



**Blockchain
and
A Re-imagined Global Supply Chain**

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In March 2016, Blockchain, the Distributed Ledger Technology powering the cryptocurrency Bitcoin, was first written into China’s 13th Five-Year Plan (2016-2020) for the development of information technology, along with other cutting-edge technologies including AI and IoT.

Again in May 2018, in a major policy speech, President Xi Jinping affirmed that Blockchain represents a new generation of technology that will accelerate breakthrough applications, shaping China's pursuit of becoming a global center of science and innovation, a major imperative of the BRI (Belt Road Initiative). Despite China's official sanction on the sales of new digital tokens in the form of ICO (Initial Coin Offering) and halting Bitcoin trading, the country remains a hub of activities for Blockchain technology development.



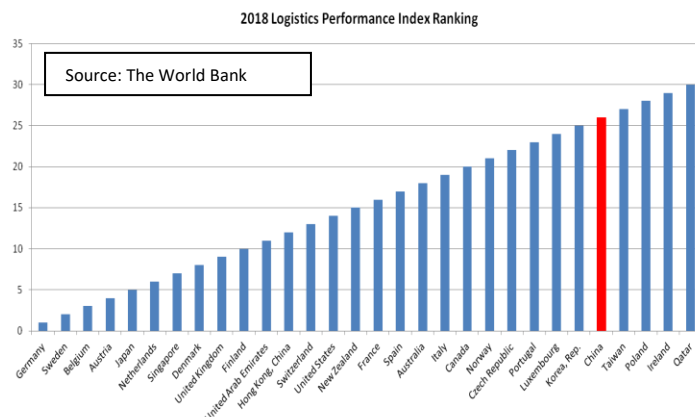
Source: State Council, People's Republic of

China is the world's factory. Despite potential challenger countries from India, SE Asia, and Africa, China will continue to be the world's factory for many years to come. "Made in China 2025" further outlines the ambitious goal of becoming a global player in the production of innovative and modern high-tech products, at a fair price, by the year 2025.

China officially is in a trade war with the United States. As the world becomes increasingly interconnected, the US-China trade relation is no longer a mere bilateral one [Edward Tse, Gao Feng]. While the world watches, the China-US trade friction may escalate before rationality kicks in. However, the intertwined global supply chains, with the myriad web of relationships amongst their global participants, will continue to march on with technologies such as Blockchain, exploiting its many promises, trade war or not.

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Supply Chains in China are enormous and complex. Fueled by the explosive eCommerce growth with the rise of titans such as Alibaba and JD.com, China's logistics market is the largest in the world. Half of the world's parcels are delivered in China. However, China ranked only twenty-sixth in the latest World Bank logistic performance index (LPI). The market is inefficient, low



transparency, laden with crowded intermediaries, and weak provenance governance. As the products and components journey through the supply chain, there are myriad improvement opportunities leveraging many of Blockchain's promises. It is no accident that Blockchain was written into China's 13th five-year plan and

President Xi Jinping included this technology by name in his policy speech. Furthermore, Blockchain has the potential to accelerate the pace of infrastructure development for the economies along the BRI and the potential to make the movement of goods and manpower faster and more economical in a transparent and trusted manner.

What is Blockchain?

Blockchain is a growing list of records, called blocks, which are linked using mathematical algorithms called cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. Blockchain is resistant to modification of the data. Once recorded, the data in any given block cannot be altered retroactively without the alteration of all previous blocks, which requires consensus of the network majority. In their simplest form, Blockchain is the digital equivalent of a 'ledger', for recording and verifying transactions and terms of engagement. The transactions can be any number of things: who owns a specific asset, where is the origin of the asset, who bought a particular product from whom, who shipped the product, who received the product, what quality assurance steps have been performed on the product, etc. Depending upon the type of implementation, participants in a Blockchain can be either identified (permissioned Blockchain) or anonymous (permissionless Blockchain).

Supply Chain and Quality Management

Supply chains often involve many stakeholders with complex interactions amongst each other resulting in extremely complex logistics management challenges. Ideally, every interaction point between two stakeholders in the supply chain should be authenticated, verified, and transparently recorded in an immutable manner (unalterable after the fact).

Quality has always been fraught with challenges for MNCs manufacturing and sourcing in China. The common challenge is that Chinese suppliers do not always adhere to agreed upon standards. As China's supply chain matures, more suppliers are embracing ISO standards - ISO 9001 Quality Management and ISO 14001 Environmental Management. Today, China is already the world leader when it comes to the number of ISO 9001-certified companies. More than 30% of all ISO 9001 certificates worldwide were issued in 2016.



Source: International Organization for Standardization

ISO 9001 Quality Management certification does not guarantee product quality. Conventional supplier governance consists of sporadic assessments, evaluations, and audits. Even with vigilant governance, if a supplier determines to do so, it is still relatively easy to skip processes, diluting quality, or even counterfeiting and passing them off as authentic products. Many

companies still lack effective measures for assuring the quality of their goods, ensuring the components meet the required certifications, and ensuring the provenance of the components (make sure they aren't counterfeit or grey market). Some suppliers refrain from the agreed upon QA measures to reduce costs or use different materials from those stated in the contractual agreements. Not only this is bad for business, it is also a public safety issue. Blockchain can provide an immutable proof that the information claimed in relation to a product or manufacturing process is accurate and not fraudulent. It can record the origin and the manufacturing material of the part, what process and testing procedures performed, and when. Currently buyer can only 'trust' the supplier. With Blockchain, they can trust and verify to a single source of the truth.

Reimagining the Global Supply Chain - Based on 'Trust'

Traceability and transparency are some of the most important foundations of supply chains and logistics. In January 2018, IBM and Maersk announced an industry wide collaboration to explore Blockchain in transportation and logistics. Last month, TradeLens was introduced, a Blockchain based shipping solution that promises to "*promote more efficient and secure global trade, bringing together various parties to support information sharing and transparency*". [IBM, Maersk, TradeLens] This week, Walmart, the world's largest retailer and grocer, announced that they will require their produce supply chain to use a Blockchain database to enable greater traceability and transparency in the name of food safety. [Walmart, Blockchain, Food Safety] Blockchain brings trust, transparency, and accountability to the data it stores. Blockchain can help prove the quality of products, where they come from, how they were sourced, and where they have traveled. The increase in the number of collaborators requires a corresponding increase level of transparency and trust among participants.

Quality Assurance (QA) discipline enables product and services to be delivered to a 'quality' level that is governed by the supplier's internal standard, industry regulation and the buyer's expectation. The rigor of these QA processes depends on the nature of the industry and the product. Blockchain will not improve the product quality. The information each block holds is only as good as the data it captures. However, Blockchain will be able to provide a traceable, verifiable and immutable record of the QA processes the supplier and buyer mutually agree to: what was the origin of the material, how was it manufactured, what were the QA processes performed, and what were the test results, as the products and components journey through the supply chain.

Call to Action - Respond, Lead or Do Both

While there is no crystal ball on how a transformative and disruptive technology like Blockchain will come to pass towards a re-imagined global supply chain, one thing we do know: Blockchain

as a technology itself is about creating trust, lowering the cost of trust and democratizing trust. In supply chain and logistics, using Blockchain to enable disruptive breakthrough applications delivering 'trust', will challenge the existence of the traditional custodians of trust. Blockchain enables the establishment of trust between peers. Intermediaries whose sole existences are to establish trust between parties will need to find new roles in the re-imagined global supply chain. This is an existential challenge to many intermediary businesses who are thriving under the inefficiencies and lack of transparency environment. There are major obstacles to overcome before Blockchain can deliver a 'Trusted Network' to participants in manufacturing, supply chain and logistics. Furthermore, in addition to quality, many businesses are pursuing other causes such as environmental stewardship and sustainable manufacturing practices. With its immutable records, Blockchain can help the tracing of a product, component or commodity through a supply chain to determine whether the product meets the criteria of an eco-label and that the certified product is identifiable. For example, a piece of timber was trustfully harvested from a sustainable forest.

As China transforms from the world's factory to the world's innovation incubator, manufacturers should take steps to leverage the promises of this transformative technology Blockchain in their supply chain management (SCM), quality management system (QMS) and logistics. A sea-change digital transformation is taking place. Whether it is a hybrid digital and paper supply chain or a fully digitalized supply chain, it will require certification, identity verification, and trust. Many of these initiatives are high on data and low on trust. Because trust is expensive. It is never too early to start lowering the cost of trust. When trust goes up, value goes up. Blockchain is not a silver bullet. Implementation of a newer technology such as Blockchain will require corresponding investment in organizational and operational transformation. In the era of open innovation, pro-active efforts on Blockchain to ward off FoMO (Fear of Missing Out) is relatively inexpensive. Participants in manufacturing and supply chain should embrace the promises of Blockchain and its many potential benefits by either respond, lead, or do both. Alternately, a wait-and-see attitude can end up being quite costly.

About the author:

Yuen H Lee is an Executive Vice President at Augmentum, Inc., responsible for worldwide sales and marketing. Mr. Lee has over 35 years of experience in systems development, sales, marketing, general management and cross border global transactions. Throughout his career, Mr. Lee pursued a methodology of co-innovation and co-creation with many clients in the logistics, financial, education and hospitality sectors, to achieve business imperatives with measurable results. Mr. Lee leverages commercial off-the-shelf technologies as well as exploring advanced technologies such as machine learning, predictive analytics, cloud, IoT and Blockchain to deliver true business values. Mr. Lee received a MBA from UCLA Andersen School of Management and a Bachelor degree in Computer Science and Engineering from the Massachusetts Institute of Technology.

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