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Ethical Considerations Related to Blockchain Adoption in the Nonprofit Sector

Humanity is on the cusp of an integrative and technologically-driven fourth industrial revolution "that will fundamentally alter the way we live, work, and relate to one another" (Schwab, 2016, para. 1). One of the most prominent innovations at the core of this impending societal transformation is the technology of blockchain. The nonprofit sector, oft misperceived as staid and subdued, may seem like strange bedfellows to the "wild west" (Cunha, 2019, para. 7) world of bitcoin, cryptocurrency, and blockchain. But it may very well be that nonprofits – and those they serve – have more ROI to gain from the adoption of this technology than their counterparts in the public and private sectors.

A defining characteristic of the fourth industrial revolution is an exponential acceleration of technology advances in conjunction with like advances across multiple sectors. A contemporary example would be the integration of drones, agriculture imagery, and artificial intelligence (AI) used to monitor palm oil plantations, already displacing hundreds of workers in Southeast Asia (Raghu, 2019). The unanticipated ethical challenges accompanying these types of advances will impact society at every level. As such, this journey can be uniquely informed by the vantage point the nonprofit sector brings to the table; namely, an experience formulated on the front lines of working with and informing policy concerning marginalized and vulnerable populations across society. It will be imperative that the social sector, "as public conscience" (Kramer, 2018, para. 7), be a proactive participant in that conversation.

In this paper, we will explore (a) the composition and origins of blockchain, (b) its practical applications in the nonprofit sector, (c) the resultant ethical challenges to be considered, and (d) ethical opportunity to be considered. Rather than explore whether the nonprofit sector should or should not adopt blockchain technologies in its operations, this exploration is rooted in

the consequentialist (Broun, Lott, Taylor, 2013) presupposition that blockchain technology is "inevitable" (O'Neal, 2019, para. 2) and will likely become ubiquitous in its application and usage. As such, this paper grapples with the considerations of 'when?' and 'in what way?' the nonprofit sector might best adapt to these technological changes, and explores which ethical considerations should be weighed in making those decisions.

It is also important to note that while this paper utilizes technical verbiage related to blockchain, cryptocurrency, and bitcoin, the focus of the paper is not on the intricate digital mechanics of the technology, but rather on a philosophical exploration of the ethical challenges associated with its usage, specifically focusing on the considerations of the nonprofit sector. For those who would like to access a more in-depth, technical exploration of blockchain and related technologies, the website www.Bitcoin.org maintains an extensive 'Resources' section that will serve the reader well.

Composition and Origins of Blockchain

In common parlance, the term 'bitcoin' is often used to describe many digital transactional technologies. But it warrants clarification that bitcoin is, in fact, only one (specifically, a cryptocurrency) out of thousands of applications built on the underlying digital construct more accurately referred to as blockchain. Often described as "a distributed, decentralized, public ledger" (Fortney, 2019, para. 1), blockchain is "at its most basic level, literally just a chain of blocks … of digital information (the "block") stored in a public database (the "chain")" (para. 3). These blocks of information store specific data related to the transaction, which might represent a portion of a contract or a component of a monetary exchange. All the pertinent details are stored in digital, de-identified, unalterable, numeric form and create "a unique code called a 'hash' that allows us to tell it apart from every other block" (para. 7). Rather

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than being stored in one single place, the data is compiled, validated, and encrypted across a decentralized global network of computers, rendering it highly secure. From this vantage point, we begin to understand that blockchains are simply transactional digital records and represent a utility upon which countless applications can be built. Given the incredibly complex transactional nature of nonprofit work, we now begin to see why the technology could be so well-suited to the sector.

Before we delve into the functional applications of the technology, let us briefly examine the origins of the technology's very existence. This is important because the founders of what we now know as blockchain held a strikingly similar ethos to that of the nonprofit sector, promoting individual human rights, privacy, and collective societal responsibility.

The origins of blockchain itself can be traced back to cryptography in 1991 when the research scientists Haber & Stornetta published a paper titled 'How to Time-Stamp a Digital Document' in the *Journal of Cryptology*. Their paper was incredibly prescient at the time, given that very few individuals were anticipating the challenges inherent to the coming digital transformation of society. Namely, "the prospect of a world in which all text, audio, picture, and video documents are in digital form on easily modifiable media raises the question of how to certify when a document was created or last changed" recognizing that "the problem is to time-stamp the date, not the medium" (Haber & Stornetta, 1991, pg. 99). Their paper is notable in that they anticipated the practical and ethical consequences of data existing in purely digital form, and formulated a new technological approach to solve the problem. The concepts in Haber & Stornetta's work were built upon further by key figures such as Philip Zimmerman's early 1990's work on cryptographic email privacy (Garside, 2015) and Hal Finney's early 2000's privacy encryption (Popper, 2014). Many are perhaps most familiar with the introduction of

bitcoin in a 2008 paper titled 'Bitcoin: A Peer-to-Peer Electronic Cash System' published under the pseudonym Satoshi Nakamoto and laying out how a decentralized, digital currency based on blockchain could work.

According to Harvard Business Review, early adaptations of blockchain quickly moved beyond digital timestamping and bitcoin to smart contracting (ethereum) (Gupta, 2017, para. 5), "proof of stake" security (para. 6), and scaling, a data efficiency "expected to be fast enough to power the internet of things and go head-to-head with major payment middlemen (VISA)" (para. 7). Today, the seemingly innocuous technology of the 1990's Cypherpunk programmers (Basson, 2018) is now disrupting the international benchmark LIBOR interest rate (Castillo, 2019) with blockchain adoption expected to continue growing at a rate of 75% over the next three years (Seth, 2019).

While blockchain stands out as a uniquely important technology, the most critical piece to understand is not its mere existence, but the broader context within which it sits. After all, the aforementioned fourth industrial revolution is characterized by not one groundbreaking advance (as previous industrial revolutions have been), but by the culmination of advances "merging the physical, digital and biological worlds that create both huge promise and potential peril" (World Economic Forum, n.d., para. 1). As such, we must not entertain blockchain in a vacuum, but in symbiosis with other advances and societal needs which are also simultaneously overlapping and accelerating.

Practical Applications in the Nonprofit Sector

What does all of this have to do with the nonprofit sector? As it turns out, it has to do with everything. Because nonprofits are so transactional in nature (be it client data, record security, reporting and financial compliance, or philanthropic dollar transfer), many of the

seemingly routine exchanges that constitute nonprofit operations, can be simplified, strengthened, and automated using combinations of blockchain utilities. This may feel over simplistic, but, in fact, these types of complex transactions are already being conducted at scale, with the city of Dubai's commitment to be "the first city fully powered by Blockchain by 2020" standing as a primary example (Smart Dubai, 2019), with plans to "have robot cops, flying taxis and autonomous vehicles on its roads in coming years" (D'Cunha, 2017, para. 1). While this may seem far afield for the current nonprofit sector, the individuals and communities we serve will be impacted by this type of rapid technological transformation and it behooves our sector to be at the forefront of that evolution.

To fully understand how much of nonprofit work is transactional think about how many steps occur in just the lifecycle of a case file record maintained in the course of human services delivery. From demographic data and id verification, to medical insurance information and case notes, all the way to reporting, billing, licensure, and accreditation, the factors associated with each case file consist of numerous transactions taking place with a likelihood of inefficiency and security risk at each juncture. A blockchain protocol could streamline and automate each of those data transitions so that staff time and expertise could be refocused to immediate human need and community engagement. One recent report estimated that "healthcare blockchain could save the industry up to USD$100B" annually on "costs related to IT, operations, support functions, personnel, and health data breaches by the year 2025" (Donovan, 2019, subtitle). Furthermore, as the nonprofit sector grapples with the reality of having to do more with less, staff and infrastructure are often stretched beyond capacity. Automating many of the hands-on transactional components of day-to-day workflow would unlock significant human capital

efficiencies which could be redeployed back to service delivery, thereby increasing overall organizational efficiency and "lowering administrative costs" (Mire, 2018).

The following functions are potential transactional junctures in the nonprofit space where blockchain efficiencies could be implemented. Although some of these groupings merit their own separate explorations, for sake of brevity they have been combined into similar functional categories.

1. Legal, Regulatory, and Contractual. The regulatory burden faced by the domestic nonprofit sector is significant in its complexity and breadth. This becomes even more complex in the international non-governmental organization (NGO) space. From reporting and contractual considerations, to human capital and fiduciary standards, nonprofits must manage an immense amount of regulatory information, and the data that goes with it. Blockchain could be used to increase efficiency in nonprofits being able to meet legal and regulatory burdens by using transactional junctures as a trigger to automatically and securely compile records, document compliance with regulatory standards, and deliver reporting outcomes to funders. By taking this approach, integrative ledger functions could reasonably result in a reality where a nonprofit provides a contracted service, the documentation and billing is automatically generated and accounted for directly from the electronic client record, and - provided outcomes are met - contracts are then automatically validated and renewed rather than entering a lengthy and disruptive Request for Proposal cycle. This could be achieved securely, in real time. In Africa, the NGO Sustainability International is already piloting blockchain-based software solutions in this space (Conway, 2017).

2. Accounting and Financial Applications. The fiduciary requirements of even the smallest, local nonprofit can be quite involved. Larger organizations, with numerous funders and

regulators demanding different requirements, not to mention monthly and annual financials, run

into a sea of detail. Fortunately, as pointed out by the ICAEW, "blockchain is fundamentally an

accounting technology" (2018, p. 1) and, as such, naturally lends itself to record-keeping, data

analysis, audit, and forecasting. The advantage of blockchain is that it creates a backbone upon

which similar organizational functions (such as purchasing, distribution, payroll, and billing) can

be connected and become automated with the introduction of artificial intelligence (Drew, 2018).

These digital combinations can also be configured to handle the complexities of cross-border

transactions in the international NGO space.

      3. Client Records, Case File Management, and Review. As discussed in the

introductory example to this section, many nonprofit staff spend an inordinate [yet necessary]

amount of time on case record review, accreditation compliance, and utilization management.

There are numerous aspects of these tasks that could be automated using blockchain, thereby

freeing up staff time to focus on face-to-face service delivery in the community. This work is

already being prototyped by MIT in the healthcare space under the MedRec project (Ekblaw,

Azaria, Halamka, & Lippman, 2016).

      4. Data and Asset Security. While not infallible (Orcutt, 2018), blockchain encryption is

incredibly secure. According to cryptography pioneer Philip Zimmerman, "if you look at …

firewalls, intrusion detection systems … they keep getting breached. The one thing that does

seem to do well is strong encryption. Of all the things you see getting broken into, it's

conspicuously absent from that list" (Dredge, 2015, para. 17-18). For the social sector, this is a

factor worth considering. Not only are data breaches a growing concern for nonprofits, but the

costs associated with such a breach can be crippling, with the average cost of a U.S. data breach

running ~USD$7M (Ponemon Institute, 2016), which is more than the average annual budget of

85% of the nonprofits in the United States (Frailey, 2017, para. 3, Table 1.). It would seem that blockchain encryption of data and assets would be a wise investment and could significantly minimize the risk of breach.

5. Physical Assets and Supply Chain Management. For nonprofits dealing in goods - particularly humanitarian groups, NGOs, aid organizations, and agriculture nonprofits - the tracking and delivery of goods can be disproportionately time-consuming. An open-source technology known as hyperledger can be used to "efficiently distribute goods and materials" (Maheshwari, Chavan, & Kadambi, 2019) as well as be linked to billing, inventory, logistics, and analytics, saving nonprofits considerable administrative time and expense. This application can also aid in automating cross-border transactional compliance.

6. Philanthropic Utility. Fundraising and donations is an area where nonprofits deal with opposing demands as donors seek more flexible, technology-enhanced ways to give, while at the same time demanding organizational transparency, donor privacy, and customization of the giving experience to accommodate donor intent (Independent Sector, 2015, p. 38). Blockchain applications are actively being developed to address nonprofit organization's ability to accept (or to use transactionally) cryptocurrency. The Better Business Bureau's Wise Giving Alliance is already piloting a blockchain-powered platform for online giving called GiveSafely (BBB Wise Giving Alliance, 2019), as are other NGOs such as Heifer International (2019, para. 1).

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Ethical Challenges to be Considered

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While the practical applications and efficiencies of blockchain might be an easy sell to many nonprofit executives, what's the catch? These adaptations are not without their ethical dilemmas, even if they are not readily apparent. It is important that the nonprofit sector, more so than other sectors, give these dilemmas the thorough consideration they deserve. This is

especially difficult given that we are entering uncharted philosophical waters with some of these issues. However, the future state of society deserves that we spend time thinking through the potential ramifications of our decisions.

1. Perception.   The adoption and acceptance of cryptocurrency in the nonprofit space has advanced at a rapid pace, with Fidelity Charitable reporting that in 2017 its donor advised funds saw "USD$69M in donations of cryptocurrency, such as bitcoin, a nearly tenfold increase from the previous year" (Fidelity Charitable, 2018). Despite these advances, cryptocurrency - and by affiliation blockchain - is often associated with illicit, criminal activity. And there is certainly ample evidence and history to support those accusations (Foley, Karlsen, & Putniņš, 2018; Pollock, 2018). However, that association is not transitive, meaning that a nonprofit cannot somehow be infected by the nefarious past usage of a unit of bitcoin. Nevertheless, depending on where a nonprofit operates and/or the types of services it provides, there may be significant perceptual issues associated with accepting cryptocurrency or utilizing blockchain in the course of one's business. As such, a nonprofit must weigh whether or not there may be reputational risk, no matter how misguided, associated with their adoption of blockchain technology. Conversely, this may be outweighed by the advantages found in utilizing the technology.

2. Operational Capacity, Regulatory Risk, and Opportunity Cost. While blockchain sounds conceptually attractive, where does a nonprofit start pragmatically? This can be perceived operationally as a daunting undertaking for which many nonprofits, particularly smaller ones, may be ill-equipped. Not only does an organization need to implement the infrastructure for such operations (along with absorbing the associated costs), but it needs to be able to manage those functions long-term. Additional government regulatory considerations, both legal and fiduciary

(Library of Congress, 2018), may hinder how a nonprofit is able to accrue and utilize cryptocurrency within its locale.

Who pays for all of this? Certainly, the upfront expenditure will likely pay for itself with long-term efficiencies, but where will that initial capital come from? There are certainly some well-connected nonprofits that may have a tech billionaire or corporate partner who would be willing to foot the bill. Or this may be another space where social impact bonds could be brought to bear. But for most small-to-mid-sized nonprofits, this represents a financial lift that may constitute dollars that should be used to solve more pressing immediate needs in the community.

Finally, what is the opportunity cost associated with this expenditure of time, energy, and financial resource? And, is that lesser or greater than a future state cost where the organization realizes it would have been cheaper and less disruptive to have been an early adopter? Conversely, it may be worth holding out until "off the shelf" versions of blockchain applications are more widely available.

3. Data Ownership and Security. There has been much concern, and rightfully so, regarding big data's entrance into the nonprofit space, with *the Atlantic*'s Sidney Fussell noting that "Google is an emerging health-care juggernaut, and privacy laws weren't written to keep up" (2019, subtitle). However, proponents of "data as a property right" (Yang, 2019) support arrangements whereby blockchain technology would not only allow the individual to be the owner of their data (Floyd, 2019), but to derive revenue from it. But this arrangement fundamentally alters the power and revenue dynamic between the nonprofit and the individual they serve, whose data they need in order to be reimbursed for services. How does the nonprofit sector, who so frequently advocates for individual rights and transparency, feel about this

dilemma? How will the nonprofit sector advocate for or against this likely utilization of

blockchain technology?

One additional aspect is the question of who maintains another person's data? And in the

secure maintenance of that data, who is the responsible party if there is a data breach? Granted, a

breach of the actual blockchain itself would be exceedingly rare, but the data interacts with other

vulnerable systems whereby breaches could conceivably occur. If blockchain has allowed for

individual ownership of one's personal data, but a nonprofit provider (who has been granted

permission to use a client's personal data) is involved in a breach while transmitting that data,

who is at fault and who bears the fiduciary risk?

4. Unintended Consequences. One of the most critical considerations we have to make

in this equation is the matter of precedent. We are still early in the fourth industrial revolution.

AI plus blockchain may make our lives more convenient, but what happens when the AI starts

using blockchain on its own, based on the technology configurations we've created (Corea,

2017)? Or what happens to our staff who we've automated out of a job in the quest for nonprofit

efficiency (Thompson, 2019)? Additionally, the mining of cryptocurrency is an outsize consumer

of energy and power (Vincent, 2019). Are we, as the social sector, ok with that sort of

environmental degradation? In other words, what future societal state are we enabling? This

already represents an ethical challenge across all spheres of society, but it is especially relevant

to the social sector given that our concern and obligation lies in facilitating societal good.

Ethical Opportunity to be Considered

Along with ethical challenges, the social sector should take time to recognize that this

current moment in time also affords ethical opportunities which it would be prudent to capitalize

upon. Too often, nonprofits approach the field of ethics from the standpoint of what shouldn't be

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done, as opposed to thinking of it as opportunity to build competitive advantage through transparency and the building of trust. But we need to think about where our sector possesses new opportunities to lead, and the adoption of technology like blockchain, along with the prominent discussion and ownership of the ethical challenges that go along with it, represents a highly-visible thought leadership opportunity for our sector to build trust and goodwill in recognition of the value our sector's work contributes to society.

Given how much the fourth industrial revolution will change society – automation, information technology, workforce changes (including white collar jobs (Muro, Whiton, & Maxim, 2019)), food in/security, artificial intelligence, and disruption in energy distribution – we can safely assume that many vulnerable individuals and communities will be left in the dust. This is where the nonprofit sector can bring a voice to the table that considers the societal implications of the long-term policy decisions and regulatory considerations that already need to be made in this arena. There is no other sector who should be more engaged with these topics than the nonprofit sector.

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