



BLOCKCHAIN

POWERING PORT COLLABORATION

Wolfgang Lehmacher, Author, Global Executive, Advisor, Entrepreneur, and expert in the field of Supply Chains, Transport and Logistics, The World Economic Forum (WEF)



The world has become a system of interconnected systems brought on by the Fourth Industrial Revolution (4IR). Extensive connectivity should, in principle, improve and reinforce collaboration. Advantages and benefits of business collaboration, whether vertically, horizontally or in geographic areas, have been demonstrated. Vertical collaboration, i.e. the alignment along the chain of suppliers, manufacturers, sales channels, customers and consumers is simply a necessity. Geographic collaboration, e.g. in cities and corridors, is promising but in its digital infancy. Horizontal collaboration is an exception with high potential. In the port industry collaboration can reduce congestion, improve safety and security, and make the flow of goods more even and fluid.

Our new interconnected environment needs one ingredient as old as time: Trust. Blockchain, the most well-known of enablers of distributed ledger technology (DLT) is seen as the agent of trust in the digital world.

MERITS OF COLLABORATION

Working together is the very nature of business – whether within organizations or between partners along the supply/value chain. Also, competitors collaborate, as liner alliances exemplify. While vertical collaboration is well advanced, horizontal collaboration remains largely untapped. Collaboration, in particular the sharing of transport capacity, can bring opportunities and significantly reduce costs and carbon emissions. While we require a reduction of 40-70% to keep the increase in average global temperature below 2°C, total annual transportation emissions are expected to increase by 70% by 2050, when compared to 2010.

Collaboration in the context of smart city concepts and along corridors can yield significant economic benefits and improve quality of life. Cyber resilience also benefits from collaboration. Exchanging information about risk and mitigation measures is an important part of cyber-strategies, and the better the knowledge and use of digital tools the better our protection.

In ports, collaboration helps to ease congestion. By addressing uneven cargo flows as a collective supply chain issue – caused by weekly manufacturing cycles, the rush in cargo volumes before rate increases, wrongly declared weights, and so forth – collaboration and information sharing platforms can become a significant part of the solution.

HOW BLOCKCHAIN CAN HELP

Game theory demonstrates that it is trust which sits at the centre of successful collaboration. Only trust allows you to maximize the outcome for everyone. Trust is the result of good faith, transparency and integrity, and that's precisely where blockchain and DLT come into play.

As DLT enables the transparency of the transfer of assets and immutability of records within the chain, the distributed ledger can bring a new quality of trust to the cyber-physical world. Transparency ensures the enforceability of rights. Yet 'work in progress' is often the digital identity of goods. It can, however,



be ensured when goods own unique characteristics, such as laser-graved serial numbers or specific chemical compositions.

Blockchain is one type of DLT. In this paper, the terms blockchain and DLT are used interchangeably. They stand for the concept of immutable distributed ledgers. Blockchain can be private and public. The focus here is on the public blockchain/DTL.

DLT-POWERED VERTICAL COLLABORATION

DELL PIONEERED VERTICAL COLLABORATION

Vertical collaboration is a necessity in business. Dell was the first to promote the deep integration of all parties along the supply chain. Since then, vertical collaboration has been further developed thanks to information and communication technology (ICT). The 4IR technologies at large, including blockchain/DLT, will help to bring collaboration to the next level. Information such as the provenance of goods, classification data, tariff codes, import/export data and certificates, manifests and loading lists, customs

values, status information, and all other information about goods within the supply chain ecosystem, will be available for all parties involved at any time and place (through computers or mobile devices).

Blockchain can be used to execute smart contracts. Once data intakes prove that the conditions which are captured in the database/contract have been met, payment can be authorized. DLT promises groundbreaking advances in trade and supply chain finance, resulting in reduced costs, to the benefit of small-ticket transactions and SMEs. Crowdfunding platforms have emerged. Tradeshift, a procure-to-pay supply chain management platform, announced an innovation lab and incubator that will focus on transforming supply chains through emerging technologies, such as distributed ledgers, artificial intelligence (AI) and the Internet of Things (IoT).

While startups are on the rise, traditional incumbents are not inactive. Maersk Line and IBM have announced their blockchain-

powerful trade platform. Hyundai Merchant Marine has completed its first blockchain voyage. Marine Transport International (MTI), in conjunction with Agility Services, has conducted a pilot of blockchain technology which saw a new 'Container Streams' system based on the sharing of data on suppliers, shippers, load points, customs and terminals on a shared blockchain ledger. PSA International, Pacific International Lines, and the Port of Antwerp have also carried out blockchain tests. So, it is clear that DLT-based vertical collaboration tests are in full swing.

GAINS OF GEOGRAPHIC COLLABORATION

Ports are an integral part of their host cities. Central to the smart city concept is the existence of platforms which connect all intelligent things. The aim is to provide benefits for the collective and the individual parties operating in the city, as well as the city dwellers. Citizens expect a high level of service, flexibility and transparency, which requires data flows,

integration, and sharing with confidence across the private and public sectors.

Emerging corridors such as China's Belt and Road Initiative (BRI) require 4IR technology to ensure a new quality of growth. Upgraded technology along the BRI could, for example, level the playing field. SMEs could create market intelligence reports based on real-time market data enabled by the IoT and cloud services. This would help them understand product supply-and-demand dynamics and quickly adjust production plans, track pricing, predict future price trends, as well as identify and react to new market demands that are not fully satisfied. DLT could help these smaller and medium-sized companies reduce counterparty risk and minimize fraud. In all, the market access gains made by SMEs are expected to boost GDP in BRI countries by 4%-7%.

HORIZONTAL COLLABORATION

BCOs can significantly reduce shipping costs and emissions by collaborative shipping, i.e. by pooling their transport needs either on the same lane (bundling volumes) or in opposite directions. When Ocean Spray shifted 80% of its shipping on the New Jersey-Florida route off trucks and into Tropicana's rail cars, the company reduced carbon emissions by 20% and transport costs by 40%. In the US, 15% of trucks run empty while the remaining 85% run at an average capacity utilization of 64%. Global shipping is a US\$60 billion business with enormous potential to move goods cheaper and with less carbon emissions within and between countries and continents.

Leveraging the potential requires that companies overcome inertia, corporate beliefs and risk aversion, and move towards actively exploring collaboration opportunities. While leaders will continue to push digital integration and startups offer match-making and collaboration platforms, industry digitization will help to find the right collaboration partners. Leadership has to face the fear of giving away valuable information to competition, as well as stress the factors companies really compete on. Which is usually product and service design, performance, access, price and after sales and customer service.

A SUPER ROBOT IN THE MAKING

As several examples show, progress is not only driven by blockchain. 4IR technologies rarely come alone. Blockchain reinforces the links created by IoT and DLT sits at the heart of the platform economy, allowing data to flow securely. The platform is the link and structure that connects all intelligent things. It is the medium which

allows IoT to exchange and transact. AI improves the quality of DLT data intake and gives the global 'super robot in the making' its brain. AI decodes text and voice, checks inputs and authenticity, and computes small and big data. For example, IBM Watson helps third parties to optimize their supply chains. Platforms are not just digital anymore. They offer shipping, warehouse space and digital storage capacity – as demonstrated by Ebay and Amazon.

In ports, digital platforms connect people, goods and equipment. All port-related information can be handled on a platform too. Blockchain allows for distributed and real-time multi-party tracking, digitized bill of landings and letters of credit, machine-to-machine (M2M) interactions, and helps to establish a new level of visibility of assets, movements and liabilities.

Blockchain-powered trade platforms, smart contracts, digital wallets and secure digital asset and information transfer, ease maritime operations, as well as unlock new opportunities for all parties and reduce risk. Significant amounts of paper and time can be cut out of administrative and handling processes within the port and in the interplay with the world beyond the gate. Without the concept of blockchain it would be hard to imagine an autonomous supply chain, economy or port.

A PINCH OF SALT

Blockchain is not beyond criticism, however. Some claim that after years of relentless efforts and billions of dollars invested, the technology has not yet reached scale. That its 'success' is largely limited to bitcoin and currency speculations. Further, the high number of blockchain startups can be seen as sign of its immaturity.

But business lacks trust and inclusiveness. Blockchain is able to fix this. It is a concept which allows peer-to-peer transactions – a surefire route to a more inclusive world. DLT is an idea which is here to stay, independent of its final form, as the burgeoning cyber-physical world requires reliable tools of trust.

Blockchain/DTL is a disruptive 4IR technology attracting many entrepreneurs and significant funding. It will disrupt all industries. It is just a question of time. Other industries have shown how new entrants and technologies can dramatically change the game, so the private and public sectors need to prepare for change and its consequences.

CONCLUSIONS

With its dynamics and speed, 4IR leaves no room for inaction. But what measures are

appropriate to stay in the game without doing too much harm to culture, people and finances? What should businesses and governments do to set themselves up for long-term success? There are myriad directions leaders can opt for. However, before they do, they need to upgrade their legacy IT systems and define a DLT and 4IR technology roadmap, explore strategic partnerships, and design an operating model that allows swift adaptations.

Blockchain is a key enabler of trust and inclusiveness. Two qualities desperately required in today's fractured and volatile world. BCOs, government agencies, carriers, and all the other service providers and players operating in ports, will have an increasingly hard time ignoring the risks and new possibilities brought by the 4IR. Most of us are not only interconnected, but increasingly interdependent. Digitally enabled collaboration might be forced on us as the new paradigm of doing business. Blockchain is key to this new reality.

ABOUT THE AUTHOR

Wolfgang Lehmacher is an author, global executive, advisor, entrepreneur, and expert in the field of supply chains, transport and logistics. Lehmacher has been involved in various major change initiatives in the supply chain. He has been President and CEO of GeoPost Intercontinental and a Member of the Executive Board, as well as Director: Supply Chain and Transport Industries at the World Economic Forum.

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ENQUIRIES

World Economic Forum Switzerland
91-93 route de la Capite,
CH-1223 Cologny/Geneva
Switzerland
Tel: +41 22 869 1212
Fax: +41 22 786 2744
Email: contact@Web: weforum.org
Web: www.weforum.org