From Analogue to Digital: An Exploration of Digitizing Elections, Electoral Integrity and Voter Trust

Isabella Wilkinson

I. Introduction

The past year has heralded unprecedented changes and challenges to the administration of elections. The COVID-19 pandemic and its obstacles have disrupted democracy as we know it, and provided dangerous global openings for authoritarian encroachment on political rights and civil liberties.[1] Digital threats to elections have reached a crescendo, originating from outside and within established liberal democracies. All the while, many countries are undergoing gradual evolutions towards the implementation of digital tools in elections.

One of such countries is Estonia. Estonia's internet-voting platform has won global plaudits since its implementation in 2005. Globally, Estonia may be considered *the* global pioneer in the digitization of elections, with a world-leading track record in electoral integrity.[2] Estonia hosts the Tallinn Cyber Diplomacy School, co-chairs the Compendium on Cybersecurity for Election Technology, and provides benchmarks to the European Commission's package on 'Securing Free and Fair European Elections.' [3] Estonia's diverse experiences at the intersection of democratic deepening and digital technology are at the cutting-edge of innovating democratic governance. Perhaps most importantly, Estonia is a healthy, liberal, digital-at-heart democracy, consistently scoring highly in Freedom House's Global Freedom and Internet Freedom scores.[4]

There are clear motivations for scholarly work that considers the impact of digital disruption on democracy's core tenet: democratic buy-in, or *trust in the process*. The intersection of technology and democracy — its clashes, synergies, and growing pains — will undoubtedly spur much valuable research in the coming decades,[5] rooted in questions such as the following: Is the 'Estonia model' the future of democracy? Can technology improve electoral and democratic integrity, or will it serve to exacerbate existing problems? Rather than grappling with these general questions, or proposing a plausibility probe of the impact of digital technology on elections, this study instead provides a brief roadmap for how scholars and practitioners should approach elections in the digital age and tackle key questions, such as whether technology can enhance trust in elections and the integrity of democratic societies more generally.

To start, this study defines aspects of digitization, and then proposes a theoretical approach to 'digital democracy' rooted in scholarship relating to democratic consolidation and voter trust. The next section briefly introduces two case studies — Sierra Leone and Armenia — to identify core issues pertaining to the digitization of elections, that will be further elaborated in the final section.

II. Building a Theoretical Approach

The intersection of technology and democracy is undoubtedly a growing field. As a result, an interdisciplinary approach is necessary, drawing on technological definitions and core literature on democratic consolidation and voter trust.

Generally speaking, digitization refers to the conversion of analogue processes and products to their digital equivalents; for instance, the shift from paper ballots to electronic ballots. Though often synonymized, digital transformation refers to a more pervasive metamorphosis of processes and products — that is, being "digital at heart." [6] Disruptive technology refers to the technology native to the Fourth Industrial Revolution (an era of innovation beginning in the 2010s).[7] Its constituent technologies include blockchain (digital blocks of information, stored in a digital chain securitized by cryptographic keys),[8] biometric technologies (the use of technology to identify biometric features, often fingerprints, facial recognition and iris recognition), among others.

Accordingly, digitizing elections refers to the transition — from analogue to digital — of different parts of the voting process, such as voter registration, identification, authentication, vote- casting and ballot tabulation. Most literature on the digital disruptions of electoral administration focuses on digital threats, such as disinformation and cyberattacks targeting electoral processes.[9] While some studies focus on "digital democracy," [10] research on "electronic elections" is already outdated and predominantly overlooks disruptive technologies like blockchain.[11]

Linz and Stepan's classic definition of democratic consolidation — when democracy is the "only game in town," institutionalized by citizens and the state on an attitudinal, constitutional, and behavioral level — provides a helpful starting point for studying the digital disruption of elections.[12] Scholars like Schedler and Mainwaring observe that democratic consolidation is not a linear, irreversible process; on the contrary, it unfolds concurrently in multiple sec-

tors, for multiple actors working with different timelines.[13] Related to this, research by Carey, Bermeo, and Yashar emphasizes that "[electoral] mechanisms matter:" the way that elections are administered, and who administers them, has a significant impact on democratic buy-in and consolidation.[14] Following the failure of several transitional regimes to consolidate into fully-fledged democracies in the 2000s, some scholars noted the "end of the transition paradigm" and the rise of "grey zone" regimes, stuck in the no-man's-land between democracy and authoritarianism.[15] This wave of scholarship represents a decades-long shift towards an approach to democracies that are dynamic and (perhaps, digitally) adaptive. To this end, democratic consolidation offers two main contributions to theories about digitizing elections: first, digital developments are indeed a frontier of democratic deepening; and second, digitization is an aspect of electoral design, reflecting the distinctiveness of implementing contexts.

Literature focused on voter trust differentiates between trust in *government* and trust in *elections*: the former refers to confidence in the government's day-to-day administration of governance, while the latter refers to perceptions of electoral integrity.[16] The 'Third Reverse Wave' of global democracy has prompted substantial shifts in the classic trust-as-evaluation approach to voter trust. Bermeo's explanation of democratic backsliding is a key text in any studies of digital democracy. As Bermeo explains, the rise in democratic backsliding and decline of global levels of freedom can be attributed to the malign nature of modern electoral dis-integrity.[17] Namely, using digital technologies, malign actors can gradually erode trust through sustained democracy- prevention efforts, originating from within and outside democracies, and dating months or even years before Election Day itself. [18]

The field of democracy studies offers numerous approaches to gauging voter trust. V-Dem's Democracy Index now includes a new indicator, '*Toxic Polarization,*' which measures voter trust as a subset of democratic disillusionment. [19] The Electoral Integrity Project's Perceptions of Electoral Integrity Index (PEI) measures integrity across the electoral process,[20] and Freedom House's Global Freedom Index (GFI) measures access to political rights and civil liberties,[21] with specific indicators related to electoral integrity. Also produced by Freedom House, the Internet Freedom Index (IFI) measures obstacles to access, limits on content, and violations of user rights.[22]

Contemporary literature and empirical approaches to voter trust offer two main observations relevant to this paper: first and foremost, voter trust is by no means synonymous with democratic buy-in; and second, voter trust is not static and may be eroded at any time or place in the electoral process.

III. The Cases of Sierra Leone and Estonia

The following case studies do not offer conclusive insights on digitized elections. Instead, the case studies are part of an experimental roadmap, exploring how scholars and practitioners should most effectively approach digitized elections in vastly different political and economic contexts. *What common themes arise from a brief analysis?* This section draws on empirical data (GFI and PEI),[23] country research, and electoral observation mission reports.[24]

Blockchain Vote Tabulation in Sierra Leone

In March 2018, Sierra Leone held a general election with a presidential run-off, in which President Ernest Bai Koroma's chosen successor, Samura Kamara, lost to opposition leader Julius Maada Bio.[25] A blockchain platform developed by start-up Agora enabled vote tabulation, apparently storing 70 percent of votes cast on a hyper-securitized ledger, which offered immediate transparency into vote tabulation and initial results. [26] While electoral observers recorded that Sierra Leone's elections had faced a host of difficulties — from operational difficulties, exacerbated by a short time-frame, to baseless allegations of electoral irregularities by losing political parties — vote tabulation was *not* one of these difficulties.[27] In fact, tabulation was described as at least "good" in 90 percent of polling stations observed, owing to "professionalism" and "the perceived overall integrity of the process."[28]

Data suggests that the 2018 elections did little to improve Sierra Leone's political rights and civil liberties (GFI), with evidence of a downward trend in electoral integrity (PEI).[29] However, digitized elections are now part of Sierra Leone's emerging track record in the digital innovation of governance. Leveraging past policy commitments from 2018, President Bio promoted governance digitization with the National Innovation and Digital Strategy, an official roadmap for digitizing healthcare, education, finance, and national identification.[30] Recent efforts in tandem with Kiva and the United Nations have extended blockchain-backed citizen identification in an effort to improve the breadth and depth of digital governance and improve democratic inclusivity. Granted, while Sierra Leone's first partially-digitized elections may be considered low-impact, the experience may serve as a strong foundation for further digital and democratic development — particularly as part of a consolidated, all-of-government policy commitment.

Biometric Voter Authentication in Armenia

In December 2018, Armenians went to the polls for a snap parliamentary election which resulted in a landslide victory for Prime Minister Nikol Pashinyan's reformist bloc, winning 70 percent of the vote.[31] In 2017, the Armenian electoral commission had introduced voter authentication devices (VADs), which use fingerprint scanners to authenticate voter identity by cross-checking biometric data with the country's citizenship database.[32] Both empirical data

and electoral observations suggest a remarkable improvement in Armenia's electoral integrity. PEI data records a shift from the 'low electoral integrity' group in 2013 to the 'very high' group in 2019 — a jump from 44/100 to 70/100 points.[33] The GFI records a similar improvement in political freedoms and civil liberties, although Armenia remains in the 'partly free' group. The IFI, however, ranks Armenia as 'free.' [34] Moreover, observers assessed tabulation procedures positively in most polling stations.[35]

A United Nations Development Program and Council of Europe task force[36] guided the implementation of VADs as part of an international, long-term project to combat electoral fraud and reduce political corruption.[37] While the implementation of VADs garnered global praise, the 'Velvet Revolution' of April 2018 and the new, liberal government committed to an anti-corruption agenda has had a momentous impact on the perception of electoral integrity, voter trust, and confidence in government. In Armenia's next elections, it remains to be seen whether digitized elections — in addition to a broader political commitment to fighting electoral fraud — can generate positive synergies, particularly as confidence in government has reached new lows following the Nagorno-Karabakh conflict.

What's the 'So What?' for Digitizing Elections in Sierra Leone

The selected case study countries perhaps could not be more different. However, they both implemented electoral digitization to some degree of success, and underwent significant political changes in tandem. As explored in Section 2, electoral digitization was indeed an opportunity for democratic deepening, and its mechanisms mattered: both were reflective of the government's new priorities, whether it was enhancing electoral integrity or signaling a future-ready shift in government. As for voter trust — no means synonymous with democratic buy-in more generally — both case studies may demonstrate that, while digital technologies can improve the perception of technical efficiency or operational integrity, digitization is not a stand-in for trust. The role of international organizations or international technology companies in providing technical expertise and political backing cannot be overstated. However, it is apparent that homegrown democratic deepening and a willingness to adapt is the necessary precedent for any significant digitization.

Digitization may have a significant impact on democracy. The case studies demonstrate that any research approaches to the subject must consider this impact as contingent and conditional — *contingent* on a comprehensive, consolidated political strategy for improving elections (and whether these transformations are digitally disruptive), and *conditional* on other constituent processes of democratic consolidation or deepening. Future studies may expand the regional scope of analysis and consider development indicators, such as meaningful connectivity, affordability,[38] and the IFI. Another promising research avenue may consider pre-existing digital literacy and threat perception among voters, including empirical studies of electoral cybersecurity breaches and implications for voter trust.

4. Looking Ahead: Core Issues

This paper proposes several preliminary yet important notions. **First, digitization is by no means a 'fix-all' for voter trust.** Improperly- administered digitized elections may serve to erode integrity. On the flip side, Armenia's digitized elections were *specifically* designed to build electoral integrity, and apparently did so. As both Estonia and Armenia's experiences may demonstrate, digitization is most effective for improving integrity and trust if it is part of a long-term roadmap for digital-at-heart democratic consolidation.

There is no one kind of digitization, and no 'one size fits all' model. The digitization of elections should be understood as a series of interlocking classifiers accounting for country difference, not a static procedure: the technological *mode* (i.e. what technology is implemented?), the electoral *sub-process* (i.e. when is it implemented?), and the *scope* of implementation (i.e. was it implemented locally, or nationally?).

Finally, **the political context and culture matter** greatly in the analysis of digitized elections. Isolating the implications of digitization from other political factors (such as a revolution in Armenia, or a tense political turnover in Sierra Leone) is undoubtedly complex. Locating studies of digitization within countries' experiences with democratic consolidation or deepening provides the necessary layer of contextual insight.

Generally, this study emphasizes the observation that the 'Estonia Model' and digitized elections are no longer rare outliers. Increasingly, they are the norm. The pandemic era has already redefined governance to a significant extent, and democracy's concurrent transition from the analogue to the digital world will challenge elections as we know them. However, guided by future-ready research and policymaking, this digital metamorphosis also presents new frontiers for democratic renewal, particularly in the face of emerging and long-standing threats to democracies worldwide.

Isabella Wilkinson *is a Research Associate in the International Security Programme at Chatham House (the Royal Institute of International Affairs) in London. At Chatham House, Wilkinson works on the Cyber Policy Portfolio, addressing policy issues including cybersecurity, cybercrime, internet governance and digital democracy and authoritarianism. Working at the intersection of technology and future-ready governance, Wilkinson has gained international experience at various research institutes and non-profits. Wilkinson gained her master's with distinction in Democracy and Governance from Georgetown University and gained her bachelor's with distinction in History and International Relations from the London School of Economics.*

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