



Trust with integrity: Harnessing the integrity dividends of digital government for reducing corruption in developing countries

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ABSTRACT

Does digitalization reduce corruption? What are the benefits of data-driven digital government innovations to strengthen public integrity and advance the Sustainable Development Goals? While the correlation between digitalization and corruption is well established, there is less actionable evidence on the effects of specific digitalization reforms on different types of corruption and the policy channels through which they operate. This paper unbundles the integrity dividends of digital reforms that the pandemic has accelerated. It analyses the rise of integrity-tech and integrity analytics in the anticorruption space, deployed by data-savvy integrity institutions. It also assesses the broader integrity dividends of government digitalization for cutting redtape, reducing discretion and increasing transparency in government services and social transfers. It argues that digital government can be an effective anticorruption strategy, with subtler yet deeper effects. There nevertheless needs to be greater synergies between digital reforms and anticorruption strategies.

POLICY SIGNIFICANCE

Corruption is one of the greatest policy challenges of emerging economies and major impediment to achieving the Sustainable Development Goals. Digitalization has become a potent driver for state modernisation and public governance, boosted by the smarter use of data by integrity institutions. Yet, beyond the hope and the hype, policymakers lack actionable frameworks to fully harness the integrity dividends of going digital. This paper puts forward policy recommendations to devise comprehensive digital strategies against corruption and make further progress on achieving Sustainable Development Goal 16, especially target 16.5, which aims to substantially reduce corruption and bribery in all their forms. First, it analyses the rise of integrity-tech solutions based on data analytics focusing on public finances. Second, it looks at broader government digitalization efforts that help reduce corruption vulnerabilities, especially in social transfers. The paper thus contributes to the growing literature on the value of digitalization for better public policies and for achieving the Sustainable Development Goals.

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CONTENTS

I	Moving beyond hope and hype.....	3
II	Unbundling the integrity dividends of digitalization.....	5
III	The rise of anticorruption technologies and integrity analytics.....	6
	Tax and customs administration	6
	Property and land registries	8
	Government contracting	8
	Oversight, audit and anticorruption agencies	9
	Integrity-tech and civic-tech startups	9
IV	Government digitalization as an integrity strategy.....	10
	Digitalization of government services.....	11
	Digitalization of social transfers.....	12
V	Policy findings and recommendations	13
	Bibliography	16

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I Moving beyond hope and hype

Refitting governments for purpose in the digital era has thus gained prominence in the global agenda, putting people at the center. The UN Secretary General’s report on “Our Common Agenda” of 2021 underscores that trust is critical for a people-centred and rights-based digital transformation. The UN Roadmap for Digital Cooperation adopted in 2020 highlights the challenges for ensuring inclusive recovery and the importance to close the digital divides, between and within countries. Its implementation, led by the Office of the Envoy on Technology, is therefore a critical opportunity to leverage the digital acceleration to advance the Sustainable Development Goals. Critical for the digital transition is ensuring that no one is left behind and that people are at the center of the transformation driven by disruptive technologies and the exponential growth of data (UN DESA 2021). People, not technology, should drive change.

The coronavirus crisis has accelerated the digital transformation of governments around the world, providing a renewed impetus to reinvent them (Santiso 2020c). Governments have intensified their digitalization efforts in the past decade, through end-to-end digitalization of public services, integrated government service portals, as well as critical enablers such as digital identity, digital payments, and data-sharing arrangements. These are complex reforms require political heavy-lifting. They had been previously paralyzed for political or budgetary reasons and are now unlocked and accelerated. Digitalization is indeed central to governments’ post-pandemic recovery plans. For example, the European Union has allocated at least 20% of its €750 billion recovery package, the Recovery and Resilience Facility, toward investments in digital transformation for the “digital decade”. By the end of 2021, this target was significantly surpassed, with digital spending representing over 26% of the funds approved.¹

Recovery packages around the world reflect a sharp increase in the role of the state with massive fiscal injections. Governments realise the need for more agile models of governance to deliver better, faster, and seamless services. Digitalization is also resetting the relationship between states and citizens. Digital natives, equipped with better data and analytics capabilities, are expecting more participation in public policies and integrity in government. In that context, digital government is recognised as a tool to transform both internal government work processes and external relationships with citizens and businesses (Shim and Eom, 2008).

The pandemic has made salient the importance of agile, accessible and seamless government services built upon a foundation of integrity. It also exposed the enduring corruption vulnerabilities of analogue systems in the health sector in particular, linked to emergency rules for government procurement. As such, the crisis is helping boosting the global fight against corruption, propelled by smarter use of data and the rise of integrity analytics. Technology is becoming transparency’s greatest ally in the global fight against corruption.

Building forward better will require strengthening trust, integrity, and inclusion in government, in the broader context of opportunities and challenges that digital governance represents. As such, digitalization has become a potent force to make progress on achieving Sustainable Development Goal 16, especially target 16.5, which aims to substantially reduce corruption and bribery in all their forms. The digital transition has brought to the fore three critical challenges in rethinking the role of government in the digital age, in a context which has seen a dramatic expansion of the role of the State in the economy:

- ♦ *Trust.* Generating or reinstalling trust in government will be central and feasible by designing adequate public policies and delivering better services for all through trust-worthy and trust-enhancing government technologies. This is a critical juncture in time where the way in which governments

¹ For further information on the EU Recovery and Resilience Facility, see: https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en

manage and regulate technologies and the data of people will enhance or further undermine trust in government (UN DESA 2021).

- ◆ *Inclusion.* Trust in government in the digital age also means that no-one should be left behind or excluded from the digital transition by applying processes that are human-centred and representative of the realities of societies, especially in developing countries. Ensuring equitable and adequate access to digital government services will be critically important to underserved or disadvantaged communities. It is critical to avoid digital exclusion and the widening of digital divides, especially by supporting the data poor (OECD 2021a).
- ◆ *Integrity.* Trust in government also requires strengthening public integrity, especially as the pandemic has also implied a greater role of the State, so that emergency and recovery funds are used for the purposes intended. Digital and data solutions have tremendous potential to detect and deter corruption, one of the world's greatest policy challenges, and anticorruption strategies should be at the heart of government digitalization.

For policy reformers in emerging economies, digital technologies are rapidly becoming their strongest ally in the fight against corruption and their greatest hope for better government. Digitalization can improve government efficiency, service delivery and citizen engagement. By automatizing government services, digitalization reduces red-tape and bribe solicitation risks in bureaucratic procedures by automatizing processes and limiting in-person interactions. It also allows for more effective oversight by tech-smart accountability institutions and data-savvy civil society. As such, it enables integrated approach to reducing corruption vulnerabilities in corruption-prone government operations such as tax administration and public procurement.

Yet, despite all the hype and the hope, we know little about the relationship between government digitalization and corruption control. At a macro level, the correlation between government digitalization and corruption reduction is well-established, but the causality of the relation remains an unsettled matter. Furthermore, little is known about the specific policy channels through which digitalization reduces corruption, which types of digital reforms impact which types of corruption risks, and what other institutional and regulatory reforms are needed to make integrity analytics work. Integrity analytics refers to the use of data analytics for anticorruption purposes, using advanced analytics and artificial intelligence tools to detect fraud and deter corruption. These relationships and effects are particularly hard to untangle as corruption itself is fraught with immense measurement challenges.

This paper thus unbundles the integrity benefits of digitalization and the digital strategies deployed to prevent corruption.

- ◆ First, it analyses the deployment of digital and data solutions in the fight against corruption with the rise of integrity-tech and fraud analytics.
- ◆ Second, it delves into the integrity side effects of broader digital government reforms, especially in social transfers. It posits that government digitalization can be an effective anticorruption strategy, often without being its explicit and primary intent.
- ◆ However, digitalization alone does not automatically translate into positive anticorruption outcomes and greater synergies between digitalization reforms and anticorruption strategies should be pursued.

II Unbundling the integrity dividends of digitalization

The correlation between digitalization and anticorruption is well established at a macro level (CAF, forthcoming 2022; Gallego, 2021; Rustiarini, 2019; World Bank, 2020a, 2020b; 2016). The corrosive effects of corruption on the Sustainable Development Goals are also well established (UN 2019). Government digitalization, measured by the expansion of government digital services,² has been shown to reduce corruption³ (World Bank 2020c; Zhao and Xu, 2015; Choi, 2014; Mistry, 2012; Andersen, 2007), improve government effectiveness⁴ (World Bank, 2020a, 2020c), and ameliorate the business environment (Martins and Veiga, 2018). For example, examining evidence from 127 countries, Shim and Eom (2008) show that e-government mitigates corrupt behaviours by bolstering internal managerial controls, while e-participation enhances government transparency and accountability. Interestingly, these variables have greater effects on corruption control than bureaucratic professionalism, bureaucratic quality, and law enforcement.

However, the causality of this relation remains an unsettled matter and evidence on the impact of digitalization on corruption still embryonic. Furthermore, it is not easy to untangle the corruption gains of digitalization, from its broader efficiency gains. Thus, at a more micro policy level, it is still difficult to untangle the effects of specific digitalization reforms on different types of corrupt behaviours. A better understanding of which specific policies impact which types of corrupt behaviours would help policymakers devise more effective anticorruption solutions.

When assessing the impact of digitalization in the fight against corruption, there are important preliminary considerations to bear in mind, however.

- ◆ First, digitalization has long been a tool for government modernisation. Governments have leveraged new technologies to modernise government for decades. Tech-driven modernisation has concentrated in particular in the area of government financial management (Gupta et al., 2017), with the automation of tax administration, treasury operations, and government procurement. Govtech reforms have included integrated financial management information systems, electronic tax invoicing, e-procurement platforms. In turn, government digitalization has accelerated the push for transparency, access to information and, in recent years, open data. What is different now is the role of disruptive technologies, the exponential growth of data, and the expansion of analytics capabilities enabled by developments in computing.
- ◆ Second, integrity is not usually the prime driver for digital reforms. Anticorruption is generally not the primary objective of digital government reforms, which have traditionally been driven by efficiency considerations to rationalise public spending, especially in times of crisis and budget restrictions. In this context, automation helps optimise the cost-effectiveness of government operations, improve the quality of public services, and respond to citizen expectations, especially among young, tech-savvy “digital natives”. If integrity is not the stated goal of digital reforms, the question then becomes whether government digitalization produces anticorruption positive externalities and whether its anticorruption intent is implicit, yet intentional.
- ◆ Third, it is important to untangle the specific integrity benefits of different types of digital reforms. Digitalization upsets the “corruption equation” (Klitgaard, 1998) by reducing discretion, increasing

2 Measured by the United Nations’ e-government development index. <https://publicadministration.un.org/en/Research/UN-e-Government-Surveys>

3 Measured by Transparency International’s corruption control index. <https://www.transparency.org/en/cpi/2020/index/nzl>

4 Measured by the World Bank’s worldwide government indicators. <https://info.worldbank.org/governance/wgi>

transparency, and enabling accountability (Basel, 2017). It reduces opportunities for rent-seeking by self-interested officials through the automation of tasks, the digitalization of services, and the reduction of in-person interactions. But corruption has many faces and shapes (Campos and Pradhan, 2007), from petty bribery and grand theft to subtle forms of undue influence through wheel-greasing and access money (Ang, 2020a and 2020b). Hence, the anti-corruption potential of digitalization may vary depending on the roots, nature and symptoms of a given type of corruption.

III The rise of anticorruption technologies and integrity analytics

In the wake of the global coronavirus crisis, digital acceleration is permeating the integrity space in many different ways. Actors within the integrity ecosystem – within and beyond government – are increasingly using disruptive technologies and data analytics as anticorruption devices. Prominent among these actors are government entities that manage public resources, such as finance ministries, tax authorities, procurement agencies, and accountability institutions, such as audit offices, civil society and, increasingly, civic-tech start-ups (Santiso, 2020a). In Denmark, for example, the application of data analytics in welfare fraud detection led to savings of over 60 million euros in 2019 (European Commission, 2020).

Integrity-tech and fraud analytics refer to digital and data technologies that are specifically used to detect, disrupt, deter and prosecute corruption. Integrity-tech builds on previous gains in access to information and open data, as part of the open government agenda since the early 2010s. Propelled by the “data revolution”, fraud analytics is a game changer, both within oversight agencies in the public sector and amongst compliance officers in the private sector (United Nations, 2014). The exponential surge of data, in terms of volume, variety, and velocity, combined with increasing computational power, provide powerful fuel to integrity analytics and risk-based approaches to corruption control.

Nevertheless, the effective deployment of integrity analytics also presents various challenges. Some are related to the underlying data infrastructure in terms of the availability, quality, and integrity of data. The Open Data Charter identifies 30 datasets that are critical for anticorruption, ranging from government contracts and asset declarations to tax payments, lobby registers and corporate ownership. These datasets are, at best, uneven and incomplete, which prevents integrity actors from fully leveraging their anticorruption potential. Other challenges are linked to data governance in terms of regulatory hurdles and the integration of data beyond data silos across governments. Still, what are likely today’s most important challenges relate to policy implementation -- the translation of data analytics into targeted integrity reforms and regulatory improvements.

Tax and customs administration

Many tax authorities are using digital technologies to make the process of paying taxes easier and more transparent. Tax administrations have long been active users of new technologies to increase voluntary tax compliance and prevent tax fraud. Red-tape in taxation is indeed considered a major hindrance to economic efficiency and a critical source of corruption. Making tax payments less complex and burdensome can generate significant fiscal and governance benefits, especially in informal economies. Colombia for example, with the support of the Inter-American Development Bank (IDB 2020), is undertaking a major digital overhaul of its tax administration that includes the creation of an analytics department. In the Republic of Korea, the Chungcheongnam-do provincial government, a recipient of the United Nations Public Service Award in 2018, has strengthened the disclosure of budget status, revenues and expenditure on its website.⁵

⁵ See: https://publicadministration.un.org/unpsa/database/Winners/2018-winners/Tax_

Evidence shows that the e-filing of tax obligations lowers tax compliance costs,⁶ improves tax collection and reduces tax fraud (Kochanova et al., 2020; World Bank, 2016). It also reduces opportunities for the solicitation of bribes by public officials. Other reforms, such as the digitalization of tax administration procedures, pre-filled tax returns and online tax payments have also been found to reduce tax compliance costs (World Bank, 2016; World Bank and PwC, 2020). Interestingly, the integrity impacts of e-filing tend to increase when combined with complementary reforms such as digital payments.

In Kenya, Ndung'u (2017) found that the introduction of a digital platform, combined with the implementation of an integrity program, has enabled the tax authority to increase transparency in its operations and reduce opportunities for corruption. Ndung'u assesses the impact of the introduction of M-Pesa, a money-transfer program that facilitates tax payments. M-Pesa utilizes web-enabled application systems for the administration of domestic taxes (the iTax system) and a mobile phone application that facilitates tax payment and taxpayers' access to tax information (the M-Service platform). Ndung'u shows that digitalization has reduced face-to-face interactions between taxpayers and tax officers and, as a result, opportunities for bribery. It has also allowed the revenue authority to reduce tax collection costs, with many small and previously undocumented businesses starting to use mobile phones for tax payments.

Data mining, artificial intelligence and social networking analysis are boosting revenue authorities' ability to detect tax evasion, especially in high-risk sectors, such as the construction, real estate and art industries. In the United Kingdom, for example, the revenue agency has extended its data analytics power to reduce the "tax gap". Its Connect system analyses taxpayer data and monitors discrepancies through social network analysis to identify potential tax evaders. Its predictive algorithm then identifies people most at risk of committing tax fraud and helps devise pre-emptive actions through behavioural nudges. It is estimated to have secured £3 billion in additional tax revenue between 2008 and 2014. Taking into account the £80 million costs of the system, this represents a 37.5 to 1 return on investment in its first five years.⁷

Combined with artificial intelligence, machine learning has become another powerful tool to disrupt fraud drawing out patterns not directly seen by humans (Kaiser, 2020). Mexico's tax authorities identified 1,200 fraudulent companies and 3,500 fraudulent transactions within three months of deploying an artificial intelligence tool (Arvik, 2019). Similarly, India's Union Finance Ministry Project Insight monitors data from various sources, including social media, to detect spending patterns and compares the same data with tax records (Kaiser, 2020).

Following the lead of tax authorities, custom agencies are gradually going digital to facilitate trans-border trade. Procedural red tape and the significant discretion wielded by customs officials make customs a major source of corruption. Singapore, Rwanda and Georgia have undertaken important digitally-driven customs reforms. Colombia has undertaken important digital reforms of its customs agency with the explicit aim to reduce corruption. Evaluating the impact of early efforts in Colombia, Laajaj et al. (2018) show that the digitalization of customs procedures and import transactions has improved importers' productivity, reduced the time to clear customs, increased predictability and promoted judicial recourse.

⁶ Tax compliance costs include the number of tax payments, the time required to pay taxes, the probability of tax inspections, and the perception of tax administration as a hindrance to doing business.

⁷ The Connect system is also estimated to have prevented £4.1 billion in lost revenue as a result of the criminal investigations it helped trigger between 2010 and 2014. See: https://library.croneri.co.uk/acmag_176927

Property and land registries

Another policy area in which digitalization mitigates corruption risk is the management of land assets and property registries. In developing countries, conflict over land ownership gives rise to a range of corruption risks and is often a source of conflict over the ownership of land assets and their trading. In Rwanda, where land administration has traditionally been riddled with corruption, the government introduced digitally-enabled reforms in 2008. The first phase focused on land mapping and titling, and a second phase, which started in 2012, focused on managing a digital land registry. These efforts resulted in a reduction in bribery and petty corruption, according to Shipley (2020). In Georgia in 2018, 1.5 million land titles were published on a blockchain-based platform, which helped strengthen the integrity of the land registry system by providing an immutable chain of records on the ownership and value and an unalterable history of transactions of land titles (Shang and Price, 2018; Santiso, 2018).

Government contracting

The digitalization of government contracting is another key policy arena for the deployment of integrity-tech (Neupane et al. 2012). In the Republic of Korea, Georgia, Rwanda and Estonia, changes in procurement policies have focused on increasing transparency. These reforms have been reinforced by advanced e-procurement platforms that have standardised processes and generated a wealth of data. These efforts have led to substantial increases in the level of competition and greater transparency regarding the identity of bidders and contract winners. However, while e-procurement lowers administrative costs, increases bidder competition, and reduces the prices of contracts, empirical evidence on its impact on grand corruption remains inconclusive (Kochnova et al., 2020). This partly due to the fact that fraudulent bidders are able to circumvent corruption controls and exert undue influence at less-monitored stages of the contracting process, such as contract renegotiations (Campos et al. 2020).

Gradually, public contracting agencies have moved beyond the digitalization of bidding processes to the use of contracting data to gather intelligence on corruption risks through risk-mapping and red-flagging. They have heavily invested in improving the quality, reliability and reusability of procurement data for analytics purposes. The procurement agencies of over 30 national and subnational governments - including Australia, Chile, France and Ukraine - have adopted the open contracting data standard developed in 2015 by the *Open Contracting Partnership* to better structure the data they generate through their e-procurement platforms, making it possible to mine it for suspicious patterns and transactions.

The Republic of Korea has been a pioneer in procurement fraud analytics applied to government contracting. Its *Bid Rigging Indicator Analysis System* (BRIAS) introduced in 2006, was the precursor of business intelligence systems deployed by public procurement agencies to uncover cartel activity and identify bid rigging. The system predicts the probability of bid rigging by analysing large amounts of bidding data from a large number of public agencies. Similarly, in 2016, Ukraine made the use of its e-procurement platform mandatory to all public agencies and developed the ProZorro platform⁸ to scrutinize its 4,500 daily bids. In its first two years of operation, ProZorro saved the government US\$1.9 billion and increased competition in procurement (OECD, 2019). Nevertheless, as Aarvik (2019) shows, fraudulent bidders have been able to game the system. When Ukraine's state audit office developed 35 risk indicators that would trigger closer inspection, bidders adapted their behaviour to avoid these fixed criteria.

⁸ See: <https://prozorro.gov.ua/en>

The COVID-19 crisis has exposed new risks in government contracting related to the use, abuse and misuse of emergency procurement. Emergency procurement is often carried out through direct contracting, circumventing standard auction-based processes that tend to be more cumbersome and lengthier. Many countries have sought to mitigate these risks by releasing their COVID-19 spending in open data formats. For example, Paraguay, with support from the Inter-American Development Bank, created an open data platform that tracked in real time all COVID-19 spending, including emergency programs, government subsidies, public contracts and donor grants.⁹

These developments are often part of comprehensive open data platforms designed to track the implementation of public investments along their entire value chain (Khan et al, 2018). Colombia, for example, developed an open data platform to track the use of mining royalties and the infrastructure projects that they finance.¹⁰ A recent evaluation by Lauletta et al (2019) found that the platform increased the efficiency of public investment projects and reduced monitoring costs, both for independent overseers and within the government itself.

Oversight, audit and anticorruption agencies

Oversight agencies, audit institutions and anticorruption offices are also increasingly implementing anti-corruption technologies solutions. In the past decades, the gradual opening-up of budget and procurement data has enabled the development of business intelligence tools designed to detect corruption vulnerabilities. Audit agencies are increasingly resorting to artificial intelligence to red-flag potential irregularities in government procurement. These initiatives have proven particularly useful during the pandemic by uncovering anomalies in the emergency procurement of health equipment, especially at the local level.

Audit offices have become increasingly savvy in their use of integrity analytics to identify high-risk transactions and implement risk-based approaches to government auditing. In 2017, the Brazilian internal audit office developed a machine learning system, Alice, that automatically analyses bidding contracts to detect suspicious patterns and identify irregularities. In 2018 and 2019, Alice was used to monitor contracts totalling US\$600 million (Cetina, 2020b). In Colombia, the audit office developed an analytics platform, Océano, that triangulates contracting data with company registries in order to detect anomalies and flag suspicious transactions. Between 2014 and 2019, Océano exposed the concentration of 27% of the seven million large government contracts in a limited number of bidders, a trend which was more acute at the municipal level (Cetina, 2020b). Similarly, the artificial intelligence algorithm of the Mexican audit office is capable of automatically detecting contracting irregularities at the sub-federal level by the country's 7,881 spending entities.

However, tech, per se, is not a substitute for clear legal frameworks and proactive independent auditors. It is important to underscore that while innovations in integrity analytics help auditors perform their responsibilities more efficiently, they do not replace the need for auditors to act on these insights and enforce accountability. Rather, it should be used to enhance the efficacy of laws and those who enforce them. To this end, in its 2019 *Moscow Declaration*, the international organisation of audit institutions committed to make better use of data analytics in audits and advance greater openness of data, source codes, and algorithms.

Integrity-tech and civic-tech startups

Increasingly, tech-based, data-powered start-ups are seeking to have positive social impact by partnering with civil society in the fight against corruption. Private sector tech start-ups are partnering with civil society organizations to fight corruption, providing them with new tools to detect corruption risks using advanced

⁹ See: <https://rindiendocumentas.gov.py/>

¹⁰ See: <https://mapainversiones.dnp.gov.co/>

analytics, network analysis and artificial intelligence. For example, the French start-up Linkurious and the Swedish start-up Neo Technology have helped the *International Consortium of Investigative Journalists* make sense of the trove of data leaked from the Panamanian law firm Mossack Fonseca, an effort that led to the Panama Papers' global scandal. The same partnerships between tech start-ups and civil society have been at play in the Paradise and Pandora papers.

In Mexico, the national anticorruption commission set-up an “anticorruption digital marketplace”,¹¹ an open-source platform containing a variety of anticorruption technologies and civic-tech solutions, provided by startups or developed by government agencies, freely available to public entities and local authorities. To catalogue the recent growth in these initiatives, in 2018, the World Economic Forum created a tech4integrity platform to serve as a global reference hub for integrity-tech innovations.¹²

The rise of such digital solutions against corruption deployed by civil society and tech startups are a prolongation of the digital platforms developed to facilitate citizen oversight and engagement, especially in cities. There has been a proliferation of digitally-enabled accountability tools that empower citizens in the oversight of government. These digitally-enabled accountability tools contribute to further open government and citizen engagement, empowering citizens in the oversight of government. Civic-tech are technologies that enable engagement and enhance the relationship between the people and government by facilitating and enabling citizen participation public decision (Knight Foundation 2013). They aim to facilitate civic engagement and encourage citizens to act for the public good (Le Blanc, 2020; van Ransbeeck 2019).

In Spain, for example, Madrid created an interactive platform, Decide Madrid, to consult citizens who can, individually or collectively, raise concerns and make proposals to improve public services.¹³ In Australia, the South Australian regional government set-up an open platform for participatory budgeting, *Fund my Community*, to identify and finance projects to improve the lives of disadvantaged, isolated or vulnerable citizens.¹⁴ More recently, the city of Bogotá in Colombia, created a single citizen window, *Bogotá participa*, to consult citizens on municipal priorities and participatory budgeting.¹⁵

More recently, start-ups have begun to partner directly with government entities to accelerate innovation, open government and citizen-centered public services (Santiso and Ortiz de Artiñano, 2020). Govtechs are a new type of startups that offer innovative solutions to improve public services and make governments more agile, refocusing them on users (Santiso 2020d).

IV Government digitalization as an integrity strategy

The irruption of tech innovations in the integrity space has captured the spotlight, with its hope and hype. Nevertheless, the most significant integrity benefits may come in a subtler form. These are often derived from advances in the digitalization of public administrations that reduce opportunities for corruption. In emerging economies, the expansion of government digital services and the digitalization of social transfers have had a significant impact on bureaucratic corruption.

11 See: <https://mda.plataformadigitalnacional.org/>

12 See: <https://widgets.weforum.org/tech4integrity/index.html>

13 See: <https://decide.madrid.es/>

14 See: <https://publicadministration.un.org/unpsa/database/Winners/2017-Winners/Fund-My-Community>

15 See: <https://participacion.gobiernoabiertobogota.gov.co/>

Digitalization of government services

In developing countries, petty bribery in everyday government services has the greatest impact on the quality of life and trust in institutions (Roseth, Reyes and Santiso, 2018). For individuals and small business, the costs of bureaucratic red-tape can be significant. According to Transparency International, in 2017, one third of Latin Americans paid a bribe to access a public service they were entitled to (Transparency International 2017). In Mexico, in 2019 and 2020, the costs of red-tape and regulatory burden at the federal level represented 3.4% of GDP (Gonzalez Briseño and Espinosa-Wang, 2021).¹⁶

In that context, the digitalization of governments can have three integrity spill-overs. First, it reduces arbitrary interference by unscrupulous public officials. The automation of internal bureaucratic processes cuts discretion in the machinery of government. These efforts typically entail automating standard procedures and reducing reliance on paper-based processes (Santiso, 2019 and 2021b). They include the streamlining of bureaucratic processes through administrative simplification and process re-engineering, often through ad-hoc de-bureaucratisation initiatives and reforms in regulatory policy. The combination of digitalization and simplification of bureaucratic procedures tends to improve both their transparency and reliability. In recent years, many countries are also deploying digital payment solutions to pay for public service fees, that further reduce in-person interactions with civil servants and therefore bribery risks.

In 2015, Argentina decided to go paperless, with the digitalization of administrative procedures, the introduction of digital authentication, and the expansion of digital services.¹⁷ The goal was to make administrative procedures more efficient and less prone to tampering. The government embraced a dual strategy: on the one hand, it ended paper-based processes and implemented digital services and, on the other hand, it simplified administrative requirements to the greatest extent possible without having to alter underlying regulations. The simplification program targeted the productive sector to cut red-tape faced by the private sector, which resulted in the streamlining 480 procedures and the elimination of 600 unnecessary and easily manipulatable norms. It generated savings to the productive sector estimated at US\$2.1 billion (Ghersinich Eckers, 2020). Similarly, the social security agency ANSES deployed an artificial intelligence system, *Laura*, to improve both the agency's internal operating efficiency and its services to pensioners.

A second integrity dividend of government digitalization relates to the automation of public services through the expansion of government services that are directly accessible on-line and end-to-end. These efforts initially entailed making available online information on the process, requirements and paperwork required. They now also entail putting the entire process online, from end to end, allowing citizens to complete and monitor it remotely. By digitalising public services, governments aim first to improve the effectiveness and efficiency of service delivery, but by limiting discretionality, these reforms also reduce red-tape and thus petty corruption (Basel 2017). This is especially important for widely-used critical services. For example, Mexico digitalised its birth certificates and Argentina its drivers' licenses – two high-impact public services that are particularly vulnerable to bribe solicitation when people seek to expedite the process for obtaining either document.

A third integrity benefit of digitalization relates to the reduction in information asymmetries between governments and users (citizens and businesses) that often enable corruption (Charoensukmongkol and Moqbel, 2014; Adam and Fazekas, 2018). The digitalization of public services automatically generates better data on bottlenecks and vulnerabilities in service delivery. It allows to track administrative procedures throughout

¹⁶ The federal statistics agency INEGI estimates that petty bribery alone cost the economy US\$650 million or 0.4% of GDP in 2019, that is an average of about US\$200 per victim.

¹⁷ See: https://www.clarin.com/politica/gobierno-resolvio-tramites-digitales_0_ry8iifcBm.html

its various stages and the myriad of public entities involved. This is particularly important for services critical to economic activity, such as business licences, construction permits, and property registration.

The private sector is particularly concerned with bribery risks when interacting with government entities and has developed methodologies to better assess those risks.¹⁸ Global business increasingly appreciates the value of digital government to mitigate corruption risks in interactions with public entities and has become an active advocate for better digital government services. As part of their compliance policies, companies are mandating their managers to use of digital channels in their interactions with governments. For example, the *Anti-Bribery and Corruption Policy* of GSK, a multinational pharmaceutical company, encourages its managers to use digital channels in their interactions or transactions with governments.¹⁹ Similarly, the anti-bribery code of business practice of Unilever, the world's largest consumer goods company, encourages its managers to use e-government solutions for licensing, procurement, and taxes.²⁰ Some companies have started to include measures of digital governance maturity in their assessment of country risk.

Digitalization of social transfers

Digitalization has also made important strides against corruption in social policies and antipoverty programs. Available evidence suggests that digitalization helps antipoverty programs in various ways: it facilitates the biometric identification of beneficiaries (Gelb and Diofasi 2018), increases the ease of government payments (Radcliff, 2016, 2017), and improves the tracking of transfers to beneficiaries (Banerjee et al. 2016).

The introduction of digital registers, digital identity and digital transfers has improved the precision of public benefits programs and reduced the diversion of public funds (World Bank, 2021). These three digital innovations have been particularly effective in improving social spending. The digitalization of beneficiary registries has helped improved the targeting of social transfers and the removal of ineligible beneficiaries. In South Africa, provincial governments have used fingerprint-based biometric smart-cards to deliver pension benefits and social grants. By 2013, 20 million social grant recipients had been registered by the South African social security agency. Gelb and Diofasi (2018) found that digitalization detected 650,000 ineligible recipients, saving the government over US\$65 million annually. The digitalization of civil servants' registers has also reduced fraud in payroll outlays in the public sector.

The introduction of universal digital identity has further improved the targeting of social transfers. In 2009, India launched its "Aadhaar" digital identity program that now reaches all of its 1.15 billion residents through unique biometric identifiers that allow to automatically determine who is eligible to which social program (Roy and Rai, 2017). There is evidence that biometric identification has reduced corruption in employment and pension programs (Muralidharan et al., 2016), as well as in fuel subsidy programs (Barnwal 2018). Using a randomized control trial, Muralidharan and others (2016) found that Andhra Pradesh's government reduced the leakage rate of its *National Rural Employment Guarantee Scheme* from 30.7% to 18.5% on average by digitalising it. Banerjee and others (2016) show that digital government reduced fiscal leakages in India's workfare program, although it did not necessarily improve program outcomes.

Digital identification is also instrumental in curbing corruption in other government transfers, such as public salaries and emergency aid. Nigeria, for instance, eliminated over 43,000 ghost workers from the public

¹⁸ For example, Trace International, a global anti-bribery association, measures business-related bribery risks in 194 countries.

¹⁹ These may include e-invoicing; e-filing of taxes, contributions, licensing; e-procurement, e-tendering, e-sourcing. See: <https://www.gsk.com/media/2976/anti-bribery-and-corruption-policy-v15.pdf>

²⁰ See: <https://assets.unilever.com/files/92ui5egz/production/9772de5552b371e4f573e78922263658c9f3b80f.pdf/cobp-anti-bribery.pdf>

payroll following an audit using biometric identification in 2011, which saved the government US\$60 million (Gelb and Diofasi 2018). In Ghana, the digitalization of civil service databases and salary payments has helped eliminate “ghost workers” and reduced the public-sector wage bill (Cangiano et al., 2017). Biometric information has also reduced leakage in emergency aid. For example, AID:Tech, a gov-tech startup, helped deliver emergency aid to Syrian refugees in Lebanon in 2016. Its blockchain-based decentralised digital identity and interoperable protocol enabled digital assets to be delivered in a transparent and reliable manner.²¹

The digitalization of payments is providing a further driver of integrity in social transfers, as corruption often runs on cash. The best-known demonetisation initiative of recent years is probably that of India (Roy and Rai, 2017). In November 2016, the Indian government decided to withdraw large-denomination bank notes – about 87% of currency in circulation. India’s finance minister explained that the government was motivated by a desire to reduce tax evasion and expand the tax base, stating that “the predominance of cash in the economy makes it possible for the people to evade taxes” (Roy and Rai 2017:266).

The move from cash to digital transfers is not a minor issue for development countries. In the social realm, cash transfers are the most widely used social assistance intervention and many governments have introduced new initiatives specifically in response to COVID-19 (Davidovic et al., 2020). A decade ago, Brazil improved the delivery and targeting of its public benefits by switching to digital payments after consolidating four existing cash-transfer programs into one, *Bolsa Familia*, in 2003. It also reduced the administrative costs of serving *Bolsa Familia*’s 12.4 million eligible households, which have since then declined by more than three-fourths, down to 2.6% from a previous high of 14.7% of the total benefits delivered (Pickens et al. 2009).²²

During the pandemic, governments accelerated the shift from cash to digital social transfers – in particular pension benefits – to mitigate the risk of contagion and, at the same time, reduce fraud. Prior investments in the digitalization of beneficiary registers and payment methods have played a critical role in scaling-up emergency transfers during the pandemic (Gelb and Mukherjee, 2020). Colombia, for example, was able to leverage various databases to better identify the beneficiaries of its COVID-19-related emergency transfers, *Ingreso Solidario*, through the use of a pre-existing integrated system for potential beneficiaries of Colombia’s social programs, SISBEN.

Lund and others (2017) find that digitising government payments in developing countries could save about 1% of GDP annually, equivalent to US\$220–\$320 billion per year. These savings stem from reduced leakage in government benefits and tax payments, reduced fraud and tax evasion, and increased cost savings from digitising payment processes. Nevertheless, progress is slow and uneven, even in more advanced economies. In the United States, for example, the federal government completely phased out paper checks for recipients of social security in 2013.

V Policy findings and recommendations

The acceleration of government digitalization caused by the pandemic provides an opportunity to make further progress on achieving Sustainable Development Goal 16, especially target 16.5, which aims to substantially reduce corruption and bribery in all their forms. Beyond the use of digital innovation and data intelligence to combat corruption, this paper has shown that the digitalization of government has more subtle, yet broader anticorruption impact. This is especially the case in high-risk policy areas related to the management

21 See: <https://www.aid.technology/>

22 The digitalization of salary payments in the public sector also has important integrity benefits. In 2009, when the government of Afghanistan started to transfer their pay to its police officers by mobile phone rather than in cash, police officers started to receive their full pay for the first time (Lund et al. 2017) – unlike in the past, nothing was skimmed off by intermediaries.

of public finances. However, to fully exploit the integrity benefits of digital transformation, there needs to be greater synergy between digital government reforms and anticorruption strategies.

Overall, government digitalization has 5 main integrity benefits:

- ◆ It allows for greater access to information and open government data, and thus increases actionable transparency;
- ◆ It reduces discretion and limits in-person interactions in government transactions and services by unscrupulous public officials, limiting opportunities for rent-seeking and bribe solicitation;
- ◆ It reduces transaction costs for service users, which increases voluntarily compliance by citizens and companies;
- ◆ It expands competition in government contracting, which drives down costs and reduces collusion;
- ◆ It increases trust in institutions and governments' capacity to deliver, by facilitating access to public services and making them more efficient, simpler and reliable.

Five policy insights and recommendations can be drawn.

- ◆ First, government digitalization policies can be an effective anticorruption strategy, precisely because they are called as such. The integrity benefits of digital transformation can be significant, often with lasting structural impact. They are also difficult to undo as the digital revolution grows in ubiquity. These positive externalities of digital reforms contribute not only to the deter rent seeking behaviours, but also to anchor integrity in government operations, altering incentives and changing mindsets. In emerging economies, the anticorruption intent of digitalization is often implicit and indirect, because the political costs of digital reforms tend to be lower than those incurred by anticorruption strategies. Moreover, and although less visible and harder to measure, the anticorruption externalities of digitalization make it a better investment than the punitive approaches of criminal investigation and prosecution.
- ◆ Second, digitalization alone does not automatically translate into positive anticorruption outcomes. Its impact hinges on those digital and analytical tools being effectively used by integrity actors to enforce accountability, which, in turn, requires an enabling regulatory and institutional environment. Furthermore, these digital tools need to be adapted to the local context and the broader political economy in which they operate and require tackling corruption's political roots (Kaiser, 2020; World Bank, 2016 and 2020b). Institutional incentives, state capacities and strong leadership are key. Hence, to make digitalization work as an anticorruption device, it is equally important to reform underlying institutions.
- ◆ Third, the impact of digitalization on public integrity is contingent on policy choices. Policy content does matter. Digitalization can make transparency more agile and enforce transparency obligations, but the amount of transparency is actually a policy decision. In other words, the integrity dividends of digitalization are contingent to the extent to which public policies are increasing governments' transparency obligations, in both the digital and analogue worlds. One thing is to further government digital services, which tend to be low-value, high-volume corruption opportunities; another matter is to pursue digital reforms in high-value policy arenas, such as government procurement, wage bill management, and customs operations.
- ◆ Fourth, to effectively drive digital transformation and deploy anticorruption technologies, governments need to strengthen their own digital capabilities and expertise. This also applies to regulators that need to upgrade their digital capabilities for smarter regulation and enforcing compliance. Often, government tech procurement is complex and exposed to implementation failures, cost overruns and

vendor capture. Such risks are often the result of the excessive outsourcing of tech expertise in the development digital government projects. The financial management of large government tech projects is an area which requires greater attention.

- ◆ Fifth, digitalization also creates new corruption risks that need to be mitigated. The sharp rise in state tech budgets and the increasing complexity of digital solutions create their own set of vulnerabilities. Often, government tech procurement is complex and exposed to implementation failures, cost overruns and vendor capture.²³ Such risks are often the result of the excessive outsourcing of tech expertise in the development digital government projects. The financial management of government tech is an area which requires greater attention. Furthermore, digitalization creates new digital forms of corruption, as corrupt networks are, too, leveraging tech innovations. The more governments go digital, the more they expose themselves to cybercrime, ransomware attacks and new corruption risks associated with the manipulation of digital records and the misuse of digital identity. Governments are thus realising that to effectively invest in and deploy gov-tech solutions, they need to scale-up their in-house digital expertise.

More broadly, central to the global debates on the future of government in the digital era are the broader challenges of ensuring an inclusive digital transformation and the ethical use of new technologies, with the goal of leaving no one behind. Reinforcing trust in the digital transformation has many dimensions, including trust in governments' capacity to deliver services cost-efficiently; trust in institutions to ensure that these services are delivered in an inclusive, fair and effective manner, especially to those who need them most; and trust in democracy to mitigate the risks of disinformation and polarization that new technologies and in particular social platforms create.

²³ In 2013, the United States experienced a massive failure in its healthcare.gov platform, designed to implement the Affordable Care Act and to enrol citizens in health insurance. The website crashed upon take-off. The system, initially budgeted for US\$93.7 million, ended-up costing US\$1.7 billion.

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