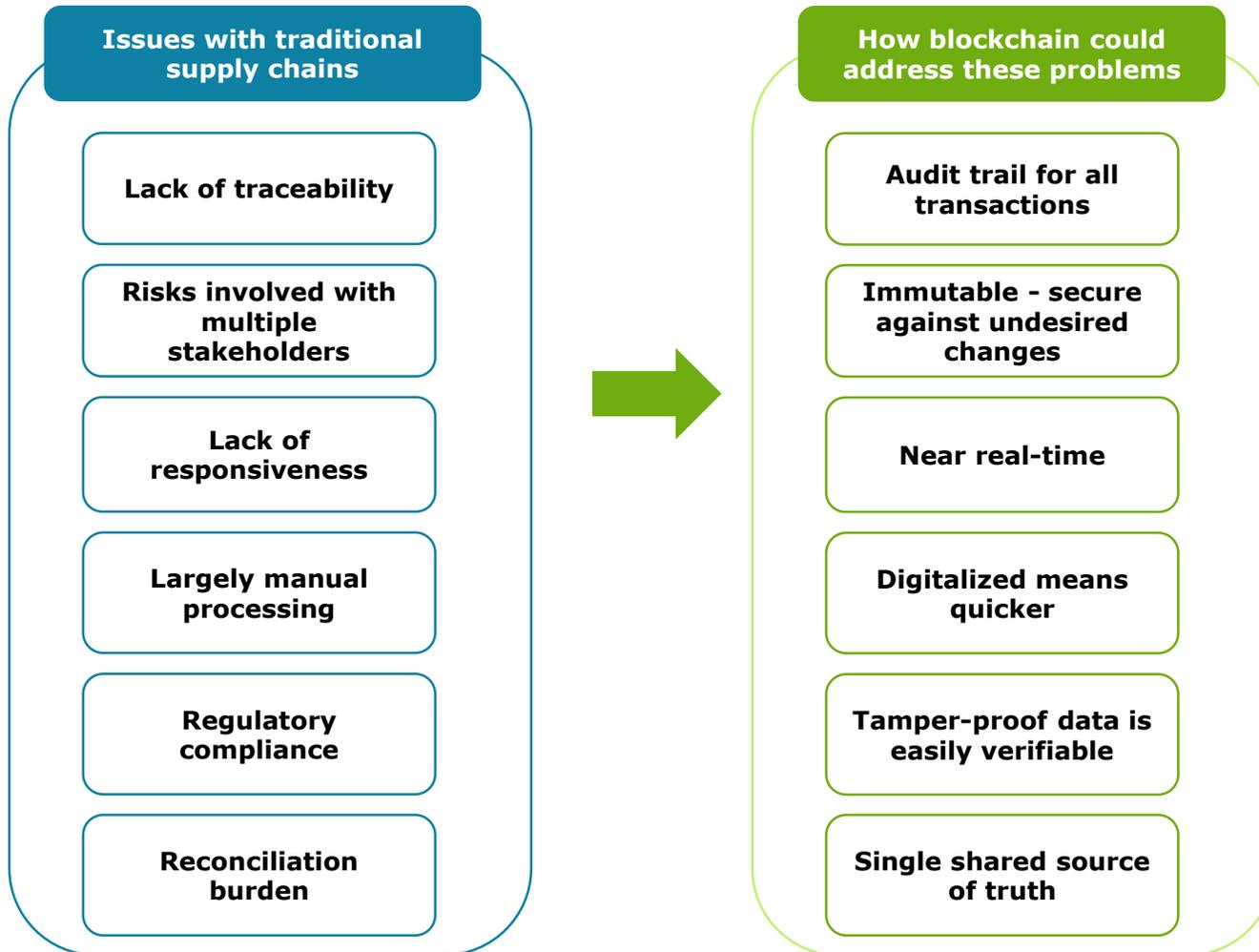


02

Organizations turn to blockchain to tackle their supply chain pain points



Blockchain helps address issues with traditional supply chains



Supply chains are increasingly becoming global. And issues like food contamination highlight the need for tracking the affected parts as quickly as possible.

Lack of traceability is one of the key pain points of traditional supply chains, which blockchain can address.

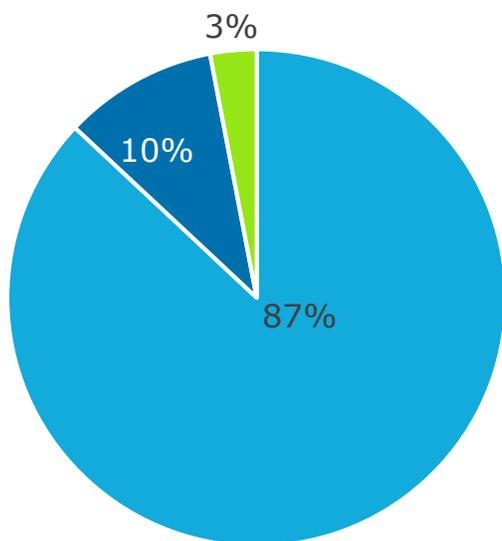
Walmart's blockchain pilot in China enabled them to track a package of mangoes from store to farm in a few seconds. Previously, this would have taken days or weeks.

Forbes, "3 Innovative Ways Blockchain Will Build Trust In The Food Industry", April 2018.



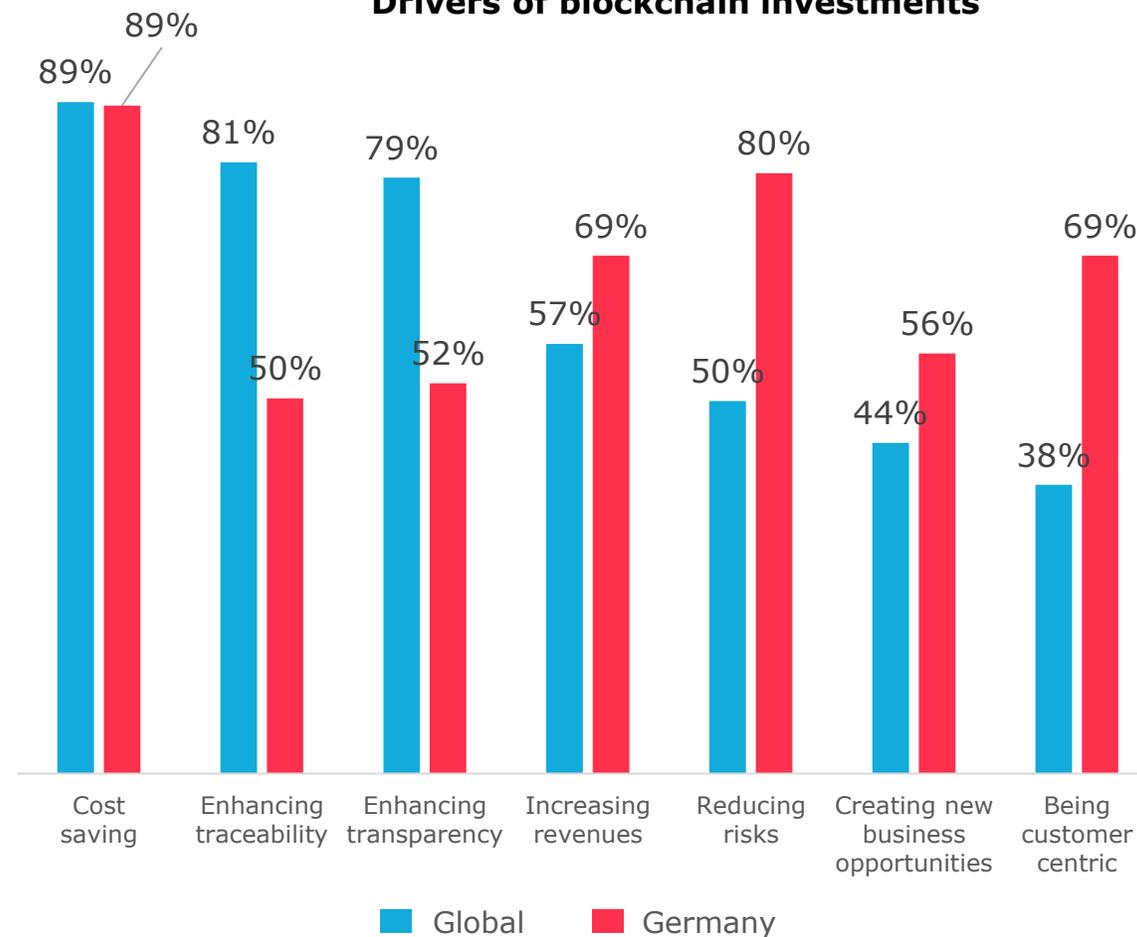
Nearly all organizations are still in the experimentation stage

Blockchain deployments



- Only Proofs of Concept
- Pilot in at least one site
- At-scale implementations

Drivers of blockchain investments



Source: Capgemini Research Institute, Blockchain Survey; April–May 2018, Global N=447 organizations; Germany N=64 organizations.



Blockchain for enterprise supply chain – key considerations (1/2)

Blockchains are one form of distributed ledger technology (DLT). A distributed ledger is a decentralized, shared, immutable distributed database of transactions. While the nature of B2B requires a private / permissioned blockchain, organizations should look at a few key areas before going ahead with an enterprise implementation.

Key factor	Area of consideration
Security at all levels	Security for all layers – infrastructure (on which the DLT is deployed), the ledger, the software, identity and access management
Privacy	Fine grained access controls for managing data across all layers of the platform
Scalability and performance	Managing for speed and throughput once the transaction volumes pick up
Environment	Choosing the suitable option from amongst – on-premise, single or multi-cloud environments
Enterprise integration	Required APIs (Application Programming Interface) to plug into data sources within and across the enterprise at speed as part of the use case lifecycle
Architecture	If microservices can be developed over time as the DLTs mature
Customer experience and visualization	Ability to create user interfaces and maintain user experience that masks technology complexities of DLTs (similar to web browsers)



Blockchain for enterprise supply chain – key considerations (2/2)

Data distribution

Data distribution refers to how the ledger is shared between the nodes of a blockchain network.

- ❑ **Broadcast** – This is the traditional way to share a ledger. Every transaction is shared and replicated among all nodes, so everyone in the network can access the complete ledger.
- ❑ **Channels** – Hyperledger Fabric introduced the concept of sub-networks. Data is only broadcast to members of this sub-network.
- ❑ **Bilateral communication / peer-to-peer** – Instead of sharing data across a network or a sub-network, data is only shared between named entities, usually the ones engaged in the transaction (two or three entities in most cases).

Governance

An enterprise blockchain program will need governance at various levels:

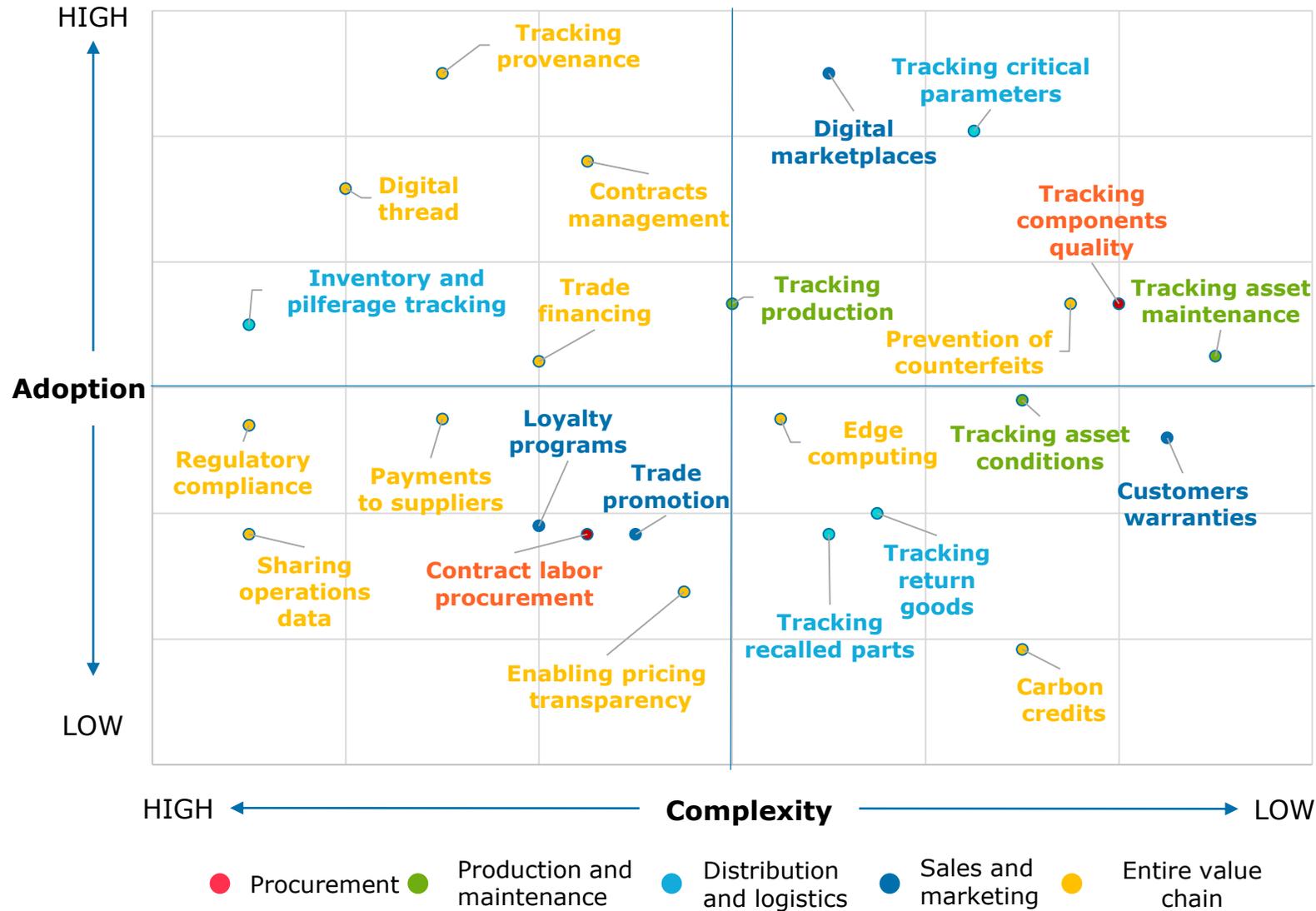
- ❑ **DLT ecosystem governance** – This needs to be developed both for the business and the technology. The operating model should detail the roles and responsibilities for all partners in the ecosystem.
- ❑ **Deployment governance** – Around regulation, compliance, and security.
- ❑ **Technology governance** – For integrating blockchain and DLT solutions with other digital disruptors like IoT and AI.
- ❑ **Program governance** – For developing and maintaining a business case for investment in DLTs.
- ❑ **Ownership** – Unlike a centralized system, it is not always obvious who owns the ledger. A new foundation in a multi-stakeholder ecosystem is one possible answer.



03

Blockchain applications that are gaining traction

Applications gaining traction in supply chain by different parts of the value chain

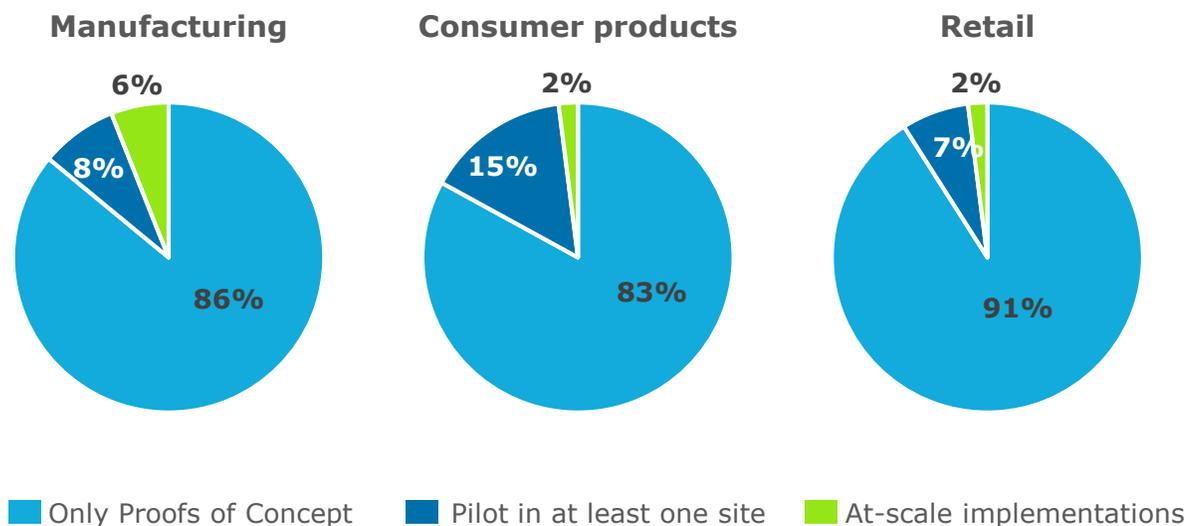


Source: Capgemini Research Institute, Blockchain Survey and expert interviews; April-May 2018, N=447 organizations.



Consumer Products has the highest share of companies that have moved beyond proofs of concept

Blockchain adoption by industry



Nestlé, Unilever, Tyson Foods, Golden State Foods, Dole Food Company, McCormick & Co are some of the big names in consumer products that have started blockchain trials in their supply chains.

Reuters, "Nestle, Unilever, Tyson and others team with IBM on blockchain", August 2017.



Manufacturing organizations are engaging with blockchain mainly for managing supplier contracts

Top five blockchain opportunities that manufacturers are pursuing:

- ❑ **Supplier contract management** Smart contracts can be used to transform transaction efficiency, improving speed of execution and supporting faster dispute resolution. Responsive contracts eliminate inefficiencies associated with regular contracts.
- ❑ **Digital thread** A communications framework that connects traditionally siloed elements in manufacturing processes and provides an integrated asset view. Blockchain adds trust to this ecosystem when multiple partners are involved.
- ❑ **Production tracking** Manufacturers need instant information on the products completed by their EMS (electronic manufacturing services) providers. A blockchain helps OEMs track and authenticate this in real time.
- ❑ **Tracking asset maintenance** Blockchain, along with technologies such as IoT, helps in determining whether an asset has been maintained according to schedule, especially when multiple parties are involved.
- ❑ **Tracking recalled products** Blockchain enables product or component tracking by recording a product's entire manufacturing journey, from the origin of its components until the product reaches the consumer.

A number of automotive manufacturers, such as Robert Bosch and ZF Friedrichshafen, have formed a consortium called the Mobility Open Blockchain Initiative (MOBI) with automakers such as BMW, General Motors, and Renault.

MOBI's aim is to establish compatibility standards across multiple brands for various blockchain-based services.

Automotive News Europe, "Automakers, suppliers team up to develop blockchain technology," May 2018.

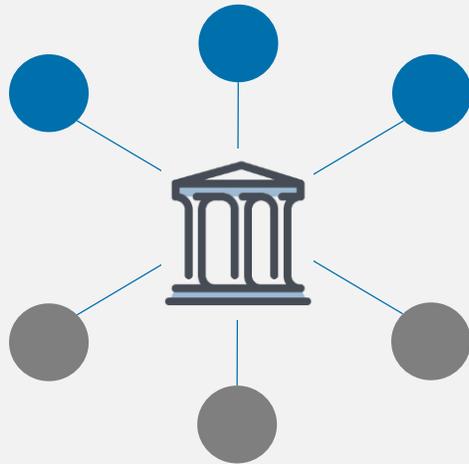
Foxconn (Apple Inc.'s largest electronics contract manufacturer) has launched a blockchain-based supply chain finance platform called Chained Finance as part of its efforts to provide working capital to its supply chain base.

SCF Briefing, "Foxconn uses blockchain for new SCF platform after \$6.5m pilot," March 2017.



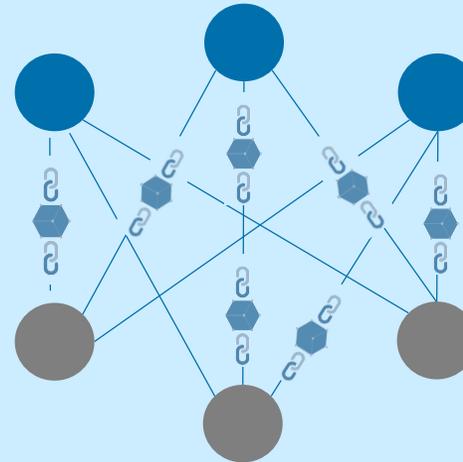
Supplier contract management with blockchain

Traditional transaction model



- Transactions rely on a central authority (e.g. banks, exchanges) for verification
- Transaction data is primarily stored by the central authority

Blockchain transaction model



- Transactions are carried out directly between two parties resulting in faster execution
- All transactions are stored on an encrypted distributed ledger that substitutes an intermediary

● Member group 1 (e.g. OEM)

● Member group 2 (e.g. supplier)

🏛️ Central authority (e.g. bank)

🔗 Encrypted blockchain

Consumer product organizations are focused on provenance tracking solutions

Top five blockchain opportunities that consumer product organizations are pursuing:

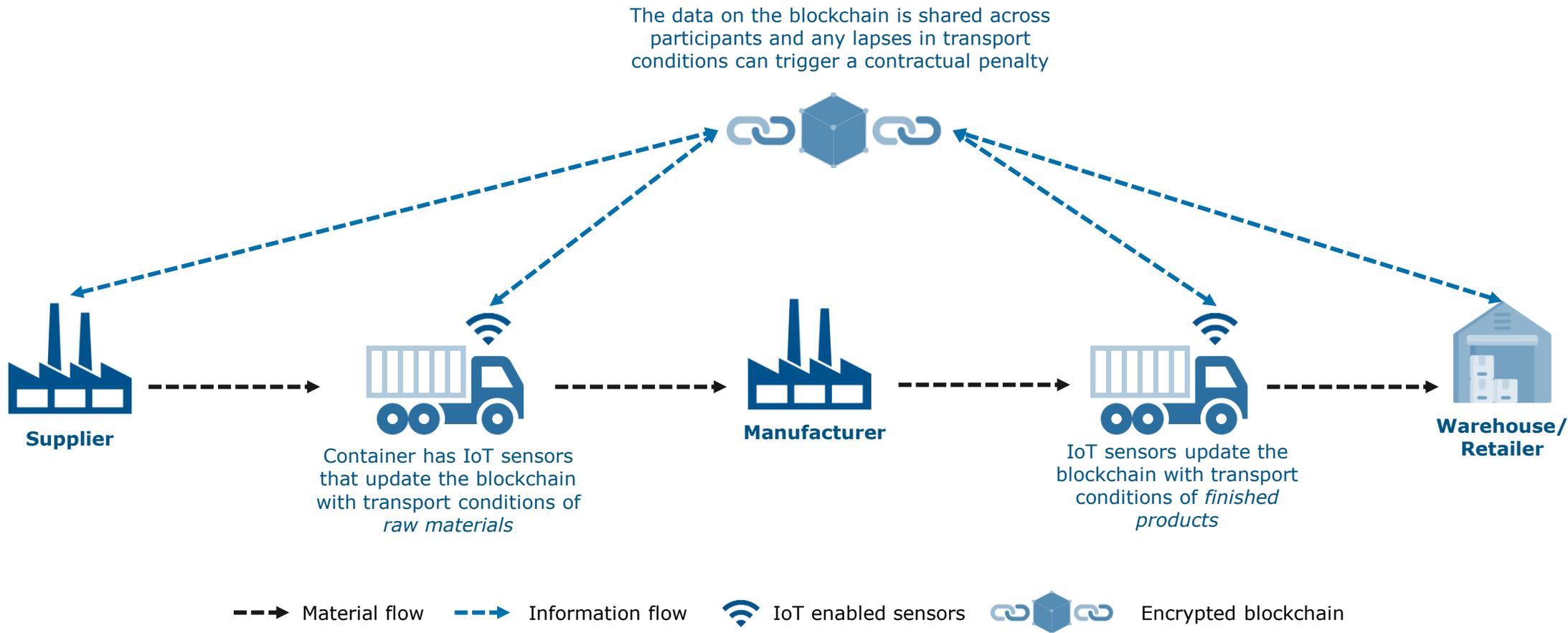
- ❑ **Tracking Provenance** Blockchain allows businesses and consumers to trace a product's origin, attributes, and any change of ownership.
- ❑ **Tracking critical parameters** For products that are sensitive to storage conditions, blockchain, coupled with IoT, can help companies track conditions, such as temperature, during transit.
- ❑ **Monitoring asset conditions** Blockchain, coupled with technologies such as IoT, helps in monitoring the condition of assets in remote locations.
- ❑ **Regulatory compliance** A blockchain can maintain a product's entire history and allows regulators to determine whether that product has been manufactured and handled in a compliant manner.
- ❑ **Providing warranties** Blockchain helps to establish the proof of ownership of a product. This allows organizations to extend warranties to customers with genuine products and avoid losses in warranty frauds.

A London-based NGO has developed a system to track skipjack and yellowfin tuna, creating "catch-to-consumer" transparency. The fishing crew attach an RFID tag to the fish that are caught and scan and upload the information to the cloud using handheld devices. This data is added to the blockchain ledger, creating a tamper-proof trail. This helps in tracking the product as it passes from catch, to canner, and on to the consumer.

Forbes, "How Blockchain Could Help End Modern Day Slavery In Asia's Exploitative Seafood Industry," February 2018.



Tracking critical parameters using a smart container application



Retail organizations are focused on digital marketplaces and preventing counterfeits



Top five blockchain opportunities that retailers are pursuing:

- ❑ **Blockchain-enabled marketplaces** Trust in the intermediary (marketplace) is replaced with trust in the underlying code and consensus rules. Blockchain technology allows this verification to be undertaken at minimal costs, even at scale.
- ❑ **Preventing counterfeit products** With the ability of blockchain to track the origin of each part of a final product, it is possible to have an audit trail that is visible to all relevant parties. This ensures the authenticity of goods and reduces counterfeiting.
- ❑ **Inventory and pilferage tracking** End-to-end visibility from suppliers to retailers ensures transparency and authenticity where multiple suppliers are involved.
- ❑ **Tracking returned goods** Blockchain systems help retailers ensure returned goods are tracked back to their suppliers along with contracts to better manage returns.
- ❑ **Loyalty program management** A blockchain-enabled loyalty program can be used to create a single wallet for loyalty rewards, providing convenience to customers and improving trust when multiple businesses are involved in the same program.

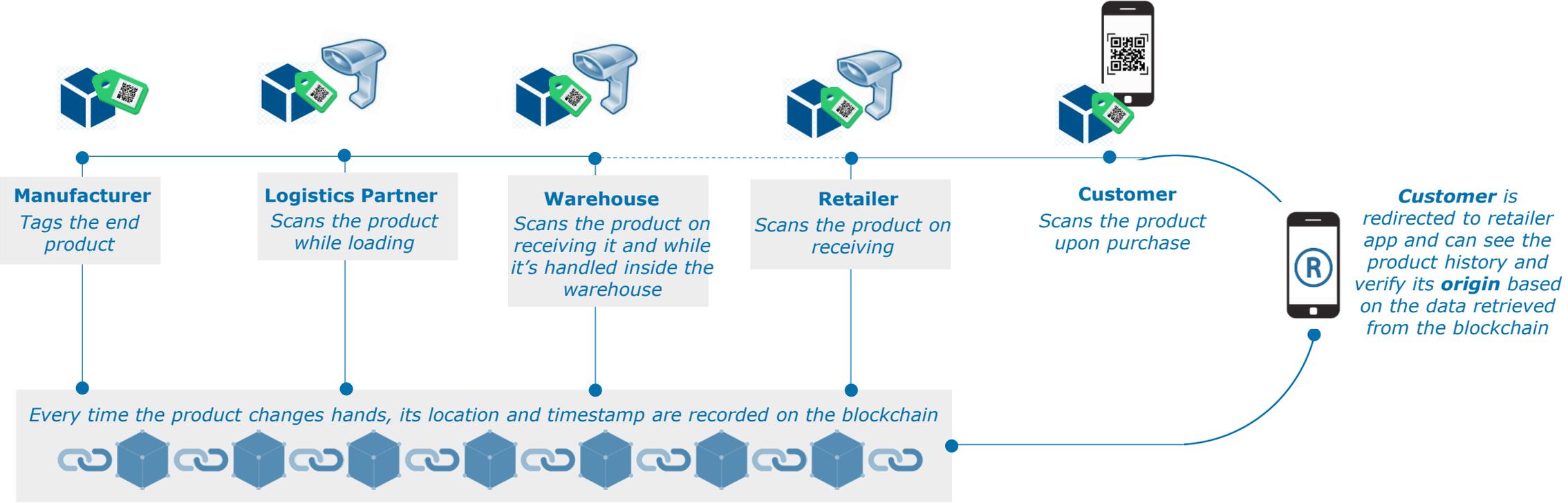
Walmart, Starbucks, Carrefour, JD.com, and Amazon are among the big retail players to have started blockchain trials.

Riznews, "Unbreakable Trust: 5 Retailers Exploring Blockchain," April 2018.

Coupit is an example of a blockchain-driven e-commerce marketplace that is designed to help verify the reputation of buyers and sellers.

Retail TouchPoints, "Coupit Offers Blockchain-Driven E-Commerce Marketplace", July 2018.

Simplified process for tracking products using blockchain to prevent counterfeiting



Source: Capgemini Research Institute.



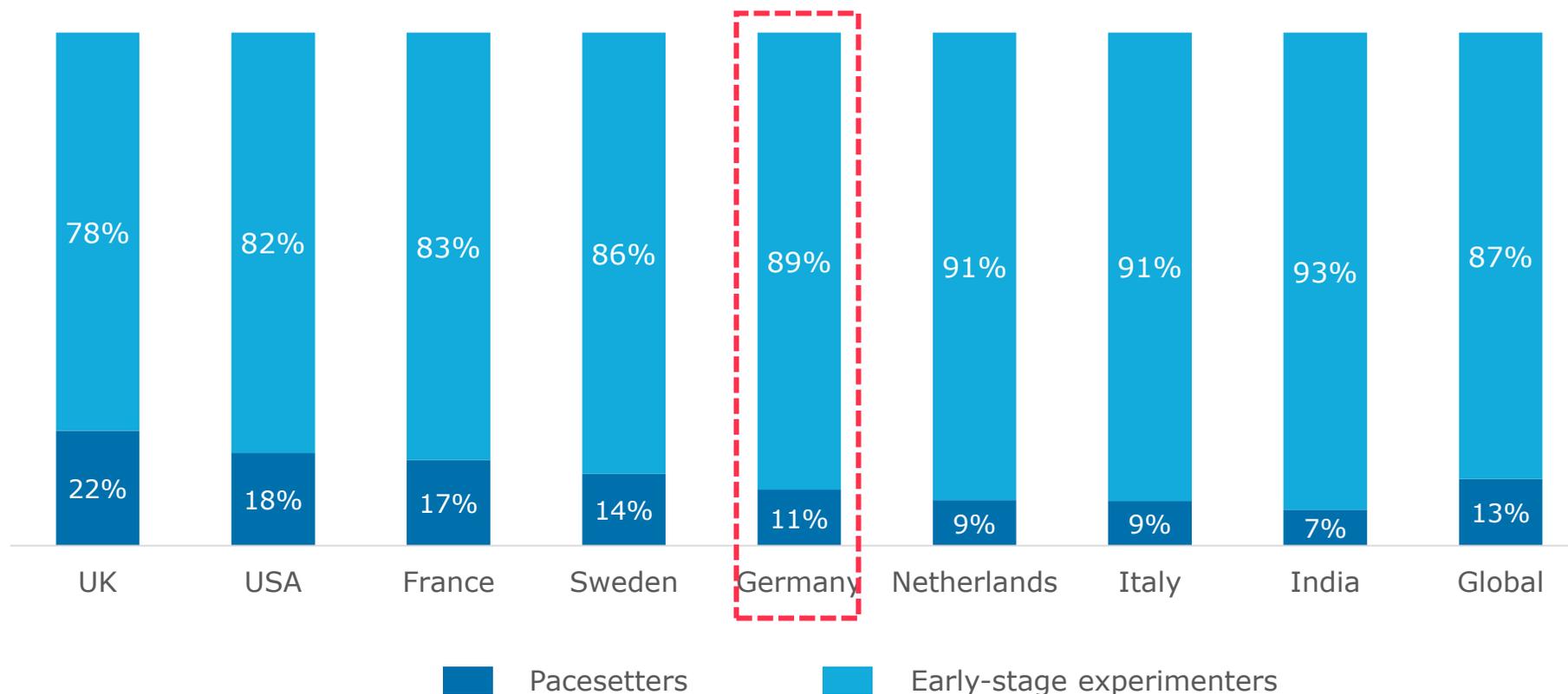
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Who is leading in the blockchain race?

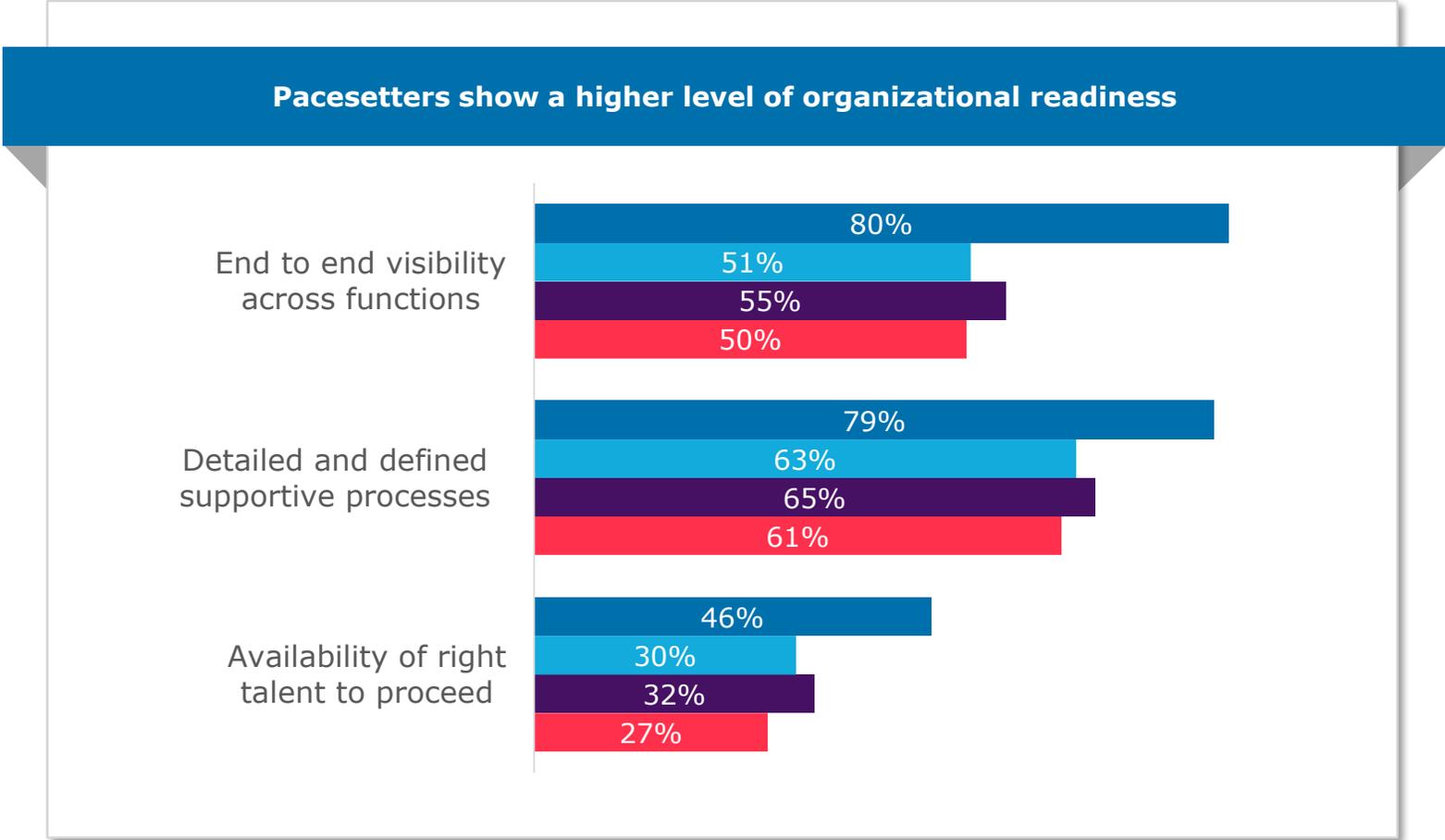


The UK, US and France have the highest proportion of pacesetters

Pacesetters - organizations that have either deployed blockchain at scale (3%) or have pilots in at least one site (13%)



Cross-functional visibility and process maturity differentiate pacesetters



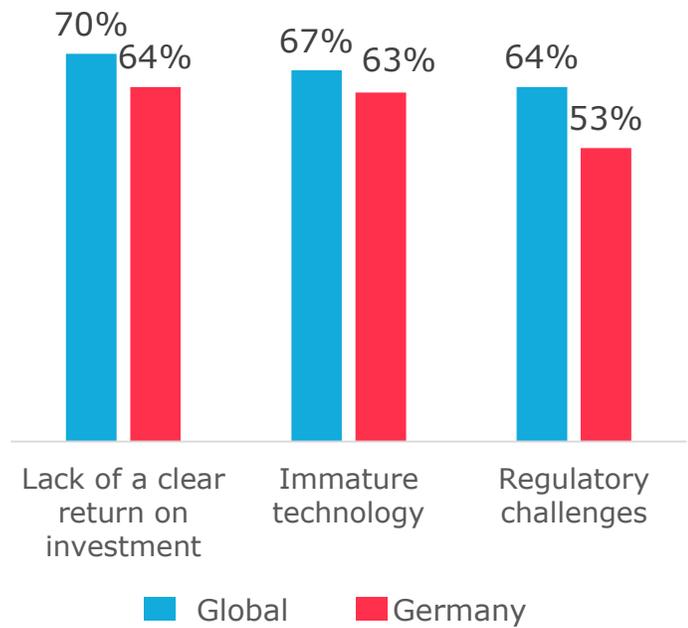
■ Pacesetters (Global) ■ Early-stage experimenters (Global) ■ All implementers (Global) ■ All implementers (Germany)

Source: Capgemini Research Institute, Blockchain Survey; April–May 2018, Global N=447 all organizations, N=61 pace-setters, N=386 early-stage experimenters; Germany N=64 organizations.

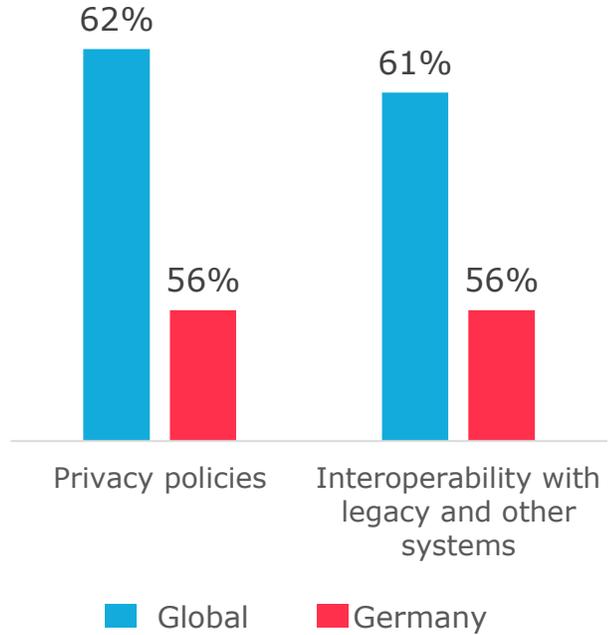
Establishing a clear ROI remains the top challenge for blockchain adoption in Germany



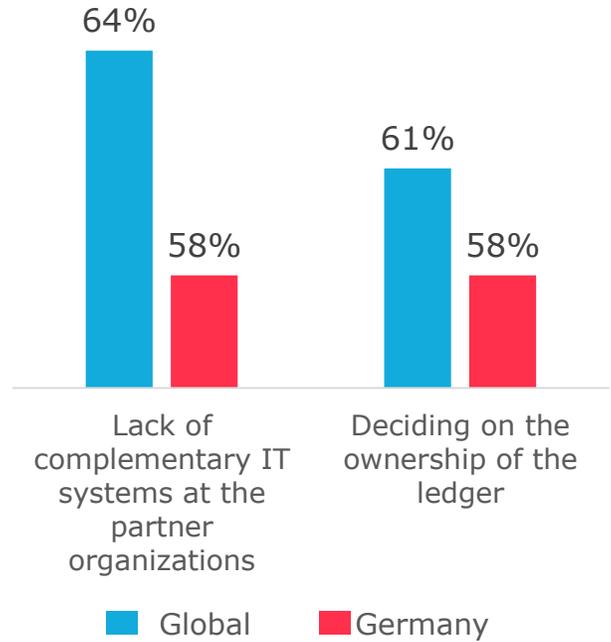
Strategic challenges



Operational challenges



Partner-level challenges



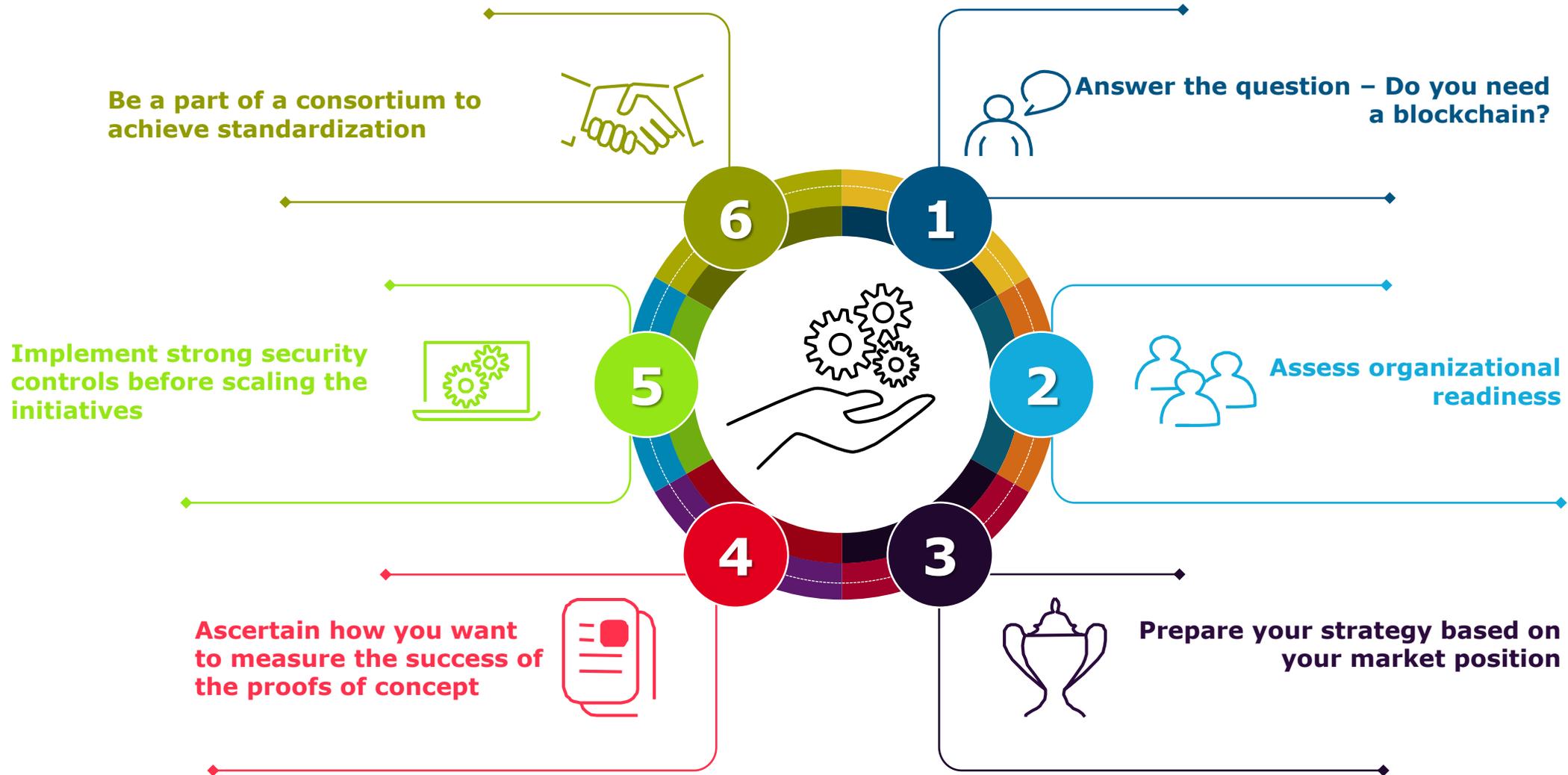


05

Recommendations for a resilient blockchain program



How to implement a resilient blockchain program





Assessing the need for blockchain, current state of your organizational readiness, and shaping a strategy based on your position are critical



Answer the question – Do you need a blockchain?

- Is traceability a critical aspect of your supply chain, is it difficult to achieve with the current set up?
- Would you like to eliminate intermediaries and improve the efficiency of the entire value chain?
- Do you want to benefit from the trust-based business models that blockchain enables?

Assess organizational readiness

- Can your current supply chain solution offer same benefits as those of a blockchain, with some customization?
- Does your IT architecture allow an enterprise blockchain solution to be integrated with minimum efforts?
- Do you have the required skills (such as Solidity) and talent who can lead the blockchain initiative to its completion?

Prepare your strategy based on your market position

Blockchain's many benefits will come to play when all parties – suppliers, carriers, wholesalers, distributors, retailers, regulators and others – are on the platform.

- If you are in a strong position to negotiate with your suppliers rather than distributors, working on getting the upstream partners onto the blockchain



Alternate ways to evaluate success of your POCs, strong security controls and becoming a member of a consortium are equally necessary



Ascertain how you want to measure the success of the proofs of concept

- Reconsider the use of Return on Investment as the sole criterion of success for your proofs of concept
- Assess the success of these initiatives just like venture capitalists assess the successes or failures of their investments

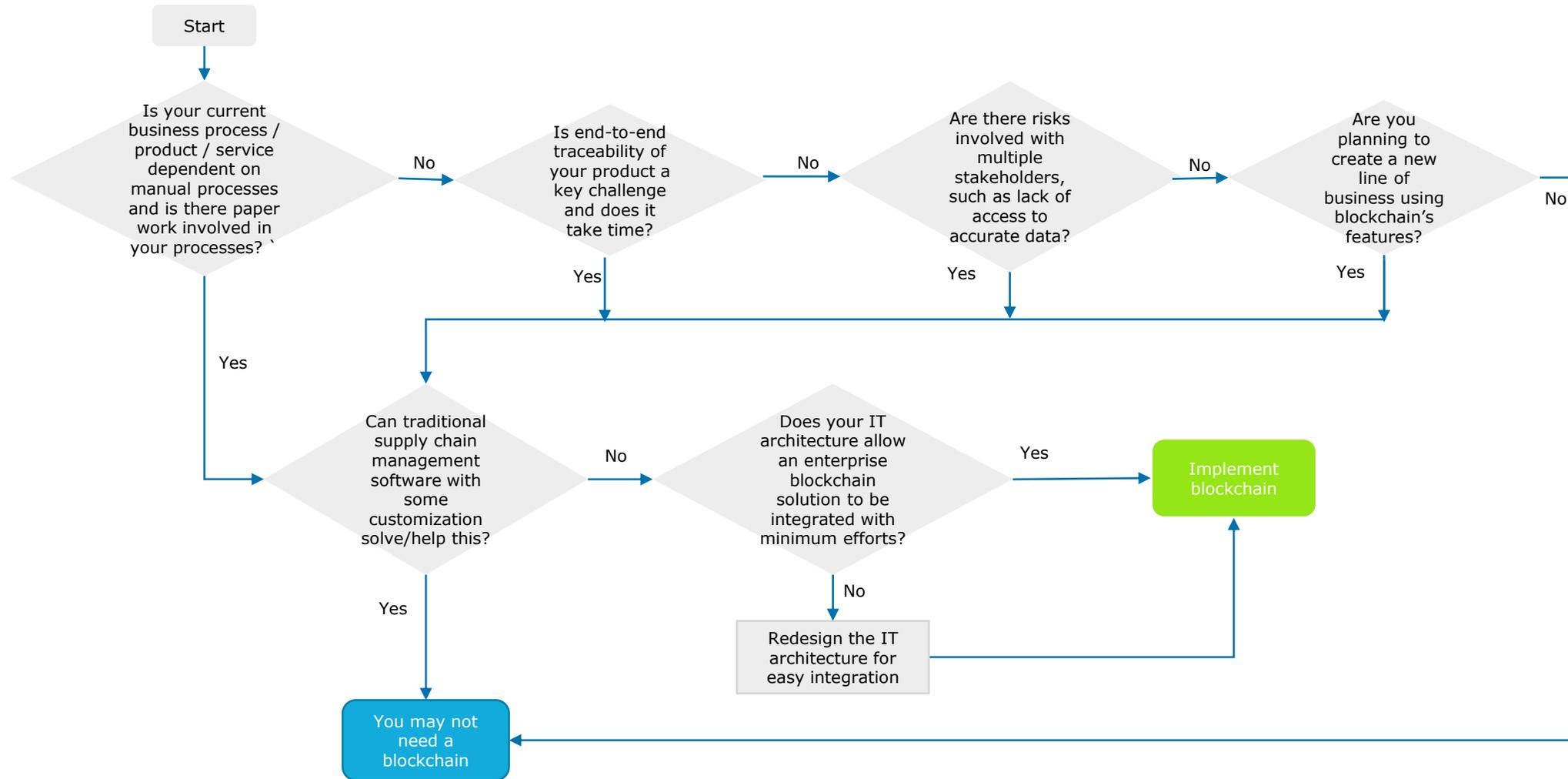
Implement strong security controls before scaling the initiatives

- Focus on the last-mile connection between a physical event and a digitized record of this event and ensure they are tamper-proof
- Organizations should secure all the points of entry and assess the risks before they think of deploying their proofs of concept at a larger scale

Be a part of a consortium to achieve standardization

- To bring out the network effect of a blockchain solution, common business and technology standards needs to get established.
- Organizations should either mobilize a new consortium or be a part of one.

How to evaluate the need for blockchain and assess organization readiness





People matter, results count.



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