

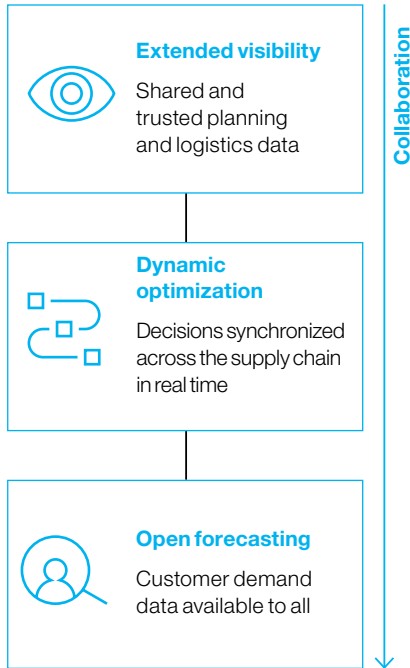


Trust in trade

Toward stronger supply chains

Figure 1

Data doesn't just follow the goods; it becomes an audit trail that promotes collaboration and trust



Trust in trade

The modern supply chain is long on data and short on trust. Historically, mistrust between organizations, including fear that information might be passed on to a competitor has stopped organizations from sharing data. In turn, even when information is shared, it's often not fully trusted.

Blockchains – distributed ledgers that create a permanent and shared record of every transaction associated with an asset – create an unbroken chain of trust. Each record is time-stamped and appended to the event before it. Blockchains have the potential to generate breakthroughs in three areas: visibility, optimization and demand.

Visibility: Planning with greater certainty

Even with an abundance of data, supply chains are replete with blind spots. Has our supplier sent a full order? Did the ship depart the port on time? Blockchains can reveal where an asset is at any point in time, who owns it or is handling it, and what state it's in. With that data, organization can better predict when goods will arrive and in what condition. Benefits accrue up and down the supply chain, from just-in-time planning and inventory management to dispute resolution, reduced wastage and quality controls.

Absent access to reliable real-time data, handoffs can become invisible, bottlenecks emerge, inventory levels rise or fall to sub-optimal levels, lead times extend. Even organizations that have mastered visibility within their organization can't see around all corners, particularly when goods are in transit. Transport remains highly dependent on a flood of paper that is often never digitized.

Sending a bulk shipment of flowers overseas can generate as many as 200 paper documents from a dozen vendors. The document that certifies goods such as flowers to be hygienic and insect-free must be stamped and signed by numerous agencies, and then transported separately by air to the import destination because customs agents don't trust a scanned version. One small error on paper documents like these can result in delays that spoil a shipment or hold up payments.

Likewise, multiple parties, including exporters and importers, insurance companies, customs agents, terminal operators, freight forwarders, carriers and more, use the bill of lading. Typically, the bill of lading is couriered overnight after the seller receives word that the shipment has arrived. Any time a document needs to be shared with multiple institutions, putting that record on the blockchain can create significant savings in time and cost.

Data records on the blockchain can be accessed only by authorized participants; this can be all participants or only those that need a particular portion of the data. Data ownership and access can be anonymous yet securely identified between partners who require verification. In short, it can be widely shared and protected at the same time.

Greater visibility, fewer disputes

The IBM Global Financing Unit extends credit to thousands of partners who purchase from IBM suppliers. It has piloted a blockchain for dispute resolution that can handle the 2.9 million transactions that lead to an average of 25,000 disputes annually and tie up about USD 100 million in capital. By transferring data to the blockchain, IBM expects to reduce the time to resolve disputes from more than 40 days to fewer than 10, improving capital efficiency by 40 percent.

Blockchains create visibility into where things are, but also traceability, showing where things have been. Wheat, for example, could be tracked from the farm to the ship container to the factory floor to the loaf of bread on a shelf. Organizations are already testing sensors that monitor crop conditions and record them on the blockchain. Long before the wheat arrives on the factory floor, managers could access data on attributes like moisture content, or whether it has been genetically modified and plan accordingly.

Tracking the provenance of goods on the blockchain reduces risk and raises the bar on quality in production and distribution. Manufacturers can know that the metal they receive has the right mixture of alloys. Buyers can ascertain whether the wine or medication has been shipped at the proper temperature. Wastage, spoilage and defects are diminished; so too are fraud, theft and counterfeiting.

Combining RFID tags with blockchains, one UK start up, Provenance, is certifying seafood as it is sustainably harvested off the coast of Indonesia and transported to the most demanding purchasers in the industry – sushi-traders in Japan.¹ Also in the UK, Everledger is helping companies track the provenance of diamonds, replacing paper documents – that are easily forged and separated from shipments – with data on the blockchain that can trace each individual diamond.² “Blood diamonds,” produced by forced labor, can’t enter the market. A stolen diamond can be traced in perpetuity, easing the risks for insurers.

Today, intermediaries perform any number of roles to create trust in the supply chain. From certifying goods as safe or regulatory compliant to financing and executing payments as goods change hands, trusted intermediaries reduce risk – but also erode profits. As provenance is verified on blockchains and organizations extend their line of sight, accountability and trust between peers becomes more assured. Intermediaries that exist solely to establish trust will need to find new roles or risk disintermediation.

Optimization: Ready for real time

The foundation for supply chains on the blockchain is being laid today with optimization, the next step after visibility. To minimize disruptions, for example, Toyota expects use blockchains to track the thousands of parts that travel through countries, factories and suppliers to manufacture a single car.³

Optimizing a supply chain on the blockchain makes new things possible, such as the real-time synchronization of decisions with supply chain partners. A supply chain with continuous, real-time access to a chain of events can optimize iteratively. Aware ahead of time that a supplier's shipment is actually a partial order, the organization can take steps to reshuffle internal inventory, complete it from a different supplier or adjust pricing. It can re-route a container to a different warehouse, even share a warehouse, truck or loading dock to optimize efficiency.

Ultimately, the audit trail established by a blockchain creates a wider circle of trust. If a partner assembles parts on time, that event becomes part of a permanent record. Reputations established on the blockchain open up supply chains to new partners, including small and startup

organizations. They make it easier for organizations to switch partners midstream if needed.

Information can be more widely shared to enhance decisions at all levels of the supply chain and optimize in the moment. Information can even be dynamically permissioned. The contents of a container, which are typically not shared with dockworkers out of concerns about theft, could be shared as circumstances warrant. In the case of a storm or strike, containers on the dock that hold goods subject to damage could be prioritized and safely stored, and as operations resume, optimized across facilities to avert delays.

By giving intermediaries information about contents as needed, goods might be redirected based on multichannel demand changes. Security authorities could access additional information in the event there is a concern, avoiding the delay of opening containers for inspection.

Dynamic optimization requires massive collaboration; its fullest potential is achieved with broad participation across the ecosystem, including everyone from manufacturers to carriers to authorities to customers.

How can you create value, collaborate and compete with blockchains?

Organizations looking for new ways to create value, collaborate and compete must consider the following questions:

- Which of your existing partners and what other institutions need to participate in the blockchain to make it worthwhile?
- How much and which data should you reveal and to whom?
- What data do you have that might have value to others and is there a way for you to benefit from that value?
- Which intermediaries in your ecosystem exist simply to certify trust or handle complexity?
- How would new access to customer – or supply chain partners' – demand signals change my operations?

Forecasting: Open to all

Customer replenishment systems to predict demand have created huge efficiencies for some, but remain bounded by a number of constraints. Point of sales data from smaller retail outlets or other points of distribution may not be available. The data the manufacturer receives is rarely shared with other participants in the supply chain. In short, demand forecasting leaves too many in the dark.

Because data on the blockchain is widely accessible, demand data like customer purchases could be instantaneously available to every participant in the production or distribution network. So when a dishwasher is purchased, the manufacturer and all of its partners, from parts suppliers to service vendors and shippers, could have access to the data as soon as the retailer does.

Synchronous access to data could democratize the art of forecasting, which is too often confined to large manufacturers and retailers. Shippers, for example, almost always receive orders only a few days in advance. This makes it difficult for them to optimize cargo or infrastructure, let alone aggregate the kinds of data they would need to forecast capacity.

The new art of collaborative forecasting will no doubt be heavily dependent on advanced analytics and cognitive systems to make sense of abundant and instantaneous data. It will benefit from the aggregation of data concerning events like weather or promotional campaigns, a sudden disruption on a factory floor or political strife in a region. But even without those factors, open access to verifiable demand signals can be applied to great effect today. Demand data on the blockchain could eradicate one of the more intractable challenges of the supply chain – the bullwhip effect, where orders are inflated as they move upstream, obscuring demand, inflating inventories and diminishing fill rates.

Recommendations

Turn to trust

Blockchains confer trust in data and the organizations you work with. Look at your organization from the perspective of trust. Determine which parts of your operations require the highest levels of trust. Seek new partners based on confidence in their data and their promises. If you work with intermediaries whose only role is to “certify” trust, blockchains could obviate that need.

Mind the data gap

A blockchain is as good as the data it shares. Identify the data somebody else has that you don't – and which you need most to change your bottom line. Seek partners that could benefit from data you've not previously been comfortable sharing or not had an easy way to share. Blockchains could bridge those areas where you have a data gap – whether you'd like to receive or share.

Advantage everyone

By introducing efficiencies to all possible players, blockchains may level the playing field. Organizations accustomed to competitive advantage from their supply chain may need a new approach for differentiation. One place to start: transforming the supply chain not simply for efficiency, but to create new and differentiated value for customers and partners.

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