

Virtualizing diaspora: new digital technologies in the emerging transnational space

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Abstract *Since new distributed ledger technologies hold out a promise to restructure cross-border flows of people and material resources, they affect globalization and alter transnational spaces. Their capacity to facilitate secure and disintermediated value transfer through crypto-code and smart contracts enables novel forms of remittance transfer, resource management and digital identity verification – and may also generate new vulnerabilities. In this article, we examine the use of emerging blockchain applications in various migration and diaspora related initiatives in the emerging economies of Africa, Asia and Europe. By building on existing social networks of mutual obligation and quasi-ethnic affinities, blockchain technologies may facilitate the ability to enlarge the scope of diasporas and change the nature of belonging, sovereignty, migration and statehood. Through exploring the selective foregrounding of mutuality and materiality in such alternative value transfer systems, we seek to explain the dynamics of trust and agency that these networks generate to extend commitments and loyalties in the transnational space.*

Keywords DIASPORA, DIGITAL LEDGERS, E-RESIDENCY, MIGRATION, REMITTANCES, TRANSNATIONALISM

Kaevats told me it irked him that so many Westerners saw his country as a tech haven. He thought they were missing the point. ‘This enthusiasm and optimism around technology is like a value of its own,’ he complained. ‘This gadgetry that I’ve been ranting about? This is not *important*.’ He threw up his hands, scattering ash. ‘It’s about the mind-set. It’s about the culture. It’s about the human relations – what it enables us to *do*.’¹

(‘Estonia, the digital republic’, Heller 2017)

A Filipina domestic working in Kuwait transfers wages home to her family via the bitcoin-based service; a Somali cab driver in New York drops by a small storefront to send money home through the age-old system of hawala; a Ukrainian businessperson verifies her business transaction with a remote partner through Estonia's blockchain-enabled e-residency system. These manifestations of new forms of 'virtual diasporas' among diverse global citizenry reflect the peculiarities of the current era that involve both expansion and contraction of the transnational space. The confrontation of the evolving expansion in global interconnections and human and resource flows with emerging political and electoral concerns with cross-border movements of people and material resources (see Malcolm Campbell-Verduyn's introduction to this issue), raises questions about the meanings of local and global, formal and informal. These concerns are amplified by the spread of new blockchain-based financial and communication infrastructures that advance the promise of decentralized and 'trustless' value transfers and an increasing focus on individual agency and anonymity, forecasting fundamental changes in the nature and governance of the transnational space.

In this article, we explore the implications of digital ledger technologies for global networks of value transfer and verification. It has become increasingly evident that blockchain applications involve more than technological innovation affecting information and communication transfer networks. Blockchain technologies may have the potential to effect significant restructuring in the 'traditional operation of economic, financial, legal, and governance systems' (Swan and De Filippi 2017: 606) and to facilitate novel forms of economic and political organization in societies (Davidson et al. 2018). The new modes of decentralized value transfer, identity verification, and business and asset management that computer protocols and crypto-codes mediate – to replace public or private third parties – raise novel questions about the nature of trust and commitments that the new technology, and the social institutions they engender, facilitate.

We contend that the abilities of a blockchain to effect novel connectivities that transfigure global economic and political spaces are reflected in their applications relating to migration and diaspora. The present era is marked by an intensifying global mobility. Hundreds of millions of people are living outside their countries of birth and the global refugee crisis has resulted in an unprecedented mass displacement. The livelihoods of those left behind can depend vitally on the transfers of resources from their relatives and friends in the global diasporic communities (Rodima-Taylor 2013). Diasporas are increasingly central to facilitating transnational connections and spaces for both developed and emerging economies. A diaspora is defined as a community of people who 'live outside their shared country of origin or ancestry but maintain active connections with it' and include 'both emigrants and their descendants'.² The transnational transfers connecting diasporic communities with their countries of origin involve economic as well as social contributions and knowledge flows. In this article, we contend that such processes are historically and culturally embedded, and that the effects of a blockchain on cross-border spaces call for a context-specific analysis.

Drawing on cases from Kenya, Somalia, the Philippines, Georgia, and Estonia, we argue that the meanings of diaspora, and of statehood, are changing with the

development of such digital communicative technologies that facilitate the rise of novel transnational spaces and affinities – both virtual and material. The effects of a blockchain, as of other technological innovations, are uneven, for existing institutions and conventions shape the rapidity of uptake and the extent to which the emerging technology offers opportunities for particular groups' empowerment or exploitation. It is sometimes claimed that as a system for creating consensus between individuals and by-passing central intermediaries, a blockchain may potentially replace institutions with technology (Norman 2017: 13). We argue, however, that emerging empirical cases of blockchain application reveal that, to a significant degree, these are determined by existing socio-political agendas and institutional environments. While focusing on assemblages of material and ideational elements to stress the internal heterogeneity of the emerging economic architectures, we thus follow Guyer's (2016) call for a historically grounded 'forensic analysis' of the elements in these layered assemblages.

Emerging theoretical approaches to infrastructures and globalization, and empirical research in Africa and Asia, inform our analysis, which seeks to lay the groundwork for future research in political economy and economic and political anthropology. Our discussions about new digital finance infrastructures in East Africa and Asia not only reveal how communicative technologies affect existing social networks and reciprocal obligations, but also show the capacity of mobile money and digital remittances to expand and transform them. We contend that emerging digital finance infrastructures build on existing social pathways of mutual support and utilize historically defined nationalist imaginaries to legitimate them, paying special attention to the emerging heterogeneous assemblages that focus on the actors, their agendas, histories, and interaction. In this sense, blockchains may not create a new dynamic of connection, but rather act as one more – albeit very powerful – influence on the array of connections and traditions that constitute notions of communication.

Discussing the role of trust in emerging digital networks, we compare blockchain-based value transfer systems to another decentralized peer-to-peer money transfer alternative – the historical hawala that has evolved into a complex global system that blurs the lines between formal and informal. The discussion reveals how both systems build on a selective foregrounding of mutuality and materiality. Furthermore, the cases of several former Soviet Republics are explored as offering examples of how low trust in state institutions is driving new uses of blockchain technology for private verification of ownership and identity. The ontologically generative dimensions of the technology in redefining social spaces are revealed in the innovative 'virtual diaspora' initiative of the Estonian state. This programme, which aims to create a 'new borderless digital nation for global citizens, powered by [the] Republic of Estonia'³ is analysed as an example of the innovative potential of emerging distributed digital technologies to create new conceptualizations of statehood, diaspora, and transnational spaces that bypass the traditional denominators of physical territory and ethnicity.

By exploring these diverse initiatives from emerging economies in Africa, Asia, and Europe in the article, we strive to present a new understanding of the existing and potential effects of blockchain technologies on the processes of globalization and transnational space-making. In doing so, we seek to set an agenda for the ongoing study

of the role of such digital technologies in virtualizing diasporas by developing and adapting a coherent theoretical approach, drawing on theoretically-informed comparisons, and using both to analyse the blockchain's effects to date – and to identify likely areas of future expansion – in the diasporic space.

Facilitating 'ambient accountability': trust and property in blockchain-based networks

Blockchain is a software protocol that facilitates secure transfer of money, assets and information via the internet, without the need for third-party intermediation (Swan 2017; Swan and De Filippi 2017). As a type of distributed ledger,⁴ it is a database of time-stamped records of transactions that are aggregated into linked blocks within the network. Changes in the ledger are disseminated to all of the network nodes and added to the data structure when multiple distributed parties reach a consensus based on pre-agreed rules. Bypassing centralized intermediaries, a blockchain thus transmits and manages data through a consensus among a distributed network of users. In theory, it is 'trustless' because it eliminates the need to know and trust human and institutional counterparties (Swan 2017: 7).

Blockchain-based digital ecosystems are shared standardized digital platforms that combine features such as an absence of 'middle-man servers', a blinded infrastructure in which user identities and transactions remain anonymous, and a decentralized data architecture in which a key split between the user and data custodian encrypts the digital assets (Wolfond 2017: 36). Blockchain solutions may therefore alleviate customer privacy and data integrity concerns that are characteristic to broker-based data verification models. The technology has also made possible more complex decentralized transactions such as smart contracts and self-governing organizations that operate without external regulation (Ishmaev 2017: 667). This can empower users who are no longer subject to exploitation by a monopolistic provider or monitoring by political authorities, but it also opens them up to new vulnerabilities and may enable exploitative or criminal behaviour that disproportionately harms marginal populations.

Public (permissionless) blockchains, such as Bitcoin and Ethereum, are open to anyone and users remain anonymous. They constitute a 'censorship-resistant' neutral platform with a potential to drive innovation (Birch and Parulava 2018: 381). Private (permissioned) blockchains know their users and facilitate cost-effective managing of data across organizations. In an increasing number of empirical cases, the degree of openness and decentralization varies and blockchain platforms may have hybrid features (World Bank 2017: 11). Private ledgers tend to employ algorithmic mechanisms for verifying transactions other than the proof-of-work that is used to establish consensus in public ledgers. The institution controlling access to the network therefore mediates the trust in private ledgers more explicitly.

Enhancing transparency and reducing corruption are often highlighted as major potential benefits of blockchain technologies in both public and private sectors; claims about immutability of this emerging technology should, however, also be balanced with a critical consideration of original data validity, technical vulnerabilities, and network

governance issues (see Lemieux 2017). Enabling interinstitutional communication and data sharing, as well as erasing the ‘boundaries between compliance and auditing’, enhances ‘ambient accountability’ in which the ‘technological architecture means constant verification and validation’ (Birch and Parulava 2018: 384–6). Ambient accountability denotes a spatial perspective in which corruption control and transparency are embedded in the ecosystem’s environment. Algorithm-operated smart contracts that are accessible to regulators can advance ‘regtech’ (regulatory technology) and bring down compliance costs in the financial industry (Michaels and Homer 2018). We argue that ‘ambient accountability’ is not just a technically determined feature of blockchain technology, but, first and foremost, is also socially grounded – namely facilitated by specific sets of institutions, expectations and social imaginaries that mediate the collective life that converges around use cases.

The applications of blockchain technology that matter to the management of transnational spaces include money transfers in the contexts of mobility, but also secure identity verification and value transfer platforms that empower transnational connections. National governments have remained important actors in those processes. Providing a technological framework for governments to fight corruption and reduce error, blockchains can potentially redefine a government’s relationship with its citizens ‘in terms of data sharing, transparency and trust’ (World Bank 2017: 34). National governments have developed about a dozen blockchain projects, including ‘citizen payments in the UK, contracts in the US state of Delaware, identity in Estonia, and voting in Denmark’ (Weiss and Corsi 2018: 13). Blockchain-registered ‘smart assets’ such as titles on land, homes, cars and mortgages, can be easily verified and transacted (Swan 2017).

Several former Soviet republics offer poignant examples of how mistrust in state institutions is driving new uses of blockchain technology as a private means of verifying ownership and transactions. The land registry of the Republic of Georgia in partnership with blockchain technology company Bitfury Group, has published 300,000 land titles on the blockchain and is working on smart sale contracts (Weiss and Corsi 2018). The partnership that started in 2016 launched a private blockchain for property rights registration, anchoring it in the public Bitcoin blockchain (World Bank, 2017). The existence of a digitalized system for registering property in the country eased the transfer of the registry to the distributed ledger. According to Bitfury, the new technology reduced service delivery time from several days to seconds and brought down operational costs by 90 per cent (Weiss and Corsi 2018: 11).

The blockchain-mediated registry in Georgia was viewed locally as a shift from national to global scales in protecting people’s property rights, which was driven by a ‘general distrust towards politicians’ in the country (Weiss and Corsi 2018: 10). Following Georgia, Ukraine has announced plans for a blockchain-based platform to manage its farmland registry: the transfer is expected to reduce ownership conflicts and facilitate land reform (Verbyany 2017).

Digital identity management has emerged as another pivotal area of blockchain application, central to the online services that a variety of public and private sector actors, including banks, telecommunication and health care companies, which share

economy companies and governments, provide (Wolfond 2017). While blockchain-enabled digital-identity verification offers individuals more control of their own data, administering effective national and global ID systems requires systematic collaboration with governments and state regulators (World Bank 2017). That remains a challenge in many fragile states with weak institutional capacities.

These initiatives aimed at more secure and transparent management of national and transnational spaces build on some conceptually novel features of the technology. Blockchains may offer a novel basis for expanding or changing property law and related social institutions. Ishmaev (2017) suggests that the implications of this may be more profound than the anticipated replacement of legal frameworks by computer code (Swan 2015) or the rise of a techno-legal body of law – *lex cryptographia* (Wright and De Filippi 2015). The rise of ‘smart property’ – assets connected to the internet and transacted via computer code – may result in a qualitatively different property law institution. As the cryptographic primitives of the blockchain function satisfy the exclusivity and separability criteria of property ownership (Penner 1997), they create the possibility of nearly absolute ownership by the users (Ishmaev 2017: 677–9). Cryptographic ownership thus endows the users with a unique ability to exclude anyone from interfering with their ownership rights socially as well as technologically. Ishmaev points out that blockchain-based property may constitute an ideal case of ‘bottom-up’ ownership in the Hegelian sense, where property rights are not granted by a higher-standing institution but derived from individual freedom and will externalized in relation to others. The cryptographic technology enhances the essence of property as a social convention because it facilitates universal access to knowledge about one’s rights and eliminates the need for third party involvement in their reinforcement.

Thus, blockchain technology may advance novel ways for people to express their autonomy and property ownership through others. It also facilitates new modes of value transfer that have become more direct and immediate, as well as more material in that they are embodied in and managed by crypto codes and smart contracts. Although it does not necessarily make property rights enforceable if states fail to recognize the legitimacy of particular transactions, it creates new opportunities for verification and enforcement in the vast universe of transactions that are currently considered either ‘informal’ or too small to use the tools of law or government to enforce. This enables blockchains to engender new types of social institutions, albeit by building on existing organizational templates, cultural patterns, and social affinities.

Blockchain as a lens on transnational spaces and flows

Blockchain technologies thus mark a new stage in internet-based communicative networks. Blockchain ledgers have replaced the first phase in network computing – transfer of information via simple networks – with digitally validated transfer of value via smart networks (Swan and De Filippi 2017: 604–5). These rely on software protocol placing control and security within a computer code instead of human agents or physical institutions. Swan and De Filippi (2017: 617) point out that the technology does more than bring together elements, functions and flows from diverse sources – it

introduces an ‘ontological status of novelty or emergence’ that may constitute a ‘new and foundational mode of configuring reality’. They suggest that conceptual metaphors around the technology may help one understand better the elements and effects of the complex blockchain technology that integrates many disciplinary fields and societal realms. This is as true for participants in diaspora networks as it is for scholars.

Blockchain applications in migration and diaspora spaces involve new connections mediated by technology within globally dispersed networks of users, thus enabling us to explore the intersections of blockchains with society in novel ways. This entails paying attention to emerging areas of innovation and generative potential as expressed through the intentions, expectations, and social imaginaries around the technology. It also recognizes the potential for negative disruptions. In the current era of intensifying global mobility, the transnational flows that connect diasporic communities with their homelands involve both economic and social contributions. Over the past ten years, remittances to developing countries have increased by 51 per cent. Besides material resources, diasporic networks can be an important source of ‘social remittances’ in the form of ideas, skills and behaviour and they can facilitate novel ‘state–society synergies’ (Levitt and Lamba-Nieves 2011). The emerging transnational assemblages of knowledge and resources call attention to the importance of cultural practices and values in the circulation of people, ideas, and materiality.

We contend that such processes are historically and culturally embedded, and that they call for a careful and differentiating examination of the effects of blockchain to cross-border spaces. When studying globalizing processes, caution is needed to avoid totalizing narratives that see the intensifying transnational interconnections as producing a ‘coherent world-making system’ (Tsing 2000, 2005). Shifting attention from the flows to ‘channel carving processes’ that incorporate the agency of actors, as well as social and cultural histories, helps us to view place making as a ‘cultural as well as political-economic activity’ (Tsing 2000: 338).

Guyer (2016) suggests the ‘platform economy’ concept for a more empirically-focused analysis of current economies globally, paying attention to the components and applications that form the architectures of the economies, while also attending to the dimensions of public participation and representation. To avoid temporally and socially disembedded depictions of the economic condition, she views a platform economy as a novel framing device that brings the ‘entanglements’ of local logics and logistics together with a broader, historically situated analysis. The digital financial platforms discussed in the present article have displayed a potential to integrate actors and institutions in novel ways. We suggest viewing them as an expression of the emerging platform business model that utilizes technology to bring together participants in a diverse interactive ecosystem in which value is a function of a complex set of relationships and locations (Langley and Leyshon 2017; Zachariadis and Ozcan 2017). Blurring the boundaries between producers and consumers, platforms combine input and technology from different external sources – while uncovering new sources of value and eliminating traditional gatekeepers through novel modes of reintermediation (Parker et al. 2016).

Thus, analysing the effects of blockchain technologies on power and inequality requires consideration of a broad set of practices and actors involved in their actualization and governance. We suggest that to illuminate the social and political effects of digital ledger technologies, it is helpful to conceptualize them as elements of heterogeneous networks. While conventional networks are based on chains of belonging and cooperation, heterogeneous ones also incorporate material and ideational elements that allow attention to the points in the web of actors where important connections are revealed and value conversions occur (Rodima-Taylor 2016; Strathern 1996). This approach allows the analyst to observe older and newer elements through the ways they interact and the social effects that they produce. It highlights actors as co-constituted through their relationships, and as holding identities and interests through their participation in multiple networks (Gray and Gibson 2013). In such networks, technology does not determine social relations unidirectionally; rather, power can be seen as co-produced through an articulation of diverse human and non-human actors affected by other networks in which they participate – such as the configurations of the informal economy and the ties of mutual security in East African societies that we examine below. As actors redeploy elements borrowed, their responses are shaped by a context-dependent strategy of *bricolage* as a situational adaptation of existing ideational and material resources. Such design by ‘recombination and grafting’ not only draws attention to the socio-cultural context of the elements used, but also highlights the experimental and agency-centred dimensions of transnational space-making.

Digital remittance networks as mediating cultural expertise and political spaces

Africa has been at the forefront of social innovation in digital communication and finance. Mobile money transfers facilitate novel modes of connection within and across national borders. According to recent estimates, digital finance constitutes up to 85 per cent in certain African economies (IFC 2017b). Storing and transacting digital funds can be done using the basic feature phone, available to most low-income people. Mobile money integrates its customers with the payments’ ecosystem and acts as a gateway to savings credit and insurance. We contend that the proliferating mobile money systems in Africa not only provide an integrative platform for blockchain technologies but also offer important insights into the potential social and political effects of such digital finance networks.

Kenya’s M-Pesa is the most studied digital payment system in Africa. Facilitating small-scale electronic payment and store of value by using text messages on a feature phone, M-Pesa is mostly used for person-to-person money transfers; indeed, it has become the dominant mode of domestic (urban–rural and other) remittances and is increasingly supplanting cash even in local transactions. In 2015, M-Pesa had more than 19 million subscribers in Kenya, with daily transactions of \$150 million (Ochieng 2016). While inspired by a local payment innovation of people sending prepaid airtime to each other as currency (Maurer 2015), the service is provided by the dominant telecom company in Kenya, Safaricom. Providing mobile connectivity to 70 per cent of the country’s population, the telecom has grown into a central actor in Kenya’s cultural and

political landscape. The case of Safaricom illustrates the ambiguous placement of contemporary digital infrastructures between public and private spheres, and between the nation and state (UK-based Vodafone owns 40 per cent of shares and the Kenyan government 35 per cent). Park and Donovan (2016) argue that the company has expanded its role in Kenyan socio-political life by performing state like functions and skilfully navigating the ethnically focused political discourse. In efforts to balance its commercial aspects with those emphasizing social purpose, Safaricom conducts pompous annual shareholder meetings to highlight its entanglement with the Kenyan body politic. Meanwhile, its corporate social responsibility initiatives provide education, health and sanitation services and other 'state-like actions'. Safaricom's strategies thus involve underplaying its commercial and corporate side, while emphasizing its purported intimacy with the daily lives of the Kenyan citizens as a provider of the public good. Its engagement strategies thus remain mediated by the local cultural and political dynamics and add social legitimacy to its commercial activities.

Digital finance infrastructures thus intersect with existing informal networks of mutual support in African communities, which they amplify and extend. Digital finance builds on the ways people manage their money in the low-income communities in East Africa. M-Pesa links into informal networks of reciprocal transfers and expands the social circles of mutual obligation (Jack et al. 2013; Mas and Radcliffe 2010). Centring on women-centred household units, mobile money networks in Western Kenya both facilitate resource pooling among extended kin and provide new economic and social opportunities (Kiiti and Mutinda 2011; Kusimba et al. 2016). These 'matrilineal ties of mobile money', which are sibling focused, build on affective elements of caring and support. Beyond the domestic sphere, however, digital finance facilitates the ongoing fragmentation of polygynous households and allows women to broker new resources – connecting people to 'new circulations of money that are flexible and dispersed' (Kusimba et al. 2016: 267) and thereby effecting larger social transformations.

The new digitally based social networks therefore enable enhanced connectivity between people in the contexts of growing mobility and provide new ways of disconnecting from mutual expectations. Rodima-Taylor (2014) has noted a recent rise in informal financial groups in African communities in which cooperation and sharing paradoxically appear to exist alongside the expansion of the money economy. Involving hybridity between the formal and informal, these voluntary associations challenge the conceptualization of financial inclusion as an inevitable movement towards greater formalization. Digital finance has enabled a further expansion of existing networks of mutuality, transforming these to facilitate new modes of individual accumulation. Remittance infrastructures thus reflect the values of local kin-based mutuality while building on the imaginaries of mobility and new global connections.

Social embeddedness of crypto-remittance networks

Migrant remittances constitute ever-expanding 'markets of devotion' (Todoroki et al. 2014) driven by the motivations of diasporic members to maintain connections with their families and friends. Indeed, financial obligations are in many cases the glue that

holds the transnational networks together. Global remittance flows for 2016 are estimated at more than \$600 billion, with remittance fees amounting to \$40 billion annually. Foreign exchange fees form about 20 per cent of the total cost, with bank transfer costs even higher than those of money transfer operators and often amounting to 10–15 per cent (IFC 2017a). Remittance costs are highest in the poorest areas. With digital solutions to peer-to-peer transfers proliferating in many emerging economies, and steps being taken to extend the technology to financial services beyond payments, cross-border remittances and payments are particularly open to blockchain disruption. Blockchain technology has made possible a conceptually novel approach to sending and receiving migrant remittances; this helps to create more efficient remittance systems and enhances financial inclusion in economies with underdeveloped infrastructures for their traditional finance (Rodima-Taylor and Grimes 2017).

In particular, blockchains can reduce the costs of cross-border fund settlement in remittance transfers. It can provide secure digital identity for KYC compliance and a digital fiat for currency conversion (IFC 2017a). A blockchain-based distributed network for cross-currency settlement can replace corresponding bank chains with their interbank fees that currently dominate remittance networks, significantly lowering the costs and duration of remittance transactions (World Bank 2017: 23). This is not just potential. The number of startups offering blockchain-based global money transfers is rapidly growing, including Abra and Ripple in the United States, Bitpesa in Africa, BitSpark in Hong Kong, OkCoin in China and OkLink/Coinsense in India, Coinnect in Mexico and Argentina, and Rebit and Coin.ph in the Philippines (IFC 2017a: 6). Several large banks are developing partnerships with blockchain technology providers to reduce remittance costs and facilitate trade finance, such as the blockchain platform between ICICI Bank – India's largest private sector lender, and Emirates NBD Bank of Dubai (IFC 2017a: 6).

To understand the impact of cryptocurrencies on international remittances, it is essential to realize that what we often shorthand as 'formal' remittance systems are actually complex assemblages, of which the formal elements are often the least challenging. Cryptocurrencies have already made inroads into these assemblages, although currently most corridors utilize bitcoin only as a 'middle' currency to avoid going through the international wire transfer system, which in some cases provides most of the benefits to the middlemen rather than the end users. For example, in the Philippines, bitcoin-based remittance services continue to operate along the 'last mile' rails of traditional remittance outlets that have no incentive to lower their fees for cryptocurrency transfers. Interfacing with existing money delivery businesses still often remains crucial. The rapid rise of Bitcoin as a competitive player in the robust remittance market in the Philippines could be partly attributed to the effective partnerships of the crypto-remittance companies with the existing local distribution channels, taking care of the 'last mile' issue (Buenaventura 2017). The mobile wallet based Coins.ph has a network of more than 10,000 locations, collaborating in remittance delivery with banks and licensed local retail agents (Buenaventura 2017). This illustrates how actors' choices, rather than inherent characteristics of the blockchain technology, affect outcomes.

In Africa, Bitpesa – a digital foreign exchange and payment platform leveraging blockchain technology – has sought to revolutionize the continent's cross-border

remittance space. Its customers include small businesses and individuals sending money to sub-Saharan Africa, with coverage spanning more than 85 countries. Bitpesa employs a flat transaction fee of only 2 per cent, compared with an average 12 per cent remittance transfer fee in Africa. The company views itself as ‘a complementary platform that can add value to traditional players like banks, telcos and corporates’, providing solutions for customers in the frontier markets constrained by insufficient liquidity in local African currencies (Ogunfowoke 2018). Launched in Kenya in 2013, the digital payments startup failed to form a partnership with the monopolistic M-Pesa delivery platform to expand its delivery networks. The company has now expanded to West Africa, with offices in Senegal, Nigeria and Ghana. The success of crypto-remittances thus depends on the existence of robust money delivery infrastructures in the area and effective partnering with them. The scaling of blockchain-based money transfer platforms is also limited by smartphone and internet access in the developing world. For the peer-to-peer crypto-remittance apps – such as Abra – to scale globally, a critical mass of exchange outlets is needed (Tapscott and Tapscott 2016: 187). An additional concern is that the value of digital currencies can fluctuate widely as it is determined by supply and demand, exacerbated by a general lack of digital currency ecosystems in most developing countries (World Bank 2017).

Blockchain mediated remittance transfers thus still largely rely on existing domestic payment infrastructures – including mobile money networks, traditional banks and money transfer outlets. It has been suggested that this could change if acceptance of digital currencies becomes more widespread among local businesses, possibly with central banks initiating their own digital fiat currencies (World Bank 2017: 26–7). This includes the cryptocurrency initiative – electronic Central African Frank – by the Central Bank of West African States (BCEAO), announced to be launched in Senegal and several other West African countries that use the Central African Frank (CFA) as a common currency. The initiative is expected to facilitate interoperability between e-payment systems in the region.

Comparison: modern hawala as a hybridized global value transfer network

Hawala is one of the most widespread informal systems of migrant remittance transfer, and it is popular in the Middle East, Asia, and Africa. The modern hawala is a highly efficient transnational money transfer system that has developed through adapting age-old principles of reciprocal exchange and that involves an intriguing combination of contemporary and traditional institutions (Rodima-Taylor 2013). Hawala has been instrumental in scaling multiple contemporary global diasporas, such as the Somali migrant diaspora, in the absence of a centralized state. Furthermore, modern financial and communication technologies have been central to the development of contemporary global hawala networks. As hawala involves peer-to-peer transfers that occur in a complex infrastructural system that guarantees trust between the participants, we argue that it can offer useful comparisons with blockchain-based, ‘trustless’ remittance systems. Parallels are drawn between the ways both systems extend commitments and loyalties in the transnational space.

By offering an alternative to money transfers managed through the centralized banking system, hawala's 'cash-in and cash-out' business outlets (FATF 2013) are central to remittance transfers in many regions with underdeveloped financial systems. Hawala facilitated cross-border trade in early mercantile networks such as the Silk Route in Asia – highlighting its connections to broader movement of goods and capital. Hawala is embedded in cultural and religious traditions and in the ethnically based networks that rely on social reputation and prestige.

Contemporary hawala networks are hybrid in nature. Social and cultural templates underlie their functioning within transnational diasporic networks. For example, traditional norms of forging fictive kinship relations facilitated the networks of Afghani refugees in Pakistan and Iran through transfers of money and merchandise (Monsutti 2004). Hawala operators in the UK's South Asian diaspora draw on quasi-kinship connections that articulate trust in the network (Ballard 2003: 15). Behind the cultural logic of solidarity are strong economic incentives to avoid exclusion from the system.

Paradoxically, the rise of modern Western banking has not rendered hawala obsolete. Its operators provide their customers with better outreach and low transaction costs (Hariharan 2012; Wilson 2002). Instead of the physical movement of money, hawaladars settle their outstanding debt at a later point through a multi-tiered system involving diverse localities and intermediaries. Regional exchange hubs reroute hawala debts through global financial centres as 'virtually all transactions are settled through the formally organized banking system' (Ballard 2003: 28–9). According to Ballard (2003: 34), the hubs depend on their capacity

to facilitate complex swaps between networks operating on a basis of unqualified trust in European, North American, West Asian, Iranian, Afghani, South Asian, Chinese, and South East Asian markets. Once relationships of trust are in place, which at this level are organized primarily in terms of quasi-kinship, differences in ethnicity and nationality are no obstacle to the construction of hawala deals.

Thus, the workings of modern-day hawala present an intriguing combination of highly personalized trust relationships and quasi-kinship reciprocities between individuals, and anonymous digital flows routed through the global banking system.

Trust and reputation are important in informal value transfer systems – present-day Western financial markets often exhibit considerable reliance on interpersonal trust due to high levels of uncertainty (de Goede 2003). Hawala's so-called negative traits, such as 'speed, trust, paperlessness, global reach, fluidity' (de Goede 2003: 517), may seem desirable in Western finance. Incorporating these characteristics into the rise of digital finance has made possible the global expansion of modern financial markets (de Goede 2003: 517; see also Maurer 1999).

In some conflict-affected societies, such as Afghanistan and Somalia, hawala has facilitated the emergence of novel technology-induced diasporic networks. Remittances constitute a life-line for fragile states: a recent FNSAU/FAO study estimates that in Somalia they have reached 1.5 billion annually, and that these mostly move through informal channels. Clan-based networks and customary law play a central role in

regulating Somali's hawala transactions (Lindley 2010). The centrality of remittances in local livelihoods became an incentive for grassroots telecommunication entrepreneurs to leapfrog 'into wireless and other advanced technologies' after the war devastated the fixed line system in the 1990s (Feldman 2007: 571). During that time, the global expansion of Somali's diasporic trade networks emerged in its present form. The highly advanced commercial hub in Nairobi's Eastleigh district in Kenya is built on capital from the remittances of Somali's global diaspora (Carrier 2017). Thus, actors, cultural forms, and technological change have operated mutually to constitute a virtualized, trust-based financial and trading network.

This phenomenon is not purely benign and empowering. The high level of fragmentation and anonymity of hawala transfers renders them vulnerable to criminal activities, and fragile countries like Somalia can be especially at risk. Moreover, power and politics continue to operate in the background of this particular payment assemblage. In recent years, given the growing international demand for more transparency, all the major UK and US commercial banks have severed ties with Somali money transfer companies. By providing opportunities for more transparent and cheaper cross-border payments, blockchain-based transfers could play an important role in fragile states and reduce their dependence on the regulatory and monopolistic challenges of mobile money systems (Perez 2015).

Both hawala and blockchain-based alternative payment systems offer secure transactions and enjoy high levels of trust, enabling transnational expansion of their user networks. By attempting to replicate the relative anonymity made possible by traditional systems of reciprocity based on shared social ties, blockchain-based systems can be seen as mimicking the mechanisms of social trust in hawala. The functioning of trust in both systems is thus more complex than it appears. While in blockchain-based networks, the material dimensions – hardware, infrastructures and code – are brought to the fore in both user interactions and broader public discourses, with hawala, the opposite is the case. Hawala money transfer infrastructures are kept out of sight – the service users and hawala operators barely notice the complexity of transactional chains and the integral connections to the formal sector remain intact. Hawala participants view their actions as guided by traditional ethnicity and kin-based loyalties, and the credit dimension – a focus on mutual obligation – is therefore seen as the system's guiding principle. The functioning of the blockchain-based system thus generates an illusion of anonymity, while hawala employs an illusion of sharing and mutuality. In fact, blockchain applications are often defined by existing institutional patterns, pathways and locally available technology as demonstrated in the earlier discussion of crypto-remittances, whereas the 'quasi-affinities' advanced through hawala enable the employment of age-old, honour-based idioms of mutuality to engage a globally dispersed community of migrants, refugees, and other people loosely connected by heritage or religious tradition.

Creating a global virtual diaspora: the Estonian way

In contrast to the other forms of virtualized diasporas addressed in this article, the Estonian e-residency programme is an ambitious and conscious effort to create a global

Estonian ‘diaspora’ whose members are not expected to share an ethnically-derived sense of belonging. It does so by trading digitally enabled services for voluntary inclusion in the diaspora, but without demanding loyalty or cultural affinity in return. This transnational identity programme provides an intriguing example of the potentials of a blockchain to employ its trust- and security-building mechanisms for virtualizing diasporas and managing them on a global scale. It also reveals that such initiatives, although capitalizing on the anonymity and security of digital technologies, are firmly grounded in particular socio-political histories and cultural imaginaries. At the same time, the Estonian ‘virtual diaspora’ programme engenders new conceptualizations of statehood and diaspora that go beyond the limitations of territoriality, physical space, or common ethnicity.

Estonia has been at the forefront of innovative and unique advances in e-governance and e-commerce. It is known for several digital initiatives of global import, including the online telecommunications platform Skype, file-sharing software Kazaa, and digital peer-to-peer money transfer company Transferwise. A complex digital ecosystem, called e-Estonia, includes areas such as i-Voting, e-Tax Board, e-Business, e-Banking, e-Ticket, e-School, University via internet, and the e-Governance Academy. The system that is considered the most ambitious nation-wide digital initiative globally is connected to the digital identity card – 98 per cent of Estonia’s population had digital ID cards by 2018.⁵

These advances have a distinctive socio-political background. On its independence from the Soviet Union in 1991, the country’s infrastructural and commercial sectors faced severe challenges. Less than half the population had a telephone line. Rejecting Finland’s offer of its dated analogue telephone exchange, Estonia embarked on rapid digital advancement.⁶ After nearly half a century of Soviet rule that had severely limited international travel and information exchange, the Estonian government and its people felt the need to forge new global connections. Another relevant factor was the country’s small and declining population of 1.3 million, with high levels of out-migration of work-age individuals. One of the authors of this article grew up in socialist Estonia and witnessed first-hand the closed and technologically marginalized society. Now, much has changed – after independence, Estonia went to great lengths to open its borders physically and virtually. In 2000, Estonia declared internet access a human right, and the country’s internet penetration at 75 per cent is among the highest in the world.

Organized cyber-attacks against Estonian internet infrastructures by Russia’s hackers in 2007 mobilized a unified response that fostered the rise of Estonia as one of the most advanced digital countries in the world. Based on initially unorganized responses from local technology specialists, an institutionalized cyber-security community rapidly took form (Schmidt 2013: 14). In the following decade, the country forged a unique digital network connecting its citizens, commerce, and government. Since 2000, Estonia has been employing a technological platform for secure online data transfers between information systems – X-Road.⁷ It acts as a distributed data exchange layer connecting existing databases from public and private sectors, employing ‘authentication, multilevel authorization, a high-level log processing system, encrypted and

time-stamped data traffic' for a versatile security solution.⁸ The decentralized, low-cost system enables users to address privacy concerns effectively and allows consumers to control access to their data.

The cyber-attacks also led to the first partnerships between the Estonian government and the private sector around digital ledger technology to build a reliable and scalable service for data integrity. In 2007, a team of Estonian software and security specialists designed the digital signature system that would lead to Keyless Signature Infrastructure (KSI) Blockchain Technology Stack, building on the 'hash-linked time-stamping' technology developed by local cryptographers.⁹ The KSI Technology Stack, which the software security company Guardtime produced, is a permissioned system, enabled by a public distributed database that maintains a continuously growing list of data records, chained together against revision and tampering. Since 2012, KSI has been in productive use in Estonia guarding the national data and e-services of both the public and private sectors.¹⁰ A variety of state registries use KSI technology, including Healthcare Registry, Property Registry, Business Registry, and Digital Court System.¹¹ For the past ten years, KSI blockchain has functioned as a 'trust anchor to verify [the] data integrity' behind one of the most advanced e-governance systems in the world, according to Henry Rõigas, senior policy officer at Guardtime.¹² By providing security, data integrity and auditability for an array of digital databases that connect to the e-governance system, it effectively promotes public trust in government services, says Rõigas.

The well-established national digital services framework served as a basis for the innovative e-residency initiative that began in 2014. Offering a transnational digital identity to citizens of any part of the globe, it allows anyone outside Estonian borders to engage in commercial activities with public and private sectors, using a 'platform built on inclusion, legitimacy and transparency'.¹³ It is the first programme in the world to provide a government-authenticated digital identity to foreigners – 'an international passport to the virtual world' and one can see it as an important step towards a novel idea of a borderless state (Sullivan and Burger 2017: 470). E-residents can register and manage businesses, open bank accounts, and trade goods and services from anywhere in the world. According to its proponents, e-residency offers 'huge value to entrepreneurs seeking trust, location-independence, minimal bureaucracy, low business costs and access to a wide range of business services' (Kaspar Korjus, programme director of e-residency).¹⁴ The Estonian government's goal is to reach ten million e-residents by 2025; about 35,000 e-residents have now applied from over 150 countries, with thousands of new companies established. As Estonian e-residents would gain access to the European Union business environment, the programme has had a particular appeal to applicants from emerging economies, including the post-Soviet countries.

E-residency offers a strong global digital identity for foreigners, particularly in countries without efficient electronic IDs.¹⁵ The Public Key Infrastructure (PKI) card (a binary key code with an encrypting key pair) gives Estonian residents access to more than a thousand government and private sector services. In 2015, the e-residency initiative partnered with blockchain startup Bitnation, which employs Ethereum smart contract technology for piloting blockchain records for decentralized governance.¹⁶ The 'Decentralized Borderless Voluntary Nation' aims to 'out-compete governments by

providing the same services cheaper and better through the blockchain', thereby giving people a 'choice of a provider' and rendering obsolete borders between nation-states.¹⁷ The company facilitates public notary services for Estonian e-residents for registering, recording and managing marriage and birth records, wills, property titles, business contracts, and so forth. In other parts of Europe, Bitnation has assisted conflict refugees with blockchain-based emergency IDs and debit cards that enable them to receive money from relatives; the initiative was recently awarded the UNESCO NETEXPLO 2017 Grand Prix.

The e-residency platform also serves as a site of expansion for other blockchain initiatives in the country. For example, the leading stock exchange Nasdaq is working on developing several blockchain applications in Estonia through the Tallinn Stock Exchange and the Estonian Central Securities Depository. Former Estonian President Ilves who was central to enabling the digital advances in Estonia, highlighted the role of the innovative technology in the country:

Our digital society is underpinned by blockchain technology and our secure digital identities provide a significant advantage to blockchain companies that need to verify online identities. Through e-residency, Estonia is ready to support blockchain pioneers from anywhere in the world, so they can build the future through our digital infrastructure.¹⁸

The digital advances that now build on and enable various blockchain-powered initiatives can be seen as resulting from a combination of diverse modes and layers of decentralizing technology – including the X-Road, PKI-based digital IDs, KSI-based data management, Bitnation's Ethereum-powered public notary services, and planned global data embassies¹⁹ for added cyber security. Principles of Estonian e-governance include decentralized data storage, interconnectivity facilitated by the data exchange platform X-Road, blockchain-mediated data integrity, open source infrastructure, and transparency – the right of every user to track his or her information and its use. The X-Road platform ensures a rigorous filtering of data sharing and visibility. Estonia may thus far have avoided the possible threats to individual autonomy resulting from the digitization of personal data. Pointing out the paradox that the blockchain technology that people who 'want less government in their lives' love is also increasingly employed by governments; Kaspar Korjus of e-residency argues that its use would still result in 'more power being put into the hands of people'.²⁰ According to 'e-Estonia Ambassador' Anna Pīperal, there is no Big Brother in Estonian e-governance, but Little Brother: 'you can tell him what to do and maybe also beat him up'.²¹

Estonia's digital ecosystem and virtual diaspora project are, at their core, assemblages that bring together and interweave multiple technical solutions around decentralized platforms. Although the elements are technical rather than human in nature, they operate together in a way that is directly analogous to the African and Philippine mobile and blockchain-based remittance networks that build on structures of informal economy described above. The various elements are not 'integrated' into a centralized system and indeed continue to operate independently across various markets; rather, they are

being used functionally to address real demand by technological bricoleurs, which in the Estonian case include state actors.

It remains to be seen how many of Estonia's ambitious goals e-residency will fulfil, but one should understand the venture as one that goes beyond business opportunities or technologically-driven social networking. Rather, it seeks to create a virtual diaspora of people who develop emotional bonds to a country that many will never visit. Indeed, the programme stresses that e-residency applicants should possess some interest in or ties to Estonia. According to the programme vision, income from paid services to the new global residents could help Estonia to 'protect our language, culture and nature, and to pay Estonian citizens by birth decent wages and pensions' (Adee 2017).

The e-residency initiative could signify a movement towards a global system of digital identification interfacing beyond state borders, and towards a 'cross-globe digital economy' (Kerikmäe and Särav 2015: 83). Kaspar Korjus suggests that we could interpret the concept of 'nation' not only territorially but also as a shared ideology uniting disparate people. This implies that people might be able to base their choice of where they wish to belong on their values. We suggest that this also entails novel implications for the meaning of 'diaspora', which could now be conceptualized as a *virtual* pool of global e-residents dedicated to contributing to the socio-economic and cultural development of a country, motivated by shared values and ideology. Such digital identity and residency projects can therefore be seen as engendering social paradoxes such as statehood without physical space, and diaspora without common ethnicity. Digital ledger technologies may thus carry the potential to change the nature of sovereignty, facilitating the rise of virtual and 'distributed' sovereignty instead of one embedded in a territorially defined nation-state.

Concluding remarks

To explore the effect of blockchains on globalizing processes, in this article we looked at their applications in various migratory and diasporic related initiatives. We pointed out that emerging blockchain technologies may be able to scale diasporas and change the nature of migration, statehood, belonging and sovereignty; and we showed that entrepreneurs, sociocultural networks and governments are already making efforts in that direction. The existing uses and potential applications of these technologies for managing transnational spaces and flows are diverse. Through enabling transparent, cost-effective and time-efficient cross-border money transfers, emerging blockchain applications can reshape migrant remittance sending. The technology delivers novel opportunities for financial access and entrepreneurship to the global unbanked and provides individuals from the developing world with connections to broader regional economies. Digital identity management also redefines national and cross-border spaces. The enhanced security and connectivity of blockchain-based identity verification systems can facilitate complex transnational ecosystems of joint standards and harmonized interactions. Institutional, regulatory and technological limitations still often constrain the scaling and fuller integration of these technologies. Unequal access to equipment and skills may create a digital divide as these technologies become more established in the poorer parts of the world.

We argue that the uptake and eventual impact of blockchain technology on enhancing virtualized diasporas depend crucially on existing notions of kinship, diaspora and group. However, blockchains offer new and attractive features for transnational networks, particularly those that operate at least partly in low-trust environments. New, more direct and materially-grounded modes of value transfer are embodied in cryptocodes and smart contracts. By utilizing and transforming existing templates and affinities, this gives blockchains a capacity to engender new types of social institutions. Blockchain based mechanisms of asset ownership and management – smart property – raise the possibility of a radical reconceptualization of property laws, by enhancing an individual's exclusive ownership, and universal externalization through the recognition by others in the network. The technology therefore gives people new avenues through which to express their autonomy in socially recognized ways. These may be especially important in low-trust, transitional environments like post-socialist Georgia, Ukraine, and Estonia discussed above. As we saw, transitioning digital databases to the blockchain was often seen as a shift from national to global scales in safeguarding people's property rights. The cases also revealed that as an emerging technology with still nascent markets, blockchains had a better chance of scaling or making a broader social impact in areas with significant digital platform penetration – such as the mobile money system in Kenya, digital property databases in Georgia, or intersecting with and building on the advanced decentralized digital ecosystem in Estonia.

What do the institutions and social commitments driven by smart contracts imply about the nature of these processes? Does the rise of blockchains signify the emergence of a society that is more dependent on crypto codes than on human organization and interaction? This article contends that to evaluate the impacts of digital ledger technologies on social institutions and political spaces, it is necessary to pay attention to the 'channel carving processes' (Tsing 2000) that reveal the actors, along with their agendas, histories and the interrelationships that go into making such pathways. The Kenyan mobile money system was inspired by local payment innovations and actual money management practices, capitalizing on a flexible regulatory environment. It built on existing social pathways of mutual support, expanding and transforming these through novel money circulations and new modes of social capital. Through its nationalist rhetoric and culturally conditioned 'social mutuality' initiatives, the monopolistic telecommunications provider Safaricom claimed affinity with the Kenyan state as a provider of public good and political unity. Similar social grounding in existing remittance institutions and pathways also characterized the emerging crypto-remittance initiatives in the Philippines and elsewhere. Even in the case of Estonian e-residency, we see the effects of blockchains operating through complex assemblages of heterogeneous elements that make sense together because of existing social understandings and institutions. For a future study of this distributed peer-to-peer technology, it is therefore important to situate it within existing social networks, conventions and histories of mutuality and trust, both formal and informal.

It is still too soon to know how far the blockchain-enabled virtualization of diaspora will go, or in which functions it will have its greatest impact. It is clear, however, that the research into transformative blockchain possibilities must be differentiated and

socially grounded. Digital technologies have been instrumental in the global expansion of finance – including formal finance and informal value transfer networks such as hawala – through amplifying connections to local knowledge and networks of interpersonal trust. Considering this, blockchain technology may advance further novel modes of scaling in the connective networks of transnational space, even as it competes with other technologies and systems that seek to address the same challenges.

We also argue that comparisons with another decentralized peer-to-peer money transfer alternative (hawala) can help elucidate the implications of blockchain technology in transnational space making. Both technologies offer high levels of trust and security, and both enable frictionless expansion of their communities of users. Concealing the complex financial infrastructures and transactions that underlie modern hawala networks from view highlights the cultural and religious grounding of social trust and mutuality. Although the emphasis on ethnically based mutuality may be illusory, it has facilitated the scaling up of an ‘affinity’-based transnational network of remittance senders, receivers and hawala intermediaries. In blockchain-based networks, on the other hand, the material dimensions of hardware and code are at the fore, which obscures the infrastructure’s trust-building dynamics; in other words, the system builds on the similarly illusory anonymity and ‘virtual’ sovereignty it promises to its users.

Through this selective foregrounding, both systems generate possibilities for scaling the diasporas along the lines of assumed affinity and commonality of value. The ontologically generative dimensions of the blockchain technology in recasting political and social spaces are revealed in the innovative ‘diaspora-building’ initiative of the Estonian e-residency programme. Illustrating the groundedness of digital ledger applications in particular social and political histories and cultural imaginaries, the Estonian ‘virtual diaspora’ initiative introduces new paradigms of statehood that bypass the traditional denominators of common territory or ethnicity. Somewhat paradoxically, the ‘virtual sovereignty’-generating capacity of the technology has been harnessed here by a nation-state that seeks to expand the global ranks of its subjects.

Notes

1. Martin Kaevats is the national digital adviser to the Government Office of Estonia.
2. <http://www.diasporaalliance.org/what-is-a-diaspora/>.
3. <https://e-estonia.com/toolkit/>.
4. The blockchain technology features transaction blocks linked by cryptographic hashes into an immutable chain for added security.
5. <https://e-estonia.com/toolkit/>.
6. <https://www.economist.com/the-economist-explains/2013/07/30/how-did-estonia-become-a-leader-in-technology>.
7. Developed by Estonian technology company Cybernetica.
8. <https://www.ria.ee/en/x-road.html>.
9. There has been some debate in online media about whether KSI should be considered a ‘blockchain’. However, both Guardtime and the Estonian government describe KSI technology as a blockchain. Since it is proprietary technology, such debates are at best

- speculative. For the purposes of this article, we accept KSI's self-characterization. For technical details, see <https://guardtime.com/technology>.
10. <https://guardtime.com/solutions/egovernment>.
 11. NATO, the US Department of Defense, Lockheed Martin, Boeing, and Ericsson also use Guardtime's KSI blockchain.
 12. Interview with the author, June 2018.
 13. <https://e-estonia.com/toolkit/>.
 14. <https://medium.com/e-residency-blog/estonia-could-offer-estcoins-to-e-residents-a3a5a5d3c894>.
 15. <https://www.wsj.com/articles/estonia-to-offer-e-residency-to-foreigners-1413897698>.
 16. <https://tse.bitnation.co/>.
 17. <https://www.ibtimes.co.uk/bitnation-estonian-government-start-spreading-sovereign-jurisdiction-blockchain-1530923>.
 18. <https://medium.com/e-residency-blog>.
 19. Server resources for storing state information outside Estonia's territorial boundaries.
 20. <https://medium.com/e-residency-blog>.
 21. <https://www.newyorker.com/magazine/2017/12/18/estonia-the-digital-republic>.

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