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D!igitalist
Magazine

How blockchain is revolutionizing supply chain management

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1 | How blockchain revolutionizes supply chain management

Nearly all of the world's leading companies run computerized enterprise resource planning (ERP) and supply chain management software. From connected manufacturing equipment to digital shipping notices and RFID scanning, products are tracked on computerized systems from their earliest origins, often all the way to the recycling bin.

Yet despite this huge investment in digital infrastructure, most companies have only limited visibility and insight into where all their products are at any given moment.

The culprit, in most cases, is the analog gaps that exist between systems within enterprises and across enterprise boundaries. Production may be recorded digitally, but the moment it moves to shipping, a PDF document is created for the shipping label that is little more than a software copy of a printout. The shipment may have its own digital number, but that number tells you where the box is and who signed for it, not what is actually in the box. And so on down the road: oceans of digital data but only islands of useful information.

This is not a new problem, and companies using systems like electronic data interchange (EDI) and XML messaging try to maintain information continuity across system and enterprise boundaries. But point-to-point messaging systems have

their own issues, as they are often out of sync and move data only one stop down the supply chain. The result: inventory that seems to be in two places at once.

These systems were created for an era of big, vertically integrated companies with large, but mostly static supply chains. They were very relevant 30 years ago, but not so much today.

The advent of huge, dynamic ecosystems

Two big transformations have swept through global supply chains recently. First, supply chains are no longer traditional networks of OEMs and suppliers. Now they are vast ecosystems, with many product variants moving through multiple parties, all trying to coordinate work together. It's not uncommon for a single company to have multiple contract manufacturers, all drawing upon a similar supplier network and feeding a range of distribution models, from traditional retail stores to online consignment services.

Secondly, supply chains and operations have become increasingly dynamic. Product lifecycles are shorter, and ramp-up and ramp-down periods are more intense.

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Even as supply chains have transformed, companies have not updated the underlying technology for managing them in decades. With blockchain technology, companies can rebuild their approach to supply chain management at the ecosystem level and go from islands of insight to an integrated global view.

Trustworthy truth without trusted intermediaries

Everyone loves to hate middlemen, but it turns out they are really useful. Until the advent of bitcoin and blockchain technology, the only way you could get a large number of entities to agree upon a shared, truthful set of data, such as who has what bank balance, was to appoint an impartial intermediary to process and account for all transactions. Blockchains make it possible for ecosystems of business partners to share and agree upon key pieces of information. But they can do it without having to appoint an intermediary and deal with all the complex negotiations and power plays that come with setting the rules before handing over really critical business information. Instead of having a central intermediary, blockchains synchronize all data and transactions

across the network, and each participant verifies the work and calculations of others. This enormous amount of redundancy and crosschecking is why financial solutions like bitcoin are so secure and reliable, even as they synchronize hundreds of thousands of transactions across thousands of network nodes every week.

The core logic of blockchain, applied to the supply chain

Apply that same security and redundancy to something like inventory, and substitute supply chain partners for banking nodes, and you have the foundation for a radically new approach to supply chain management.

The use cases for this new way of working are compelling. At its most basic level, the core logic of blockchains means that no piece of inventory can exist in the same place twice. Move a product from finished goods to in-transit, and that transaction status will be updated for everyone, everywhere, within minutes, with full traceability back to the point of origin.

Do you want to negotiate procurement deals based on total ecosystem volume – not just what you buy from a

supplier, but what all your partners do as well? With a blockchain-based solution, you can calculate the exact volume discount based on total purchasing. You can mathematically prove the calculation is correct. And you can do so even while preserving the privacy of each company’s individual volumes.

Promising pilots

The added transparency offers proof about how goods were sourced and how they comply with regulations. The physical, financial, and digital information is brought together in one platform to reveal sources of value leakage – from everyday inefficiencies to fraud and abuse – and helps you hone new strategies to combat them.

Blockchains are still new technology, but the early results EY is seeing in pilots with clients suggest big benefits and the opportunity to recast how we approach these problems, from point-to-point integration to ecosystem-level thinking. We expect to see significant strategic transformations and fairly quick tactical returns as these solutions gain traction. I’ll examine both areas in more detail later in this series.



This article was originally published in *Digitalist Magazine* on August 23, 2017.



2 | The power of a blockchain-enabled supply chain

Through blockchains, companies gain a real-time digital ledger of transactions and movements for all participants in their supply chain network. But don't let the simplicity of the tool overshadow how transformational it is. The benefits to be gained will save you time, money, and effort on several fronts – and have the potential to redefine how you do business.

Procurement: more visibility and more savings

Companies negotiate procurement discounts based on the total number of purchases they drive. Your business may ask other people to do purchasing on your behalf, but the consequence is that it's hard to keep track of the volume you drive across subsidiaries, business partners, and everyone else in your supply chain network.

Blockchains make that simple. With a constantly refreshed digital ledger that incorporates data from all your relevant partners, your company can see the total volume regardless of who directed the purchase activity – without each user having to share its operational data with the others.

Without a blockchain, companies hire many people to audit their orders to capture these volume-purchase

benefits. Large businesses can have dozens of professionals spending days and nights to audit each one to add up all the gains they're supposed to receive. (For example, EY assisted a large consumer goods company that had 60 people devoted to this task.) But blockchains do this work without the staff and without any added time, eliminating the extra price-verification process.

Data and analytics: better data, better outcomes

The oldest phrase in computing is "garbage in, garbage out" – and nowhere does that apply more strongly and more expensively than in supply chain management. To compensate for uncertainty in how much product or material is in different locations – how much actual demand there has been in a period of time – companies put in extra inventory.

And while that inventory is often cheaper than a lost sale, it's far from free. In the technology industry, it is often estimated that keeping \$1 of inventory costs 20 cents to 40 cents per year, when you account for both the cost of capital and the rapid depreciation of technology products.

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With blockchains, through the ability to track and manage resources at the ecosystem level, the payoff should be much greater accuracy and, from there, better forecasts, and the need for less inventory to maintain the same service level.

Digital contracts and payments

The average U.S. Fortune 100 company has more than 60 days of sales outstanding. That’s how long it takes for companies to get paid after completing a task or delivering a product in the real world. What’s odd about this statistic is that nearly all these companies are interacting with each other in contracts that specify payment upon receipt or, at most, within 30 days.

The gap between contracts and reality comes because payments, though themselves digital, are separated from contract performance by an “analog gap.” That is, work is done and invoices are generated, which are emailed to customers, who, in turn, enter them manually and decide when and how to pay them.

Smart contracts to end costly procure-to-pay gaps

The result is a ridiculous and insanely expensive dance as suppliers politely call and nudge customers to pay, while customers aim to cash in on the float by entering and processing invoices at a snail’s pace and occasionally “losing” them. Blockchains can put an end to that by integrating delivery and payment in digital contracts that flow across enterprises and integrate with logistics partners and banks.

Using smart contracts, where the terms are payable upon receipt, a proof of delivery from a logistics carrier will immediately trigger automatic digital invoicing and payments through the banking system, with no analog gap between customer and supplier. The result has the potential to radically reduce working capital requirements and dramatically simplify finance operations, with a direct impact to the bottom line.

Putting a stop to the rogues

Blockchains give these supply chain networks the chance to create one shared truth without one all-powerful, centralized intermediary. Each participant has a copy of the ledger, and all transactions and movements are part of that ledger. If any participant tries to game the system or perpetrate fraud, that company is manipulating only its ledger and is immediately out of sync with the rest of the ecosystem, a powerful deterrent to bad behavior.

Sounds good, right? So what’s the catch? You may be thinking that the blockchain is yet another “solution” in a long line of others you’ve purchased, and that you’re not ready to rip everything up and start again. The good news: you don’t have to. I’ll discuss how you can seize upon the supply chain of the future in the last article in this series.



This article was originally published in *Digitalist Magazine* on August 30, 2017.



3 | Integrating blockchain into your supply chain doesn't need to be complex

Better visibility into procurement, more accurate and reliable data for analytics, and increased trust among all participants in your supply chain network are some of the benefits of adding blockchain to your infrastructure. But how much will it disrupt your current way of doing business? You may be understandably wary about the costs and potential turmoil behind yet another piece of technology.

It's important to clarify that the blockchain isn't merely a prerequisite piece of software to buy. As an integrative technology, its underlying logic and processes force data to become synchronized – and that allows companies to capture the broad benefits I described in Part 2 of this series. So don't think of it as a hurdle or just another program to learn that needs to be integrated into your current system. It's actually the opposite: a solution to your current fragmented infrastructure.

Plugging into your existing infrastructure

The blockchain essentially functions as a layer supplementing your existing enterprise resource planning (ERP) software. You can still see your existing user interface and business process. But now, when you look at inventory, you see everyone else's alongside your own. And instead of a placeholder of a price, the actual price based on the consumption of your supply chain network is available.

Done properly, a blockchain installation slots into your workflow without disruption, so it can feel like you're not really leaving your existing infrastructure. The installation will likely not be as simple as a "one-size-fits-all" approach; it's more like three sizes, depending on your current infrastructure and the smaller partners you may need to set up.

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To accommodate your other partners, the blockchain can be built into a Web interface to use, also relying on electronic data interchange (EDI) connectors. These connectors take the messages from disparate systems – such as when inventory departs one warehouse and ends up in another that operates under a different platform – and bring them together.

Professional services firms and software companies have made significant investments into developing blockchain capabilities and resources, with the goal of making the process as seamless as possible. For instance, EY recently introduced [EY Ops Chain](#), our in-house suite of applications and services built on open-source blockchain components. The result is that, as an enterprise IT organization, you increasingly have more options to choose from, with your convenience paramount.

How blockchain works in real life: the ROI

What does adding blockchain capabilities look like in the real world instead of just the abstract? EY helped a global manufacturer leverage blockchain technology in its existing environment to solve compliance issues for its procurement/direct-buy processes. These issues stemmed from third-party, pass-through pricing from its suppliers to contract manufacturers, in which audits revealed that the correct pricing was not used, requiring time-consuming reconciliation efforts.

We conducted a proof of concept demonstrating the features required to manage a contract manufacturer supply chain under a blockchain. Then it was a matter of expanding it across their network, reducing value leakage and eliminating the costly price verification process that was eating into the savings

under negotiated pricing agreements.

It’s possible that cost savings just from reduced auditing could cover your entire blockchain investment – but you’re also getting so much more. In an increasingly globalized world, with the speed of business accelerating and data swirling all around us, it’s worth exploring your blockchain options with a trusted advisor.



This article was originally published in [Digitalist Magazine](#) on September 6, 2017.



About Paul Brody

Paul Brody is global innovation blockchain leader at EY. Paul is responsible for driving EY's initiatives and investments in blockchain, playing a dual role as global innovation blockchain leader as well the Americas strategy leader for the technology sector. He has extensive experience in the areas of IoT, supply chain, and operations and business strategy.

As published on *Digitalist Magazine* by SAP
August 23, 2017 – September 6, 2017
at <http://www.digitalistmag.com/tag/blockchain-and-supply-chain>

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EYG no. 05344-173Gbl

BMC Agency
GA 1005915

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