Session #3
Leveraging the potential of blockchain to foster due diligence
Cotton Blockchain Pilot Progress

(13:10–14:00)

Moderated by

Maria Teresa Pisani
Project Lead
Economic Cooperation and Trade Division, UNECE
Progress Pilot #1
Blockchain technology for traceability and due diligence in the cotton value chain

Andrea Redaelli, Principal Project and Portfolio Management
Olivia Chassot, Junior expert, UNECE

Pilot #1 - Implementing a blockchain technology for traceability and due diligence in the cotton value chain in support of a circular economy

1. POLICY RECOMMENDATION
   - Framework
   - Measures
   - Guidelines

2. TEXTILE TRACEABILITY STANDARD
   - Business Process Descriptions
   - Activity Diagrams
   - Business Requirement Specification
   - Data Model

3. LEATHER TRACEABILITY STANDARD

4. PILOT AND CAPACITY BUILDING

STAKEHOLDERS QUESTIONNAIRE
SCOPE DEFINITION
USER STORIES & “FIL ROUGE”
SUSTAINABILITY CLAIMS
BUSINESS & TECHNICAL REQUIREMENTS
LEGAL VALIDATION
SOLUTION DESIGN

Pilot Concept to be implemented
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COTTON VALUE CHAIN PILOT

2020

- Jan: Pilot Project Setup
- Mar: Business & Technical Requirements

2021

- Feb: Trainings & Go Live
- Jul: Capacity Building

Requirements

- Business & Technical
- Procurement

Timeline

Based on the assumption to start the contract on 15.09.20
Different roles to contribute to the pilot project

**EXPERTS**

- Technology
- Business
- Tags
- Fintech
- Organizations
- Institutions
- Sustainability
- Supply Chain
- Associations
- Fibers
- Leather
- Retail/Brand
- Traceability

**CERTIFICATIONS, LEGAL, TECHNICAL, AUDITING, EDUCATION, TRAINING,...**

**RAW MATERIAL SUPPLIER**

1. Planting and cultivation of cotton
2. Cotton harvest identification & transfer from farmer to ginner
3. Ginning & transfer to spinner
4. Spinning & transfer to dyer, blancher, washer
5. Dyeing, bleaching, washing & transfer to weaver
6. Weaving & transfer to fabric finisher

**MANUFACTURER**

7. Fabric finishing, other treatments & transfer to manufacturer
8. Garment production & packaging and transfer to "retailer"
9. Product enoblement & packaging and transfer to "retailer"
10. Placement of product in stores or on-line for sale
11. Consumption and disposal
12. Post-consumption recycling

**BRAND**

**RETAILER**
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UNECE-UN/CEFACT & Partners

- 22 pilot experts
- 2 brands
- 4 manufacturers / 1 farmers’ association
- 4 certification bodies
- 2 academia/think tank
- 1 DNA tracer

Where

- 5 countries
  - Egypt
  - Germany
  - Switzerland
  - Italy
  - UK
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Unravelling the pilot

UPSTREAM
Seed
Cultivation
Ginning
Transport
Spinning
Dyeing
Knitting
Assembly
Transport
Distribution
Sales

DOWNSTREAM
Transport
Sales

VALUE CHAIN

SUSTAINABILITY (RISKS)

• Child labour, Forced labour
• Sexual harassment, gender-based violence
• Wages, Working time
• Trade unions, collective bargaining
• Occupational health & safety
• Homeworkers
• Hazardous chemicals
• Water consumption & pollution
• Greenhouse gas emissions
• Bribery and corruption
• Economic, Management, Quality

USER STORIES

AS A Brand
I WANT TO I want to demonstrate the origin of the product
SO THAT I can be transparent about my upstream supply chain and origin of the material I sell

AS A Brand
I WANT TO demonstrate the usage of chemicals for the fabric used in my garment product
SO THAT I can be transparent about the chemicals presence in the products I sell

AS A Weaving Mill
I WANT TO demonstrate the social, labour aspects of my business
SO THAT I can be transparent about the practices in my business

Data Management & Protection

CLAIMS
Enhancing Transparency and Traceability for Sustainable Value Chains in Garment and Footwear

Sustainability Claims and Data Protection

Claudia Di Bernardino
Lawyer
UN/CEFACT project legal expert

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**Guidelines for Claims**

**What:** Tool for Developing Claims

**Why:** To Have Better Quality Claims

**Who:** Partners/Tech Providers

**How:** Methodology
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Claim Key Content

- Traceable Asset
- Claim Statement
- Verification Criteria
- Objective
Types of Claims Linked to Sustainability Hotspots

- Social
- Environmental
- Economic

Product
Process
Organization

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Verification Models

- Self Declared
- Self Assessment
- Second Party Verified
- Third Party Certified
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From Information to Action

- **Traceable asset**
  - The Cotton of this T-shirt

- **Claim Statement**
  - Contains at least 95% Organic Cotton

- **Verification Criteria**
  - Certified by GOTS

- **Objective**
  - for Responsible Sourcing
Trade off between
Information Transparency and Confidentiality
1 – Analysis of Data Collection and Processing
2 – Data Protection Impact Assessment
3 – Mitigation Measures
4 – Governance Framework
5 – Policies, Awareness and Verification

Development of the Blockchain Application based on the outcome of the Risk Assessment

Risk Based Approach
Possible Solutions

- Off-chain Data Storage
- Pruning
- Zero-Knowledge Proofs
- Deletion of Encryption Keys
- Pseudonymization and Anonymization
- Self-Sovereign Identity Management
How to use the blockchain system?

Giacomo Poretti
Information Systems and Networking Institute
University of Applied Sciences and Arts of Italian Switzerland (SUPSI)
Distributed Ledger technologies have the potential to solve important glitches in traceability and provenance challenges.

Blockchain technology offers a way to record transactions or any digital interaction that is designed to be secure, transparent, highly resistant to outages, auditable and efficient.

A **solid** unique blockchain environment will ensure that the exchanged wares are authenticated, thus preventing potential frauds.

**Solid** = protocol that avoids the insertion of inconsistencies and non verified information BY DESIGN
The system will enable actors to register and verify in an immutable and trusted blockchain, claims related to their activity, processes and products.

The system will address 5 different claims types:

- ORIGIN
- CHEMICAL USE
- FIBRE CONTENT (e.g. ORGANIC, CONVENTIONAL, RECYCLED)
- DUE DILIGENCE
- QUALITY

through the management of different issued certificates and physical documents.
The solution will enable system stakeholders to register relevant events.

The solution will handle in the data model various types of events:

- **Objects events (Transfer / Trades)**: B2B transactions
  - Objects events:
    - Harvesting (Why)
    - Production (Who)

- **Transformation events**: internal processes

- **Observation events (Certifications)**: B2Certifier links sustainability related information (certificates + inspections reports)
  - Transformation events: i.e. aggregation
  - Observation events: certifications/inspections
Manual input of events

For the pilot project we do not integrate the system with external systems (facilities ERP)

All input data will be done manually, so we will have to maximize the granularity of the information without losing and kind of necessary detail
### Registration event example WHAT & WHY

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#### Internal ref Code

- **Internal ref. code (SKU)**: PD0088 - Seed cotton (raw cotton)
- **Product category**: GOTS
- **Product detail**: GOTS

#### UN/EDIFACT 1001

- **Doc type**: UN/EDIFACT 1787

#### UN/EDIFACT 1001

- **Type of doc**: UN/EDIFACT 1787
  - **Process Categories**:
    - PR0030 - Trading
    - PC0031 - Undyed yarns
    - PD0088 - Seed cotton (raw cotton)

#### Internal ref Code Root doc

- **Business step**: 705 - Bill of lading
- **Type of doc**: PFD bill of lading

#### Internal ref Code

- **Quantity**: [ ] Units
- **Weight**: [ ] Kg

#### Transfer

<table>
<thead>
<tr>
<th>transfer</th>
<th>Date</th>
<th>FROM MY facility TO your facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>Date</td>
<td>dd.mm.yyyy</td>
</tr>
<tr>
<td>FROM</td>
<td>To</td>
<td>Your facility</td>
</tr>
</tbody>
</table>

#### Registration event example WHAT & WHY

- **WHAT**
  - Internal ref Code
  - Product category
  - Product detail

- **WHY**
  - Root doc
  - Business step
  - Type of doc
  - long-term order
  - PR0030 - Trading
  - 705 - Bill of lading
  - UN/EDIFACT 1001
  - PFD bill of lading

#### ADD doc
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Scuola universitaria professionale della Svizzera italiana
Dipartimento tecnologie innovative
Istituto sistemi informativi e networking

System architecture

**Internal stakeholders**

- **Web app / cloud / DBMS**
  - user / password protected
  - manual input of data

- **Blockchain**
  - open-source
  - permission less
  - on-chain “public” data

**External users (public / end customers)**

- on-chain data only
**Public permission-less environment**

- Ethereum

- Blockchain data visible to end customers → **privacy & confidentiality problem to solve**

- in public blockchain information is available to everyone

**Active users registered by project governance**

- Only projects stakeholders can play with the system with well defined authorization profiles

- Active stakeholders will store information in private mode

- Everyone can access information flagged as public
Privacy and confidentiality by design

for active actors of a specific supply chain full backward traceability is granted (all backwards information available in private mode)

for external/passive actors (customers) the system will enable to disclose selected public information, certified by the blockchain structure

This will be achieved applying cryptographic encryption technologies and decoding key exchanges so to avoid unexpected information disclosure, while exploiting the advantages of a public blockchain environment
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Backwards traceability

At every supply chain level the owner of the product will be able to trace backwards provenance with all related linked information

Forwards transparency

Claims and certificates will be shifted upwards to end customers so to enable their verification
Architecture of the blockchain structure (the project smart contract) will avoid to insert inconsistent information:

- A certificated to issued by a correct certification party
- A fraudulent provenance of a product
- A non existing trade
- Etc.

This will be achieved by typical cryptography blockchain proofs and crossed verifications.

In the same way a blockchain structure refuses fraudulent transactions.

In the same way a Bitcoin user can not spend money he does not own or he can consume twice the money he has (double spend).