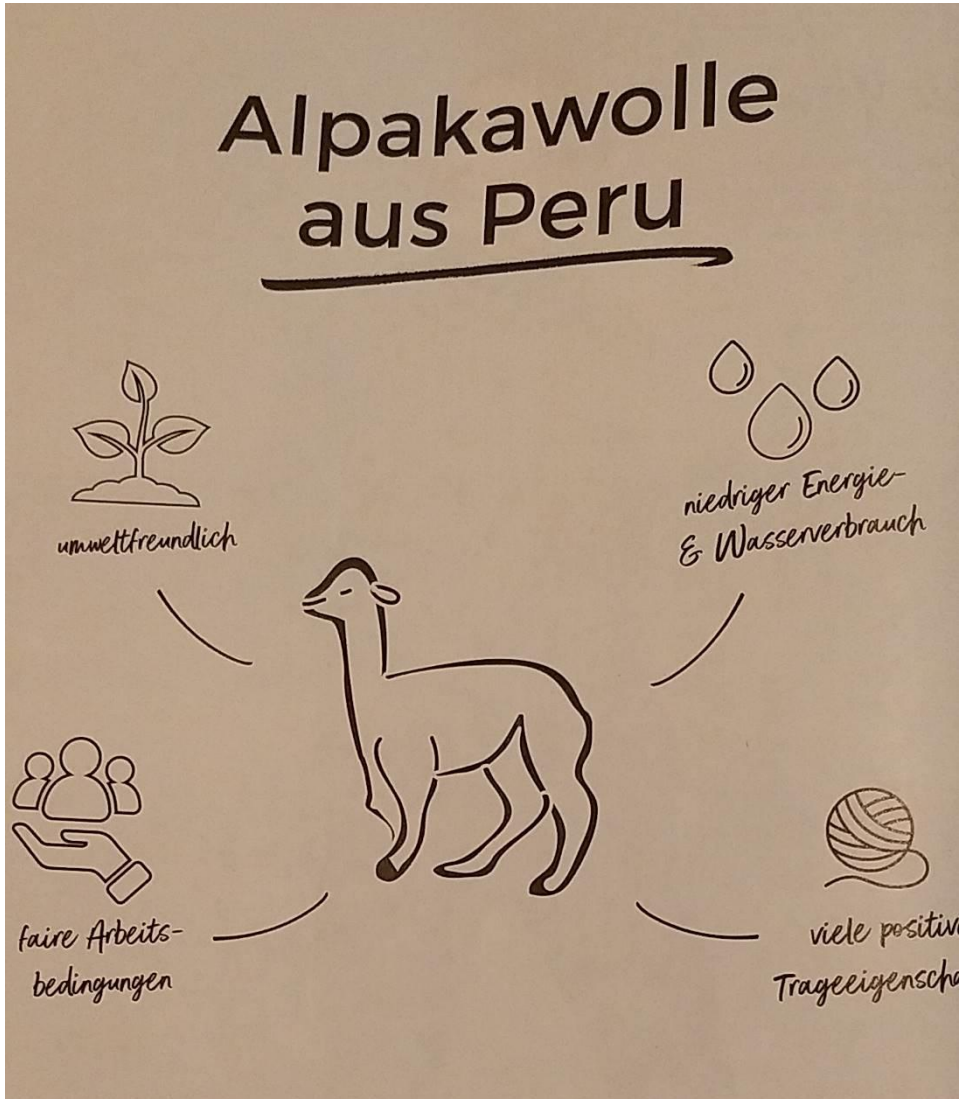
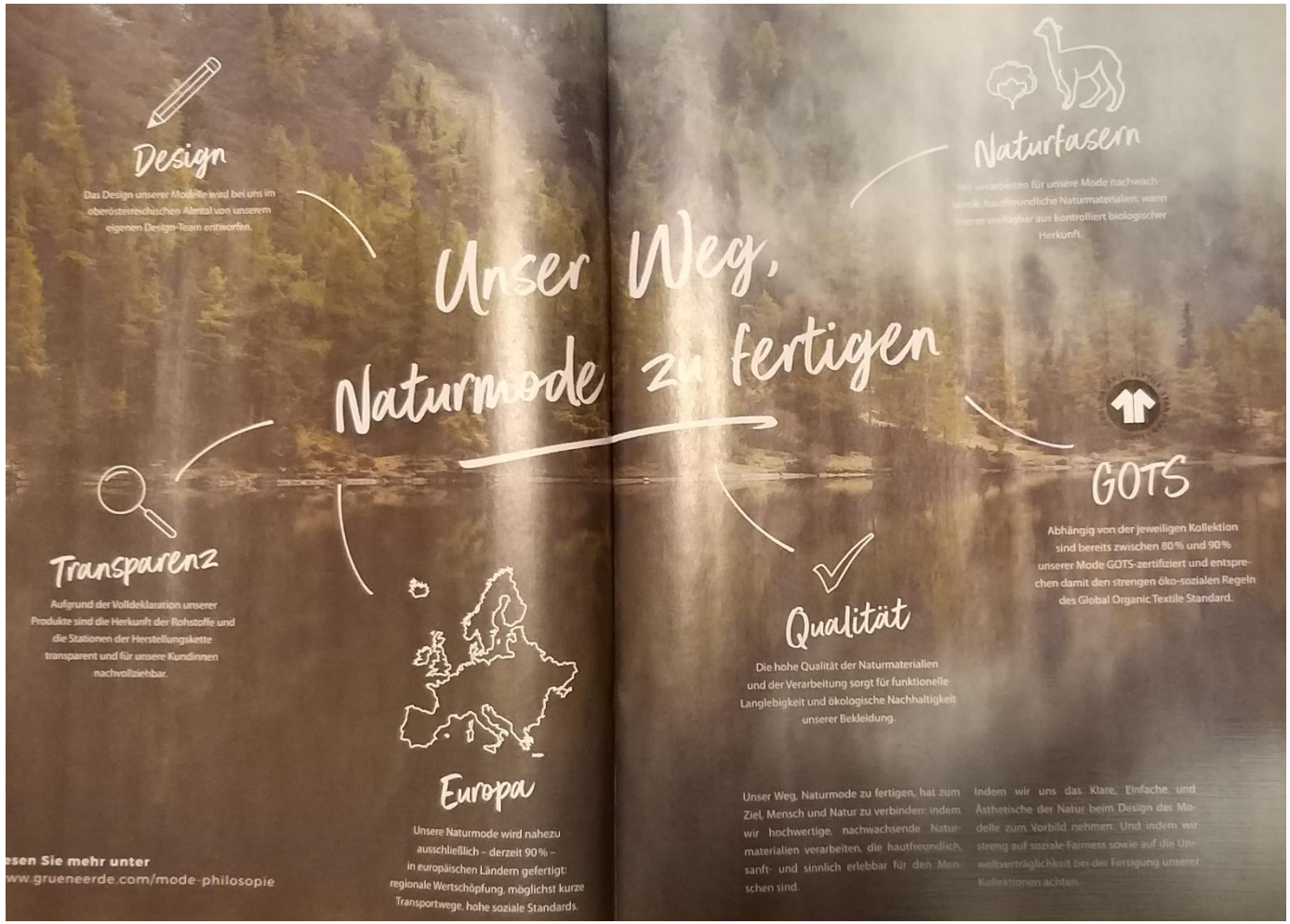
Traceability of animal fiber: Blockchain as a game changer?

Maria Wurzinger & Michael Braito

BOKU-University of Natural Resources and Life Sciences, Austria


Alpakawolle
aus Peru
umweltfreundlich
niedriger Energie-
& Wasserverbrauch
faire Arbeits-
bedingungen
viele positiv
Trageeigensch


Design
Das Design unserer Modelle wird bei uns im oberösterreichischen Almtal von unserem eigenen Design-Team entworfen.
Unser Weg, Naturmode zu fertigen
Naturfasern
Wir verarbeiten für unsere Mode nachwachsende, hautfreundliche Naturmaterialien, wann immer verfügbar aus kontrolliert biologischer Herkunft.
Transparenz
Aufgrund der Volldeklaration unserer Produkte sind die Herkunft der Rohstoffe und die Stationen der Herstellungskette transparent und für unsere Kundinnen nachvollziehbar.
Europa
Unsere Naturmode wird nahezu ausschließlich – derzeit 90 % – in europäischen Ländern gefertigt: regionale Wertschöpfung, möglichst kurze Transportwege, hohe soziale Standards.
Qualität
Die hohe Qualität der Naturmaterialien und der Verarbeitung sorgt für funktionelle Langlebigkeit und ökologische Nachhaltigkeit unserer Bekleidung.
GOTS
Abhängig von der jeweiligen Kollektion sind bereits zwischen 80 % und 90 % unserer Mode GOTS-zertifiziert und entsprechen damit den strengen öko-sozialen Regeln des Global Organic Textile Standard.
Unser Weg, Naturmode zu fertigen, hat zum Ziel, Mensch und Natur zu verbinden: indem wir hochwertige, nachwachsende Naturmaterialien verarbeiten, die hautfreundlich, sanft- und sinnlich erlebbar für den Menschen sind.
Indem wir uns das Klare, Einfache und Ästhetische der Natur beim Design der Modelle zum Vorbild nehmen. Und indem wir streng auf soziale Fairness sowie auf die Umweltverträglichkeit bei der Fertigung unserer Kollektionen achten.
esen Sie mehr unter
ww.grueneerde.com/mode-philosopie

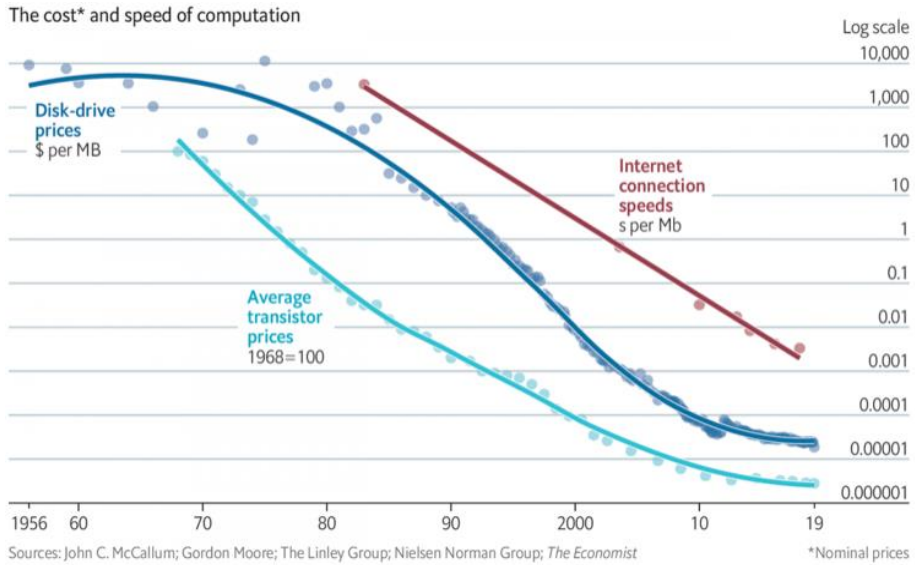
?
Consu-
mers in
Europe
?
Yak in
Mongo-
lia
?
Alpaka
in Peru

Eco-labelling schemes

- voluntary governance programs
- to inform sustainable purchasing decisions
- by confirming a range of socio-environmental performance criteria

- Confusion over their credibility:
- *Do they deliver what they promise?*
- How are they conditioning indefinite sustainable production?
- addressing inequalities within the supply chain

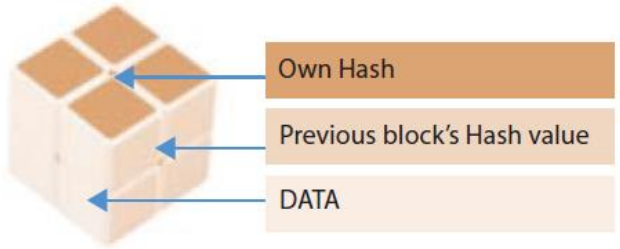
Blockchain – part of digitisation



The internet of things (IoT): 100 devices/chips per person by 2025 → *smart everything*

Universal accessibility of information

Blockchain technology



Example:
SHA-256 hash of the word **FAO:**

dbf99f2954da9cfa1a9e74fb65736ce6baec9
7c00ce6a401c3556434c9725500

Figure 2: A block

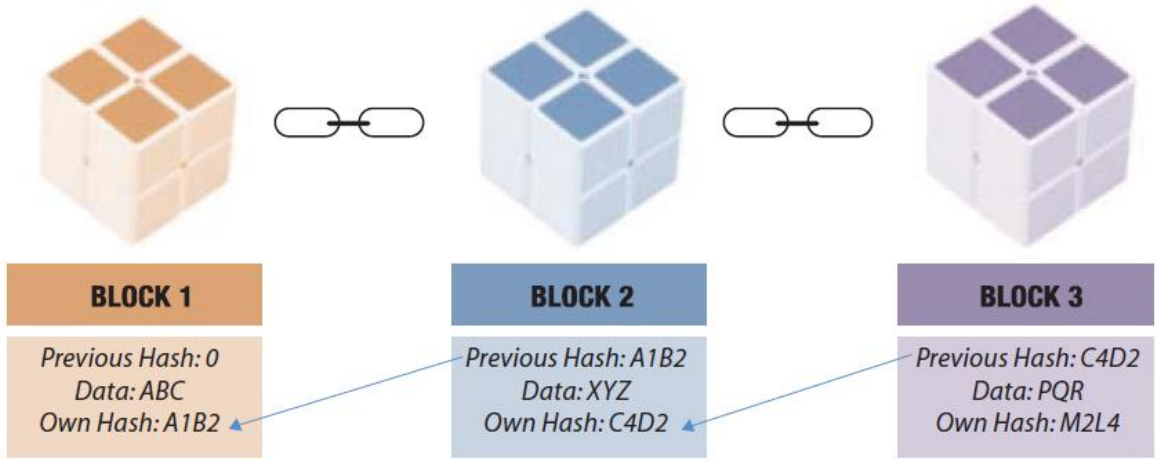
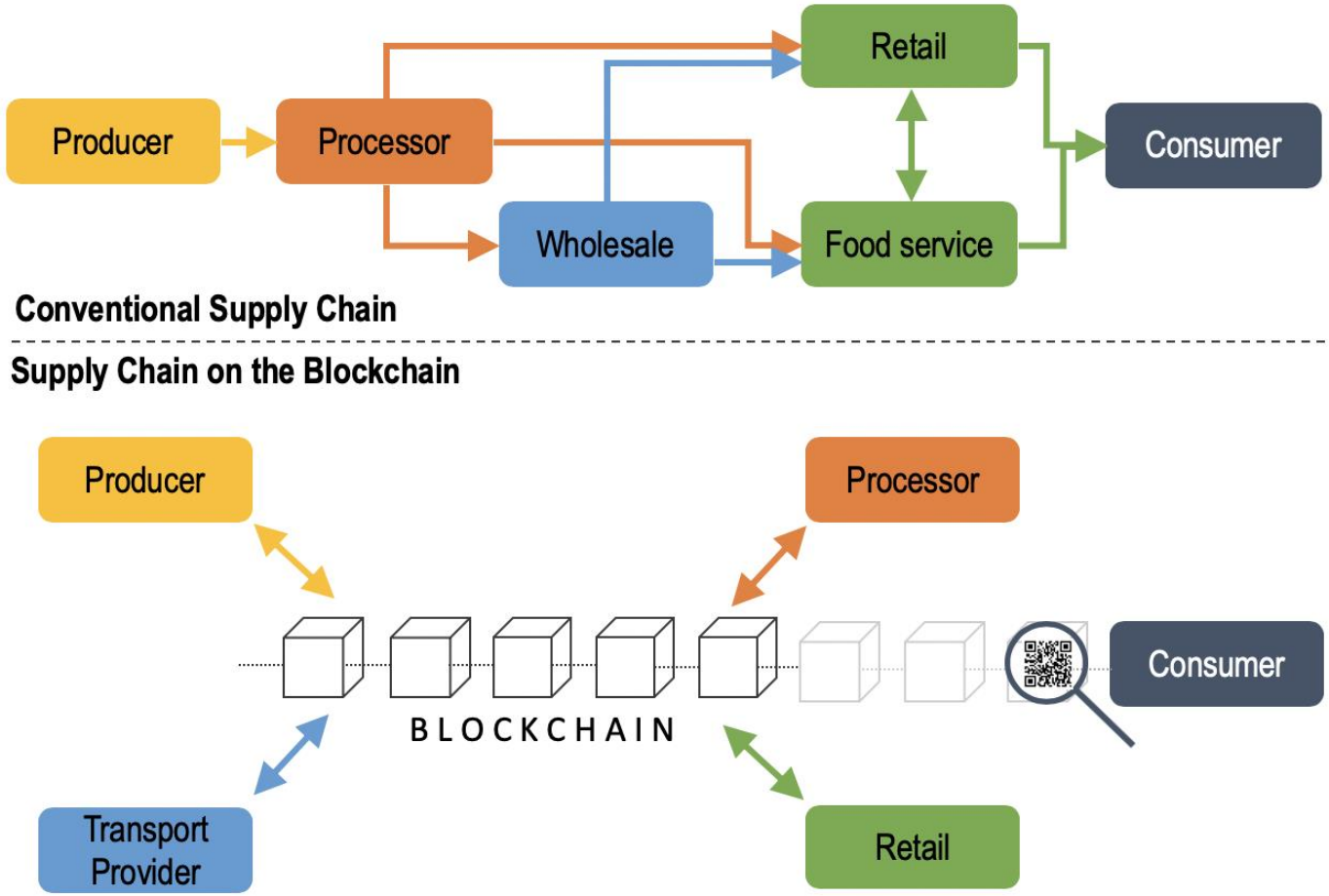


Figure 3: A blockchain

Source: FAO and ITU 2019

Blockchain changes supply chains?



But first: A commercial insert …

This is no ordinary coffee. Single-origin Kenyan Coffee. 6000 feet above sea-level. But how do you really know? Trust? IBM Blockchain. A smart way to track every step you take…

… 6 000 feet above sea level, and not a foot lower!

Blockchain - a distributed ledger

Source: https://www.youtube.com/watch?v=suE5KHkESF4

Blockchain – a distributed ledger

- A distributed *ledger* (an account, or a book of accounts) documents all information of production (inputs, working conditions…)
- It may also contain „smart contracts“ capturing all conditions of exchanges, possibly also triggering a monetary transfer in exchange for a good or service etc.
- Beyond the reach of any central authority
- Furthermore, those involved will not have separate documentation but rely on the same document.
- Once additional information is encoded, it cannot be changed (manipulated) anymore.
- All information accumulated this way is accessible and allows for symmetry in information for those concerned.

Blockchain – just imagine!

- no forgery, nor fraud in papers or databanks
- no incomplete contracts,
- full transparency & clear identity of producers
- full and easy traceability
- complete information for all participants, no more market failures
- accessible for smallholders, jointly with micro credits
- "…*dynamic demand chains* in place of *rigid supply chains*." – the ideal of consumer sovereignty.
- To sum it up: in terms of Transaction Cost Economics (TCE) BCT has lower transaction cost than other forms of economic organisations/institutional arrangements.

- The whole story?

Principle changes, disruption of the public

- *So far:* **Trust** is built on personal relations and/or it is supported by institutions (certification, food law, etc.)
  Now, with BCT-IoT: Trust is supposed to be built on digitised monitoring of production; or, more precisely: Trust is replaced by **certainty**.

- *So far:* General **product safety** is provided as a public good on the basis of law.
  Now, with BCT: **Safe product** items are provided as private goods. It may be asked, whether the former public good is neglected under this condition.

Examples of blockchain uses

- Financial sector
- Digital identity
- Education sector
- Logistics sector
- Health sector
- Insurance sector
- Retail sector
- Energy sector
- Agriculture (insurance, land registration and supply chains)

Examples of blockchain initatives – I

ID	Description	URL
Bext360	Bext360 allows buyers of coffee to rapidly analyze the quality of a farmer's product in the field and weigh it. The mobile robot uses optical sorting. Buyers and farmers then negotiate a fair price through the bext360 mobile app.	www.bext360.com
Provenance	Provenance tracks products through the supply chain: materials, ingredients, and impact, to provide consumers with greater transparency about a product's authenticity and origin.	provenance.org
Full Profile	Real-time transactions for farmers through "smart contracts"—payments can be made immediately following the transfer of asset ownership.	fullprofile.com.au
Heifer International	Heifer is using blockchain technology for fundraising and the food supply chain.	www.heifer.org

Examples of blockchain initatives - II

ID	Description	URL
Ambrosus	Combining high-tech sensors, blockchain protocol and smart contracts for a universally verifiable, community-driven system to assure the quality, safety & origins of products.	ambrosus.com
Somish	Tokens can be exchanged for fertilizer for small farmers. They cannot misused or imitated, ensuring that the government-allocated funds are creating maximum impact where intended.	www.somish.com
ICS	developing accessible, affordable crop insurance in East Africa.	https://www.ics.nl
The Seam	blockchain consortium of globally well known cotton leaders.	www.theseam.com

Barriers to blockchain adoption

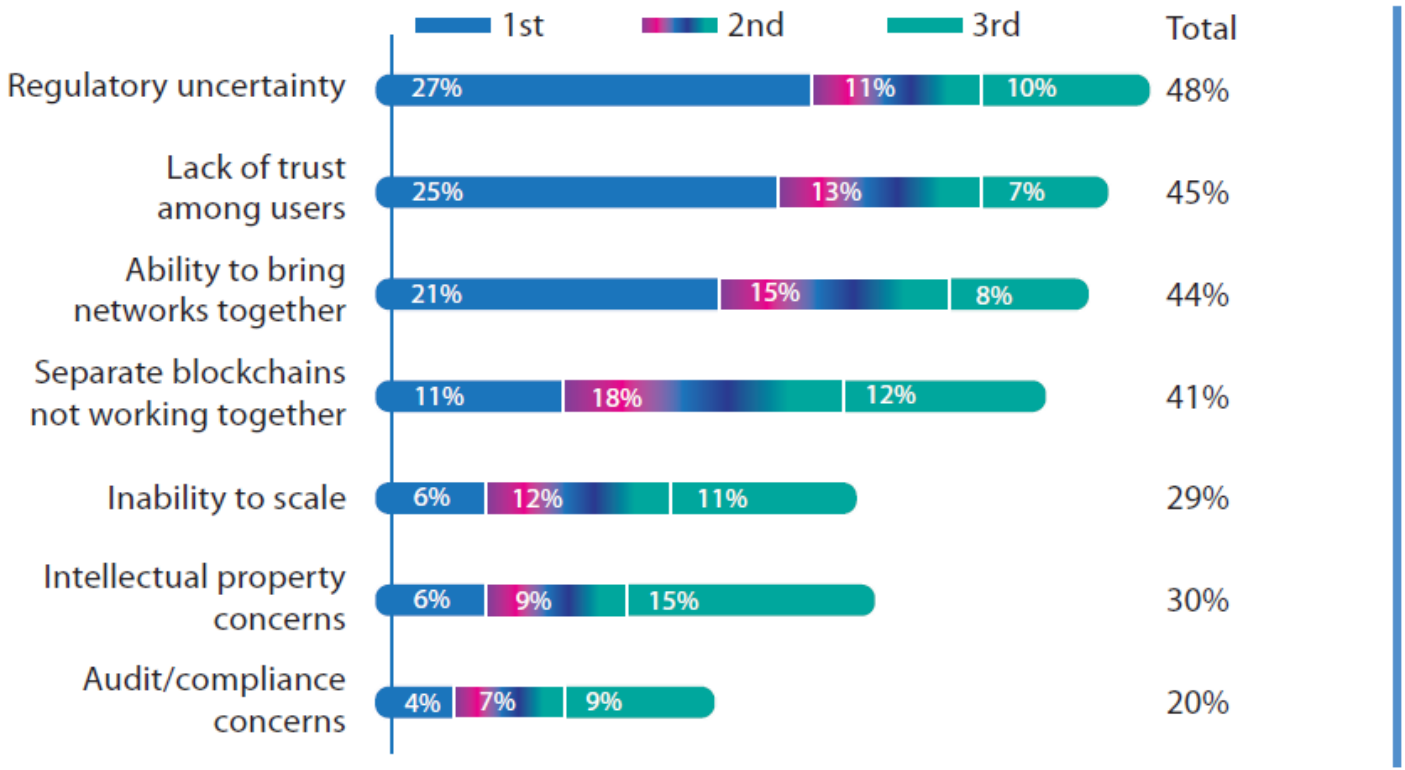


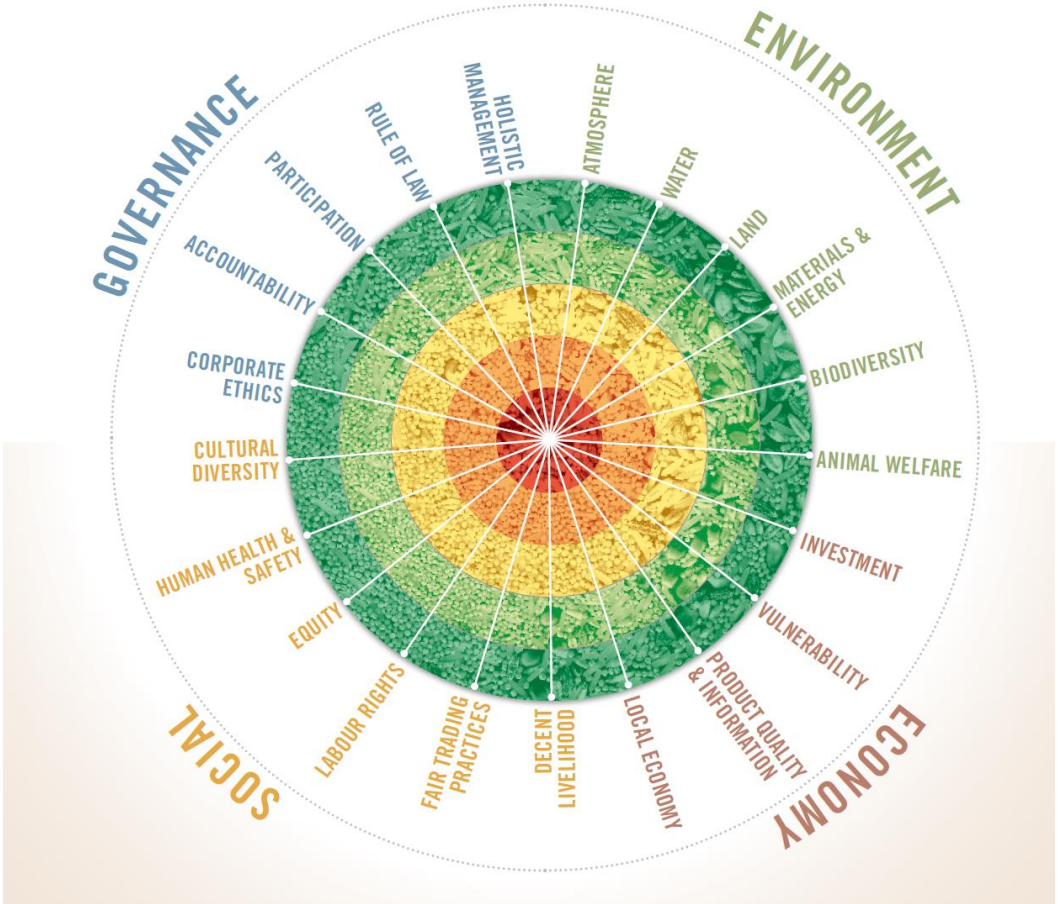
Figure 1: The biggest barriers to blockchain adoption

(Respondents' top three challenges)

Source: PwC blockchain survey

?
Consu-
mers in
Europe
?
Yak in
Mongo-
lia
?
Alpaka
in Peru

Assessing sustainability



Example of assessment report using SAFA guidelines

Set up and test a pilot blockchain

Criteria catalogue for sustainability assessment

Evaluate impact on producer and consumer

Participartory research process to design an validate the criteria catalogue

Qualitative interviews to assess farmers response to the technology

Interviews and questionnaire surveys to assess their information needs and their attitude-behavior gap

Questionnaire surveys to assess the technologies' impact on customers' attitude-behavior gap

The project outputs will serve:

- companies
- the blockchain community
- Researchers proximity

Hola José,
Gracias por la chompa!
Te mando 20 Euros como plus para tu familia en Puno.
Saludos desde Viena. Susi

Hola Susi,
Me alegra que te haya gustado.
Saludos desde Puno. José.

Thank you for your attention!