

# Road Map to Implement Blockchain-enabled Digital Traceability Platform for Sustainable Enterprises in Bangladesh

Md Monzur Morshed  
Center for Development Economics  
*Williams College*  
[mm74@williams.edu](mailto:mm74@williams.edu)  
[m.monzur@gmail.com](mailto:m.monzur@gmail.com)

## Abstract

Digital traceability is becoming a powerful enabler of transparency, sustainability and trust in global supply chains. Although agriculture, textiles and food processing sectors have been performing well in Bangladesh, the synergy of manufacturing and business process backed by Blockchain-enabled digital systems could be a game changer for sustainable enterprises. This paper prescribes a model to develop Blockchain-enabled digital traceability platform for sustainable enterprises in Bangladesh.

## 1. Introduction

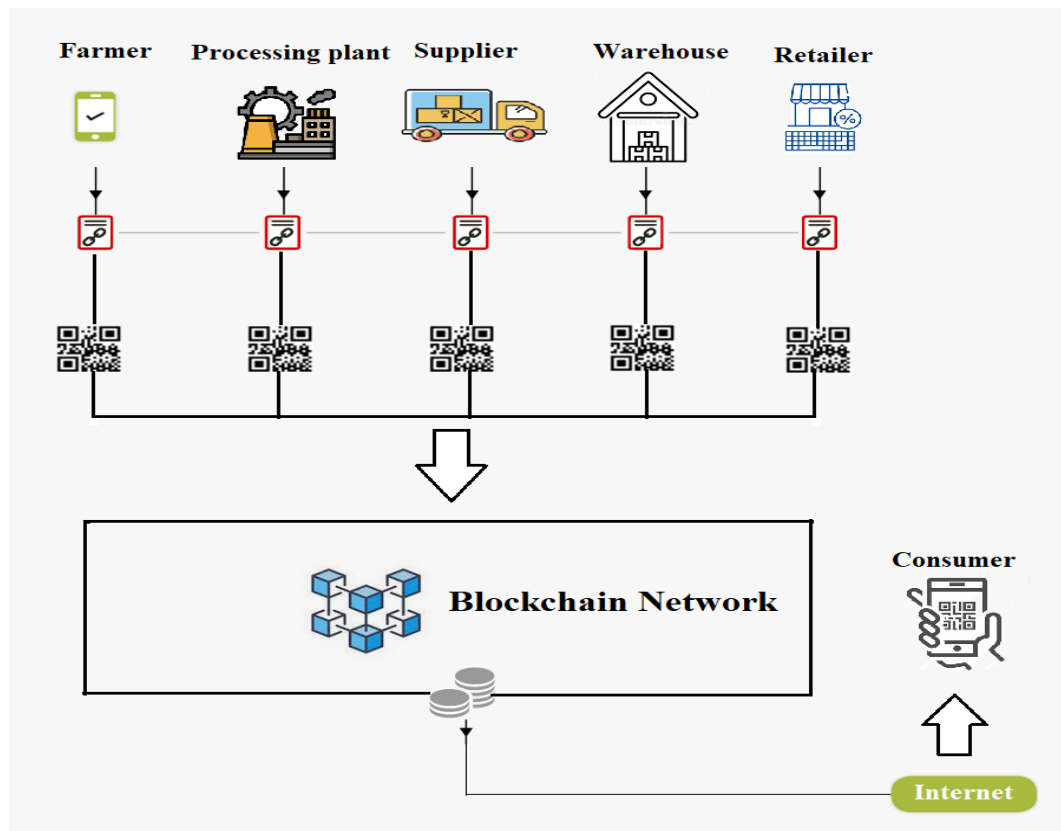
Sustainable enterprises are under the increased scrutiny of regulators for achieving total transparency, tracing the entire end-to-end supply chain from the raw material source to the final steps of production. Traditional traceability systems face issues of data manipulation, low efficiency and lack of real on-time visibility in such processes (Saber et al., 2019). The decentralized and immutable nature of blockchain technology makes it a transparent solution. This paper presents a model that can be used by Bangladeshi businesses to implement as a blockchain-enabled digital traceability platform to leverage sustainability practices, consumer confidence and the global market.

## 2. System Overview

The platform connects the entire supply chain — farmers to consumers — in a blockchain network providing digital traceability. Every stakeholder will log information at each step in the product lifecycle. It will be validated by the next participant and stored securely. This enables consumers to scan a QR code and trace the entire lifecycle of the product.

### *Participants:*

- Farmer: Inputs initial product data.
- Processing Plant: Records processing steps and quality checks.
- Supplier: Logs transport and handling details.
- Warehouse: Inputs storage conditions and durations.
- Retailer: Updates final sales and shelf information.
- Consumer: Scans QR code to access full traceability record.



**Figure:** Blockchain-enabled Digital Traceability Platform

### 3. Road Map for Implementation

#### *Phase 1: Planning and Feasibility Study*

- Stakeholder Analysis: Identify and engage all participants.
- Needs Assessment: Evaluate technical literacy and internet availability.
- Regulatory Compliance: Align with ICT policies and traceability standards.

#### *Phase 2: System Design*

- Blockchain Selection: Choose between public and permissioned blockchains.
- Smart Contract Development: Automate verification and validation.
- QR Code Integration: Link product information to blockchain records.

#### *Phase 3: Platform Development*

- Front-End Applications: Develop mobile apps and web portals.
- Back-End Infrastructure: Establish blockchain nodes.
- Data Standards: Standardize data templates for consistency.

#### *Phase 4: Pilot Testing*

- Sector Selection: Launch pilots in sectors like organic agriculture.
- Participant Training: Educate stakeholders on platform usage.
- Monitoring and Evaluation: Assess performance and usability.

#### *Phase 5: Full-Scale Deployment*

- Scaling Up: Expand to multiple sectors.
- Continuous Improvement: Implement system upgrades based on feedback.
- Marketing and Branding: Promote Bangladesh's sustainable supply chains globally.

#### **4. Benefits of Blockchain-enabled Digital Traceability**

Blockchain-enabled traceability offers numerous advantages (Casino et al., 2019):

- Transparency: End-to-end product visibility.
- Trust: Tamper-proof records build consumer and partner confidence.
- Efficiency: Automated data entry and validation.
- Market Access: Satisfies international certification requirements.
- Sustainability: Verifiable eco-friendly practices.

#### **5. Challenges and Mitigation Strategies**

Challenge	Mitigation Strategy
Technical Literacy	Conduct training workshops.
Initial Cost	Form public-private partnerships and seek grants.
Internet Accessibility	Enable offline functionality with delayed synchronization.
Resistance to Change	Launch awareness campaigns and showcase success stories.

#### **6. Conclusion**

Digital traceability platform based on blockchain technology embedded together with the sustainable enterprises of Bangladesh can enhance the visibility, competitiveness as well as accountability of the country to portray a better standing of the sustainable enterprises. This systemic way of planning, design, piloting and scaling can also help Bangladesh turn out to be a role model. Transparency is an integral part of sustainability, and blockchain-enabled digital traceability technology will provide the ideal foundation upon which the future can be built.

#### **References**

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- Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International Journal of Production Research*, 57(7), 2117-2135.