

COBALT SUPPLY CHAIN TRANSPARENCY, AUDITABILITY AND TRUST USING BLOCKCHAIN TECHNOLOGY

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**Core
Consultants**

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WRITE A TITLE IN THIS SECTION

Core Team



Lara Smith

Managing Director, Core Consultants

Lara is an internationally recognized expert in the field of mining analysis and a well-known speaker at international conferences. In 2009 she funded Core Consultants, the first focused commodity consultancy in South Africa.



John Parker

Process Engineer

John has over thirty years experience as a chemical and process engineer. During 2010/11 John provided process input to the Tenke Fungurume cobalt plant options study for Freeport McMoran and is currently working on ERG's Kolwezi's copper/cobalt retreatment plant and KCC



David Creamer

Chief Executive Officer, Core Africa

David's strengths lie in understanding the different regulatory environments, the key stakeholders and the cross border flow of funds between regulatory jurisdictions in Africa.



Michael Gluckman

Chief Technology Officer

Michael is a software engineer and is one of the few technologists in South Africa to have had experience in solving problems related to big data. His previous roles include head of Big Data at Mxit and implementation of a large scale integration at First National Bank's treasury risk department.



Core Services



Core Africa

A business risk consultancy focused on the African opportunity. Assists clients to define their strategy and structure in Africa



Core Connect

An expert network. facilitates private conversations with industry experts to provide unbiased market insights,



Core Consultants

A bespoke consultancy service, providing independent proprietary advice. Services include feasibility & prefeasibility studies, market evaluations, sourcing offtakes



Core Insight

Industry studies focused on current market conditions and the potential outlook for these markets. These studies are available on subscription

Presentation Outline



Description of Cobalt Supply Chain and Issues



Legislation/ Initiatives



Blockchain Technology-
What Is It and How Can It Assist



Hurdles to Implementation

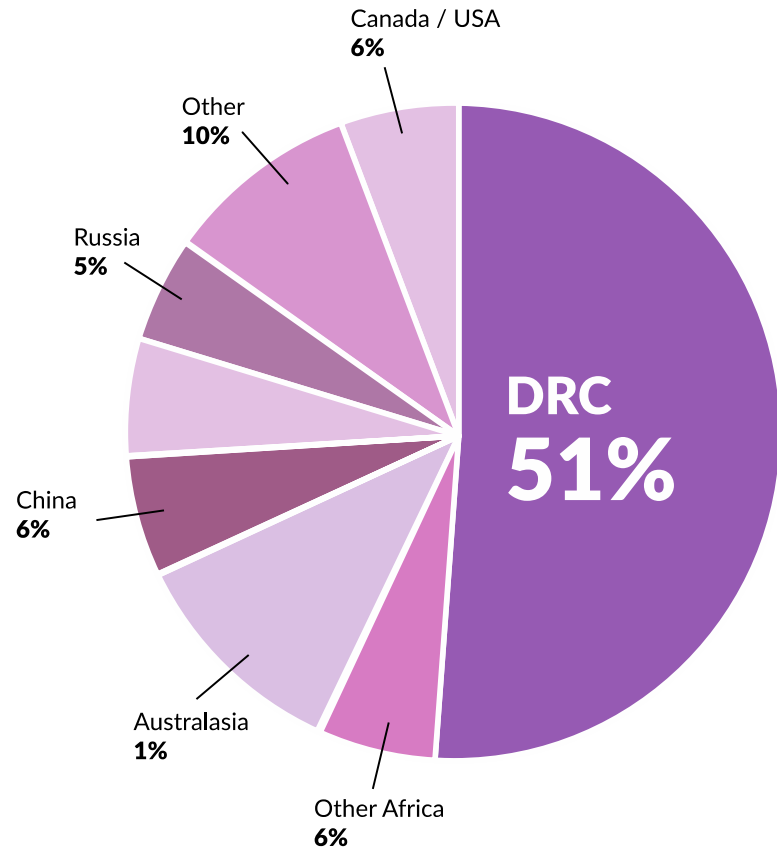


Next Steps

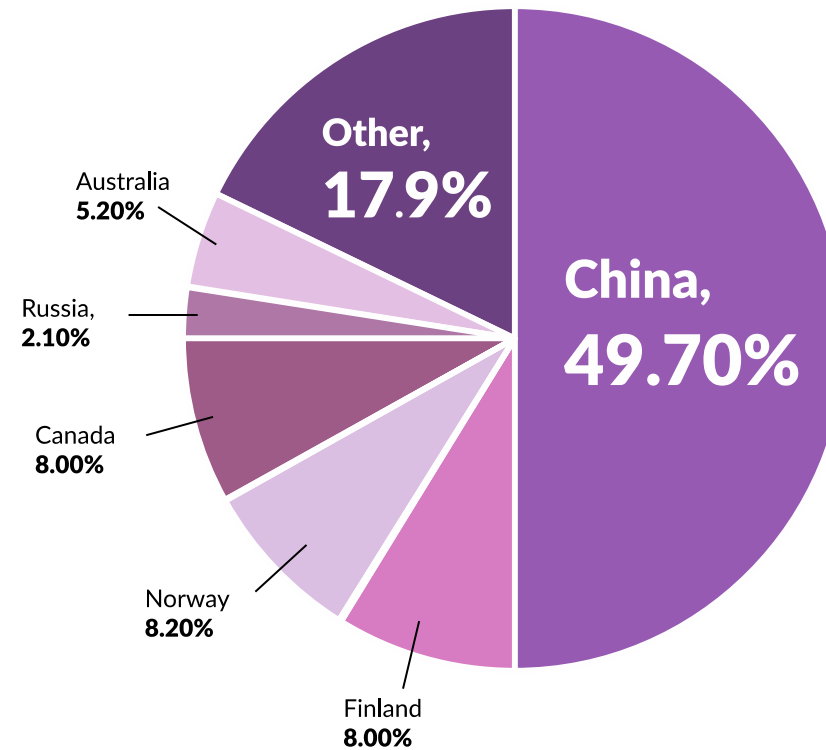


Description of Cobalt Supply Chain

Cobalt Mine Production



Recipients of Cobalt

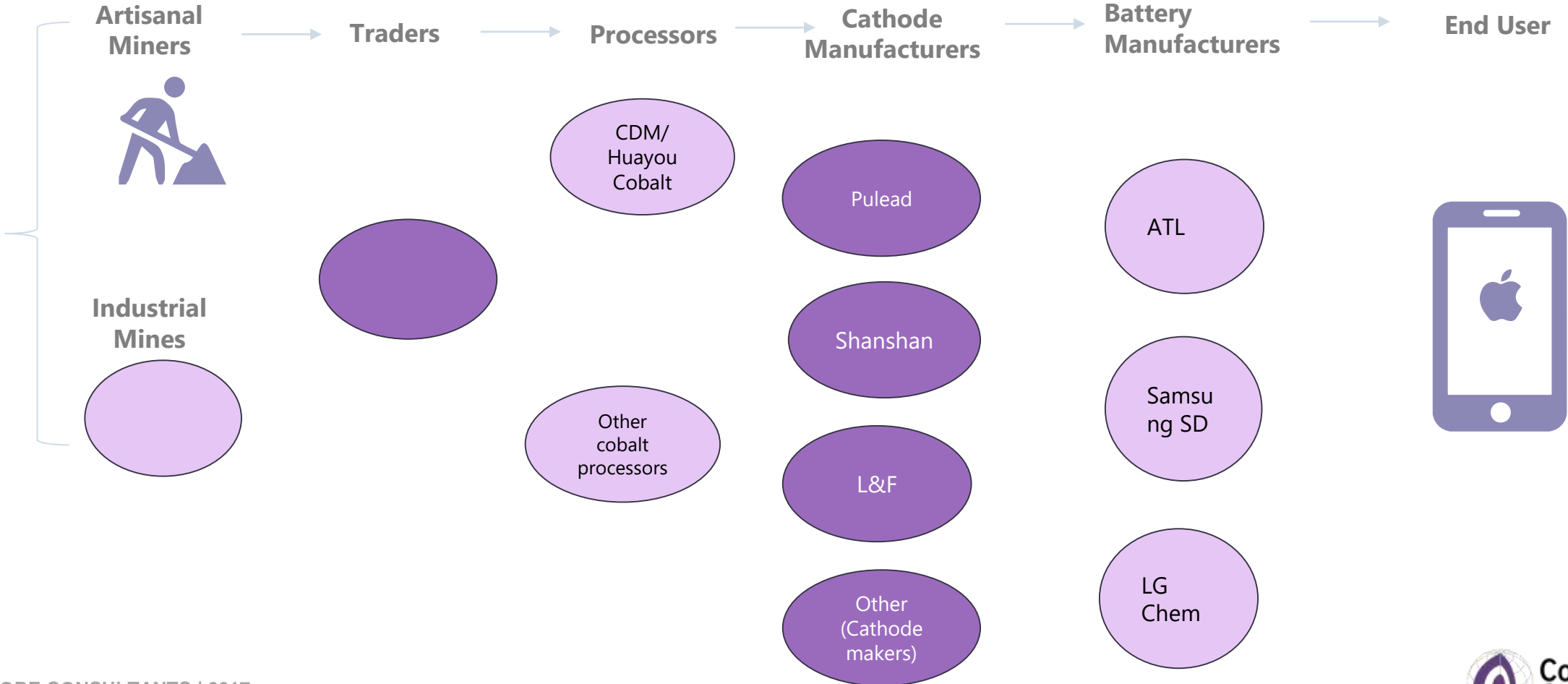


Cobalt from Legitimate Sources is Increasing

- ◆ Legitimate Sources is Increasing as a proportion
- ◆ 2015 artisanal material was 14,000-15,000 tonnes
- ◆ Grade depletion and accessibility
- ◆ Natural decline could be negated by an upward swing in prices



Cobalt Supply Chain Journey



New Legislation, Consumer Pressure Forcing A Change

Efforts to improve supply chain transparency

- Volunteer Committee
- OECD
- NGOs

Arguably, 2 publications became the game changer

- Amnesty International
- Washington Post

Responsible Cobalt Initiative

- Tech giants have joined the initiative
- Pledges OECD guidelines

Pledged to Join Responsible Cobalt Initiative

01 Tech giants join Responsible Cobalt Initiative

02 Pledge is to follow OECD guidelines for mining supply chains

03 It calls on companies to TRACE how cobalt is being extracted, transported, sold

04 The Initiative is led by Chinese business group, Chinese Chamber of Commerce for Metals and Chemical Importers and Exporters.

05 To date the traceability is one of the biggest stumbling blocks to overcoming the supply chain issues

06 Any solution requires industry buy-in and needs to be technology-based

Responsible Cobalt Initiative - Positive Sign of Change



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*The problem cannot be fixed
by one company.*

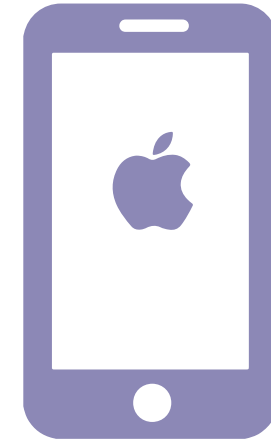
Bryce Lee, Huayou Manager for responsible sourcing.

Cobalt Supply Chain Journey



Artisanal Miner

\$2 per day



iPhone 8

\$750 price tag

Cobalt Supply Chain Journey

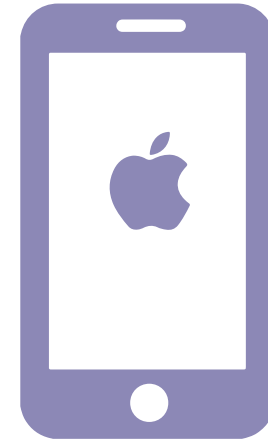


Artisanal Miner

\$2 per day

100 000 industry workers

INDUSTRY FACTS



iPhone 8

\$750 price tag

**Estimated production
of 68 000 tons in 2017**

Cobalt Supply Chain Journey



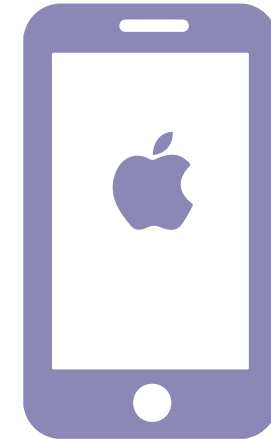
Artisanal Miner

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100 000 industry workers

**Estimated 10 - 20%
world production**

INDUSTRY FACTS



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Battery cathodes driving demand

Cobalt Supply Chain Journey



Artisanal Miner

\$2 per day

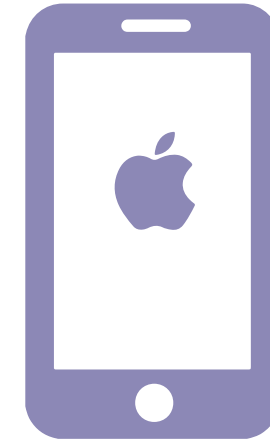
100 000 industry workers

**Estimated 10 - 20%
world production**

INDUSTRY FACTS

**Estimated 17 - 40%
Congo production**

**60% reserves sits
in DRC**



iPhone 8

\$750 price tag

**Estimated production
of 68 000 tons in 2017**

Battery cathodes driving demand

What is Blockchain?

A blockchain is just another type of database for recording transactions – one that is copied to all of the computers in a participating network. A blockchain is thus sometimes referred to as ‘distributed ledger’. Data in a blockchain is stored in fixed structures called ‘blocks’. A blockchain system is not based on trust but on

Decentralised

A key difference is that databases today are mostly centralised – as in there’s one big powerful owner or colluded group who acts as the system admin and guardian to the data. With blockchains, databases become decentralised – anyone can add and access data without needing a centralised authority to broker everything, yet due to some awesome computer science innovations data can still be trusted. Trust is brokered peer-to-peer.

Immutable

No one can tamper with data in a blockchain. Its immutability is central to the reasons that it’s so trustworthy.

Blockchain Benefits- Transparency, Auditability, TRUST

The authors believe blockchain technology can increase TRANSPARENCY in supply chains. This is possible using its decentralised ledger that can track and record movement of goods through supply chains from end to end. Tracking goods using blockchain technology enables a capability to directly validate an item's provenance and authenticity. Every actor within a blockchain network has a complete and constantly updated copy of the ledger. This enables them to use the ledger for real time monitoring of their supply chain

Transparency

Bitcoin is a public blockchain and is open to everyone. In this instance, the players on the network will be known. Anonymity is not desired. Every action taken on the blockchain is visible to every other player.

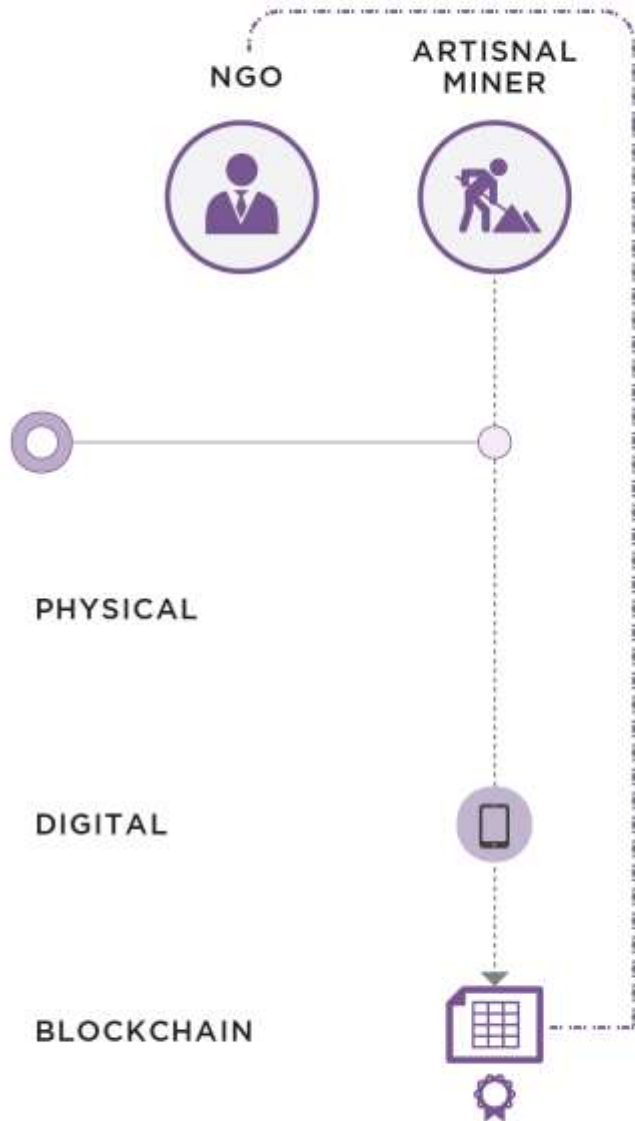
Auditability

Every transaction has an associated digital fingerprint, which uniquely identifies the owner of that transaction. This provides the auditability

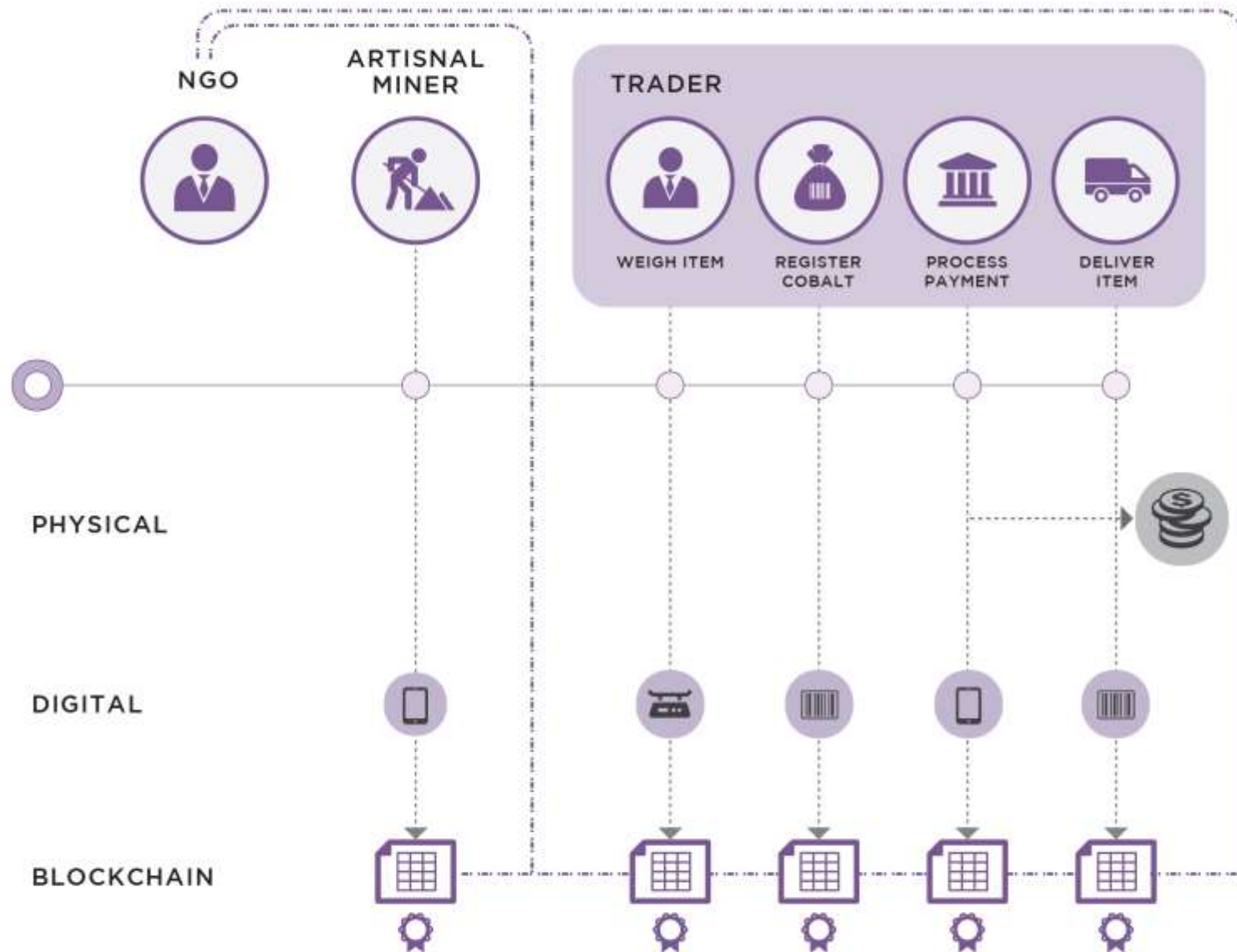
Trust

Trust is enabled by cryptographic algorithms, by ensuring that transactions are immutable

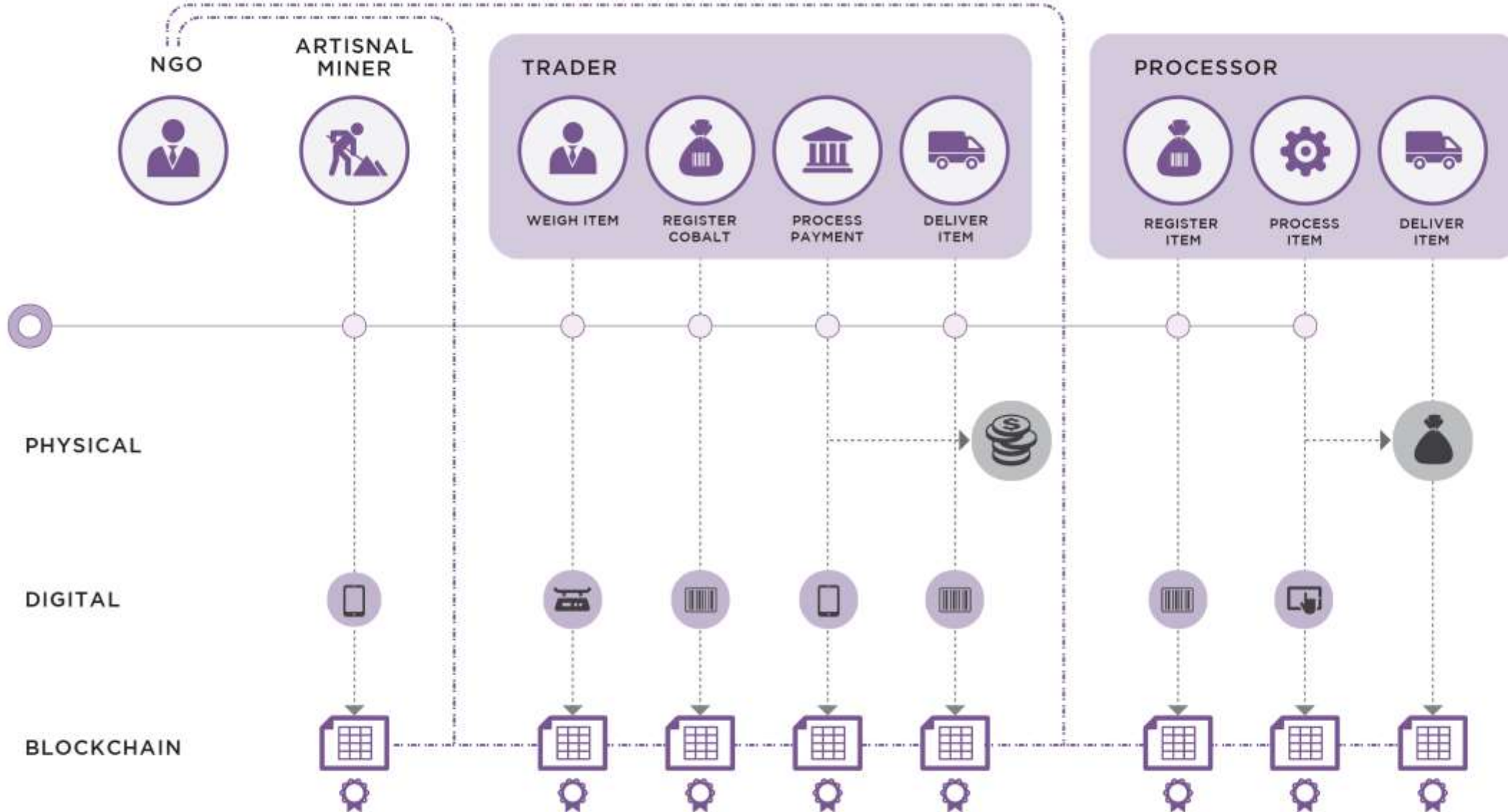
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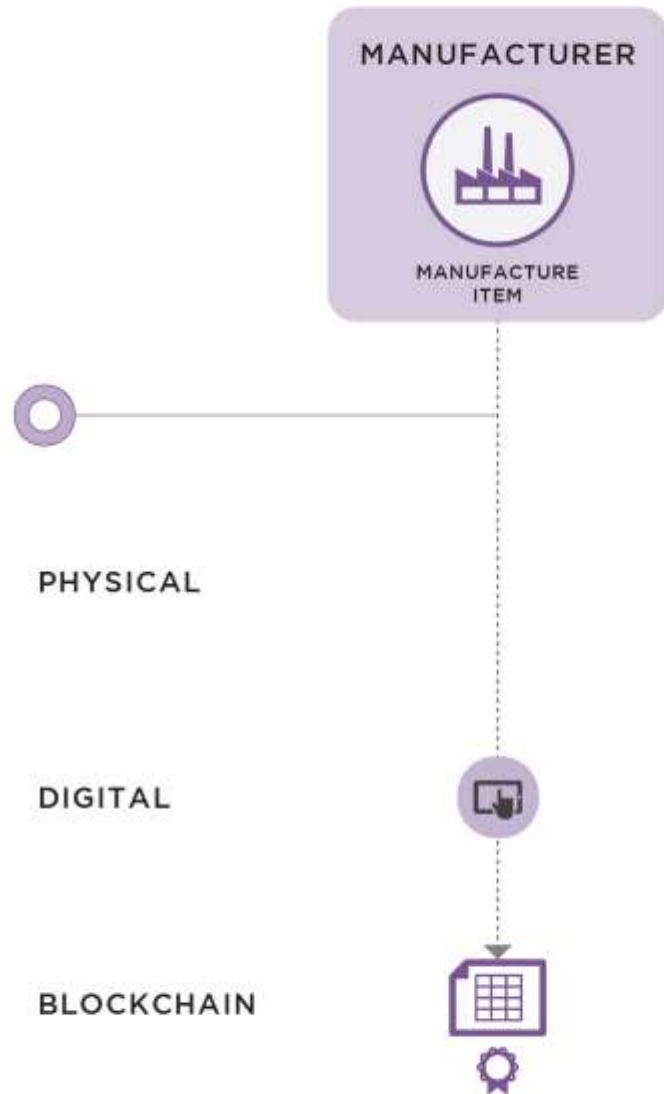
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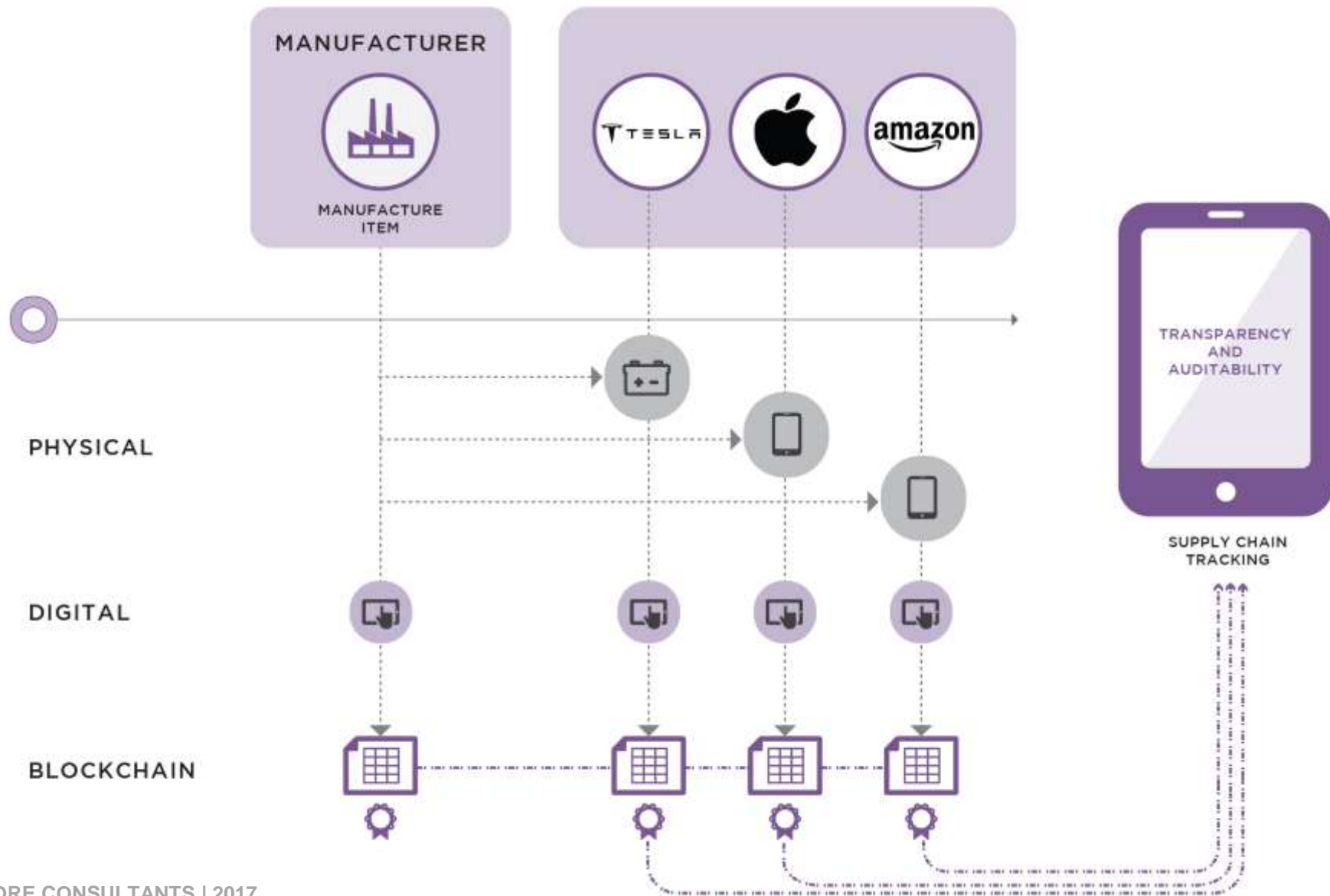
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COBALT SUPPLY CHAIN BLOCKCHAIN JOURNEY



Hurdles to Implementation

Blockchain is not a panacea to all these problems.

- ✓ Technical challenge is blockchain cannot guarantee information reliably in the recording. So we need to maintain trustworthiness of the records
- ✓ Non-technical challenge is the issue of differing incentives to reliably implement blockchain technology
- ✓ Small wins: May not clean up the entire supply chain, but if we can ensure these miners are being paid more market related or trace the money which can be put back in the form of improved safety measures, then this is a first step



Children sorting cobalt-bearing stones in the DRC: Source: Amnesty International



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Next Steps

Blockchain is not a panacea to all these problems.

- ✓ Within this due diligence, we need to fully understand the point of entry of the artisinally mined material in the supply chain.
- ✓ Need to undertake a detailed economic due diligence, in order to work out whether blockchain technology can be used.
- ✓ The idea would be to start with the first block, namely just getting a digital footprint of the bags of artisinally mined material to the traders. This would provide a starting point for a discussion around fairer pay and working conditions for artisanal miners which is a step in the right direction.

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