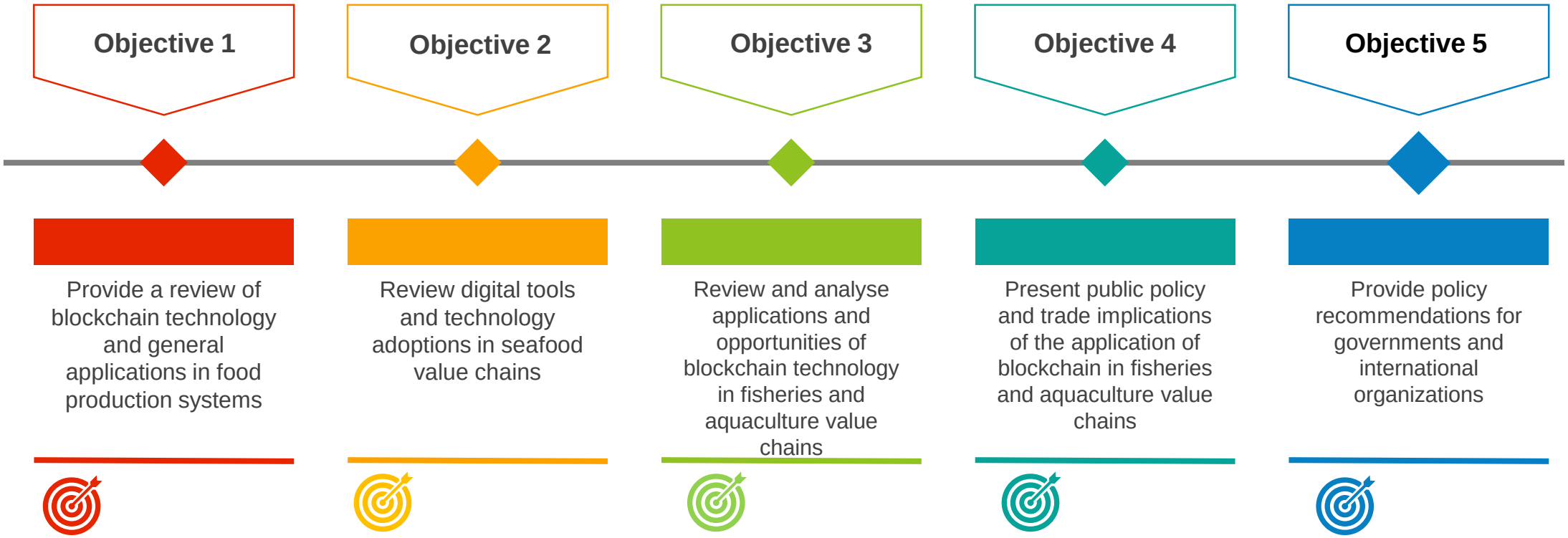

Blockchain application in seafood value chains
COINTELEGRAPH

Study objectives

Demystify blockchain technology, provide thoughts on the opportunities and challenges in implementing blockchain-based systems as well as document some case studies on its use in seafood value chains



Study findings

Similarities across 7 reviewed blockchain projects

Immutability of data and secure data sharing

These were the most common reasons for utilizing blockchain technology

Link between digital and physical

All projects rely on some way to link the physical with the digital, either through tagging individual fish or some other means of recording units of catch data

High-value fish species

Projects focused on tuna and Patagonian toothfish species, which are considered high-value commodities

Use of QR codes on product packaging

This method was favoured, possibly because of its utility

Communality analysis

Table 7. Commonality analysis of blockchain projects

Project	Commodity	Blockchain	Comments
Provenance Indonesia	Tuna Fishing method: handline, pole and line	Ethereum Type: N/A	Fish are individually identified back to the fisher Fish are tracked through transformation in processing facility Uses near-field communication (NFC) on product packaging to communicate provenance story
WWF-New Zealand, ConsenSys, Sea Quest, TraSeable Solutions	Tuna Fishing method:	Ethereum Type: private Platform: Quorum	Fish are individually identified back to the fisher Trialled radio-frequency identification (RFID) and Internet of Things (IoT) sensors Fish are tracked through transformation in processing facility Uses Quick Response (QR) codes on product packaging to communicate provenance story
Pacifical, Atato Pacific and import markets	Tuna Fishing method: purse seine	Ethereum Type: public Platform: Atato notary application programming interfaces	Fish are not individually identified Uses existing Parties to the Nauru Agreement Office (PNAO) fisheries information management system platform for data capture of Marine Stewardship Council (MSC) chain of custody (CoC) Atato notary service receives digital traceability data at key points and records onto blockchain Provenance story linked to lot/batch number printed on canned tuna
OpenSC, WWF-Australia, BCG Digital Ventures Australia	Patagonian toothfish Fishing method: longline	N/A	Fish are individually identified back to the fisher Uses RFID and IoT sensors Uses QR codes on product packaging to communicate provenance story
Bumble Bee Foods, SAP	Yellowfin tuna	HyperLedger	Fish are individually identified back to

Clearly defined value chains with known actors

Most of the projects had relatively short and clearly defined or vertically integrated value chains where the actors were known

Study findings

Challenges across 7 reviewed blockchain projects

Tagging and labelling of fish

Physical fish tags/labels could be lost or damaged while transporting the fish or could potentially be tampered with

Reliance on human input

Most of the projects rely on human input of fish data, which themselves could be open to tampering

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WWF-New Zealand, ConsenSys, Sea Quest, TraSeable Solutions Fiji	Tuna Fishing method: longline	Ethereum Type: private Platform: Treum (previously Viant)	Fish are individually identified back to the fisher Trialled radio-frequency identification (RFID) and Internet of things (IoT) sensors Fish are tracked through transformation [illegible]
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Complex seafood value chain scenarios untested

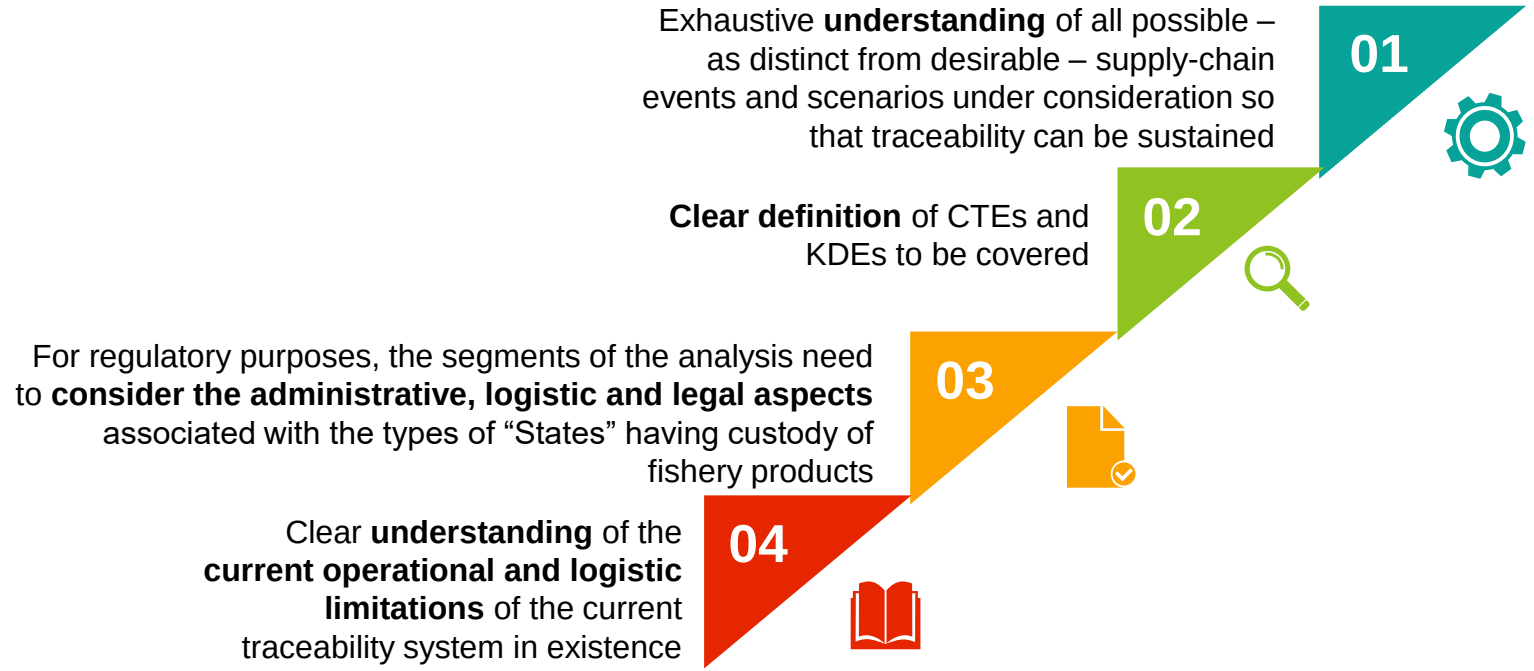
Solutions were not tested in real-world complex seafood value chain scenarios where the value chain actors were unknown

Verifiability of private and consortium blockchain platforms

By their very nature, these types of blockchains are not open to the public and transactions on them cannot be independently verified

Main recommendations

Critical forethought needs to be given to traceability along the value chain:



Main recommendations

Critical forethought needs to be given to blockchain as an appropriate tool for traceability:

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Use a well-designed **decision tree**, or other **decision model**, to determine whether it is the right tool to use

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If blockchain is chosen as the appropriate tool, then **attention still needs to be given to**:

- Operational considerations,
- Security considerations,
- Electronic data interchange,
- Regulatory uncertainty,
- Increased responsibility of the user,

Final comments:

Permissioned consortium blockchains in particular have the greatest potential in the current state of the technology to be scaled to address seafood traceability without the concerns of high energy use and slow transaction times that public permissionless blockchains have.

The study has not found limitations on the blockchain technology that cannot be overcome under the right scenario. However, whether there exists the collective will to adopt and expand an integral, value-chain-encompassing traceability system is a different matter.

The recommendation of this study for governments and international organizations in regard to the development, use and promotion of blockchain technology is to follow strict due diligence at legal, commercial and operational level prior to commitment.

“Blockchain, data mining, and AI will not stop IUU fishing, will not prevent overfishing and discarding. But they may help to make global streams of fish and seafood products with the associated flow of money becoming more visible and transparent” (Probst, 2019).

Be careful about the current media discourse that seems to pin the solution to multifaceted seafood value chain problems (from IUU fishing, seafood safety and species fraud to labour issues) on one data architecture tool – blockchain.
- *This risks hyperi-nflating expectations on what the technology can offer, with potential operators then walking away because it does not deliver on the hype built around it.*

Thank you !

https://www.fao.org/3/ca8751en/ca8751en.pdf

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