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COUNTERING TRANSNATIONAL CORRUPTION STATE OF INNOVATION ANALYSIS

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ACRONYMS

3T	Tin, tungsten, and tantalum
ACTF	Anti-Corruption Task Force
AI	Artificial intelligence
AIS	Automatic identification system
ASM	Artisanal and small-scale mining
BOT	Beneficial ownership transparency
CoC	Chain of custody
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSO	Civil society organization
CFM	Community forest management
CTC	Countering Transnational Corruption
DNA	Deoxyribonucleic Acid
DRC	Democratic Republic of Congo
E-GP	E-government procurement
EITI	Extractive Industries Transparency Initiative
ELIMS	Electronic logistics management information systems
ESG	Environmental, social, and governance
EU	European Union
FATF	Financial Action Task Force
FSC	Forest Stewardship Council
FLEGT	European Union Forest Law Enforcement, Governance, and Trade Action Plan
G7	Group of Seven
G20	Group of 20
GIZ	German Agency for International Cooperation
GHAP	Global Health Assurance Partnership
GHSC	Global Health Supply Chain Program
HIV	Human Immunodeficiency Virus
ICT	Information and communications technology
ICMM	International Council of Metals and Mining
IMF	International Monetary Fund
ITSCI	International Tin Supply Chain Initiative
KPCS	Kimberley Process Certification Scheme
LGBTQI+	Lesbian, gay, bisexual, transgender, queer, and intersex
LME	London Metals Exchange
MNC	Multinational corporation
NGO	Non-governmental organization
NRGI	Natural Resource Governance Institute
NWC	National Whistleblower Center
OECD	Organization for Economic Co-operation and Development
OCDS	Open Contracting Data Standard

OCP	Open Contracting Partnership
PEP	Politically-exposed person
PFSCM	Partnership for Supply Chain Management
PRC	People's Republic of China
PWYP	Publish What You Pay
RFID	Radio-frequency identification
RMI	Responsible Mineral Initiative
SNBC	Social norms and behavioral change
SOE	State-owned enterprise
TNRC	Targeting Natural Resource Corruption
QR	Quick response
USAID	United States Agency for International Development
UWO	Unexplained wealth order
WWF	World Wildlife Fund

1. INTRODUCTION

While systemic corruption remains a pervasive challenge in many countries around the world, it is also a growing global phenomenon beyond the purview of individual countries or communities.¹ Corrupt actors engage in bribery across borders, co-opt and misuse high-value commodities and global supply chains, and utilize the international financial system and professional service providers to hide ill-gotten assets offshore. Recent research and investigative journalism, such as the Panama and Pandora Papers, have documented the extent to which legal and regulatory deficiencies in the international financial system and other professional service industries allow corrupt actors the means to transfer and conceal ill-gotten gains.

Systemic corruption is a fundamental threat to the achievement of development outcomes, democratization and democratic resiliency, and effective responses to crises. Corruption in key economic sectors deprives countries of much-needed tax revenues for the provision of public services and infrastructure, deters private investment, and undermines the growth of local enterprises. Corruption robs citizens of equitable access to critical public goods such as electricity, water, health, infrastructure, and education and diverts scarce resources during emergencies and humanitarian disasters.

Corruption also has significant negative political, social, and environmental consequences. It undermines key democratic values around transparency, accountability, and participatory governance. Moreover, corruption undermines government legitimacy and citizens' trust in key political institutions, including the judiciary, police, and elected officials, and can be used to diminish the integrity of elections. Corruption can intensify social inequities and disproportionately impact the most vulnerable in society, including women; Indigenous populations; racial, religious, and ethnic minorities; and LGBTQI+ people. The erosion of government legitimacy may incentivize communities to look for other entities that can deliver goods and services, including non-state armed groups. Corruption in the natural resource sector, including extractives, timber, fishing, and wildlife trafficking can degrade the environment, contribute to biodiversity loss, accelerate climate change, and contribute to human rights and labor abuses.

Effectively countering transnational corruption requires approaching the problem from multiple angles and sectors and partnering with a range of stakeholders. To support this effort, this report evaluates the state of innovation to counter corruption in high-risk supply chains, illicit finance, and the trafficking of commodities, which are the targets of the Countering Transnational Corruption Grand Challenge for Development (CTC Grand Challenge). USAID's Grand Challenges for Development mobilize a broad array of stakeholders to bring in new voices to solve development problems and to source and scale novel and proven innovations, solutions, and ideas. As the vanguard of USAID's suite of anti-corruption programs in the Presidential Initiative for Democratic Renewal, the CTC Grand Challenge will leverage innovation and collaboration to prevent corrupt actors from siphoning off critical resources that should be used for the public good. The CTC Grand Challenge solutions will detect and disrupt illicit finance and trafficking in commodities; strengthen transparency and accountability in global supply chains; promote standards,

¹ USAID defines corruption as the abuse of entrusted power or influence for personal or political gain.

practices, and norms that enhance integrity in the public and private sectors; and address other significant dynamics of transnational corruption.

The purpose of this analysis is to:

- Provide a rapid survey of the current landscape of innovation related to countering transnational corruption;
- Identify gaps, barriers, and opportunities for developing, piloting, testing, and scaling innovation toward this effort; and
- Provide recommendations for the overall scope of and particular activities under USAID's CTC Grand Challenge.

This analysis was conducted through a non-exhaustive desk research of more than 200 resources (including articles, blog posts, journal articles, reports, requests for information responses, videos, and websites) and consultations with more than 50 stakeholders within technical sectors and innovation arenas from government, the private sector, and civil society. The scope of the analysis is limited to corruption in high-value supply chains, illicit finance, trafficking of commodities, and cross-cutting innovations focused on open data, public procurement, and social norms and behavioral change. High-value supply chains of primary interest include health, critical minerals, timber, and fishing.² Trafficked commodities of interest include wildlife, minerals, and counterfeit pharmaceuticals.³

The findings in this report are organized around **three mutually-reinforcing objectives** from USAID's Anti-Corruption Policy that are critical for changing corrupt actors' incentives and shifting the norms, behaviors, and incentives that sustain corruption:

- ***Reducing opportunities for corruption:*** This objective focuses on making it difficult for public officials to engage in corrupt behavior, launder stolen resources, and enjoy their ill-gotten gains. Examples include promoting e-governance and automation in public administration; improving procurement practices; increasing beneficial ownership transparency and disclosure requirements for public officials; and passing prohibitions on bribery and money laundering.
- ***Raising the costs of corruption:*** This objective focuses on imposing consequences on corrupt actors – both as a means of accountability and as a deterrent – by bolstering exposure of corruption, supporting advocacy and coalition-building, and improving investigation and enforcement capacities. Examples include stimulating the development and testing of new tools and technologies to detect and disrupt illicit flows; supporting investigative journalists to expose corruption; supporting civil society campaigns to monitor and put pressure on the government; strengthening anti-corruption bodies and specialized courts; bolstering supreme audit institutions; improving the capacity of prosecutors, judges, and law enforcement agencies to

² Critical minerals, such as copper, lithium, nickel, cobalt and rare earth elements, are minerals that are essential to the economic or national security of the United States and have a supply chain that is vulnerable to disruption. The U.S. Geological Survey has published the full list of [50 critical minerals](#). Conflict minerals include gold, tin, tantalum, and tungsten.

³The trafficking of narcotics, arms, and counterfeit goods are outside the scope of this analysis.

investigate and prosecute financial crimes and corruption; and providing evidence and insights to sanctions authorities.

- ***Incentivizing integrity in the public and private sectors:*** This final objective focuses on creating positive inducements for controlling corruption and improving governance in the public and private sectors by partnering with the private sector to promote traceability in global supply chains; promoting adherence to global norms and standards; cultivating a race-to-the-top in high-risk industries; driving private and IFI investment toward countries that have undertaken reforms; developing social norms and behavioral change approaches to anti-corruption; and providing support for strategic communications to fight disinformation and celebrate anti-corruption progress.

2. INNOVATIONS THAT REDUCE OPPORTUNITIES FOR CORRUPTION

A. Procurement and licensing innovations

Public procurement refers to the purchase of goods, services, and works by governments and state-owned enterprises.⁴ Public procurement is one of the government activities most vulnerable to corruption due to the high value and volume of transactions, complexity of the process, and close interaction between public officials and private actors. Procurement innovations have applications in a wide range of public sectors including health, education, energy, mining, infrastructure, defense, and law enforcement. Recent procurement and licensing innovations include the promotion of open contracting, the integration of information and communication technology (ICT), the creation of emergency protocols during the COVID-19 pandemic, and technical support in the design of contracts.⁵

Open Contracting

- Open contracting refers to the reform of public procurement policies and processes to increase transparency, participation, and inclusivity by using open, timely, and accessible data for decision-making, monitoring, and oversight.⁶ Open contracting reforms can not only limit corruption, but also increase competition, reduce costs, shorten procurement times, and enhance social inclusion.
- To date, more than 50 countries have implemented open contracting programs and international institutions like the United Nations, Organization for Economic Co-operation and Development (OECD), World Bank, International Monetary Fund (IMF), Group of Seven (G7), and Group of 20 (G20) have endorsed, promoted, and supported the adoption of open contracting.
- Open Contracting Partnership (OCP) promotes and supports open contracting reforms by engaging governments, private firms, civil society, and technologists.⁷ OCP has also developed the Open Contracting Data Standard (OCDS), a free, non-proprietary open data standard and

⁴ OECD (2016). "[Preventing Corruption in Public Procurement](#)."

⁵ While our initial analysis did not identify recent innovations related to political disclosure requirements, we recognize the importance of these interventions and intend to further explore these topics in future research.

⁶ Open Government Partnership (2022). "[Skeptic's Guide to Open Government](#)."

⁷ Open Contracting Partnership. "[Open contracting: impact and evidence](#)," accessed July 20, 2022.

publication format for information related to the planning, procurement, and implementation of public contracts.⁸

- The World Bank, in partnership with the Government Transparency Institute, has developed the Procurement, Anti-Corruption, and Transparency platform, which provides access to open data from national electronic procurement systems from 46 countries and to open data on World Bank- and Inter-American Development Bank-financed contracts for more than 100 countries.⁹ The database features contract-level transparency and integrity risk scores based on a methodology developed as part of the Global Integrity Anti-Corruption Evidence program funded by the United Kingdom's Foreign, Commonwealth & Development Office.¹⁰

E-procurement

- E-procurement refers to the use of ICT in public procurement. E-procurement systems can increase transparency, facilitate access to public tenders, reduce direct interaction between procurement officials and companies, increase competition, and allow for easier detection of irregularities and corruption. The digitization of procurement processes also provides audit trails to assist in investigation activities.¹¹
- Notable adoptions of e-procurement systems in developing countries include Bangladesh's e-Government Procurement (e-GP),¹² Colombia's Electronic System of Public Contracts,¹³ Moldova's MTender, Ukraine's ProZorro,¹⁴ and Zambia's e-GP.

Emergency procurement protocols during the COVID-19 pandemic

In response to corruption risks during the COVID-19 pandemic, countries have adapted and strengthened existing monitoring mechanisms to oversee public health procurement through the expansion of e-procurement systems, use of dedicated task forces and audit teams to track emergency funds, pre-registered suppliers lists, and publication of emergency contracts.

- Integration of COVID-19 products into e-procurement systems: The Global Fund made COVID-19 products (personal protection equipment and diagnostic tests) available to principal recipients on wambo.org, an online platform developed to help countries procure health commodities. The platform allows recipients to search for, compare prices, and purchase quality-assured

⁸ Open Contracting Partnership. "[Open Contracting Data Standard](#)," accessed July 20, 2022.

⁹ World Bank, "[ProACT: Procurement Anti-corruption and Transparency platform](#)" accessed July 29, 2022.

¹⁰ David-Barrett, L. and Fazekas, M., "[Using 'red flag' indicators to identify corruption and analyze reform efforts in the procurement process.](#)" GI-ACE.

¹¹ OECD (2016). "[Preventing Corruption in Public Procurement.](#)"

¹² World Bank (2020). "[World Bank: e-Procurement Reform in Bangladesh.](#)" in *Enhancing Government Effectiveness and Transparency: The Fight Against Corruption*.

¹³ Open Contracting Partnership (2020). "[Open for business: Colombia's data-driven procurement reforms increase competition.](#)"

¹⁴ Kovalchuk, A., Kenny, C., and Snyder, M. (2019). "[Examining the Impact of E-Procurement in Ukraine.](#)" Center for Global Development.

products. Previously, wambo.org only allowed the purchase of human immunodeficiency virus (HIV), tuberculosis, and malaria-related commodities with Global Fund grants.¹⁵

- **Pre-approved vendor lists:** Chile maintains lists of pre-approved vendors that meet rigorous qualifications and vetting standards, presenting lower risk during accelerated procurement processes.¹⁶
- **Publication of emergency contracts:** In Ukraine, the government is required to publish the full text of all emergency contracts online. In one case, this allowed a civil society organization (CSO) to uncover a state-owned enterprise issuing an inflated contract to procure safety suits.¹⁷

Technical support for governments in licensing negotiations

- The **CONNEX Support Unit** provides assistance to developing and transitional country governments in negotiating or renegotiating large-scale, complex licensing contracts in the extractive sector. The unit aims to provide rapid, independent high-quality, and multidisciplinary support and is implemented by the German Agency for International Cooperation (GIZ).¹⁸

B. Beneficial ownership transparency (BOT)

Anonymously-owned companies are often used to conceal corruption, and the real owners of companies, known as the beneficial owners, are often kept hidden by complex corporate structures set up across different jurisdictions. A beneficial owner is defined as “the real person who ultimately owns, controls, or benefits from a company or trust fund and the income it generates.”¹⁹ Without BOT, money laundering is easier to get away with and corruption is more difficult to investigate.

The promotion of BOT is seen as a central means to limit the political capture of high-value sectors and curb illicit financial flows. Regulatory loopholes in beneficial ownership disclosure requirements in one country have serious global consequences. The practices employed for laundering illicit finance adapt to seek out jurisdictions where legal structures offer the greatest degree of privacy protection.

In 2020, registering beneficial ownership was mandatory in 64 countries; however, the implementation of BOT reforms in developing countries is limited. Only 20% of East Asia and Pacific economies and 21% of Sub-Saharan African countries ask companies to submit information on beneficial owners.²⁰ Moreover, less than 14% of low-income economies require BOT disclosure, compared with 51% of high-income economies.²¹ Notable innovations that promote BOT in developing countries include:

¹⁵ The Global Fund, “[Procurement Tools](#)”, accessed July 22, 2022.

¹⁶ Ellena, K., Brown, A., & Dreher, C. (2020). “[Preventing Government Corruption in Crises](#).” The International Foundation for Electoral Systems.

¹⁷ Ibid.

¹⁸ GIZ. “[Fair and stable investment contracts for the extractive sector](#),” accessed July 20, 2022.

¹⁹ Transparency International. “[Beneficial Ownership Secrecy](#),” accessed July 20, 2022.

²⁰ World Bank (2020). “[Beneficial Ownership Transparency](#).” in *Enhancing Government Effectiveness and Transparency: The Fight Against Corruption*.

²¹ Ibid.

Non-governmental organizations (NGOs) and industry associations promoting beneficial ownership disclosures

- To support its efforts to promote revenue transparency in the natural resource sector, [Extractive Industries Transparency Initiative \(EITI\)](#) started to require companies in implementing countries to disclose beneficial ownership information in 2020.
- [Opening Extractives](#) is a partnership between EITI and Open Ownership to promote BOT in the extractives sector.²²
- [Open Ownership](#) provides technical and policy support and guidance on how to implement BOT reforms and has created the [Open Ownership Register](#), which is a prototype, transnational, and open beneficial ownership registry that holds 16 million records from 7 million companies from 200 jurisdictions.²³

Use of artificial intelligence and other technologies to identify beneficial owners

- Microsoft has launched the [Anti-Corruption Technology and Solutions](#) initiative, which uses dynamic multipartite graph-embedding technology to aggregate beneficial ownership information disclosed by an entity and compares it with the dynamic information on how that entity behaves in the real world. The tool aims to fill in gaps in beneficial ownership registration and identify potential relationships between various shell companies.²⁴
- [Deep Discovery](#) is an artificial intelligence (AI) system that helps banks, regulators, law enforcement, and journalists identify beneficial owners to assist in the effort to counter money laundering and financial terrorism. The system applies advanced machine learning algorithms over a global knowledge graph of more than a billion companies, directors, and officers to identify financial crime within opaque networks.²⁵
- [Triton by the Center for Advanced Defense Studies](#) analyzes and reports the ownership structures of the world's industrialized fishing fleet in an effort to reveal linkages between fishing vessels and the companies that profit from their activities. Triton currently analyzes 10,000 entities across 60 jurisdictions. Triton's network analysis is built primarily on official documentation and data from national corporate, property, and judicial registries, and secondarily on public data, such as credit reports, official company websites, public reporting, and trade records. Vessel information is drawn from national vessel registry data, regional fishery management organization authorized vessel lists; Information Handling Services Markit, and Trygg Mat Tracking's illegal, unreported, and unregulated fishing vessel list.²⁶

²² Open Ownership. "[Opening Extractives](#)," accessed July 18, 2022.

²³ Open Ownership. "[Open Ownership Register](#)," accessed August 26, 2022.

²⁴ Microsoft. "[Shining a light on beneficial ownership](#)," accessed July 18, 2022.

²⁵ Deep Discovery. "[Artificial intelligence for ending global corruption](#)," accessed July 18, 2022.

²⁶ C4ADS. "[Triton](#)," accessed July 18, 2022.

Creating linkages between BOT and Politically Exposed Person (PEP) records

- Joining the Dots by Directorio Legislativo and EITI has implemented an innovative pilot database that links BOT and PEP records in Colombia.²⁷ A PEP refers to an individual who is or has been entrusted with a prominent function.

C. Application of blockchain technologies to data management

Public-sector corruption centers around a lack of transparency, inadequate record-keeping, and low accountability. Blockchain technologies have the potential to increase transparency and accountability in corruption-prone government processes and reduce the risk of corrupt activity.²⁸ A blockchain is a form of distributed ledger technology that acts as an open and trusted record of transactions from one party to another that is stored on multiple computers in a public or private network.²⁹ Once data records or “blocks” are collected in a chain, they cannot be changed or deleted by a single actor. Instead, they are verified and managed using automation and shared governance protocols.³⁰ Blockchain technology can simplify the management of trusted information and make it easier for government agencies to access, use, and secure critical public-sector data.³¹ This section features recent blockchain applications in wage bill management and land rights records. Blockchain applications that reduce corruption in high-value commodity supply chains are further discussed in the report’s section on traceability innovations.

- The IMF developed a blockchain-based public administration system in Guinea-Bissau to assist in the reconciliation of government personnel and payroll records. The solution integrates existing Ministries of Finance and Public Administration databases and creates a single shared record of employment and expenditure. The application aims to provide visibility into the real-time budget, size of the public workforce, and compensation. Additionally, the application has built-in features to identify data integrity issues and inconsistencies.³²
- BitFury has designed and managed a blockchain system for Georgia's National Agency of Public Registry to secure and timestamp notarized documents and contracts. Based on the Exonum platform, BitFury has also developed a blockchain land rights records registry in Georgia. Land and property owners will have immutable proof of ownership and transactions and constant access to their records through an encrypted entry on the blockchain.³³

²⁷ Directorio Legislativo. “[Joining the DOTS with PEPs](#),” accessed July 18, 2022.

²⁸ WEF (2020). “[How governments can leverage blockchain to stunt corruption](#).” World Economic Forum Insight Report.

²⁹ Ibid.

³⁰ Cheng, S., Daub, M., Domeyer, A., & Lundqvist, M. (2017). “[Using blockchain to improve data management in the public sector](#).” McKinsey Report.

³¹ Ibid.

³² IMF (2022). “[Guinea-Bissau 2022 Article IV Consultation and Third Review under the Staff-Monitored Program](#).”

³³ Aarvik, P. (2020). “[Blockchain as an anti-corruption tool](#).” U4 Anti-Corruption Resource Center.

D. Barriers to the implementation of innovations that reduce opportunities for corruption

- Participation in open contracting, procurement, and beneficial ownership reforms is voluntary and often faces significant political opposition in countries or sectors with systemic corruption. In order to be effective, reforms need to be supported by clear, consistent legislative frameworks and apply to foreign and domestic firms as well as state-owned enterprises.
- To be useful in stemming corruption, beneficial ownership data must be reliable, detailed, up-to-date, and accessible. BOT registries are often populated through self-reporting by companies, face weak or non-existent data verification processes, and are thus subject to inaccuracy. Furthermore, many countries have reporting requirements that are insufficient to improve transparency and accountability.³⁴ The global standard for disclosure is 25 percent of the ownership of a company. Many stakeholders, such as OCP and Natural Resource Governance Institute (NRGI), however, argue that owners of as low as five percent of a company should be disclosed in order to effectively counter corruption.
- The development of open contracting, e-procurement, and beneficial ownership systems requires significant resources and technical expertise. The systems have high investment and maintenance costs and may take many years to be adopted across all high-risk sectors. Additionally, these new systems are not immune to corruption. Corrupt behavior can adapt to new procurement technologies or form indirect beneficial ownership structures based on rent-sharing agreements.
- In order for transparency innovations to limit corrupt behavior, they must be linked with effective accountability mechanisms. Increased transparency alone is not sufficient to stop corruption. For example, researchers at NRGI found that the monitoring and enforcement of beneficial ownership transparency is a critical gap that enables corruption in the granting of licenses in the extractive sector. NRGI reviewed more than 50 mining and oil laws and found that about half contained prohibitions on government officials or their close associates holding interests in companies applying for extractives licenses. However, none of the laws required regulators to actually check beneficial ownership records as part of screening license applications.³⁵

3. INNOVATIONS THAT RAISE THE COSTS OF CORRUPTION

A. Innovations to detect corruption and illicit flows

Before corrupt activities can be investigated and prosecuted, they must first be detected. Traditionally, it has been difficult to detect corruption due to its hidden nature. Emerging technologies, however, have spurred the development of new software tools for detecting corruption. These detection tools can allow enforcement agencies to disrupt illicit flows and initiate investigations into corruption networks. In the public and financial sector, AI tools (e.g., machine learning, deep learning, data mining) are

³⁴ Landau et al. (2021). [“Supporting beneficial ownership transparency in Mongolia.”](#) Brookings Institute.

³⁵ Westenberg, E. and Sayne, A. (2018). [Beneficial Ownership Screening: Practical Measures to Reduce Corruption Risks in Extractives Licensing.](#) NRGI.

increasingly being used to detect anomalies, red flags, and other patterns that signal fraud and money laundering. These tools have the ability to use large datasets to reveal complex relationships and patterns that would be difficult for humans to detect. In the natural resource sectors, private firms and researchers have also started to develop and test monitoring tools that utilize remote sensing data and machine learning techniques to identify and track illegal mining, logging, and fishing. Corruption, including the involvement of government actors, false permitting, and customs fraud, frequently underpins these illegal activities in the natural resources sector.

Public procurement sector

- The European Commission has developed a data mining and data enrichment risk-assessment tool, [ARACHNE](#), to support managing authorities responsible for the European Structural and Investment Funds. The system was created as a response to an increased demand for accurate fraud prevention and detection strategies and helps identify projects susceptible to risks of fraud, conflict of interest, or other irregularities.³⁶
- Transparency International Ukraine created [Dozorro](#), an online monitoring platform and a set of intelligence tools focused on detecting misuse of public funds in public procurement. The platform is based on data from Ukraine’s ProZorro e-procurement system.³⁷
- NGO and private actors in Eastern Europe and Central Asia have developed [tools to analyze unit prices in procurement contracts](#). The tools build on an increasing number of e-procurement systems in the region and many of them include an open application programming interface (API), based on the Open Contracting Data Standard. Support from Open Contracting Partnership has allowed the integration of the tools into business intelligence modules in [Kyrgyzstan](#), [Moldova](#), and [Ukraine](#).³⁸
- Microsoft’s [Anti-Corruption Technology Solutions Initiative](#) promotes automated detection of corruption using data science and AI tools that can identify relevant information (e.g., pricing irregularities or nonstandard contracts) that may signal corruption.³⁹
- [Wipfli](#) piloted an application that can uncover bid rigging including no-bid contracts, change-order abuse, raising of the price of a project after bidding, and bidder exclusion. Wipfli’s technical team assembled years of data from procurement contracts and conducted statistical analysis to create a price book of goods and services. The application uses the price book in algorithms to search vast amounts of data for suspicious transactions or bids.⁴⁰
- Academic research has recently started to apply machine learning methods to predict corruption in procurement. For example, researchers from Paraguay have developed a procurement anomaly detection tool based on data published in the Open Contracting Data

³⁶ Lu, C. (2022). [“New Technologies for Sustainable Development: Perspectives on Integrity, Trust and Anti-Corruption.”](#) UNDP.

³⁷ Ibid.

³⁸ Hrytsenko, Y. and Tarnay, V. (2022). [“Analyzing Unit Price in Public Procurement in Eastern Europe and Central Asia.”](#) Open Contracting Partnership.

³⁹ Microsoft. [“Tackling Corruption with Transparency and Technology,”](#) accessed July 18, 2022.

⁴⁰ Microsoft. [“Anti-Corruption Technology Solutions,”](#) accessed July 18, 2022.

Standard, which allows for its application in other countries that implement the same data standard.⁴¹ Additionally, a recent DevLab@Penn and USAID co-sponsored conference featured research that utilized machine learning to identify politically-connected firms, detect collusive networks in e-procurement, and predict levels of subnational corruption.⁴²

Illicit finance

- CipherTrace, a cryptocurrency intelligence company recently acquired by Mastercard, helps calculate the risk levels of cryptocurrency transactions. It uses clustering algorithms to aggregate data, correlate indicators, and attribute them to suspicious addresses and cryptocurrency wallets.⁴³

Illegal mining in the extractive sector

- ASMSpotter is a machine learning application to automatically identify artisanal and small-scale mining (ASM) sites using multispectral satellite imagery and a mining activity training dataset. The pilot project with the European Space Agency in Suriname was able to predict new gold mining activity with an accuracy of more than 80% and has since been expanded to Peru and Guyana. The targeted users are local authorities, mining and environmental ministries, supply chain actors, and development organizations.⁴⁴
- Project Inambari is an open mapping platform developed by SkyTruth that uses publicly available Synthetic Aperture Radar satellite imagery and other data sources to detect illegal gold mining activity in tropical forests in the Peruvian Amazon.⁴⁵

Illegal logging in the timber sector

- Remote sensing technology, such as Global Forest Watch, has been deployed to monitor deforestation and used as a monitoring tool under the Reducing Emissions from Deforestation and Forest Degradation process.⁴⁶
- The World Wildlife Fund (WWF) is supporting the Romanian government's timber traceability system, SUMAL, to incorporate the use of hidden cameras to monitor logging trucks' license plates and payloads and compare the information with reported data. The system has allowed

⁴¹ Niessen, M. E. K., Paciello, J. M., & Fernandez, J. I. P. 2020. "[Anomaly Detection in Public Procurements using the Open Contracting Data Standard](#)." 2020 Seventh International Conference on eDemocracy & eGovernment.

⁴² DevLab@Penn/USAID, 2022. "[Big Data for Development and Governance](#)." University of Pennsylvania. Philadelphia, PA. October 20-21, 2022.

⁴³ Ciphertrace. "[Cryptocurrency intelligence & blockchain analytics](#)," accessed July 18, 2022.

⁴⁴ Levin Sources (2021). "[Opportunities for technology use in responsible minerals production and sourcing in the DRC](#)."

⁴⁵ Artisanal Mining Challenge. "[Project Inambari: Alert system for tropical forest mining](#)," accessed July 20, 2022.

⁴⁶ Wickberg, S. (2013). "[Technological innovations to identify and reduce corruption](#)." U4 Anti-Corruption Resource Center.

the detection of trucks lacking proper delivery documents, multiple trucks using the same delivery documents, and fraudulent declarations of timber volumes.⁴⁷

Illegal fishing and wildlife trafficking

- Camera-based electronic monitoring systems in industrialized fisheries use cameras, gear sensors, and sophisticated data analysis to provide accountability for fishing activities.⁴⁸
- Global Fishing Watch is a big data technology platform that uses data from the Automatic Identification System (AIS) network to create a near real-time global map of commercial fishing. Global Fishing Watch has also developed and publicly released the first-ever global map of previously undetected dark vessels (non-broadcasting vessels) using satellite imagery and machine learning. Dark vessels are more often engaged in illicit activities than those that broadcast their positions. Of the few hundred vessels on the illegal, unreported, and unregulated vessel list, only a handful broadcasted their positions over AIS in the past two years.⁴⁹
- FISH-i Africa is a task force of eight Eastern African countries committed to using monitoring and market forces to deter illegal fishing and fisheries crimes (fraud, forgery, corruption, and slavery). It promotes the use of AIS and Vessel Monitoring Systems to track and identify vessels to catch illegal activity. The task force uses the information to deny port access to known illegal vessels, uncover vessels with no or false licenses, and locate vessels fleeing enforcement officers.⁵⁰
- Data Mining International has developed the Network for Environmental Crimes Targeting software tool to uncover patterns that indicate wildlife crimes in national import and export data.⁵¹
- Enforcement Gaps Interface is a tool that uses machine learning to mine hundreds of commercial sites on the open web for ads potentially containing illegal wildlife and wildlife products. Law enforcement can view and use the data through a password-protected interface. The tool is used to launch investigations by enforcement agencies into the actors and transport networks involved in wildlife trafficking.⁵²
- Wildlife Sentinel is an app to help airport and airline staff report suspected wildlife trafficking and corruption. The app is anonymous and collects information on what raised suspicions, the location of the incident, details of the person(s) involved, and flight information. The information is then passed to law enforcement authorities. The key feature of this intervention

⁴⁷ Grant, J., Freitas, B., & Wilson, T. (2021). "[Traceability systems: Potential tools to deter illegality and corruption in the timber and fish sectors?](#)" TNRC.

⁴⁸ Fujita et al. (2018). "[Technologies for Improving Fisheries Monitoring.](#)" Environmental Defense Fund.

⁴⁹ GFW. "[Dark Vessels Research Project.](#)" accessed August 8, 2022.

⁵⁰ Gutierrez, M., Daniels, A., and Jobbins, G. (2018). "[Fishing for data: the role of private data platforms in addressing illegal, unreported and unregulated fishing and overfishing.](#)" ODI.

⁵¹ Wildlife Crime Tech Challenge. "[Tackle Corruption Finalists.](#)" accessed August 1, 2022.

⁵² Wildlife Crime Tech Challenge. "[Detect Transit Routes Winners.](#)" accessed July 18, 2022.

is that it is embedded in transportation networks and can identify network vulnerabilities and persons involved.⁵³

B. Innovations that bolster enforcement actions

Anti-corruption agencies, audit institutions, and criminal justice systems play a pivotal role in the enforcement of anti-corruption laws. Independent, transparent, and capable legal institutions are needed to hold powerful corrupt actors accountable. This section explores new technologies that support anti-corruption investigation and prosecution efforts including network mapping tools, blockchain de-anonymization tools, forensic science tools, and technical assistance.

Illicit finance

- The Special Unit on Organized Crime of the Paraíba State Public Prosecutor's Office in Brazil has developed a prototype tool for automating and optimizing the detection of shell companies used by criminal organizations to launder money. The tool utilizes data mining algorithms to build multi-level networks of criminal organizations, extract hundreds of money-laundering risk red flags, and predict the firms that have a high likelihood of being shell companies used by criminal organizations to launder money. The algorithms use data on individuals, firms, and public contracts as well as previously unstructured data composed of thousands of individuals and firms associated with past money laundering cases. The tool has been incorporated into a Decision Support System that automatically produces reports for investigations. Previously, the same type of report would require hundreds of man-hours.⁵⁴
- CipherTrace Inspector has developed blockchain forensic tools that enable investigations of criminal activity, fraud, and sanctions evasion. The platform offers de-anonymization tools to identify and trace criminals who attempt to use any of more than 800 cryptocurrencies. The platform can also trace funds that have been deposited into a centralized exchange. Once the funds reach an exchange, law enforcement can stop the movement of funds by requesting that the exchange freeze the account.⁵⁵
- In 2018, the United Kingdom introduced unexplained wealth orders (UWOs), which are an investigative tool designed to help law enforcement agencies identify and seize corrupt assets. UWOs are a type of court order that require the owner of an asset worth more than £50,000 to explain how they were able to afford that asset. UWOs affect PEPs and persons where there are reasonable grounds to suspect involvement in serious crimes such as fraud, money laundering, tax evasion, sanctions offenses, or bribery.⁵⁶

⁵³ TRAFFIC. "[New mobile reporting app is helping combat corruption and wildlife trafficking in the aviation industry](#)," accessed July 18, 2022.

⁵⁴ IMF, "[Innovation at the IMF Anti-Corruption Challenge](#)" accessed July 29, 2022.

⁵⁵ Ciphertrace. "[Cryptocurrency intelligence & blockchain analytics](#)," accessed July 18, 2022.

⁵⁶ Arshinoff, N., Humphreys, J., and Tasse, M. (2022). "[Global Finance and Enablers of Corruption](#)." Global Integrity Anti-Corruption Evidence Program.

Wildlife trafficking

- The United Nations Office of Drug Control goCASE is a software that provides wildlife crime case management tools that help strengthen transparency and reduce discretion through systematic case progress monitoring by both agency leadership and external stakeholders, such as civil society or natural resource management practitioners.⁵⁷
- Wildlife DNA testing is frequently used in investigations and criminal proceedings of wildlife trafficking to provide evidence that the animal in question is part of a defined, protected group.⁵⁸ Wildlife DNA testing relies on identifying genetic markers which are consistent within a species, but which vary between species. For each relevant animal, a new methodology and set of genetic markers need to be developed, mapped, and validated. For example, researchers at the Universidad Nacional Autónoma de México are developing forensic tools that can identify the Scarlet Macaw, the Military Macaw, and the Red-Eyed Tree Frog at both the individual and species levels in Mexico, Guatemala, Honduras, and Costa Rica.⁵⁹
- DNA testing can also be used as a source determination tool and identify the geographic location from which a sample originates. Using DNA for source determination requires sufficient genetic variation between geographically distinct wildlife populations as well as reference data from the source populations of interest.⁶⁰ For example, DNA testing has been used to identify major elephant poaching hotspots in Africa for investigation⁶¹ as well as help enforcement agencies identify illegal trade routes of rhino horn trafficking using a Rhino DNA Index System⁶².

Illegal logging in the timber sector

- Wood forensic science, which encompasses both wood identification technologies and the use of test results to aid in law enforcement, can help enforcement agencies combat illegal logging in the timber sector by using scientific testing methods to verify the species and/or geographic origin of wood products. Identification helps in detecting fraud and curbing the supply of illegal wood products that are otherwise easily disguised.⁶³

Diverted and counterfeit commodities in the health sector

- Global Health Assurance Partnership (GHAP) conducts assessments and partners on investigations related to supply chain integrity and technical assistance for National Medical and

⁵⁷ United Nations Office on Drugs and Crime. "[goCASE](#)," accessed July 18, 2022.

⁵⁸ UNODC (2019). "[Criminal Justice Responses to Wildlife Trafficking-DNA](#)."

⁵⁹ USAID Wildlife Crime Tech Challenge, "[Meet the Winners](#)," accessed July 29, 2022.

⁶⁰ Ogden, R. (2010)., "[Forensic science, genetics and wildlife biology: getting the right mix for a wildlife DNA forensics lab](#)." (2010) *Forensic Science, Medicine, and Pathology*, 6(3), 172–179.

⁶¹ Wasser et al. (2004). "[Assigning African elephant DNA to geographic region of origin: Applications to the ivory trade](#)." *Proceedings of the National Academy of Sciences*, 101(41), 14847-14852.

⁶² Harper, C. K. (2021). "[RhODIS®\(The Rhinoceros DNA Index System\): The Application of Simple Forensic and Genetic Tools Help Conserve African Rhinoceros](#)." *Wildlife Biodiversity Conservation*.

⁶³ Grant, J. and Chen, H.K. (2022). "[Using Wood Forensic Science to Deter Corruption and Illegality in the Timber Trade](#)." TNRC.

Regulatory Agencies to identify illicit trade in medicines and supplies. GHAP has developed nationally-led responses to the trade in substandard, falsified, and diverted medicines and health products. GHAP has been implemented into USAID programming and coordinates with the State Department Bureau of International Narcotics and Law Enforcement Affairs and Drug Enforcement Agency.

- The President's Malaria Initiative has piloted a [counterfeit drug detection device](#), which is a handheld screening device that can be used to detect falsified malaria medicines.⁶⁴

C. Innovations that empower local actors to monitor and sanction corrupt actors

Anti-corruption efforts that empower local actors are often seen as a way to restrain corrupt actors, involve those most affected by the consequences of corruption, and build trust and legitimacy at the local level. Key local actors in the fight against corruption include civil society organizations, journalists, and local communities. This section focuses on efforts to strengthen whistleblower protections and the deployment of ICT applications that make information more accessible to citizens.

- Whistleblowing is a powerful tool for exposing and prosecuting corruption. However, without proper protection, individuals with evidence of corruption cannot step forward to assist law enforcement officials due to the threat of retaliation from wrongdoers. [Whistleblower protection](#) refers to the set of legal rights afforded to whistleblowers by domestic and foreign laws. Strong whistleblower protection systems ensure “confidentiality, utilize independent reporting channels, and provide financial rewards tied to the whistleblowers’ role in producing a successful outcome.”⁶⁵ Whistleblower laws in the United States have been used to challenge corruption in other countries and offer options for whistleblowers regardless of location or citizenship. Additionally, NGOs, like the [National Whistleblower Center \(NWC\)](#), are assisting whistleblowers in finding legal aid and advocating for stronger whistleblower protection laws. NWC currently has active campaigns to strengthen whistleblower protection systems in the fossil fuel, banking, shipping, logging, fishing, and wildlife sectors.⁶⁶
- [Indonesia Corruption Watch](#) and Indonesia’s public procurement agency have introduced a framework for monitoring contracting that relies on timely data aggregated from various government sources and crowd-sourced intelligence from civil society actors. The partners created an online risk-monitoring tool, [Opentender.net](#), and trained more than a thousand transparency advocates, researchers, journalists, and auditors to use it to detect suspicious contracting processes.⁶⁷
- Nigeria’s [Dataphyte](#) has monitored \$120 million worth of government health, education, water, and electricity projects using an open contracting approach across the states of Ebonyi, Edo, and

⁶⁴ PMI. “[President’s Malaria Initiative Increases Vigilance, Global Response To Counterfeit Antimalarial Drugs](#),” accessed July 22, 2022.

⁶⁵ Kohn, S. and Kostyack, J. (2021). “[Whistleblower Protection: An Essential Tool for Addressing Corruption that Threatens the World’s Forests, Fisheries and Wildlife](#).” TNRC.

⁶⁶ National Whistleblower Center. “[Current Campaigns](#),” accessed July 25, 2022.

⁶⁷ Indonesia Corruption Watch. (2021). “[Opentender.net, the site helping Indonesians spot shady government spending](#).”

Jigawa. Dataphyte also held capacity-building workshops with journalists, CSOs, and community organizations that focused on how to locate and analyze data on their state’s e-procurement portals.⁶⁸

- As part of the Sustainable Use of Technology for Public Sector Accountability in Nepal project, the Center for International Studies and Cooperation, the Rural Development and Research Center, and YoungInnovations created a digital platform to track small-scale infrastructure projects, called the Infrastructure Management System. In addition to digitizing project tracking for municipalities, the system also allows citizens to check the details of projects and report issues via a mobile app.⁶⁹ A similar open-data platform, BA Obras, has also been implemented in Buenos Aires to support community monitoring of public infrastructure.⁷⁰
- A Mexican civil society organization, Project on Organization, Development, Education, and Research, created an open database of public contracts, Todos Los Contratos, that cover 4 million public contracts worth \$1.5 trillion. The organization has also published detailed user guides for journalists, CSOs, and programmers to use the information.⁷¹
- Ritshidze is a community-led monitoring online platform used by the South African National Department of Health that allows patients to report on services they received. Data from the platform is aggregated up to the provincial level and allows government actors at all levels of government to identify red flags for further investigation. The platform is also monitored by donors to help verify that provided commodities are being disbursed during appointments.⁷²
- Publish What You Pay (PWYP) coalition is a global campaign, with more than 1,000 member organizations and 51 national coalitions, for oil, gas, and mining companies to publish their payments (license fees, royalties, and taxes) to governments. One component of PWYP’s work focuses on the active participation of communities, women, and youth in relevant extractive governance initiatives. In collaboration with United Nations Women, PWYP created an extractive value chain toolkit to help activists incorporate gender issues into natural resource governance campaigns. The toolkit outlines ways to increase women’s participation in community consultations, impact assessments, compensation negotiations, monitoring activities, and the revenue allocation process.⁷³
- Community Forest Management (CFM) has become an influential approach in the management of forests around the world that has largely resulted in positive environmental and economic outcomes for local communities.⁷⁴ CFM refers to planned forest activities conducted by local actors based on sustainable exploitation of the forest. CFM initiatives not only recognize

⁶⁸Aloba, A. and Mbah, C. (2022). “All eyes on the data: How Nigeria’s Dataphyte monitored \$120 million worth of government projects using an open contracting approach.” Open Contracting Partnership.

⁶⁹Brown, S. (2020). “Citizens empowered: An open secret to building local infrastructure on time and budget.” Open Contracting Partnership.

⁷⁰OECD Observatory of Public Sector Innovation. “BA Obras,” accessed July 25, 2022.

⁷¹PODER. “Watchlist of government contracts in Mexico,” accessed July 25, 2022.

⁷²Ritshidze. “Community-led Clinic Monitoring in South Africa.” accessed August 19, 2022.

⁷³Publish What You Pay (2021). “Increasing Women’s Voice and Participation in Extractive Governance: The case of Mozambique, Tanzania and Uganda. Kampala, Uganda.”

⁷⁴Hajjar et al. (2021). “A global analysis of the social and environmental outcomes of community forests.” *Nature Sustainability*, 4(3), 216-224.

indigenous communities' ability to manage and protect forests but also focus on promoting community participation in decision-making and equitable benefit sharing throughout the value chain.⁷⁵ By building capacity at the community level, CFM aims to prevent abuses from government actors and third parties such as land grabbing and illegal logging.

D. Barriers to the implementation of innovations that raise the cost of corruption

- Many of the innovations to detect corruption are created by private sector actors or NGOs and are in the early stages of development and implementation. Innovations in this space rely heavily on cutting-edge technology such as data mining and machine learning. To be successful in spurring investigations, these tools and/or the information they produce need to be tailored to and accessible by bureaucracies and enforcement agencies in developing countries. Uptake in developing countries will likely be constrained by local technical capacity and require investments in skills training.
- Digitization is a prerequisite for AI tools to be deployed in anti-corruption efforts, and many countries do not currently have a sufficient level of digitization in society to take advantage of AI.⁷⁶ Relatedly, detection tools based on supervised machine learning methods require local training datasets, and many existing applications may not be readily transferable to other contexts without being retrained. Lastly, AI tools are subject to many ethical challenges, including privacy concerns, surveillance issues, and opaque decision-making processes, that need to be carefully addressed.
- ICT innovations focused on local empowerment face numerous barriers to success including sufficient uptake, continued financial support, access to ICT, and security challenges. Based on the innovations reviewed for this analysis, strong partnerships between ICT developers, local NGOs and CSOs, and governments are a key determinant of uptake and longevity of applications. Additionally, ICT developers need to carefully match solutions with local capacity as a significant proportion of the world's population still lacks internet access. This limits the use of more advanced ICT tools for anti-corruption. Lastly, ICT innovations face significant security challenges associated with the use of mobile phones for reporting corruption. ICTs are increasingly being misused by undemocratic governments for control. If systems are poorly designed or vulnerable to interception by government actors, users risk being identified and targeted by corrupt actors.

⁷⁵ Gianella, C. and Cárdenas, C. (2022). "[Community forestry and reducing corruption: Perspectives from the Peruvian Amazon.](#)" TNRC.

⁷⁶ Aarvik, P. (2019). "[Artificial Intelligence – a promising anti-corruption tool in development settings?.](#)" U4 Anti-Corruption Resource Center.

4. INNOVATIONS THAT INCENTIVIZE INTEGRITY IN THE PUBLIC AND PRIVATE SECTORS

A. Due diligence requirements, assistance, and tools

Supply chain due diligence is the ongoing process in which companies research and investigate their suppliers to identify any risks associated with those businesses. For example, companies need to ensure that their suppliers are not involved in illicit practices such as bribery, money laundering, human rights violations, child labor, or environmental damage. Robust private sector participation in the establishment of due diligence standards, systems, and tools in high-risk sectors is crucial for fostering shared responsibility and achieving sufficient uptake. Supply chain actors are incentivized to conduct due diligence to avoid penalties for non-compliance with laws and regulations in the countries in which they operate. If downstream actors and/or consumers value responsible production, supply chain actors are also incentivized to conduct due diligence in order to receive a price premium for their product. In certain sectors, actors are also incentivized to participate in due diligence and traceability schemes in order to access consumer markets in countries with strict entry requirements. Recent innovations in due diligence include guidance from international organizations and industry associations, consumer country regulations and import requirements, and crowd-sourced data collection tools that support due diligence efforts.

Intergovernmental Organizations and Industry Association Standards

- The [OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas](#) provides detailed recommendations to help companies respect human rights and avoid contributing to conflict through their mineral purchasing decisions and practices.⁷⁷
- In 2020, the [London Metals Exchange \(LME\) Responsible Sourcing Requirements](#) began to require that all brands have a due diligence management system aligned with the relevant OECD Guidance and undertake a Red Flag Assessment and audit of any potential risks in their supply chains. The requirements cover all metal products traded on the LME.⁷⁸
- The [International Council of Metals and Mining \(ICMM\)](#) is working to consolidate and standardize international responsible mining metrics. ICMM is collaborating with other standard owners to develop equivalency assessments that allow stakeholders to see where requirements are comparable or differ.⁷⁹
- The [Global Dialogue on Seafood Traceability](#) is an international, business-to-business platform established in 2017 to create the first-ever global industry standards for seafood traceability.⁸⁰
- The [Financial Action Task Force \(FATF\)](#), an inter-governmental body, has developed the [FATF Recommendations](#), which is a framework of measures aimed at combating money laundering

⁷⁷ OECD (2016). "[OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas: Third Edition.](#)"

⁷⁸ RCS Global (2022). [Are you LME ready? Understanding the LMW Responsible Sources Requirements and Ensuring Compliance.](#)"

⁷⁹ International Council of Metals and Mining. "[Metrics and Standards,](#)" accessed July 25, 2022.

⁸⁰ Global Dialogue on Seafood Traceability. "[GDST Standards,](#)" accessed July 22, 2022.

and terrorist financing. FATF has also developed guidelines and best practices to assist jurisdictions in the implementation of the recommendations. Currently, more than 200 countries and jurisdictions have committed to implementation.⁸¹ However, reforms based on FATF guidelines have not been uniformly implemented or enforced thus far. As of 2020, the FATF had reviewed over 100 countries and jurisdictions and found that 80 were not non-compliant with the guidelines. Of these countries, 60 have since undertaken additional reforms.⁸²

Consumer country regulations and import requirements

- Several major timber product consumer nations have adopted timber regulations that prohibit and penalize the importation of illegally harvested or traded wood products including the United States (Lacey Act), the European Union (Timber Regulation and Forest Law Enforcement, Governance, and Trade (FLEGT) Action Plan), South Korea (Act on Sustainable Use of Timber), and Australia (Illegal Logging Prohibition Act).
- The United States, European Union (EU), and Japan, which account for 64 percent of the seafood market, have all established seafood import control schemes.⁸³ Although the different schemes vary in coverage of seafood species, they do cover seafood identified as the most vulnerable to illegal fishing and fraud. The systems require documentation of a set of key data elements that are designed to help establish the legality of fish catches. Required data include information on vessel ID, flag state, onboard workers, species of fish caught, dates of fishing, location and jurisdiction of catches, and fishing equipment.⁸⁴
- Both the United States and the EU have introduced conflict minerals due diligence requirements. US Dodd-Frank (Section 1502) requires U.S. companies to disclose annually whether any conflict minerals (tantalum, tin, tungsten, or gold) originated in the Democratic Republic of the Congo (DRC) or an adjoining country. EU Conflict Minerals Regulation also came into effect in 2021.⁸⁵

Due diligence monitoring and certification schemes

- The Kimberley Process Certification Scheme (KPCS) imposes extensive requirements on its members to enable them to certify shipments of rough diamonds as “conflict-free” and prevent conflict diamonds from entering the legitimate supply chain. Participating states must put in place national legislation and institutions; establish export, import, and internal controls; and commit to data transparency. Participants can only legally trade with other participants who

⁸¹ FATF. “[FATF Recommendations](#),” accessed August 22, 2022.

⁸² Arshinoff, N., Humphreys, J., and Tasse, M. (2022). “[Global Finance and Enablers of Corruption](#).” Global Integrity Anti-Corruption Evidence Program.

⁸³ Orłowski, A. (2020). “[Seafood importing countries could lock out illegal fish with better control schemes](#).” Seafood Source.

⁸⁴ Freitas, B. (2021). “[Corruption in the Fisheries Sector: Import Controls, Transparency, and WWF Practice](#).” TNRC.

⁸⁵ European Commission. “[Conflict Minerals Regulation](#),” accessed July 22, 2022.

have also met the minimum requirements of the scheme. The KPCS covers 82 countries and accounts for approximately 99.8% of the global production of rough diamonds.⁸⁶

- The International Tin Supply Chain Initiative (ITSCI) for due diligence and traceability in tin, tungsten, and tantalum (3T) minerals was introduced in 2011. The ITSCI works within the OECD's *Due Diligence Guidance* framework to assist companies with traceability, due diligence, and audit requirements that arise from purchasing 3T minerals from the DRC, Burundi, Uganda, and Rwanda. In 2019, ITSCI covered over 2,000 3T mines.⁸⁷
- The Responsible Mineral Initiative (RMI) provides tools and resources to help companies make sourcing decisions that improve regulatory compliance and support responsible sourcing of minerals.⁸⁸ RMI has also supported initiatives to define ASM cobalt responsible sourcing criteria in the DRC. RMI also has developed the Responsible Minerals Assurance Process which includes an independent third-party assessment of smelter and refiner management systems and sourcing practices.⁸⁹
- The RCS Better Mining Program provides on-the-ground risk monitoring and assurance services to more than 30 tantalum, tin, tungsten, and gold ASM sites in the African Great Lakes Region. In partnership with RMI, the program has also covered eight additional cobalt-copper sites in the DRC in partnership since 2020. Each ASM site covered by Better Mining is assessed and monitored against the requirements of the OECD Due Diligence Guidance and seven additional environmental, social, and governance (ESG) risk categories.⁹⁰
- The Just Gold Project, developed by IMPACT, supports responsible ASM gold production and trade by offering miners incentives, including technical assistance, international market access, and transparent purchase pricing, to participate in the legal market and implement supply chain due diligence. The Just Gold Project has been implemented in the DRC and is currently being expanded to the Ivory Coast.⁹¹

Crowdsourced data collection tools for due diligence

- The Transition Minerals Tracker is a database that monitors the human rights practices of companies mining six key minerals vital to the clean energy transition: cobalt, copper, lithium, manganese, nickel, and zinc. The annually updated database currently covers 103 mining companies. Although the tracker focuses on human rights violations, it demonstrates an opportunity to develop an open-source database that captures allegations of corruption.⁹²
- The Better Chain Due Diligence Innovation Lab has developed several due diligence tools for gold and critical mineral supply chains.⁹³ Consolidated Autonomous Due Diligence is an open-

⁸⁶ Kimberley Process. "[What is the Kimberley Process?](#)" accessed August 22, 2022.

⁸⁷ Pact (2020). "[ITSCI: A decade of success.](#)"

⁸⁸ RMI. "[Minerals Due Diligence,](#)" accessed July 25, 2022.

⁸⁹ RMI. "[Responsible Minerals Assurance Process,](#)" accessed July 25, 2022.

⁹⁰ RCS Global (2021). "[RCS Global and Responsible Minerals Initiative Expand Better Mining Programme.](#)"

⁹¹ Katho et al. (2021). "[The Just Gold Project: Lessons for the Future of Artisanal Gold in Democratic Republic of Congo.](#)" IMPACT.

⁹² Business & Human Rights Resource Centre. "[Transition Minerals Tracker,](#)" accessed August 22, 2022.

⁹³ Better Chain. "[Crowdsourcing risk and impact data at the origin of supply chains,](#)" accessed July 20, 2022.

source, pilot framework for upstream supply chain stakeholders to consolidate local due diligence in the gold and tantalum supply chains.⁹⁴ [Datastake](#) is an incentivized data management platform designed to improve access to information in logistically-challenged countries. The platform can be used to help local citizens turn their information into a tradable resource, by connecting them to global demand for localized data.⁹⁵ The Datastake platform has been utilized in [USAID’s Zahabu Safi Project](#), which supports the establishment of OECD-compliant gold supply chains originating from ASM operations.⁹⁶

- [Crowdsourcing Application for Responsible Production in Africa](#) has developed a crowdsourcing application to facilitate dialogue that promotes more responsible production in supply chains in the DRC, Mali, Rwanda, and South Africa. Users include 46 members trained to participate in dialogue through the app platform, who share knowledge of cases and initiatives on the platform.⁹⁷
- [Kufatilia](#) is a short message service incident reporting and follow-up mechanism that was launched in 2019 to increase the transparency of mineral supply chains in eastern DRC. The monitoring system allows users to report corruption-related incidents as well as mining accidents, violence, child labor, and environmental degradation. Participating civil society organizations have access to an online incidents database in order to validate and follow up on the reported incidents.⁹⁸

B. Supply chain traceability using innovative technologies

Corruption has been a persistent problem in high-value supply chains. In the extractive and natural resource sectors, corruption can occur at every step of the value chain from the decision to extract and licensing of rights to the extraction, transportation, processing, and export of commodities. For example, bribery can be used to obtain licenses, change documentation on the volumes and/or origin of products, and encourage customs inspectors to look the other way.⁹⁹ Additionally, the collection and management of natural resource revenues are also vulnerable to corruption. In the health commodity supply chain, corruption risks are heightened at the distribution stage, where theft and diversion affect access to scarce medicines, equipment, and supplies. Diverted medicines refer to medicines that are intended to be dispensed in public health facilities free of charge or at discounted rates, but which instead appear on private markets at higher prices. An additional, related problem in health supply chains is the sale of substandard and counterfeit pharmaceuticals and medical products, which has become even more widespread during the COVID-19 pandemic as countries have introduced measures to expedite procurement and distribution that have their reduced oversight capacities.¹⁰⁰ It is estimated that 13.6% of essential medicines tested in low- and middle-income countries failed quality analysis,

⁹⁴ European Partnership for Responsible Minerals. “[CADD](#),” accessed July 20, 2022.

⁹⁵ Datastake. “[Applications](#),” accessed July 20, 2022.

⁹⁶ USAID. “[Zahabu Safi-Commercially Viable Conflict-Free Gold Project](#).”

⁹⁷ Bwanaet al. (2020). “[Developing a Crowdsourcing Application for Responsible Production in Africa](#).”

⁹⁸ IPIS. “[Kufatilia – Incident Reporting and Monitoring](#),” accessed July 20, 2022.

⁹⁹ Williams, A. (2021). “[Commodity supply chain traceability initiatives and their anti-corruption potential](#).” TNRC.

¹⁰⁰Steingrüber, S. and Gadanya, M. (2021). “[Weak links: How corruption affects the quality and integrity of medical products and impacts on the COVID-19 response](#).” U4 4 Anti-Corruption Resource Center.

with failure rates of over 18% in Africa.¹⁰¹ Corruption, notably bribery, has underscored the proliferation of counterfeit drugs. Suppliers of substandard and counterfeit products can offer bribes in exchange for preferential treatment in the procurement process.¹⁰² Additionally, government regulators may receive bribes to provide unwarranted certifications or product approvals or by delaying the approval of competitors.¹⁰³ Lastly, customs agents may be paid to allow the import or export of counterfeit commodities.

Traceability initiatives can reduce corruption in supply chains by increasing access to data that enables greater scrutiny from enforcement agencies, civil society actors, and citizens.¹⁰⁴ Traceability systems are also key tools for conducting due diligence in complex supply chains. Traceability systems allow supply chain actors to track a product throughout the supply chain using a recorded system of information in order to prove responsible sourcing practices. In recent years, traceability innovations have focused on the development of digital traceability systems that monitor the flow of materials through supply chains to their origins, flag anomalies, and alert businesses and governments to possible corruption. Other traceability innovations have focused on new scientific approaches to identify the origin of commodities. Ultimately, the efficacy of traceability systems as anti-corruption tools will be conditional on the degree of transparency they provide and the will and capacity of businesses or authorities to act on the information.¹⁰⁵

Critical and conflict mineral supply chains

- Everledger, in collaboration with the International Business Machines Corporation, built a blockchain platform for the diamond supply chain, which provides a secure record of commodities from mining, sorting, cutting, and retailing.¹⁰⁶ The company is also applying this technology to critical minerals.¹⁰⁷
- Circular built a Hyperledger-based blockchain system for tantalum that helps ensure that minerals are mined, transported, and processed under approved conditions with an unbroken chain of custody. The system uses facial recognition and quick response (QR) codes to deliver

¹⁰¹ Ozawa et al. (2018) "[Prevalence and estimated economic burden of substandard and falsified medicines in low- and middle-income countries: a systematic review and meta-analysis](#)". JAMA Network Open.

¹⁰² See the 2020 allegations of Ministry of Health corruption in Zambia. Maurice K. Nyambe, M. (2020). "[Zambia's medical supply scandal makes anti-corruption a key electoral issue this year](#)." Transparency International Zambia.

¹⁰³ Steingrüber, S. and Gadanya, M. (2021). "[Weak links: How corruption affects the quality and integrity of medical products and impacts on the COVID-19 response](#)." U4 4 Anti-Corruption Resource Center.

¹⁰⁴ Williams, A. (2021). "[Commodity supply chain traceability initiatives and their anti-corruption potential](#)." TNRC.

¹⁰⁵ Grant, J., Freitas, B., and Wilson, T.. (2021). "[Traceability systems: Potential tools to deter illegality and corruption in the timber and fish sectors?](#)" TNRC.

¹⁰⁶ Lu, C. (2022). "[New Technologies for Sustainable Development: Perspectives on Integrity, Trust and Anti-Corruption](#)." UNDP.

¹⁰⁷ Everledger. "[Harnessing the blockchain for mineral transparency and streamlined compliance](#)," accessed July 20, 2022.

mine-to-manufacturer traceability. The system was piloted in three mines and an ore-sorting facility in Rwanda in 2018.¹⁰⁸

- The Global Battery Passport, an initiative of the Global Battery Alliance, is a digital identification for electric vehicle batteries that conveys information about ESG and lifecycle requirements.¹⁰⁹ The battery passport will include relevant information including ESG ratings and adherence to standards, production history, origin of materials, maintenance and repair history, and current performance levels to advance battery life and enable recycling. The Global Battery Passport is still under development and will be a key feature of the forthcoming EU Battery Regulation.¹¹⁰
- Pervasive Exploitation Activity Detection and Response is a pilot tool developed by Rovjok that uses satellite data and AI to enhance supply chain visibility in the mining sector.¹¹¹
- Minexx’s Minesmart platform uses digital payments and blockchain to support transparency in mineral supply chains. The platform facilitates trade while managing compliance requirements and recording transactions.¹¹²
- Resource Matters has developed a Cobalt Supply Chain beta platform that displays information about current or future cobalt-related transactions across the global supply chain. The goal of the platform is to provide greater transparency to cobalt-related supply chains and to help companies, governments, and NGOs improve their assessment of due diligence risks. The scope of the beta platform is currently limited to the subsidiaries, suppliers, and clients of seven companies: Glencore, China Nonferrous Metal Mining Group, MMG Limited, China Molybdenum, Zhejiang Huayou Cobalt, Jinchuan Group, and China Railway Group.¹¹³
- Source Certrain’s TSW Trace is a scientific method for establishing the provenance of a commodity. Advanced scientific instrumentation is used to determine key markers (elements, isotopes, and molecules), which when combined form a chemical “fingerprint” or “profile” that is characteristic of a commodity’s origin. The method has applications for a wide range of commodities but one notable application is to link stolen or smuggled gold back to its mine of origin, which is referred to as “gold fingerprinting.”¹¹⁴
- Researchers at the South Dakota School of Mines are working with the U.S. Department of Defense on the development of a mineral source determination tool using laboratory scale analyses. The effort will require samples from mines and geographic locations of interest. The initial pilot is working to establish a source database on coltan.

¹⁰⁸ HyperLedger (2019). “[Case Study: Circular achieves first-ever-mine-to-Manufacturer traceability of a conflict mineral with Hyperledger Fabric.](#)”

¹⁰⁹ Global Battery Alliance (2020). “[Battery Passport: Giving an identity to the EV’s most important component.](#)”

¹¹⁰ Halleux, V. (2022). “[New EU regulatory framework for Batteries.](#)” European Parliamentary Research Service.

¹¹¹ Artisanal Mining Challenge. “[Pervasive Exploitation Activity Detection and Response,](#)” accessed July 20, 2022.

¹¹² Minexx. “[Securing the mineral supply chain from earth to tech,](#)” accessed July 20, 2022.

¹¹³ Resource Matters. “[Cobalt Supply China Beta,](#)” accessed August 22, 2022.

¹¹⁴ TSW Analytical. “[TSW Trace: Proven Proprietary Provenance Technology,](#)” accessed July 20, 2022.

Timber supply chains

- The Forest Stewardship Council (FSC) is piloting a new secure blockchain technology, [FSC Blockchain Beta](#), based on its chain of custody supply chain standards to support FSC certification. Previously, the transaction verification process operated using a paper-based system, which is highly vulnerable to fraudulent manipulation.¹¹⁵
- Preferred by Nature has partnered with iov42 to launch a blockchain platform that streamlines the certification of timber supply chains called [Timber Chain](#). The platform allows real-time supply chain data to be stored on iov42’s distributed ledger that is visible to external parties specified by Timber Chain users. It also enables certification bodies to add data to and use the distributed ledger’s information.¹¹⁶
- To support its Voluntary Partnership Agreement with the EU under the FLEGT initiative, Ghana has launched the Ghanaian Legality Assurance System and Wood Tracking System.¹¹⁷

Seafood and wildlife supply chains

- The [Blockchain Supply Chain Traceability Project](#) is a project by the WWF, ConsenSys, TraSeable Solutions Pte Ltd., and Sea Quest Fiji Ltd. to develop a system to track fish through the tuna supply chain in Australia, Fiji, and New Zealand. The pilot utilizes a combination of radio-frequency identification (RFID) tags, QR code tags, and scanning devices to collect information about tuna along the supply chain. The collected information is then recorded using blockchain technology.¹¹⁸ Other organizations, such as Provenance, have piloted similar blockchain applications.¹¹⁹
- [TrazApp](#) is a WWF pilot project with two fishing cooperatives in La Isllilla and La Tortuga in the Piura region of Peru. Over 200 users from 300 fishing vessels are now using the application to register their catches. TrazApp has registered over 2,000 fishing trips and more than 25,000 tons of catches.¹²⁰
- The [eCITES initiative](#) helps to streamline and automate the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) permit processes and controls. The reduction or elimination of paper permits helps to limit opportunities for criminals to use fraudulent or falsified permits.¹²¹ In 2019, CITES began to explore the secure exchange of CITES

¹¹⁵ FSC. “[FSC Blockchain Beta](#),” accessed August, 12, 2022.

¹¹⁶ Preferred by Nature. “[Timber Chain](#),” accessed August, 12, 2022.

¹¹⁷ Arts, B., Heukels, B., and Turnhout, E. (2021). “[Tracing timber legality in practice: The case of Ghana and the EU.](#)” *Forest Policy and Economics*.

¹¹⁸ Lu, C. (2022). “[New Technologies for Sustainable Development: Perspectives on Integrity, Trust and Anti-Corruption.](#)” UNDP.

¹¹⁹ Provenance. “[Tracking Tuna from Catch to Customer.](#)” accessed August, 12, 2022.

¹²⁰ WWF (2021). “[Trazapp: How a mobile app facilitated a technological revolution in the Peruvian artisanal fishing sector.](#)”

¹²¹ Convention on International Trade in Endangered Species of Wild Fauna and Flora. “[eCITES Initiative](#),” accessed July 20, 2022.

permits in a blockchain.¹²²

Health and humanitarian assistance supply chains

- GS1 established a global, standardized system for traceability, from product manufacturing to patient treatment to counteract counterfeiting and corruption in the health sector. In adherence to GS1, global manufacturers are required to label and barcode products for traceability. GS1 is the most widely used traceability system in the world with many manufacturers utilizing GS1's Global Trade Item Number serialization.¹²³ USAID's Global Health Supply Chain Program (GHSC) is working with country authorities to draft guidelines for the incorporation of GS1 into health commodities. GS1 is also being piloted now for COVID-19 vaccine verification with UNICEF and USAID.
- Electronic Logistics Management Information Systems (eLIMS) are supply chain management tools that aim to improve the delivery and security of key health commodities. eLIMS facilitate and track orders, transportation, storage, and consumption. Logistics data is communicated to supply chain managers for inventory management and supply and demand planning. USAID's GHSC Procurement and Supply Chain Management project works with countries to modernize their supply chain systems to increase efficiencies, reduce costs, and minimize risks.¹²⁴ Example projects include Ethiopia,¹²⁵ Rwanda,¹²⁶ and Zambia.¹²⁷
- Partnership for Supply Chain Management (PFSCM) provides global procurement and distribution services to health programs in developing countries. PFSCM has implemented One Network's Control Tower platform to improve supply chain end-to-end traceability and streamline collaboration among stakeholders. Control Tower allows for the improved management of freight costs, automation of operational processes, streamlined communications with vendors, freight forwarders, and clients, and increased data visibility for partners and clients through scalable, real-time integration. The system also lays the groundwork for future digital supply chain innovations such as blockchain systems, the internet of things, and serialization. With increased visibility along the supply chain, there are increased chances to detect counterfeit drugs and track those diverted onto the gray market.
- mPedigree has developed a platform that enables users to verify, in real time, whether a pharmaceutical product is genuine or counterfeit by scanning or typing in a code on their phone. The platform also notifies manufacturers of instances where counterfeit products have been

¹²² Busse et al. (2019). "[A response to the United Nations CITES Blockchain challenge: Incremental and integrative poa-based permit exchange.](#)" 2019 IEEE International Conference on Blockchain and Cryptocurrency (ICBC).

¹²³ GS1. "[GS1 standards in healthcare.](#)" accessed July 22, 2022.

¹²⁴ USAID. "[Global Health Supply Chain Program.](#)" accessed July 22, 2022.

¹²⁵ JSI (2022). "[Using Digital Tools to Track and Trace Health Commodities in Ethiopia.](#)"

¹²⁶ USAID GHSC (2017). "[Rwanda National Supply Chain Assessment Report.](#)"

¹²⁷ USAID (2022). "[Zambia Electronic Supply Chain Management Information System.](#)"

identified. mPedigree operates in Ghana, Nigeria, Kenya, and India and has pilots in Uganda, Tanzania, South Africa, and Bangladesh.¹²⁸

C. Social norms and behavioral change approaches to anti-corruption

Social norms are “shared understandings about actions that are obligatory, permitted, or forbidden within a society.”¹²⁹ Descriptive norms refer to societal perceptions about how other people behave, and injunctive norms refer to societal perceptions of what is approved or disapproved of by others. Social norms have a significant influence on how people behave, as most people have a desire to “belong.” As a result, a person might choose to act a certain way due to pressure from social norms even if it does not align with their individual attitudes or morals.

Social norms and behavioral change (SNBC) approaches have increasingly gained ground in policymaking as they aim to influence how people behave and make decisions. In anti-corruption policies, these approaches contribute to a better understanding of the drivers of corruption and complement traditional anti-corruption approaches based on principal-agent theory and collection action. SNBC approaches aim to change the behavior of a target group by changing individual attitudes and beliefs as well as social norms that make corruption acceptable or expected. SNBC strategies may target actors directly engaged or complicit in illicit activities or broader social norms that create an environment conducive to corrupt behavior. Strategies to change social norms focus on people’s beliefs about what others in their social group do, think, and expect of them. Examples of SNBC approaches include: facilitating group deliberation and reflection, publicizing trendsetters and positive deviants, creating a new reference group, encouraging public commitments or declarations, comparing performance to peer groups, supporting social norms marketing through information campaigns, supporting role models, and changing laws or regulations.¹³⁰

Although SNBC approaches to anti-corruption are still nascent, SNBC approaches have proven to have great potential to address other development issues such as maternal and child health, family planning, gender-based violence, and HIV prevention. This analysis focuses on practitioner guidance on developing SNBC interventions, research on the design of effective anti-corruption messaging, and recent SNBC interventions in the health and wildlife sectors.

¹²⁸ mPedigree. “[mPedigree is building innovative technology tools to solve global challenges](#),” accessed July 29, 2022.

¹²⁹ Jackson, D. and Köbis, N. (2018). “[Anti-corruption through a social norms lens](#).” U4 Anti-Corruption Resource Center.

¹³⁰ Chigas, D. and Dininio, P. (2019). “[Strengthening Rule of Law Approaches to Address Organized Crime: Social Norms](#).” USAID Whitepaper. Bureau for Africa.

SNBC frameworks for practitioners

- Two prominent research centers, the Corruption, Justice, and Legitimacy program¹³¹ and Basel Institute for Governance¹³² have developed guidance on how to develop SNBC anti-corruption interventions. The guides help practitioners analyze drivers of corruption, identify when an SNBC approach is appropriate, present frameworks to assist in formulating theories of change, and suggest specific SNBC elements that can be built into interventions.
- Targeting Natural Resource Corruption (TNRC) has developed a behavioral change approach called INTEGRITY to combat illegal wildlife trade that uses cognitive, psychological, and social science research to influence the motivations, attitudes, values, and actions of those engaged in illegal and corrupt practices. The framework is designed for application to both grand and petty forms of corruption.¹³³

Research on how to design effective anti-corruption messaging

- Anti-corruption information campaigns are designed to influence citizens' beliefs and perceptions by raising awareness about the destructive consequences of corruption using billboards, leaflets, posters, art, news articles, and web campaigns. Research on the effectiveness of anti-corruption messaging is still at an early stage but has already raised concerns. Initial studies have suggested that awareness-raising campaigns have had limited success or even been counterproductive because they can emphasize (and in some cases overly so) the extent of the problem and encourage corruption fatigue.¹³⁴ These early studies have spurred an additional wave of research that examines how to design effective anti-corruption messaging by using targeted messages or leveraging information about descriptive norms and injunctive norms.¹³⁵
- Cheeseman and Peiffer (2021) conducted a survey experiment in Nigeria that found that untargeted anti-corruption messages either had no effect or actually made Lagosians more likely to pay a bribe. The study found that the effect of anti-corruption messaging is conditional on individuals' pre-existing perceptions of the prevalence of corruption (descriptive norms). Among respondents who believed that corruption is widespread, anti-corruption messages typically encouraged corrupt behavior. In contrast, the study found that targeted messages that stressed the adverse effect of corruption on taxation made respondents significantly less likely to pay a

¹³¹Scharbatke-Church, C. and Chigas, D. (2019). "[Understanding Social Norms: A reference guide for policy and practice.](#)" Leir Institute, Tufts University.

¹³²Baez Camargo et al. (2022). "[Developing anti-corruption interventions addressing social norms: Lessons from a field pilot in Tanzania.](#)" Basel Institute on Governance.

¹³³Burgess, G. (2019). "[Changing Corrupt Behaviors through an INTEGRITY Framework.](#)" TNRC.

¹³⁴See Corbacho et al. (2016). "[Corruption as a self-fulfilling prophecy: Evidence from a survey experiment in Costa Rica.](#)" *American Journal of Political Science*, 60(4), 1077-1092; Peiffer, C. (2020). "[Message received? Experimental findings on how messages about corruption shape perceptions.](#)" *British Journal of Political Science*, 50(3), 1207-1215.

¹³⁵For an in-depth review of recent experimental SNBC studies on anti-corruption see Stahl, C. (2022). "[Behavioral insights and anti-corruption: Executive summary of a practitioner-tailored review of the latest evidence.](#)" Basel Institute on Governance.

bribe. Overall, the findings imply that carefully targeted messages may have the potential to strengthen public resolve to resist corruption.¹³⁶

- Agerberg (2022) conducted a survey experiment in Mexico that was designed to increase the effectiveness of anti-corruption messaging by correcting misperceptions of the prevailing injunctive norm by including information on other community members' strong anti-corruption convictions. Sharing information on societal anti-corruption convictions was found to influence perceptions about the injunctive corruption norm, raise reported levels of interpersonal trust, decrease perceptions that corruption is a basic part of the culture, and decrease reported willingness to pay a bribe.¹³⁷

SNBC interventions in the health and wildlife trafficking sectors

- Baez Camargo et al. (2022) conducted a pilot SNBC project in Tanzania that aimed to shift patients' and health providers' attitudes and perceived social norms around gift-giving in order to reduce the exchange of gifts in health facilities. The SNBC intervention had four components: 1) posters that clarified the hospital's and the Ministry of Health's policy that gift-giving from patients to staff is considered corruption and may have consequences for staff; 2) desk signs placed in consultation rooms providing steps for healthcare providers to politely refuse gifts; 3) the training of Staff Champions to persuade peers about the need to refuse gifts; and 4) letters sent to healthcare providers that clarified the Ministry of Health's policy on gift-giving. Following the pilot, survey results reported a substantial decrease in gift-giving intentions and attitudes among hospital users.¹³⁸ Based on qualitative interviews, the intervention was perceived to work by raising awareness of the injunctive norm (i.e. that gift-giving is considered corruption and could have consequences for the healthcare provider) rather than changing perceptions of the descriptive norm (i.e. that gift-offering and gift-accepting is a common practice).
- Wildlife conservation NGOs have utilized consumer demand reduction campaigns to combat illegal wildlife trade based on public awareness campaigns that enlisted celebrities to endorse general messages and more targeted messages informed by SNBC approaches that address individual costs and status. For example, the WWF has launched a major demand reduction campaign to persuade PRC nationals to stop buying elephant ivory to complement a government ban on ivory. Working with the market research firm GlobeScan, the WWF conducts annual surveys of consumers to better understand attitudes toward ivory. Based on market research, campaigns are designed to change social norms around ivory in an effort to make it socially unacceptable to buy and display it.¹³⁹ Similar demand reduction initiatives have also been deployed by TRAFFIC and Breaking the Band to reduce the demand for rhino horns in

¹³⁶ Cheeseman, N., and Peiffer, C. (2021). "[The Curse of Good Intentions: Why Anti-corruption Messaging Can Encourage Bribery](#)". *American Political Science Review*.

¹³⁷ Agerberg, M. (2022). "[Messaging about corruption: The power of social norms](#)." *Governance*, 35(3), 929-950.

¹³⁸ Baez Camargo et al. (2022). "[Using behavioral insights to reduce gift-giving in a Tanzanian public hospital Findings from a mixed-methods evaluation](#)." Basel Institute on Governance.

¹³⁹ Nicolas, A (2021). "[Understanding Consumer Behavior to Reduce Wildlife Demand](#)." WWF.

Vietnam.¹⁴⁰ Initial evidence from these scaled programs suggests that SNBC interventions work best when used to complement and support traditional anti-corruption initiatives focused on increased accountability.

D. Barriers to the implementation of innovations that incentivize integrity

- Due diligence frameworks and traceability systems require consensus on responsible production standards and standardized chain of custody information. Coming to an agreement about which responsible production standards for due diligence frameworks and deciding on the types of data that should be recorded in a traceability system is expected to be a major barrier to implementation in large high-risk sectors.¹⁴¹
- The effectiveness of due diligence efforts in deterring corruption is limited by corporate capacity and will. Our consultations reported that even large multinational corporations (MNCs) have limited bandwidth to conduct proper due diligence on upstream operations in low-transparency environments, especially during supply chain crises. In natural resource supply chains, limited capacity is often exacerbated by a lack of transparency and due diligence reporting by midstream processors. Additionally, the interests of private actors may not always align with anti-corruption efforts. Often, responsible sourcing standards are generally weak on corruption-related issues, and corruption is not the primary focus of due diligence efforts. As a result, corruption risks in supply chains are sometimes overlooked or overshadowed by other topics or reduced to a compliance perspective. For example, in 3T and gold supply chains, due diligence efforts primarily focus on human rights, child labor, environmental pollution, and the entry of illicit materials from conflict zones into the supply chain. In contrast, due diligence efforts focus less on investigating the presence of corruption during the licensing and permitting stages, which are primary sources of grand corruption in the sector.¹⁴²
- The application of blockchain technology to traceability systems is still in the early stages of development and piloting for it to be fully understood and implemented at scale on the ground. In developing countries, it is important to understand if the prerequisites of connectivity, digitized data, and technical capacity exist before launching blockchain-based projects.¹⁴³ Supply chain records need to be digital, which in many cases entails a cumbersome process to digitize paper documents and processes.¹⁴⁴ Additionally, users need technical training to ensure that quality information is recorded in traceability systems. Blockchain technology does not provide protection against deliberately false information input and malfeasance. As a result, a major

¹⁴⁰Baez Camargo, C, and Burges G. (2022). "[Behavioral drivers of corruption facilitating illegal wildlife trade: Problem analysis and state of the field review.](#)" Basel Institute on Governance.

¹⁴¹ RCS Global (2017). "[Blockchain for traceability in minerals and metals supply chains: Opportunities and challenges.](#)"

¹⁴² Transparency International Australia (2020). "[Through the looking glass: Corruption risk in mining licensing and permitting in the pandemic era.](#)" Transparency International Accountable Mining Program Report.

¹⁴³ Aarvik, P. (2020). "[Blockchain as an anti-corruption tool.](#)" U4 Anti-Corruption Resource Center.

¹⁴⁴ For examples of digitization and connectivity challenges in Ghana's timber traceability system, see Arts, B., Heukels, B., & Turnhout, E. (2021). "[Tracing timber legality in practice: The case of Ghana and the EU.](#)" *Forest policy and Economics*, 130.

barrier to the usefulness of traceability systems as anti-corruption tools is the need for external auditing of data and responsible input.¹⁴⁵ Unfortunately, third-party audits with site visits typically reveal very little beyond petty corruption due to its concealed nature.

- An additional barrier to the feasibility of due diligence and supply chain traceability is the prominent role of the People’s Republic of China (PRC) in several high-value supply chains. The PRC is the largest midstream processor of copper, nickel, cobalt, lithium, and rare earth metals. It is also the world’s largest importer and exporter of timber and seafood. In theory, upstream actors are incentivized to participate in due diligence and traceability schemes by a price premium and direct commercial benefit from increased market access to downstream markets.¹⁴⁶ These incentives are undermined, however, if prominent downstream actors do not value responsibly sourced commodities. The enforcement of due diligence standards on PRC-based midstream and downstream actors will be crucial to the development of responsible global critical minerals supply chains.¹⁴⁷
- A major barrier to SNBC approaches is that they often lack generalizability to other contexts and require high levels of technical expertise to design interventions. SNBC interventions must be justified for relevance in each context and require a nuanced and targeted design based on an analysis of contextual and cultural factors.¹⁴⁸ Interventions that proceed with insufficient analysis may be ineffective, reinforce corrupt behavior, or put citizens at risk if the intervention provokes a backlash. Piloting SNBC interventions is therefore a central step in designing effective interventions and is fundamental for building an evidence base and mitigating risks.

5. KEY TAKEAWAYS AND OPPORTUNITIES FOR INNOVATION

1. **Open contracting reforms, e-procurement, and beneficial ownership transparency are innovations that, if properly implemented, have the ability to curb corruption and illicit finance across a range of public sectors.** Successful reforms require sustained engagement with national and local governments and a high level of technical assistance. Progress is often made over many years as transparency systems are gradually established across economic sectors or subnational areas where political support exists. The World Bank, OCP, and EITI have played a central role in promoting transparency reforms and providing technical assistance to support their implementation. That said, there is still substantial opportunity for improving transparency systems including expanding coverage to new countries and sectors; strengthening international BOT standards for disclosure requirements; improving data interoperability and coordinating access across countries; concentrating reform pressures on the most vulnerable sectors; integrating BOT registries with procurement processes; developing technological tools and

¹⁴⁵ RCS Global (2017). “[Blockchain for traceability in minerals and metals supply chains: Opportunities and challenges.](#)”

¹⁴⁶ OECD (2021). “[Costs and Value of Due Diligence in Mineral Supply Chains.](#)” OECD Position Paper.

¹⁴⁷ Castillo, R. and Purdy, C. (2022). “[China’s Role in Supplying Critical Minerals for the Global Energy Transition.](#)” Leveraging Transparency to Reduce Corruption.

¹⁴⁸ Scharbatke-Church, C. and Chigas, D. (2019). “[Understanding Social Norms: A reference guide for policy and practice.](#)” Leir Institute, Tufts University.

monitoring approaches to verify accuracy of these databases; and supporting the development of ICT tools that make this information available to citizens. Additionally, a key gap identified in the analysis is that there are relatively few innovations that reduce opportunities for corruption in resource-rich countries including extraction licensing, the operations of state-owned enterprises, and the management of natural resource revenues and sovereign wealth funds.

2. **Cutting-edge innovations that detect corruption require significant investments in technical capacity to be scaled and broad integration into enforcement agencies in order to be effective in promoting accountability.** Innovations that raise the costs of corruption identified in this analysis focus on applying cutting-edge technological solutions, including AI, data mining, and remote-sensing technologies, to detect anomalies and red flags that signal corruption and illicit finance. A majority of these tools are focused on identifying corruption in public procurement and illicit activity in the natural resource sector. However, the analysis identified a significant gap in the dissemination and integration of these tools to enforcement agencies, likely due to the infancy of these technologies. Detection tools will only be effective if they are integrated into bureaucratic processes and enforcement agencies and used to disrupt illicit behavior and hold corrupt actors accountable. Progress will be conditional upon the will and capacity of authorities to act on the information the systems provide. The deployment of these tools will require significant investments in technical capacity and expertise as well as regulatory oversight to avoid misuse or bias in the application of new technologies.
3. **ICTs that provide greater access to public information can empower local actors to exert influence on political and bureaucratic actors to restrain corruption.** The analysis revealed notable examples of ICTs that leverage open procurement data to empower citizen monitoring across a range of sectors and levels of government. Many of the most successful ICT innovations had strong leadership from prominent NGOs and active plans to train journalists, CSOs, and citizens on how to utilize the applications. It is important to note that the effectiveness of bottom-up accountability interventions likely varies by context. In environments with systemic corruption, low political accountability, and weak rule of law, citizen monitoring of government performance is often ineffective at improving performance. In these contexts, information from monitoring is often ignored, suppressed, or does not make it far enough up in the chain of bureaucracy where the authority to punish corruption rests.
4. **Due diligence requirements and traceability are the primary innovations to address corruption in high-value supply chains.** Multinational corporations and industry associations are the critical actors to engage to combat corruption in high-value supply chains and progress has been most successful in sectors when supported by strict due diligence legislation in major consumer countries. To improve traceability, firms and governments have started to integrate tagging technologies (QR codes and RFID) with database technologies (blockchain or supply chain management databases). The implementation of these technologies is limited, however, by technical capacity and characteristics of commodities. The health commodity supply chain is best equipped to make scaled progress on traceability because pharmaceutical and healthcare MNCs have direct control over upstream production and financial incentives to prevent diversion and the entry of illegal commodities into domestic supply chains. Additionally, donors are currently making significant investments to establish supply chain management systems in

many developing countries. In contrast, natural resource commodities are inherently more difficult to track due to the physical nature of the commodities and the processing that occurs throughout the supply chains. Timber and fish traceability systems are only likely to be effective in addressing corruption when they are mandatory and used by governments to enforce laws and/or collect revenue, and traceability in the fishing sector is severely constrained by a lack of electronic monitoring infrastructure on vessels.¹⁴⁹ Due diligence and traceability schemes in the mining sector have primarily focused on 3T minerals and gold from conflict-affected regions and suffer from significant concerns of laundering of minerals from unvalidated mines.¹⁵⁰ With the new boom of critical mineral mining, there is a significant need for additional processes, policies, and regulations for critical and green mineral supply chains. Areas for innovation include solutions that pool due diligence information between private actors, the expansion of consumer country market regulations that require due diligence, and cross-learning from the experience of existing 3T mineral schemes to other minerals. The geographic concentration of critical minerals presents an opportunity for donors and MNCs to focus anti-corruption efforts on a relatively limited number of producer countries.¹⁵¹ These efforts, however, will need to account for the central role of PRC-based firms in upstream and midstream operations.

- 5. SNBC approaches to anti-corruption are still in the early stages of development and evaluation but have the potential to be important parts of sectoral anti-corruption strategies.** Existing research and programs have largely focused on anti-corruption messaging, bribery, and reducing consumer demand for illicit goods. Research on how to change norms and behaviors of political, bureaucratic, and criminal justice actors remains an important gap in the field and is necessary to evaluate the usefulness of SNBC approaches to countering grand and transnational corruption. Further research is needed to discern what types of SNBC dimensions (personal beliefs, descriptive norms, injunctive norms, behaviors) are most effective to leverage in SNBC interventions.

¹⁴⁹ Grant, J., Freitas, B., & Wilson, T. (2021). "[Traceability systems: Potential tools to deter illegality and corruption in the timber and fish sectors?](#)" TNRC.

¹⁵⁰ The Global Witness (2022). "[The ITSCI laundromat.](#)"

¹⁵¹ IEA (2021). "[The Role of Critical Minerals in Clean Energy Transitions.](#)" World Energy Outlook Special Report.