Build it on Blockchain

A sustainable palm oil industry

wipro

The production of palm oil has risen to unprecedented levels in the past decade to meet its consumption demand. As a result, there is a great deal of public scrutiny into its use, environmental impact and the sustainability of its supply chain.

The industry's initiatives to address growing concerns by developing sustainability benchmarks have made some headway. For example, the Roundtable on Sustainable Palm Oil (RSPO)[1] works to implement best practices in production and trade, while leading brands have pledged to be committed to 100% RSPO-certified palm oil and oil products. However, despite their best efforts, only 17% of global palm oil production is certified sustainable[2].

In reality, the supply chain is still relatively opaque, making it hard for regulatory bodies to ascertain whether a producer is genuinely sustainable and for consumers to know they are buying ethical products. There is no foolproof system to trace back the produce to the plantation, and traceability is still in its infancy—and in many cases almost impossible.

However, there's good news for producers, regulators, and consumers. Emerging technologies like Blockchain could have a transformative impact on the palm oil industry–not only by creating near-perfect transparency in the supply chain, but also creating value for its stakeholders, both upstream and downstream.

Blockchain to the rescue

The financial services industry has already embraced Blockchain technology to create more transparency in its transactions and reduce leakages. What's more, there is a precedent for the use of Blockchain in building sustainable supply chains. British technology platform Provenance piloted the use of Blockchain to bring greater transparency to the controversial tuna fishing industry so that the entire sourcing process—from farm to table—was visible to every stakeholder in the supply chain.

We believe that by 2030, the use of Blockchain combined with smartphones, RFID, IoT networks and mobility applications could create a palm oil trading industry with near-perfect sustainability records. While we may realize this vision earlier, there are real technology adoption challenges in palm oil-producing countries that must be factored in.

What is a Blockchain?

Simply put, a Blockchain is a tamper-proof, encrypted database that resides on the premises of every participating entity—or node—in a value chain. Each of these nodes contains precisely the same transaction records—be it the farmer, producer, transporter or buyer, every transaction in the value chain will exist in every node. This is because a Blockchain application running in each node encrypts transaction data, storing it in containers of information called 'blocks', which are pushed out across all the nodes. A Blockchain can also embed business rules, known as 'smart contracts' into the blocks that apply 'if this, then that' logic, making actions free of human arbitration.

[1] WWF Palm Oil Score Card 2016 - http://awsassets.panda.org/downloads/wwf_palm_oil_scorecard_2016_1.pdf

[2] RSPO – Round of Sustainable Palm Oil - http://www.rspo.org/about

Building sustainability on blockchain

Blockchain finds an astute place in the palm oil supply chain, where it is capable of closing current gaps in transparency. Exhibit 1 shows the concept of how a digital layer can shift the value chain into a sustainable digital supply chain with an audit trail that runs from end to end.

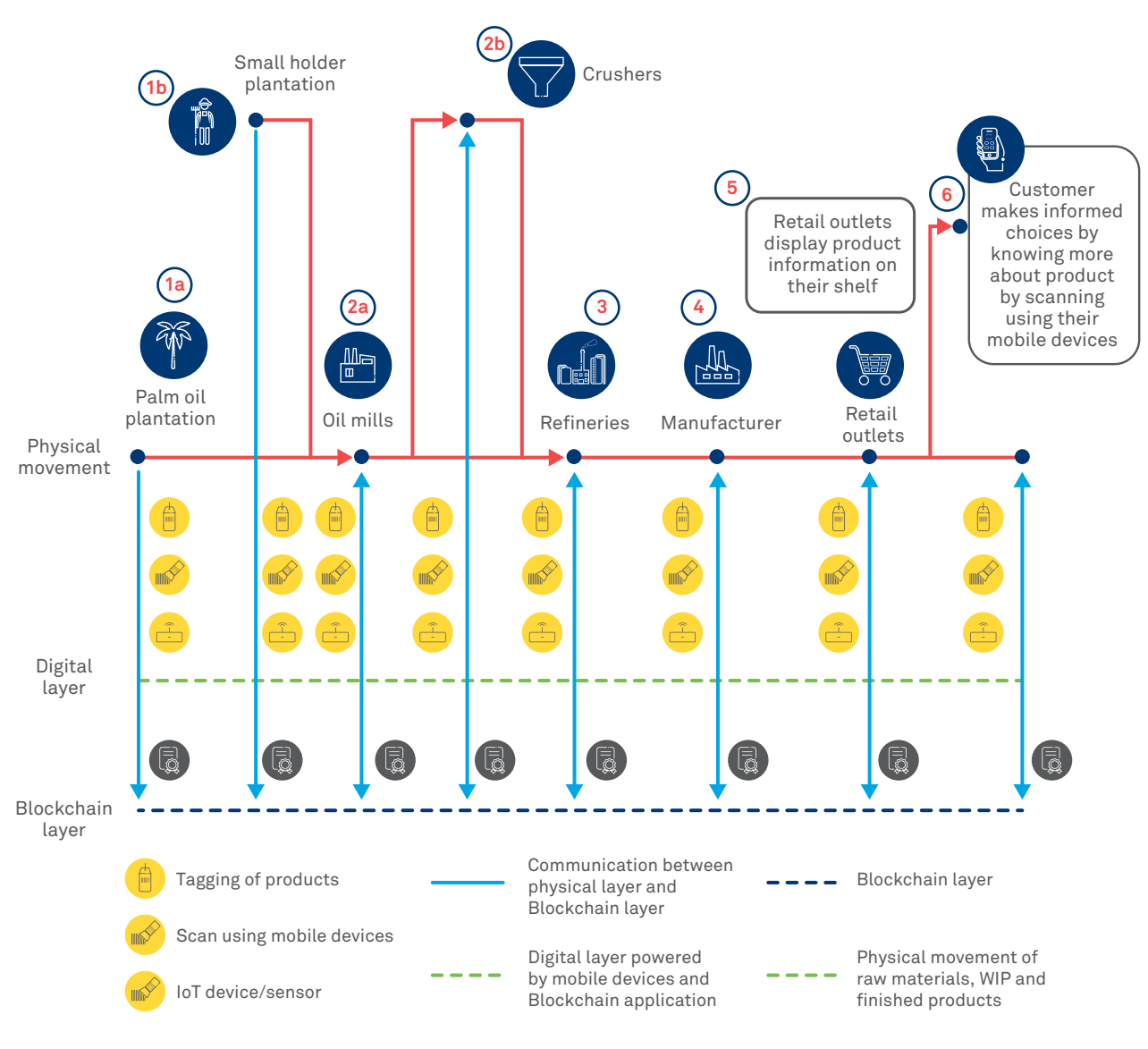


Exhibit 1: Sustainable palm oil supply chain supported by Blockchain technology

A plantation worker (1a) tags the fresh fruit bunches to the palm tree using a mobile device. Information such as the tree's location, plantation identity, worker identity, date and time harvested, and batch ID can be captured and uploaded into a Blockchain application in near real-time. Blockchain can support the registration process for compliant plantations, which can then be used to check the geolocation data of the harvested fruit bunches (1a & 1b).

This not only provides an unprecedented level of transparency, but also contributes to protecting the working conditions and legal employment of field workers, and gives plantations rich data on crop harvesting. Thanks to digital maps with geolocation features, farmers, governments, certification authorities, and producers can maintain digital inventories of the plantations, and implement sustainable land usage planning policy.

Another primary concern that Blockchain can address in the supply chain is to minimize the spoilage of oil. Palm oil has a propensity to rapidly oxidize or hydrolyze under sub-optimal storage and transport conditions (2a, 2b, 3 & 4). Both these reactions—activated by high temperature, moisture, or impurities—can increase the contents of Free Fatty Acids (FFAs) in the oil, which could prove to be hazardous for human consumption.

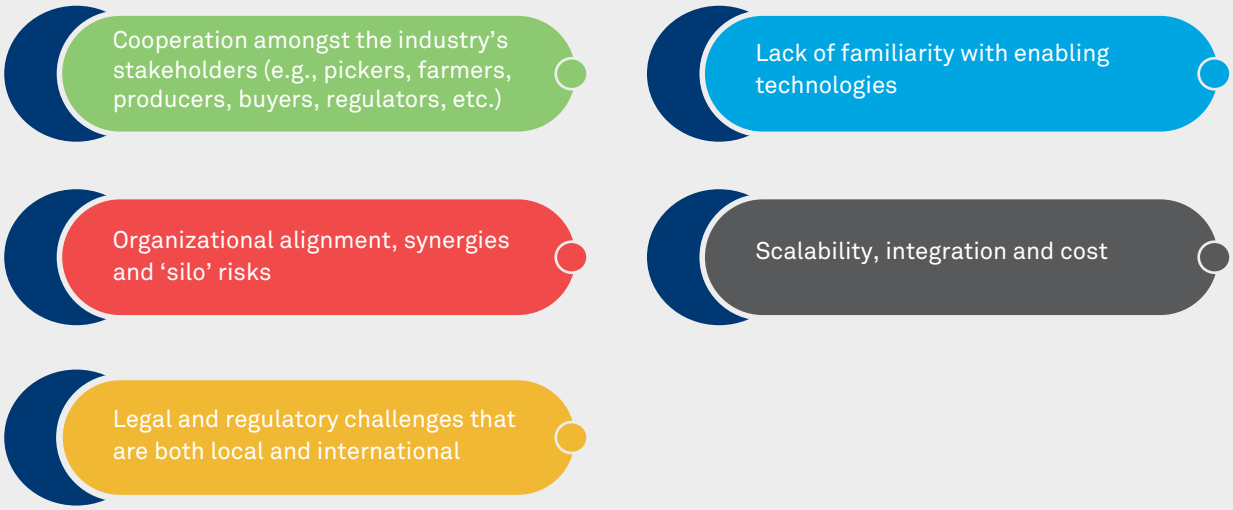
With Blockchain and IoT-backed sensors, transportation companies can monitor temperature and humidity during processing, storage, and transport, and integrate the data on a Blockchain to record out-of-range instances, thus efficiently identifying poor batches. Blockchain's smart contracts can then enforce rules that automatically grade products in a way that only those that meet the highest standards enter the market for human consumption.

Similarly, in the palm oil's multimodal transportation chain, shipping companies could use tamper-proof GPS-enabled seals to lock containers, and mobile devices to record product shipment information in the Blockchain application. Once the shipment reaches the destination, only authorized personnel can access the credentials from the Blockchain application to open the seal and start the receiving process.

Finally, retailers can (5) present the end product with identifiers such as RFID, NFC chips or QR codes, enabling buyers to view the oil's journey back to its source. In the age of the environmentally aware and health-conscious consumer (6), this level of transparency will usher in a new era of trust and brand loyalty that is of great value to companies in a competitive age.

Addressing challenges to implementation

Despite Blockchain's many benefits, there are several hurdles to building a truly sustainable supply chain. Some of the prevalent challenges are:



Adopting the following four-step approach could potentially address many of the implementation challenges:

- **Blockchain strategy & roadmap:** Secure the commitment and participation of a critical mass of stakeholders to build a Blockchain strategy and roadmap; coach targeted executives within each organization to align them with the initiative. This helps align various stakeholders towards a common cause and paves the way for regulatory and legal cooperation.
- **Blockchain readiness:** Run design thinking workshops and ideation engagements to collaborate, innovate and experiment to find the right solution. This helps familiarize the key stakeholders with the enabling technologies, as well as enlist the support of people who are collaborating to build a universal solution.
- **Blockchain in action:** Bring together the necessary architecture and design teams to build a proof of concept (PoC); scale this up, produce, and implement it, running change management in parallel. This also helps familiarize stakeholders across the value chain with enabling technologies—from those who tag the baskets of raw produce, to manufacturers who use palm oil in their products.
- **Blockchain is mainstream:** By this time, enough case studies prove the efficacy of Blockchain in creating sustainable practices in the palm oil industry, and the value generated from a more efficient and rapid supply chain, reduced wastage, and increasing consumer affinity for sustainable products.

We anticipate that our aspirational timeline to 2030 will shorten as trust and understanding of Blockchain technology deepens, and new enabling technologies emerge to make it easier for users to adopt Blockchain, even in the most remote locations of palm oil-producing countries.

This article was originally published at Hyperledger.

Wipro Limited
Doddakannelli, Sarjapur Road,
Bangalore-560 035,
India

Tel: +91 (80) 2844 0011
Fax: +91 (80) 2844 0256
wipro.com

Wipro Limited (NYSE: WIT, BSE: 507685, NSE: WIPRO) is a leading global information technology, consulting and business process services company. We harness the power of cognitive computing, hyper-automation, robotics, cloud, analytics and emerging technologies to help our clients adapt to the digital world and make them successful. A company recognized globally for its comprehensive portfolio of services, strong commitment to sustainability and good corporate citizenship, we have over 160,000 dedicated employees serving clients across six continents. Together, we discover ideas and connect the dots to build a better and a bold new future.

For more information, please write to us at **info@wipro.com**

IND/B&T/JAN-JUN2018