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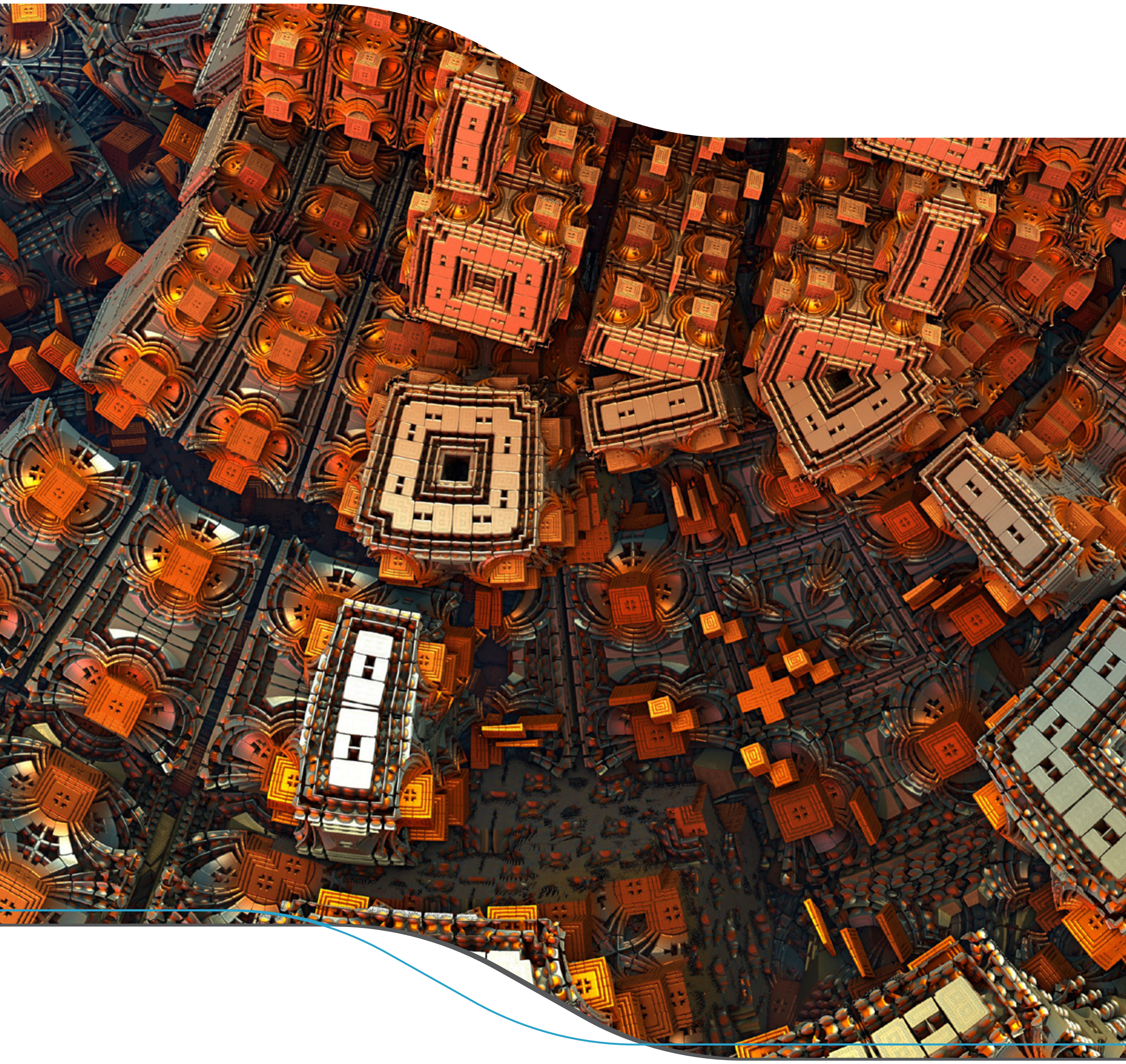
Trado: New technologies to fund fairer, more transparent supply chains



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The opinions expressed here are those of CISL and do not represent an official position of the Trado consortium or any of its individual members.

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Foreword

The United Nations Sustainable Development Goals (SDGs) are the cornerstone of a peaceful world that places protection of the environment and people at the core of economic prosperity. Yet it is becoming increasingly clear that these will not be achieved if we follow the path of business-as-usual, and that deep and broad innovation will be vital for the systemic change needed to deliver a safe, fairer future.

The complexity of the climate, environment and geopolitical challenges at hand means that developing effective innovations to contribute to the SDGs requires a different kind of collaboration – one with new types of partners and roles, between corporates, financiers, start-ups and governments. These parties will need to go beyond traditional operational comfort zones to understand their position in a system that can improve social and environmental sustainability, while still offering an attractive bottom line.

This report focuses on the results of one such collaboration across sectors and expertise, where an experimental model that could contribute to achieving SDG 12's focus on sustainable consumption and production was trialled in an existing tea supply chain in Malawi.

The project was supported by BNP Paribas, Barclays, IDH the Sustainable Trade Initiative, Rabobank, Sainsbury's, Sappi, Standard Chartered and Unilever, with funding from the UK Department for International Development (DFID); the start-ups were Halotrade, Meridia and Provenance, and the project was led by CISL.

The positive outcomes of this experimental project have given us a glimpse of what the new business-as-usual might become – where partnership and collaboration can bring greater sustainability and environmental information, lower financial risks, and improve the opportunities for small-scale farmers and businesspeople; where a new business-as-usual can help deliver a safer future through the SDGs.

Jacques Levet
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Executive Summary

Throughout this report the definition of terms that appear in the text in blue the first time they are mentioned can be found in the glossary.

Overview

This report describes the process and results of a consortium-based project called Trado, established to test whether preferential access to **trade finance** using new financial technologies could drive positive social, environmental and economic impact.

The report focuses on the outputs of the project, as follows:

- a new model for sharing sustainability data that enables traceability in supply chains with the potential for broader applications beyond this project;
- an innovative **blockchain** supply chain finance structure;
- pre-shipment financing for a tea supply chain in Malawi, with potentially real, long-term benefits for a group of at least 225 **smallholder** farmers in that supply chain;
- no indication of any price increases to end-consumers because of using the **Trado model**.

The Trado model

The Trado model is the result of an experimental project of a consortium which included: Barclays, BNP Paribas, University of Cambridge Institute for Sustainability Leadership (CISL), Halotrade, IDH the Sustainable Trade Initiative, Meridia, Provenance, Rabobank, Sainsbury's, Sappi, Standard Chartered and Unilever. The project was supported by the UK Department for International Development (DFID). The Trado consortium's aim was to apply new technologies to enable large-scale system change in supply chains to contribute to SDG 12: Responsible Consumption and Production[i].

The project emerged from a Fintech Taskforce run by CISL's Banking Environment Initiative (BEI). The Taskforce was created at a summit convened by HRH The Prince of Wales in early 2017, with a mandate to design multisector collaboration between multinationals, financial institutions and start-ups to harness fintech for sustainable business.

At Trado's core is a *data-for-benefits* swap between a **buyer** and a **supplier** in a supply chain. This data is provided by the supplier and can contain '**first mile**' social or ecological factors that may not be previously available to the buyer. In exchange for the data, the buyer enables provision of benefits by allowing their (lower) financing rate to be applied to working capital financing of the supplier.

This can make a difference to the supplier because they often borrow money to cover their working capital needs, and their cost of borrowing is often higher than that of the buyer. The transaction takes place using a bank's regular supply chain financing processes. The Trado model acts as an add-on, causing minimal disturbance to the bank's business processes.

Both the first mile production data in the swap, as well as the overarching data on the Trado transaction itself, were entered into and accessed via a decentralised depository (a blockchain). In the model the first mile producers (who, in this case study are also smallholders) benefit from the financing cost difference, which is made transparent and controllable.

The Trado model could enable access to sustainability data by many parties in a given supply chain, or across multiple supply chains. Included data could reflect any number of topics, for example: deforestation, land management, biodiversity, socio-economic development, the distribution of Trado-generated benefits, and so on.

Trado design and testing

At the project outset, consortium members defined a set of propositions against which the efficacy of a model could be assessed. To test these, start-up-style trials were conducted by **dry running** historic data through the Trado model. This to identify which propositions could make up a workable model design for live testing.

This live pilot involved a Malawian tea supply chain, with actual deliveries of tea and actual payments. The pilot's supply chain involved a large end-buyer, an intermediate processor, an international bank and 225 first mile smallholder producers.

Trado blueprint

Without necessarily adding costs for end-consumers, the Trado model was found to provide financial savings to reward sustainability practices in the first mile of production. The data generated through the model can enable multiple applications, including marketing, reporting and innovative lending or investment products. As a result of these positive outcomes the consortium decided to publish the Trado model as a new and potentially useful data-exchange concept, delivering a blueprint for wider replication.

[i] Goal 12: Ensure sustainable consumption and production patterns. (n.d.). Retrieved August 8, 2019 from United Nations website, https://www.un.org/sustainabledevelopment/sustainable-consumption-production/

Introduction

Global supply chains

The ambition of the Trado project was to contribute to systemic change towards more sustainable global supply chains by improving traceability.

A supply chain is a system of organisations, people, activities, information, and resources involved in moving a product or service from supplier to customer, increasing value along the way. In global supply chains production crosses at least one border, and typically many borders, before final assembly. The scale of these systems is vast and many chains consist of complex patterns of production processes, transactions, knowledge and relationships. The World Trade Organization puts the value of global trade in goods and services at US$23 trillion for 2017, two-thirds consisting of trade in goods.[ii]

Along a supply chain, ownership of commodities and products typically changes hands several times between various organisations and legal entities before reaching the end-consumer. For low-added-value products such as agricultural commodities ('soft commodities') and certain types of mining commodities ('hard commodities') supply chains typically entail an aggregation process. In such a process, goods are provided by many small-scale producers ('the first mile') to larger scale supply chain players. At this point, these goods are aggregated for further processing towards an end-product. For soft commodities in low-to-middle-income countries these small-scale first mile producers are called 'smallholders'. In 2013 it was estimated that globally there are 500 million smallholders.[iii]

It can be hard for supply chain partners to uphold sustainability standards across a complex chain of resources, activities and organisations, particularly when this involves large aggregations of smallholders. Lack of visibility alongside lack of knowledge and minimal incentives can lead to a compounding of poor sustainability standards. Examples include deforestation driven by soy production for food, animal feed and biofuels, or poor working conditions in rare earth metals extraction on which smartphones depend.

Improving traceability

Upstream supply chain partners, such as major corporations from affluent countries, have focused on improving the traceability of production locations and other properties of the commodities. Underpinning the move towards increased traceability is a market rationale: enabling market players to voluntarily choose commodities and products which come from more sustainable production. To market players traceability is not a new thing. The first traceability systems emerged in the mid-1930s in Europe as a way to prove authentic origin of high-value food, such as French champagne.[iv]

The International Organization for Standardization (ISO) standard 9000 defines traceability as '"the ability to trace the history, application, use and location of an item or its characteristics through recorded identification data".' In the context of sustainability, as defined by the United Nations Global Compact, '"traceability is a tool to assure and verify sustainability claims associated with commodities and products, ensuring good practice and respect for people and the environment all along the supply chain'chain".[v]

The drive for traceability has led to certification schemes such as the Forest Stewardship Council (FSC) for timber, the Roundtable for Responsible Soy (RTRS) for soy and Fairtrade for a host of products.[vi] In response to criticism of the efficiency (and effectiveness) of such schemes further innovations in transparency have followed, such as Trase [vii], developed by the Global Canopy, and Global Forest Watch (GFW) [viii] from the World Resources Institute.[ix]

Trado's contribution

Where these solutions provide traceability by tracking formal trade documentation (Trase) or geo-spatial observations (GFW), Trado aims to be complementary by providing direct data from first mile producers. Currently such data is rarely available. Those producers who do provide data tend not to be rewarded or incentivised to keep their data up-to-date. Trado contributes to improving the availability and reliability of up-to-date first mile data on supply chain sustainability characteristics.

ii World Trade Organization. (2018). World Trade Statistical Review 2018. Retrieved from https://www.wto.org/english/res_e/statis_e/wts2018_e/wts2018_e.pdf

iii International Fund for Agricultural Development. (2013). Smallholders, food security, and the environment. Retrieved from https://www.ifad.org/documents/38714170/39135645/smallholders_report.pdf/133e8903-0204-4e7d-a780-bca847933f2e

iv Asian Development Bank Institute. (2009, May). Food Safety and ICT Traceability Systems: Lessons from Japan for Developing Countries. Retrieved from https://www.adb.org/sites/default/files/publication/155994/adbi-wp139.pdf

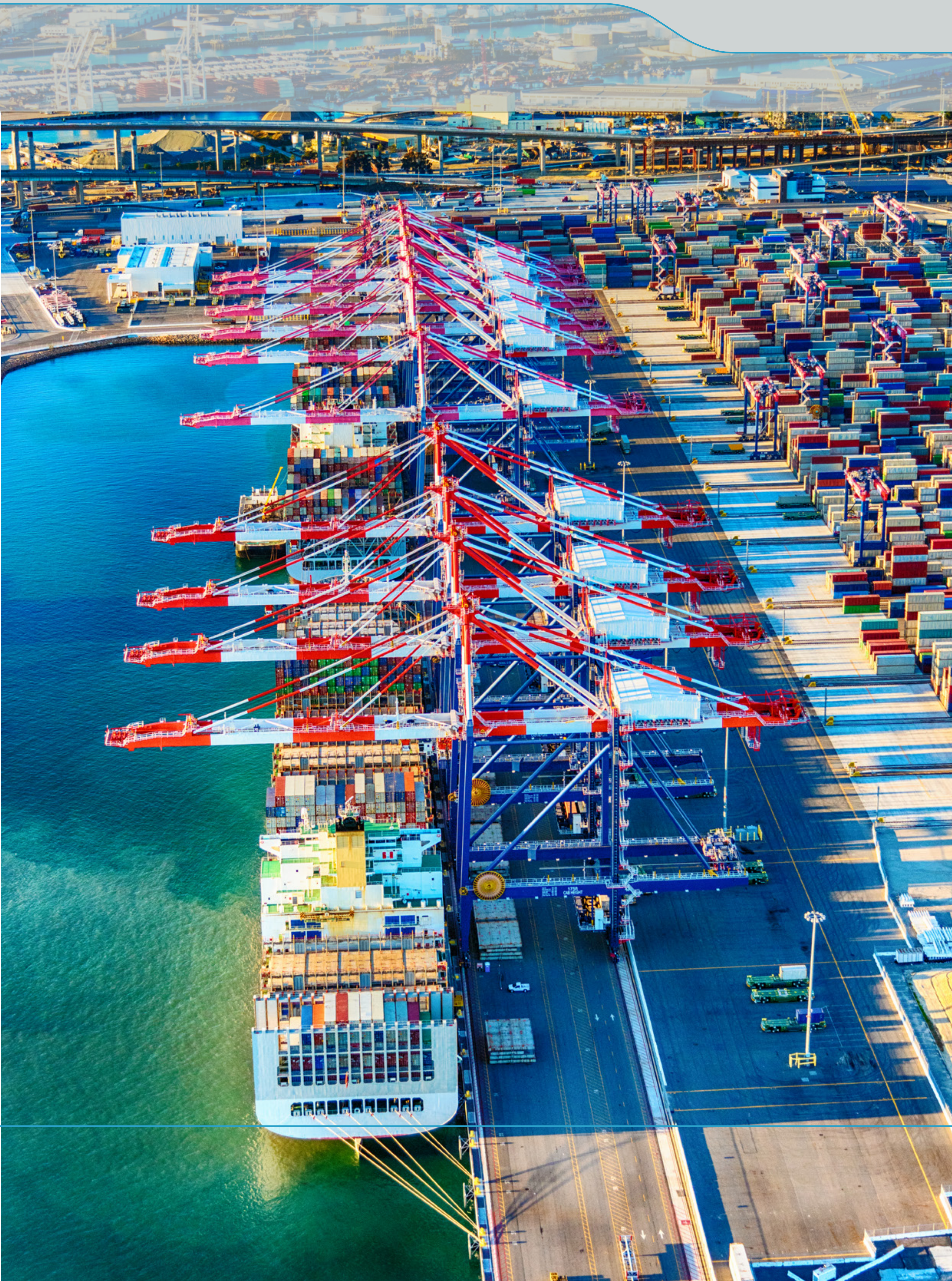
v UN Global Compact. (2014). A Guide to Traceability: A Practical Approach to Advance Sustainability in Global Supply Chains. Retrieved from https://www.unglobalcompact.org/library/791

vi Forest Stewardship Council: https://ic.fsc.org/en/what-is-fsc, Roundtable for Sustainable Palm Oil: https://rspo.org/about, Fairtrade: https://www.fairtradecertified.org/why-fair-trade

vii Trase: https://trase.earth/

viii Global Forest Watch: https://www.globalforestwatch.org/

ix Mehta, A. (2018, July 15). Are Sustainability Certifications fit for Purpose? Retrieved from http://www.ethicalcorp.com/are-sustainability-certification-schemes-fit-purpose



Chapter 1

Project description

Supply chain choice for the project

Early on, the consortium members chose to focus on a specific tea supply chain in Malawi because it was shared across two of the corporate members involved (Unilever and Sainsbury's). Also, the project objective was supported by the Malawi Tea 2020[x] initiative, which seeks to improve the incomes of Malawian tea workers and smallholders.

Formulating the propositions

The following propositions were defined by consortium members at the project outset during a two-day workshop.

1. Blockchains can enable data to be collected from global networks to describe the flow of materials and their attributes (impact and quality) within them.
2. Existing trade finance pricing models are inefficient in attributing risks due to a lack of information about product flow and supply chain party participation.
3. The flow of data enabled by blockchain can improve these existing pricing models. More specifically:

   a. It is possible to generate financial savings by adjusting the regular supply chain finance mechanism.

   b. It is possible to motivate a redistribution of such savings from an end-buyer to smallholders.

   c. Both of these goals can be achieved through new supply chain information data and evidence of impact.
4. Smallholders can access direct **purchase order financing** to get a significantly better price for the raw goods they sell, as well as obtain financing at an earlier stage.
5. It is possible to ensure the end-buyer passes savings on to smallholders through a pricing mechanism linked to the latter's individual sustainability score, thereby incentivising smallholders to further improve sustainability performance.

The consortium aimed to test these propositions through developing the Trado model across five project phases:

- Supply chain research
- Trado model design
- Dry runs – testing the solution with historical data
- Live pilot – testing the solution in live transactions with live data
- Testing the variance of the solution across different commodities and locations with historical data

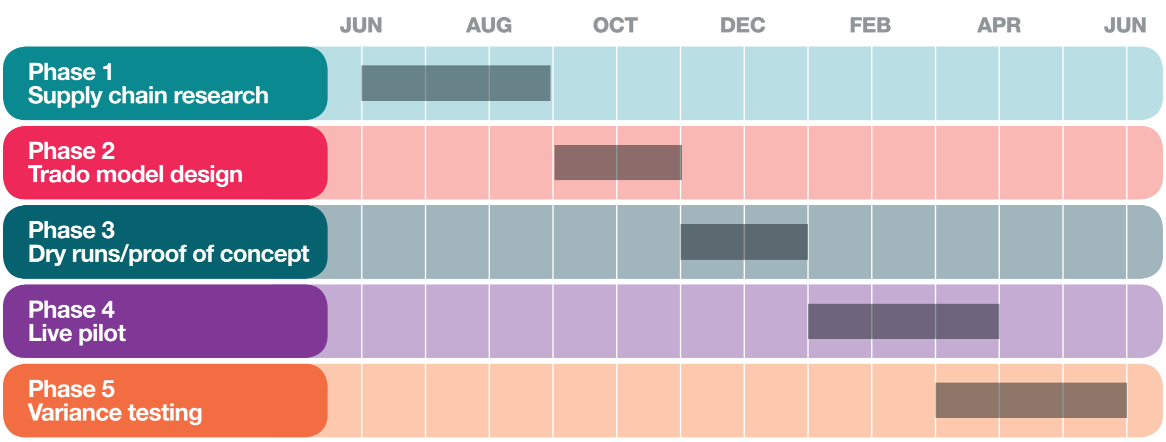


Figure 1: Project Trado timeline

x The Malawi Tea 2020 programme: https://www.malawitea2020.com

Phase One: Supply chain research and refining the propositions

The first phase, supply chain research, was aimed at mapping out various supply chains and understanding the flow of goods, money and data through these chains.

This research included both tea and paper packaging supply chains to holistically cover the range of products involved to bring tea to end consumers. The research into the paper packaging showed that no supply chain finance was used and led to a separate pilot described in Annex IV. The research into the tea supply chain led to the work described in the remainder of this report.

For the tea supply chain research, an extensive smallholder data collection exercise was carried out by interviewing 225 smallholders from Lujeri Tea Estates in Malawi. With the estate's guidance, those sampled were selected from the approximately 10,000 smallholders at Lujeri. Each interviewee was allocated a sustainability score based on five individual data points collected from the smallholder and scored in the Trado model.

In addition, information was gathered through targeted interviews with over 30 supply chain actors, including processors, end-buyers, non-governmental organisations (NGOs) and banks.

To capture and collate this data, an interview script and data capture form were designed and then analysed by the project team. It was determined that it would not be possible to test Propositions Four (direct receivable financing) and Five (rewarding individual sustainability scores) in the tea supply chain in Malawi.

Limiting factors

Proposition Four - Smallholders can access direct purchase order financing
i) The supply chain research revealed that the price of **green leaf** is fixed in Malawi.[1] This restricts the model's ability to pay 'a significantly better price', as per the proposition.

ii) Also revealed was the fact that smallholders are already paid through a regular process established by the **tea processor** (Lujeri Tea Estates). As there would be two pilot transactions in a two week period on a one-off basis, Lujeri and the project team deemed it disruptive to implement two separate payment processes (one Trado, one non-Trado). This because having two payments would trigger a need to explain to smallholders, and manage expectations, as to why they were receiving a payment now, and why this payment wouldn't be guaranteed to continue in the future.

However, the research showed that the smallholders do have individual bank accounts with local banks in Malawi. Therefore, it would have been possible to distribute individual payments that could then have been differentiated based on each participant's score. Such data points could then later have been individually audited. Notwithstanding that the smallholders availed of individual bank accounts, the decision that no separate 'Trado payment' would take place during the pilot meant that Proposition Four could not be tested.

iii) Finally, the supply chain research found that a direct receivables approach would have required onboarding individual smallholders into a bank's supply chain finance payment system. This would have been challenging for the bank, as they were legally required to verify the identities of all clients and assess their suitability.

Based on these three challenges, it was determined that for the pilot phase the Trado model would not be designed to pay smallholders directly. Instead, the model was designed to re-invest savings into sustainability initiatives which directly benefitted the smallholders. Therefore, Proposition Four was descoped.

Proposition Five- End-buyer passes savings on to smallholders
i) It was not possible to define a mechanism to link pricing to sustainability metrics of individual smallholders, as too few historical data points were available to generate their 'sustainability score'. This was because most smallholders did not keep written records and the sustainability data collected by consortium member Meridia therefore formed a baseline observation.

ii) During the dry run phase, the estimated **Trado saving** was deemed not high enough to influence individual smallholder behaviour towards sustainable production on a one-off pilot basis.

For the pilot it was determined that the saving distribution would not be based on individual smallholders' sustainability performance, thus Proposition Five was also descoped from the project.

Phase Two: Model design

Following the de-scoping of Propositions Four and Five, the model design phase aimed to test Propositions One, Two and Three. For this the Trado model was developed (Annex I contains the model's blueprint).

The objective of the resulting Trado model[xi] was that it would entail collecting data throughout the supply chain (Proposition One). An additional objective was that providing this data could enable a different estimate of risk (Proposition Two), enabling a different cost of funding, leading to a saving which could be redistributed to the smallholders (Proposition Three).

The model was designed collaboratively in the pilot supply chain, with the actors identified in Phase One. The design centred on enabling the data-for-benefits swap, and was designed with four main technical components:

1. **User profiles** designed to provide transparency into supply chain actors: a digital user profile capturing key business information (name, location etc)

2. **Asset tracking to provide transparency of raw goods to buyer:** digital product information including the transfer in ownership as the physical product moves from owner to owner through the supply chain

xi For a description of the model, see the next section ('What is the Trado model? p11').

3. **Finance saving calculator to measure the saving derived through earlier financing:** an algorithm for calculating the savings accrued by a supplier from the earlier access to supply chain financing

4. **Verification of saving distribution to smallholders and associated impact on the ground:** digitally signed agreements through user profiles against a statement

Phase Three: First dry run

The first dry run, consisted of running a fictitious but plausible data set from a desk against Proposition Three ('a saving can be redistributed to smallholders'). The objective here was first to simulate how the model performed through a process with low running costs and operational risks. If the dry run generated a positive outcome (ie a simulation resulting in a positive interest rate differential) then it would be worthwhile to run the model in the field.

Virtually, the simulation yielded a positive interest rate differential, and the model was therefore moved to a live pilot phase with real actors, real transactions and live production data.

Phase Four: Live pilot

The pilot phase entailed close collaboration between the Unilever tea supply chain in Malawi, the aggregator Lujeri Tea Estates and the BNP Paribas supply chain finance team. The pilot took place in February 2019 and consisted of two real **purchase orders** for real tea being processed through the Trado model.

There were several process inefficiencies and delays, due to the Trado model not being integrated into standard operating procedures. These delays decreased the number of days the benefit could be generated. But despite this, the transactions generated a Trado saving. The distribution of this saving back into the smallholder community was tracked through the Trado model, thus demonstrating that the model worked.

Phase Five: Variance testing of the model through additional dry runs

The last phase involved variance testing the Trado model. This phase involved research into the model's applicability outside of the Malawi tea supply chain, with the aim of understanding its possible application elsewhere, and on a larger scale. The results uncovered supply chains that were suitable and those that were not, as documented in Chapter 2. This phase also led to the development of key Trado criteria as a test for the model's applicability in a given supply chain (see Annex II).

Phase Five also included a consultation with consortium banks to discover their requirements for financial risk reappraisal, based on the sustainability data generated through the Trado model. A major finding here was that in order for financial risks (specifically credit risk) to be reappraised, an analysis of a multi-year data set would be needed.

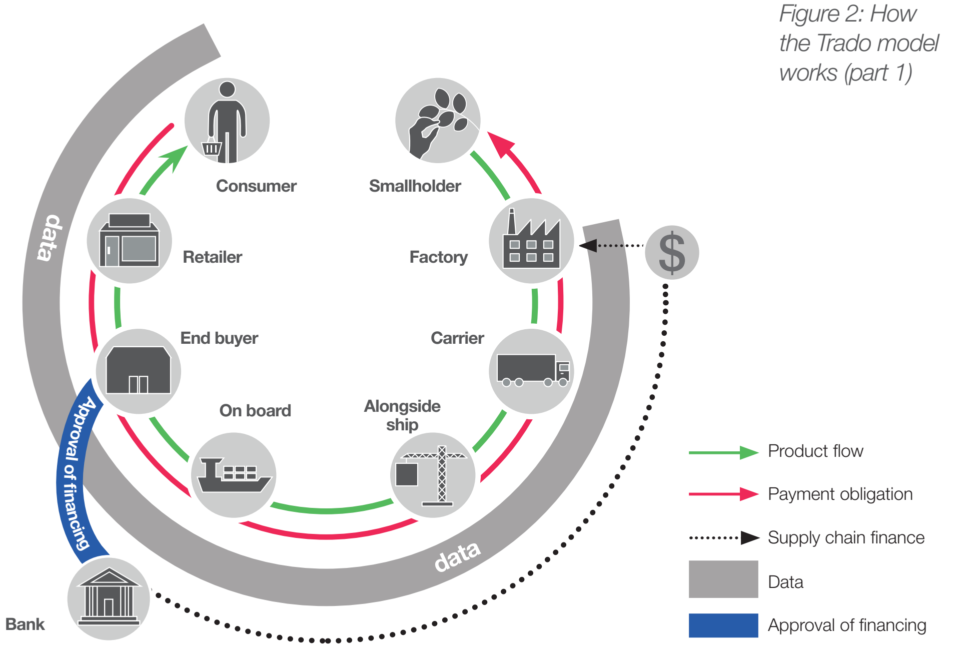
Current credit risk models do not allow for direct use of Trado data, and any adjustment to the price of the risk would require either some form of subsidy (lower pricing for achieving a higher standard) or punitive pricing (for not achieving the required standards). Neither were considered acceptable in a smallholder context. This meant that current credit risk models could not be altered without multi-year data sets, which, in turn, are too expensive to create without a reappraisal of the risk. The amount of time needed to build up the required data set would stretch well beyond the 12-month time frame of the project. For this reason Proposition Two could not be validated.

1.1 What is the Trado model?

The Trado model allows savings generated in a supply chain to be funnelled back to benefit smallholders at no extra cost to the end-product. In the case of the pilot the benefit was provided by farmer field schools, sustainable development initiatives for smallholder farmers.[xii]

A typical supply chain financing model

Figure 2: How the Trado model works (part 1)



The problems

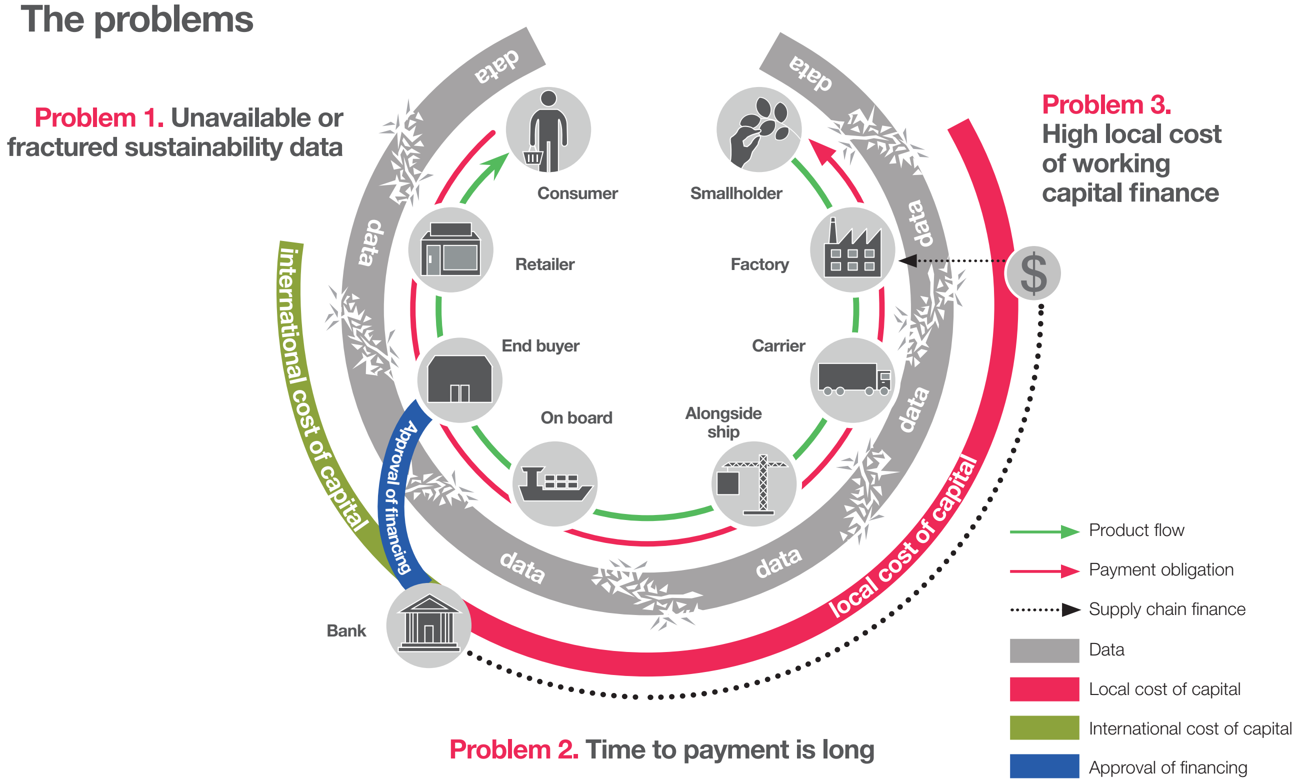


Figure 2: How the Trado model works (part 1)

xii For more detail on the model design, please refer to Annex I: Technical blueprint p24.

In many cases, supply chain finance is used by sellers to increase cash flow in the time interval between invoicing a buyer and receiving a payment. One common supply chain financing model consists of the buyer's bank purchasing an unpaid invoice from the supplier against immediate payment of that supplier. This speeds up the inflow of cash for the supplier. In exchange for this service, the bank deducts a sum of interest. For the supplier, an improved interest rate (and therefore lower sum deducted by the bank) is achieved by aligning their interest rate to that of the buyer.

As this structure increases the **delivery risk** (or 'performance' risk) to the buyer, the buyer must agree to the moment in the supply process (Figure 3) when the bank provides financing to the supplier. In the Trado model, the buyer approves this supplier financing earlier. Trado's data-for-benefits swap means the buyer achieves greater visibility of their supply chain, while the supplier benefits financially.

With the Trado model, the financial savings are generated through **making the buyer's (eg Unilever's) lower interest rates** available to the supplier earlier. In supply chain structures such as in the pilot, the supplier would only be able to borrow from the buyer's bank (at the buyer's lower interest rate) when their goods have been boarded on a ship destined to the buyer. In the period between producing the goods and those goods being boarded, a supplier would normally need to rely on more expensive local financing.

With the Trado model, however, the supplier can borrow sooner at the buyer's lower rate from the buyer's bank, namely when the goods *have been produced*. In the case of the Malawi pilot, this time difference was 35 days. Thus, the supplier saves money by having a lower interest rate during this 35-day period.

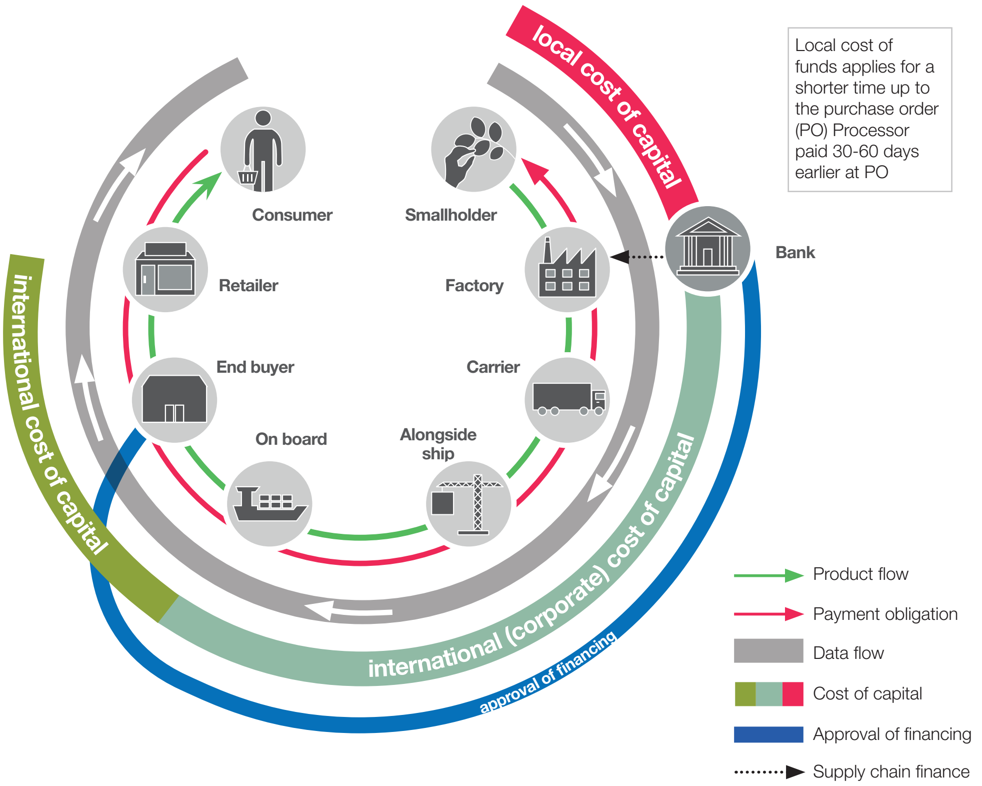
Trado improves the supplier's cash flow by decreasing both the cost and duration of funding. The decrease in cost is achieved by exchanging the supplier's local higher cost of funds for the buyer's lower cost of funds. The decrease in duration is achieved by allowing the supplier to sell the invoice sooner, at the buyer's lower interest rate, to the buyer's bank.

We call this exchange a data-for-benefits swap and it helps to **increase the transparency of the supply chain**[2], which can benefit all actors by gaining greater insight into sustainability impacts on and from smallholders. It can enable the delivery of various products, such as trustworthy marketing communications/stories for consumer brands, or trustworthy data for sustainability reporting by corporates. Trado can also support the development of new types of sustainable lending and investing products for impact investors.

The proposed solution

Decrease financing cost

Increase data availability and data quality



Why the solution can be offered

Smallholder and processor agree to make data visible. Based on visibility, end-buyer has confidence to instruct bank to release money earlier.

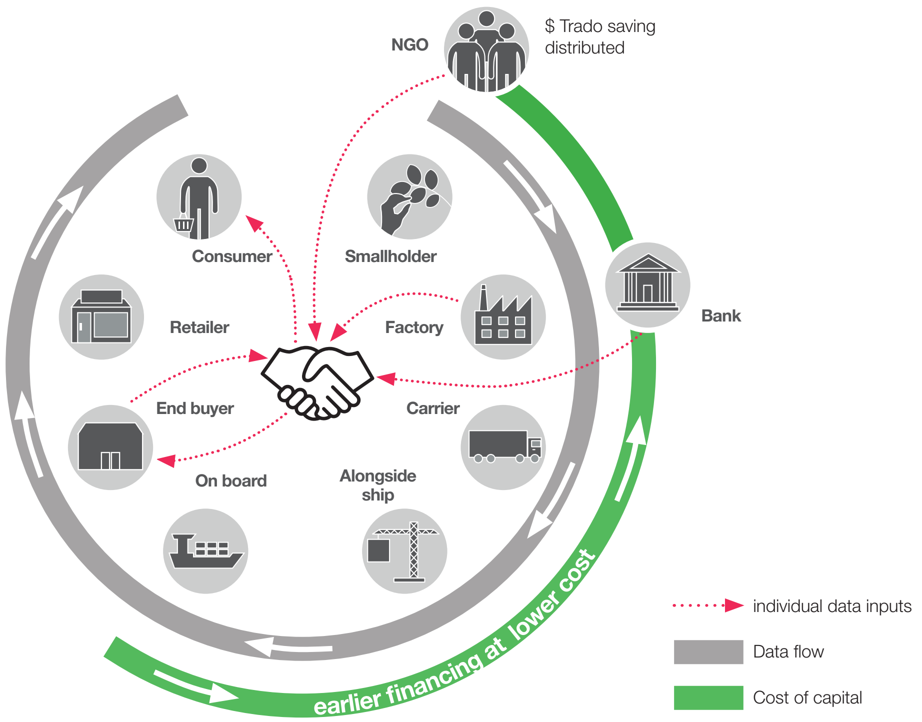


Figure 2: How the Trado model works (part 2)

1.2 Innovation outcomes of Project Trado

By making supplier data transparent, the Trado model was able to bring the 'trust point' in a trade transaction forward. Bringing this forward allows the end-buyer to instruct the bank that finances the supplier to release payment earlier, thereby creating a financial saving.

Earlier trust point

A **trust point** occurs when the end-buyer is confident enough that the goods purchased will be received at a point in the future. This trust enables the buyer to instruct their bank to release invoice financing to a supplier at the buyer's interest rate. The Trado model enables the trust point to be brought forward to the point when the legal commitment to buy (ie a purchase order) is made. Releasing financing at this point is usually considered higher risk,[3] as it is raised when the goods are still in the supplier's hands.

By enabling the payment to move to this earlier point, invoice financing is released significantly earlier in the goods' lifecycle. This improves a supplier's cash flow and reduces their requirement for more expensive working capital financing. This saving can be invested back to the smallholders, once agreed by the end-buyer and supplier to do so. In the Malawi dry run, the simulation before the pilot, this saving would be a 1–3 percentage point increase to the value of the smallholder green leaf.[4]

New and additional data

An additional innovation of the Trado model is that it provides new data about the smallholder and goods to the end-buyer, specifically data about goods' quantity and time of delivery. This creates greater transparency of the nature of the raw goods associated with the purchase order. The Trado model tracks the '**digital assets**' from smallholder to processor. Stored on the blockchain, there now exists an incorruptible asset history.

Guaranteeing smallholders gain the Trado saving

The project provided evidence of the distribution of the 'Trado saving'. The model's closed loop nature assures that this saving is passed on to smallholders. This is achieved through multiple parties affirming through two-way agreements (eg a **handshake**) that i) the saving was generated through the Trado model and ii) the saving was distributed to the smallholder community. In the pilot transactions, this happened through the Ethical Tea Partnership (ETP), an NGO.

The multi-party agreement on the level of saving, alongside evidence of how the saving was spent, is stored on a blockchain as a data record. In the case of the Malawi pilot this was a public blockchain[xiii] which was accessed via the platform of consortium member Provenance.

1.3 The Malawi pilot

The dry run for the Malawi transactions saw a 1–3 percentage point increase in the value of smallholder green leaf. The consortium decided that this increase was interesting enough to merit running two live pilot transactions for real Malawian tea. The consortium members involved in these pilot transactions were BNP Paribas, Halotrade, IDH, Meridia, Provenance and Unilever.

The supply chain data collected for the pilot included data points from *individual smallholders, goods traded* (the tea) and *supply chain finance* (eg trading terms, cost of funds). See Annex I: Technical blueprint, Section 2 'Trado data schema' for details.

Two purchase orders were run using the Trado model in addition to the regular trading and trade-financing processes between Lujeri and Unilever. Due to operational inefficiencies, an uplift of 0.68 percentage points was generated, instead of the projected 1–3 percentage points. This was unexpected and reduced the length of time between trust points. The longer it takes to do the invoice financing (ie for the bank to be able to buy the invoice), the lower the Trado saving will be. The operational inefficiency was caused because the transactions needed to be done on the buyer side outside business-as-usual. This led to a delay in the approval of the purchase orders and therefore the processing of payments. Thus, the supplier had to use the more costly, local working capital financing for longer.

Nonetheless, an actual saving was still generated in the pilot and appropriately redistributed to smallholders via a locally active NGO, the Ethical Tea Partnership (ETP). The ETP purchased resources for a Farmer Field School, a global programme to educate farmers on more sustainable farming practices.[6]

[xiii] This public blockchain is called Ethereum, see Annex IV p38.

A handshake was completed in the system of consortium member Provenance between two other consortium members: Unilever and Halotrade (who provided the Trado saving calculation component within the Trado model). This handshake affirmed that the saving value had been generated by the Halotrade calculator as part of the Trado model. A further handshake between Unilever and ETP affirmed that the saving had been spent on the ground in Malawi.

1.4 A note on sustainability impact measurement

The pilot primarily focussed on whether a data-for-benefits swap could be made to work in a sustainable development context such as Malawian tea. The objective of the swap is to provide transparency on sustainability efforts, but the effectiveness of this technique will always depend on the level of ambition in the sustainability criteria/metrics used for the data involved.

Distribution of Trado saving

The pilot project did not aim to innovate on how savings could be distributed, instead relying on a locally active NGO along with the end-buyer to determine the most appropriate distribution to maximise **social impact**.

In the two pilot transactions, direct payments to smallholders were ruled out early on. Thus, the NGOs and end-buyer agreed that the saving would have the greatest impact if allocated to FFS. This decision was based on research by ETP stating that 72 per cent of smallholders reported an increase in yields after their participation in FFS, and 85 per cent said they saw an increase in income from sales,[7] while also aligning with the end-buyer's corporate responsibility strategy.

Logging of impact data

The Trado model does not prescribe a specific set of impact metrics. Once impact definitions have been determined, the model enables the logging of impact data. For the pilot, none of the smallholders had attended FFS, so this served as baseline data from a developmental perspective. If the model were to be applied further in Malawi beyond this pilot, it could capture the increase in FFS participation over time. This information then would be made available to the end-buyer, NGOs, financiers and consumers to display the social impact over time from implementing the Trado model.

The wider sustainability components of the data collected for Trado pilot transactions centred on SDG 12 – Responsible Consumption and Production, particularly SDG 12.6 ("Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle") and SDG 12.A ("Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production").

For the pilot, relevant data for SDG 12.6 and SDG 12.A was collected from the perspective of tea production in Malawi. This consisted of bespoke smallholder data newly collected by consortium member Meridia from individual smallholder farmers. This covered the following demographic, economic, financial and agricultural data from individual smallholder farmers:

- The demographic data included: gender, marital status, number of children, occupation, education level, possession of ID document, possession of 'Lujeri card', number of dependents, and distance to preschool/primary school/health centre/market.
- The economic data included: type of floor in dwelling, type of walls, walls plastered or not, type of roof, solar panels, type of lighting source, type of cooking source, use of energy-saving measures, type of water source, location of water source, time required to access water source, type of toilet facility, access to waste disposal, ownership of house items such as mobile/radio/colour TV/fridge, type of transport, source of income, access to mobile money.
- The financial data included: borrowing, lender, interest rate, barriers to borrowing, savings, state of farm finances in 2017, breakdown of farm expenses in 2017.
- The agricultural data included: average parcel size in hectares, working with day labourers or not, number of day labourers, number of planted trees, number of crops grown from a list of 20, percentage of farmers growing each crop, type of topography, tea plant density, tea plant quantity per type of topography, average age of tea bushes, tea varieties, type of tea varieties. number of planted trees, number of crops grown from a list of twenty, percentage of farmers growing each crop, type of topography, tea plant density, tea plants quantity per type of topography, average age of tea bushes, tea varieties, type of tea varieties (or 'cultivars').

Chapter 2

Applicability of the model in other supply chains

Through the consortium's research, several important criteria were identified for the successful application of the Trado model (see table in Annex II). They include specific financial, structural and timing characteristics of a supply chain that were identified as either critical or highly important to generating a finance saving in a supply chain through the Trado model. The most important of these criteria are required for the model to generate a benefit at all. These therefore offer an acid test of whether the model is applicable in a given supply chain.

To test the robustness of the Trado model used in the pilot, as well as its wider applicability, deeper analysis was conducted into three supply chains.

The supply chain analyses were:

- an extension of the Malawi tea pilot (Unilever)
- Rwandan tea (Sainsbury's and Unilever)
- Brazilian coffee (Sainsbury's).

2.1 Dry runs to test variance

Notes on methodology
The dry runs were desk-based, using historic data, without any real transaction taking place. The first three boxes below describe an extension of the Malawi tea context as well as the supply chains in Rwanda and Brazil. The last box outlines supply chains which were found to be inappropriate for the Trado model and explains why.

These dry runs consisted of two activities. First, a given supply chain was checked against the key Trado criteria. Secondly, projected purchase order data was used to calculate the estimated annual saving of applying the Trado model to each supply chain (see 'Trado model architecture' in Annex I for calculation methodology).

Supply chains of Trado consortium members (Unilever and Sainsbury's) were chosen to make most efficient use of available resources, time and data. All tested supply chains met the four critically important Trado criteria (1.1–1.4), and the potential applicability of the supply chains for the Trado model was guided by the six high-priority Trado criteria (2.1–2.6).

Trado Criteria – see Annex II for a more detailed description

#	Priority	Criteria
1.1	Critical	Difference in cost of borrowing between buyer and supplier must be >0 per cent
1.2	Critical	Source of funds availability in end-buyer jurisdiction
1.3	Critical	The source of raw goods for the supplier is a smallholder
1.4	Critical	Available data per smallholder on raw goods produced
2.1	High	High currency value of the produced goods
2.2	High	High volume of smallholder goods per transaction
2.3	High	High transaction frequency
2.4	High	Long production time (interval between raw goods transforming to produced goods)
2.5	High	Long interval between produced goods and payment by end-buyer
2.6	High	The number of commercial entities between the end-buyer and smallholder must be one or two

The potential saving for each dry run was calculated by determining the percentage point increase of the value of the raw material.

Dry run 1: Malawi | Tea | Unilever - Lujeri pilot extension

In addition to the pilot, further analysis examined the benefits if the Trado model were to be implemented across all Unilever's tea purchases from the Lujera tea estates.

Background

Tea is Malawi's second biggest export[8] and the sector provides livelihoods to more than 18,000[9] smallholders.

Poverty is prevalent in the country, with over 50 per cent of the population below the poverty line.[10] Efforts are being made to raise the standard of living. A living wage benchmark was set in 2014[11] and the Malawi Tea 2020[12] initiative was instigated in 2015 to move the tea sector to provide living wages to tea workers and a living income to smallholders. The living income in Malawi is currently ~US$ 2.24[13] per day and would need to double to meet the benchmark.

Potential Applicability

Lujeri Tea Estates processes green leaf from over 10,000 smallholders alongside their own estate-grown produce. Unilever's contract constitutes a considerable percentage of Lujeri's annual production volume of tea,[14] which creates a favourable opportunity for Trado as the **transaction frequency is high (Key Trado Criterion 2.3)**.

As Malawi is a least developed country (LDC),[15] the **cost of funds differential between a supplier and buyer of Unilever's is also high (Key Trado Criterion 1.1)** and therefore represents an opportunity for meaningful saving generation. The greater the funds differential between buyer and supplier, the greater the value of the saving as less money will be spent on a high local interest rate by the supplier.

Challenges

The Malawi tea supply chain has certain attributes that decrease the level of potential savings generated through Trado. The **price of tea is low (Key Trado Criterion 2.1)** in Malawi,[16] which limits the value of tea that can be financed earlier through the model, therefore reducing the value of the interest saving.

Additionally, compared to other dry runs, the **smallholder contribution of green leaf to the overall purchase order is low (Key Trado Criterion 2.2)**. Approximately 30 per cent[17] of the green leaf processed by the estate is grown by smallholders. This product is combined with estate-grown green leaf, which is considered of a higher quality. So not all the green leaf in a batch bought by the buyer is produced by smallholders. The agreement between the buyer and the supplier is that earlier financing is conditional on the green leaf being produced by smallholders. Therefore, not all the tea sold can be financed earlier. In this context, the economic viability of scaling a Trado model could be challenged if its application were limited to smallholder product only.

The Malawi supply chain also benefitted from a pre-existing supply chain finance structure. This meant that the **period between the produced goods being made available and the payment to the supplier was shorter (Key Trado Criterion 2.5)** than in supply chains without supply chain finance. This therefore reduced the saving opportunity, as the cost of funds differential was applicable for a shorter period of time.

Projected savings

The analysis revealed that the estimated cost of funds differential (the 'Trado saving') if the Trado model were to be extended would be 2.88 percentage points. The calculation to get to this figure was based on 2018 figures of Unilevers purchased volume (of smallholder tea only) and the cost of funds differential with the supplier.

Dry run 2: Rwanda | Tea | Finlays

Background
Like Malawi, tea is one of Rwanda's most important exports[18] grown primarily by smallholders. A 2013 report found that were around 27,000 smallholders, who own about 70 per cent of the total area used for growing tea.[19]

Smallholder tea farmers are seen as integral to the country's economic success.[20] Significant efforts – such as the privatisation of factories[21] and the government's reform of green leaf pricing[22] – have been made to enhance the profitability of the tea sector. Even though these initiatives were specifically aimed at improving the livelihoods of smallholder tea farmers, poverty still affects more than a third of the country.[23]

Potential Applicability
Both Unilever and Finlays, a leading UK-based tea supplier to Sainsbury's, purchase tea from factories in Rwanda. These factories have a smallholder green leaf contribution of 100 per cent (Unilever) and 75 per cent (Finlays) to the factory's tea production.

Rwanda is known for producing **high-quality tea and therefore garners a higher price (Key Trado Criterion 2.1)** than producers in Malawi. This feature favours the applicability of the Trado system as it increases the value of goods to be financed earlier, which in turn generates a larger saving.

The Rwanda tea context differs again from that of Malawi in that there tend to be small privately owned estates with a large number of contributing smallholders.[24] This **increases the percentage of smallholder-grown tea (Key Trado Criterion 2.2)** in the associated purchase order (75–100 per cent smallholder contribution in the researched cases compared to 30 per cent in Malawi), which creates a greater opportunity for saving generation for smallholders.

Challenges
The Trado model requires working capital financing to be used by the supplier in order to **generate a saving (Key Trado Criterion 1.1)**. Factory privatisation is ongoing within Rwanda and the needs of factories for working capital funding differ depending on the stage of investment from external companies. Neither factory in the Unilever or Finlays supply chains utilised funding for working capital owing to sufficient cashflows generated from the factory's operational cashflows. These supply chains are therefore not suitable for a Trado model – no saving can be generated as there is no requirement for external sources of finance.

Dry run 3: Brazil | Coffee | Finlays

Background

Brazil is the world's largest coffee producer, producing around a third of the world's supply.[25] The country is classified as an upper middle-income country, with research on 2014 identifying approximately five million registered smallholder farmers in Brazil across all commodities[26] representing 84 per cent of all farms.[27]

Agriculture and smallholder farming are recognised as critical to the country's economy.[28] Significant efforts have been made to bolster smallholders and reduce poverty, including government commitments to buying from family farms for the public sector[29] and subsidised farm loans.[30] However, approximately 21 per cent of the country's population still lives below the poverty line.[31]

Potential Applicability

Finlays, supplying into Sainsbury's, purchases coffee from a co-operative located in Southern Brazil, which processes coffee grown solely by smallholders with approximately 640 coffee growers.

As the product is produced entirely by smallholders, this is very favourable to the applicability of the Trado model as the **total value of the purchase order will be financed earlier (Key Trado Criterion 2.2)**.

Because of the seasonal nature of coffee, which is harvested three to four months of the year, it is necessary for the co-operative to store the coffee for seven months, on average. The **lengthy storage period is suited to the Trado model (Key Trado Criterion 2.4)**, as a longer period between production and payment means a greater saving on borrowing under the Trado model.

Challenges

In recognition of the importance of the agricultural sector, the Brazilian government provides subsidies in the form of farm loans, which are applicable to the coffee industry. The **cost of working capital for the supplier is therefore reduced (Key Trado Criterion 1.1)**, which limits the potential impact of the Trado model. The model leverages the cost of funds differential between buyers with stronger credit ratings in lower interest rate environments and suppliers with weaker credit ratings in often higher interest rate environments. The lower the differential, the lower the saving opportunity.

Projected Savings

The analysis revealed that based on Finlays purchased volume and cost of funds differential with the co-operative, the estimated saving from implementing a Trado model could be as large as a 2.19 per cent increase to the market value of the coffee (based on 2018 and year-to-date 2019 figures).

Supply chains not applicable to the Trado model

The following supply chains were found not to be applicable to the Trado model: Unilever tea from Rwanda, Sainsbury's cashew nuts from Madagascar, and Unilever apples from Kyrgyzstan.

In all these cases the supplier **did not utilise working capital from a third party** (ie a bank), and therefore there was not an external working capital financing differential with the buyer.

Without this, the Trado model cannot generate a saving and therefore cannot create a benefit to the smallholder.

Chapter 3

Lessons learned

Lessons in relation to the end-buyer (Unilever) in the Malawi pilot

Strong existing supplier relationships were a condition in the current Trado model in order to unlock financing earlier. The Trado model creates real-time transparency regarding the existence of the raw goods associated with a purchase order. This allows for moving the 'trust point' earlier in a supply chain. However, in the pilot, high levels of trust already existed in the supply chain. Further testing of the model should explore the applicability of the model to de-risk earlier release of financing where buyer–supplier relationships are less established.

The end-buyer is willing to release finance earlier for a portion of the overall purchase order. For the Malawi pilot, only 13 per cent of the tea volume in the purchase order was contributed by smallholders and financed earlier through the Trado model. For the supply chains in the dry runs the product could potentially be 100 per cent smallholder produced. Depending on the agreement between buyer and supplier, this means that the full purchase order could be financed earlier. Doing so has implications for delivery risk (ie the buyer receiving the goods on time and in the state that was agreed). It would entail recognising title transfer of stock earlier than present (which is currently either post-shipment or post-delivery), something which should be considered in further research of the Trado model.

Current tea production processes do not enable tracking of raw goods into the produced goods purchased by a specific end-buyer. Once green leaf is received from smallholders, it is mixed before being processed by the factory into black tea. The Trado model cannot determine that a particular smallholder delivery of green leaf went into a specific purchase order. Tracking the goods therefore needs to take a **mass balance** approach. The value of the purchase order financed through the Trado model should be based on the percentage of smallholder green leaf that was delivered during a specific production period.

Lessons in relation to the Processor

Generating value for the processor is key to driving adoption of the Trado model in a tea supply chain. The processor does not benefit sufficiently from earlier financing if the smallholder contribution to the purchase order is low. The processor is a critical actor in the tea supply chain, key to driving adoption and further exploring the value case of the Trado model. Further testing could explore the opportunity of financing the full delivery (including estate-own/non-smallholder tea) earlier to increase benefit to the processor. Additionally, engaging the processor on interventions that direct the savings towards improving the quality of smallholder tea would also add value to both the processors and the smallholders' products.

Lessons in relation to the Smallholder

A value exchange is required to regularly collect reliable sustainability data on smallholders. The pilot relied on a combination of smallholder data provided by the processor, and individual profiles with data manually collected by consortium member Meridia. Other existing parties on the ground could share similar data which they collect on a regular basis. For instance, the Rainforest Alliance is leading initiatives as part of the Malawi Tea 2020 programme. Also, anecdotal signals from smallholders in Malawi indicated that they would be willing to change their production practices in exchange for an additional 10 per cent or more of a living income. Testing of the level of elasticity of their willingness to barter data for various levels of incentive did not take place due to time and resource constraints.

Lessons in relation to the Banks

The Trado model as it stands did not create any material disturbance to business-as-usual banking processes. The risk rating of the buyer was applied earlier to the supplier; however, no changes in the underlying risk evaluations took place. The additional counterparty data generated through Trado could be analysed to identify whether the credit risk is better for suppliers performing well from a sustainability perspective. If so, that might lead to preferential financing by banks through a change in their credit risk models. However, overhauling these models using such new data would entail a major effort using multi-year data sets. Such changes may also require involvement of banks' regulators for model validation. Also, the Trado model enables banks to service their corporate clients in obtaining supply chain visibility. Finally, the project learned that data generated through the Trado model might enable banks to innovate products, for example, in the structuring of novel types of investment products for the impact investing market.

Chapter 4

Future development and conclusions

The Trado consortium has noted that the following areas would benefit from further development.

1. Increasing data integrity through smallholder engagement

In future work on the Trado model, ways should be identified to **increase the active and accredited engagement of the smallholders.** For example, they could be more actively involved by affirming or denying key data points. This way the smallholders would improve data integrity with digitally signed evidence. The Malawi pilot relied on Lujeri as a central source of goods data, and Meridia as a source of sustainability data. A future development could incorporate the smallholder as a co-owner of the data sets to improve data quality and trust.

Another possible development strand would be for goods data to be generated at the point when ownership changes from smallholder to processor. An example would be an Internet of Things (IoT) weighing device,[32] which could act as an independent automated data source. Such interventions could enable both the buying and supplying parties to agree publicly on a blockchain on the amount, quality and price paid for delivered goods. Such information could be further corroborated by the seller and buyer as an additional source of data used in financial and risk calculations.

For sustainability data, tools such as mobile phones could support smallholder-farming practices while simultaneously collecting data. The Malawi pilot offered limited scope to use such technologies due to smallholder illiteracy and lack of mobile access. However, a variety of emerging digital solutions support first mile producers with digital productivity tools.[33] These tools can triangulate data points, such as with satellite imagery, to provide insights to smallholders on yield and to end-buyers on environmental impact. This technology has the potential to create new dynamic smallholder data backed by third-party proof, boosting its credibility.

Building evidence to enhance digital identities in the supply chain. The Trado model could enable the build-up of data points over time to generate positive social, environmental and economic impact for smallholders. Individual smallholders could amass a verified track record of performance, in turn enabling them to access new lending and investing opportunities. This might lead to the creation of a new peer-to-peer reputation mechanism to verify or deny the veracity of the sustainability data provided.

Digitising trade finance documentation further to bring forward the release of finance. There is momentum within various blockchain technology communities for solutions that provide a **single source of truth** of trade finance documentation.[34] Future work on the Trado model could entail integrating with this work to reduce the time taken to process invoices through siloed systems across the processor, end-buyer and bank. During the pilot this process took a week from the purchase order being raised to the payment being released to the processor.[35] These innovative solutions will create further time efficiencies in the release of finance. If these time savings were to be achieved this should positively influence the value of the Trado saving. It should also generate greater trust in the transactions being financed. This is because a decrease in processing time reduces the potential for fraud, especially if unique and original trading documents can be authenticated at source. Such improvements in speed and documentation reliability would pave the way for further financing innovations that could help sustainable development.

2. Increasing market adoption through consumer demand

The Malawi pilot tested the impact of closing the information loop on the allocation of the Trado saving. It did so in such a way that the sustainability data could be made visible to prospective shoppers. A qualitative, small-scale, deep-dive consumer test was conducted with 16 tea consumers. Four packaging concepts with Trado-generated sustainability messages were tested on actual consumers of leading tea brands to identify consumer preferences and potential impact on purchase behaviour.[36] The findings suggested that communication of a measurable positive financial, social or environmental impact at smallholder level did indeed engage both segments of consumers tested to preferentially choose those products. Findings also indicated that for mass-market brands, on the other hand, this preference is likely to come after traditional factors such as price, quality, brand loyalty and taste. Further research should be conducted to identify the extent to which a change in consumer behaviour could be effectuated through verified information such as that provided through models like Trado.

3. Enhancing the sensitivity of Trado as a sustainable development tool

As indicated earlier, the Trado model does not prescribe a specific set of impact metrics. Once impact definitions have been determined the model enables the logging of impact data. When applied to a diverse set of supply chains and commodities this might lead to a diversity of sustainability claims, each with a varying level of robustness, all from the same data sourcing model. Further research into the Trado model therefore should examine whether, how and at what level a standardisation of impact measurement across users of the model should and could be achieved.

Also, in a future scenario the structure for distributing the Trado benefit could be changed to give more say to the smallholders. In the pilot, given the previously described stipulation by Lujeri that no individual payments could be made to smallholder farmers, the Trado model used a specific approach to funnel the saving into one designated fund. This fund was managed by Ethical Tea Partnership (ETP), which determined which sustainable practices would be supported. In this case, the ETP nominated their Farmer Field School (FFS) as the investment candidate and some tools (eg fertilizer scoops) for these schools were purchased. In a future scenario it should be possible to have a 'savings fund' controlled and managed by the farmers themselves, or for savings to be paid to them directly. The applicability and suitability of such a distribution model would be dependent on multiple context-specific characteristics such as existing relationships, negotiating power of each supply chain player, cost of organisation, and others.

4. Increasing the value of the saving and further risk reduction for banks

The Trado model currently requires the buyer to approve payment of an invoice while the goods are still in the physical possession of the supplier. While not unusual in commercial transactions, the buyer must consider how to mitigate delivery risk by the supplier. This is normally achieved through insurance or risk alleviation, whereby another party, such as an investor, takes the first loss. In the former case, this could be either cargo insurance where the point of origin begins earlier, or through credit insurance (business interruption risk cover on the supplier), both of which might increase the insurance premium.

At a workshop with bank representatives, several opportunities were identified to generate new value from Trado, including i) improving credit risk evaluation – which would require a longer term approach, ii) increasing the scope of supply chain finance solutions and iii) identifying external (impact) funders that could take a first loss.

Conclusion

The Trado consortium ventured into an exploratory and experimental project to learn whether preferential access to trade finance using new financial technologies could drive positive social, environmental and economic impact. The Trado project has delivered a data-sharing model that can unlock financial incentives in return for information. In this instance the information was related to sustainability and indicated the project's strong potential to support the delivery of SDG 12's focus on sustainable consumption and production.

Within the frame of the Trado project two propositions were validated:

1. Blockchains enable data to be collected from global networks to describe the flow of materials and their attributes (impact and quality) within them.
2. The resulting flow of data can improve the pricing of supply chain finance.

These findings indicate the Trado model has potential applications beyond tea in Malawi, and could support social and environmental improvements, especially where smallholder farmers are part of global supply chains and when they are found in low-income countries with high costs of borrowing.

Given these realities, there is merit in investigating whether there is significant financial and sustainability value in the Trado model beyond the scope described in this report. To that end, the consortium has developed a blueprint to support wider exploration of the uses of the Trado model.

Annex I

Technical Blueprint

This Annex provides the technical blueprint of the Trado model, with the aim to provide a deeper understanding of its design and to inform a DIY replication.

This section contains three main parts:

1. the Trado **model architecture** outlining the flow of data, money and goods
2. the Trado **data schema** outlining the various data inputs and outputs required to facilitate the model
3. the Trado pilot's **tech stack** outlining the technology services used to run the model

Together these illustrations and descriptions detail the model's technical aspects, which can be applied, or experimented with, independently.

Blueprint part 1: architecture of the Trado model

Trado model Four key technical components	I. User profiles	II. Asset tracking	III. Finance saving calculator	IV. Verification of saving distribution
	designed to provide transparency into supply chain actors: *a digital user profile capturing key business information (name, location etc.)*	to provide transparency of raw goods to buyer: *digital product information including the transfer in ownership as the physical product moves through the supply chain*	to measure the saving derived through earlier financing: *an algorithm for calculating the savings accrued by a supplier from the earlier access to supply chain financing*	and associated impact on the ground: *digitally signed agreements through user profiles against a statement*

The architecture diagram of the Trado model illustrates the **flow of data, money and goods** throughout the Trado model. The model consists of four main technical components and a **six-stage process to deliver supply chain finance savings to smallholder farmers**. This section describes these technical components and outlines how they were applied in the Malawi pilot.

The six-stage process is:

Stage 1: **Capture user profile data**

Stage 2: **Track raw goods from smallholder to processor**

Stage 3: **Capture purchase order contract details**

Stage 4: **Calculate the Trado saving and early discounting of the purchase order**

Stage 5: **Distribute the Trado saving to the smallholder community**

Stage 6: **Evidence the Trado saving distribution** (shareable with end-consumer)

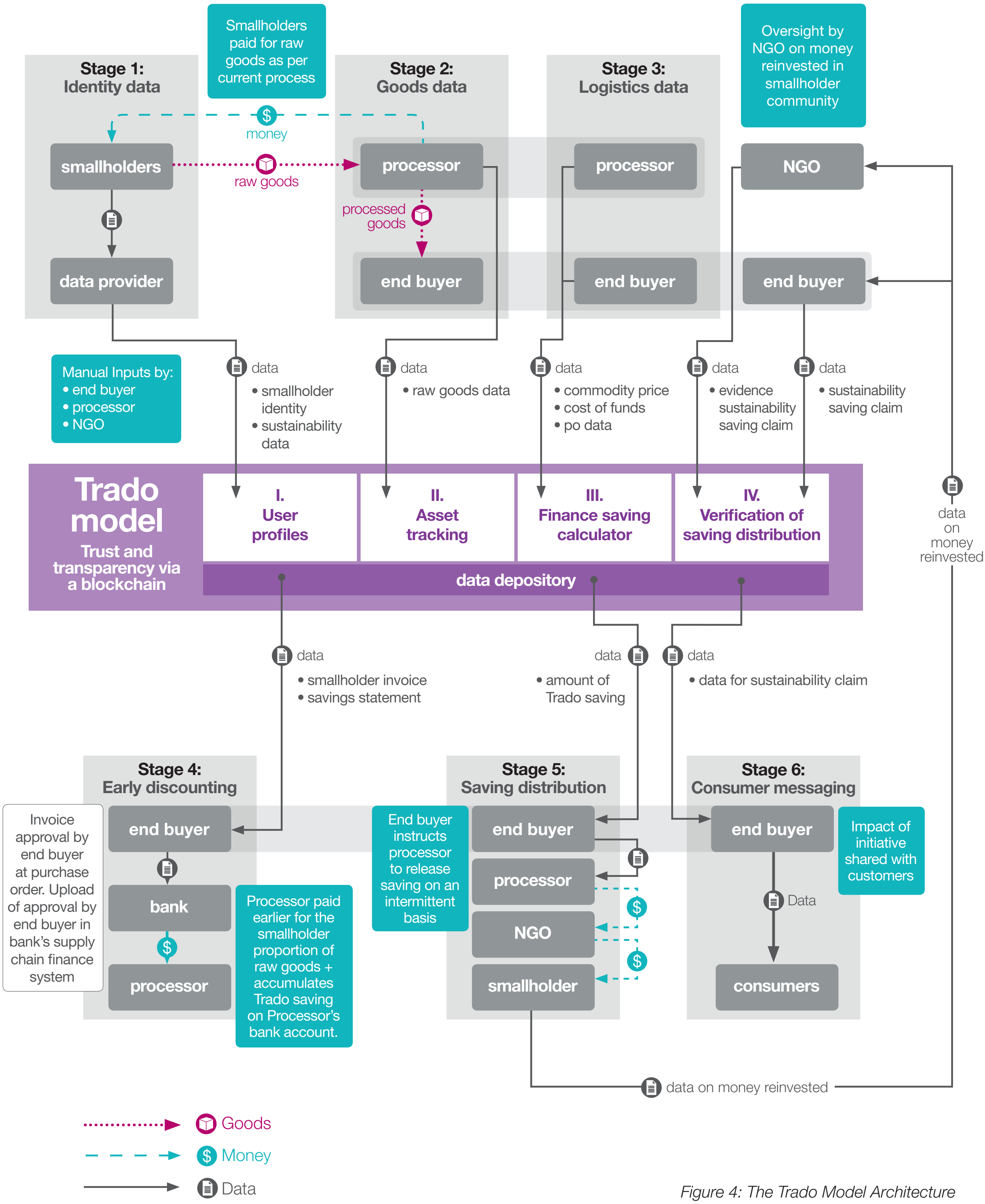


Figure 4: The Trado Model Architecture

Stage 1 of Trado Process: Capture user profile data

Data flow = Data Provider → Trado Component I (user profiles)

Smallholders

Smallholder identity and sustainability data (either collected by the data provider or provided directly) is uploaded into the data depository component of the Trado model. The data creates a unique smallholder profile with name, smallholder ID (from the processor internal system), location and sustainability metrics.

To protect the identity of the smallholder the profile information is only made available to supply chain participants linked as digital 'connections' in the Trado model. A connection is a two-way digital agreement between two actors with profiles in the Trado model (for the smallholders in the pilot the connection was made with their approval on their behalf).

Other supply chain actors

For other supply chain actors (end-buyer, processor, NGO) the user profiles are created through the user interacting directly with the Trado model and manually entering their profile information (name, location) through a user interface in a data depository.

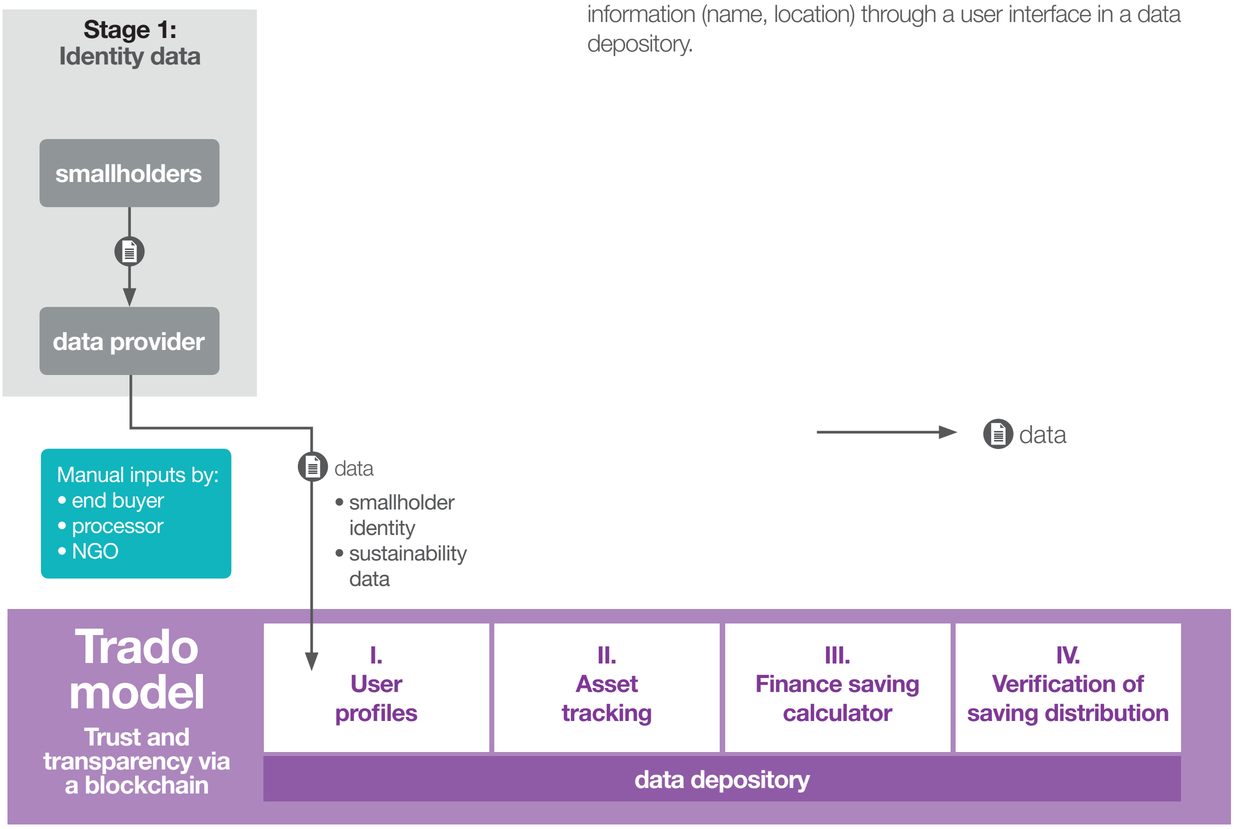


Figure 5: Stage 1 of the Trado Process

Stage 2 of Trado Process: Track raw goods from smallholder to processor

Data flow = Processor ➔ Trado Component II (asset tracking) ➔ Trado Component III (finance saving calculator)

The smallholder raw goods deliveries are collected by the processor through their internal IT system (as per the current business process – goods flows). This data is then provided to Component II of the Trado model where it is uploaded into the data depository that attributes raw goods deliveries to smallholder profiles based on the linking smallholder ID.

Every smallholder delivery of raw goods is registered on a blockchain as a digital asset with a batch ID referencing the harvest date. This asset maintains an immutable, date-stamped register of ownership and quantities for the physical asset it represents. The digital asset is transferred to the processor's profile on receipt of the 'goods received' data at Component II of the Trado model. This data is used as the processor's agreement in a two-sided **handshake**. Smallholder agreement can be direct, via an independent intermediary or via data captured in the process (eg when a swipe card is used to register delivery of raw goods). The smallholder can be represented by an independent third party in this process, such as an NGO or co-operative, if they are unable to perform the registration or handshake directly.

The raw goods data is then extracted from Component II as an input to Component III (finance saving calculator – see Figure 6). This extract contains all smallholder raw goods deliveries associated with a particular purchase order. This allocation is flexible based on production processes. For example, in the Malawi pilot, all green leaf produced during a particular week was assigned to the following week's purchase order. The smallholders were paid on a monthly schedule for the green leaf by the processor (as per the current business process – money flow).

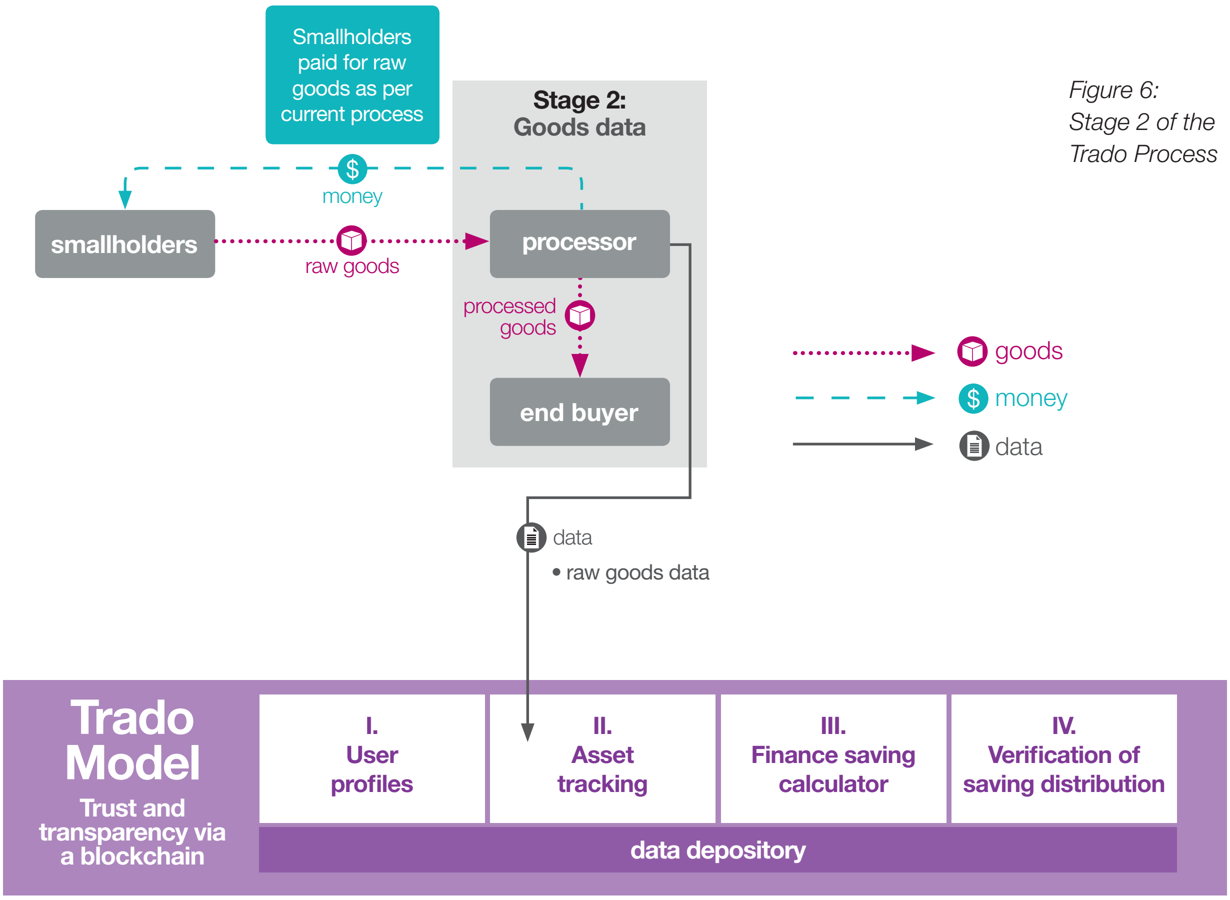


Figure 6: Stage 2 of the Trado Process

Stage 3 of Trado Process: Capture purchase order contract details

Data flow = End-buyer/Processor → Trado Component III (finance saving calculator)

In addition to raw goods delivery data, the finance saving calculator requires logistics data related to the purchase order, as well as the end-buyer's and processor's cost of funds. For the Malawi pilot this data was provided to Component III via an online data entry application called Typeform[xiv] (which allowed the end-buyer and the processor to provide data separately). Typeform allows organisations to engage their audiences with "conversational forms and surveys", the objective of which is to motivate an organisation's audience to provide more data.

This data enables the calculator to determine the savings associated with financing the working capital using the cost of funds of the end-buyer earlier in the supply chain.

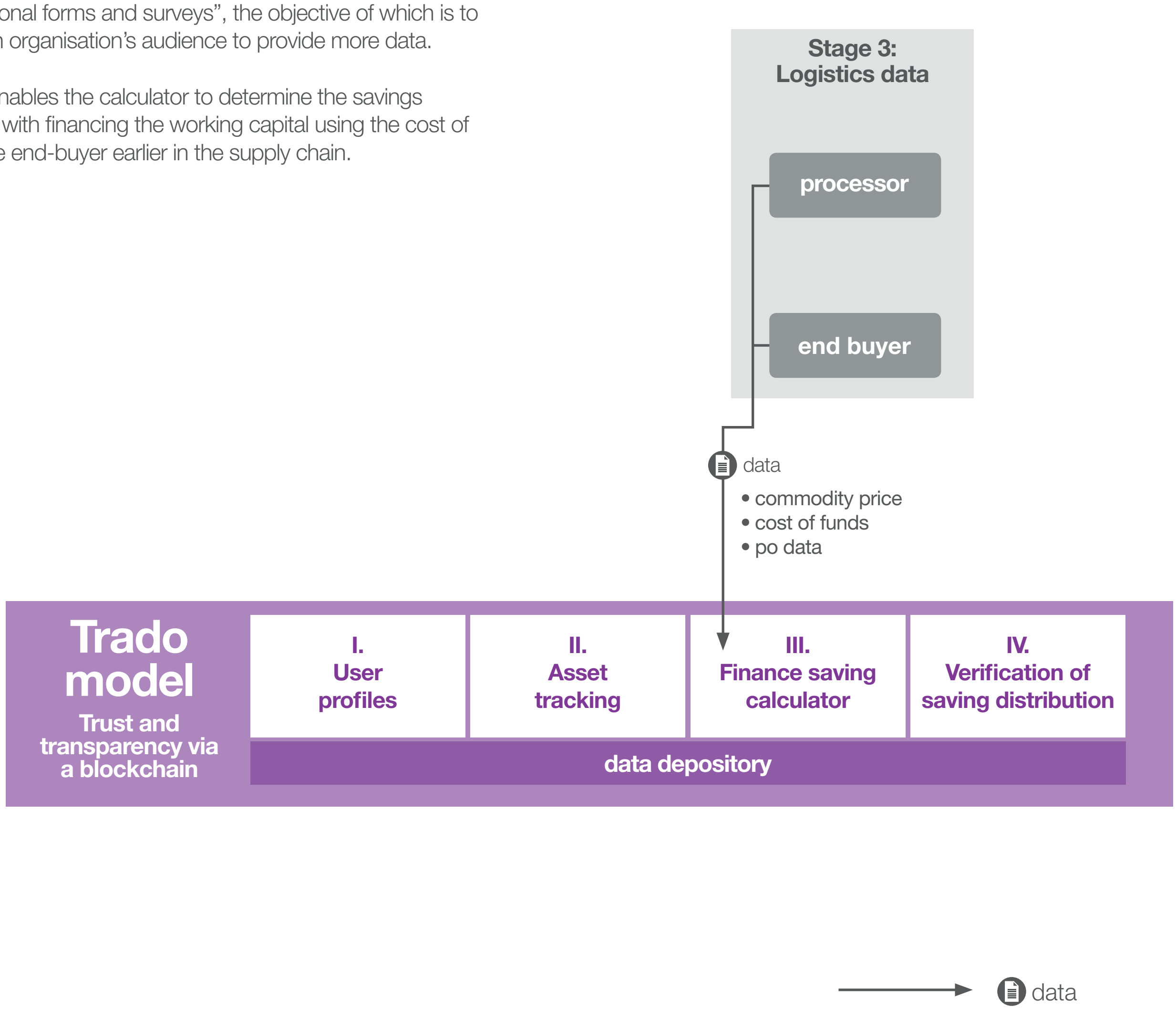


Figure 7: Stage 3 of the Trado Process

xiv https://www.typeform.com/product

Stage 4 of Trado Process: Calculate the Trado saving and early discounting of the purchase order

Data Flow = Trado Component III (Finance Saving Calculator) output → End-Buyer

The finance saving calculator is an algorithm for calculating the savings accrued by a supplier from the earlier access to supply chain financing. Using inputs from the buyer and supplier as well as smallholder raw goods data from the blockchain, it calculates the value of a Trado invoice for the early discounting of the smallholder-produced portion of a purchase order.

This is then verified by both buyer and supplier, after which the invoice is raised, approved and **discounted** by the buyer's bank. Inputs from the supplier's and the buyer's bank are used to calculate the difference in financing costs, and this differential is multiplied by the number of days of finance saving. The output is a finance saving which is verified by both supplier and buyer. The algorithm can be expressed according to the following formula:

$$FS=FV*PD\Delta*COF\Delta\div DB$$

FS = *Finance Saving,* **FV** = *Financeable Value,*
PDΔ = *Payment Date Differential,* **COFΔ** = *Cost of Finance Differential,* **DB** = *Day Basis.*

The processor then raises an invoice for the smallholder contribution to the purchase order and submits it to the end-buyer (as per current process). Once the invoice is approved, the end-buyer submits it into the bank's supply chain finance platform. The bank enters the LIBOR and risk margin into its supply chain finance platform, equating to the all-in discount rate of the end-buyer in Component III. This is the final data point required to calculate the initial sustainability saving.

The bank then releases payment to the processor (money flow). Following the completion of the invoice payment cycle, the actual shipment date is recorded as a final data point, rather than the estimated shipment date used to run the initial savings calculations. This maximises the saving based on actuals.

The end-buyer will receive the physical produced goods (goods flow) once the shipment arrives.

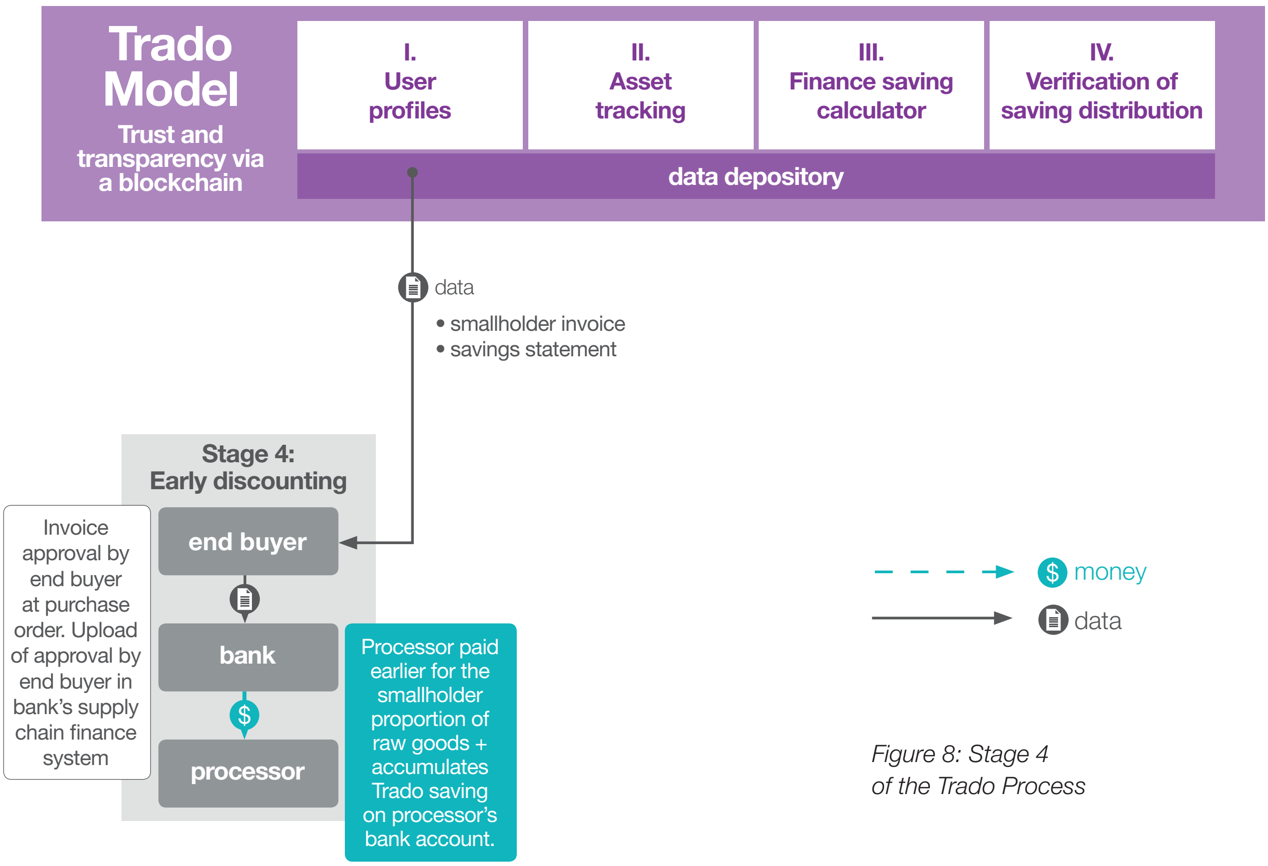


Figure 8: Stage 4 of the Trado Process

Stage 5 of Trado Process: Distribute the Trado saving to the smallholder community

Data flow = End Buyer/NGO ➔ Trado Component IV (**saving distribution verification**)

Once both purchase orders have been processed, a consolidated 'savings statement' is produced by Component III detailing the total saving.

The saving will accumulate on the processor's balance sheet on a recurring basis (weekly for the Malawi use case) and the value is made available to the end-buyer through the 'savings statement' in the Trado model. The end-buyer and NGO will agree a suitable saving value at which to instruct the processor to release the saving. The end-buyer will work with the co-operative or NGO to determine the most suitable initiatives for the funds to support.

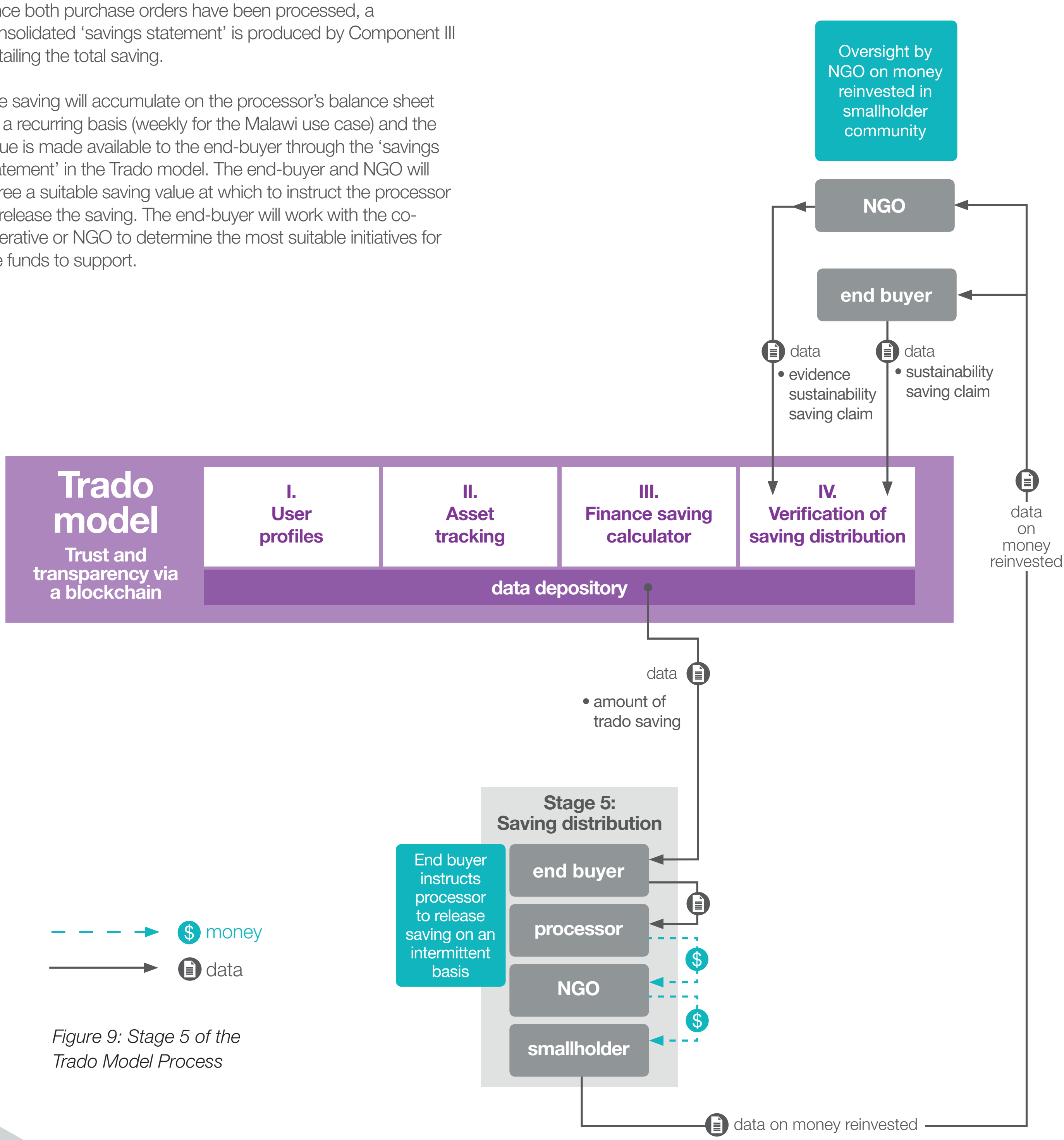


Figure 9: Stage 5 of the Trado Model Process

Stage 6 of Trado Process: Evidence the Trado saving distribution (shareable with end-consumer)

Data flow = Trado Component IV (Saving Distribution Verification) → Consumer

Once the saving has been fully spent, the Trado model facilitates a 'claim' made by the end-buyer that the financial efficiency was distributed to the first mile (as opposed to being absorbed onto the balance sheet).

The claim is stored on the public blockchain and evidenced by a two-way handshake between the end-buyer and the Trado entity. (In the pilot this was performed by Halotrade.) The end-buyer and NGO confirm that the saving is derived from the Trado calculator (saving statement generated from the finance saving calculator included as evidence) and was distributed in the smallholder community (NGO to provide digital evidence of spend in the form of an invoice).

This claim can then be used for sustainability reporting, forwarded to end-consumers or integrated in impact investment products to support assurance related to sustainable initiatives (in reporting, on product pack or in investment product). The provision of information on sustainable credentials is achieved at no extra cost to the reporter, consumer or investor.

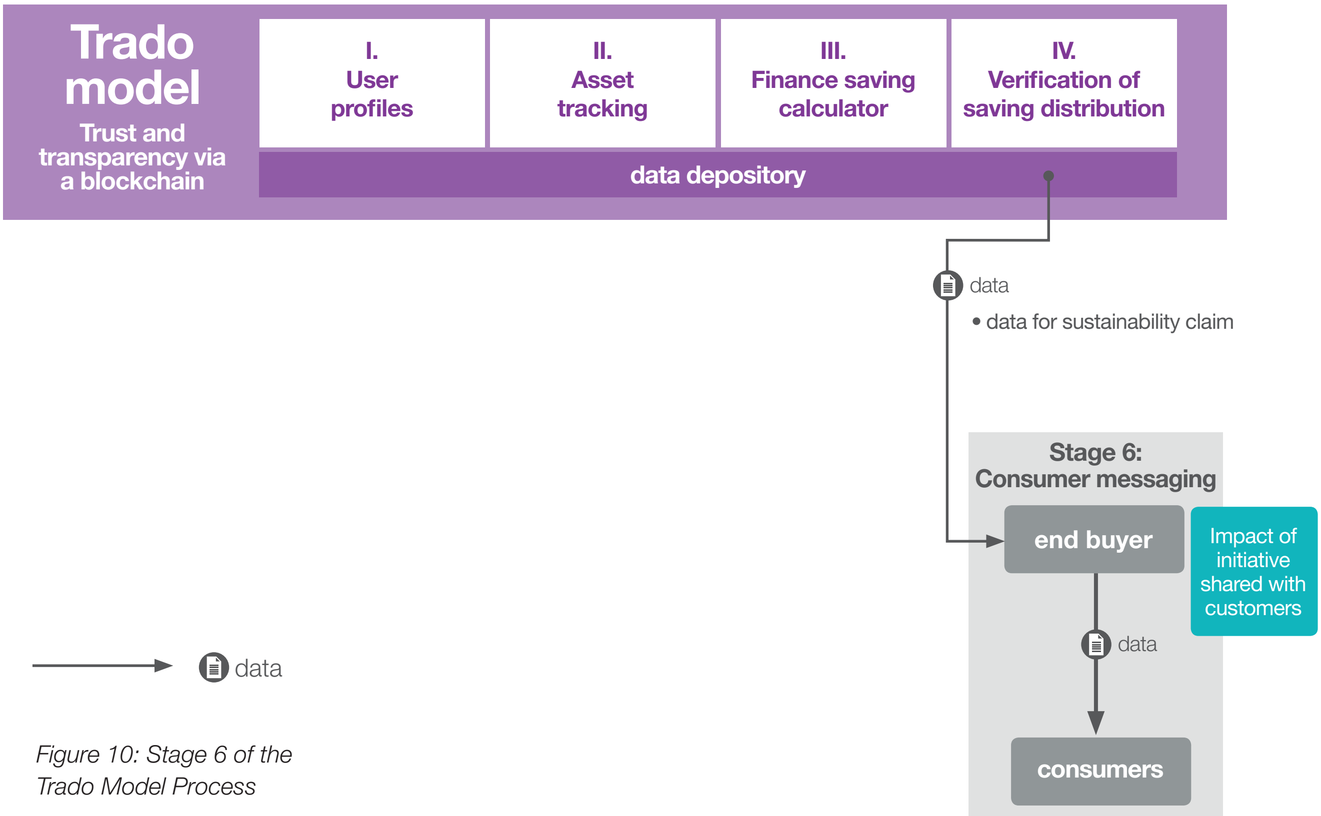
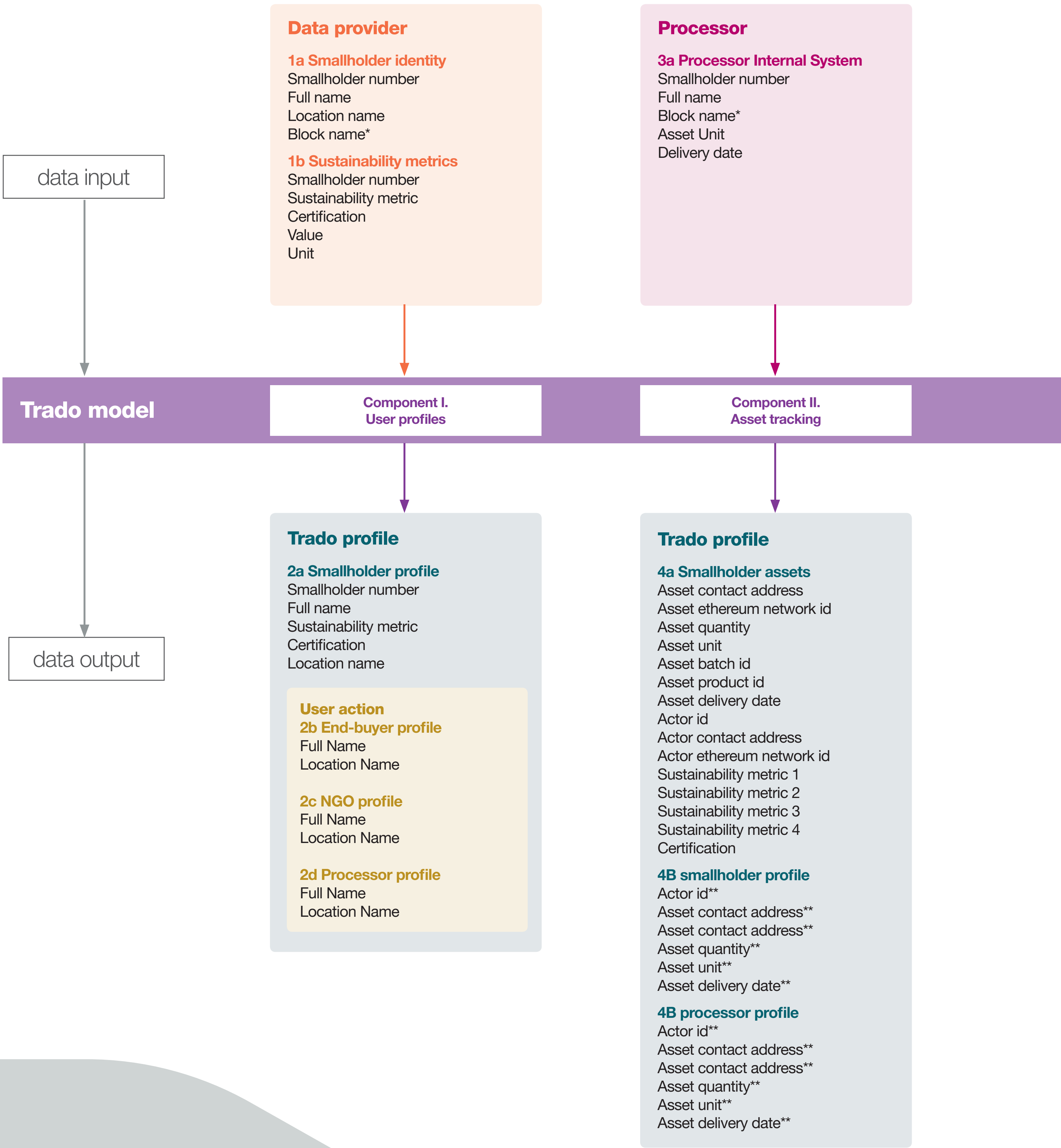
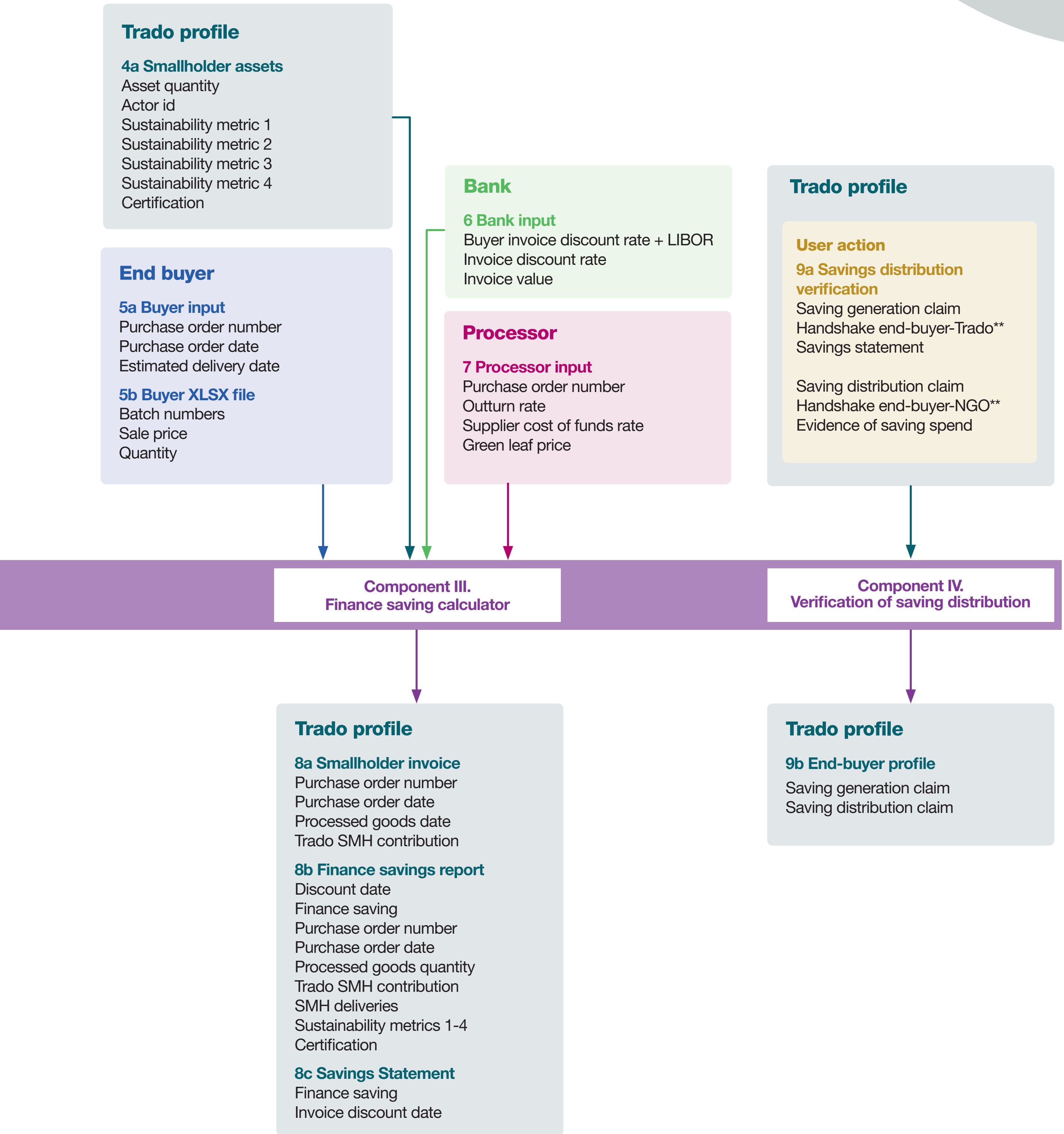


Figure 10: Stage 6 of the Trado Model Process

Blueprint part 2: Trado data schema

The following data schema references the various data inputs and outputs required to facilitate the Trado model. This illustration aims to provide the reader with a deeper understanding of the process design, specifically the data flow aspect, to enable DIY replication. The following link leads to the Application Programming Interface (API) for the Trado model as it was used in the pilot transactions: **https://projectprovenance.github.io/trado-api-docs/#Trado-API**





* Data point optional

** Data point stored on the blockchain

Figure 11: Trado data schema

Blueprint part 3: Trado tech stack

The following tech stack details the technology services used to run the Trado model, including back-end and front-end components. The solution providers in the pilot are included between brackets but other applications and technologies that provide a similar functionality could be used for the Trado model as well.

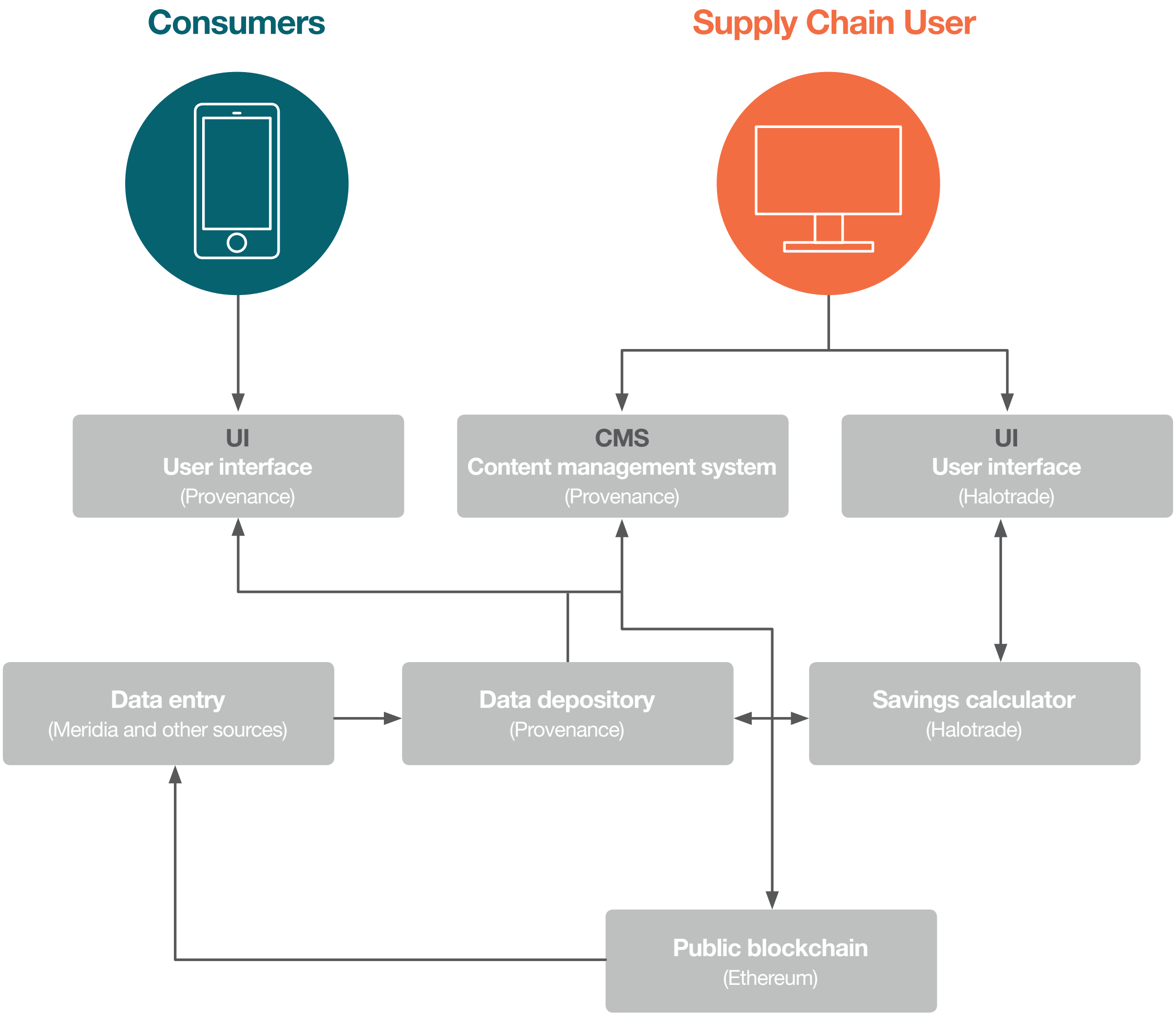


Figure 12: Trado tech stack

Annex II

Risks with the Trado model

This Annex describes some important risks identified for if the Trado model were to be applied at scale. The list below is not comprehensive or conclusive, but rather aims to highlight emerging risks observed during the research and Malawi pilot. Deeper analysis into the risks and uncertainties would be required if applying the Trado model to multiple contexts.

Socio-economic risks

The Trado model is reliant on agreeing revised payment terms between the buyer and supplier as well as setting up a scheme to facilitate this locally. Critically the Trado model should not be applied as a one-size-fits-all approach but rather adapted to best reflect local socio-economic conditions.

Also, since the Trado model may operate in economically or politically unstable contexts, it is possible end-buyers may be unwilling to provide the financial infrastructure necessary for the associated risks.

Separately, without the systematic registration of farmers, the selective use of blockchain for smallholders participating in the Trado model could create a separate ‘class’ of farmers whose freedom to trade with others may be hampered.

Technology risks

The Trado model leverages blockchain technology, whose applicability within supply chains at scale is still at pilot stage. Therefore, aspects of the proposed solution may become redundant or revised over time as collective understanding evolves. Blockchain technology introduces a number of considerations if adopted at scale, which are not covered in this report.

The model also introduces new actors into the digital data capture process who may have low technology literacy (smallholders). This could affect data quality or lead to a slow adoption of the model. Also, data exploitation of such actors needs to be avoided. Considerations need to be taken to leverage digital solutions designed for the first mile, to support model adoption.

Security & data risks:

The Trado model captures multiple data points considered commercially sensitive – such as supply chain actor identity, goods, logistics and financials. The model can move the trust point based on surfacing new data. However, existing data privacy considerations and regulations need to be in place to ensure confidential data is not exposed to any incorrect parties. The commercial sensitivity of certain required inputs (eg cost of funds) could deter certain actors from participating in the Trado model if they are unwilling to disclose this data. Separately, given that privacy remains an unresolved issue on a blockchain, great care needs to be taken with handling smallholder identity data.

Financial risks

Variations of economic conditions could mean a lower saving is generated and thus less benefit passed back to the smallholder. The Trado model depends on the differential in cost of funds between buyer and supplier. This variable is influenced by the economic conditions in the jurisdictions of both the buyer and supplier. Economic developments or government subsidies in the supplier’s country could lower the cost of borrowing (reducing the cost of funds differential). Alternatively, the buyer’s cost of funds could increase based on credit risk changes or increases in LIBOR rates (reducing the cost of funds differential as well). Both of these would narrow the margin between borrowing rates along the chain, therefore reducing the value of the saving to be derived from the Trado model.

Strategic risks:

The Trado model depends on the buyer having a level of risk acceptance to pre-finance shipments (as it brings forward the release of financing to the point before the goods have been shipped). If the buyer changes their appetite for such risk (instigated by a change in corporate strategy, new ownership or the fact the total invoice value per annum exceeds the buyer’s threshold to accept) and therefore pulls out of the Trado model, this would potentially cause significant disruption. This would especially be the case if local co-operatives and smallholders had become used to receiving extra income to finance their livelihoods. As such, a range of options would need to be developed that would not require the buyer to assume the **performance risk** of the supplier, such as extending cargo insurance to point of origin in the factory.

Legal & compliance risks:

Traditional supplier financing structures require the financing bank to have in place internal jurisdictional approval before they can purchase receivables from suppliers (either the processor or the smallholder). This normally requires the financing bank to obtain a legal opinion on the enforceability of debt in the country and ability to implement a receivables purchase legal agreement with the supplier. In the case of smallholders with poor literacy levels, this was not deemed practical. Most financing banks require the supplier to be a corporate legal entity and not an individual, and again the status of smallholders as small to medium-sized enterprises (SMEs) would need to be tested. Suppliers in such facilities are also required to have and show proof of bank accounts into which proceeds can be remitted. (In the pilot the Malawian smallholders all had bank accounts.) Suppliers are all required to be screened by financing banks for anti-money laundering (AML) and sanctions checking, and the practicalities and cost of processing the data for huge numbers of smallholders is a consideration.

The Trado solution requires the buyer to approve payment of an invoice while the goods remain in the physical possession of the supplier. While this is in no way unusual in commercial transactions, the buyer should consider how to mitigate delivery risk by the supplier. This is normally achieved using insurance: either cargo insurance (where the point of origin begins earlier) or credit insurance (business interruption risk cover on the supplier), both of which might increase the insurance premium.

Annex III

Key Trado criteria

The following criteria are important to generating a finance saving through the Trado model in a supply chain. The criteria 1.1 to 1.4 are critical; when these are not met, the model will not generate a saving in a given supply chain.

#	Priority	Criteria	Description/Reasoning
1.1	Critical	Difference in cost of borrowing between buyer and supplier must be >0 per cent	Cost of borrowing funds must be higher for supplier than buyer. A greater difference in borrowing rates creates a higher saving.
1.2	Critical	Source of funds availability in end-buyer jurisdiction	There must be a source of funds available within the relevant financial regulatory jurisdiction of the end-buyer. Generally but not limited to banks.
1.3	Critical	The source of raw goods for the supplier is a smallholder	The source of raw goods will directly or indirectly be the beneficiary of the financial savings generated through the Trado model.
1.4	Critical	Available data per smallholder on raw goods produced	The Trado model requires data per smallholder on contribution of raw goods to end-buyer.
2.1	High	High currency value of the produced goods	The savings generated by the Trado model are proportional to the total value of the goods being financed. Higher priced outputs will result in higher savings.
2.2	High	High volume of smallholder goods per transaction	The quantity of goods traded in each transaction between buyer and supplier should be high. The savings generated are proportional to the value of the goods being financed.
2.3	High	High transaction frequency	The number of transactions should be high. The savings generated (per time period) are proportional to the number of the transactions during that period.
2.4	High	Long production time (interval between raw goods transforming to produced goods)	The time it takes to convert raw goods into produced goods should be high to increase the saving (as the time period of the cost of funds differential will be longer).
2.5	High	Long interval between produced goods and payment by end-buyer	The interval between produced goods being available from the processor to the end-buyer and the payment being made by the end-buyer to the processor for those goods should be greater than 30 days.
2.6	High	The number of commercial entities between the end-buyer and smallholder must be one or two	The Trado model requires a contractual link to be present between the smallholder (supplying the raw goods) and the produced goods purchased by the end-buyer. The end-buyer must be able to determine the proportion of the purchase order that is attributed to smallholders to finance the Trado invoice. This is challenging if there are multiple intermediate entities (such as traders) taking ownership of the raw goods.

A comment on key criteria boundaries

Additional case study data collection and analysis would be required to determine key criteria boundaries/thresholds. Future analysis should focus on determining thresholds for each criterion, as well as developing a minimum value of a saving required to achieve sufficient impact on the ground for any given supply chain (eg review estimated saving against the living income benchmark[37] for the country).

Annex IV

The Packaging/Round Wood Pilot

This Annex gives a brief summary of the packaging/roundwood pilot that was run as part of the Trado project.

From the outset, the Trado consortium took a holistic view of the tea supply chain and considered the application of the model's **'asset tracking' component** for the **tea packaging supply chain**.

Besides the pilot in Malawi a second live pilot was initiated with Sappi Europe's roundwood [xv] supply chain. Since no supply chain finance was used in this supply chain, the pilot did not use the Trado model but instead aimed to test whether supply chain transparency (through blockchain technology) can **add value to the chain of custody by strengthening certification claims.**[38]

Pilot: Germany | Packaging | Sappi

Background
This pilot focused on the **roundwood supply chain** into Sappi's Alfeld Mill, with inputs originating from German forest owners. The roundwood logs are purchased from forest owners and sold to the mill by the trader proNARO (a company jointly owned by Sappi).

Forest owners can be either certified or uncertified, and this data accompanies the wood throughout the supply chain to enable claims to be made. Currently data on forest owners is managed by proNARO, which holds a chain of custody certificate, certifying them to pass certification claims of wood origin downstream to Sappi.

The pilot tested the opportunity for digitally tracking physical log deliveries on the blockchain. To represent physical log deliveries, digital 'assets' were created from four certified forest owners over a two-week period in March 2019.

Key outcomes
Component II of the Trado model (asset tracking) can create a real-time view into certification at origin. Currently certification of origin for wood sources is trusted through chain of custody schemes. The data is held in siloed systems and chain of custody certification holders are audited on an annual basis. In the pilot the roundwood data was stored on the blockchain (through Component II of the Trado model) creating a single source of truth[xvii] detailing origin and change in ownership as the wood moved through the chain. This enabled Sappi to view data that is currently stored with the trader.

Component II also creates a single source of truth. Tracking digital assets on a single data point reduces the opportunity for mismanagement of certification claims that are passed along the chain. Storing certification data on a single data point ensures that the certification 'credit' cannot be reused when the digital asset is transferred from one actor to another, therefore reducing opportunity for mislabelling of non-certified wood as certified.

Challenges
Asset tracking, or Component II, does not currently provide the required level of confidentiality for product flow information. The Trado model stores data on the public blockchain. While identity is anonymised, product flow data is made public to prove that the seller has enough certified wood to sell to the buyer. Further development in the technology is required to meet the industry requirement that this information is kept confidential. Zero-knowledge proofs[xvii] are one area of development designed to meet this need.[39]

Foreseeable next steps
The benefit of a blockchain model **requires cross-industry participation**. The data captured on the blockchain for the pilot was data easily accessible to Sappi today. Further testing of the solution, with **engagement of certification schemes**, is required to determine the data availability and requirements for the other supply chain participants (eg wood pulp and wood chip suppliers).

xv Roundwood: Wood in its natural state as felled, with or without bark. It may be round, split, roughly squared or in other forms. Source: FAO Forest Harvesting Glossary.

xvi In information systems design and theory, single source of truth (SSOT) is the practice of structuring information models and associated data schema such that every data element is stored exactly once. In blockchains there is a single 'version' of all the (transaction) data that has ever been entered. The source is not necessarily singular given the distributed nature of information storage in blockchains (see Annex IV –Blockchains).

xvii In cryptography, a zero-knowledge proof or zero-knowledge protocol is a method by which one party (the prover) can prove to another party (the verifier) that they know a value x, without conveying any information apart from the fact that they know the value x.

Annex IV

Blockchains[xviii]

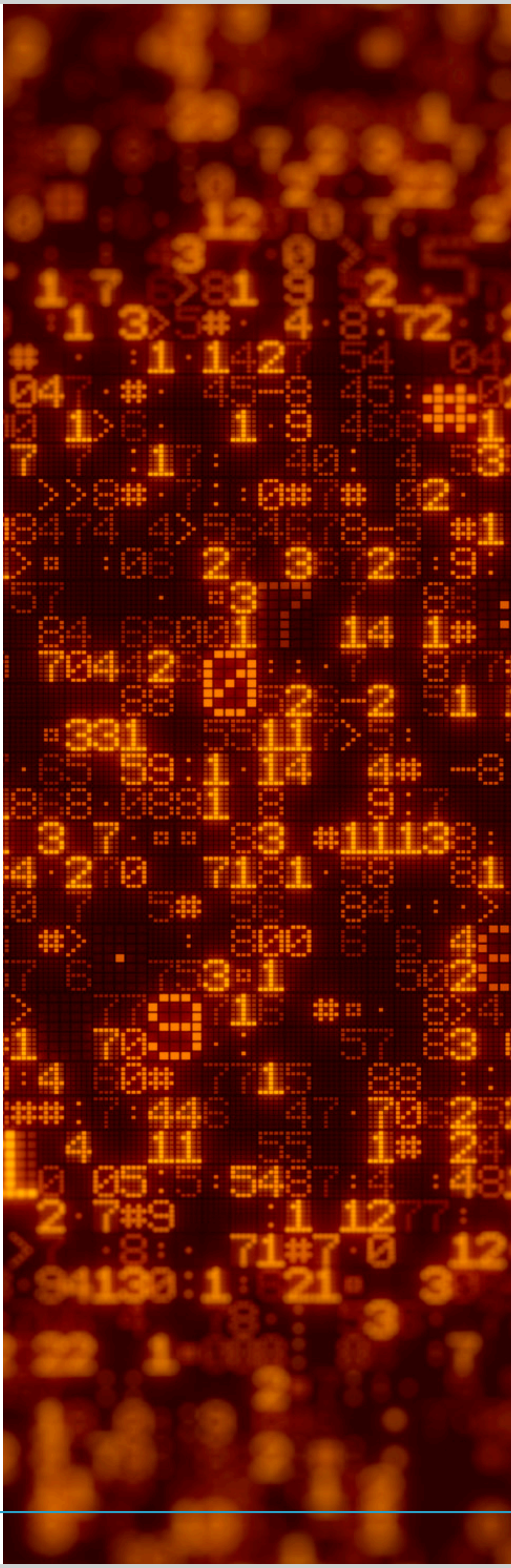
What is a blockchain?
A blockchain is an algorithm and distributed data structure for managing electronic transactions. Many, but not all, blockchains do so without a central administrator among parties that do not have to know one another. Blockchains can be 'public' – this is when anyone in the world can read them, add transactions to them and contribute to 'consensus building' (see below). Blockchains can also be 'private' – this is when reading of data from, data entry into and consensus building for (see below) that blockchain is more or less restricted to specific parties. Examples of public blockchains are Ethereum and the Bitcoin blockchain. Examples of private blockchains are The Linux Foundation's Hyperledger and the blockchains offered by Digital Asset.

How does it work?
As any data structure, a blockchain contains data records – sets of structured data. In the case of blockchains, these data records are about electronic transactions. A decentralised network of nodes of that blockchain monitor and verify the order of these transactions between blocks to establish the true version of the ledger. Having one true order of transactions between blocks is important because, without it, parties can 'rewrite history' and change the historic transactions in the ledger. This would, for example, enable double spending of currency but also other potentially fraudulent changes in the entered data such as double counting of carbon credits. There are a number of methods for nodes to do this verification, and different types of blockchains use different types of verification methods. Two of the most well-known methods are *Proof of Work* and *Proof of Stake*.

Proof of Work
In the *Proof of Work* method, the nodes enter in a race of being the fastest in 'transaction confirmation and cryptographic puzzling' for any given block. Once any one of the nodes solves the puzzle, and its answer is confirmed as being correct by the other nodes, the block is closed and the winning node wins a prize. This prize consists of a number of units of cryptocurrency as well as the right to produce the next block in the chain. *Solving* the difficult cryptographic puzzle by providing the correct answer takes a lot of time and computational capacity. However, *checking* the correctness of that answer costs other nodes little time or computational power. It is therefore easy for the nodes in the network to identify if the puzzle has been solved and the block should be closed. This process is called 'reaching consensus'. Consensus means that a majority of nodes agrees that all transactions in the recent past are unique and that a specific group of transactions are to be placed together. Once this consensus is achieved, that particular set of transactions is cryptographically sealed into a new block. A difficult-to-crack calculation is run with the transaction data as input resulting in an outcome that uniquely identifies that block. Each new block is linked through a similar calculation to previously sealed blocks to create a chain of accepted history. This way a verified record of every transaction is created.

While the race between the nodes is still on, the individual nodes i) confirm the validity of transactions from a pool of yet unverified, pending, transactions, and ii) try to solve the difficult cryptographic puzzle. To verify transactions, the node checks the original state of the ledger (ie before the transaction took place), and it checks whether the transaction has been correctly signed with a public–private key pair. The puzzle solving takes place through cryptographic hashing. This means taking an input string of *any length* and putting it in a 'hashing algorithm' that results in an output of a *fixed length*. In the case of the Proof of Work method the hashing inputs are all the previous blocks, the current verified transactions as well as a random 16-symbol number (a so-called 'nonce' or random hexadecimal number). The 'puzzle' that a node needs to solve to win the race is the requirement that the node's output number from the hashing operation must start with a predetermined number of zeros. The higher the number of zeros the hash number is required to start with, the harder the puzzle, the longer it will take and more computational power will be required to try different input options in the hash function (input consisting of random nonces + combined previous blocks + all current transactions) to achieve the required number of zeros at the beginning of the output number.

Proof of Stake
Another blockchain technology is Proof of Stake, which at the time of writing is under development (but not yet implemented) by the developers of the well-known Ethereum blockchain. In this method the validating nodes must lock up some of their cryptocurrency as 'stake'. As in the Proof of Work method, the nodes check the original state of the ledger to do the transaction verification (ie before the transaction took place), and check whether the transaction has been correctly signed with a public–private key pair. Once the group of validating nodes is determined and a number of transactions has been proposed as valid by the various nodes, the blockchain algorithm identifies the node that has the final say over the true version of the current block by means of a random draw from all the validating nodes. The draw is tilted towards older nodes



or nodes with more cryptocurrency on their tally. The older the node or the more cryptocurrency it has, the greater the odds that its proposed version of the final state of the block will be accepted through the random draw. One of the advantages of Proof of Stake is that much less computational power is needed to get to consensus. The carbon footprint of this method therefore tends to be lower than in the Proof of Work method.

What do people use blockchains for?

People use blockchains for various purposes. These purposes vary from having a type of digital money with which it is possible to avoid state control, to creating digital identity management, to sharing all kinds of supply chain data in a reliable way. In the case of the Trado model, a blockchain is used for the latter objective. For the pilot transactions in Malawi a type of blockchain called Ethereum was used. Anybody can run a node of the Ethereum blockchain[xix] on their computer to help validate transactions and create blocks. Much of Ethereum's basic functionality is similar to other blockchains; it allows for the entry of transaction records and validates that these transactions have actually taken place through node-based consensus. Where Ethereum is different is that additionally it contains a scripting language that allows software developers to write programs on top of the blockchain functionality. This way all kinds of 'if-this-then-that' functions (or 'smart contracts') can be added to the underlying structure of immutable transaction data.

Blockchain controversies

From a sustainability perspective blockchains can be criticised since they require large amounts of electricity for their cryptographic calculations. The carbon footprint is therefore high, for example the University of Cambridge tracks the electricity consumption of the blockchain that runs the Bitcoin cryptocurrency. At the time of writing its electricity use amounted to 61.95 TWh per year.[xx] For comparison, this figure sits between the total annual national energy consumption of Switzerland and the Czech Republic. The blockchain communities are working to develop solutions to decrease the carbon footprint, but most of these are in their infancy. Also, blockchains have sometimes been used for illicit activities such as money laundering, theft, tax evasion and other misdemeanor.

xviii Wilson, S. (2017, May 22). Blockchain explained in plain English. Retrieved from https://www.zdnet.com/article/blockchain-explained-in-plain-english

xix Running an Ethereum Node. (n.d.). Retrieved June 20, 2019, from EthHub website, https://docs.ethhub.io/using-ethereum/running-an-ethereum-node

xx Cambridge Bitcoin Electricity Consumption Index. (2019). Retrieved July 15, 2019 from University of Cambridge Judge Business School website, https://insight.jbs.cam.ac.uk/2019/cambridge-bitcoin-electricity-consumption-index-cbeci/. See also https://cbeci.org/comparisons/.

Glossary

When a term from this glossary appears for the first time in this report it is diplayed in **bold blue** text

Key Term	Explanation
Asset tracking	A digital system that tracks physical assets as they move through the supply chain, capturing ownership, location and composition information
Blockchain	A form of distributed ledger technology that enables consensus to be reached within a trustless peer-to-peer computer network, the implication of which being that the system as a whole can be more trustworthy than any of its individual participants
Buyer	A party downstream in a supply chain purchasing from a party upstream
Delivery risk	The chance that a counterparty may not fulfil its side of the agreement by failing to deliver the underlying asset or cash value of the contract
Digital assets	An item of property in an electronic form; also an electronic ownership title to a physical item
Dry run	A practice exercise, in some software development communities these types of practices are also called 'proof of concept'
First mile	In supply chains, the first mile refers to the initial production of products, and the initial movement of these products. In many agri-commodity supply chains the first mile consists of smallholder producers.
Green leaf	Freshly picked tea leaves that have not yet gone through a further tea production process
Handshake	A public, authenticated mutual agreement between two parties which is written on a distributed ledger
Invoice discounting	A common form of business finance where funds are advanced by a financier against unpaid invoices prior to customer payment
Mass balance	A system whereby products from both sustainable and non-sustainable sources are mixed, but as these move through a supply chain an exact account is kept about the volume ratios
Percentage point	A percentage point or percent point is the unit for the arithmetic difference of two percentages
Performance risk	The risk that a supplier might fail to provide the right quality product in a timely manner in accordance with the terms of the supply contract
Purchase order	A commercial document and offer issued by a buyer to a seller indicating types, quantities and agreed prices for products or services, used to control the purchasing of products and services from external suppliers
Purchase order financing	A short-term commercial finance option that provides capital to pay suppliers upfront for verified purchase orders
Saving distribution verification	The statement confirming the value of the Trado saving to be distributed
Single source of truth (SSOT)	The practice of structuring information models and associated data schema such that every data element is stored exactly once, with any usage thereof referring to this single storage instead of storing it somewhere else as a duplicate
Smallholder	A farmer owning a small-scale plot of land, and relying primarily on family labour
Social impact	The positive effects on people and communities that happen because of an action, activity, project, programme or policy
Supplier	A party upstream in a supply chain selling to a party downstream
Tea processor	A company in a tea supply chain that specialises in transforming the leaves from the tea plant into the dried leaves for brewing tea
Trade finance	Financing for trade, concerning both domestic and international trade transactions, which requires a seller of goods and services as well as a buyer, and can be facilitated by various intermediaries such as banks and financial institutions
Trado model	A data-sharing model enabling a connection of all supply chain players including first mile producers and last mile consumers, which acts as a data-for-benefits swap between a buyer and a supplier, and is enabled through a trade finance transaction
Trado saving	The net amount of the benefit generated in exchange for data when the Trado model is applied
Trust point	A term used in the project to describe the point at which the buyer has sufficient confidence to approve an invoice for payment
User profile	A digital user profile capturing key business information (name, location etc)

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