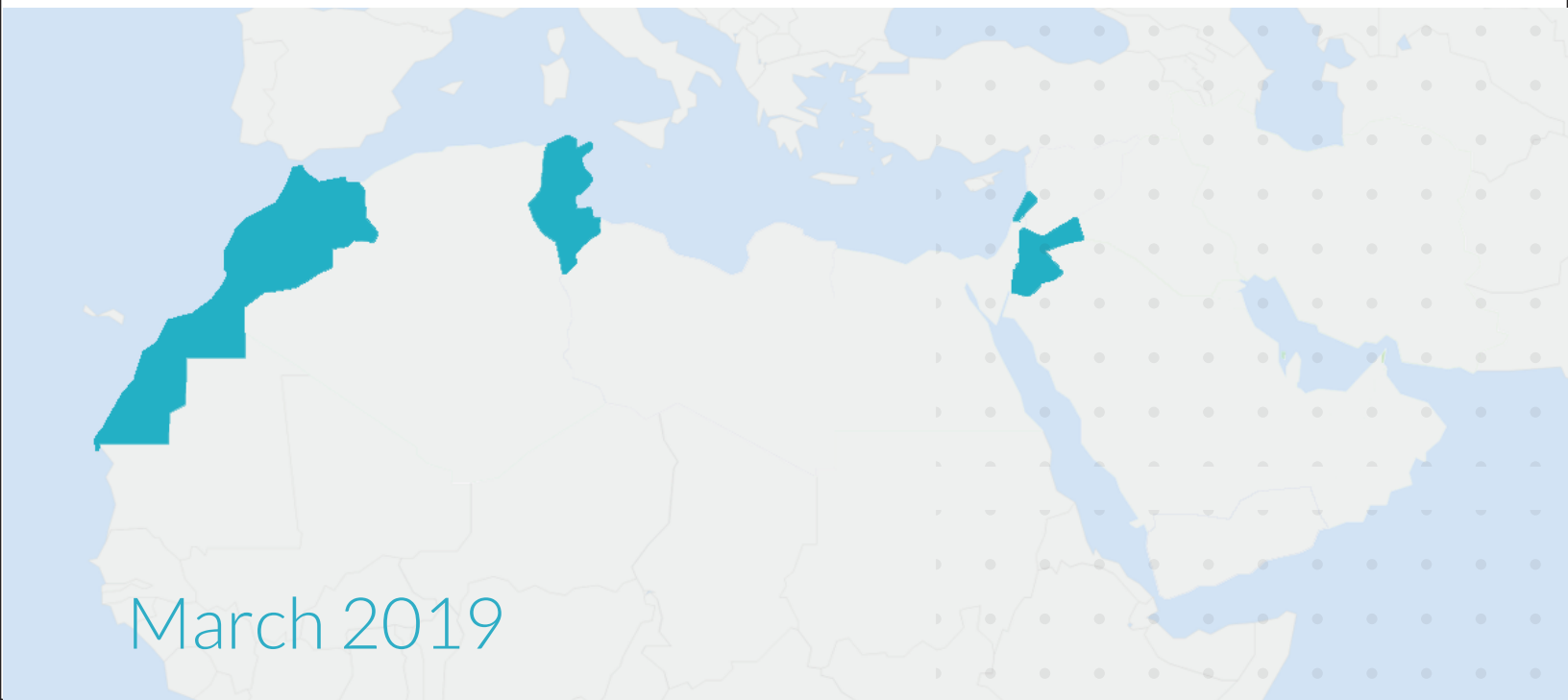
INNOVATION FOR CHANGE
MIDDLE EAST & NORTH AFRICA

Digital Currencies, Blockchain and the Civic Sector in the MENA Region

Tunisia, Jordan, Morocco, & Lebanon



March 2019

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Report Overview

This report was commissioned by the Innovation for Change (I4C) network. I4C is a global network of people and organizations who want to connect, partner and learn together to defend and strengthen civic space and overcome restrictions to humanity's basic freedoms of assembly, association and speech. The Middle East and North Africa (MENA) Hub is one of six regional hubs that aim to be a hub for exchanging ideas, sharing successes, challenges and opportunities in incubating social change and building sustainable solutions. I4C was curated through a partnership between CIVICUS and Counterpart International and made possible via funding from the United States Agency for International Development (USAID).

The primary purpose of this research is to provide a critical analysis of the potential of digital currencies and blockchain for the "social sector", with a specific emphasis on the MENA region. For the purposes of this report, "social sector" refers to the part of social and economic activity done for the purpose of benefiting society. The social sector can include non-governmental organizations (NGOs), civil society organizations (CSOs), and social entrepreneurs. The social sector typically does not include governmental entities, although governments do often encourage social sector activities through the granting of incentives. Moreover, the term "social good," which will be used often throughout this report, infers actions that have a positive impact on society.

Part One of this report begins by clearly defining the terminology associated with digital currencies--notably "bitcoin," "ethereum," and "blockchain." The terminology of this section is defined to set the stage for a further understanding of the development of the digital currencies, but more importantly the "blockchain for social good" sector, so as to understand MENA's place in it with appropriate context. A distinction is drawn between bitcoin and blockchain for social good, and the challenges to applying blockchain in social good contexts are addressed. **Part Two** of the report delves into the top findings on the digital currency ecosystem within MENA, based on interviews with blockchain early adopters within Jordan, Lebanon, Morocco and Tunisia. The ecosystem is in its early stages, so most blockchain use is still centered around bitcoin and beginning to move toward broader applications in the social space. The report concludes with a case study of DigiCash and the Tunisian eDinar - a successful application of blockchain in the MENA region that is already connected with the civic space.

Research for this report was conducted between October – December 2017 as part of a larger initiative of Innovation for Change's MENA Hub to understand the role of digital money in supporting civil society sustainability. The vision for the research is to understand the potential for donors to send support to beneficiaries within civil society in a variety of contexts. The first content is those deemed as "relatively open," --Jordan, Lebanon, Morocco, and Tunisia—which are ranked as the most open of all MENA countries according to the CIVICUS Monitor. However, the use of the term "relatively open" must be noted in comparison with all MENA countries, which fall within the three worst of five rankings-- obstructed, repressed, and closed--indicated by the Monitor. Future research will focus on the role of digital money in closed countries and conflict spaces. By conducting this research, the I4C network seeks to engage with relevant experts including policymakers, banks, lawyers, CSOs, tech activists, and social entrepreneurs, to advance the development of digital money—including digital currencies—as a tool for civil society in the MENA and other regions.

The report is intended for donors, activists, NGOs, and civil society actors in MENA or who have a focus on the region, who are interested in the blockchain and social good space. It addresses the question of how blockchain is being used in the social space in MENA, within the context of the blockchain industry as a whole and the blockchain and social good space overall.

Acknowledgment

Special thanks to Grace Ezzell for conducting the research for this report. Thank you to all members of the Innovation for Change Network and interviewees who contributed information and insight to make this report possible.

Social Media Exchange (SMEX)

Social Media Exchange (SMEX) is a registered Lebanese NGO that works to advance self-regulating information societies in the Middle East and North Africa (MENA). Our work encompasses media development programs, as well as Internet policy research and digital rights advocacy in support of more accessible, participatory, and just enabling environments for civil society across the MENA region. While we engage globally, Lebanon is our home, making Arab society and culture our primary context for action. We are headquartered in Beirut. You can always reach us by emailing info@smex.org. SMEX was responsible for all project management and research coordination for this research project.

Introduction

When the term "digital currencies" today is used, it often is associated with the hot topic of finance in 2017: Cryptocurrencies. Bitcoin specifically is dominating the discussion about the future and impact of this financial technology. In December 2017, bitcoin hit an all-time high of nearly $18,000.[1] Bitcoin began as a technical paper posted on an obscure cryptography site and was launched as a global currency - where hundreds of bitcoin were worth just a few cents.[2] In the current media landscape, there are harried discussions about the future of bitcoin (do you believe in it or not?) and routine statements from world leaders such as Christine Lagarde, Director of the International Monetary Fund (IMF) either supporting or condemning the technology.[3] The skyrocketing value of bitcoin has attracted investors that want to make money off of the currency. Profit is the topic that often piques the interest of curious onlookers from the outside looking into this strange new world.

Non-governmental organizations (NGOs) and civil society activists and communities are beginning to respond to the rise of bitcoin by seeking to define the "social" in this new digital currency world.[4][5] How does an asset that is now skyrocketing in value and creating millionaires in its wake a technology notable for the social space?

Bitcoin, since its creation, has served as a beacon for individuals' varying political projections about how the world should be. For example, in a YouTube video titled "Nobody Can Stop Bitcoin," the interviews featured include commentators expressing strong political opinions about the future impact of bitcoin.[6] But this is because of the great potential in bitcoin's underlying technology: blockchain.[7] Through empowering users to interact and exchange value with each other from anywhere in the world without needing an intermediary, the essence of blockchain is decentralization, transparency, accountability, and immutability.[8]

Through empowering users to interact and exchange value with each other from anywhere in the world without needing an intermediary, the essence of blockchain is ***decentralization****,* ***transparency****,* ***accountability****, and* ***immutability.***

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[1] [1] Timothy B. Lee, "Bitcoin jumps another 10 percent in 24 hours to pass $19,000," *ARS Technica,* 17 Dec. 2017, https://arstechnica.com/tech-policy/2017/12/bitcoin-shrugs-off-bubble-talk-and-surges-past-19000/.

[2] "Bitcoin: A Peer-to-Peer Electronic Cash System – the paper that first introduced Bitcoin," *Bitcoin,* https://bitcoin.org/en/bitcoin-paper.

[3] Robert Hackett, "IMF Head Says Cryptocurrency Could Be the Future. Really." *Fortune,* 2 Oct. 2017, http://fortune.com/2017/10/02/bitcoin-ethereum-cryptocurrency-imf-christine-lagarde/.

[4] "Blockchain for Social Impact (New York, NY)," *Meetup,* https://www.meetup.com/Blockchain-for-Social-Good/. [5] Michael J. Casey, "Social-good innovators bet on blockchains to solve big problems," *VB,* 5 Aug. 2017, https://venturebeat.com/2017/08/05/social-good-innovators-bet-on-blockchains-to-solve-big-problems/.

[6] "Bill Gates: Nobody Can Stop Bitcoin," *YouTube*, https://www.youtube.com/watch?v=JvF3FTS5cQ4.

[7] James Cheo, "Why Blockchain Is Real And Bitcoin Is A Mirage," *Forbes,* 10 Dec. 2017, https://www.forbes.com/sites/insideasia/2017/12/10/why-blockchain-is-real-and-bitcoin-is-a-mirage/.

[8] "Blockchain: The Immutable Ledger of Transparency in Healthcare Technology," *Sidebench,* 23 Aug. 2017, https://medium.com/@sidebench/blockchain-the-immutable-ledger-of-transparency-in-healthcare-technology-a4a64b1d5594.

From a digital currencies perspective, blockchain has innate social implications when addressing challenges of financial inclusion[9] and oligopoly in current payments systems, which drives up costs passed on to consumers.[10] At the same time, there is a growing community of blockchain ventures with an explicit social mission--everything from tracking supply chains to ensuring a standard of ethics[11] to creating transparency within NGOs and aid delivery [12] --there are myriad social applications of blockchain that are being tested out now day by day.[13]

For MENA, there are actors from outside the region, such as the World Food Program that are piloting blockchain technology in the region.[14] The government of the Emirate of Dubai aims to have all of its government functions on blockchain in the upcoming years, and has opened up funding and support for blockchain startups.[15] This is an era where information is more accessible and democratized than ever, so it is possible for anyone from anywhere, with the right education and resources, to be a part of global movements towards the adoption of new technologies. [16] Within Jordan, Lebanon [17] , Morocco[18], Tunisia[19], and the wider region, there are communities of early adopters of bitcoin that have formed organically. There is a strong need for civil society--including NGOs and the social sector--in MENA to play their role in advocating for the needs of their communities and forming effective partnerships in the space with tech companies, programmers, policymakers, and standards organizations in the blockchain space.[20]

This report contains three sections:

1. An overview of digital currencies (Bitcoin and Ethereum) and blockchain technology, its development as an industry, and specific challenges that are present and geography agnostic;

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[9] Pani Baruri, "Blockchain Powered Financial Inclusion," presentation, *Cognizant 2016,* http://pubdocs.worldbank.org/en/710961476811913780/Session-5C-Pani-Baruri-Blockchain-Financial-Inclusion-Pani.pdf.

[10] Nicholas Economides, "Competition Policy Issues in the Consumer Payments Industry," in Litan R. et. al, *Moving Money: The Future of Consumer Payments* (Brookings Institution: 2009) , http://www.stern.nyu.edu/networks/Economides_Competition_Policy_Payments_Industry.pdf.

[11] "Blockchain: the solution for supply chain transparency, " *Project Provenance Ltd.,* 21 Nov. 2015, https://www.provenance.org/whitepaper.

[12] "Transparency Tech Seeks to Solve Non-Profit Accountability," *Factom,* 1 Sep. 2015, https://www.factom.com/blog/transparency-tech-seeks-to-solve-non-profit-accountability.

[13] "A Revolution in Trust: Distributed Ledger Technology in Relief and Development," *Mercy Corps,* May 2017, https://www.mercycorps.org/sites/default/files/Mercy-Corps-A-Revolution-in-Trust-Blockchain-May-2017_1.pdf.

[14] Joon Ian Wong, "The UN is using Ethereum's technology to fund food for thousands of refugees," *Quartz,* 3 Nov. 2017, https://qz.com/1118743/world-food-programmes-ethereum-based-blockchain-for-syrian-refugees-in-jordan/.

[15] "Dubai Blockchain Strategy," *Smart Dubai,* December 2016, http://www.smartdubai.ae/dubai_blockchain.php.

[16] Harrison W. Inefuku, "Globalization, Open Access, and the Democratization of Knowledge," *Educause Review,* 3 Jul. 2017, https://er.educause.edu/articles/2017/7/globalization-open-access-and-the-democratization-of-knowledge.

[17] Pamela Kesrouani, "When will the Middle East adopt Bitcoin? We ask 3 experts," *Wamda,* 12 Mar. 2015, https://www.wamda.com/2015/03/bitcoin-come-middle-east-we-ask-experts.

[18] Frisco d'Anconia, "Bitcoin Conquers Morocco As Underground Crypto Bazaar is Flourishing," *The Coin Telegraph,* 15 Feb. 2017, https://cointelegraph.com/news/bitcoin-conquers-morocco-as-underground-crypto-bazaar-is-flourishing.

[19] "Bitcoin in Africa: The Success Story of a Tunisian Entrepreneur," *CCN,* 26 Sep. 2014, https://www.ccn.com/bitcoin-africa-success-story-tunisian-entrepreneur/.

[20] Don Tapscott et al., "Realizing the Potential of Blockchain: A Multistakeholder Approach to the Stewardship of Blockchain and Cryptocurrencies," white paper, *World Economic Forum,* June 2017, http://www3.weforum.org/docs/WEF_Realizing_Potential_Blockchain.pdf.

2. An analysis of the digital currencies context across Tunisia, Lebanon, Morocco, Jordan. This section also contains a case study of DigitUs and the Tunisian eDinar, the world's first nationalized cryptocurrency.
3. Concluding remarks and final recommendations

The report concludes with a call to action for the social sector and recommendations for future programming within the social context in MENA. Also included are Appendices containing examples of early social impact ventures in the digital currencies/blockchain industry that could be relevant applications in MENA but are ultimately outside the scope of the terms for this report.

Part One: Defining Digital Currencies

CRYPTOCURRENCIES, BLOCKCHAIN, AND SOCIAL GOOD

Bitcoin and Ethereum are the most common ***cryptocurrencies*** - which are a subset of digital currencies. Digital currencies can be defined as monies used via the internet, "a payment method which exists only in electronic form and is not tangible. Digital currency can be transferred between entities or users with the help of technology like computers, smartphones and the internet."[21] Some functionalities for digital currencies include electronic bill payment [22] and money transfer via digital accounts. [23] Cryptocurrencies are a subcategory of digital currencies, that use blockchain technology and derive from the field of cryptography in order to secure transactions--usually in a decentralized manner.[24]

Bitcoin

Bitcoin is a means of transferring value between point A and point B without an intermediary - in a way that is transparent, trusted, and without barriers to interaction.[25] It is in effect a digital currency, meaning that owners of bitcoin can use it to buy products or services where it is accepted. However, with its skyrocketing price of more than $19,000 per bitcoin in December 2017[26], it is beginning to attract the attention of investors that consider it to be a security or asset class more than an actual currency.[27]

The emergence of bitcoin in 2009 is widely regarded as a timely response to the financial crisis of 2008.[28] Some economists attribute the 2008 financial crisis as causing citizens to lose trust in financial institutions and governments.[29] Though it is unclear who wrote and implemented the open source code that makes up the currency, it is thought that some of bitcoin's key characteristics--transparency of transactions, immutability, and the ability to transact without an intermediary--were designed in

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[21] "What is Digital Currency? - Definition from Techopedia," *Techopedia,* https://www.techopedia.com/definition/6702/digital-currency.

[22] Evander Smart, "Bitwala Bringing Bitcoin Bill Payment Services to Japan & Mexico," *Bitconnect*, 7 Oct. 2016, https://bitconnect.co/bitcoin-news/282/bitwala-bringing-bitcoin-bill-payment-services.

[23] Amit Goel, "11 Money Transfer Companies Using Blockchain Technology," *Let's Talk Payments*, 23 Oct. 2015, https://letstalkpayments.com/11-money-transfer-companies-using-blockchain-technology-2/.

[24] Ameer Rosic, "What is Cryptocurrency: Everything You Need to Know," *BlockGeeks,* https://blockgeeks.com/guides/what-is-cryptocurrency/.

[25] "What is bitcoin?" *CoinDesk*, 20 Mar. 2015, https://www.coindesk.com/information/what-is-bitcoin/.

[26] Timothy B. Lee, "Bitcoin jumps another 10 percent in 24 hours to pass $19,000," *ARS Technica,* 17 Dec. 2017, https://arstechnica.com/tech-policy/2017/12/bitcoin-shrugs-off-bubble-talk-and-surges-past-19000/.

[27] Jeffrey Dorfman, "Bitcoin Is An Asset, Not A Currency," *Forbes,* 17 May. 2017, https://www.forbes.com/sites/jeffreydorfman/2017/05/17/bitcoin-is-an-asset-not-a-currency/.

[28] "Cryptocurrency a Response to Financial Crisis, Says CEO," 14 Jun. 2016, http://www.wsj.com/video/cryptocurrency-a-response-to-financial-crisis-says-ceo/D28A8012-413F-447E-AA5A-F1911BA64FC3.html.

[29] Minjeong Kang et al., "Comparing Effects of Country Reputation and the Overall Corporate Reputations of a Country on International Consumers' Product Attitudes and Purchase Intentions," *Corporate Reputation Review* 13, no. 1 (2010): 52-62, https://doi.org/10.1057/crr.2010.1

response to key challenges within the banking industry, some of which precipitated the financial crisis.[30]

Bitcoin is built at the nexus of three core technologies: (1) **decentralized peer-to-peer networks**, such as what drove music file sharing programs like Napster, (2) **cryptography**, the field that allows us to encrypt and protect our data and even send emails through the use of so-called public and private keys, and (3) **proof of work**, a way of securing a network that is most visible to everyday users in the form of a CAPTCHA. When filling out a form online, oftentimes users are asked to enter in a string of characters or identify certain photos to prove that they are not bots. These technologies all come into play to make bitcoin work the way it does.[31]

Blockchain

Blockchain is the technology underlying bitcoin (and other coins, tokens, and cryptocurrencies) that allows users to transact without an intermediary.[32] It is an innovation on a classic computer science issue called "the Byzantine General's problem."[33] In this example, the Byzantine army is attempting to attack a city and waiting on the outskirts to decide its plan of action. However, the generals leading each regiment are geographically distributed around the city and cannot meet directly to make decisions on a plan of action. They must instead communicate through messengers, among whom could be spies. How can the army ensure that its plan of action is not corrupted by bad actors when they are geographically distributed?

Until bitcoin was released, there was not an answer to this question within the field of computer science. The innovation that allows for transacting in a decentralized way, that is secure (think of the Byzantine army), is a combination of the three technologies mentioned above: peer-to-peer networks, cryptography and proof of work.[34][35]

Because blockchain provides a new way to send money, it is important to understand the ledger system of banks and our current system of sending money. For example, in our current system, when User A (John Doe) wishes to wire or send $20 to User B (Jane Doe), depending on how he does it, there is a network of banks and payment providers between them to facilitate the transaction.[36] At the end of the day, the banks must be able to check to ensure that John has $20 in his account to send to Jane, and that it is John that wants to send the money and not someone else. If the transaction is verified to

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[30] "A Quick Reminder Why Bitcoin was Invented in the First Place," *Playbook App,* 8 Aug. 2017, https://medium.com/founder-playbook/a-quick-reminder-why-bitcoin-was-invented-in-the-first-place-f9ae7430bc17.

[31] Marvin Dumont, "Bitcoin White Paper: Beginner's Guide," *Bitcoin.com,* 15 Sep. 2017, https://www.bitcoin.com/guides/bitcoin-white-paper-beginner-guide.

[32] Nolan Bauerle, "What is Blockchain Technology?" *CoinDesk,* https://www.coindesk.com/information/what-is-blockchain-technology/.

[33] Leslie Lamport et. al, "The Byzantine Generals Problem,"*ACM Transactions on Programming Languages and Systems* 4, no. 3 (1982): 382-401, https://doi.org/10.1145/357172.357176

[34] Dug Campbell, "The Byzantine Generals' Problem," *Dug Campbell,* 7 Feb. 2015, http://www.dugcampbell.com/byzantine-generals-problem/.

[35] Debraj Ghosh, "How the Byzantine General Sacked the Castle: A Look Into Blockchain," 5 Apr. 2016, https://medium.com/@DebrajG/how-the-byzantine-general-sacked-the-castle-a-look-into-blockchain-370fe637502c.

[36] Jesse Onslow Norton, "Blockchain and Hyperledger - the technology transforming ledger systems," *AAT Comment,* 2 May. 2017, https://www.aatcomment.org.uk/blockchain-and-hyperledger-the-technology-transforming-ledger-systems/.

be possible and coming from John in reality, then John's account is debited $20 and Jane's account is credited $20. This transaction is then listed in the ledger or list of economic transactions that the bank (or banks) keep on file to manage their accounts.[37]

The blockchain is effectively a distributed or decentralized ledger. This means that the technology does the work that banking networks normally do in order to verify transactions, and the system creates its own ledger to record transactions.[38] In contrast with the example above, let's say John wants to send Jane one bitcoin (BTC). John sends Jane the bitcoin by entering Jane's ***public key***, which is a string of numbers and letters that is like her address to receive money--acting like an account number. That is, if the account number only allowed people to send money.[39] ***Private keys*** allow users like Jane to access their bitcoins and should not be shared with others. Because the bitcoin system alone is not user-friendly for most users, companies provide ***wallets*** with bank-like user interfaces to manage public and private keys and sending/receiving money.[40] When John sends the bitcoin to Jane's public key (which is generated by her wallet), the transaction is recorded on the "ledger" or list of all transactions that have ever happened in bitcoin. This ledger of every transaction that has ever happened in bitcoin is publically available and almost impossible to tamper with or alter. [41] In the bitcoin community, this transaction history of the entire network is stored on thousands of computers across the world and people can earn bitcoin by using their computer's power to do "proof of work"-like problems to verify transactions and finalize them on the ledger. This is called ***mining***.[42] Once miners pick up John's transfer to Jane and provide the computing power to verify the authenticity of the transaction (like a bank would do by checking John's account balance), then the bitcoin arrives in Jane's account in a matter of seconds.[43]

If Jane then wants to send 0.5 bitcoin to her friend Leila, then this transaction is linked on the public ledger to the previous transaction, which was John sending 1 BTC to Jane. When there are a certain amount of transactions stacked, they are considered to be a "**block**."[44] It is very difficult for anyone to hack into the blockchain to change the history of transactions.[45] For example, to try to alter the written record of John's transfer to Jane, the hacker would have to alter the transaction that happened right after it--the transfer of 0.5 BTC from Jane to Leila. When there are over 265 million bitcoin transactions to date (and more every second), then it is next to impossible to tamper with these records.[46] Thus key characteristics of blockchain are its *transparency and accountability* (all transactions that have ever

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[37] Richard Gendal Brown, "A simple explanation of fees in the payment card industry," *Gendal Blog,* 9 Aug. 2014, https://gendal.me/2014/08/09/a-simple-explanation-of-fees-in-the-payment-card-industry/.

[38] Nolan Bauerle, "What is a Distributed Ledger?" *CoinDesk,* https://www.coindesk.com/information/what-is-a-distributed-ledger/.

[39] Rich Apodaca, "Six Things Bitcoin Users Should Know about Private Keys." *Bitzuma,* 5 Dec. 2017, https://bitzuma.com/posts/six-things-bitcoin-users-should-know-about-private-keys/.

[40] "How To Set Up a Bitcoin Wallet," *Buy Bitcoin Worldwide,* https://www.buybitcoinworldwide.com/wallets/set-up/.

[41] "Bitcoin Block Explorer," *Block Explorer,* https://blockexplorer.com/.

[42] "Bitcoin Mining," *Bitcoin Mining,* https://www.bitcoinmining.com/.

[43] Richard Gendal Brown, "A Simple Explanation of Balance Sheets (Don't run away… it's interesting, really!" *Gendal Blog,* 5 Jul. 2015, https://gendal.me/2015/07/05/a-simple-explanation-of-balance-sheets-dont-run-away-its-interesting-really/.

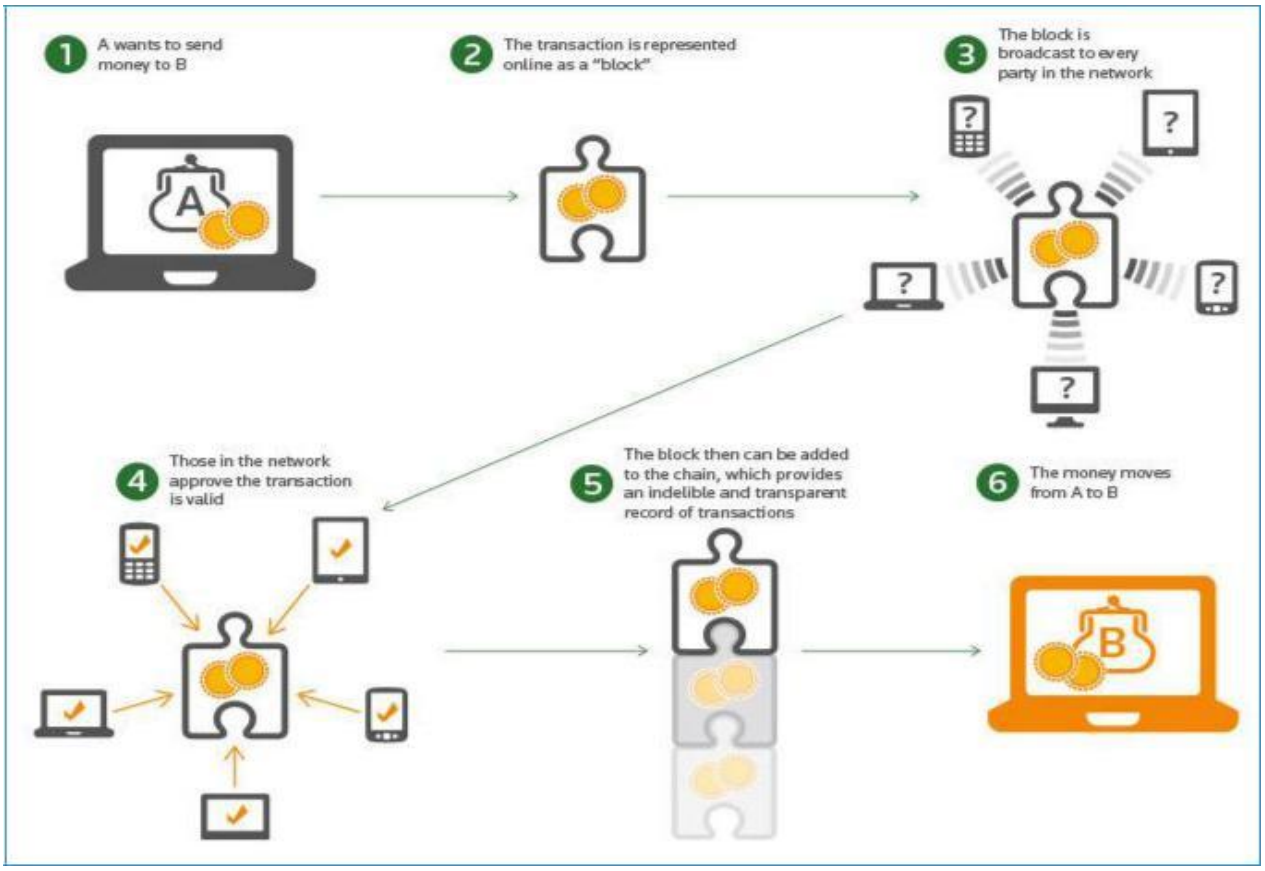
[44] "Block Size And Transactions Per Second," *bitcoinPLUS,* 9 Mar. 2017, https://www.bitcoinplus.org/blog/block-size-and-transactions-second.

[45] Ken Cottrill, "Blockchains Aren't Changeable and That's Final, Sort of," *Chain Business Insights,* 31 May. 2017, https://www.chainbusinessinsights.com/insights-blog/blockchains-arent-changeable-and-thats-final-sort-of.

[46] "Total Number of Transactions – Blockchain," *Blockchain.info,* https://blockchain.info/charts/n-transactions-total.

occurred--the entire 'paper trail' of blockchain, is public), its *immutability* (it is almost impossible to tamper with the ledger of past transactions), and its decentralization (because the entire ledger is stored on computers all of over the world instead of central servers, thousands of computer would have to be compromised to bring down the network). [47]

Diagram 1 - How does a bitcoin work?[48]



The Ethereum Blockchain

Blockchain was a term coined after the rise of bitcoin to describe the underlying technology that supports bitcoin. [49] The first blockchain was the bitcoin blockchain and the first prominent

[47] Ziben Zheng et al., "An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends," *2017 IEEE International Congress on BigData Congress,* (Honolulu, HI, 2017), 557-564, https://doi.org/10.1109/BigDataCongress.2017.85.

[48] Image from http://sitetalk-world.info/tyvy/how-does-a-bitcoin-transaction-work-1212.php.

[49] Rich Bodo, "Usage of the word "blockchain," 20 Sep. 2017, https://medium.com/@richbodo/common-use-of-the-word-blockchain-5b916cecef29.

cryptocurrency was bitcoin.[50] The bitcoin blockchain allows bitcoin to work as a currency, but what if users wanted to create another currency like bitcoin that also runs on a blockchain? The bitcoin blockchain only works for bitcoin, so this is not possible, except for with outside protocols that work like adaptations compatible with the bitcoin blockchain such as colored coins[51] and side chains.[52] What if users wanted to use the same blockchain system of securing transactions in a decentralized ledger to send documents or information securely instead of currency? Again, the bitcoin blockchain only works for bitcoin, but that doesn't mean these concepts cannot be useful and transferable to other use cases.

Enter Ethereum and the Ethereum blockchain. Ethereum was created in 2014 by a group of bitcoin computer scientists as a new blockchain system building on the innovations of bitcoin.[53] While the bitcoin blockchain aims to create a new monetary system that disrupts the intermediaries in the financial system (which are banks), the Ethereum blockchain aims to disrupt the way that applications run on the internet --from centralized servers to decentralized--and disintermediate systems around the world.[54] It does this by creating a script where applications can be built on top of the blockchain, so that anyone can create a version of bitcoin, whether it's their own coin or currency, or they want to use the technology to secure or send information instead of money.

The backbone of the Ethereum blockchain functions through ***smart contracts***, which are the code-backed commands that are at the core of any function built on top of the blockchain. From a computer science perspective, "a smart contract is a computer program that can directly and automatically execute the transfer of digital currencies or assets between parties under specified conditions."[55] The bitcoin blockchain can also run smart contracts, but for only one functionality: a certain code or protocol that instructs value to be transferred under specific conditions. With Ethereum, developers can build applications on the blockchain to create their own smart contracts that instruct the system to carry out commands for more than simply a value transfer use case of bitcoin. This is the core innovation of Ethereum that makes the technology applicable to use cases outside of simply bitcoin's financial function.[56]

With Ethereum, communities can issue their own coin to help build on local economic activity--with different rules than bitcoin.[57] In the same vein, companies looking for funding can issue a coin to

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[50] Bernard Marr, "A Short History Of Bitcoin And Crypto Currency Everyone Should Read," *Forbes,* 6 Dec. 2017, https://www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/.

[51] Antonio Madeira, "What are Coloured Coins and Meta Coins?" *CryptoCompare,* 12 Jan. 2018, https://www.cryptocompare.com/coins/guides/what-are-coloured-coins-and-meta-coins/.

[52] Richard Gendal Brown, "A simple explanation of Bitcoin 'Sidechains'," *Gendal Blog,* 26 Oct. 2014, https://gendal.me/2014/10/26/a-simple-explanation-of-bitcoin-sidechains/.

[53] Ameer Rosic, "What is Ethereum? A Step-by-Step Beginner's Guide," *Block Geeks,* https://blockgeeks.com/guides/ethereum/.

[54] Sudhir Khatwani, "How Is Ethereum Blockchain Different From Bitcoin's Blockchain?" *CoinSutra*, 24 Dec. 2017, https://coinsutra.com/ethereum-blockchain-vs-bitcoins-blockchain/.

[55] Margaret Rouse, "What is smart contract?" *TechTarget,* http://searchcompliance.techtarget.com/definition/smart-contract.

[56] Alyssa Hertig, "How Do Ethereum Smart Contracts Work?" *CoinDesk,* https://www.coindesk.com/information/ethereum-smart-contracts-work/.

[57] "Create a cryptocurrency contract in Ethereum," *Ethereum.org,* https://www.ethereum.org/token.

represent shares in their company, referred to as an ***initial coin offering*** (ICO), using this as an alternative funding mechanism similar to a crowdfunding campaign within the structure of an initial public offering (IPO). [58] Additionally, the core features of transparency, immutability, and decentralization can be adapted and applied across industries.[59]

With a land registry or real estate system built on the Ethereum blockchain, the paper trail of land transfers is completely transparent.[60] With a decentralized social network[61], instead of consumers relying on Facebook to provide its platform and make money off of farming their data, they participate in a social media network that runs itself as a platform, and they can own their own data because there is no centralized company or platform controlling the system. They could even choose which data they want to sell to companies and earn money on it themselves.[62] These are just a few of the scenarios predicted and already in practice in the Ethereum blockchain space.[6364]

Blockchain as an early stage technology

Because Ethereum is a relatively newer technology than Bitcoin, and both are young in terms of their technology diffusion cycle[65], many of the pilots and organizations surrounding these technologies are still building technical infrastructure for the space and figuring out how these platforms will scale as interest is skyrocketing. According to Ben Siegel of Blockchain for Social Impact, "Blockchain is still just a toddler. It is trying to figure out what it can do."[66] Before blockchain can move into applications outside of the pure technology sector, its basic infrastructure must be able to support broader use cases.[67]

Banking-focused bitcoin came earlier than the decentralized apps-based Ethereum, which is reflected in the most prominent startups in the blockchain space, featured in Diagram 2. Not only are most organizations focused on the basics of making bitcoin work (as a financial currency) in different ways, but even in the other blockchain functions --such as storage, identity, and social good--are mostly still bitcoin blockchain applications focused on building technical infrastructure.

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[58] Julia Verhage et. al, "What's an ICO? Like an IPO But With Digital Coins," *Bloomberg Businessweek,* 17 Sep. 2017, https://www.bloomberg.com/news/articles/2017-09-18/what-s-an-ico-like-an-ipo-but-with-digital-coins-quicktake-q-a.

[59] John Ream et. al, "Upgrading blockchains: Smart contract use cases in industry," *Deloitte Insights,* 8 Jun. 2016, https://www2.deloitte.com/insights/us/en/focus/signals-for-strategists/using-blockchain-for-smart-contracts.html.

[60] "The Land Registry in the blockchain – testbed," *Kairos Future,* March 2017, https://chromaway.com/papers/Blockchain_Landregistry_Report_2017.pdf.

[61] Zak Mustapha, "Is It Time For a Decentralized Social Media?" *Huffington Post,* 7 Sep. 2016, https://www.huffingtonpost.com/zak-mustapha/is-it-time-for-a-decentra_b_11887128.html.

[62] Gaurang Torvekar, "How Blockchain Will Shape the Future of Social Networks," *Nasdaq,* 22 Aug. 2017, http://www.nasdaq.com/article/how-blockchain-will-shape-the-future-of-social-networks-cm835390.

[63] "Spokes," *Consensys,* https://consensys.net/ventures/spokes/.

[64] Jeff John Roberts, "Ethereum: 5 Ways Businesses Are Already Using Blockchains," *Fortune,* 22 Aug. 2017, http://fortune.com/2017/08/22/blockchain-walmart-maersk-banking/.

[65] Estelle Roiena, "Blockchain and the technology diffusion cyce," *Fintech Extra,* 31 Oct. 2016, https://www.finextra.com/blogposting/13317/blockchain-and-the-technology-diffusion-cycle.

[66] Ben Siegel, *Workshop 3: Blockchain for Refugees*, Techfugees Summit, Paris. 25 Oct. 2017.

[67] Pascal Thellman, "The Next Frontier in Blockchain Technology: Scaling," *Coin Telegraph,* 18 Nov. 2017, https://cointelegraph.com/news/the-next-frontier-in-blockchain-technology-scaling-and-commercial-optimization.

Diagram 2: Bitcoin and Blockchain Startups (Market Map)68

68 "Trends in Blockchain and Bitcoin," *CB Insights*, 2 May 2017, https://www.slideshare.net/CBInsights/trends-in-blockchain-bitcoin.

Invention and innovation from the perspective of innovation theory are different concepts often confused for one another. An ***invention*** is characterized as the creation of a new technology or tool, such as the blockchain. An ***innovation*** is when that technology or tool is able to be put into practice in a profitable way and actually applied.[69] For the social good space, the idea of profit is different than financial institutions, but at the end of the day, bitcoin and blockchain are only as useful as they are able to be adapted. The social applications of these technologies are still in the early stages of a space that is already young. After all, how is it possible to use the bitcoin blockchain as the backend of a microfinance fund (for example) if the blockchain itself is lagging because of scaling and infrastructure issues?[70] [71]

Themes within Blockchain and Social Good

The descriptions above of Bitcoin, blockchain, and Ethereum, provide a picture of how these technologies have aspects applicable to civic society - when applied in the right way:

- **Transparency** in the financial activities of organizations to an extent is a way to encourage trust and accountability.[72]
- **Decentralization** of data and systems has the potential to address power structures that are both new and entrenched in society. For instance, from the perspective of the blockchain, some of the largest internet intermediaries like Google, Facebook, and Amazon, which command enormous amounts of power, can be challenged by systems where the returns are invested more equitably into the communities that are the part of decentralized platforms: the users themselves.[73]
- Blockchain transactions are **immutable**, meaning they cannot be deleted.[74] If someone, such as a human rights activist, is organizing using the for-profit platforms that are so entrenched in our digital world right now, controversial activist events or information could be deleted at best, or reported to the government or used in an incriminating way at worst.

The use cases in the civic and social space for this technology are still in the stage of early partnerships, consortiums, and pilots and are largely exploratory. This is the same for many other industries predicted to be influenced by blockchain, with the exception of banking. However, there are some emerging themes in the bitcoin and blockchain social good space, which are detailed below.

Remittances and Financial Inclusion

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[69] Session 1: Invention vs. Innovation. MGT-523 - Principles of Disruptive Innovation. University of Nicosia Masters in Digital Currencies. Summer 2016.

[70] Chadwick Strange, "Blockchains and Social Enterprises," 20 Sep. 2016, https://medium.com/@cstrange/blockchain-and-social-enterprises-f1516ade6d39.

[71] Chadwick Strange, "Blockchains and Social Enterprises (Part 2)," 19 Jun. 2017, https://medium.com/@cstrange/blockchains-and-social-enterprises-part-2-3d01c1929471.

[72] Diana Ngo, "Governments, NGOs Consider Blockchain Pilots for E-Governance," *Bitcoin Magazine,* 31 Mar. 2017, https://bitcoinmagazine.com/articles/governments-ngos-consider-neocapitas-blockchain-pilots-e-governance/.

[73] Siraj Raval, "Chapter 1: What Is a Decentralized Application?" *Decentralized Applications,* (O'Reilly Media, Inc., 2016), https://www.safaribooksonline.com/library/view/decentralized-applications/9781491924532/ch01.html.

[74] "Blockchains and Human Rights," *Provenance News,* 5 Dec. 2016, https://www.provenance.org/news/technology/blockchains-and-human-rights.

One of the earliest ideas for bitcoin social impact is around the themes of financial inclusion and "banking the unbanked," as well as creating avenues for more affordable remittances. Worldwide, there are over 2 billion adults without access to financial services[75], and even in comparatively wealthy countries like the U.S., banks do not always provide affordable services to those that need them the most. Remittances are often small amounts of money sent by migrant workers from one country to the next, with relatively high transaction fees given the low salaries of the senders and recipients, as well as the small amounts being sent. According to the World Bank's "Remittance Prices Worldwide" site, "remittances totaled $575 billion in 2016, $429 billion of which went to developing countries, involving some 232 million migrants."[76] High remittance transaction fees for those who are often low-income workers indicate a broader trend in financial inclusion. Those who are the most vulnerable within our financial system often pay the highest transaction fees and receive the least amount of services, if any at all. By lowering transaction fees and barriers to entry, bitcoin and blockchain-based systems have potential to alleviate these pains.

Other financial use cases involve blockchain for more direct social lending and investment in community causes, such as the ability for cryptocurrencies to vote and fund social causes at their will. The ability of communities to create their own currencies or barter systems to track and strengthen their economic activity is another use case being currently explored.

Additional themes

With the further development of the bitcoin blockchain toward use cases outside of the purely financial and the introduction of the Ethereum blockchain, the cryptocurrency/blockchain community thinking around social good evolved in tandem. Now there are a few prominent, high-level themes that are beginning to emerge in the space:

- ***Identity:*** Providing refugees and other unidentified populations (estimated to be at over 1.1 billion worldwide)[77] with a digital identity that they can use at will. This could be either issued by a gatekeeper, such as a UN or government agency, or be provided as a platform where refugees and other vulnerable populations could begin to "build" what is called a self-sovereign identity from the ground up in order to identify themselves.
- ***Ethical Supply Chains:*** Using the transparency of blockchain to create more ethical supply chains from industries such as diamonds to food and drugs. This has the potential to help ensure consumers that goods are ethically sourced and to provide accountability within the supply chain system.
- ***Energy:*** Redesigning current energy systems using blockchain as a way to manage an electricity or alternative energy grid that allows users to consume what they need and then return their unused energy to the grid and sell it back to those who need it. Other examples within this theme could involve creating transparent markets for trading carbon credits - incentivizing organizations to reduce and account for their impact on the environment.
- ***Humanitarian/Aid Delivery:*** Blockchain for aid organizations has the potential to make aid delivery both more efficient (with fewer transaction costs), as well as transparent and data-driven. One early pilot has been carried out by the World Food Organization, which has

[75] Camilla Hodgson, "The world's unbanked population, in 6 charts," *Business Insider,* 30 Aug. 2017, http://www.businessinsider.com/the-worlds-unbanked-population-in-6-charts-2017-8.
[76] "Remittance Prices Worldwide," *World Bank,* https://remittanceprices.worldbank.org/en.
[77] "ID2020," http://id2020.org/.

experimented with blockchain-driven aid delivery.[78] Other applications could exist in reducing transaction costs for aid delivery and showing transparency and accountability in aid distribution.

For specific examples of organizations addressing these themes, as well as pilots and exploratory projects, refer to Appendix 1: Social Good Blockchain Startups and Appendix 2: Early Pilots.

Challenges and Barriers to Adoption in the Social Space

Lack of knowledge of the potential of the blockchain and conflating bitcoin use with blockchain present challenges to adoption of blockchain in the social space. Bitcoin, largely seen by governments as a risky asset class and a threat to national currencies, is banned in many countries. Especially in the social space, there is a key distinction between bitcoin--an asset class that is not likely to be used in the social space--and the underlying technology of blockchain, which is not controversial in the same way as bitcoin. This is mentioned in section 2 of this paper when looking at the banning of bitcoin in MENA and DigiCash, an example of non-controversial, government-mandated, applied blockchain technology that addresses the issue of financial inclusion in Tunisia. Almost all of the social good applications mentioned in this paper are built on the blockchain, but not engaging with bitcoin. Blockchain, however, presents its own challenges in the social good space.

- **Regulatory:** Social impact use cases in the bitcoin/blockchain space are still largely in their earliest stages, especially given that they are often applications of a technology that itself is still in development. For example, many social good use cases rely on smart contracts, which need to be tested under many circumstances in order to prove to be reliable. The legal framework for smart contracts is also at an early stage.
- **Infrastructure:** Testing blockchain can be difficult in developing countries, due to the infrastructure requirements needed for testing. In order to run a pilot, there is a need for high smartphone penetration (or very good community locations with internet access), high digital literacy, and a certain level of infrastructure required within the country or community in order for the pilot to be feasible.
- **Knowledge gap:** The technical and infrastructural challenges in running a social impact pilot in the blockchain space are only eclipsed by the knowledge gap--the fact that many of those who are in most need of blockchain-based solutions (such as NGOs and social activists) are far outside the blockchain community. They may not even know that blockchain could enhance their work, and if they do, there are formidable challenges to them finding the right support to build solutions to their need. Those who are most technically or financially equipped to build blockchain solutions (blockchain technologists and insiders), even the well-intentioned, are so far from the stakeholders and communities they are hoping to build for, that there is a lack of key understanding of social contexts. Even with the best technical knowledge and resources, technologists are not equipped to handle work with communities and NGOs work without the right partners.

[78] Blockchain Against Hunger Harnessing Technology Supports Syrian Refugees," *World Food Program*, 30 May 2017, https://www.wfp.org/news/news-release/blockchain-against-hunger-harnessing-technology-support-syrian-refugees.

- **Lack of credibility and transparency:** There is currently a credibility problem within the blockchain and social good space, as well as a transparency problem.[79] This makes industry-wide learning difficult. Many of the social-impact focused blockchain projects are run by for-profit startups, which are not held to the same level of accountability as donor-funded NGOs. For instance, a for-profit company called Aid:Tech publicly claims that it was the first company to deliver aid via blockchain to Syrian refugees with an Irish Red Cross pilot in Lebanon in 2016.[80] However, it is said quietly within the blockchain social impact community that the pilot had technical failures that are not being reported. Other pilots have been announced in press releases and then never mentioned again. A Factom land registry pilot with the Honduras government, with very little public data available to show what had actually been accomplished, was later rescinded completely.[81] In the case of the eDinar in Tunisia, it was announced that Monetas, a Swiss blockchain company, was the main partner with the Tunisian government[82], but they pulled out of the project a year later and it has since been launched successfully by DigitUs, a Tunisian company (profiled as a case study in section 2). The Monetas press release is still one of the more prominent pieces on the eDinar. Lastly, there is a perceived profit opportunity, particularly within the refugees and blockchain space, that has attracted an influx of investment for new startups that do not always have founders with experience in the social sector. Some social good blockchain startups have received hundreds of thousands of dollars in investment and spoken publicly about users and partnerships that they are unable or unwilling to back up with any demonstrable traction.
- **Ethics, protection of vulnerable populations, and data security:** Particularly in the blockchain and identity space, there is a technical need to verify users' online identities with offline data. For example, some tech companies aim to use blockchain to allow humanitarian organizations to distribute aid to refugees. The aid is effectively "sent" to a digital account for each refugee. However, in order to connect the account to the user, there is a technical issue. How can it be proven that an online account actually belongs to a user? One of the more prominently discussed solutions is for a gatekeeper, like the UN or a private company to collect a user's biometric data (fingerprints, retina scans, etc.) that can be used access or use an account as an offline verification that it belongs to the user.[83] This is already practiced by the UNHCR in Jordan for their Cash Transfer program. There are few regulations right now on privacy and collection

[79] Strange, Blockchains and Social Enterprises (Part 2).

[80] Nial Dennehy, "AID:Tech's Blockchain Digital Identity for Equitable Access," *Solve,* https://solve.mit.edu/challenges/sustainable-urban-communities/solutions/2649.

[81] Pete Rizzo, "Blockchain Land Title Project 'Stalls' in Honduras," *CoinDesk.* 26 Dec. 2015, https://www.coindesk.com/debate-factom-land-title-honduras/.

[82] Evander Smart, "Tunisia Becomes First Nation To Put Nation's Currency on a Blockchain," *DCE Brief,* 28 Dec. 2015, https://dcebrief.com/tunisia-becomes-first-nation-to-put-nations-currency-on-a-blockchain/.

[83] John Callahan, "Blockchain & Biometrics: The Future of Identity," *Veridium,* 25 May. 2017, https://www.veridiumid.com/blog/future-identity-blockchain-biometrics/.

of biometric data in humanitarian contexts and tracking refugees oftentimes without their consent, which can put already vulnerable populations at risk.[848586]

Due to the challenges as described above, social good use cases in the blockchain space are complicated, and often require the coordination of cross-sectoral stakeholders to be most effective.[87] For example, in the case of creating a blockchain-based identity for refugees, there is a role for technology companies, governments, and civil society organizations, all of which must be able to coordinate to develop this level of solutions. This theme of needing coordination for the development of blockchain-based solutions is common across this industry and is reflected in the emergence of consortiums such as ConsenSys's Blockchain for Social Impact Coalition and ID2020 - a public-private partnership aimed at using technology to solve the identity issue for the unbanked.

In the next section, we will see that the bitcoin and blockchain communities in the MENA region are quite early stage. However, the DigiCash eDinar use case in Tunisia is the result of a strong public-private partnership that is yielding results for community and civic organizations--an example that epitomizes what is necessary to apply this new technology to complex social and financial needs.

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[84] Monia Mazigh, "Refugees, Immigrants and Surveillance," *Big Data Surveillance Workshop,* 12 May 2016, http://www.sscqueens.org/sites/default/files/11_refugees_immigrants_and_surveillance-monia_mazigh.pdf.

[85] Caroline O'Donovan, "Tracking Refugees Puts A Vulnerable Population At Risk ," *Buzzfeed News,* 7 Dec. 2015, https://www.buzzfeed.com/carolineodonovan/tracking-refugees-puts-a-vulnerable-population-at-risk.

[86] Sneha Indrajit, "The Cybersecurity Risks of Using Biometric Data to Issue Refugee Aid," *Henry M. Jackson School of International Studies, University of Washington,* 25 Jul. 2017, https://jsis.washington.edu/news/cybersecurity-risks-using-biometric-data-issue-refugee-aid/.

[87] Don Tapscott et al., "Realizing the Potential of Blockchain: A Multistakeholder Approach to the Stewardship of Blockchain and Cryptocurrencies," white paper, *World Economic Forum,* June 2017, http://www3.weforum.org/docs/WEF_Realizing_Potential_Blockchain.pdf.

Part Two: Digital Currencies in MENA

Note: This section was the result of interviews with early adopters and evangelizers of blockchain from Jordan, Lebanon, Morocco, and Tunisia, Due to the sensitive nature of bitcoin in some parts of the MENA, most names are omitted from this report to respect the privacy of first-hand sources, with the exception of those who are named explicitly.

Introduction: Blockchain and Digital Currencies in MENA

To focus on the potential of digital currencies and blockchain in MENA, particularly for the civic sector, is to look at the Middle East and North Africa (MENA) within the global trend of technology diffusion and adoption. Bitcoin and blockchain are like other game-changing technologies such as the Internet and later Voice over IP (which enables free calling through Skype and WhatsApp) that were critical in transforming entire industries. MENA, with its technology-driven Arab revolutions and explosion in use of social media technologies and other VOIP communications tools like WhatsApp, was not spared from the largest technology diffusion cycles of the past two decades.

Though many worldwide are becoming more attracted to bitcoin for its allure as an asset that is rapidly soaring in value, the early adopters interviewed from Jordan, Lebanon, Morocco and Tunisia working on and evangelizing this technology--though none are actually working explicitly in the civic sector-- talk about the technology in terms of its ability to improve fundamental aspects of their society in the long term by solving infrastructure problems in their respective countries. Some, like Bellaj Badr, a Moroccan developer working at a blockchain consultancy in London and CTO of Mchain, Morocco's first blockchain consultancy, learned about the technology outside the region and saw its potential in their home country.[88] Hichem Ben Fadhl from DigitUs in Tunisia, a former Facebook developer, also became versed in the technology in Dubai and was propelled to return to Tunisia to adapt it.[89] These early players are optimistic about the technology, eager to expand opportunities for their home countries, and are already in the early stages of doing so. This is markedly different than how many bitcoin and blockchain entrepreneurs outside the region see the technology, which is not always for advancement of the good of a particular geography or society, but for broader aims related to the development of the industry as a whole or more technology-driven aims that are still early stage and difficult to clarify in terms of their future applications or social implications.

For some, like Omar Mahboub, the co-founder of ArabBit in Jordan--the first Arabic language bitcoin and blockchain media site--they were originally attracted to technology as a whole because of the Arab revolutions in 2011, when use of social media in protests in Egypt and Tunisia awoke a hunger in youth across the region to demand change.[90] In MENA, there is a different context as to the potential for social transformation through technology, as informed by the 2011 Arab revolutions. This is a lived experience that is not as prominent in the U.S. or other countries. Also in response to the rise of "tech

[88] Interview - Bellaj Badr. 5 Dec 2017.
[89] Interview. Hichem Ben Fadhl. 7 Nov. 2017.
[90] Interview. Omar Mahboub. 6 Dec. 2017.

for the civic sector," the explosion of tech startups in the West, in addition to demand for knowledge around technology driven by the Arab revolutions, there are now international NGOs like Mercy Corps funding tech accelerators such as Gaza Sky Geeks and new upstarts following in their footsteps such as Iraq Recoded for refugees in Erbil and Turkey. Tech development and social good are often already linked in MENA, both in individual perceptions but also more concretely in social sector institutions' funding and support for technology education and hubs.

Where in MENA?

For the purposes of this report, Jordan, Lebanon, Morocco, and Tunisia were all considered when investigating the status of digital currencies in MENA. These countries were selected because they were highlighted as being similar in terms of "civic-society openness," which makes them interesting for comparison and relevant for a report examining digital currencies for civil society use (see Report Overview for more information). In some ways, they could be considered "bridging" countries. In the case of Jordan and Lebanon, they play host to vulnerable populations from neighboring conflicts themselves and have been shaped by them. Countries such as Palestine and Iraq and very difficult cases such as Syria and Yemen have different profiles in needs and approach to technology. Though Egypt and Algeria were brought up in some interviews, they have not been explicitly pursued in the primary sources for the purposes of this research.

Lastly, some Gulf countries, particularly the Emirate of Dubai in the United Arab Emirates (UAE), have taken a more proactive approach to adopting bitcoin and blockchain than the rest of the region. Although not considered in primary research, Dubai's move towards blockchain startups as part of its goal to move all government services onto blockchain by 2020 reflects its economic integration with the West and also provides interesting use cases for the technology, although it must be kept in mind that this remains in its infant stages.

Overview / Trends in Digital Currencies in MENA

Bitcoin is analyzed in MENA as part of the terms of reference for this paper, but the analysis goes as far as showing that bitcoin is being obstructed in many Arab countries. Based on the previous section, bitcoin is not a central aspect in social-good focused projects in the space. It is blockchain and its broader applications outside of bitcoin that present promise for social good. However, with the blockchain community very early stage in MENA, bitcoin is analyzed within this paper as a way of tracking the presence of the first application of blockchain in the region.

Bitcoin is "illegal," but what does that mean?

Perhaps the biggest headline in the "semi-open" countries of Jordan, Lebanon, Morocco, and Tunisia, regarding bitcoin is its ban. In **Tunisia**, trade of bitcoin and other cryptocurrencies, as well as ICOs, are all banned and the bitcoin community is thus relatively small--mainly enthusiasts and early adopters. In **Morocco**, there is an avid bitcoin community, but bitcoin was recently banned by the Foreign

Exchange Office and Central Bank in November 2017[91], days after a large Moroccan payment services company announced it would accept bitcoin. In October 2017, **Lebanon's** central Banque du Liban (BDL) also issued a ban on cryptocurrencies, citing them as risky to use and illegal.[92] In **Jordan**, the government issued a public warning against the use of cryptocurrencies in 2014[93], followed by a ban from the Central Bank of Jordan and the Telecommunications Regulatory Commission in December 2017 against the trading of bitcoin.[94] Though some local businesses are accepting bitcoin in Jordan, financial institutions are banned from dealing in the currency and like the other countries on this list, bank accounts that have been used to purchase bitcoin in the past have sometimes been frozen.

Interviewees in all four countries did not seem necessarily worried about the governments' ban of cryptocurrencies. It is worthwhile here to again draw the distinction between the use of bitcoin as a currency and an asset and use of blockchain as an infrastructure. To look at the text of a direct statement banning bitcoin, the head of Banque du Liban stated: "These [bitcoin] are not currencies but rather a commodity whose prices rise and fall without any justification. For this reason, BDL has banned the use of this currency in the Lebanese market."[95] This statement has been repeated across the region and emphasizes the fact that the primary concern of governments is trading of bitcoin in its capacity as a currency, not its underlying use as blockchain. To underscore the point, the Lebanese government has stated it favors the introduction of a Central Bank-sponsored digital currency based on blockchain technology in the coming years and the Tunisian government has already begun testing this function. According to Bellaj Badr of Mchain in Morocco, most of their partnerships within Morocco are with government agencies privately piloting some form of blockchain.

Regional governments also state bitcoin is a risk for investors and consumers because of its volatility and because it is not managed by a certified entity, as well as its use for money laundering. There is also general fear in countries with stronger banking systems that bitcoin could actually undermine their currencies and other banking services when it comes to using it for services such as remittances. Interviews conducted for this research also revealed that it seems regional players generally acknowledge the need to educate governments more on how to properly use and regulate bitcoin and see the upcoming period as a time for advocacy and partnership. After all, it seems the bans have largely been in response to the bitcoin frenzy and rise in its price over the last few months of 2017.

In some sectors in the bitcoin world, there is the idea that governments can only do so much to undermine bitcoin. This is true to some extent. For some experienced enough to mine bitcoin or others who already have access to financial services, it is still possible to acquire bitcoin. For example, on Localbitcoins.com--the bitcoin trading site mentioned in the section following--many people wishing to

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[91] "Bye-bye Bitcoin: Morocco Bans Cryptocurrencies," *Morocco World News*, 21 Nov. 2017, https://www.moroccoworldnews.com/2017/11/234382/bitcoin-morocco-cryptocurrencies-economy/.

[92] Adam Reese, "Lebanon's Central Bank Bans Cryptcurrency," *EthNews,* 31 Oct. 2017, https://www.ethnews.com/lebanons-central-bank-bans-cryptocurrency.

[93] "Countries Explicitly Banning the Use of Bitcoin," *Worldcore Blog,* 26 April 2017, https://worldcore.eu/blog/countries-explicitly-banning-use-bitcoin/.

[94] "ندر لأا† عنه ىلماعتلا ةلمع ىلإ كنإ•~ن," Khaberni news, 17 Dec 2017, https://www.khaberni.com/news/%D8%A7%D9%84%D8%A3%D8%B1%D8%AF%D9%86-%D9%8A%D9%85%D9%86%D8%B9-%D8%A7%D9%84%D8%AA%D8%B9%D8%A7%D9%85%D9%84-%D8%A8%D8%B9%D9%85%D9%84%D8%A9-%D8%A8%D9%8A%D8%AA%D9%83%D9%88%D9%8A%D9%86-217659

[95] Brady Dale, "Lebanon's Central Bank Governor Disses Bitcoin Digital Currency Launch," *CoinDesk,* 27 Oct. 2017 https://www.coindesk.com/banque-du-liban-digital-currency/.

exchange bitcoin in countries where it is banned request payment through bank transfer, implying they are from a more affluent sector of the population that has a bank account to begin with. After all, governments can only really regulate the institutions surrounding the use of bitcoin, such as exchanges and wallets. However, for the purposes of consumer protection and accessibility, it is often the bitcoin-focused institutions developing outside of MENA in countries where bitcoin is permitted that have potential to make bitcoin safer to buy and sell for consumers. With the ban on transacting in bitcoin, those who do still continue to use it still suffer risks, when there could be a role for the government to institute smart regulation. At the end of the day, the banning of bitcoin may not affect individual users of bitcoin, but it does make it difficult for institutions to use and build solutions around the currency, with the civic sector as no exception. Hence, this report focuses on blockchain as a better approach to building solutions.

Bitcoin users in Morocco, Lebanon, Tunisia, Jordan (and broader MENA)

It is difficult to track the number of bitcoin and cryptocurrency users in MENA precisely because bitcoin transactions don't necessarily have a concept of location when they occur on the bitcoin blockchain. [96] After all, it is estimated that over $2 trillion worth of transactions occur daily now in Bitcoin and it is difficult to track the bulk of these by specific country. One of the ways to then track cryptocurrency use is through exchanges and the infrastructural services like wallets that support the use of the bitcoin blockchain. This is how it is tracked for larger markets like the U.S. However, with bitcoin use verbally banned in most countries covered in this report, that makes it difficult to track conversions of bitcoin to currencies in banned countries because those infrastructural services are largely unavailable. The only country whose currency still makes it onto bitcoin transaction analytics sites is the Moroccan Dirham. This ban could also mean that bitcoin transactions, when converted into other currencies, are often driven into the USD and Euro, as opposed to local currencies.

Anecdotally, it has been said that there are bitcoin users in all the countries profiled in this report. There is a bitcoin and blockchain Meetup[97] in Lebanon with 439 members and there used to be one in Jordan. There are private Bitcoin in Arabia Whatsapp groups and Facebook groups as well, mostly dominated by people inquiring about trading and mining bitcoin. There have been bitcoin and blockchain-focused conferences and events in each country. When BitOasis, the region's first bitcoin wallet, launched in 2015, they had 15,000 users registered after their initial launch, with users in Morocco and Tunisia. [98] As one of the most prominent wallets in the region, that number has undoubtedly increased. BitOasis's founder, Ola Doudin, cites Morocco as one of the most active bitcoin user bases in the region.[99] However, though BitOasis has an office in Amman and users elsewhere, they offer exchange services only for Gulf countries.

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[96] "How do I Trace a Bitcoin to Find its Location?" *Stack Exchange,* https://bitcoin.stackexchange.com/questions/29457/how-do-i-trace-a-bitcoin-transaction-to-find-its-location-in-the-world.

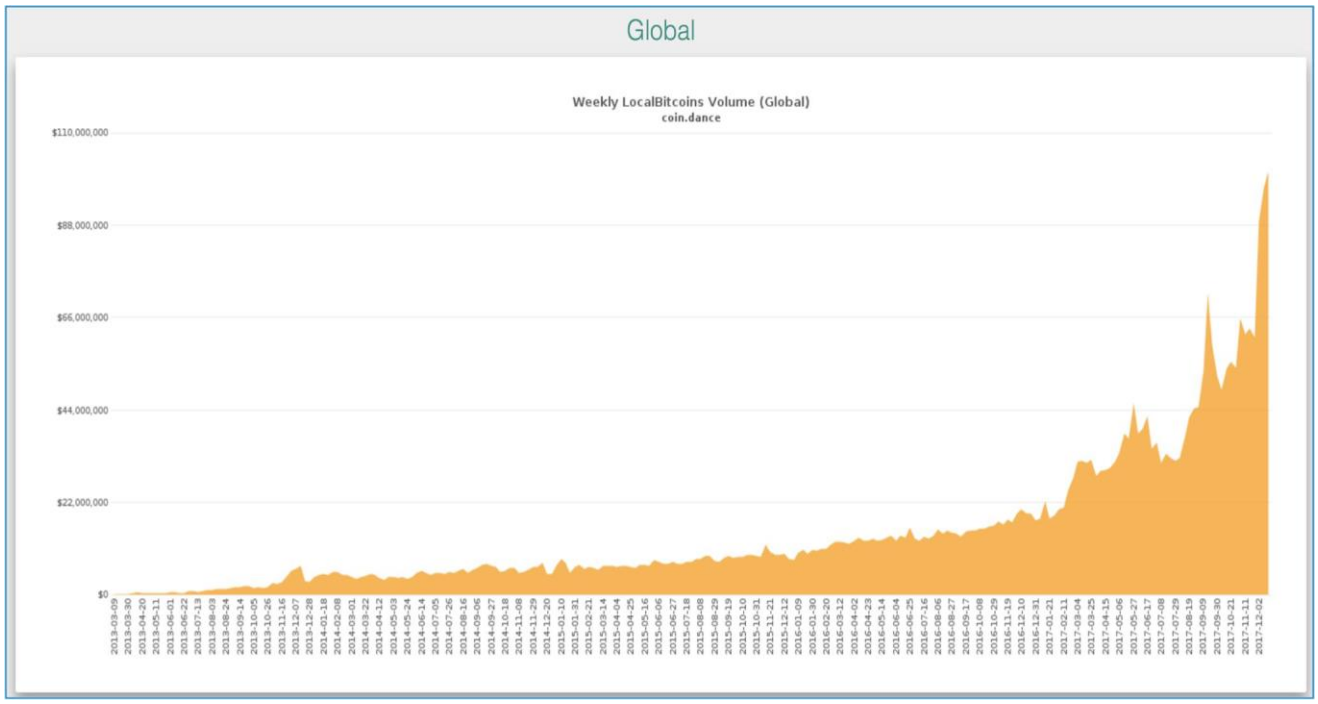
[97] "Bitcoin & Blockchain Beirut," *Meetup,* https://www.meetup.com/Bitcoin-Beirut/.

[98] Pete Rizzo, "Dubai's BitOasis Opens Bitcoin Buying Services at TechCrunch Disrupt," *CoinDesk,* 6 May 2015, https://www.coindesk.com/dubais-bitoasis-opens-bitcoin-buying-service-at-techcrunch-disrupt/.

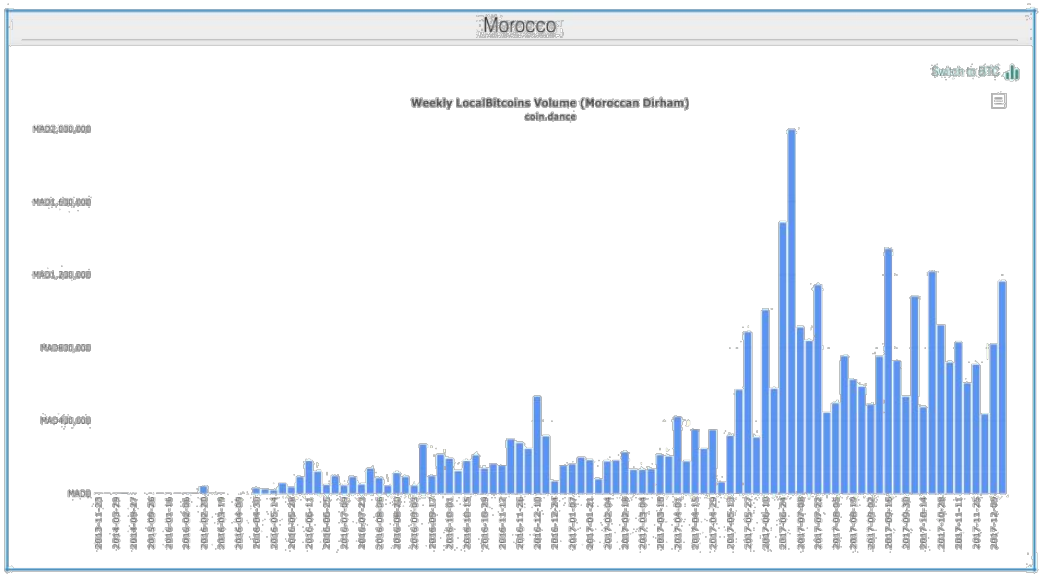
[99] "Female Entrepreneur Launches Bitcoin Exchange BitOasis in Dubai," *Bitcoin Exchange,* 5 September 2016, https://www.ccn.com/female-entrepreneur-bitcoin-bitoasis-dubai/.

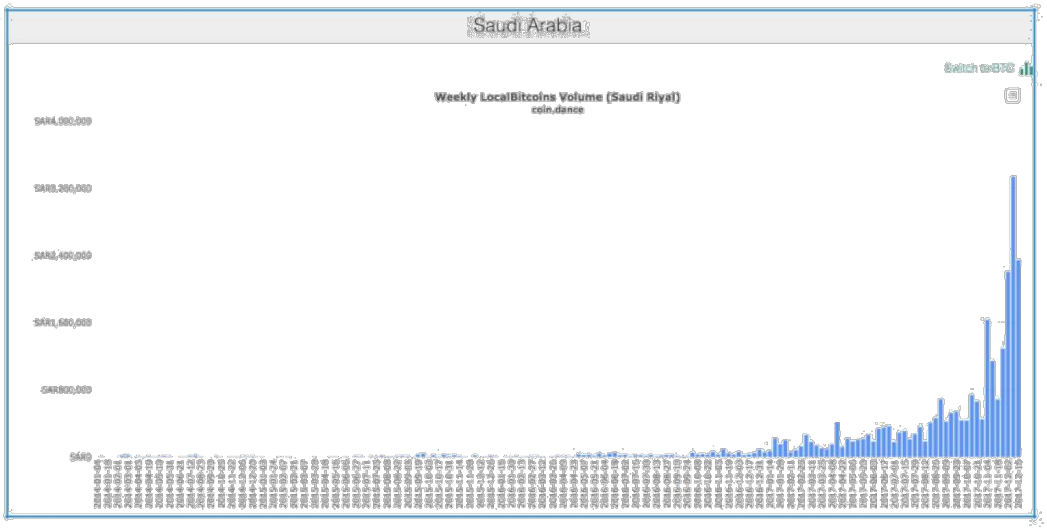
In terms of bitcoin nodes--the miners that support the network and provide the computing power to confirm transactions on the distributed ledger--it is said that the number of bitcoin nodes worldwide are often underestimated, but there are sites like Bitnodes.com[100] that attempt to quantify the nodes and track them geographically. Ethereum nodes appear to be a bit easier to track and through Ethernodes.org[101] it can be seen that out of over 28,000 nodes worldwide, 6 are listed in Tunisia, 13 in Lebanon, 15 in Morocco, and 9 in Jordan. Most Ethereum nodes (30 percent) are in the U.S., with about 60 percent total in the U.S., Russia, China, and Europe. This is by no means an exhaustive list of the nodes within MENA, but it shows that there are core creator/users of the technology present in the countries profiled.

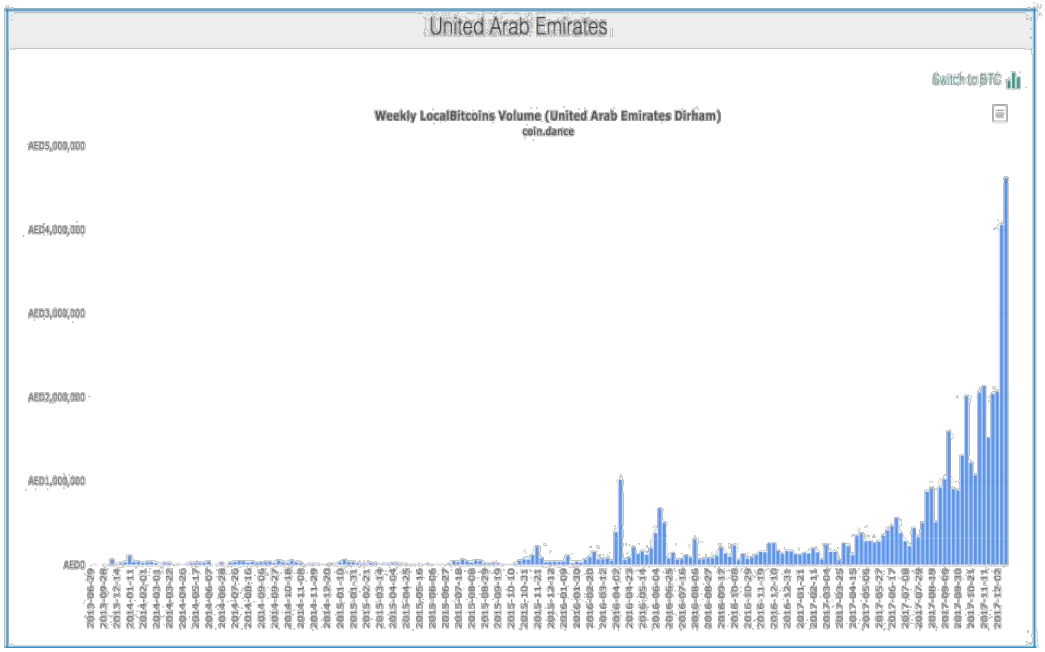
Lastly, some bitcoin activity can be tracked on sites like Localbitcoins.com, which is a peer-to-peer exchange platform that connects people who want to buy or sell bitcoin in person by country and currency. At any given time, it is possible to go to their local sites for Jordan, Lebanon, Morocco, and Tunisia and see local offers or individuals who wish to buy or sell, as well as estimates by city for exchange prices based on past transactions. In most of the analytics sites such as Coindance.com, the main MENA countries that make any kind of ranking or show trade volume prominent enough to be listed are Morocco, the UAE, and Saudi Arabia. See below for charts.



[100] "Global Bitcoin Nodes Distribution," *BitNodes,* https://bitnodes.earn.com/.
[101] "Blocks," *Ethernodes.org,* https://www.ethernodes.org/network/1/nodes.


Morocco
Switch to BTC
Weekly LocalBitcoins Volume (Moroccan Dirham)
coin.dance
MAD2,000,000
MAD1,600,000
MAD1,200,000
MAD800,000
MAD400,000
MAD0


Saudi Arabia
Switch to BTC
Weekly LocalBitcoins Volume (Saudi Riyal)
coin.dance
SAR3,200,000
SAR2,400,000
SAR1,600,000
SAR800,000
SAR0


United Arab Emirates
Switch to BTC
Weekly LocalBitcoins Volume (United Arab Emirates Dirham)
coin.dance
AED5,000,000
AED4,000,000
AED3,000,000
AED2,000,000
AED1,000,000
AED0

Capital controls and banking inclusion restrict bitcoin use

In Tunisia, the Tunisian dinar is restricted by foreign exchange capital controls and Tunisians do not have the right to own foreign currency. This means that it is difficult to transact outside of Tunisia - which has spurred increased interest in bitcoin. The Tunisian Dinar itself was not considered fully convertible into foreign currencies until recently under very restricted circumstances. Though this may appear to present an opportunity for bitcoin, it also means that it is more difficult to actually buy bitcoin without a foreign bank account and almost impossible to buy with the Tunisian Dinar.[102] This restricts those who are actually able to access bitcoin to citizens who have traveled or hold dual citizenships, who have mined bitcoin (providing their computer processing power to help run the bitcoin network in exchange for compensation in bitcoin), and those who have traded bitcoin on a peer-to-peer level.

The same can be said for those holding only a Lebanese passport or bank account. It is difficult for them to have access to digital assets like bitcoin and there is not really a way to digitally transact within Lebanon. In Jordan, one must have a debit card to buy bitcoin. In Morocco and Jordan, it is comparatively more open to buy bitcoin than in Tunisia, but the community seems to skew towards those who are developers/early adopters of bitcoin and those who have ties and can already transact outside their home country through education, work, or foreign citizenship. To say bitcoin is still very early-stage and still inaccessible to most reflects both the status of the industry as a whole worldwide, and the particular status of the MENA region as being largely unbanked - with an estimate of 80 percent of the region not having access to banking service in 2014. [103] Though being unbanked is often presented as an opportunity for bitcoin to provide needed service, it also, on the contrary, makes it difficult for many people to buy bitcoin to begin with.

Blockchain is seen as the game changer, but education is needed

The illegality of bitcoin was more of a footnote in primary-source conversations about the technology in the face of interesting work being done in the blockchain sector. In light of this, the most cited need for bitcoin and blockchain industry in the MENA region was the call for education to achieve blockchain's potential. In the U.S. and the Western world, the rise of bitcoin has begun with early-stage efforts centralized around changing the banking sector, with the tide of conversation shifting toward blockchain as a driver for disintermediation of other industries as the community and technology have advanced. As mentioned in the first section of this report, it is after some years of advancement that bitcoin and blockchain are beginning to be discussed in more real terms as concrete means of achieving social impact, as will also be described more fully in the third section of this report. However, that jump from interest in bitcoin--often precipitated by the rising prices in bitcoin as an asset--as a window for deeper understanding and greater appreciation of blockchain and what it can accomplish for society has not yet happened in MENA to the extent of other countries, due in part to the very early-stage of the bitcoin community.

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[102] "Tunisia: Currency and Banking," *Info-Prod Research (Middle East) Ltd.,* http://www.infoprod.co.il/country/tunis2c.htm.

[103] Noyan Ayan, "80% of Arab world unbanked, promises huge growth for e-payments," *Webrazzi,* 5 June 2014, http://en.webrazzi.com/2014/06/05/80-of-arab-world-non-banked-promises-huge-growth-for-e-payments/.

There is a need for education, both for government officials as potential partners and needed regulators (to an extent) and for individuals, about the importance of blockchain. There is an interest and hunger for this blockchain education from both private sector organizations and organizations in the social sector. For example, in an interviewer with Mchain, the first blockchain consultancy in Morocco, they said the interest in blockchain was very high within government and private sector, but the understanding of what it could accomplish was very low. For Mchain, clients want to use blockchain but don't know what to do with it, but across the region, the social sector, including civil society, is in a similar problem albeit with fewer resources to assess the potential of adapting the technology.

Social sector is still not connected, but there is potential

The earliest players in the MENA bitcoin and blockchain communities are, not surprisingly, a select group of bitcoin and cryptocurrency users and miners, with some vendors (such as in Jordan and Morocco) accepting bitcoin as a means of payment. BitOasis, based in Dubai, is still the primary wallet and bitcoin exchange in the region, although primarily serving Gulf markets. Many enthusiasts if not technologists are bankers, who understand the potential of bitcoin but may not be able to speak openly about their bitcoin use in public in countries where the technology has been banned. Of the organizations interviewed, Mchain, the first blockchain consultancy in Morocco, and DigitUs, the main partner for Tunisia's blockchain backed eDinar, had considered working with the civic sector and found it to be a worthwhile step for the future; however, both had not yet had the opportunity. Mchain works mostly with governments and corporates in Morocco but was open to using their technology and expertise for social good. As a technology company, they would need the appropriate partners in civil society in order to apply the technology. DigitUs also expressed the potential of using the eDinar and other similar models for the future of crowdfunding in the region and interest in partnering with the social sector. Arabbit, the first Arabic language bitcoin/blockchain media site, is actively engaged in a mission of education, creating Arabic language resources to learning about the technologies and also sees a strong social potential for the technology, but is still working on the education aspects of it. A Lebanese blockchain employee based in the U.S. but looking at opening an exchange back in his home country emphasized the potential of using private blockchains. Private blockchains are now being favored by governments and corporates across the region but also globally as a way to safely pilot the technology and as a potential tool for aid organizations to distribute aid to partners.

Though the civic impact of blockchain is not always explicitly present in the activities of early-stage industry players interviewed as primary sources, sources are driven by a desire to change their societies, a conviction that bitcoin and to a greater extent blockchain present potential for this change, and by doing their part to create infrastructure or spread the word about these technologies, their work will eventually grow into opportunities for collaboration with the social sector.

Ecosystem is still very early stage

To reiterate, it is not unusual, given how the bitcoin and blockchain communities and industries have progressed in other areas, that there are not NGOs and civil society organizations from the MENA region piloting social impact-focused blockchain initiatives at this time. Given the young nature of the industry everywhere, these social -impact pilots are just beginning to form themselves in areas where bitcoin and blockchain are more widely accepted, legal, and there are already stronger technology

infrastructures in place to drive innovation. Nevertheless, there is still an important role for civil society organizations in MENA as these technologies emerge in driving the first pilots and partnering with technology companies and across the civic sector to create ecosystems supporting the application of blockchain where it is most needed. After all, technology companies are only experts in technology, not in social need.

Case study: Financial Inclusion with DigiCash, La Poste Tunisienne, and the eDinar

In recent years, central banks from countries as far as Russia, the UK, China, Palestine, the United Arab Emirates, and Senegal have expressed interest in issuing a "national digital currency," perhaps in response to the rise of bitcoin. Some, like Lebanon, have banned bitcoin in anticipation of issuing this central bank-stamped cryptocurrency. This digital currency would ideally save on costs of keeping printed cash in circulation, which is estimated at $200 billion in the U.S. alone and $10 trillion worldwide.[104] Additionally, governments in countries without wider electronic payments infrastructure would have the potential to provide accessible e-payment services.

Though there has been talk worldwide of this being the next step for governments this year, Tunisia was the first government worldwide to begin working on issuing a national digital currency, the eDinar, back in 2014. The project was originally announced then as a partnership between the Tunisian Post office (which provides a bank account for 90 percent of banked Tunisians) [105] and Monetas, a Swiss company that provides blockchain services. Monetas later pulled out to focus on more generalized solutions and Hichem Ben Fadhl and Walid Driss, former Facebook engineers that had experience promoting blockchain technology in Dubai and founders of DigitUs Tech, took on the challenge of creating a proprietary blockchain-backed platform unique to Tunisia's local context and co-owned by the Tunisian Post called DigiCash.

Hichem and Walid had worked with institutions in the past and acknowledged that in order to bring blockchain into the mainstream, it would have to be accessible and this is where the Tunisian Post came in as a trusted institution. "With 1,200 branches across the country, the national postal service represents accessibility, not only geographic but economic, since anyone, regardless of financial means, can deposit and withdraw money through the post in the same way that anyone can purchase a scratch card from the corner store to refill phone credit."[106] In Tunisia, though only 35-50 percent of the population have access to banking services[107], there is 50 percent mobile penetration and the partnership with the Tunisian Post was an ideal way to reach those who needed financial mobile services the most.

DigiCash allows Tunisians to send Tunisian dinars to each other digitally through its own app, which can be downloaded from the Tunisian Post website. People can use the app to scan a QR code and click a link to pay for utilities, water, and phone bills. They cash money into the app through transfer or directly at the Tunisian Post. The money on the app is pegged to the Tunisian dinar, so it is not the creation of a new currency but digitization of a current one. This takes out the controversy of "money creation by a non-government entity" that is plaguing bitcoin across the region and uses its best qualities to create digital payment solutions.

Within the broader bitcoin and blockchain community, working with institutions can be controversial, especially by "bitcoin purists." After all, one of the key features of the blockchain bitcoin is that proof of work-type mining activity produces the processing power necessary for the system to confirm transactions and allocate bitcoin accordingly without an intermediary like a bank. Working with the bank takes out the need for a public blockchain based upon mining, but adapts it to use by a private intermediary to speed up or digitize their transactions. Instead of a network where the nodes maintaining trust in the system are miners, the banks themselves are the nodes. Though it may seem outwardly unpopular in some circles to work with institutions like governments and banks, they are actively adapting and experimenting with aspects of blockchain to streamline their internal processes. Hichem and Walid prove that these partnerships and hybrid adaptations of blockchain--especially in a region where education about bitcoin and blockchain is still early stage and governments are banning the technology-- are both essential and effective in realizing the financial inclusion benefits of blockchain technology.

DigitUs, which worked for two years on the technology and had its first open beta version in March 2017, had over 1000 downloads of the app with some early revenue --all without doing any promotion and marketing. They are as of now one of the only operational blockchains with real users and will be releasing a new version soon having integrated the feedback of their beta customers.

According to Hichem, "We are not competing against bitcoin. Our service is another world. We just take the strengths [of bitcoin] and adapt them to existing use cases, giving more ease of use to people."[108]

On the social front, DigitUs is already working with six Microfinance institutions in Tunisia through Enda Inter Arabe, a development organization with a microfinance program reaching over 200,000 clients.[109] With the current pilot, DigitUs is integrated with the institutions in order to give people the ability to pay back their loans in rural areas. Oftentimes rural clients who want to repay their loans take a whole day to travel to the city in order to do so. The pilot involves using smartphones in agricultural areas to collect money for loan paybacks.

Additionally, DigitUs is also working with the central bank on regulated ICO. The idea is to have a project and crowdfunding the money, but instead of creating specific coins it would just digitally collect dinars. It would be like an ICO, but in a regulated mode.

"We have discussed [our model] with many institutions. When you find someone innovative enough in old institution, for sure in each new country there will be interested parties," says Hichem.[110] In 2018 they hope to be expanding to West Africa and Europe through partners of the Tunisian Post in order to provide a two-way remittance service between Tunisia and the partner countries where customers receive their transactions in real time and money transfer and conversion is managed through partner banks as an extension of the DigiCash platform.

Overall, DigitUs is an example of a platform and hybrid adaptation of blockchain that is both needed within countries like Tunisia and appropriate for the regulatory climate. In the future, there is hope that there will be similar collaborations and opportunities for civil society organizations to benefit from such platforms.

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[104] Bhaskar Chakravorti et al., "The Countries that would profit from a cashless world," *Harvard Business Review,* 31 May 2016, https://hbr.org/2016/05/the-countries-that-would-profit-most-from-a-cashless-world.

[105] "Tunisia to Replace eDinar with Blockchain-Based Currency," *EconoTimes,* 11 Jan 2016, https://www.econotimes.com/Tunisia-To-Replace-eDinar-With-Blockchain-Based-Currency-140836.

[106] Vanessa Szakal, "The DigitUs team: working to broaden Tunisia's digital ecosystem," *Nawaat,* 5 April 2017, https://nawaat.org/portail/2017/04/05/the-digitus-team-working-to-broaden-tunisias-digital-ecosystem/.

[107] Janine Firpo et al., "IFC Mobile Money Scoping – Country Report: Tunisia," presentation, 27 May – 2 June 2011, *International Financial Corporation,* https://www.ifc.org/wps/wcm/connect/eaf900004a052ba48ae7ffdd29332b51/Mobile%2BMoney%2BScoping%2BReport %2B-%2BTunisia.pdf?MOD=AJPERES.

[108] Interview. Hichem Ben Fadhl. 7 Nov. 2017

[109] "Enda inter-arabe," *Grameen,* http://grameen-jameel.com/enda-inter-arabe-enda/.

[110] Interview. Hichem Ben Fadhl. 7 Nov. 2017

Part Three: Concluding Remarks and Recommendations

Overall, there is a role for the social sector in the development of the blockchain community, especially as blockchain begins to move into the social impact field both inside and outside of MENA. With the development of the blockchain industry having wide future ramifications, a variety of voices are needed to shape the progression of the sector and its guiding principles. This includes voices that are diverse geographically from places like MENA, that are not always trending on the global charts for bitcoin usage and blockchain community growth, as well as sectorally, where there is an acute need for voices outside of the technology sphere. Additionally, with the evolution of governmental regulation around bitcoin, it is equally important for the civic sector to understand its stake in the blockchain community so as to have a voice in industry policy and standards.

In the U.S., there are social-good focused blockchain meetups such as ConsenSys's Blockchain for Social Impact and issue-focused consortiums such as ID2020, which aims to apply blockchain technology to help refugees maintain their personal credibility when they move to a new country. There have been social impact conferences like Techfugees in Paris with blockchain for refugees-focused solutions and a Blockchain for Humanitarian Action conference at Fordham University in NYC. Many events were focused on issues relevant to MENA, but MENA-based NGOs and voices were underrepresented. Conversely, in MENA, Dubai aims to be the hub for new blockchain startups and aims to have blockchain-backed government services in the near future. Who in MENA will be the hub for socially-focused blockchain initiatives? How can NGOs and the civic sector in MENA engage more broadly in the blockchain space outside of the region when technology companies are already talking about addressing problems relevant to MENA? How can the civic sector address data concerns for vulnerable populations in MENA? There are many opportunities for participation in consortiums, standards groups, partnerships, pilots, and even the founding of new platforms for education in the region.

DigitUs in Tunisia continues to be an example that represents the best of what the blockchain industry can bring. It represents the cross-border education (both founders worked for Facebook in Dubai and learned about blockchain there, bringing it back to Tunisia) and cross-industry partnerships necessary to bring the potential of blockchain to its fruition. This is a call to action for the social sector to partner with organizations like DigitUs that are creating an infrastructure that connects government, banking, and technology to serve the broader public and create new platforms for civic society funding and accessibility of capital as they move into new countries.

Appendix 1: Social Good Blockchain Startups

The following are examples of social good startups across the globe seeking to use blockchain for social good. The startups contained in this list have not been vetted for quality or potential for partnerships. Additionally, they are all very early stage and some may still be in the process of launching. An exhaustive list is difficult, as the space is rapidly shifting. An assessment of the viability of the startups and organizations active in the social impact/blockchain sector is work for another report.

Name of Organization	Overview/Mission	Programming
Name: Alice Web: Alice.si Headquarters: London, UK Theme: Humanitarian/Aid Delivery 	Alice is a social funding and impact management platform built on the Ethereum blockchain. Alice seeks to incentivize social organizations (charities, NGOs, social enterprises) to run projects transparently, by making sure that they get paid more when they achieve their goals. The performance of each project is publicly available, making it easier for funders (philanthropic organizations, impact investors, small donors) to identify and help scale social projects that actually work. Shared impact data also helps reduce due diligence and reporting costs, and helps social organizations collaborate more effectively.	Applications available for: • Transparent donations (currently live) • Impact management (to be developed) • Impact investing (to be developed) • Grants DAO (to be developed)
Name: Banqu Web: http://www.banquapp.com/ Headquarters: U.S. Theme: Financial Inclusion, Identity 	BanQu allows the unbanked to set up a personal digital identification profile while connecting to their banked network including family, friends, small businesses, and associated NGOs. As they start accumulating a transaction history on the BanQu blockchain, the unbanked also develop a tractable, vetted financial and personal history.	Banqu's blockchain platform allows people to record a variety of transactions including remote purchases, funded wallets, term purchases, cash disbursements, property records, health records, education records, and credit histories among others. This economic Identity provides a baseline for the unbanked to participate in the global economy.
Name: BitGive Foundation Web: http://www.disberse.com/ Headquarters: UK Theme: Humanitarian/Aid Delivery	Founded in 2013, BitGive is the first Bitcoin 501(c)(3) nonprofit, giving it tax exemption status at the federal level in the United States. BitGive has built a positive philanthropic representative organization for the Bitcoin and Blockchain industry, bridging the gap between an innovative technology and its practical applications for nonprofits and humanitarian work in the developing world.	BitGive has launched a platform, GiveTrack, for nonprofits to provide transparency and accountability to donors by sharing financial information and direct project results in real time. BitGive currently has two areas of focus: • Public Health • Environment

BitGive	BitGive has established strong partnerships and raised funds with well-known nonprofits including Save the Children, The Water Project, TECHO, Medic Mobile, and more. In 2015, BitGive announced its Bitcoin Charity 2.0 Initiative, which includes a variety of projects aimed at leveraging Bitcoin and blockchain technology to benefit charitable organizations worldwide.	
Name: Disberse Web: http://www.disberse.com/ Headquarters: UK Theme: Humanitarian/Aid Delivery DISBERSE	Disberse is a fund management platform that drives the transparent, efficient and effective flow and delivery of development and humanitarian aid. Disberse enables donors, governments, NGOs to transfer and trace funds through the whole chain, from donor to beneficiary, via intermediaries. Disberse ensures vital resources reach those they are intended to serve, for the greatest impact.	A financial operating network for global development, built on blockchain technologies. With this platform, customers can: • Transfer payments in real-time, managing multiple currencies and exchange rates • Trace the flow of funds throughout the chain, from donor to beneficiary • Deliver services and funds via voucher systems, mobile money, using enhanced ID practices • Complete and immutable data for reporting, auditing, and compliance trails and enhanced impact
Name: EduDAO Web: https://www.edudao.org/ Headquarters: U.S. Theme: Funding mechanism, Education EDU DAO	The mission of eduDAO is to provide a low-cost, fully accountable funding platform for the most underfunded education-related organizations while bringing people together to support and empowering the local communities to drive the changes in their neighborhoods.	EduDAO is using Ethereum to empower community partners in education to raise money for causes they care about, beginning with a school in the South Bronx in NYC.
Name: Grid+ Web: https://gridplus.io/ Headquarters: U.S. Themes: Energy/Environment	Grid+ creates economic incentives through market-based energy pricing encouraging the adoption of distributed generation (solar panels), and distributed energy storage (batteries).	Grid+ is developing a hardware and software stack to create a secure Ethereum-enabled gateway and connect Internet-of-Things (IoT) devices. The hardware gateway, or "smart energy agent" is an Internet-enabled, always-on appliance which will securely store

GRID+		cryptocurrencies and process payments for electricity in real-time. The Smart Agent will also be able to programmatically buy and sell electricity on behalf of the user.
Name: Moeda Web: Headquarters: Brazil, U.S. Theme: Financial Inclusion, Remittances moeda	Moeda offers simple peer-to-peer payments and a peer-to-peer remittance network to help drive entrepreneurs toward their goals. From micro business loans to large crowdfunded initiatives, the Moeda digital token, which is fiat pegged, can empower regular people across the world.	Moeda partners with local credit cooperatives that have existing relationships with customers in rural areas, but aren't always able to extend services at affordable rates, if at all. While Moeda vets and decides which projects can be featured on the site to receive loans, once those projects are reviewed, lenders can send money directly to the recipients. In September [2017], the company processed a $50,000 pilot loan to a cooperative farm in rural Brazil, making it possibly the first-ever such investment denominated in a cryptocurrency (the project's own Moeda tokens).[111] Source: https://www.coindesk.com/microlending-trends-startups-look-blockchain-loans/

[111] Aaron Stanley, "Microlending Startups Look to Blockchain for Loans," CoinDesk, 8 Dec 2017, https://www.coindesk.com/microlending-trends-startups-look-blockchain-loans/.

Appendix 2: Pilots

Title: “Building Blocks”
Location: Zaatari camp, Jordan
Implementers: UN World Food Program
Overview: World Food Program deploys blockchain technology to make cash-based transfers faster, cheaper, and more secure.
Link: https://www.wfp.org/news/news-release/blockchain-against-hunger-harnessing-technology-support-syrian-refugees

Title: “New Horizons in Charitable Giving”
Location: Denver, Colorado, U.S.
Implementers: The Distributed Giving Project
Overview: “Our pilot program, in partnership with the Denver Rescue Mission, provided 24 participants with access to funds they used to purchase food and drinks, toiletries, and other daily essentials from an approved vendor. Our goal was to provide an easy way for disadvantaged and homeless individuals to better their lives.”
Link: http://rmblockchain.org