# The Future of Blockchain Within Supply Chain Management

## The Potential Benefits of Blockchain Technology within Qualcomm's Supply Chain Management Process

Final Project Presentation
SCM 6110 – Global Supply Chain Management and Logistics
Professor Dr. Nasrin Mohabbati

By Daniel Marich
May 9, 2023

# Table of Contents

# Part One -
# What is blockchain?

- Blockchain
- Smart Contracts
- Supply Chain

# Blockchain Technology

▶ Blockchain is a design philosophy born during the 2008 financial crisis when Bitcoin was first invented by Satoshi Nakamoto.

▶ Blockchain is a data structure that stores data chronologically in blocks that are chained together in a continuously growing series.

▶ Distributed digital ledger, a specific type of distributed database with no central authority, where participants must reach consensus to record any new input.

▶ A combination of existing technologies (public key cryptography, hash functions and consensus mechanisms) pieced together in an innovative way.

▶ Trust is in software, the complex math, and the system of incentives built into the blockchain

Source: Meyer & Meyer, 2019

# Smart Contracts

▶ A term used to describe computer code that automatically executes all or parts of an agreement and is stored on a blockchain-based platform; Ethereum, smart contracts are executed on the Ethereum Virtual Machine (Levi & Lipton, 2018)

▶ Self-executing program based on if-then logic. For example, vending machines (Pacheco, 2022)

▶ In a blockchain-based smart contract an input to the oracle triggers the action (Levi & Lipton)

▶ Oracles can be scanners, sensors, RFID tags, or IoT devices

▶ The oracle connects the blockchain to real-world events. It allows inputs and outputs from the real world to execute smart contracts

# Supply Chain

▶ Application areas included: traceability, sustainability (reliable supplier data), trade documentation, and dispute resolution

▶ A distributor or middleman cannot send the same tagged or traced product to two places or two customers

▶ History cannot be rewritten but new events that correct old events can be added to the chain

▶ Two Challenges

  ▶ Participants in the supply chain must be willing and able to collect the data.

  ▶ Ensuring data is accurate and remains accurate as the goods move through the supply chain.

Source: Meyer & Meyer, 2019

**Part Two -
The Blockchain Potential**

Incentives

Industry 4.0

# Incentives

▶ Capture operational efficiencies - examples included trade documentation, dispute resolution, and smart contracts in which a blockchain-based system might be able to reduce administrative costs, improve reliability, or accelerate supply chain processes

▶ A blockchain-based system might enable or support product differentiation which should garner a higher price or higher market share; help deeper tier suppliers establish a differentiated market in raw materials that offers a price incentive

▶ Address regulatory mandates related to product safety, composition, and authenticity; end-to-end visibility within the supply chain provides a single version of the truth through secure, tamper-proof data

Source: Meyer & Meyer, 2019

# Industry 4.0 – Smart System Manufacturing

► Future impact of IoT, 5G/6G connectivity, RFID, big data, Robotics, and AI technologies on the manufacturing industry

► Autonomous manufacturing and flexible configuration via a seamless integration of multiple advanced information techniques across all operations of the manufacturing system

► Blockchain can address cybersecurity issues within the manufacturing system

► Enhance system performance through scheduling, planning, and data management
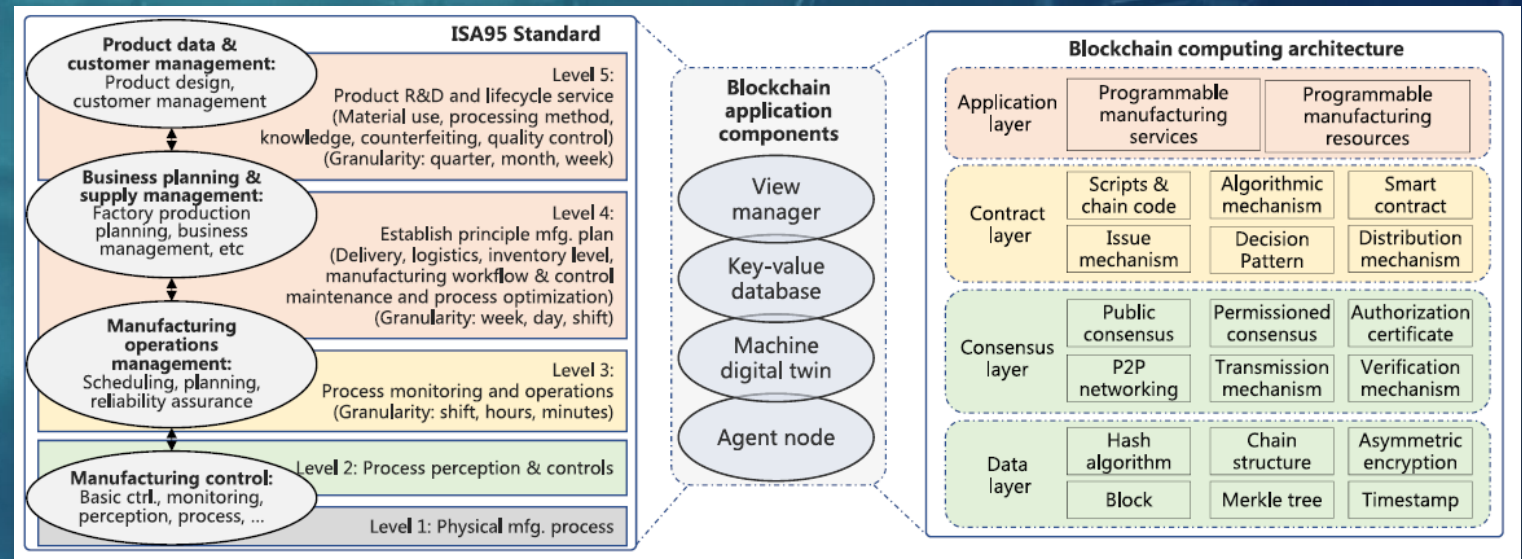


Source: Leng et al., 2021

# Part Three – Qualcomm Recommendations (A Fabless Semiconductor Company)

▶ Embrace blockchain technology as an important and secure technology that can record price, date, location, quality, certification, and other relevant product information (Mirchandani & Kashyap, 2021) which will provide value throughout the semiconductor industry supply chain

▶ Participate with suppliers, partnerships, customers, end-users, competitors, and the government in developing supply chain blockchain technology standards

▶ Embrace blockchain technology as a critical component in securing smart manufacturing systems

▶ Provide support and expertise to suppliers, partners and customers to implement blockchain technologies as the industry begins to transition to the implementation of Industry 4.0 systems

# Thank You!

**References**

Leng, J., Guo, W., Liu, Q., & Cao, W. (2021, June 27). *Blockchain-Secured Smart Manufacturing in Industry 4.0: A Survey*. ResearchGate. https://www.researchgate.net/publication/346376588_Blockchain-Secured_Smart_Manufacturing_in_Industry_40_A_Survey

Levi, S., & Lipton, A. (2018, May 26). *An Introduction to Smart Contracts and Their Potential and Inherent Limitations*. The Harvard Law School Forum on Corporate Governance. https://corpgov.law.harvard.edu/2018/05/26/an-introduction-to-smart-contracts-and-their-potential-and-inherent-limitations/

Meyer, A., & Meyer, D. (2019). *A Consensus on the Truth? Blockchain Applications in Supply Chain Management*. MIT Center for Transportation & Logistics.

Mirchandani, N., & Kashyap, R. (2021, December 20). *Blockchain in the Semiconductor Industry: 5 Innovative Use Cases*. The Manufacturing Leadership Council. https://www.manufacturingleadershipcouncil.com/blockchain-in-the-semiconductor-industry-5-innovative-use-cases-24859/

Pacheco, G. (2022, September 12). *10 Examples of Smart Contracts on Blockchain*. TechTarget. https://www.techtarget.com/searchcio/feature/Examples-of-smart-contracts-on-blockchain

Shafigh, F. (2023, April 20). Personal communication [Personal interview].