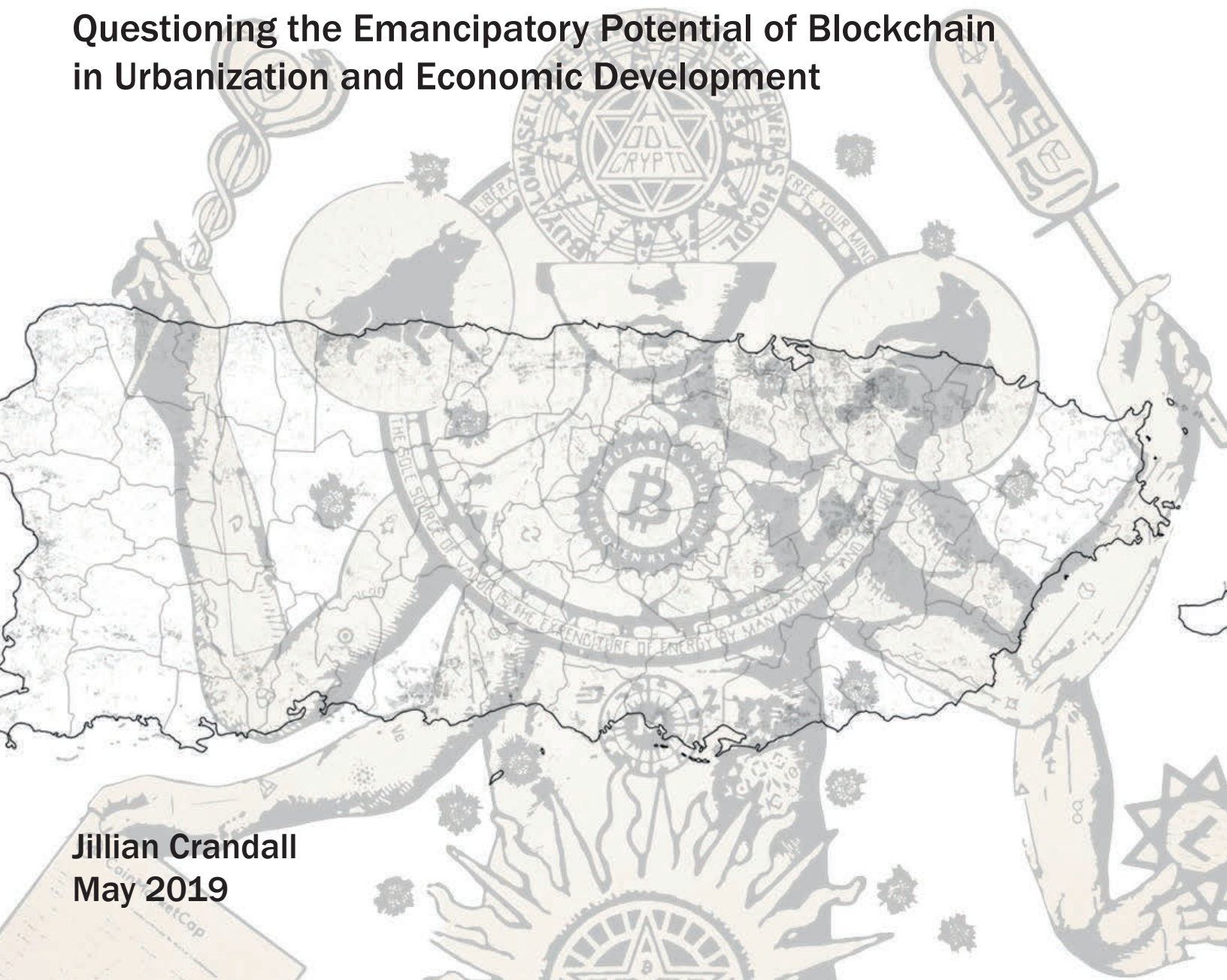


Cryptoeconomic Geographies and Contestation in Puerto Rico

Questioning the Emancipatory Potential of Blockchain in Urbanization and Economic Development

Jillian Crandall
May 2019



**Cryptoeconomic Geographies and Contestation in Puerto Rico:
Questioning the Emancipatory Potential of Blockchain in Urbanization and
Economic Development**

by

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Onward.

Table of Contents

Abstract	2
Introduction Overview and Chapter Descriptions	4
Methodologies, Positionality, and Contextualization <i>Insert: Methodologies, Positionality (Images/Diagrams)</i>	
Chapter 1 Socio-Technical Relations of Cryptocurrency and Blockchain Urbanization	24
<i>Insert: Socio-Technical Relations of Crypto and Blockchain (Images/Diagrams)</i>	
Chapter 2 Transactionary Publics and Cryptoeconomic Geographies in Puerto Rico	74
<i>Insert: Transactionary Publics and Cryptoeconomic Geographies (Images/Diagrams)</i>	
Chapter 3 Resistance and Contestation: Alternate Techno-Economic Visions	134
<i>Insert: Resistance and Contestation (Images/Diagrams)</i>	
Bibliography	166

Note: Cover Image by author. Credit for base image: *Roots of Energy*, by HODL Crypto (@hodlcrypto), blockchain artist | pro-crypto propagandist; originally print on metal panel, 20"x30".

Abstract

This thesis is about how the new techno-capitalist industries oriented around blockchain technology and cryptocurrencies are further marginalizing already marginalized groups in Puerto Rico. These industries are forming new distributed cryptoeconomic geographies with highly local impacts. While socio-technical relationships with crypto and blockchain are forming all over the globe, the scenario in Puerto Rico has the most the most at stake for residents who do not have a stake in cryptocurrency. Specifically, a group of crypto-proponents (primarily male-dominated US expats) is looking to establish a new “crypto-utopia” in San Juan. These transactionary publics, as I define them, are groups with certain discourses, ideologies, and rhetorics centered around individual transactions, goals, and gains. They work through vastly different power structures that allow them to act more autonomously and anonymously via digital technology. However – there are local, native Puerto Ricans, government organizations, and institutions engaging as well on the basis of economic development. From a feminist perspective, this thesis challenges the assertion that blockchain technology has emancipatory potential, particularly for Puerto Rico. I discuss the resistance and contestation against crypto-colonialism and economic injustice in Puerto Rico, and highlight strategies both with and without digital technology. Specifically, I question if the politics of blockchain technology are compatible with those of platform cooperativism. I conclude with a number of speculative future scenarios for how alternate techno-economic strategies may play out in Puerto Rico, and what their consequences may be.

Extended Abstract

This thesis is about how the new techno-capitalist industries oriented around blockchain technology and cryptocurrencies are further marginalizing already marginalized groups in Puerto Rico. These industries enact uneven spatial and material transformations across the globe, forming new distributed cryptoeconomic geographies with highly local impacts. These industries also enact new processes of urbanization in service to blockchain technology, cryptocurrency, and its proponents. While new socio-technical relationships with crypto and blockchain are forming all over the globe, the scenario in Puerto Rico has the most extreme complexities and contradictions, and the most at stake for residents who do not have a stake in cryptocurrency. Specifically, a group of crypto-proponents (primarily male-dominated US expats) is looking to establish a new “crypto-utopia” in San Juan. These transactionary publics, as I define them, are groups with certain discourses, ideologies, and rhetorics centered around individual transactions, goals, and gains. These groups are exploiting Puerto Rico’s laws, land, infrastructure, environment, and its situation of crisis layered upon crisis - to enact their own desires in space. They work through vastly different power structures that allow them to act more autonomously and anonymously via digital technology. However, crypto- and blockchain-oriented groups in Puerto Rico are not just comprised of like-minded expats – there are local, native Puerto Ricans engaging as well, with various intentions. These groups are varied, forming new relationships with existing infrastructures, publics, institutions, NGOs, non-profits, and governments.

In this thesis, I engage critical urban theory, feminist political economy, feminist digital geographies, and the emerging field of critical blockchain studies. One aim of this thesis is to appeal to academics critically studying blockchains, cryptocurrencies, and their socio-technical relations. I argue that broad-sweeping generalizations may not hold true in different scenarios and locations, especially in this nascent stage of crypto and blockchain development, but I suggest that much can be learned from empirical studies of how diverse and varied contextual relations are playing out on the ground. Another aim of this thesis is to appeal to blockchain developers, urban decision-makers, and governments looking to engage with blockchain in an equitable way, or as a means to empower marginalized groups. From a feminist perspective, this thesis challenges the assertion that blockchain technology has “emancipatory potential,” particularly for Puerto Rico. While the speculative industry around cryptocurrency (including mining bitcoin) can, in theory, be separated from the technology of blockchain itself, at this point in time, blockchain is still a predominantly capitalist industry. Its cryptoeconomic logics have certain embedded politics and assumptions about human behavior, centered around the individual and viewing everything as a transaction. Additionally, its technical architecture is built on top of already-existing digital infrastructures (the internet) that may further entrench existing inequalities. I argue that what “emancipatory” means, and its capacity *to be* emancipatory, is politically, socially, economically, and culturally context dependent. This is particularly relevant for Puerto Rico, which has been subject to serial-colonization, first Spanish, then (and now) United States, and perhaps new crypto-colonialism.

The fundamental aim of this thesis is to raise awareness of the exploitative scenario in Puerto Rico, and of the resistance and alternatives. In contestation with the actions of crypto-colonialism and male-dominated transactionary publics interested in further capital accumulation in service to their individual goals and gains, I foreground actionable emancipatory urban practice and alternate economic strategies in Puerto Rico – within and/or without blockchain, crypto, or digital technology. In solidarity, I feature a number of communal, collaborative, cooperative practices, including native Puerto Rican women-led organizations, community oriented publics, and explicitly anti-colonial economic projects in Puerto Rico, each interested in generating and supporting a local economy, improving community health and collective well-being. For alternate techno-economic strategies in Puerto Rico, I specifically consider two models – blockchain-based businesses and platform cooperatives, and question if the inherent or embedded politics are compatible. I conclude with a number of speculative future scenarios for how these strategies may play out in Puerto Rico, and what their consequences may be.

Introduction

Overview

I initially came to study cryptocurrencies, blockchains, and their socio-technical relations not from the perspective of finance or technology, not from start-up culture, nor desire for innovation, nor out of sheer curiosity, but rather from the perspective of space, infrastructure, and political economies and ecologies. More specifically, I was drawn into the “blockchain space” (a term I give to the seemingly alternate reality made up of people and groups who read about, think about, and create blockchain projects) from what I perceived to be a shockingly obvious socio-spatial injustice, that of self-proclaimed “Puertopians” – expats looking to build a “crypto utopia” in San Juan, Puerto Rico, oriented around their new blockchain businesses (Bowles 2018).

At the time I read this article in *The New York Times*, it was early 2018 and the blockchain had been around for a decade, but at that time I had not felt the need to engage. I knew a bit about bitcoin – one of my best friends in college had actually “mined”¹ some bitcoin from his laptop in our dorm back in our first year of undergrad, and he had been lamenting to me lately about how he should have held onto it.² I would later realize the hilarity of using a laptop to mine bitcoin (an impossible endeavor at the time of this writing), and the irony of extracting “free” electricity from a university that we paid to attend.

I am a practicing architect who at the time had decided to leave the coding and decoding of the blockchain to other more informed and technology-knowledgeable people. I would wait until I could read more about what other people had to say. A lot of people (mostly men, I noticed) had a lot of the same things to say. Decentralization, trust, transparency, privacy, security, immutability were the words of blockchain proponents – it was like a script – but according to popular writers and outlets, the blockchain would change the global economic order (Vigna and Casey 2016); it was a revolution (Tapscott and Tapscott 2016); and it would change the world (McKinsey 2016, Forbes 2018). These were grand, sweeping claims that seemed to me both too big to dispute and too impenetrable to try. But reading Bowles’ article in *The New York Times* would change that for me in an instant.

When I first read the article, I naively thought it had to have been published before Hurricanes Irma and Maria had wiped out the entire archipelago’s electricity infrastructure. On the contrary, it was published on February 2, 2018, exactly four months after Hurricane Maria had finally dissipated as a storm system after making landfall in Puerto Rico on September 20, 2017³. Realizing this, the situation became clearer. I was well-aware of the discontents of opportunism and disaster capitalism, but this... overwhelmingly male act of blatant spatial domineering conceived as an act of altruism was something else entirely. I had to research the context to begin to understand the situation.

I knew I would be coming to this from a position of privilege. As a white woman from New York, my home and family were not directly impacted by Hurricanes Irma and Maria. However, I had become hyper-attuned to news about Puerto Rico after the hurricanes. A friend and colleague had family who owned

¹ The process of “mining” bitcoin is an analogy for the process by which a computer is put to work confirming transactions on the bitcoin blockchain, essentially acting as an accountant for the network (thanks to Koray Çalışkan for helping me formulate this understanding). Mining bitcoin is not a process of literally seeking and extracting a digital coin buried somewhere on the network. Rather, a bitcoin is the “token” reward procured by the owner of the computer that first solves one of the cryptographic puzzles required to confirm a transaction. This process was referred to as “mining” for the first time by the pseudonymous Satoshi Nakamoto in the first blockchain whitepaper, “Bitcoin: A Peer-to-Peer Electronic Cash System” (Nakamoto 2008). It relates to the comparison of the gold standard, a type of digital metallism. This token reward was intended to incentivize participation, to compensate users for the energy expenditure and cost needed to run the computers to confirm transactions. On the blockchain network this process is not a direct extraction, but when we view the infrastructure that supports the bitcoin blockchain, the internet, the computers, and the energy infrastructure that powers them, we can appreciate the extraction analogy of mining. See (Zimmer 2017) for a metaphorical comparison between bitcoin mining and the silver mining economy of Cerro Rico de Potosí.

² In February 2018, one bitcoin (BTC) could be sold for about \$6,200 USD.

³ Richard J. Pasch, Andrew B. Penny, and Robbie Berg (April 5, 2018). Tropical Cyclone Report: Hurricane Maria (Report). Miami, Florida: National Hurricane Center. Retrieved April 10, 2018.

property in Canovas, and their house had been destroyed in the hurricane. As an architect and human, I was in solidarity. I would later take on hurricane recovery work for new roofs and emergency generators, and my architecture work would take me to San Juan several times over the course of two years.

My scholarly, professional, and personal worlds were colliding. As I continued research on blockchain and cryptocurrency and its spatializations in Puerto Rico, my colleague Abby Zan Schwartz and I received a fellowship to travel to Puerto Rico from the Zolberg Institute on Migration and Mobility. Our work sought to better understand the competing forces shaping the landscape of post-disaster development, displacement, and migration in Puerto Rico. We traveled in June 2018 and met with a number of local collectives and individuals who represented a range of perspectives on issues of climate justice, art, activism, digital technology, environmental justice, and future development in Puerto Rico, many with whom I would become close friends and collaborators. Our discussions focused on the overlapping migrations of climate-driven exodus, profit-driven settlement, as well as actionable strategies and alternate ways to (re)claim space. There was impassioned urgency, but a stronger desire for sustained, slow movement and work. This, for me, would become a long-term commitment.

I began as an “outsider” to Puerto Rico, but my life would quickly become entwined with the place and people. Perhaps more so, I was an “outsider” to the world of blockchain. At that time, I was not a programmer (though I have since learned some JavaScript and am working on a number of coding related data projects). When I began, I owned zero cryptocurrency, and that remains the same today. My awareness of being an “outsider” to both worlds affected my research process, and my stance in solidarity with Puerto Rico cannot render me a purely objective observer.

I began to weave my way into the blockchain space in Puerto Rico, and in New York City, attending meetups with groups such as Women in Blockchain which had distributed branches in Puerto Rico, New York City, and many other cities across the globe. At my first “Crypto Happy Hour” at Delavida in the nightlife hub La Placita, San Juan, I arrived early and the rooftop bar was already crowded. I spoke with over a dozen people (hip, young, mostly male), all of whom were involved in some way with crypto consulting, owning or working for a business related to cryptocurrency or the blockchain, or were conceiving startups to do so. Many had grand ideas for how the blockchain could be used, some directly related to Puerto Rico while others were more far-reaching. One man pulled me aside to a quiet area of the bar to lecture me about the blockchain, emphasizing over and over again that it was all about “*value*.” Others were very kind and welcoming, but none of the people I spoke to were born in Puerto Rico.⁴ There were a number of people from the mainland United States, but there was almost an equal number from outside of the United States. Most had recently moved there over the last couple of months. I even met a whole family (parents with two college-age sons) who had recently moved to San Juan and were pursuing various crypto-endavors.

A curious thing would happen when I would introduce myself to other attendees, similar to what would happen in meetups I attended back in New York City. During every event, when I introduced myself as an architect, people’s immediate reaction would be to ask something like, “oh, what platform?” with the assumption that I was a software architect. I would have to correct them and explain I was a building architect, physical, not digital. In doing so, I would also feel even more out-of-place. The conversation after would often become stilted. I just did not possess the right technical vocabulary with which to engage these individuals at the level they wanted. After the eighteenth time this occurred, I became convinced about an idea I had begun formulating that the digital architect vs. physical architect are undergoing an unrecognized competing dominance in actualizing and building the world.

I began to seriously consider - what is with this duality between the digital and physical worlds? It is not new to the blockchain (after all, we have “the Cloud”⁵), but this is both indicative of the Stack (Bratton 2016) and something beyond. Why is it typically technologists, and to an even greater degree blockchain

⁴ This does not mean that there are no Puerto Ricans working on blockchain projects or engaging cryptocurrencies. There are, which I will describe in more detail later in this thesis.

⁵ For essays documenting the political-economic materialities of “the Cloud” and data, reference (Burrington 2014, 2016)

proponents, who impose this duality? In creating a mental separation from the physical world, is this a means to eschew real-world issues and physical infrastructures in favor of focusing on a new digital overworld that hovers above the lesser physical world but rarely attempts to touch down? Is this not like the imposed duality of nature vs. urban? These are questions I address in this thesis. I make the argument that digital infrastructure and its politics must not be deemed separate from the new, existing, or absent physical infrastructure, its politics and discontents, all of which together have local material, environmental, spatial, and social implications. On another register, however, this imposed dualism indicates an imagined externality that privileges the “digital world” over the “physical world.” This is highly reminiscent of forms of colonization which have a history of imposing dualisms between the improved, advanced, sophisticated “new world” vs. the “old world”.

Cryptocurrency use and blockchain development are by no means unique to Puerto Rico, rather it is widely distributed across the globe. As I continued in my efforts to understand what exactly is cryptocurrency, and what is blockchain, I began to realize there was a disjunction between different groups of people who were writing and talking about it. This led me to assemble an empirically informed anthropology of the blockchain. From here, I became aware that cryptocurrencies and blockchains are forming new complex socio-technical relationships between humans and non-humans, software, hardware, new and already existing infrastructure, institutions, organizations, and agencies. By extension, these relations are embodied and enacted in space, in geographical concentrations and distributions. There are many ways that the blockchain has become urbanized, both intentional (ie. what can the blockchain do for urban and/or global development), and unintentional (ie. in service to the blockchain and the ideas of its proponents), or as a hybrid byproduct or side effect of activities related to the blockchain. I will present these in a taxonomy of blockchain urbanization which will be the aim of the first chapter of this thesis.

In Chapter 1, I will describe what I mean by urbanization, the process by which the “urban” is produced. I will then give an overview of cryptocurrency and the blockchain, particularly looking at the blockchain in three ways: one - as a technology; two - as an industry; and three - as a platform around which new ideas, imaginaries, speculative futures, and “utopian dreams” are being convened. There is much buzz around the blockchain and its potential to radically change the global order. Many writers have claimed that it is too soon to tell how this may play out, but I argue that we actually *can* project future urban scenarios by looking more closely at the proclaimed blockchain “ecosystem” as I define it - a socio-technical network of actors, ecologies, and systems (technical, political, social, and their cross-pollinations). With the rise of crypto-millionaires, massive energy expenditure from mining operations, and adoption by central banks, key institutions, and governments, it seems the real change may be in making capitalism, as a system, far more efficient. Much of current blockchain urbanization mirrors capitalist urbanization, and it does so in its peak forms (exploitation of legal and economic policy incentives, rent-seeking behavior, accumulation of surplus wealth, individual freedoms via the free-market, and individual private property ownership). However, blockchain urbanization and cryptoeconomic behavior contains a computational component that is inflexible, and creates new (techno)power structures.

It is also important to acknowledge that neither capitalism nor urbanization are totalizing ubiquities. I acknowledge the politics of difference (Young 1990) - differentiation via structural injustice, marginalization, exclusion, oppression, and domination - which produce highly uneven geographies of urbanization and capitalism, that do not roll out uniformly across all contexts. This is particularly the case for the US Territory of Puerto Rico, another term for a US colony. As a result, I attempt to engage in a critical urban theory “attentive of historical difference as a fundamental constituting process of global political economy” (Roy 2015), as well as aspects of feminist political economy. Here, I attempt to bring together an analysis of *contextual* processes of economization with processes of urbanization, examining how the blockchain as an economic technology is spatialized, and comparing this to how earlier economic technologies (particularly the ledger and double-entry bookkeeping) have been contextually spatialized, and how both urbanization and economization contributed to the development of wider political-economic systems such as capitalism. Where the first chapter of this thesis provides a general overview of blockchain and cryptocurrency use across the globe, it is well beyond the scope of this thesis to empirically research each specific context. Puerto Rico, however, represents one of many unique

scenarios, where multiple contesting institutions, publics, and individuals are investing in cryptocurrency, or developing projects using blockchain technology, with differing intentions.

Some groups and developers across the globe are leveraging blockchain's "emancipatory potential" for social good, while others are more interested in individual gain. Despite contesting ideas, I argue that these individuals and groups are forming a new "technologist class" that were previously excluded from decision-making processes about what the urban should be and do, and who now have increased agency through techno-power. Their work takes place building digital architectures on top of already existing digital and physical infrastructures with planetary reach and highly local impacts. Actions via blockchain architectures are moving toward full computationalism. It has been well documented how modern infrastructures such as roads and shaped potential actions and behavior⁶. I make the same argument for digital infrastructures and architectures. However, the tendency toward complete computationalism makes digital infrastructures and architectures more controlling than physical infrastructures. The potentials enabled or disabled by blockchain protocols will not just suggest actions and behaviors - they will dictate them. In order to understand the blockchain's "potentials", we must closely examine the technopolitics of the blockchain, its muddled (often unaddressed) political-economic ideologies and assumptions about human behavior, which have been pushed aside in favor of narratives around decentralization, consensus, and incentivization.

In Chapter 2, I will use methodologies described in this introduction by looking at the blockchain as a technology, industry, and platform for visioning ideal futures, and by analyzing how these are spatialized, materialized, and experienced on the ground in Puerto Rico. I will address the blockchain ecosystem in the context of the environment and broader ecology of systems within which Puerto Rico is situated, particularly after Hurricanes Irma and Maria, with already existing layers of inequality such as serial-colonization, extractionism, and opportunism. I will focus on the new agencies, groups, and institutions forming around the nucleus of the blockchain in Puerto Rico, and their relationships with existing publics and institutions. This includes the influx of "Puertopian" expats after Hurricanes Irma and Maria in 2017, incentivized by Acts 20/22⁷, as well as new businesses who want to use Puerto Rico as a test case for their blockchain-based services. I will also address how urban decision-making processes are being affected, particularly in relation to the Puerto Rico Blockchain Advisory Committee in the Economic Development branch of the government, who are in conversations with technologists and tech translators about how blockchain can "benefit" the Puerto Rican economy⁸. While these groups are "harnessing the power of crypto capital,"⁹ it remains uncertain if the blockchain can be used outside of capitalism in Puerto Rico, particularly to support cooperatives or communal groups who have returned to small-scale farming, and community-owned solar microgrids. If not, will there be room for contestation as to how Puerto Rico's urban support infrastructures are organized, owned, and operated in the near future? I ask - where do groups such as "Women in Blockchain Puerto Rico" fit in, trying to work with blockchain for social impact on the inside. One of the core tenants of the blockchain is its utility to computationally determine "consensus", however, it is imperative that there be room for contestation of groups who do not have the privilege, access, or time needed to understand and engage cryptocurrency and the blockchain, and for those who vision alternate techno-economic urban futures independent of the blockchain entirely.

To investigate the position that alternate currencies are often proposed as a response to a lack of trust in the existing exchange system, or as a response to moments of failure in capitalist systems (Gibson-Graham 2008), or as an explicit resistance to capitalism (North 2014), I will review Puerto Rico's economic transformations under United States colonialism. I will then address the contemporary crises, namely the public debt crisis, and the climate crisis embodied in the disaster of Hurricanes Irma and

⁶ For example, low overpasses planned by Robert Moses prevented public buses, and by extension lower income people of color, from using "public" beaches on Long Island. See (Berman 1981).

⁷ I will elaborate on these Acts more throughout this thesis. However, for further reference, see <http://puertoricotaxincentives.com/>

⁸ I will elaborate on these governmental relationships in the second and third chapters of this thesis. For more information, see (Costa 2018).

⁹ From WaterChain's website, "We plan to harness the power of crypto capital to help the world meet the growing water crisis." <https://www.waterchain.io/>

Maria. In doing so, I stray from the positivist notions of crisis as occurring from a moment in time when something “went wrong,” and rather I critique the longstanding normative practices and networks of relations that led to the situation of crisis (Barrios 2017).¹⁰ I will also center feminist political economy in geography (and feminism in Puerto Rico) in comparing dominant methods of exchange with the largely unrecognized methods of exchange. Is cryptocurrency even being used as a means of exchange in Puerto Rico? This I specifically address in Chapter 2.

Relating the crisis addressed above to climate disaster, I trace the highly local impacts and inequities of cryptocurrency trading and Bitcoin mining (which extends to cryptocurrency and blockchain technologies) on Puerto Rican residents, micro-economies, vulnerable architectures, infrastructures, landscapes, and urban ecologies. This includes tracing the massive literal extraction of power from nature, taxing an energy grid with a history of vulnerability, rendered more unstable after Hurricanes Irma and Maria; as well as tracing through historic electric power infrastructures the exercise of political and legal power through political and economic policies on an archipelago subject to serial colonization (Spanish, American, now Crypto?) whose residents are citizens of the United States, but who live on a land that contradictorily belongs to - but is not a part of - the United States. This analysis will include a commentary on the politics of cryptocurrency and processes of crypto-economization through the lenses of disaster capitalism and territorial/colonial politics; and visa versa. In this, I intend to illustrate how the urban affects of the blockchain, like capitalism, are not uniform but rather context dependent, but at the same time, may possess common transferrable features (vulnerability and financial incentivization, ex. tax laws such as Acts 20/22).

In Chapter 3, I discuss the resistance and contestation against crypto-colonialism and economic injustice in Puerto Rico, and highlight strategies for resistance both with and without digital technology. I discuss a number of contesting visions for the economic future of Puerto Rico, and the different groups who hold these visions. From a feminist perspective, I address who each of these economic visions seek to benefit, and who are excluded. For techno-economic strategies posed as being “emancipatory”, I break down the claims, citing varied case studies from around the globe. In relation to Puerto Rico I specifically consider two models – blockchain-based businesses vs. platform cooperatives. I address the challenges, constraints, and feasibility of each as they relate to the political, social, and cultural context of Puerto Rico. By briefly analyzing a number of case studies from outside of Puerto Rico that aim to combine blockchain with platform cooperatives, I question if the inherent or embedded politics of blockchain technology are compatible with those of cooperativism. I conclude with a number of speculative future scenarios for how these strategies may play out in Puerto Rico, and what their consequences may be.

Methodology, Positionality, and Contextualization

In this thesis, I engage a critical urban theory that is “attentive of historical difference as a fundamental constituting process” (Roy 2015) of urbanization and economization in Puerto Rico. I also engage aspects of feminist political economy - at the heart of which is “emancipatory social change” (Derickson 2015, 2016) - in order to inform actionable critical urban practice. When discussing Puerto Rico I focus on knowledges produced within Puerto Rico and the diaspora, particularly post-colonial, Caribbean studies, and Puerto Rican feminism and feminist studies; versus rhetoric and claims made about Puerto Rico from outside.

In terms of critical urban theory, the definition of “critical”¹¹ here I borrow (with caveats) from Peter Marcuse (2009) with critical being defined as “an evaluative attitude towards reality, a questioning rather than an acceptance of the world as it is, a taking apart and examining and attempting to understand the world.” Yet my efforts are less grandiose than attempting to understand the entire world, and instead I choose to focus on a specific context and the varied networks of relations involved. The definition of “theory” I also borrow from Marcuse (2009), though I have substituted his use of the word “world” with

¹⁰ In this analysis, I acknowledge Janet Roitman’s call to question which possibilities the concept of crisis enables, and which it forecloses. (Roitman 2013)

¹¹ Though it stems from Marx in 1843, is reintroduced by Horkheimer in 1937, later Adorno, Herbert Marcuse, and Habermas in different ways.

“context,” with theory defined as: “the attempt to understand, to explain and to illuminate the meaning and possibilities of the [context] in which practice takes place,” as well as “the conscious and articulated aspect of practice, of action. It is developed through action, and in turn informs understanding and understanding informs practice.” This last sentence is hopeful, although as even Marcuse admits, critical theory informing critical practice is not always (perhaps most often not) true. Critical urban practice, of course, can happen without critical urban theory. Conversely, critical urban theory can happen without informing critical urban practice, as is very often the case with academic texts.

As a graduate student at The New School, a guest lecturer/critic at a number of universities in New York, and a registered architect practicing full-time in New York City with work in Puerto Rico over the last decade, I have attempted to balance myself between academia and practice. At times there is a disconnect. Practitioners joke about the impracticality and jargon of academics; while academics lament that practitioners fail to seriously consider the content of academic arguments. In my architecture career, my job is to coordinate the design and construction of complex urban-sited projects with multiple governmental agencies, and design disciplines (engineering, environmental, architectural, landscape, planning). There is much about this process that academics cannot fully understand unless they have worked in the industry first-hand. Still, practitioners could be more open to learning from critical academic discourse. But all together, academics *and* practicing architects, designers, and even planners have only so much power and influence on what gets built, how, why, when, and for whom. Ultimately, the primary urban decision-making factors tend to come down to economic and legal frameworks, policy and regulatory requirements, as well as the goals of “economic development,” “urban development,” or “global development,” that affect a particular context. Because of this, my provocation is not to place the sole responsibility on urban practitioners to reach out to critical scholars, but also for critical scholars to engage more readily with practitioners who are more closely linked to urban decision-making processes. This includes: 1) urban and economic policy-makers in government; 2) consulting firms who advise said policy-makers; 3) developers (private and non-profit); and 4) planners, designers, architects, engineers. At the same time, there is a strong precedent of academics and practitioners (particularly feminist and activist scholars), working in a committed, sustained way¹² with communities to affect positive change on the ground. This is particularly relevant if the existing systems and powers are unresponsive to strategies for positive change, and continue to be racist, sexist, misogynist, and otherwise inequitable.

Critical urban theory includes challenging the formations and assumptions of *urban knowledges*, and calls for a critique of ideologies, power, inequality, injustice, and exploitation (Fraser 1985). Neil Brenner (2013) suggests there is a possibility for a better, more democratic, just form of urbanization even if it is currently suppressed by dominant institutional practices and ideologies. How “the urban” is defined, understood, and conceived of by primary decision-makers has everything to do with how it is operationalized, to what ends, and for whom. Brenner’s theses on urbanization calls important attention to the “emergent process of extended urbanization,” that produces a “variegated urban fabric that, rather than being simply concentrated within nodal points or confined within bounded regions, is now woven unevenly and yet ever more densely across vast stretches of the world” (Brenner 2013). The geographies of extended urbanization are no longer contained to “densely concentrated populations and built environments of cities,” (Brenner, 2013) but rather includes urban support infrastructures built in areas that have traditionally been seen as rural (from water reservoirs, to landfills, to undersea internet cables, to data centers located in remote areas). “Geographies of extended urbanization” is a useful concept to describe how I conceive of blockchain urbanization and cryptoeconomic geographies, which are comprised of new digital/physical infrastructures and architectures. However, they have highly local impacts and unique socio-technical relations, and so it is useful to work across scales. When discussing blockchain urbanization and cryptoeconomic geographies as they relate to Puerto Rico, I propose three modifications to the concept of geographies of extended urbanization.

First, in Puerto Rico, the city with the biggest blockchain and crypto presence is San Juan, which is where I focus most of my empirical research. I argue that the city is an important empirical object because it is both an outcome and actor in transforming *processes of urbanization*. It is also an important actor in embodying and enacting *processes of economization*. This tie I believe is critical for any informed

¹² Not simply paying lip-service to terms like “community engagement,” or “participatory design.”

research on how technology-driven economic policies, and economic technologies themselves (such as blockchain), are to impact specific futures of inhabitation and exchange. Later in this chapter I will clarify what I mean by processes of economization (drawing from and modifying Caliskan and Callon (2009), and processes of urbanization (drawing from and modifying Kate Derickson's approach to "Urbanization 2" (2014).

Second, as a U.S. colony, Puerto Rico has a history of difference from western processes of urbanization as experienced in the mainland United States. Feminist scholars beginning with Ananya Roy advocate for a critical urban theory "attentive of historical difference as a fundamental constituting process of global political economy" (Roy 2015). Here it is important to acknowledge how the politics of difference¹³ (via structural injustice, marginalization, exclusion, oppression, and domination) affect processes of urbanization in specific contexts in diverse ways. As opposed to overarching narratives and "conceptual frameworks that emphasize the urbanization of everything," Roy references Chantal Mouffe (2000) to emphasize the importance of "paying attention to the "constitutive outside" of the urban and to the always incomplete process of becoming urban" (Roy 2015). The "constitutive outside," I use to describe a place that is operationalized and integral to the functioning of a larger system or place, while at the same time being excluded from (or outside of) said location and all entitled benefits of the system in the process. This is quite literal for Puerto Rico, as it is a land both *owned by* the United States, and used by the United States as an experiment in many ways, however, in its status as an *unincorporated territory*, the protections of the U.S. Constitution do not apply, nor are its citizens (despite being "citizens of the United States") granted the same rights as those in the 50 states.

This "constitutive outside" is important to consider in regards to the study of Puerto Rico and its relation to the United States. As Yarimar Bonilla put it, Puerto Rico is "a place that often falls through the cracks of both American Studies and Latin American/Caribbean Studies, and which is not necessarily thought about as a site from which to think about the United States or to speculate about American futures" (Molinari and Bonilla 2019). Many narratives about the United States (including those discussing overarching affects of neoliberalism and capitalism) start with the assumption that the United States is the contiguous or "mainland" United States. Some narratives include Alaska and Hawaii, but fewer lack consideration of Puerto Rico, perhaps because its status and relationship to the United States is not made clear to those educated within the 50 states. There, we learn Puerto Rico is a "Commonwealth," or a US Territory gained from Spain as part of the Treaty of Paris signed in 1898 to end the Spanish-American War, where Spain relinquished all claim of sovereignty of Puerto Rico (along with Cuba, Guam, and the Philippines - though their histories and current status exceeds the scope of this paper) to the United States. In Puerto Rico the euphemism for its status in Spanish is known as "*Estado Libre Asociado*". Legally and politically, Puerto Rico is neither a state, nor is it a sovereign republic - it is a *de facto* colony.

Puerto Rico is legally defined as property of the United States¹⁴. There is perhaps no better example of a "constitutive outside" than this. As Andrew Mercado-Vázquez emphasizes, the legal foundation upon which the Puerto Rico-US relationship would be constructed is based on the US Supreme Court determination in the Insular Cases, which determined that Puerto Rico was a *non-incorporated* (as opposed to incorporated) territory, meaning Congress is allowed to use its plenary powers as described in the Constitutions Territorial Clause, to treat Puerto Rico without regard to the Constitution¹⁵. In other words, as a non-incorporated territory, Puerto Rico *belongs to* but is not a *part of* the United States. Its people are United States Citizens, but they live on a landmass that belongs to the United States, with legal and economic policies that as customizable to the will of the legislative bodies, and do not have to follow the US Constitution.

¹³ Iris Marion Young, *Justice and the Politics of Difference*

¹⁴ Article 9 of the Treaty of Paris; and the US Constitution - Article 4, Section 3, Clause 2, (The Territory Clause) whereby Congress has "the power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States." It would not be until the Foraker Act of 1900 that Puerto Rico was allowed to establish a limited local government, with a Governor appointed by the US President, and with Congress holding ultimate veto power over any law approved by the newly created legislature.

¹⁵ See the US Insular Cases

The third modification to the concept of “extended urbanization,” in Puerto Rico specifically, is that there are still clear differences between “urban areas” and “rural areas,” particularly in terms of internet access, and the credit vs. cash-based economy. Those differences are key to determining whether or not blockchain can be “emancipatory” or if it is further entrenching existing inequalities. It is also important for understanding on the ground experience, and relations to geopolitical economic structures, such as capitalism, and intentional economic transformations, which will be expanded upon in this thesis. Like urbanization, capitalism (as Vinay Gidwani argues in *Capital, Interrupted*), is a “geographically uneven social formation where heterogeneous value-creating practices (‘labors’) are sutured together in lesser or greater degrees of repair (but where the wounds of that suture are never completely effaced)” (Gidwani 2008). While there may indeed be generalizations that hold for multiple contexts, understanding their differences in urban and rural dynamics in processes of economization, and processes of urbanization, are key to be able to inform actionable strategies for emancipatory change.

I emphasize that *concepts, understandings, and perceptions* of “the urban” change based on the specific context, which have much to do with the feedback loop of how the urban is produced relative to that context. Drawing from post-colonial studies and her experiences in India, Roy pushes us to consider the “entanglement of the agrarian and urban questions,” recognizing the rural not as an antonym or converse of the urban, but rather as “its necessary supplement, marking populations where the government of poverty is different, where the relationship between state and beneficiary is of a different socio-spatial character” (Roy 2015: 5). This is particularly relevant in the urban and economic development of Puerto Rico, where economic transformations play out differently with clear intent, between the agricultural areas, the rural mountainous western and southern regions, and the urban coastal areas on the east. Geographically, many mentally associate Puerto Rico with its main island, but in actuality Puerto Rico is an archipelago, comprised of the main island and two other human inhabited islands of Culebra and Vieques, along with a series of smaller islands, cays, and islets.

As I have argued, in critical urban theory, it is not enough just to be critical, it must also be actionable for (potential emancipatory) urban practice. While inspirational, Marcuse’s provocation that critical theory can solve problems by the “expose, propose, politicize” strategy (Marcuse 2009: 193), it is important to consider Roy’s insistence of the “textured plurality” of struggles and desires. As Derickson further elaborates, this “forces us to chart courses toward emancipatory futures that confront, rather than attempt to eradicate, their undecidability” (Derickson 2015: 5). This is of utmost importance when writing about the struggles in Puerto Rico, and when considering potential futures for Puerto Rico, which I will discuss in greater detail in Chapter 3. “The Puerto Rican people” are only a unified body insofar as geographical location of birth; every other aspect is one of diversity and difference. There are many identities and publics in Puerto Rico, many of which exist along cultural, gender, and racial lines, others of which come together around social, political, and economic issues.

Derickson revisits Fraser’s definition of the “injustice of cultural misrecognition,” and presses that any claim of a totalizing political “we” or a uniform body “must contend with its own geographical and structural limitations. To fail to do so is itself cultural misrecognition” (2015). Furthermore, in terms of the production of knowledges, Derickson writes, “difference matters with respect to the social location of the knower, the geographies of the case studies, and the intellectual traditions from which knowledges emerge” (2015). As I have already begun to do in this chapter, I draw heavily from knowledge produced in Puerto Rico, from progressive economic and legal policy perspectives, to activists, scholars, and practitioners who are addressing Puerto Rican issues around its colonial status. This is reflected in all of the chapters, but features most prominently, via interviews and on-site empirical research, in the last two chapters. I do not come to this research from a top-down position of expertise. I come from a position within and amongst, a listener, and a collaborator.

There is not one Puerto Rican story related to current and past urban and economic transformations of Puerto Rico, but instead many. However, there are overarching currents that shape identities, shape what it means to be Puerto Rican. As Andrew Mercado-Vázquez explains to me, “The development of the identity of Puerto Rico took place within the construct of colonialism, which implies a dependency, a constant dependency. Unlike other nations, unlike other identities that might have historical references

when they had a huge success, or a great amount of power, in the case of Puerto Rico, there's no reference point where we are able to say 'we were successful then, and we were calling the shots.' That type of psychological affect, that constant narrative - it's part of who you are - it's part of what being Puerto Rican is. It's your history." In a separate interview, Noemi Segarra has a similar outlook: "The relationship of colonialism is in everything we do. We can't push it away, *entiendo, pero*, the good thing about [Hurricane] Maria is that it has lifted off something, so that we can look at it [colonialism] from the inside out, *and* from outside looking here. In the midst of everything there is that tension. Puerto Ricans are American citizens, but we don't get to vote for US president. Help after Maria came at a totally different speed [as it would in the mainland United States]. It has to do with geography, but it has to do with politics and priorities. It's the opposite of utopia, it's looking at *how* this came to be." To Noemi's point, I choose to use my position to feature narratives that may not be readily known, to describe the "in-between spaces of everyday life as it shapes and is shaped by power structures, social relations, political-economic processes, and geopolitical orders that are expressed at more-than-local scales" (Derickson 2014).

Outside of the tech-community in Puerto Rico, I would bring up the topic of crypto with people I met in Puerto Rico, from taxi drivers, bartenders, people in the park, and my other interview contacts. Almost all of them acknowledged the "crypto-kids" or "crypto-bros," as they would refer to them. However, many admitted they had neither the time nor energy to commit to figuring out this phenomenon of cryptocurrency and blockchain, as they were still rebuilding after the hurricanes, and/or focused on immediate life issues on the ground. Noemi says, "As Puerto Ricans we don't know the whole story. When you're barely surviving, you can't keep up with all of the news. It's exhausting. On top of the hurricane trauma, there is this, and you have to block it out...one thing at a time." When I ask if she has heard of some crypto-proponents looking to buy up property across Old San Juan, she says no. "We don't even realize, or we realize after it's over and too late," she says, "And this is why it's important to have this connection with people elsewhere, interested in what's going on here, because as Puerto Ricans, we need support. And it's not going to come from the [venture capitalists] and crypto-mania."

By listening to discussions in the "blockchain space" from a *socio-spatial* perspective rather than a purely *technical* perspective, I believe situates me in a unique position, within an emerging area of "critical blockchain studies" that has counterparts in law (Walch 2019), media studies (Golumbia 2016), and geography (Zook and Blankenship 2018), environmental geography (Howson 2019), and economic anthropology (Caliskan 2018). However, I aim to bring site-specific contextualization to this area of critical study. At a broad level, I describe how blockchain is fundamentally an economic technology, concerned with matters of transaction and accounting, but rather than an analysis of the technology itself, my thesis is about the uneven socio-technical relationships that form around it, connected to Puerto Rico.

Processes of Urbanization, Economization, and Digitalization

This thesis is situated at the intersection of three tendencies that are mutually constitutive in Puerto Rico: urbanization, economization, and digitalization. Over the last five years, Puerto Rico has been moving toward a more "digital economy," as described in greater detail in Chapters 2 and 3. With policy incentives such as Acts 20/22, cryptocurrency traders, investors, and blockchain businesses are following the money, and are landing in cities such as San Juan. This digital economy has political, social, spatial implications for urbanization, or re-urbanization, as the case may be in San Juan – where blockchain and cryptoeconomic logics are remaking the urban for a specific, exclusive group of people.

In terms of political-economic processes, rather than looking at "the economy" or "the economic" as totalizing or universal subjects/objects, my research focuses on the diverse and varied "processes of economization" (Caliskan and Callon, 2009) of specific contexts. At the same time, it is important to acknowledge that most of the primary urban decision-makers (particularly for Puerto Rico) still take a totalizing approach, focused on producing a certain desired "economy" through "economic development" measures that include legal policy frameworks and tax incentives. This is common for those influenced by classical and neoclassical economics.

Research around "processes of economization" should engage a productive feedback loop, that, as Caliskan and Callon suggest, is never complete but always in the making. I use this method of research

when I analyze the role of blockchain and cryptocurrency in the design and production of space, and the new technology-oriented economy that is developing in Puerto Rico in diverse and varied ways. In proposing a shift from “the economy” to “the economic” to “processes of economization” as object of analytical focus, Caliskan and Callon offer a method that can be used to study processes in-motion, rather than studying only the past. We have reached an “all hands on deck” situation that demands critical analysis of processes in-progress. To ask what is happening, and what may happen in the future is of the utmost importance, with technological speed reaching unprecedented rates, combined with global/climate crises necessitating quick responses. I add that focusing on the explicit or implicit contradictions in these processes is important to help us ask the right questions, so that we may reach a deeper understanding, and, together with things/objects/actants, bring into being a preferable, more just future.

All of the above have identifiable materialities that can be analyzed in their contribution to processes of economization. However, I would also argue that what emerges in discourse as “non-material” is equally important to analyze and consider in relation to the material. While Caliskan and Callon place emphasis on the increasingly dominant role of materialities in processes of market-making, I argue that in the last decade since their article was published, there has emerged a competing dominance in the role of “non-materialities” in the production of markets that is important to consider. By “non-materialities,” I refer to the discursive objects that tend to be considered as non-physical, non-spatial, or otherwise non-material (ex. the internet, the “cloud,” the blockchain, cryptocurrencies). While these discursive objects may be concepts and ideas that may not have a physical form on the first order, I argue that in just about every case these have distinct physical, spatial, material presence and implications.

Emphasis on the material should also include its non-material counterparts, and more importantly address the tensions, contradictions, and blurs between the two. This is especially so for the “digital”, which certainly has material implications and can be constituted materially, but ontologically is defined as the systems that “translate all inputs and outputs into binary structures of 0s and 1s, which can be stored, transferred, or manipulated at the level of numbers, or “digits” (Lunenfeld 1999). Ontologically, the digital is just that – digits, numbers – *representations*. However, the digital can also reference the “material technologies characterized by binary computing architectures; the genre of socio-techno-cultural productions, artefacts, and orderings of everyday life that result from our spatial engagement with digital mediums; and the logics that both structure these ordering practices as well as their effects.”

Because blockchain is a *digital* economic technology, I engage the varied academic discourse on “the digital.” Within critical theory and critical data studies, there has been much writing and research produced around the social, political, and economic relations of digital infrastructure, emerging technologies, and Big Data, with some that acknowledge socio-spatial implications and questions of equity. Much of this important critical work comes from Science and Technology Studies (STS), sociology, anthropology, media studies, and geography, with fewer centered in urban studies and urban theory. While I am by no means advocating for the silo-ing of academic fields (quite the opposite), it is telling that *within* urban studies, the design professions, and the new fields of “urban analytics” and “urban data science,” much research on digital tools of production within architecture, planning, and governance remains techno-positivist.

With blockchain being enthusiastically touted as a “tool for emancipation,”¹⁶ or as a solution for problems like refugee identification, hunger, and labor¹⁷, this calls into question the idea that can that structural problems can be solved with new technology (technosolutionism). In *Artificial Unintelligence*, Meredith Broussard pushes further with the concept of technochauvinism, the “collective enthusiasm for applying computer technology to every aspect of life,” (Broussard 2018) which seems to take precedence over designing a system or solution that actually gets to the root of the problem. The mainstream eagerness for “innovation” and “revolution” that is repeated so often in blockchain lingo, is a reflection of technochauvinism, which has more interest in drumming up excitement for the technology’s “potentials” rather than seeing if it actually works, or considering its implications and consequences. However, rather

¹⁶ <https://www.ccn.com/blockchains-will-enhance-the-economic-and-socio-political-emancipation-of-humankind>

¹⁷ World Economic Forum: <https://www.weforum.org/agenda/2018/06/three-ways-blockchain-change-refugees-lives/>

than outright dismissing technology, if we work to understand its limits, rather than asking what we *can* do with it, the question may be what we *should* (and *should not*) do, to influence more equitable systems.

There are other important exceptions to techno-positivism in urban studies, for example, Graham and Marvin who make the argument in *Splintering Urbanism* that new digital tools and mediated infrastructures were key components of the emerging neoliberal city, becoming increasingly privatized but also important for enacting governance and control, and creating particular power geometries (Graham and Marvin, 2001). This point is also made by Amin and Thrift, from the perspective of poststructuralist theory, considering “the ways in which the digital production of space and mobilities is mediating new forms of governmentality,” furthermore, where “[n]early every urban practice is becoming mediated by code” (Amin and Thrift 2002). However, while these points may hold true for many western and northern contexts, I would challenge the insistence on totalizing narratives around “the neoliberal city” and “urban practice,” and “governmentality,” and instead provoke specificity, acknowledge the spaces of difference and exception in each case. Recent “code/space studies” in geography have at least acknowledged difference in the relationship of software and code to the production of space. For example, Kitchin and Dodge describes the inflexibility of code, when used, “code and space were mutually constituted as ‘code/space’: if the software failed, the space could not be produced as intended” (2011). However, these occurrences are not universal, but rather indicative of highly contextual socio-technical-spatial relationships. As they describe, “code/space emerges in contingent, relational, context-dependent and imperfect forms” (Kitchin and Dodge 2011).

A report by McKinsey claims: “By 2020 the number of smart cities will reach 600 worldwide, and 5 years later almost 60 percent of the world’s GDP will be produced in them. Digital technologies could become the engine of economic progress, and blockchain, without a doubt, could be one of them.”¹⁸ In contexts across the globe, blockchain technology is posed to be used in conjunction with “smart city” technology, as the operating system on which IoT devices run, and where AIs can communicate with each other via Smart Contracts and ERC-20 tokens. New organizations have formed such as the Global Blockchain Business Council, proclaimed as the “leading industry association for the blockchain technology ecosystem, which brings together innovative organizations and founding thought-leaders from over 40 countries to advance understanding of blockchain technology amongst global regulators and business leaders. Conceived on Sir Richard Branson’s Necker Island, the GBBC is a Swiss-based non-profit, which launched formally during the 2017 Annual World Economic Forum in Davos, Switzerland.”¹⁹ It is important to note that tech giants such as CISCO, IBM, SAP²⁰, and Microsoft, companies that play a key role in “smart city” development projects, have all have entered the new blockchain industry and are steering conversations at the business level. For example, IBM has partnered with Smart Dubai²¹ to launch a government supported blockchain platform to tap into the “potential of blockchain to revolutionize its government processes and citizen services.”²²

Looking at the relationships previously mentioned, we can see that blockchain is becoming a new techno-capitalist industry that is operationalized by existing tech corporations with terms such as “empowerment,” “emancipatory,” “innovation,” and “potential.” In many contexts including Puerto Rico, the concept of “crisis” is operationalized by technology corporations, governments, non-profits, and NGOs. We see blockchain explored in cities like Dubai, which already have vested interests in becoming a “Smart City,” however, we also see other contexts of “crisis” being operationalized – with blockchain posed as the solution, which has become part of the business model. This relates to what Orit Halpern et. al refer to as “the smartness mandate” – promises about “computation, complexity, integration, ecology, and crisis,” used to “mark the fact that the assumptions and goals of “smart” technologies are widely accepted in global policy discussions and that they have encouraged the creation of novel infrastructures that organize environmental policy, energy policy, supply chains, the distribution of food and medicine, finance, and security policies” (Halpern 2017).

¹⁸ <https://meetingoftheminds.org/using-blockchain-in-smart-cities-29319>

¹⁹ <https://gbbccouncil.org/about-us>

²⁰ <https://www.sap.com/products/leonardo/blockchain/what-is-blockchain.html>

²¹ <https://www.ibm.com/blogs/blockchain/2017/04/blockchain-in-dubai-smart-cities-from-concept-to-reality/>

²² <https://www.ibm.com/blogs/think/2018/11/how-the-uae-is-empowering-its-citizens-through-blockchain/>

In this case we can substitute the word “smart” with “blockchain” – both buzzwords themselves. Blockchain has been proposed for use in carbon trading (Howson, et. al. 2019); to make supply chains more efficient^{23 24}; to monitor the distribution of food²⁵ and medicine²⁶; to facilitate payments across borders²⁷; and to make finance and health records (Dubovitskaya, et. al. 2017) far more “secure”²⁸. In Puerto Rico, Abartys Health is exploring the use of blockchain for health records²⁹; Red Cat, is using the technology to monitor drone accidents for insurance reporting³⁰. This will be explained in more depth in Chapter 3.

It is beyond the scope of this thesis to unpack the governance and socio-technical relationships in each of these cases, however, I attempt to do so with the context of Puerto Rico. Puerto Rico’s scenario of crisis layered upon crisis (hurricane and climate crisis on top of the public debt crisis) has been operationalized by governments, groups, and businesses posing crypto and blockchain as a solution. Using empirical research, I make the case that in the context of Puerto Rico, blockchain urbanization is incentivized by economic development initiatives from the US government, Puerto Rican government, technology companies and supranational organizations. However, I argue that it is also as a means for tech-savvy individuals to act outside of government knowledge if not outside of government regulation, for example through the vehicle of the “Security Token Offering” (see Chapter 2).

I argue that academics can approach a critical study of cryptocurrencies and blockchains from a similar perspective of critical “smart city” studies. Within urban studies and urban theory, the idea of the “smart city” is dominated by techno-positivist narratives, but it is also approached by critical urban perspectives, for example Adam Greenfield’s *Against the Smart City* (2013), and Anthony Townsend’s *Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia* (2013). Looking at “smartness” as an operator, Marvin argues that Smart Urbanism (SU), is increasingly called-upon or “enacted by technology companies, national governments and supranational agencies alike, claim a supremacy of urban digital technologies for managing and controlling infrastructures, achieving greater effectiveness in managing service demand and reducing carbon emissions, developing greater social interaction and community networks, providing new services around health and social care etc.” Furthermore, Marvin argues, “smart urbanism is being represented as the response to almost every facet of the contemporary urban question” (Marvin 2015). This compilation incorporates case studies in both the Global North and South to describe the increasing tendency of techno-solutionism to address urban problems, which is key to showing variation and difference as well as similarities. However, we must question not only the specifics of relations, but also specify what is meant by “the contemporary urban question,” and acknowledge that key urban issues may change based on the context. An example of nuanced specificity within overarching tendencies is Ayona Datta’s research on Dholera, the first Indian “smart city,” where she describes its utopian imaginings, where global models of the smart city are locally/regionally provincialized (Datta 2015). Through empirical research, Datta makes the case that in the context of the Gujarat state, smart urbanization is seen as a business model rather than a model for social justice. For Puerto Rico, I ask how does cryptocurrency and blockchain galvanize individuals and groups with diverse intentions, from venture capitalists looking for individual gains, to corporations looking to establish a new market, to local Puerto Rican tech companies such as Link Puerto Rico who are looking to work with communities to address their identified needs (see more in Chapter 2).

²³ <https://www.forbes.com/sites/bernardmarr/2018/03/23/how-blockchain-will-transform-the-supply-chain-and-logistics-industry/#516878f65fec>

²⁴ <https://www.mckinsey.com/business-functions/operations/our-insights/blockchain-technology-for-supply-chains-a-must-or-a-maybe>

²⁵ <http://www.ift.org/Knowledge-Center/Learn-About-Food-Science/Food-Facts/The-Potential-of-Blockchain-Technology-Application.aspx>

²⁶ <https://www.forbes.com/sites/forbestechcouncil/2018/11/07/how-blockchain-is-transforming-health-care/#29dac6104e4d>

²⁷ <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/grid/cross-border-payments.pdf>

²⁸ <https://www.forbes.com/sites/robertpearl/2018/04/10/blockchain-bitcoin-ehr/#6c4199e179e7>

²⁹ <https://www.abartyshealth.com/about/>

³⁰ <https://www.redcatpropware.com/>

The field of geography has perhaps the most comprehensive scholarship regarding critical digital studies and critical digital practice (including critical GIS) in relation to urban work. While cryptocurrencies and blockchains have not yet become central to a generalizable urban praxis, nor are they the focus of urban scholarship in the same way that “data” or “smart cities” are, they are radically impacting certain geographies and socio-political-economic contexts, and are vastly important to consider in terms of the *digital*. Specifically, I view the digital in three parts (borrowed from Ash, Kitchin, Leszczynski 2016): how geographies and urbanization are produced 1) *through* the digital (as a site of production); 2) *by* the digital (as a mode of production); and 3) *of* the digital (as an object of production).

In addition to critical urban theory and feminist urban political economy, central to this thesis are the scholarship and methodologies of “feminist digital geographies.” As Ellwood and Leszczynski write, “this is a crucial time to be thinking about *feminist* digital geographies and insisting again that scholarship identifying itself as a ‘critical’ enterprise must necessarily be feminist” (2018) and to that point, intersectional. The utopian tendency toward techno-solutionism and “world-making” is magnified when we consider the so-called “revolutionary potential” of the blockchain. Such “world-making” within digital geographies and urban practice is a way of constructing and (re)constructing not only urban and rural spaces, but also new identities, politics, socialities. There are enormous ideological underpinnings regarding cryptocurrency and blockchains, that become imbricated in space, perpetuating and/or further entrenching digital inequality.

I use the following methodologies of feminist digital geographies (Ellwood and Leszczynski 2018, modified below to also include urban studies and urban theory):

- Acknowledge and deepen awareness of how the knowledge we make is situated and produced;
- Open epistemological closures by unlearning what we think we know about theory, rigor, relevance and other power moves;
- Listen more and talk less;
- Work to decolonize digitality, geography, and urbanization;
- Engage black and indigenous geographies scholarship, black and queer code studies, and work from and about Majority Worlds (and in the case of this thesis, Caribbean studies, postcolonial studies, and native Puerto Rican feminist studies, activists, grassroots movements);
- Avoid appropriation and erasure (as Mahtani 2014 argues) it is important to explicitly acknowledge and cite these authors;
- Contend empirically with the complexities and contradictions of digital technologies in the everyday lives of actual people.

As Ellwood and Leszczynski write, “a substantive empirical examination and theorization of the political economies of spatial big data, algorithms and geolocation technologies remains underdeveloped” (2018). In this thesis, in the context of Puerto Rico, my research focuses on empirical examination and theorization of the political economies and spatialization of cryptocurrencies, blockchains, their socio-technical relations, and their unique digital geographies and ecosystems (concentrated locally and distributed globally). My goals for engaging feminist digital geographies work include the following:

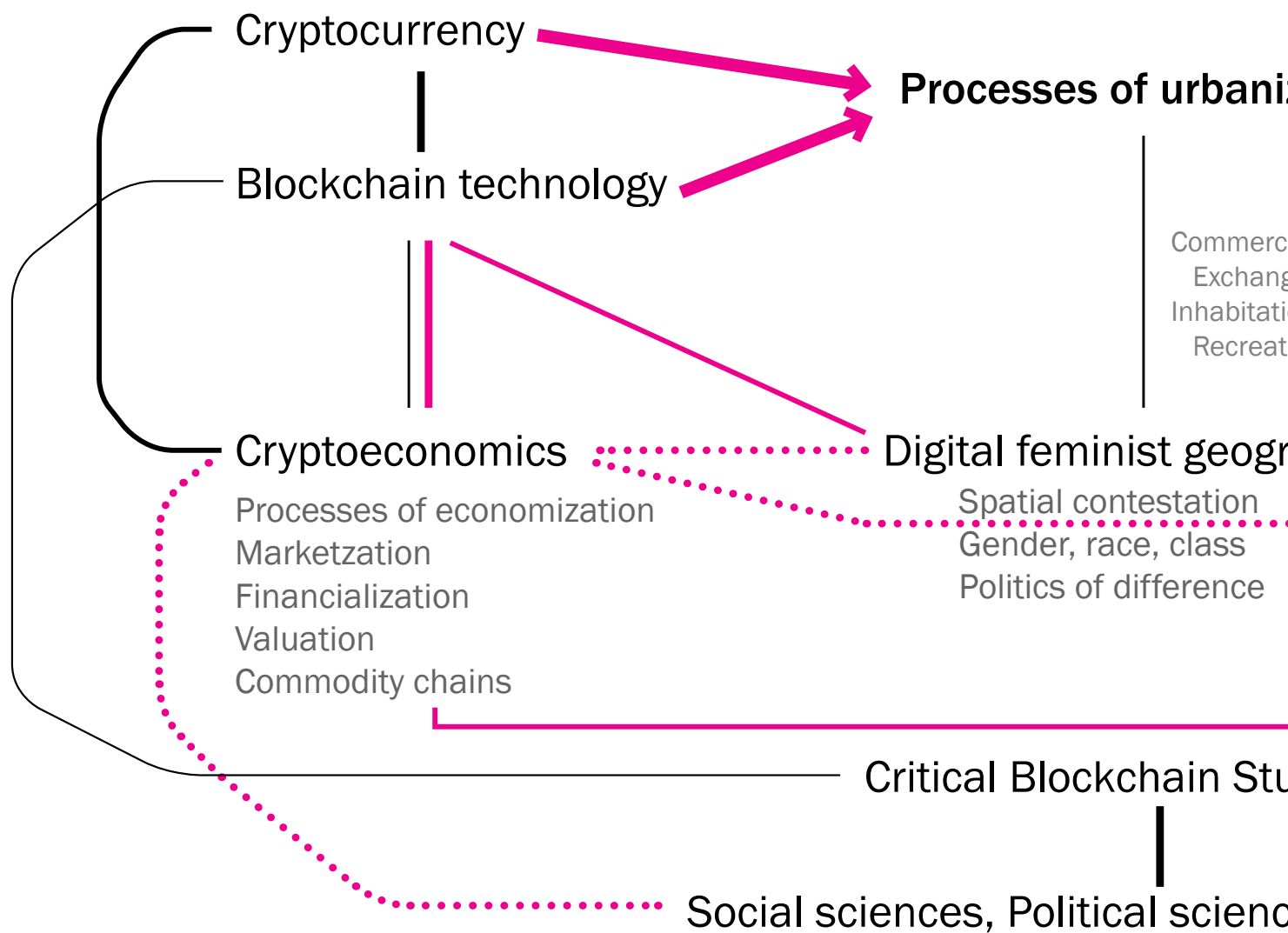
- Creating a “liberatory digital politics for re-making our technologies and ourselves as digital subjects”;
- Raise awareness as well as feature “the significant potential of contestation of, and resistance, to technology-supported forms of discrimination, and the deeply contingent nature of the processes of [technological] appropriation” (Coutard and Guy 2007, 713)
- Theorize digital practices as social (urban, political, and economic) praxes;
- Remake understandings of digital and technical ‘expertise’;
- Identify and contest the exclusions of digital spaces;
- Transform digitally-mediated modes of knowledge production by unsettling masculinist epistemologies, and ideologies.

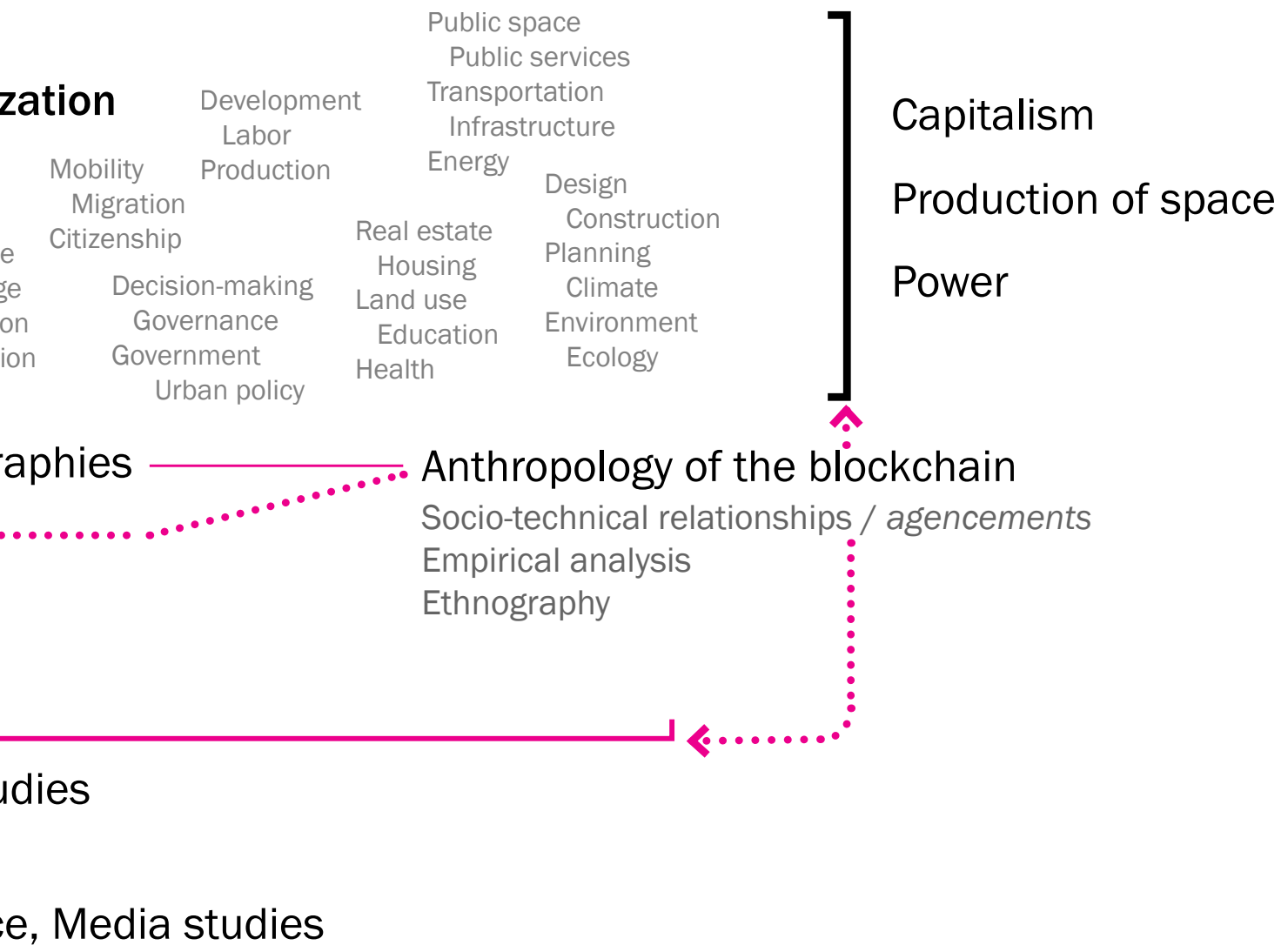
If we step back from the large techno-capitalist industry that has galvanized around blockchain, we can take a moment to look at the technology itself. Blockchain technology is neither inherently “good” or “bad,” but it does become imbricated with the politics, values, and desires of its proponents. Its capacity to be

“emancipatory” is highly dependent on the context. As opposed to the self-interested motivations of the individuals and global tech giants, in Chapter 3, I pose alternate urban/economic strategies from within Puerto Rico, as well as ones compatible with collective, cooperative practice – both with digital technology and without.

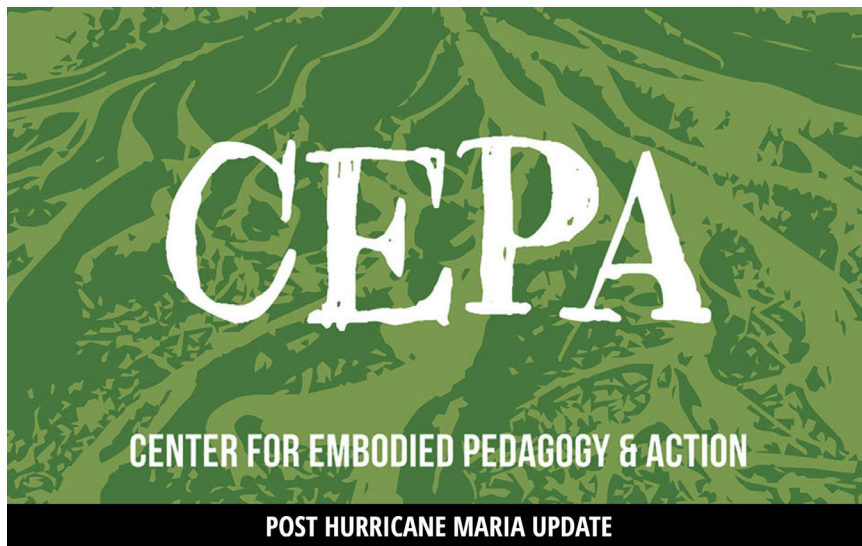
As far as alternatives – subaltern counterpublics to the transactionary publics -- JuntaGente, La Maraña, Colectiva Feminista en Construcción, Tara Rodríguez with El Departamento de la Comida – these women-led and grassroots groups are committed to slow, sustained work *with* communities - but they acknowledge that digital communications are important for spreading awareness of the diverse struggles and Puerto Rican issues. This contrasts with the fast-paced male-dominated crypto-activity coming in from the outside, which often does not consider local community input and needs, and rather uses digital technologies to intentionally obscure their activities from the broader public, and to directly facilitate their individual goals and gains – viewing everything as a transaction. Chapter 3 discusses contesting emancipatory actionable strategies for an equitable economic future for Puerto Rico. I pose platform cooperativism as one alternate to hypercapitalist blockchain-based companies, and ask if blockchain as a technology is compatible with cooperativism. I conclude with a number of speculative future scenarios, and ask which techno-economic models are most likely to affect equitable change, as determined by Puerto Ricans, for Puerto Ricans.

SITUATING THE RESEARCH - ACADEMIC CONTEXT





KEY ACKNOWLEDGEMENTS



MELISSA ROSARIO

Founder and Director

Melissa Rosario is scholar, radical educator and healer who lives and works in Puerto Rico. CEPA's purpose is to build an intellectual and political home that honors our earth, ancestors and the differences between us. It offers a place where Puerto Ricans—from island and diaspora—and their allies can construct an alternative together.

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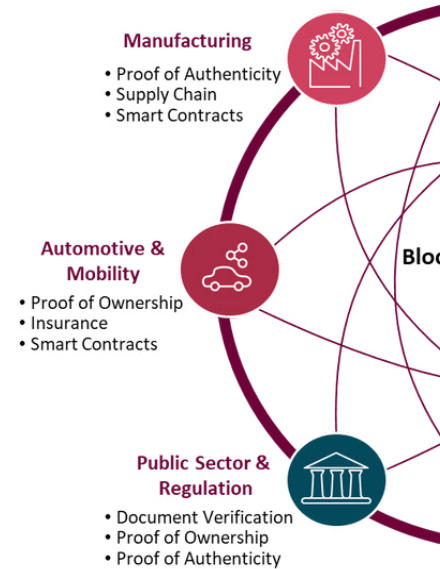
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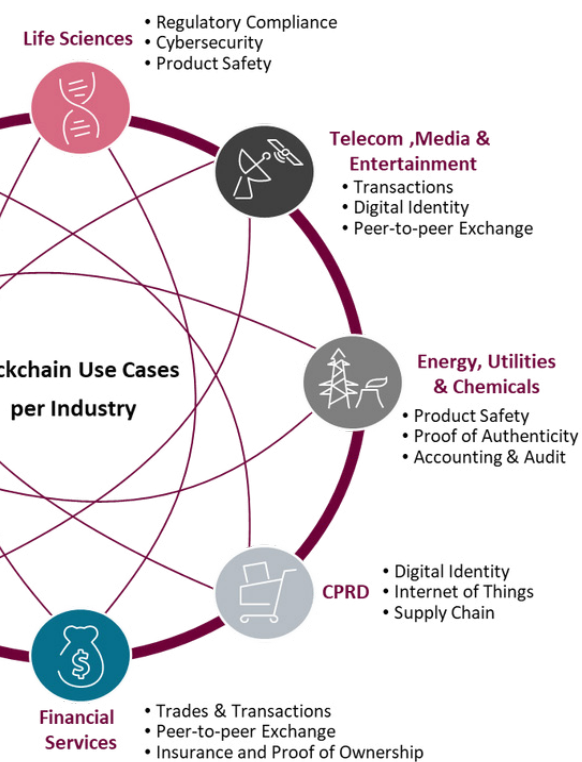
INTRO - BLOCKCHAIN AND CRYPTO IN PUERTO RICO



Source: Reddit user kylekemper; https://www.reddit.com/r/Bitcoin/comments/8jg37i/bitcoin_activation_puerto_rico/



Source: <https://www.capgemini.com/de-de>



/2018/07/value-of-blockchain-technology/



Source: "Team Joey Rocket Cryptos" <https://www.youtube.com/watch?v=4cw5zv-OARE>

Chapter 1 – The Socio-Technical Relations of Cryptocurrency and Blockchain Urbanization

In this chapter I will analyze how blockchain technology is affecting and altering processes of urbanization as a new digital economic technology, and as an industry, and platform for urban imaginaries. In doing so, I propose a new study of what I call “blockchain urbanization,” which combines the study of urbanization (how “the urban” is produced), with the emerging field of “critical blockchain studies,” building on and using research methods in urban theory, geography, sociology, anthropology, and political economies. To illustrate the range of which aspects of urbanization are being affected (development; real estate; infrastructure; transportation; migration; mobility; public space; services; governance; policy), I will briefly review a number of diverse cases of blockchain implementation or proposals at multiple scales across the globe. To address the question of *how* this is happening, I will work toward an anthropology of the blockchain. I suggest that the blockchain (both as a technology and idea with emerging discursive power) is not only “sustained by sociological characteristics – e.g. structure, leadership, hierarchy, friendship and community” (Dodd 2017), but is in fact a socio-technical tool/actor that calls into being new institutions, actors, and publics with reformed agencies (human, non-human, posthuman), which have the power to influence the production of space according to their own politics, narratives, desires, and values. These new actors do not act independently, but instead form new socio-technical relationships with existing infrastructures, publics, institutions, and governments. These relationships in turn influence the functioning of the blockchain as a technology and as a socio-technical system that affects both processes of economization (Caliskan and Callon 2009), and processes of urbanization.

The city is still conceived of as a bounded unit, measurable and metricized, a repository of “economic development” by most dominant actors, institutions, and transnational organizations such as the IMF, World Bank, and UN Habitat who influence and recommend how cities and urban areas are planned. But as capitalism gains momentum as a system, the unit of vision has increased in scale, from the “city” to “metropolitan regions” to “global cities” to “global economies”. In contradiction to total expansion, there are still clear spatial boundaries in terms of nations, states, and cities. However, our economic infrastructures and supply chains are increasingly transnational and geopolitically distributed. The same is true for crypto-infrastructure, as I will introduce in this chapter and discuss in greater detail in Chapter 2.

I argue that cryptocurrency and the blockchain are not only affecting and altering processes of urbanization, they are enacting new visions and versions of urbanization. By processes of urbanization I mean the process by which the “urban” is produced, and by “urban” I mean both the city itself and its support infrastructures – particularly economic infrastructures and technologies – that are embodied, formalized, spatialized in geopolitical concentrations and distributions, digital and physical, human and non-human. The city is an important empirical object because it is both an outcome and actor in transforming *processes of urbanization*. It is also an important actor in encapsulating and enacting *processes of economization*. This tie I believe is critical for any informed research on how cryptoeconomics and the blockchain are to impact our futures of inhabitation and exchange at any scale.

What is Cryptocurrency, Bitcoin, Blockchain?

Here I will briefly define key terms which I will expand upon in this chapter. *Cryptocurrency* is a digital representation of value. After the launch of the Ethereum blockchain in 2015, on which developers can create their own cryptocurrencies, what that value could represent is virtually limitless, from digital pets like cryptokitties¹, to voting stakes in a new company. A cryptocurrency “token” or “coin” is not a coin in the way we think of nickels, dimes, and dollars, or even the same as debit/credit cards which represent printed/minted money. Rather, a cryptocurrency coin is literally fixed, non-replicable *data*. Owning a crypto-coin, like a bitcoin (the first cryptocurrency), means you have a right to send that data on a ledger, and once sent, that right is transferred to the new owner. That ledger is known as a blockchain, which is a computational record or account of all these data transactions. An exact copy of this ledger is often distributed (as in the Bitcoin blockchain) on every computer² that transacts on that blockchain. There are

¹ <https://www.cryptokitties.co/>

² Some blockchains do not work in the same way, instead having a subset of the computers on the network maintaining the ledger.

many types of blockchains now, but in the most common, a Proof-of-Work blockchain, one can elect to put their computers to work to computationally confirm transactions, and owners are rewarded for their energy expenditure by earning cryptocurrency coins (which is one way of “mining” bitcoin). In the “blockchain space,” there has been a big push to make a distinction between the speculative and at times illegal behavior arising from the anonymity that cryptocurrencies afford, from the underlying technology of the blockchain, which is praised for its’ increased security, immutability, and transparency, and I would agree that the behavior and intent behind each of these uses is different. However, whether it is being used to mine Bitcoin, or to enact “Smart Contracts” (computationally programmed ‘contracts’ with rules and agreements that are automatically enforced when the conditions are met), blockchains are fundamentally a new digital economic technology, with embedded and enacted ideologies and assumptions about human behavior. These ideologies and rhetorics focus on transactions³, primarily transactions between individuals, advocating for freedom in terms of freedom for the individual and free markets. However, there are groups with diverse contradicting political ideologies galvanized around blockchain specifically, which will be discussed later in this thesis.

Technical Architecture of Blockchains

I will now briefly go into the technical architecture of a blockchain, using the Bitcoin blockchain as an example, but this is not meant to be a comprehensive technical definition. For that, refer directly to the Bitcoin⁴ or Ethereum⁵ documentation and technical white papers, or for a comprehensive overview, see (Narayan, Bonneau, Felten, Miller and Goldfeder 2016).

A blockchain is a digital database managed autonomously using a peer-to-peer network with a distributed timestamping server. A blockchain is composed of a chain of digital blocks linked together with cryptography. A “block” is a list of records. Each block contains a cryptographic “hash” of the block that came before it, a timestamp, and transaction data (typically in the form of a Merkle tree, which is a type of data structure that I will not explain here). A “hash” is a string of input data, typically a message (for example, Alice sends 1 bitcoin to Bob) which is then transformed into a fixed-length string of numbers and letters (such as: 5a868dae99c379d73e8163f419bb15d188da9d21ca247f06c64d14dc41ee2c53), effectively acting as an anonymized “signature” for the data. A hash is created by a “hash function” or SHA (Secure Hash Algorithm) that computationally takes a string of any length as input and produces a fixed length string which acts as a kind of “signature” for the data provided. The most common hash function in cryptocurrency and blockchain is SHA-256. SHA-256 produces a 256-bit (32 bytes) hash value, usually represented as a hexadecimal number with 64 digits. Hash functions are one-way methods, meaning they are not reversible with computing at this time. So, technically someone who sees the anonymous “signature” of the input data would not be able to know its original message; however, the person who created the original message would be able to prove that the “signature” (also known as the hash value, or digest) is created from that message. One block is typically composed of multiple hashes.

For the Bitcoin blockchain, a new block is created and added to the blockchain roughly every ten minutes, through the mining process. A transaction is not technically confirmed until the next block is created. For example, Alice’s transaction of sending 1 bitcoin to Bob is just a message request sitting in limbo, “unconfirmed” until the next block is created. The blocks are created by computers on the network (miners) solving cryptographic puzzles to confirm those transactions in limbo. When a computer gets the right answer to the puzzle, it is rewarded some cryptocurrency. The difficulty of those puzzles (as programmed by the coders responsible for coding the blockchain - typically increasing in difficulty exponentially over time) is what sets the rate of “release” of Bitcoins to be mined. Some companies require six separate computers to confirm a transaction, which typically takes about one hour. This is a slow process in a fully distributed, decentralized network of Bitcoin, far slower than most credit card transactions. For example, at the beginning of 2019, the Bitcoin network processed about 4.6 transactions per second; while Visa processed around 1,700 transactions per second on average.

³ Analyzing the top two blockchains/cryptocurrencies (Bitcoin and Ethereum) - the original Bitcoin whitepaper uses the term “transaction” (or a variant of the word) 69 times. The Ethereum whitepaper (as of March 2019) uses the term 131 times. <https://github.com/ethereum/wiki/wiki/White-Paper>

⁴ <https://bitcoin.org/en/developer-documentation>

⁵ <https://github.com/ethereum/wiki/wiki>

History and Evolution of Blockchain

In 2008, the original Bitcoin blockchain was created by the pseudonymous Satoshi Nakamoto, and was described in the whitepaper “Bitcoin: A Peer-to-Peer Electronic Cash System.” In the span of ten years, this whitepaper would catalyze an economy reaching 305 billion dollars, surpassing the market worth of the largest global credit card company, Visa.⁶ The Bitcoin blockchain is a distributed ledger (as used in accounting) that validates and records all Bitcoin cryptocurrency transactions. Bitcoin is a cryptocurrency, a digital “coin” or “token” that does not have physical form, but rather represents the right to transfer data. In other words, cryptocurrency is a digital representation of value.

The process of “mining” bitcoin is an analogy for the process by which a computer is put to work confirming transactions on the bitcoin blockchain, essentially acting as an accountant for the network⁷. Mining bitcoin is not a process of literally seeking and extracting a digital coin buried somewhere on the network. Rather, a bitcoin is the “token” reward procured by the owner of the computer that first solves one of the cryptographic puzzles required to confirm a transaction. This process was referred to as “mining” for the first time in the Bitcoin whitepaper (Nakamoto 2008). The term “mining” relates to the comparison of the gold standard, a type of digital metallism (Mauer, Nelms, Swartz 2013). This token reward was intended to incentivize participation, to compensate users for the energy expenditure and cost needed to run the computers to confirm transactions. On a blockchain network this process is not a direct extraction, but when we view the infrastructure that supports the bitcoin blockchain, the internet, the computers, and the energy infrastructure that powers them, we can appreciate the extraction analogy of mining. See (Zimmer 2017) for a metaphorical comparison between bitcoin mining and the silver mining economy of Cerro Rico de Potosí. This energy extraction will be discussed in greater detail in Chapter 2.

For several years after the launch of Bitcoin, the focus was on Bitcoin as a cryptocurrency, as money. As David Golumbia describes, the invention of Bitcoin was intended for a specific purpose with a right-libertarian political-economic ideology (Golumbia, *The Politics of Bitcoin: Software as Right-Wing Extremism* 2016). Central banks, governments, and third-party institutions are not to be trusted; free markets; individual freedom; call for a return to the gold standard – a limited number of bitcoins will control inflation; privacy is key. Bitcoin was what launched cryptocurrencies, and later blockchains into popularity. Since then, with the help of mimetic transmission on the internet, the hype has spread across the globe.

A major shift occurred with the invention of the Ethereum blockchain in 2014 by Vitalik Buterin, then 19 years old, a programmer and co-founder of Bitcoin Magazine. With Ethereum, focus shifted from Bitcoin as an unstable financial currency (plagued by Silk Road scandals, Mt. Gox exchange hack), to the value of the blockchain as a technology that can be used for purposes other than financial transactions (ex. “smart contracts,” distributed digital file storage, land registries, databases). The Ethereum blockchain with the ERC-20 token⁸ allowed other programmers and developers to build their own platform on top of the base-layer of the Ethereum protocol. This opened the blockchain up to technologists at large, and as a result there was a boom in online “whitepapers” and ICOs (Initial Coin Offerings) which are a type of

⁶ While it would seem that the invention of Bitcoin was a direct result of the 2008 financial crisis, the reality is that the ideas for Bitcoin actually stemmed from the 1980s from the cyperpunk movement and cyberlibertarians. Bitcoin is not even the first *technical* cryptocurrency. In 1989, David Chaum invented DigiCash, an electronic currency that rendered user's transactions anonymous due to its Blind Signature Technology. This was a series of cryptographic protocols using encrypted keys in which a bank, government, institution, or outside individual would be unable to trace personal transactions back to an identifiable individual. DigiCash was fully implemented in 1990, before e-commerce was fully integrated with the internet, and because of its timing, Chaum's cryptocurrency never gained mass appeal. In 2002 DigiCash was sold for assets. While the DigiCash cryptographic protocols are very similar to those used with Bitcoin, there is one key difference in its originating principles. DigiCash did not intend to disrupt traditional financial flows, and still relied on a third-party financial institution like a central bank. What it did propose to do was make our typical online purchases or banking transactions much more private and secure. For many of us that is fine, but for a certain group with a specific ideology, this did not go far enough.

⁷ Thanks to Koray Çalışkan for helping me formulate this understanding. One can read more about the workings of cryptocurrency and blockchains in his forthcoming paper “Socio-Technical Infrastructure of Cryptocurrency Blockchains.”

⁸ https://theethereum.wiki/w/index.php/ERC20_Token_Standard

crowdfunding for startup projects using cryptocurrency and blockchains, often including a value proposition and a list of promises made to investors that are proposed to be acted upon if they reach their target funding amount. As of December 2018 there were 2,073 cryptocurrencies in existence⁹, some of which are “dead coins”, meaning they no longer are transacted. A number of new blockchains have also been created that work independently from the Ethereum blockchain.

Make no mistake, the blockchain movement, even when it moves beyond bitcoin, is *economic* at its core. “Economic incentives can unite people in a way pure politics cannot,” says AngelList's Naval Ravikant in interview with Vitalik Buterin.¹⁰ Buterin agrees: “Crypto is really ultimately all about incentives on multiple levels, from the community all the way down to the security of the consensus protocol. You just cannot reason about security of blockchain consensus protocols without reasoning about economics. It's not about 'if half of the people are honest, we can prove the system is secure' or 'if Magic Bob in the sky is honest, we know the system is secure,' it's 'the system is secure because we have mathematical proofs that say if the system breaks, then the guy who did it loses \$100,000,000.' That's what we mean by cryptoeconomics, combining together cryptography, mathematical proofs, and economic game theory reasoning all together.”¹¹ Ravikant continues, “It used to be ‘*In God We Trust*,’ then it used to be ‘*In Nation-States We Trust*,’ now it is going to be ‘*In Math We Trust*.’”¹² He is joking, but there is significance to his words.

Ethereum operates with encoded principles, as well as hyper-rational, logical, math-centric economic assumptions about individual human nature, yet it is being engaged and praised by developers and people who identify with both the political left and right. How are these differences reconciled? One key unifying factor is the belief in decentralization and distributed networks rather than centralized networks, power and control. The second key unifying factor across the political spectrum is the belief in computational technology itself, and the belief that it can enact significant, even revolutionary change.

To the first point: the belief in decentralization. Some argue for decentralization on the hypothesis that it is inherently more egalitarian; while others argue for the hypothesis that decentralization has increased security and is more difficult to hack. Using blockchain, there have been proposals for a decentralized E-Bay, and a decentralized Uber. This is reminiscent of the unbundling of infrastructure as public services after Keynes (Graham and Marvin 2001). Whereas some physical infrastructures were partitioned and sold off to multiple private companies who then sell their services to the public, digital infrastructures often remain highly centralized and monopolized. Although the physical infrastructure owned by these central companies is distributed across the globe (typically in areas disproportionate to who is benefitting) the ownership is typically centralized. There are exceptions to this, community owned Wi-Fi networks (ex. NYC Mesh). But this type of decentralization doesn't require the blockchain, nor does it eschew the reliance on a core group of operators and decision-makers to run and maintain the service, which could be seen as a form of centralization in its own respect. Decentralization as a concept can work into a number of political ideologies.

However, what makes the blockchain different from a traditional distributed peer-to-peer (P2P) network (like Napster, BitTorrent) is the blockchain's added layer of economic incentivization to participate (rewarded with cryptocurrency/tokens). This layer of economic incentivization typically follows a specific assumption about individual human behavior. In many ways it is a return to classical economics and methodological individualism, whereby individual motivations. Using principles of game theory (the study of mathematical models of strategic interactions between rational decision-makers, originally designed to be applied to economic behavior); and the assumption that people act in easily identifiable ways according to maximize their utility (Hume, Bentham) and act not out of morality but out of economic incentivization to do so, or economic disincentivization to not do so. This economic layer inherent to the blockchain distributed ledger is called *cryptoeconomics*.

⁹ <https://coinmarketcap.com/>

¹⁰ Naval Ravikant interview with Vitalik Buterin, “Decentralizing Everything” at Disrupt SF 2017, TechCrunch September 18, 2017, <https://www.youtube.com/watch?v=WSN5BaCzsbo>

¹¹ Ibid.

¹² Ibid.

What is Blockchain Urbanization?

Blockchain urbanization, I argue, is a type of urbanization enacted as a result of, and in service to, the blockchain, its encoded principles and assumptions, and the ideas and desires of its proponents. Blockchain urbanization is distinct from but affected by “blockchain urbanism” (how the blockchain is intentionally championed to be used in the urban realm, ex. for urban development, urban transportation, smart cities, etc.). It is also different from but affects the “urban experience” or how the urban is lived, interacted with, experienced on the ground.

Blockchain urbanization is shaped by the tendency of blockchain proponents to view everything as a transaction to be recorded or accounted for on a distributed ledger, towards the economization of everything. Blockchain urbanization is characterized by a tendency toward decentralization, while simultaneously concentrating certain material and spatial digital infrastructures in area with maximum incentives. Blockchain urbanization is about the transgressing of certain boundaries, while simultaneously creating new boundaries and barriers. Blockchain urbanization is imbricated with cryptoeconomic and political assumptions about individual human behavior, asking what will (financially and computationally) incentive individuals to make the “right” choice. Blockchain urbanization takes these economic and ideological assumptions and combines it with computationalism¹³, building inflexible digital architectures that can only act as coded.

Urbanization and Blockchain

In order to describe how blockchain is changing processes of urbanization – furthermore necessitating a way to research blockchain urbanization in the digital age – it is necessary to explain what I mean by “urbanization.” When I refer to urbanization, I refer to the ways in which the “urban” is produced. I will expand on this, but first I will clarify how I arrive at a definition of the “urban,” as its understood meaning is not commonly shared and is even contested today. I will review popular conceptions of urbanization as both 1) the quantifiable, statistical, measurable growth of urban populations and development of urban areas (IMF, World Bank, UN), and 2) as a model to follow (ex. “smart urbanization” UN Habitat). I will then compare these notions with theoretical conceptions of urbanization, understood as an action in service to political-economic systems, by which other structural issues are perpetuated or deepened. I will review critical literature on smart cities, urban intelligence, as well as methodologies from feminist digital geographies to ask what is further enabled and contested by the blockchain as a new layer in the digital urban landscape.

Urbanization has been viewed by different groups and writers as either a negative to society that must be stopped, or a positive for society that must be encouraged. This is similar to the debates around the blockchain today (particularly in relation to cryptocurrency). I will suggest what we can extract and reassemble from all of these contested understandings, in order to inform a methodology with which we can address the contemporary conditions of blockchain urbanization in the digital age.

How does blockchain urbanization differ from and/or relate to other forms of urbanization? This is the central question of the second chapter of this thesis. In his writing on the “urbanization of capital” David Harvey asks the question, “how does capital become urbanized, and what are the consequences of that urbanization?” (Harvey, *The Urbanization of Capital* 1989). For the purposes of this essay, we ask the same question, considering capital, but through the lens of the blockchain. How does the blockchain become urbanized, and what are the consequences of that urbanization? Here we look at the blockchain in three ways:

- 1) as a digital economic **technology** (distributed digital ledger, database, or platform/operating system on which decentralized apps are built such as smart contracts);
- 2) as an **industry** (giving rise to new companies, startups, institutions, media outlets, sites of production with ASIC chip factories, and sites of extraction with mining warehouses); and
- 3) as a **platform/movement** with embedded political-economic ideologies and assumptions about human behavior, and as a platform (with a certain amount of performativity) around which to innovate and convene ideas, imaginaries, speculative futures, and “utopian dreams” (Swartz 2017), hypothetically enacted via blockchain technology.

¹³ The invisible ideology around computational logics is explored in greater detail by David Golumbia (2009).

To construct the foundations of this argument, I define *cryptocurrency* as a digital asset or medium of exchange (in the form of a digital coin or token) that uses computational cryptography to validate transactions and generate new units; and the *blockchain* as a digital ledger on which transactions are chronologically and irreversibly recorded using cryptographic techniques (encryption/decryption, nonces, hash functions). From Marx and Engels' work on political economy, much has been written about urban political economies - how economic and political institutions influence local urban and public policy. I build from this work but argue more specifically that processes of urbanization are intrinsically tied to processes of economization (Caliskan and Callon 2009), and that dominant political/economic actors and institutions have significant influence in decision-making processes on urban policy, planning, and development – all of which are key factors in how the urban is produced. However, new individuals and groups are finding the blockchain a vehicle to make their voices and ideas heard. I argue that these individuals and those who are able to pay them are now forming a new “technologist class” that were previously excluded from decision-making processes about what the urban should be and do, and who now have increased agency through techno-power.

The blockchain is not only being written and talked about by a small group of technologists. It is enabling the formation of new companies, media outlets, newsrooms, foundations, and economic institutions (trade and exchanges) all dedicated to the discussion and development of blockchain technology. In this chapter I will present an anthropology of the blockchain, listing the different types of people who are currently engaging in this technology, and their primary motivations. Furthermore, the blockchain is being engaged, considered, and legislated by existing dominant economic and political institutions (IMF¹⁴, World Bank¹⁵, UN¹⁶), who already have decision-making power in how the urban is produced. This chapter will include a taxonomy of “blockchain urbanization” that describes a categorization of new and existing actors and their socio-technical spatial relations.

Blockchain urbanization is not entirely dissimilar from the urbanization we see galvanized around the “smart city” discourse. Emerging technologies and their potential use in the city have become the center of analysis for many scholars, popular writers, and governments/institutions. From buzzwords such as the “Smart City” to the “Internet of Things,” computers, electronics, algorithms, and data have become central components of contemporary urban discourse. There has been much written in recent academic discourse of sociology, anthropology, architecture, media studies and urban studies on smart cities (Townsend 2013; Greenfield 2013), the cyborg and the city or community (Gandy 2005; Haraway 1991), artificial intelligence (Broussard 2018), data and urban planning (Halpern 2015; Thrift 2014), algorithms (Pasquale 2015; Noble 2018), interfaces and urban intelligence (Galloway 2012; Mattern 2014). These are all important pieces of writing, and there is much that can be learned. However, scholars have a limited role in the actual production of the urban. We need also to look at what is being enacted by governments, institutions, transnational organizations, and to a greater and greater degree – companies and corporations.

At present, governments are working with big data specialists almost as frequently, and often in conjunction, with developers and planners to improve efficiencies and so-called quality of life. More recently, smaller independent tech startups have emerged around data-driven urban systems - waste management, for example - with Bigbelly's solar-powered compacting waste bins¹⁷; or Zerocycle's collection of garbage and recycling rates which are then sent to household residents.¹⁸ However, large technology companies still dominate the market in “Smart City” work. In the early 2000s, Cisco invested in South Korea's Songdo International Business District, using the 1,500 acre New Songdo (master plan by KPF) as a testing ground for their fully networked technology infrastructure of sensors and actuators

¹⁴ <https://www.imf.org/external/pubs/ft/fandd/2018/06/what-are-cryptocurrencies-like-bitcoin/basics.htm>

¹⁵ <https://www.worldbank.org/en/news/press-release/2018/08/23/world-bank-prices-first-global-blockchain-bond-raising-a-110-million>

¹⁶ <http://www.undp.org/content/undp/en/home/blog/2018/realizing-the-potential-of-blockchain-for-social-impact.html>

¹⁷ Bigbelly, Smart City Solutions, <http://bigbelly.com/>

¹⁸ Zerocycle, Less Waste More Recycling, <http://www.zerocycle.co/>

monitoring and controlling waste collection, heat, hot water, and electrical distribution.¹⁹ In 2010, IBM opened the Operations Center at Rio de Janeiro as an experimental urban systems control room that uses sensors and video streams to track subway stations, power failures, and weather patterns.²⁰ This test case led IBM to develop a series of Intelligent Operations Centers through their “Smarter Cities” unit, primarily used for emergency management prior to, during, and after natural disasters. A marketing tagline for Cisco’s Smart+Connected Operations Center reads, “Know what goes on in every neighborhood, minute by minute.”²¹ Big brother has long since arrived; omnipresent surveillance techniques are second nature in our global collective subconscious.

Along with Cisco and IBM, companies such as Siemens, Microsoft, Hitachi, Ericsson, Toshiba, and Oracle are asking questions and envisioning urban futures informed by Machine Learning and Artificial Intelligence. “We want to crack the code of urbanism, then replicate it,” says Stanley Gale, CEO of Gale International, a major investor and developer of Songdo IBD.²² This profit-driven fantasy begins with the assumption that urbanism is a code that can be cracked. Many city metrics are certainly quantifiable, however, some have tried before to distill urban patterns down to an algorithm, for example Shibu Raman and Nicola Dempsey who present highly technical “toponymic analyses” and “spatial syntax models” to Indian urban spatial structure (Raman and Dempsey 2012). Others such as Lev Manovich make the argument that we can read and recognize cultural patterns in massive datasets and social media (Manovich 2011). I argue that while we may begin to know and understand aspects of urban life, urban life itself is not fully knowable, but is an ever-evolving interaction of people, objects, technologies, temporalities, networks, and flows both tangible, intangible, and everywhere in-between.

A more specific inquiry, which I echo in this thesis in relation to urban infrastructure, comes from Alexander Galloway, who asks:

What is the infrastructure of today’s mode of production? It includes all the classical categories, such as fixed and variable capital. But there is something that makes today’s mode of production distinct from all the others: the prevalence of software. The economy today is not only driven by software [but] in many cases this economy is software, in that it consists of the extraction of value based on the encoding and processing of mathematical information. (Galloway 2011)

Software is a type of digital “architecture” built on physical infrastructure, both of which have spatial implications. Building on the foundational work of Lefebvre on the production of space, I engage the theory of code/space posed by Kitchin and Dodge, which outlines the ways in which software is a core elements in the production of space – an ontogenic process continually in the making, merging human and algorithmic agency in a highly context dependent, relational manner (Kitchin and Dodge 2011). Kitchin and Dodge address the performativity of code/space, writing, “Code/space unfolds in multifarious and imperfect ways, embodied through the performance and often unpredictable interactions of the people in the space” (Kitchin and Dodge 2011: 18). It is this mix of predictability and unpredictability that I attempt to address when building a taxonomy of blockchain urbanization below. Additionally, there is an increasing agency to digital “architecture” and digital “architects” (coders, programmers, developers), which I argue have perhaps more power than physical architecture/urban planning in terms of actually making the experienced world. The increased agency of digital architects is key with blockchain urbanization, because, perhaps unlike smart city discourse which is normalized in the architecture/engineering/planning professions, blockchain is still largely in the domain of technologists, programmers and coders.

Urbanization and (Digital) Ecosystems

The concept of “urbanization” has today reached a point of epistemic crisis. On the one hand, dominant actors, institutions, organizations still equate urbanization with urban development, of land and

¹⁹ New Songdo City, Songdo International Business District, <https://www.kpf.com/projects/new-songdo-city>

²⁰ Singer, Natasha, “Mission Control, Built for Cities - IBM Takes ‘Smarter Cities’ Concept to Rio de Janeiro,” New York Times, March 3, 2012

²¹ Cisco Smart+Connected Operations Center, <https://www.cisco.com/c/en/us/solutions/industries/smart-connected-communities/city-operations-center.html>

²² “South Korea Conceptualizes the Ultimate Smart City,” NewCities, December 28, 2014, <https://newcities.org/cityquest-songdo-south-korea-conceptualized-ultimate-smart-sustainable-city/>

economies. It is conceived of as a bounded unit or area that can be measured and metricized, usually in terms of population and density, with growth predicted by any number of statistics. In discussions and writings of popular actors, the concept of urban development has shifted scales over the last two decades to *global* development, and “global cities” and their relations of trade with other global cities, all of which is equally metricized, quantified, and statistically predicted, often with “economic growth” as a goal. On the other hand, key scholars in geography, sociology, urban studies, and urban theory have developed new and important understandings of urbanization. This includes Brenner’s theses on urbanization, which calls important attention to the “emergent process of extended urbanization,” that produces a “variegated urban fabric that, rather than being simply concentrated within nodal points or confined within bounded regions, is now woven unevenly and yet ever more densely across vast stretches of the world” (Brenner, *Theses on Urbanization* 2013). The geographies of extended urbanization are no longer contained to “densely concentrated populations and built environments of cities,” (Brenner 2013) but rather includes urban support infrastructures built in areas that have traditionally been seen as rural (from water reservoirs, to landfills, to undersea internet cables, to data centers located in remote areas). According to Brenner, globalization is also inadequate as an epistemic foundation of contemporary urban theory since it presupposes “territorial boundedness” of urban units and areas, “albeit now understood to be relationally networked with other cities via transnational webs of capital, labor, and transportation/communication infrastructures” (Brenner 2013). In other words, it is not just the “global cities” (Sassen 2002) or “economic powerhouse” cities (Burdett and Sudjic 2011) such as New York, Tokyo, Dubai, and their relations of exchange between one another that are important to study.

In *Urbanization of Capital*, David Harvey argues that urbanization is the “geopolitical process of capital accumulation - the structuring of space to accommodate the flow of capital” (Harvey, *The Urbanization of Capital* 1989). No longer is surplus capital only being invested in concentrated urban centers as command and control stations; nor is it only being invested in the development of suburban outskirts, outer rings, and “edge cities” or urban agglomerations (Soja and Kanai 2006) that encourage the consumption and demand (demand-side urbanization / the expansion of things, markets, as well as space). Today, it is still both, but it is also distributed in things that are not cities, increasingly transnational, with blurred boundaries. Be that as it may, the city is often still a central hub, and clearly has a different experiential character than its rural counterparts, or smaller town neighbors. Beyond the concept of “extended regional urbanization,” how do we address these shifting organizational relations, both centralized and distributed, with a new tendency toward decentralization? This is particularly relevant an expansion of digital technologies. To contend with these contradictions, I suggest we look more closely at the concept of the “ecosystem.”

Recently, there has been a resurgence around thinking about space, material, bodies, human and non-human, as belonging to or participating in “ecosystems”. Ecosystems intersect, every system is part of another larger system, where scale becomes fluid and relational. When used by blockchain proponents, often the term “Ecosystem” really refers to a “community” of developers, which suggests that participation is elective. This appears not dissimilar to Murray Bookchin’s conceptualization of “ecosystems” or “ecocommunities” in his book *Urbanization without Cities* (Bookchin 1992). But the resurgence of the term “ecosystem” has placed a shifted emphasis on *systems* rather than the *eco*, particularly with digital technologies and computational systems.

For all the narratives around planetary and transnational connectivity, be it blockchain or urbanism - boundaries do still exist, both physical and digital, and they are constantly shifting, pressured, perforated, reinforced by various actors. Today there are competing geopolitical and economic agendas around eliminating boundaries and borders, and others acting to make them physically stronger and more impenetrable than ever before. On the one hand, we have the “annihilation of space by time” (Harvey 1990) that Harvey refers to via Marx, and on the other we have a strong national border revival. First, we have to clarify what types of borders we are talking about, as not all borders and boundaries are treated or considered equally. Secondly, we have to ask - when is it acceptable, even desired to eliminate or freely cross borders and boundaries, and when is it considered transgressive, subversive, or even anarchic? Can we break down binarisms/dualisms such as urban-rural; man-nature; man-machine; capturing the tendency toward geographic distribution and increased decentralization (a favorite

blockchain narrative) while still acknowledging that differences, and furthermore, *boundaries* and *barriers* do still exist?

This contradiction is hard to reconcile, but to do so I propose we look more closely at the term “ecosystem”. It is not a new term, but it is effectively multidisciplinary. It combines ecology (the relation of organisms to one another and their physical surroundings) and systems (a set of interacting components forming a complex whole). Gregory Bateson was influential in bringing this term to anthropology in the ‘70s, bringing systems thinking and cybernetics together with social ecologies, particularly the ecology of mind (Bateson 1972). This later influenced urban studies, and a post-structuralist subfield emerged in the ‘90s and early 2000s on urban political ecologies, with scholars such as Swyngedouw, Gandy, and Kaika, who wrote on “urban socio-natures” and urbanization as “a social process of transforming and reconfiguring nature”⁷ (Heynen, Kaika and Swyngedouw 2006).

But the term “ecosystem” has recently seen a resurgence -- with a shifted emphasis on **systems** rather than the **eco**, particularly with digital technologies and computational systems -- and even more so in blockchain narratives. We hear so much about Blockchain Ecosystems; for example, the Ethereum Ecosystem. When you go to ConsenSys’s About Page you see that their focus is on “**the ecosystem**, the growth of the Ethereum network, and global integration of the benefits of blockchain and tokenization.”²³ What do we mean here by “ecosystem”? When we hear about blockchain ecosystems, it seems to imply multiplicity; multiple “crypto-communities” unified under the umbrella of the blockchain – The Blockchain Ecosystem. But here, The *Blockchain Ecosystem* seems to imply a boundary or separation from, say, the “off-chain world”²⁴. This imposed dualism is concerning – colonization has a history of imagining forms of externality, for example “the New World”. It does not have to be this way. If we consider the Blockchain Ecosystem as all the actors who engage in the blockchain – the speculators, the investors, the miners²⁵, the developers, the startups, the banks, the institutions, the governments, the exchanges, the dreamers... we also have to include the mining warehouses, increased carbon emissions,²⁶ the ozone layer, the IPCC report on climate change. This is important when using a term derived from ecology.

Metaphysics and Technopolitics of Blockchain – Claims vs. Realities

Blockchain has made it to the Oxford English Dictionary, where it is defined as “a digital ledger in which transactions made in bitcoin or another cryptocurrency are recorded chronologically and publicly.” Its originating politics stem from right-wing cyberlibertarian viewpoints whereby central governments and central banks are not to be trusted, and a decentralized ledger that exists on the computers of multiple individual users is inherently more trustworthy. Cyberlibertarians often associate the blockchain with freedom, yet here we must define what is meant by “freedom.” As David Golumbia writes, “cyberlibertarianism can be thought of as something like a belief according to which *freedom will emerge inherently from the increasing development of digital technology*, and therefore efforts to interfere with or regulate that development must be antithetical to freedom” (Golumbia, *The Politics of Bitcoin: Software as Right-Wing Extremism* 2016). To cyberlibertarians, regulation stifles innovation and freedom. Freedom in this case is equivalent to the ultimate free market; to be free is to be free from government regulation. This belief in the power of technology itself is heady and contagious, in many ways a self-fulfilling prophecy with a snowball effect. “Technology” is often associated with “progress,” and who wants to go against progress? The speed at which technological trends and concepts disseminate and evolve is second to none. At this point in time, the technology (as hardware and software with protocols enacted in practice) does not even have to be proven to do the proponents say it does. The narrative around it is

²³ <https://consensys.net/about/> (as of December 2018)

²⁴ <https://www.investopedia.com/terms/o/offchain-transactions-cryptocurrency.asp>

²⁵ “It turns out, it’s not just the Lamborghinis that Bitcoin enthusiasts seem to be obsessed with that are pumping CO2 into our atmosphere. Accruing the wealth itself is extremely wasteful, releasing 20 megatons of CO2 into the atmosphere a year—as much as the whole Republic of Ireland.” From Marquis, Erin, “Bitcoin’s annual carbon footprint is equal to one million transatlantic flights,” *Jalopnik*, August 20, 2018, <https://jalopnik.com/bitcoins-annual-carbon-footprint-is-equal-to-one-million-1828460235>

²⁶ Hern, Alex, “Bitcoin’s energy usage is huge – we can’t afford to ignore it,” *The Guardian*, January 17, 2018, <https://www.theguardian.com/technology/2018/jan/17/bitcoin-electricity-usage-huge-climate-cryptocurrency>; see also <https://digiconomist.net/bitcoin-energy-consumption>

seductive enough, coupled with the fact that if the promises do happen to come true, the powers that already exist do not want to get left behind. According to Langdon Winner, the cyberlibertarians believe “the dynamism of digital technology is our true destiny. There is no time to pause, reflect or ask for more influence in shaping these developments... In the writings of cyberlibertarians those able to rise to the challenge are the champions of the coming millennium. The rest are fated to languish in the dust” (Winner 1997). Speed is of the utmost importance – act quickly, or get left behind. In this case, technopower is both the power of *the belief in technology itself*, and the power of the people able to engage in technological decision-making, the technocrats, technologists, and those able to pay them. The unique characteristics, formations, and relationships of technopolitics and technopower, in relation to contextual politics and power, must be understood before attempting to determine a technology's potential outcome in a given context. Both technopolitics and technopower are forms of politics and power, but ones often shrouded by the narrative that technology is neutral, technology is progress. Technology has its own forward momentum that both shapes and is shaped by already existing power and politics.

Governments, institutions, universities, NGOs, non-profits, etc. are all taking blockchain seriously. Blockchain projects have become so believable perhaps because people believe in the blockchain. The rapid speed at which blockchain projects are taking off also stems from the snowball effect, that people believe that people believe in the blockchain, and as a result have a fear of missing out. In many cases this means jumping on the blockchain bandwagon. This need to stay on the cutting edge is not new or exclusive to blockchain; it is just compounded by instantaneous digital technologies and communications as well as open-source media which feeds mimetic transmission.

There is the fear of missing out, but then there is the belief in technology itself. This is particularly so with blockchain, an almost devout worship, with mimetic transmissions of its claims. However, in being *almost* theological, there is a lack of critical exploration of the myths, metaphysics and ideologies constructed around it.²⁷ This is displayed in the cavalier yet serious claims of going from “in God We Trust” to the algorithmic “In Math We Trust,”²⁸ with blockchain and cryptoeconomics. Both crypto and blockchain have been described as a little more than cult-like. From the mythic deity and religious symbolism portrayed in the “Roots of Energy” artwork used as the base underlay on the cover of this thesis (by HODLCrypto, self-proclaimed proto-crypto propagandist), to the website “Crypto-Cult,”²⁹ to the Bitcoin Carnivores who attribute spiritual meaning to returning to a carnivorous diet³⁰ - these are instances of mythical and evangelical proportions. But crypto is not contained to a cult nor a small group of worshippers. As such, the metaphysical implications subside as you look further from social media groups - though its undertones remain.

At its core lies a contradiction; the actual “success” (defined in terms of adoption) of the blockchain depends on its perceived potential for success in the mainstream. This indicates the amount of trust people are willing to put into not just the technology itself, but in the translations, explanations, and claims of technologists -- not just about how the technology “works” -- but more importantly about what that technology has the potential to do. This is an incredible and understated form of power that is rarely addressed or acknowledged as such. Intentionally or unintentionally, the technologists have become an alternate ruling class, sometimes in opposition to but often working within (as consultants to) existing ruling classes, large-scale private corporations and governments alike.

²⁷ Thanks to Jon Thirkield for talking through some of these concepts with me.

²⁸ Ravikant 2017

²⁹ <https://cryptocult.co/>

³⁰ The following is taken from an article by Jordan Pearson in *Vice*: “The idea is simple: Use only Bitcoin, eat only meat. The espoused benefits are as much spiritual as they are financial and physical, and its advocates are self-serious. For the Bitcoin carnivore, there is a kind of metaphysical parallel between decentralized digital ledgers and an imagined idea of what our ancestors ate, and by extension, how they lived. Politics, food, and money—it’s all connected. “The 20th century was disastrous for human health and wealth, and the rise of central banking and industrial food was clearly a major reason why,” says Michael Goldstein, a vocal Bitcoin carnivore and founder of the Satoshi Nakamoto Institute, “Bitcoin is a revolt against fiat money, and an all-meat diet is a revolt against fiat food.”

- Jordan Pearson, “Inside the World of Bitcoin Carnivores,” *Vice*, September 2017,

https://www.vice.com/en_us/article/ne74nw/inside-the-world-of-the-bitcoin-carnivores

See also, Sonya Mann, “Steak is the New Salad,” <https://www.inc.com/sonya-mann/bitcoin-carnivores.html>

One could argue, as many technologists have, that ascribing potentiality to technology is not their responsibility, but the responsibility of other "interpreters." Such arguments claim technology in and of itself is neutral, apolitical, and can be used as a tool in any number of ways depending on how it is interpreted. This belief in the supposed neutrality of technology aligns with the similar belief in technology itself. Technology as a tool that cannot constitute itself apart from the politics, ethics, economics of those that use it. This belief in technology as neutral or apolitical, or as a means of technological solutionism, perhaps stem from the need to believe in an absolute neutrality, or the need to promote the appearance of such neutrality.

To counter the point that technology serves all, I reference Paul Edwards' assertion that "the most salient characteristic of technology in the modern (industrial and postindustrial) world is the degree to which most technology is not salient for most people, most of the time" (Edwards 2004). Even if we consider technology at its most abstract definition, as an application of scientific knowledge for practical purposes, this knowledge is rarely, if ever, accessible or comprehensible to all. The word "technology" itself stems from early 17th century: with the Greek *tekhnologia* meaning 'systematic treatment,' of *tekhnē* (art, craft) and *-logia* or *-logy* (branch of knowledge). By this definition, one could argue that technology as a "systematic treatment of applied knowledge" is in itself a form of politics enacted. Not only is technology a systematic treatment of applied knowledge, it is part of a wider social and political system itself, with varied affects at multiple scales.

Across the media, the "Blockchain Revolution" is posed as having the potential to radically "transform the economy and society," and more broadly "change the world."³⁶ These are some powerful claims, but before I can address the claims themselves, I want to address how we got here in the first place. Perhaps because it is still relatively new technology (Satoshi's "genesis block" on the Bitcoin blockchain was first created in 2009 - though it's precedents reach back to 1980s with David Chaum's DigiCash), its technical apparatus is relatively opaque to the average citizen. There is both a language barrier and a knowledge gap that has critical implications. Most people cannot decipher source code because most people are not trained (self-taught or otherwise) in computer science or programming languages, and as a result have to rely on translations by others who are trained and fluent (for the purposes of this paper I will refer to these people as "technologists"). From here, the translations of the technologists can be interpreted in various ways, influenced by individual positionality, which then gets transmitted via the media and word-of-mouth in a mimetic manner. Certainly this translation and interpretation happens with all technologies, so why is the blockchain such a hot topic these days? People and groups of all types from individuals, collectives, corporations, private banks, non-profits, even governments are looking at ways to adopt or co-opt blockchain technology. A wide array of blockchain based projects have been proposed, though few have been implemented.

Proponents of cryptocurrency and the blockchain tend to espouse a narrative of "transparency," but the underlying code and programming is impossible to understand by most people. The blockchain is black-boxed, not due to its success in implementation, but rather because it is so difficult to comprehend in the first place, that people must place their trust in the technologists who are able to translate the code, and describe its potential. After a short time, these narratives of potential get picked up by the media, and spread by word of mouth, generating a mimetic discourse that no longer needs technologists to perpetuate. And so is born the blockchain-buzz; the crypto-craze.

Because of its widespread adoption by individuals, local governments, and even entire countries, the originating politics of the blockchain have become enmeshed with and distorted by the wide user base, contextual network, and effective politics. Whole new markets have been created for cryptocurrency traders; countless startups have emerged using blockchain technology; banks are looking at ways to incorporate the technology for improved security; and governments are taking note. Many people who socially and politically identify with the left have also been convinced of the potentials of the blockchain, claiming its decentralized structure is inherently more democratic and egalitarian. The blockchain in concept extends beyond the financial, and can be a means to gather consensus from participants. Many also feel it is easier to use technology than to fix wider systemic issues. Instead of addressing the shortcomings of the government and the discontents of capitalism or the neoliberal order, it is apparently

preferable to work within a new governance model enacted through algorithms and protocols to incentivize moral behavior rather than rely on enforcement of laws, or relying on individuals to do the right thing. The Ethereum blockchain for example, goes beyond cryptocurrency transactions, and allows programmers to write their own "smart contracts," or self-executing contracts with "autonomous agents"³¹ that will validate a transaction or enact an outcome if and only if certain agreed-upon conditions are met. This takes the blockchain from the financial world into the legal world. Some groups like SingularityNET³² propose the integration of AI and Machine Learning with the blockchain and smart contracts, whereby AI agents may request a task of other AI agents to fulfil a smart contract initiated by a human. Smart contracts may seem the ultimate moral reinforcement, and in many ways they are – there is no going back and canceling a smart contract, and there is currently no way to deal with contingencies, variables, flexibilities, or changing conditions, which you could imagine may be a problem particularly between two humans.

To be clear, I will repeat, trust is still required, it is merely reassigned. The shift is one of trust from governments to corporations to technologists (distributed or aligned with corporations and governments). In bitcoin blockchain transactions, people must trust that their "peers" on the network will choose to do the right thing, ostensibly because there would be no economic incentive to do otherwise, (no tokens would be rewarded, and the electricity costs for running the computers doing the cryptographic work would be cost prohibitive). Of course, for the bitcoin blockchain this logic only works if individuals are economically motivated, rather than motivated in any other way. In order to "mine for bitcoins" your computer has to be put to work to solve cryptographic codes which act as confirmations of digital currency transactions on a blockchain. One bitcoin is released every 10 minutes, but as the number of computers on the network increase, the codes get harder to solve, and it becomes more rare for you to earn a bitcoin, which is why these days there are specialized power computers with intense hardware or "mining rigs or farms" that use a *lot* of electricity. The blockchain is often praised as being equitable and immutable because it is a distributed technology, but five mining pools own 98% of the network. If two of them got together at any time, they could hack the whole system, a system which has been hacked before (Silk Road, Mt. Gox, The DAO hack). Blockchains may be very difficult to hack, but they are not completely immutable.

Tracing Through the Politics of Technology

By critically analyzing the material affects and operational requirements of digital infrastructures and their networks of distribution, we can trace historical and contemporary sources of power, as well as their extractions. By tracing I mean spatially and conceptually making connections, associations, and relationships, as well as layering and recognizing patterns or traces that reveal systemic injustices. These historical and contemporary systems depend on structured relations among humans and non-humans (networks of power and extraction), while at the same time, technological change also brings new sources of power which influence already existing networks of relations.

In the case of Puerto Rico, I question what are these new forms of power that take shape through new technologies in digital infrastructure such as cryptocurrency, bitcoin, and the blockchain? How can these forms of power be traced in physical space and among relations between people and their environment?

I will now briefly divert from crypto/blockchain to discuss a physical infrastructural example, looking at technological changes in electric power. Solar power and photovoltaic technologies have dramatically improved efficiency over recent years. While we could analyze the technical artifact of the solar panel by itself, to understand the affects, benefits, or discontents of a technological system in context, we must view it as a part of a network of actors and their related exertions or extractions of power, as well as the applied technology's inherent or effective politics. In the case of solar power, it is not only the technological object of the photocell or the solar panel that produces an effective politics, but also the organizational structure of the photovoltaic grid; the means by which it is operated; as well as the

³¹ Buterin, Vitalik, "Ethereum: The Ultimate Smart Contract and Decentralized Application Platform," December 2013, <http://web.archive.org/web/20131228111141/http://vbuterin.com/ethereum.html>

³² "SingularityNET: A decentralized, open market and inter-network for AIs," <https://public.singularitynet.io/whitepaper.pdf>

people/groups who own/control it. In other words, I argue that the politics of a technology is constituted by at least three aspects: organization, operation, and ownership.

Many blockchain proponents claim that blockchain is more democratic due to its decentralized nature. Is a decentralized or distributed network really inherently more democratic than a centralized one? Is any one technology itself more democratic than another? That is the argument environmentalist Denis Hayes makes, saying “dispersed solar sources are more compatible than centralized technologies with social equity, freedom and cultural pluralism” (Hayes 1977). His argument here hinges on a certain organization to the network; which by itself does not ensure that the technology will be operated equitably, nor owned equitably (both the means of production and the product itself – electricity). If we look at photovoltaics as an example technology, I argue that it has the capacity to produce or reinforce, in effect, multiple types of politics because the grid can be organized, operated, and owned in various combinations of ways.

To expand upon this idea, I reference Langdon Winner who explains, “Some proponents of energy from renewable resources now believe they have at last discovered a set of intrinsically democratic, egalitarian, communitarian technologies. In my best estimation, however, the social consequences of building renewable energy systems will surely depend on the specific configurations of both hardware and the social institutions created to bring that energy to us” (Winner 1986). I do not argue against the idea that certain electricity infrastructures using renewable sources *can be* democratic and egalitarian; in fact many *are* in practice, around the globe. Nor do I argue that technology is neutral or apolitical; far from it. What I argue is that we should be critical when associating politics with technology, and be aware of the differences in determining whether a technology has intrinsic/inherent politics³³, or whether it has effective politics. What is the difference, and why is this distinction important? With inherently political technologies and their infrastructures, a certain politics is embedded in their creation, continued use, and the products that come out of that technology. Certain social organizations, structures, and strategies are imperative. Flexibility is non-negotiable in at least one aspect of that technology. If we turn to what I call the tri-part test (organization, operation, ownership), an inherently political technology is one in which one or more of those three parts cannot be fulfilled in any other way outside of a singular politics (both theoretically and practically). If all three parts can each, individually, be fulfilled through more than one politics, I call the sum of those politics a technology’s “effective politics.”³⁴

It is important to recognize that inherently political technologies and their infrastructures are always subject to local political and social ecologies which may or may be aligned with or in contestation with the inherent politics of said technology. This is the same for effectively political technologies. However, the difference is that while they may have an originating politics, their politics can change over time. Effectively political technologies have as much capacity to be used by one political system as another political system. This does not make these technologies de-politicized, or apolitical, rather multiple political and social configurations can appropriate the technology through a number of ideological

³³ Drawing from Winner with “Do Artifacts Have Politics?” (Winner 1989)

³⁴ With this I suggest that neither technological determinism nor social constructivism is fully adequate to explain actually existing relationships between technology, society, and the material world. In his essay, “Do Artifacts Have Politics?” Winner implores us to take seriously the characteristics of technical objects and the meaning of those characteristics. He maintains that artifacts can indeed contain political properties, through which I believe we can trace the specific forms of power that brought them into being, and which sustain their useful operation. For arguments that suggest technology is inherently political, Winner divides these into two categories. In the first category are the technical systems that “require the creation and maintenance of a particular set of social conditions as the operating environment of that system.” In the second category are the technical systems that are “compatible with, but [do] not strictly require, social and political relationships of a particular stripe.” As an extension, Winner makes a further distinction between the “conditions that are internal to the workings of a given technical system, and those that are external to it” (Winner 1989). This is where we can view actually existing technologies and their uses in relation to their development, contextual forces, and actually lived experiences. Winner agrees the second category is somewhat weaker than the first, but I would go as far as to argue only the first category is inherently political - “inherent” defined in the Oxford English Dictionary as “existing in something as a permanent, essential, or characteristic attribute.” This is not to detract from the political capacities of the second category, only that said politics are not essential to the technology being operational. This category of technology, we could say, is effectively political, produced in effect by “a result or consequence of an action or other cause.”

interests. Often, effectively political technologies are used under multiple ideologies in the same time frame and in the same geographical location, subject to the same external political and social forces, as is the case with recently implemented solar energy systems in Puerto Rico's post-Maria rebuilding.

For the people of Puerto Rico, truly democratic resource management is the best hope, according to Mónica Flores, a graduate student in environmental sciences at the University of Puerto Rico who says, "this is our energy. This is our water, and this is how we manage it because we believe in this process, and we respect our culture, our nature, everything that is supporting us" (Klein 2018). Looking at the case of Puerto Rico solar, we see that solar energy technology in and of itself is not inherently democratic, but rather it can be organized, operated, and owned in a number of political ways and motivations.

To show how the same technology can be implemented in vastly different ways, I have four case studies from Puerto Rico solar. The first case, the Humecao Solar Farm, was built before Maria. It is a centralized-concentrated massive solar farm, connected to the central grid. It is owned by Reden Solar who has a contract through PREPA³⁵. They receive money for the power they generate which goes directly to the grid and is distributed to customers as with any other power plant. There are no batteries for storage. The panels were made in France, the installation and maintenance is private only. The array was largely damaged during Hurricane Maria but has since been repaired.

The second is the corporate "get them hooked for free, make them pay later" microgrid-model which Tesla is using as selected flagship projects to raise their profile, such as the San Juan Children's Hospital. All Tesla installation and components, with Tesla batteries which can store energy to be used in the evenings. Still, the hospital still has to use a backup generator. Although the components were donated, there is talk of having to pay Tesla back at a later date³⁶. It is decentralized and not linked to a wider network, but may be someday in the future.

The third is also a private company, Sonnen, who donated their systems, but they aren't asking for money back in the future. This is a distributed system, employed across several important social nodes such as laundromats and community centers. An initial six systems were donated by Sonnen for laundromats in La Perla, Loizia, and Morovis; as well as a food shelter in Humacao for refrigeration and meal prep, and in Aguadilla a children's school and psychological development center³⁷. Local community leaders are taught how to use the battery interface, but it's unclear what happens if the hardware needs repair. Part of the impetus is that when community members go back home, they consider buying a battery and solar system for their own home.

The fourth model is a decentralized, building scale, fully autonomous solar and storage system, typically for individual buildings, similar to the last example; but these projects are all an interdisciplinary joint effort from multiple local or diaspora related non-profits (Casa Pueblo³⁸ and Resilient Power Puerto Rico³⁹). One such project was initiated by RPPR, a non-profit, and was funded with sponsor Fundacion Segarra Boerman. The microgrid is owned by El Coquí Community center and IDEBAJO, local non-profit which links with other neighborhood groups in Salinas. It is also part of a push for local youth education and trade work, training the community and having community members become teachers. It seems to be a successful model so far, but there has been talk about the Governor imposing a tax for independent organizations that set up their own renewable micro-grids which may add complications.

³⁵ Bellini, Emiliano, "Puerto Rico reviews utility-scale PV projects totaling over 280 MW," May 8, 2018, <https://www.pv-magazine.com/2018/05/08/puerto-rico-is-reviewing-utility-scale-pv-projects-totaling-over-260-mw/>

³⁶ "As for who is paying for the power system, the head of the hospitals tells [*El Nuevo Día*] that for now, it's a donation – and that after the energy crisis is over, a deal could make it permanent." Chappel, Bill, "Tesla Turns Power Back On At Children's Hospital in Puerto Rico," NPR, October 2017, <https://www.npr.org/sections/thetwo-way/2017/10/25/560045944/tesla-turns-power-back-on-at-childrens-hospital-in-puerto-rico>

³⁷ Field, Kyle, "sonnen Demonstrates the Power of Solar + Storage Microgrids in Puerto Rico," July 30, 2018, <https://cleantechnica.com/2018/07/30/sonnen-demonstrates-the-power-of-solar-storage-microgrids-in-puerto-rico/>

³⁸ <http://casapueblo.org/>

³⁹ <https://resilientpowerpr.org/>

In terms of being "more compatible" with social equity, freedom and cultural pluralism, I interpret this as solar energy infrastructures have "greater potential" to be used democratically than do infrastructures of nuclear or fossil-fuel burning energy sources (coal, oil, natural gas). Here we must determine what "potential" means. Proponents of blockchain technologies, for example, hype the technology's "potential" to do a variety of things including, "revolutionize the world economy."²¹ However, for some skeptics such as Adam Greenfield, "there is no such thing as potential, in this view: there are merely states of a system that have historically been enacted, and those that have not yet been enacted. The only way to assess whether a system is capable of assuming a given state is to do the work of enacting it" (Greenfield 2017). For both photovoltaic systems and blockchain technologies, there seem to be an equal number of thinkers on the participatory left who argue "these techniques give ordinary people a way to organize themselves democratically at scale, outside the state" (Greenfield 2017). And while several precedents have been set by autonomous organizations who operate and own their solar power infrastructures in a democratic way, for blockchain technologies, not just because they are quite new, at the time of this writing, "these discussions are always couched in terms of their potential: what might happen, what could be achieved. Nobody has yet shown that a distributed autonomous organization has done so, among any group of people, anywhere on Earth" (Greenfield 2017). Skepticism is healthy, in my opinion, but I do not want to belittle the importance of dreaming a better future, and technology can be a useful tool to enacting change for a better future. As Winner explains, "In our times people are often willing to make drastic changes in the way they live to accord with technological innovation at the same time they would resist similar kinds of changes justified on political grounds" (Winner 1989: 135). Knowing this power of technology, can it be used to transcend political boundaries to affect positive change? I argue that perhaps it can, but only if ethical and equitable frameworks are carefully considered over excitement and claims about the technology itself.

Anthropology of the Blockchain

We can summarize the trajectory of the blockchain, starting with Bitcoin (where the protocol of blockchain is in service to the currency), moving to Ethereum (where the currency is in service to the protocol), and creation of new companies such as ConsenSys⁴⁰. A protocol is simply a set of rules. Specific to computing, a protocol is a set of rules governing the exchange or transmission of data between devices. It's how email sends and receives messages - IMAP, POP3, and SMTP being the most commonly used Internet mail protocols. Different blockchains have different protocols, but all blockchain protocols typically involve cryptography in the process. (Some private and consortium "blockchains" have their own proprietary protocols that do not involve cryptographic proofs, such as Corda and Ripple. Some debate that these are not true blockchains nor distributed ledgers, but simply protocols, due to their central authority and lack of cryptographic proofs).

The main categories of utility of a blockchain can be summarized as a digital, distributed version of the following:

1. **Ledger** on which financial transactions are recorded;
2. **Platform** (a backbone, or base layer) on which applications are built, and financial or non-financial exchanges and services are facilitated (ex. smart contracts);
3. **Database/registry** on which information is stored.

Within these categories of utility are three types of blockchains based on who is allowed to use them: public (open-access), private (permissioned with centralized network administrators), and consortium (permissioned with a consortium of network administrators). The technical architecture of blockchain projects typically include the base Blockchain (think of this as the operating system of your computer or

⁴⁰ Based in Brooklyn, New York, founded by Joe Lubin. Their tag-line: "ConsenSys is solving real-world problems with Ethereum blockchain solutions for organizations of all sizes, from the local community to the global enterprise." Their About Page reads "Our focus is on the ecosystem, the growth of the Ethereum network, and global integration of the benefits of blockchain and tokenization." <https://consensys.net/about/>

your phone); and blockchain applications (runs on the protocols of another blockchain). Together, in this instance, blockchain is a digital service platform.

The “community” of users engaged in cryptocurrency and the blockchain is far from unified in their motivations and aspirations, and rather is made up of a subset of multiple interest groups and individuals, all very active online on forums and social media, and in conferences and meetups across the globe. This is what I call the “blockchain space,” and once I was introduced to it, I felt as if my eyes had been opened to an alternate reality. Every now and then a cryptocurrency or blockchain story will hit the main news outlets, but the reality is that entire newsrooms have been created to cover blockchain and cryptocurrency on a daily (and hourly/minute-by-minute) basis. Most, if not all, of these newsrooms are run by people who have a vested interest in the success of the technology. Additionally, self-proclaimed “crypto gurus” and “blockchain specialists” take to social media (especially Twitter) to provide regular commentary and debate between other gurus and specialists. While there are a fair amount of critical commentaries, it could be easy to ignore them and follow only those who hold your same opinion, a classic case of confirmation bias not constrained to blockchain. The website medium.com allows people to publish their own articles and essays on a polished platform, lending professional credence to their words. While minimal gatekeeping allows insightful critical writing to reach wider audiences, medium.com it also is a repository for hundreds of ICO whitepapers and “proof-of-concept” articles, some highly practical and others more esoteric, like Solana’s “Proof-of-History”⁴¹. There are thousands of Medium articles on cryptocurrency, blockchain, ICOs. Many of these whitepapers and articles use high-level mathematics and technical language that is geared toward other technologists. However, technical language is also co-opted and turned into technical-sounding language by groups and individuals who may not fully understand the technology but who still know the blockchain is hot and gaining traction. To non-technologists, it can be hard to differentiate between the two, as both can be seen as a form of opaque jargon that is utterly impenetrable and incomprehensible. Combined with the core blockchain narratives (trust, truth, transparency, immutability, decentralization, freedom), all of the articles, all of the posts, all of the books, all of the conferences, and all of the conversations contribute to a form of mimetic transmission. This mimetic transmission of ideas and ideals constitutes both the “success” of blockchain technology (in terms of adoption) and how realities are produced.

Who is participating in the “blockchain space” currently? (Note: these are not mutually exclusive)

1. Technologists, Developers, Startups, and Blockchain Companies (looking to achieve a wide range of “value propositions” that relate in some way to transactions and exchange);
2. Investors/speculators/traders (looking to get rich);
3. Banks, Institutions, Corporations, Industry leaders in various sectors (looking to remain relevant, improve transaction process, security, efficiency);
4. Governments (vary widely from adopting blockchain to banning cryptocurrency mining);
5. Individuals who use cryptocurrency as money, to send or receive payments for an object or service;
 - a. People looking to transfer money across borders
 - b. People looking to transact with a greater degree of anonymity
 - c. People who accept it, either out of curiosity or because it is offered to them
6. Journalists and academic writers making observations and reflections;
7. Curious non-technologists who have access to a computer, tablet, or phone.

The demographics of the “blockchain space” online are as follows⁴²:

1. Overwhelmingly male (91.22%);
2. Overwhelmingly young men, between the ages of 18 and 34 (62.24%);
3. Fewer women, and far fewer women of color.

What are the motivations of those who engage the blockchain space?

1. **Change.** This is wide ranging, but stems from the political belief that central-banks are corrupt and inefficient. “Disruption” is a term used often to describe the blockchain, and for good reason –

⁴¹ <https://medium.com/solana-labs/proof-of-history-a-clock-for-blockchain-cf47a61a9274>

⁴² According to Google Analytics and <https://coin.dance/poli>

because it often intends to disrupt. Whether or not disruptive change is actualized is another matter, because other powerful players have a vested interest in maintaining the status-quo. Other systemic change that has been mobilized around the blockchain is decolonization.

2. **Profit.**
3. **Security/efficiency.**
4. **Economic development.**
5. **Financial mobility.**

For a technology that was created to achieve consensus, there is a lot of contestation about what this technology should be and do. Furthermore, there is a lot of spatial contestation between groups oriented around the blockchain and those who are not. This plays a large role in blockchain urbanization.

Taxonomy of Blockchain Urbanization

Blockchain is global. It facilitates transactions between individuals and groups who never would have been able to interact. But its impact is also local, and highly specific. Still, there are geographical commonalities in where certain cryptocurrency related activities are occurring. For example, bitcoin mining farms are set up in areas of the globe where energy or property (preferably both) is cheap. Production of specific computer equipment also seeks these low rent locations. This infrastructural settlement often occurs not large cities, but often remote areas that have abandoned infrastructures or disinvestment. However, communities organized around cryptocurrency or blockchain technology are both distributed online and across the globe, but can also be concentrated in an existing city (ex. New York City; San Juan).

A taxonomy of blockchain urbanization consists of actors and relationships that fall into one or more of the following groups:

1. Actors who intentionally address the question of – what should the urban be/do/have/serve/produce – with cryptocurrency and blockchains

- A. Addressing Urbanization / Urban Development / Global Development⁴³
 - a. Groups that Existed Before the Blockchain
 - i. Institutions/Transnational Organizations
Ex. IMF, World Bank, UN
 - ii. Companies and Consultancies
Ex. Deloitte, McKinsey
 - iii. Governments
 - iv. Banks
 - b. Groups that Formed After the Blockchain
 - i. Companies – ex. ConsenSys (Lubin, Anderson, Thomason, 2018)
- B. Addressing urban related “use cases” – transnational projects*
 - a. Cross-Border Payments
 - b. Financial Services and Banking (BitPesa; Banqu; UCash; CASHAA)
 - c. Resource Management/Supply-Chain Management
 - d. Digital Identity (Self-Sovereign ID)
 - e. Audit Trails
 - f. Carbon Trading
 - g. Virtual Worlds
 - h. Digital Labor (ex. Procurement Process, Business Licensing; Crowdsourcing; Data-Gathering)
- C. Addressing urban related “use cases” – city or regional projects*
 - a. Geography, Cartography, and Mapping
 - i. FOAM “Proof-of-Location”

⁴³ There are a number of use cases that are currently in development that pertain to matters of global/international development. It is beyond the scope of this thesis to dive into each case as it applies to the specific context in which it is proposed, so I will simply provide an overview and in later chapters I will empirically describe how each apply to the context of Puerto Rico.

- ii. XYO
 - b. Database and Records (land registries, healthcare, insurance)
 - c. Smart Cities / Digital Service Architectures (ex. ridesharing)
 - d. Voting (ex. Democracy Earth; Sovrin)
- D. Addressing urban related “use cases” – urban or community projects*
 - a. Energy Infrastructure/Commons
 - i. Brooklyn Microgrid
 - ii. Waterchain

*These actors are primarily a combination of software developers and entrepreneurs who may act in advisory capacity or pitching their products and services to governments and other non-blockchain companies.

2. Actors who use space (and its legalities) as a tool with purpose

- A. With intent to build a new community, utopia, or nation via cryptocurrencies and blockchains
 - a. Geographically Concentrated
 - i. Individuals (such as Brock Pierce in San Juan; Jeffrey Berns in the Nevada desert)
 - b. Geographically Distributed
 - i. Governments (such as E-Estonia, with digital citizenship)
 - c. Hybrid – Distributed with Concentrations
- B. With intent to gain wealth with no overt/apparent intent to change the space in return (but do so in actuality)
 - a. Individuals, Companies oriented around cryptocurrency “mining”
 - b. Individuals, Companies who run their crypto/blockchain businesses in areas of maximum incentive (including tax incentives)
 - i. Such as Puerto Rico, incentivized by Acts 20/22

3. Actors who own/occupy space as a result of wealth accumulated via crypto, with no apparent intent to change the space, and with no immediate purpose to enact crypto/blockchain projects in that space

- a. Individuals, primarily, who buy property and things

4. Actors who document and write about these other groups and processes.

- a. Popular writers, and popular media outlets
- b. Dedicated crypto/blockchain media outlets
- c. Youtube, Reddit, online forums run by crypto/blockchain proponents
- d. Academic scholars

The formulation of this taxonomy is still in-progress. I argue that, like the implementation of most technologies, blockchain is highly context dependent, which is why I will start out with generalizations informed by research, but will seek to employ my own empirical research on the ground in a context where the most striking contradictions have occurred (Puerto Rico).

In analyzing this taxonomy of blockchain urbanization, I argue three points which will be expanded upon in the following chapters of this thesis:

- 1) blockchain technology has made utopia, speculative futures, and urban imaginaries believable, which gives power to dreamers, but raises the question of who has the power to dream?;
- 2) in order to understand a technology’s use and implications, we must understand its inherent or effective politics to determine if it can be used for anything outside of those politics;
- 3) digital infrastructure and its politics must not be deemed separate from the new, existing, or absent physical infrastructure, its political-economic origins and discontents, actors, governments, institutions, all of which together have local material, environmental, spatial, and social implications.

These suggestions call for a deeper analysis of how political-economic ideologies (cryptoeconomics) are imbricated in the production of space and digital and physical infrastructures. It calls us to acknowledge

that the urban is indeed more than the city, but that the city is still an important object of analysis. It call us to work between and across scales, to look at the specific assemblages of actors and relationships that are mobilized around the blockchain and the digital in new types of “ecosystems”, or digital service architectures, linked to a particular location while perhaps distributed across the globe. Rather than take the word “ecosystem” at face value, we must look at both the *eco-* (eco-logy and eco-nomics) and as the *-system* (technological, social, political). This includes geographies of extraction, and their spatial distributions or concentrations, including mining farms and ASIC chip factories (from Inner Mongolia to upstate New York), their planetary climate impact, and their highly local impact.

The creation and participation in new blockchain “ecosystems” has many similarities yet key different from how “ecosystem” or “eco-community” was envisioned by Murray Bookchin, as was mentioned earlier in this chapter, prioritizing the environment and communal freedoms over the individual (Bookchin 1992). Ultimately, two forms of libertarian ideology (left and right) find common ground via blockchain narratives. One is right libertarianism, prioritizing individual freedoms, free markets, and private property, with no explicit concern for social equality; and the other is left libertarianism, or libertarian socialism, prioritizing individual freedoms and liberties as a means to promote social equality, advocating for the commons and an egalitarian approach to natural resources. Many who would agree with left-libertarian beliefs do not self-identify with left-libertarianism, perhaps due to their negative views of general or right libertarianism. Both can contain varying versions of anarchism, though the former is more aligned with anarcho-capitalism, and the latter tends to be anti-capitalist, seeing capitalism as a centralized form of authority and power, as well as opposing other forms of control and oppression beyond just the state including abuse of power dynamics between the employer and the employed, the ruler and the ruled, men domination over women, heteronormative structures over queer and gender nonconforming identities (feminists, mutualists, autonomists).

I argue that the varied groups, institutions and actors engaging the blockchain space will have much to do with how it is realized over the next few years. Since the blockchain is a distributed ledger on which transactions are confirmed and validated by a distributed network of computers, all of which hold a copy of the ledger, this eliminates the “need” for a third-party central bank, or a number of centralized “intermediaries” such as Visa, MasterCard, Google/Apple Pay. However, as a reaction, and as a means to “increase security”, many central banks are introducing their own blockchains, in partnership with tech giants such as IBM⁴⁴. But banks are not the only institution considering the blockchain. While blockchain technology is being written about and considered by supernational organizations who maintain a popular understanding of urbanization (Deloitte, McKinsey, etc), these organizations and institutions are being informed by a new group of technologists who have stake in the success of the technology over other priorities. Blockchain technology has far less analysis from academics and critical practitioners who have a different theoretical understanding of urbanization. I suggest that in order to form a critical perspective, we must enter these understandings into conversation with one another, because even though some blockchain proponents would have it another way, existing institutions, NGOs, and supernational organizations currently have a lot of influence on how the urban is produced.

Using the blockchain around which to design alternate futures is not only storyboarded by supernationals and NGOs, but also tech companies using “design thinking”⁴⁵ and workshoping as a means to encourage creativity and imagination, but also to gather consensus. But not all visions are compatible with blockchain solution. While this opens up some opportunities to non-technologists, it is important this doesn’t turn into design solutionism. If blockchain is a resistance generated from within a cyberlibertarian movement, we cannot ask other movements to force their visions of the future into the technopolitical

⁴⁴ R3’s Corda is a consortium “blockchain” involving Intel, Bank of America, Merrill Lynch, Wells-Fargo and ING; Hyperledger involves IBM, HSBC, Deutsche Bank, and several others; JP Morgan Chase has Quorum. It is important to note these are not considered true blockchains by some, since they are permissioned (not open) and use proprietary consensus protocols rather than cryptographic proofs that true blockchains utilize.

⁴⁵ Design-thinking around the blockchain has been used and proposed as a model by Brooklyn based blockchain startup Patara. I visited their office where they showed me an example of a “design-thinking” workshop they held, with documentation oriented around a proposed music platform on a blockchain. Their methods can be read here: <https://medium.com/patara/design-thinking-for-blockchains-ded1d6cabe53>

anarcho-capitalist structure and ideology of the blockchain (with narratives of incentive mechanisms, consensus, tokenization, and decentralization). It does not mean that decentralization as a theme is not compatible with other ideologies. Is consensus what we are aiming to achieve? Ethereum Virtual Machine is posed as the World Computer⁴⁶, or the operating system of all transactions and exchange. This is the ultimate computational-driven hegemony where “consensus” reigns. Perhaps some movements are frustrated with the current state of affairs but would prefer instead to hold governments and elected officials accountable. Maybe some groups would prefer communal-based trust over the elimination of the need for trust in favor of computational verification. To be clear – the need for trust is not eliminated, it is just shifted to be placed in the coders and the computational process. Thousands of investors in Ethereum’s experimental distributed autonomous organization project, The DAO, found this out the hard way when 3.6 million Ether were stolen (valued at 50 million USD at the time), not due to a failure of the computational process, but due to a programming error vulnerability in the code that allowed this exploitation. This caused the Ethereum blockchain to be hard forked by its foundation (led by Vitalik Buterin) who set up a recovery address on which the funds could be converted back to Ether by its original contributors. This caused a controversy between two camps, one who supported this course correction and fund recovery because it was morally the right thing to do, while the others believed this exploitation, while perhaps unfortunate, was perfectly legitimate because the code itself should prevail. The latter group continues to use the original blockchain now known as Ethereum Classic.⁴⁷

The blockchain developers, investors, speculators, and users all play a key role in how blockchain urbanization is realized, as well as how governments respond. For all of the blockchain industry claims of disruption and revolution, cryptocurrency use and the industry as a whole is heavily male dominated, which is hardly a disruption to the gender dynamics of both the financial and tech industry.² The blockchain industry is a subset of an already male-dominated technology industry. The blockchain is yet another layer built upon layers of existing bias and discrimination in prior technologies, primarily the internet - but also GPS in the case of FOAM, see (Mattern, The Atlantic 2018) - which itself built upon earlier injustices in telecommunications infrastructures. Furthermore, many blockchain proposals are built on traditional power structures and assume men’s norms are universal cultural norms. Some feminist technologist groups and companies are aiming to change that dynamic such as Doteveryone⁴⁸. Also, the blockchain is being mobilized by groups such as Women in Blockchain, with a mission that aligns with Blockchain for Social Impact, both of which have branches and meetups distributed around the globe.^{49, 50}

In addition to gender issues, new organizations are being formed to use the blockchain as a means to combat structural issues of inequality. For example, Satoshi Centre and BitMari are working with the blockchain to help decolonize Africa.⁵¹ In countries that see high rates of inflation, such as Venezuela, cryptocurrency has been used as an alternate currency to eschew government mismanagement (Chandler 2018). At the same time government responses to cryptocurrency regulation and adoption widely vary by context. Estonia has built an entire e-nation running on a blockchain.⁵² China has placed strict regulations on cryptocurrency, though these have been subject to change (Kharpal 2018). Plattsburgh, a small city in upstate New York has placed a ban on cryptocurrency mining after it saw a huge energy spike in demand for its hydropower electricity, but has recently been considering lifting that ban (Oberhaus 2018) (Strzepa 2018). Under the current crypto-mining craze (no longer contained to bitcoin, but other alt-coins that are also ripe for speculation), these operations land in areas of maximum incentivization – to get the biggest profit from your energy expenditure, one wants to run his mining operation in an area with the cheapest energy costs.

⁴⁶ <https://ethereum.github.io/yellowpaper/paper.pdf>

⁴⁷ Out of the top 100 cryptocurrencies ranked in terms of coin market cap, ETC is ranked 18, behind ETH rank 3.

⁴⁸ <https://doteveryone.org.uk/>

⁴⁹ <https://cointelegraph.com/news/women-in-blockchain-and-crypto-how-to-tackle-gender-inequality>

⁵⁰ <https://blockchainforsocialimpact.com/>

⁵¹ “Building a Blockchain Ecosystem with Integrity and without Scams!” presentation by Alakanani Itireleng, Director at SatoshiCentre ply Ltd, at “Black Blockchain Summit 2018” in Washington DC, <https://www.youtube.com/watch?v=t5tCTW9KPdk&feature=youtu.be>

⁵² See E-Estonia: <https://e-estonia.com/>

These varied usages and positions on cryptocurrency and blockchain technology amount not to a shared consensus, but rather contestation. In order to understand what is going on, we have to consider the context, and analyze the multiple intersecting actors and issues at play in interconnected socio-technical, and socio-spatial relationships. To support this argument, Chapters 2 and 3 of this thesis I will focus on the new socio-technical relationships around the blockchain as they are forming on the archipelago of Puerto Rico, particularly in San Juan.

Discontents of Blockchain Urbanization

As I have argued earlier, blockchain urbanization, is a type of urbanization enacted in service to blockchain technology, its encoded principles and assumptions, and the ideas and desires of its proponents. It is simultaneously global, a planetary mesh, but has highly local specificity. Like capitalism is not uniformly rolled out from place to place, blockchain urbanization is not uniform but rather context dependent. It is currently co-present with other types of urbanization, including the “urbanization of capital” as described by David Harvey. A study of blockchain urbanization includes a study of the transformations in the circulation, concentrations, and distributions of capital, and a study of the resulting transformation of the so-called “urban matrix” and “rational landscape” of accumulation as discussed by Harvey. As Harvey writes, “Capital accumulation and the production of urbanization go hand in hand,” and furthermore, “capital accumulation, *technological innovation* and capitalist urbanization have to go together.” (italics my own, Harvey 1989: 23). First, it is important to note that the following is premised on the notion that “the holding and command of money confers tremendous social power. But under capitalism that power is contingent upon the continuous use of money as capital” (Harvey 1989: 22). By “social power,” I would specifically amend to this “purchasing power,” which means the ability to buy that which is desired - from land, objects, products, companies, the time and labor (physical, emotional, mental) of people, to more ontological things like ideas and influence. In other words, money can buy influence regarding how things are talked about, written about, and enacted (which we have witnessed can influence the election of government officials).

Of course, purchasing power is not the only aspect that influences how things are talked about, written about, and enacted, which is why there is still room for journalists, activists, civil society groups, and academics. Here communications technologies and digital media are critical to study. While it has been argued that the internet helps spread diverse opinions and helps “democratize” discussions, this is complicated by the fact that the internet has existing biases (Noble 2018), as well as barriers to entry. Whose voices are being amplified on the internet? Broadband internet is not equally accessible to all, and this digital divide is a result of systemic racial bias and discrimination (Daniels 2012). Still, the internet as a sociotechnical network has changed how ideas are spread, across increased distances in space, and in shorter periods of time.⁵³

The “rational landscape” that Harvey describes is the geographical and spatial manifestation of capital, organized and materialized on the ground. He argues that this process occurs as a direct relation to the organizational structure of the system regulating and controlling the circulation of capital. Particularly for institutions who are looking to adopt blockchain technology for greater speed and efficiency (cutting out the middleman). As Harvey writes, “Building a capacity for increased efficiency of coordination in space and time is one of the hallmarks for capitalist urbanization” (Harvey, *The Urbanization of Capital* 1989). This is what he refers to as “the annihilation of space by time,” the elimination of spatial barriers. We now know “time is money,” but at one point space (land) was money. However, where blockchain urbanization departs, is in a highly “technorational landscape” in the increased reliance on computational processes to do the job formerly done by third-party institutions.

⁵³ Richard Dawkins coined the term “meme” as a conceptual unit of culture that gets transmitted from person to person, analogous to the gene in living organisms. The concept is expanded upon by Susan Blackmore in *The Meme Machine*. The internet is a great transmitter of memes, which can be described as memetic transmission. However, I would like to explore another concept, that of “mimetic transmission” which I argue is equally important to cryptocurrency and blockchain ideas taking off. Mimetic, in terms of mimesis, imitating what came before. An example of mimetic transmission is the hundreds of whitepapers that were released in the style of the original Satoshi whitepaper.

Technology has agency, particularly increased agency of computational processes (non-human agents). The agency of blockchain technology, however, is one of increased computational inflexibility. This goes beyond the sociology of the door-closer of Latour, who described the nonhuman agency of a technical device that structures relations and actions. As Latour acknowledges, there are ways to override the actions the door-closer intends. First, it could break or go “on-strike” (Johnson/Latour 1988). Second, one could introduce to the door another technical device, the door stop, to prevent the door from closing. There is a certain degree of flexibility that is eliminated with computational programming. As Caliskan elaborates, “Like constitutions, protocols constitute relationships by imagining rights, subjects, objects and trajectories of actions and inaction. Yet unlike constitutions, one cannot disobey them, for they make action impossible if you do not follow the trajectories of movement they define. They display syntax error” (Caliskan 2018). There may be ways to hack and subvert these protocols, exposing a loophole in the code (as has been done before on a blockchain), but these relationships within physical space will be expanded upon in the body of this thesis. In order to understand the blockchain’s “potentials”, we must closely examine the technopolitics of the blockchain, its muddled (often unaddressed) political-economic ideologies and assumptions about human behavior, which have been pushed aside in favor of narratives around decentralization, transactions, and incentivization.

Blockchain urbanization has many parallels to modern industrial urbanization, but is now influenced to a greater extent by technological accelerationism, even greater speed, mimetic transmission, the internet. The power of the digital technologist today could not be fully anticipated by those in the industrial age, though Virilio and Massey have predicted it with their writings on speed, politics, and space (Virilio 1977 [1986]; Massey 2005). Whereas industrial urbanization in modernity was mobilized around an infatuation with technologies of mass-production and higher speed transportation; blockchain urbanization is mobilized around an infatuation with computational technologies, seemingly making possible the ultimate hyper-rational, logical method of transaction and exchange. The assumptions are not only that *central banks* cannot be trusted, but moreover that *humans* in general are fallible and cannot be trusted. With the blockchain we are now unburdened from trust by being able to rely on “unarguable” cryptographic proofs (Werbach 2018; Vigna and Casey 2018). The blockchain arguments around immutability and security stem from the logic that computers can reach valid, “irrefutable consensus” for us. Part of this is the desire for ever-increasing efficiency, part is to alleviate the all too human burden of having to do one’s research, make judgments, and face the consequences.⁵⁴ The entire premise of the blockchain as a “truth machine” is founded upon a new form of Logical Positivism, whereby consensus is logically verifiable, in this case computationally rather than empirically. This assumption relates closely to methodological individualism in economics whereby individual human economic behavior is rationally predictable, and society is the unintended consequence and unforeseen results of individual behavior.

Blockchain urbanization in particular falls into an increasingly prevalent category whereby computational processes and digital services are more relied upon, sought after, and embedded in our constructed environments (particularly “smart cities,” surveillance capitalism, platform capitalism), typically to gather more data from which companies can profit. But while blockchain urbanization does in many cases act in service to capitalist accumulation, it also shifts the balance – capital is being attained by new people and groups who aim to market a business around the blockchain industry, effectively opening up capitalism to “benefit” new groups and institutions. This new industry (mining cryptocurrency, manufacturing ASIC computer chips, startup blockchain businesses, etc) and the purchasing power of new and existing groups is being spatialized, materialized, and organized in specific ways. Blockchain urbanization is

⁵⁴ Part of the process in enacting a world where AIs and humans can communicate on a level playing field, is not in training AIs to think more like humans, but in AIs training humans to think more like machines (as is happening with Gmail’s suggested automatic “smart replies”). As Rob Horning writes about autocompletion:

“It outsources the work of whatever adversarial network might reside in our brain that assesses the acceptability of what we are saying before it is typed into an interface. It encourages the atrophy of that particular feat of imagination, or anticipating how a particular act might be received. Instead it encourages unreflexive action – simultaneously spontaneous and automation-like – that can be evaluated after the fact for what it means, without intentionality interceding. That is to say, autocomplete and smart reply are means for imposing behaviorism.” (<https://tinyletter.com/robhorning/letters/reasons-to-believe>)

bringing agency to new actors, including governance and smart contracts initiated between human, non-human, and AI. A blockchain urbanization of the future could be enacted solely by computers conversing and achieving consensus with one another on a blockchain. While the emancipatory potentials of the blockchain are currently viewed under terms of economic mobility and economic urban development, it begs the questions – is there more to freedom than free markets; is there more to prosperity than economic prosperity? And under what costs? Proof-of-Work based blockchains have massive global energy consumption. As of December 2018, the energy consumption of the bitcoin network was roughly equivalent to the electricity consumption of the entire country of New Zealand⁵⁵. This is not accounting for the energy consumption related to mining other cryptocurrencies besides bitcoin. Energy consumption is not unique to blockchain/crypto, but rather adds a significant new level of environmental extraction on top of already existing extractions in service to technorational processes, and urbanization.

The theme of power will recur throughout this thesis. In decoding what the blockchain is, what proponents claim it to be, and what it has the power to do, I discuss the power of rhetoric (language designed to have a persuasive or impressive effect on its audience), and the mimetic power of transmission. Zook and Blankenship assert that “the faith in the superiority of algorithmic governance has injected a powerful discourse in economies that has proven more important and disruptive than the actual practices of Bitcoin or blockchain” (Zook and Blankenship 2018). I call attention to a distinction between the rhetoric of blockchain-based governance, and the narratives, politics, and desires of current human blockchain proponents. “The discourse surrounding Bitcoin and the blockchain systems it has engendered has proven more important than the actual practices of these technologies,” Zook and Blankenship write, citing (Cockayne 2016). While I agree with that discourse is “not incidental to economic practice, but instead is co-produced alongside it” (Cockayne 2016), I add two points. First - rhetoric around blockchain technology should be separated into narratives about the technology itself (hard-coded, algorithmic governance built in); and the even more human, subjective narratives of blockchain proponents regarding either a) how the technology can/should be used, or b) non-technical, non-blockchain narratives about how their occupation of physical space to practice cryptocurrency/blockchain related business will contribute to some sort of perceived change (as with the “crypto utopians” of San Juan). Second - I argue that the actual practices of blockchain technology are ultimately critical to analyze – not simply to determine if these narratives are contradictory of actual practice; but, to put aside the issue of rhetoric, to question what the actual practice of blockchain technology (ex. Bitcoin mining; use of cryptocurrency as money) is doing to physical space, and what it means for the environment, climate, and current and future life. Zook and Blankenship relate code/space to the agency of the blockchain in their review of algorithmic governance. However, while they provide an important overarching review of “the basic parameters of [blockchain-based algorithmic governance’s] computer architectures, its connections to materiality and space and the complexity of its established practices” (Zook and Blankenship 2018) in the second part of this thesis my aim is to provide an empirical, ethnographic perspective of how these connections are specifically formed in the context of Puerto Rico.

Design Futuring and Questioning Emancipatory Potential

The blockchain is currently being leveraged for its “emancipatory potential”¹⁹ (see Chapter 3 for more detail). The blockchain, as an industry, has indeed opened up possibilities for new companies to form across the globe, offering new products and services - effectively allowing them to participate and compete in the market. This sounds amazing, but when we talk about blockchain having “emancipatory potential” we must be clear what we mean – freedom here means the ability to enter and compete in an idealized free market.

The blockchain is opening up the possibility for more companies across greater distances to enter capitalist markets. We have seen the creation of wealth with crypto-millionaires, and as a result capital accumulation is being distributed and concentrated in new geographies. I return to Puerto Rico where we see crypto-people landing due to the tax incentives – expats not just from the United States but from all over the globe – some with no interest in the Puerto Rican people, and others claiming they can benefit Puerto Rico by making it a new “Crypto-Utopia” (Bowles 2018). This may be yet another form of

⁵⁵ <https://digiconomist.net/bitcoin-energy-consumption>

colonization on top of an archipelago that has been serially colonized for over 500 years. The Puerto Rican economic development branch of the government is engaging the new crypto-community, and Economic Development and Commerce Secretary Manuel Laboy started a Blockchain Advisory Committee⁵⁶, supported by Governor Ricardo Rossello, during the “Blockchain Unbound” conference⁵⁷ in San Juan in March 2018. But (as I discuss in Chapters 2 and 3) the government is relying on a new class of “tech translators”, and one must wonder - what is getting lost in translation?

Looking more trans-nationally, big institutions such as the IMF, World Bank, UN are also talking about the potential use cases cryptocurrency and of the blockchain beyond cryptocurrency. These institutions are important but also exist to protect already vested interests. In making the market (or multiple little markets as may be the case in blockchain after cryptocurrency) more free and open for competition, and in seeing the tendency towards actors maximizing their individual utility, this is making capitalism as a system far more efficient.

Here I echo Lefebvre’s provocation when he asks:

Is technostucture as effective (in maintaining the relationships of production that exist, ensuring their survival and development) as it is within the enterprise? There is cause to wonder. For isn’t it precisely in this sector that technostucture and the “compensatory power” of great economic and political power structures (Galbraith) reach their “optimal” efficiency? They manage this by allowing logic and strategy to conceal themselves from view – and strategy to appear logical, or necessary. (Lefebvre 2003: 153)

With the blockchain, new power is given to developers, programmers, coders – and those who can pay them to enact their projects, a new “technologist class”. I do believe a great number of those people truly want to enact some form of social good. But with exception, excitement about the technology and its potentials has taken precedence over critical consideration of its political economic implications. This is a problem, particularly if we want to understand anything at all about its “potential” for social good. If we want to talk about “emancipatory potentials”, and if both democracy and equity are desired outcomes, we are only going to get there if we bring politics to the fore, instead of burying them behind narratives of innovation and revolution.

When used by blockchain proponents, often the term “Ecosystem” really refers to a “community” of developers, which suggests that participation is elective. Bookchin’s socialist libertarian perspectives²⁹ on freedom, decentralization, communal participation and citizenship seem fundamentally compatible with the ideologies of the blockchain. At the same time, the blockchain attracts right-libertarian and anarcho-capitalist ideals (Golumbia, *The Politics of Bitcoin: Software as Right-Wing Extremism* 2016), the marketization of everything, individual freedoms, and privatization. How are these political differences reconciled?

For many proponents of the blockchain I think it comes down to three core tenants:

- Belief in computational processes to achieve consensus
- The desire for decentralization (of power and control)
- Belief that incentivization (via tokens) can properly influence desired action.

Blockchain is an economic technology. Even if we are not talking about a financial use, it still fundamentally is a record of transactions. I argue that we have to bring processes of urbanization into conversation with process of economization, such as markets, theories of value, and particularly economic technologies – and how these are spatialized, materialized, concentrated or distributed geographically. If we look at the history of the Ledger in accounting, the invention of Double-Entry Bookkeeping with the merchants of Venice shaped the development of capitalism (an argument made by Weber, Shumpeter, Sombart), see (Carruthers and Espeland 1991)⁵⁸; conversely, Harvey described how the credit-debit regime changed urbanization (supply-side urban command centers, and demand-side

⁵⁶ Desarrollo Economico y Comercia creara consejo asesor sobre "blockchain," El Nuevo Dia, March 15, 2018. <https://www.elnuevodia.com/negocios/economia/nota/desarrolloeconomicoycomerciocreaconsejoasesorsobreblockchain-2406800/>

⁵⁷ <https://blockchainunbound.com/>

⁵⁸ Digital technology and the accounting system has further made decision-making processes even more “rational” and reliant on numerical data. See (Quattrone 2016).

suburbanization creating demand for the products) which was key to the development of capitalism (Harvey, *The Urban Experience* 1989).

The invention of Blockchain as a distributed digital ledger may likewise shape the development of capitalism, but what is unclear right now is if blockchain as a technology can exist outside of capitalism at all? To do so, we have to look at its core tenants. If the blockchain can encourage free exchange to exist without oppression and without capital accumulation and profit used to marginalize populations, perhaps there is a future where blockchain can exist outside of capitalism. Outside of capitalism, I can see a few scenarios unfolding, at different scales.

- 1) Libertarian Socialism, or cooperative democracy. Freedom of the collective, owning the means and methods of production and governing them at a communal scale – albeit the token incentivization is not required.
- 2) At scale, blockchain may be fundamentally compatible with political internationalism. The international works together on points of agreement to coordinate activity. This is a form of consensus building, however, there still needs to be room for contestation and disagreement.
- 3) In the far future, blockchain could be the operating system whereby AI agents query and exchange with other AIs and posthumans.⁵⁹ In this future, capitalism may be superseded by full computationalism. Though an interesting inquiry, this exceeds the scope of my thesis which will focus on the immediate and near future.

The core tenants of blockchain seem to lend themselves to a number of contesting communities with shared beliefs. But if a community claims a belief of “equity” or “social justice”; it must take a look at the diversity of the “ecosystem”. As a whole, the crypto space is overwhelmingly male (as has been discussed earlier in this chapter). There are more women in the blockchain space, including many who identify as progressives and are trying to change the system from within...even so far as attempting to “hack the minds of developers”⁶⁰ who tend to be young white males. But perhaps we should also look at why more women are not participating. It’s not due to lack of vision; and it’s not a call to bring more women to crypto. Women are already key leaders in long-term, sustained activist movements, galvanizing change in social and environmental justice. Some of the best speculative future designers, and science fiction writers are women: Octavia Butler, Ursula LeGuin, Margaret Atwood, N.K. Jemisin to name a few. The question really is - How do we make more visions and versions of alternate techno-economic urban futures believable?

If the blockchain opens up the power to dream new techno-economic futures, as Lana Schwartz suggests in her article on Blockchain Dreams (Swartz 2017) - it begs the question: who has the power and privilege to dream? Is it the Puertopians who flocked from the mainland United States to San Juan to remake the island after Hurricane Maria with their “benevolent capital” transformed from bitcoin? Or should it be Puerto Ricans themselves, who have long had ideas for how to govern themselves and remake the archipelago and their economy, but they have never been allowed to do so at scale.⁶¹ I believe any blockchain advocate discussing emancipatory potentials must face these types of questions.

One example for blockchain impact is by increasing opportunity for cross-border exchange (which the blockchain is very good for right now)⁶², yet we still have to ask what boundaries, borders, and barriers to entry arise in its place? Knowledge, capacity, access. Blockchain is a very difficult technology for most people to understand. It relies on translators. If somehow the translations go awry or are misinterpreted, that may be dangerous. Secondly, the blockchain is built on the internet, a project itself of large scale

⁵⁹ This is the aim of Ben Goertzel, and “SingularityNET: A decentralized, open market and inter-network for AIs,” <https://public.singularitynet.io/whitepaper.pdf>

⁶⁰ A comment made by Andrea Morales Coto, Lead Design Strategist at Consensys, in her presentation at the “Agent Intellects Symposium,” Center for Transformative Media, December 8, 2018. Andrea is trying to make the situation more equitable from within.

⁶¹ “From Brooklyn to Puerto Rico: A Just Recovery,” presentation by Elizabeth Yeampierre at The New School, April 18, 2018

⁶² “The promise of stablecoins: how blockchain can transform cross-border payments,” NASDAQ, <https://www.nasdaq.com/article/the-promise-of-stablecoins-how-blockchain-can-transform-crossborder-payments-cm1014278>

geopolitical engineering, and a technology that has implicit layers of bias, with the digital divide for one – read Jessie Daniels, Safiya Noble, Cathy O’Neil, Mar Hicks and more. If we build the blockchain on top of this technology without course correction we have to expect those biases will be entrenched. Digital equity and ethics must enter into blockchain discussions, not just lip service, but serious research – as in AI with Kate Crawford and AI Now.

We also need to bring blockchain’s technopolitics to the foreground instead of either not addressing them or embedding them deep in narratives of decentralization and claims of revolutionary potential.⁶³ We should challenge major supernational organizations and their tendency toward complete datafication and metricization. As Lefebvre writes: “the political reasons for passivity need to be taken seriously. [...] Ideologically, technically, and politically, the quantitative has become rule, norm, and value. How can we escape the quantifiable? [...] The qualitative is worn down. Anything that cannot be quantified is eliminated. It’s self-justifying nature is apparent scientificity” (Lefebvre 2003: 185).

How do we make more visions and versions of alternate techno-economic urban futures believable? Why is this important to urbanization? Because the voices and visions that are amplified are more likely to gain traction and financial support to enact - these are the ones that can take off at scale.

If the blockchain becomes a platform for design-thinking⁶⁴, and is opened up to a wider audience, and if convening around the blockchain as a means to dream a more equitable, preferred future is actually desired, at least two things must happen.

- 1) We cannot make promises about what a technology can do, if it is not compatible with what a group is trying to achieve.
- 2) We cannot ask other movements to force their visions of the future into the technopolitical-economic structures, assumptions and ideologies inherent to the blockchain (cryptoeconomics, decentralization, and consensus). Perhaps some groups want to break up corporate tech monopolies such as Amazon but would prefer instead to hold governments and elected officials accountable. Maybe some groups would prefer communal-based trust and exchange over computational verification.

The only way that blockchain-based design thinking can be equitable is if it acknowledges this contradiction – using blockchain as a starting point, but immediately abandoning blockchain as a starting point. If blockchain is abandoned as a starting point, and a version of an emancipatory future is compatible with blockchain – great! But if a visioned urban future is found to not be compatible with blockchain technology, how can it still be enacted - acknowledging that these dreamed futures are often not new but have been fought for years by activists, organizations, and civic society groups for years. Enacting preferred futures for those who are marginalized, colonized, and oppressed will take more than just belief in technology’s emancipatory potentials. Often times technology is not used to benefit people but further marginalize, and consolidate existing power and control. It will take structural change, political will, and a shift in decision-making power.

We are a part of a constantly evolving ecology of digital-physical ecosystems; organics, machines, sentience and sapience, it all depends on how you want to frame it, bound it, or break it apart. An ecology of ecosystems, and a study of the processes of urbanization, demands shifting scales of analysis, not just in space but in time. Of course the crises of today necessitate action now, with great speed, but to do it right, to enact an equitable future, an equitable *process of urbanization*, takes time and real understanding -- not just understanding of our immediate ecosystems, but of the constantly evolving planetary ecology of systems as a whole.

⁶³ Across the media, the “Blockchain Revolution” is posed as having the potential to radically “transform the economy and society,” and more broadly “change the world.” - Forbes, McKinsey, Fortune; and notably (Tapscott and Tapscott 2016).

⁶⁴ Design-thinking around the blockchain has been used and proposed as a model by Brooklyn based blockchain startup Patara. I visited their office where they showed me an example of a “design-thinking” workshop they held, with documentation oriented around a proposed music platform on a blockchain. Their methods can be read here: <https://medium.com/patara/design-thinking-for-blockchains-ded1d6cabe53>

The effects of blockchain urbanization include changes to real-estate markets and property ownership; energy extraction; new transactionary publics, institutions, and groups; blockchain for urban/global development; reconfigured boundaries/borders; economic mobility; changing relationships and new technopower around urban decision-making. This is happening by introducing new actors who are now becoming involved with decision-making processes, some of which have relationships to already existing decision-making agencies and institutions. Together this forms a type of distributed technocracy with geographical concentrations, distributions, and highly local specificities.

Five points were raised in this chapter that will be expanded upon in the following chapters. Thorough research on each is beyond the scope of this thesis, which is why I will focus on the context of Puerto Rico.

- 1) In order to understand a technology's use and implications, we must understand its inherent or effective politics to determine if it can be used for anything outside of those politics.
- 2) Blockchain technology has made utopia, speculative futures, science fictions and urban imaginaries more believable, "credible," and now fund-raisable, catching the eyes of big players who never gave these acts real consideration before, which gives power to dreamers, but raises the question of who has the power to dream? It amplifies the voices of a new "technologist class" and those who can pay them. And are we forcing their visions and versions of the future to fit into the blockchain narrative? Right now, the advantage goes to those who are technologists, programmers, and people who can pay them. The advantage goes to the people who have the time and privilege to wrap their heads around this technology, and who become the "translators," the "explainers". Blockchain has a huge barrier to entry.
- 3) Digital infrastructure and its politics must not be deemed separate from the new, existing, or absent physical infrastructure, its political-economic origins and discontents, actors, governments, institutions, all of which together have local material, environmental, spatial, and social implications.
- 4) If the blockchain is a resistance generated from within a cyberlibertarian movement, and the power to dream is really opened up to a wider audience, making design thinking and convening around the blockchain a means to dream a more equitable, preferred future, we cannot ask other movements to force their visions of the future into the technopolitical-economic structures, assumptions and ideologies inherent to the blockchain (cryptoeconomics, decentralization, and consensus) without making sacrifices. The only way that blockchain design thinking can be equitable is if it acknowledges this contradiction – using blockchain as a starting point, but immediately abandoning blockchain as a starting point.
- 5) If blockchain is abandoned as a starting point, and such emancipatory futures are found to not be compatible with the technology, how can those dreamed futures still be enacted? Acknowledging that these dreamed futures are often not new but have been fought for by activists, organizations, and civic society groups for years. Enacting preferred futures for those who are marginalized, will take more than just belief in technology as a way to benefit people. Often times it is not used to benefit people but further marginalize. It will take structural change, political will, and a shift in decision-making power for those who are marginalized. Is technocratic governance compatible with grassroots governance?

In order to determine if new blockchain-affiliated socio-technical agencies are influencing the production of space according to their own politics, narratives, and desires, we must focus on how blockchain infrastructures and representations are spatialized, materialized, and experienced in everyday life. At the same time we must question the tendency toward technocratic urbanization, computationalism, the construction of blockchain architectures on top of existing digital infrastructures, in specific contexts, to envision what kind of urban futures may be produced.

Contemporary Processes

(How the Urban is Produced)

How the Urban is Experienced Lived, Interacted With

<i>Form</i>	<i>Labor</i>
<i>Scale</i>	<i>Consumption</i>
<i>Organization</i>	<i>Exchange</i>
<i>Spatiality</i>	<i>Ownership</i>
<i>Aesthetics</i>	<i>Production</i>
<i>Physicality</i>	
	<i>Motion</i>
<i>Activities</i>	<i>Flows</i>
<i>Health</i>	<i>Rhythm</i>
<i>Well-Being</i>	<i>Emotions</i>
<i>Community</i>	<i>Intangibility</i>
<i>Relationships</i>	<i>Sensation</i>

← - sometimes relational, sometimes at odds with, sometimes entirely separate - →

What Should the Urban Be for whom, when, and where?

"The Right to the City"
Socio-spatial justice
Environmental justice
Financial mobility
Economic growth
Center of Production
Jobs, Housing,
Public Space, Social Services
Technological "Innovation"
Global "Command Center"
 etc.

Actors/Actants & Actions

Human, Nonhuman Animals, Organics,
 Objects, Machines, AIs
 conscious, subconscious, or nonconscious
 design - intentional, or unintentional
 Singular, Group, Collective, Swarm, etc.

Decisions Taken on "Other" Issues

Other Processes

Processes of economization;
 Processes of time;
 Political processes;
 Information processes;
 Technological processes;
 Sociotechnical processes;
 Environmental processes;
 Ecological processes

Individual Interests;
 Corporate Interests;
 Political Agendas;
 Capital Investment;
 Financial Regulation
 etc.

Decisions Taken on "Urban" Issues

Urban Policy
 (ex. Housing, Zoning, Transportation)

Urban "Problems"
 (ex. unemployment, food-deserts, pollution)

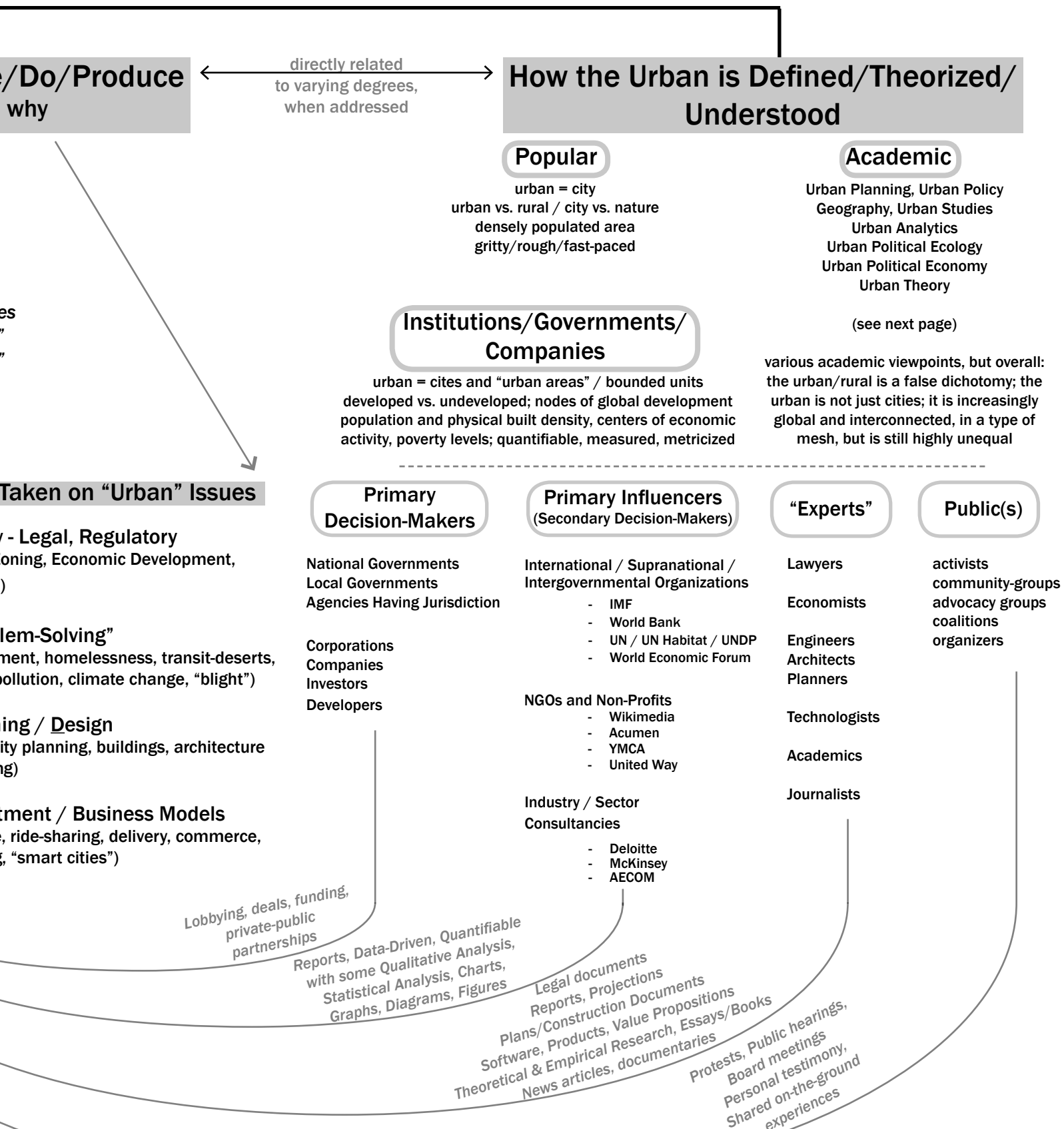
Urban Planning
 (ex. regional, city, and engineering)

Urban Investment
 (ex. real-estate, manufacturing)

Situational Actors/Actions, Contextual Forces
 Tools, Technologies, Techniques
 Decision-Making Processes
 Discourse, Ideas, Dialogues

PRIMARY TOOLS TO INFLUENCE DECISION-MAKING

of Urbanization (produced)



TAXONOMY OF BLOCKCHAIN URBANIZATION

1. ACTORS WHO INTENTIONALLY ADDRESS THE QUESTION OF - WHAT SHOULD WE DO WITH CRYPTOCURRENCIES AND BLOCKCHAINS

A) ADDRESSING URBAN DEVELOPMENT / GLOBAL DEVELOPMENT

a. Groups that Existed before Blockchain

- i. Institutions/Supranational Organizations
 - IMF
 - World Bank
 - UN
- ii. Companies and Consultancies
 - Deloitte
 - McKinsey
- iii. Governments (National, State, Local)



WHO WE ARE

WHAT WE DO

WHERE WE WORK

UNDERSTANDING POVERTY

WORK WITH US



Who We Are / News

This page in: English | 日本語

PRESS RELEASE | AUGUST 23, 2018

World Bank Prices First Global Blockchain Bond, Raising A\$110 Million

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Perspectives


Break through with blockchain

How can financial institutions leverage a powerful technology?

Blockchain has been poised to disrupt financial services. But with the sheer interest and investment by insurers, banks, investment managers, and commercial real estate firms, is blockchain a transformative technology instead of a disruptive force? We've compiled breakthrough research to show how blockchain can not only lower the risk of fraud, it can increase efficiency, improve customer loyalty, and make your organization smarter.


Blockchain beyond the hype: What is the strategic business value?

By Brant Carson, Giulio Romanelli, Patricia Walsh, and Askhat Zhumaev




AUSTRALIAN NATIONAL BLOCKCHAIN

A new digital backbone for business



BLOCKCHAIN IN GOVERNMENT

THANK YOU FOR ATTENDING
BLOCKCHAIN IN GOVERNMENT 2018!
JW MARRIOTT | WASHINGTON, DC



swisscom SWISS POST


Press release

Swiss Post and Swisscom launch a 100% Swiss infrastructure for blockchain applications



Dutch Blockchain Coalition

connect and create



Mayor Read during the hearing. Image: Jason Koebler



Puerto Rico Blockchain Advisory Council Launched By The DDEC

TAXONOMY OF BLOCKCHAIN URBANIZATION

1. ACTORS WHO INTENTIONALLY ADDRESS THE QUESTION OF - WHAT SHOULD WE DO WITH CRYPTOCURRENCIES AND BLOCKCHAINS (continued)

A) ADDRESSING URBAN DEVELOPMENT / GLOBAL DEVELOPMENT

a. Groups that Existed before Blockchain

iv. Banks & Financial Institutions

- ING (Corda)
- GMT (largest bank in Israel) w/ Ripple
- JP Morgan (Quorum)
- MoneyGram (Ripple)

v. Giant Tech Companies

- IBM (Hyperledger)
- Linux (Hyperledger)
- Mozilla (BAT)
- Cisco



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Hyperledger: blockchain collaboration changing the business world

Learn how Hyperledger, hosted by The Linux Foundation, is making revolutionary cooperation and innovation possible.

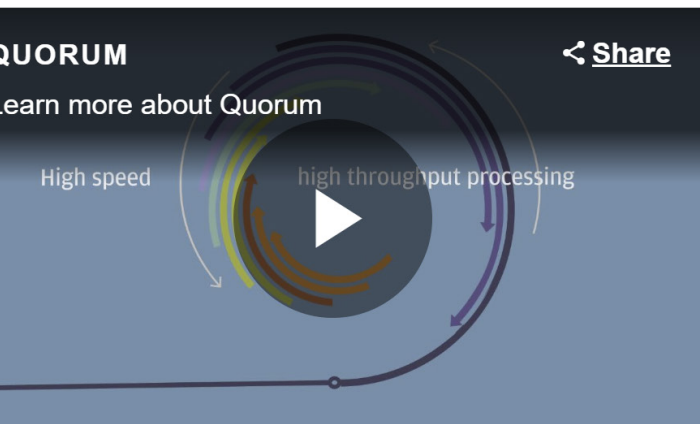


New: Hyperledger Fabric 1.4 LTS updates



Learn blockchain basics

COULD THE URBAN BE/DO/HAVE/SERVE/PRODUCE -



Quorum powers our next-gen payments solution

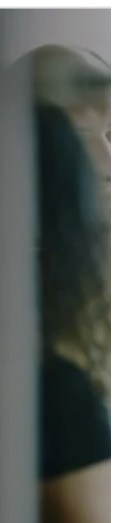
Increasing efficiency and streamlining global payments to enable 24/7 payment settlement and status tracking.

International Business Times Quorum: J.P. Morgan's Ethereum fork could eat your lunch

9 JUNE 2017

"Nothing has captured the attention of the public quite like the release of Quorum, an open source blockchain platform built on the shoulders of the public Ethereum project. ...Quorum might be the missing link that inspires business giants to ask if they can join the cool kids for lunch."

nts



TAXONOMY OF BLOCKCHAIN URBANIZATION

1. ACTORS WHO INTENTIONALLY ADDRESS THE QUESTION OF - WHAT SHOULD WE DO WITH CRYPTOCURRENCIES AND BLOCKCHAINS (continued)

A) ADDRESSING URBAN DEVELOPMENT / GLOBAL DEVELOPMENT (cont.)

b. New Institutions / Groups that Formed After the Blockchain

i. Companies

- ConsenSys*
- Patara (Design-Thinking Workshops)

ii. Joint Enterprises

- Corda Enterprise*

iii. “Non-Profit” Foundations

- ConsenSys Non-Profit Arm
- Ethereum Foundation
- Corda Foundation Board*
- Poseidon Foundation

iv. Cryptocurrency Exchanges

- Binance
- hundreds of others

ConsenSys Social Impact

Blockchain Social Impact Projects

Our mission is to leverage emerging technologies to solve the world's most pressing issues.

COULD THE URBAN BE/DO/HAVE/SERVE/PRODUCE -

Design Thinking for Blockchains

A method for exploring decentralization opportunities



Engin Erdogan

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Apr 26, 2018 · 6 min read



TAXONOMY OF BLOCKCHAIN URBANIZATION

1. ACTORS WHO INTENTIONALLY ADDRESS THE QUESTION OF - WHAT SHOULD WE DO WITH CRYPTOCURRENCIES AND BLOCKCHAINS (continued)

B) ADDRESSING URBAN RELATED “USE-CASES” - TRANSNATIONAL SCALE

- a. Cross-Border Payments
- b. Combating Hyperinflation (Venezuelan Petro)
- b. Financial Services and Banking (BitPesa; BanQu, UCash; CASHAA)
- c. Resource Management/Supply-Chain Management (Blockverify; E
- d. Digital Identity (Sovrin - “Self-Sovereign Identity”)
- e. Audit Trails (Xero; Tierion)
- f. Carbon Trading (Poseidon)
- g. Virtual Worlds (Decentraland SDK)
- h. Digital Labor (ex. procurement processes, business licensing, crow

Blockchain Project Ecosystem Map *Supply Chain / Logistics / Provenance*



IBM

IBM Blockchain Learn Solutions Services

Blockchain > Industries >

Blockchain for supply chain

Add greater visibility and efficiency across the entire supply chain to deliver higher value to your customers and trading relationships. Let's put smart to work.™

Explore supply chain use cases

What's your

* These actors are primarily a combination of software developers and entrepreneurs who may act in advisory roles.

COULD THE URBAN BE/DO/HAVE/SERVE/PRODUCE -

E PROJECTS*

Blockfreight)



dsourcing, data-gathering)

Industries ▾ Ecosystem News and events

chain

entire supply chain to deliver
relationships with IBM Blockchain.

potential ROI?



POSEIDON

With **reduce**, every purchase you make online or in a store can support rainforest conservation. This extraordinary ability is only made possible by combining blockchain and AI.

A decentralized virtual world that runs on open standards

Decentraland is a virtual reality platform powered by the Ethereum blockchain.
Users can create, experience, and monetize their content and applications

Introducing the Decentraland SDK Alpha. The tools and support you need to
pioneer Genesis City.

START BUILDING

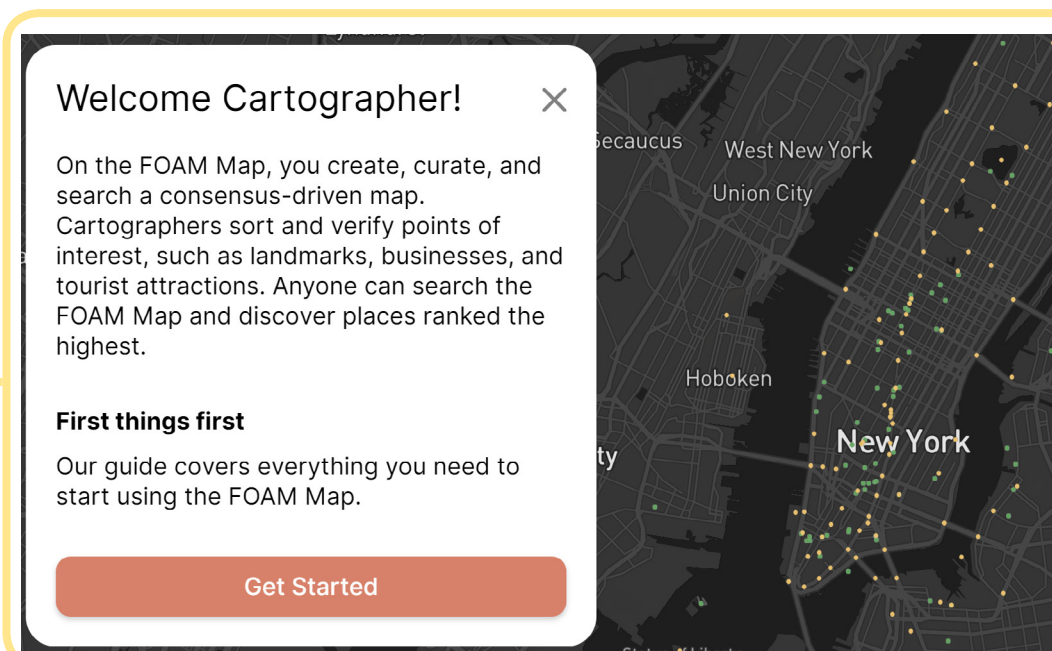
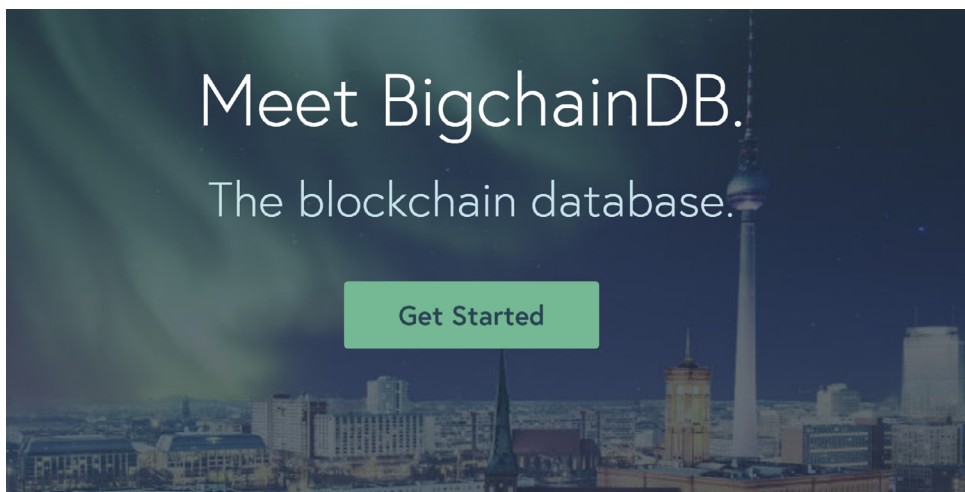
ory capacity or pitching their products and services to governments and other non-blockchain companies.

TAXONOMY OF BLOCKCHAIN URBANIZATION

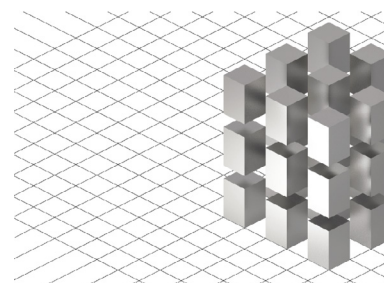
1. ACTORS WHO INTENTIONALLY ADDRESS THE QUESTION OF - WHAT SHOULD WE DO WITH CRYPTOCURRENCIES AND BLOCKCHAINS (continued)

C) ADDRESSING URBAN RELATED “USE-CASES” - CITY OR REGIONAL SCALE

- a. Geography, Cartography, Mapping (ex. FOAM “Proof of Location”; >
- b. Database and Records (land registries, healthcare, insurance)
- c. Smart Cities / Digital Service Architectures (ex. ridesharing)
- d. Governance & Voting (ex. Democracy Earth & Sovereign)



Crypto-Spatial Coordinate
location standard on Ethe



COULD THE URBAN BE/DO/HAVE/SERVE/PRODUCE -

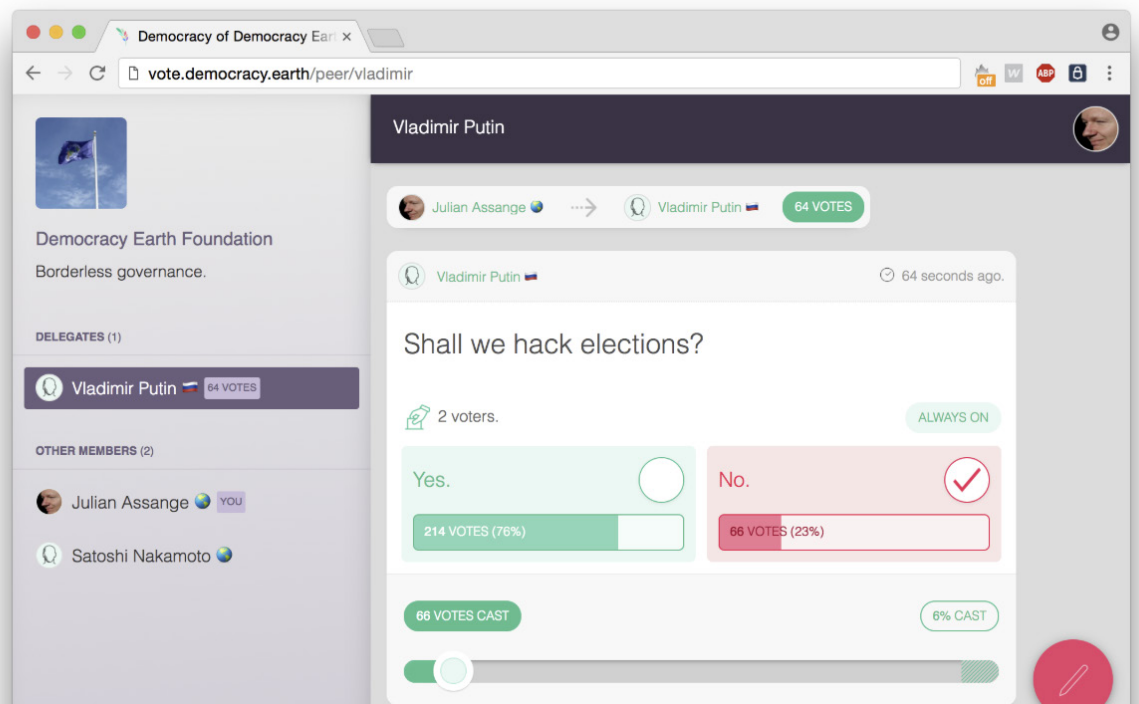
LE PROJECTS*
(YO)

Sovereign.app

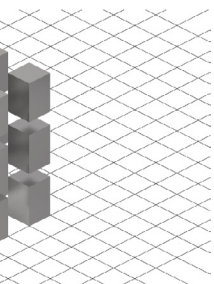
chat on gitter slack 18/2454

Sovereign is a decentralized governance platform for small & large organizations.

See our FR [Paris 2016 conference](#) presentation.



es—the open
reum



ory capacity or pitching their products and services to governments and other non-blockchain companies.

TAXONOMY OF BLOCKCHAIN URBANIZATION

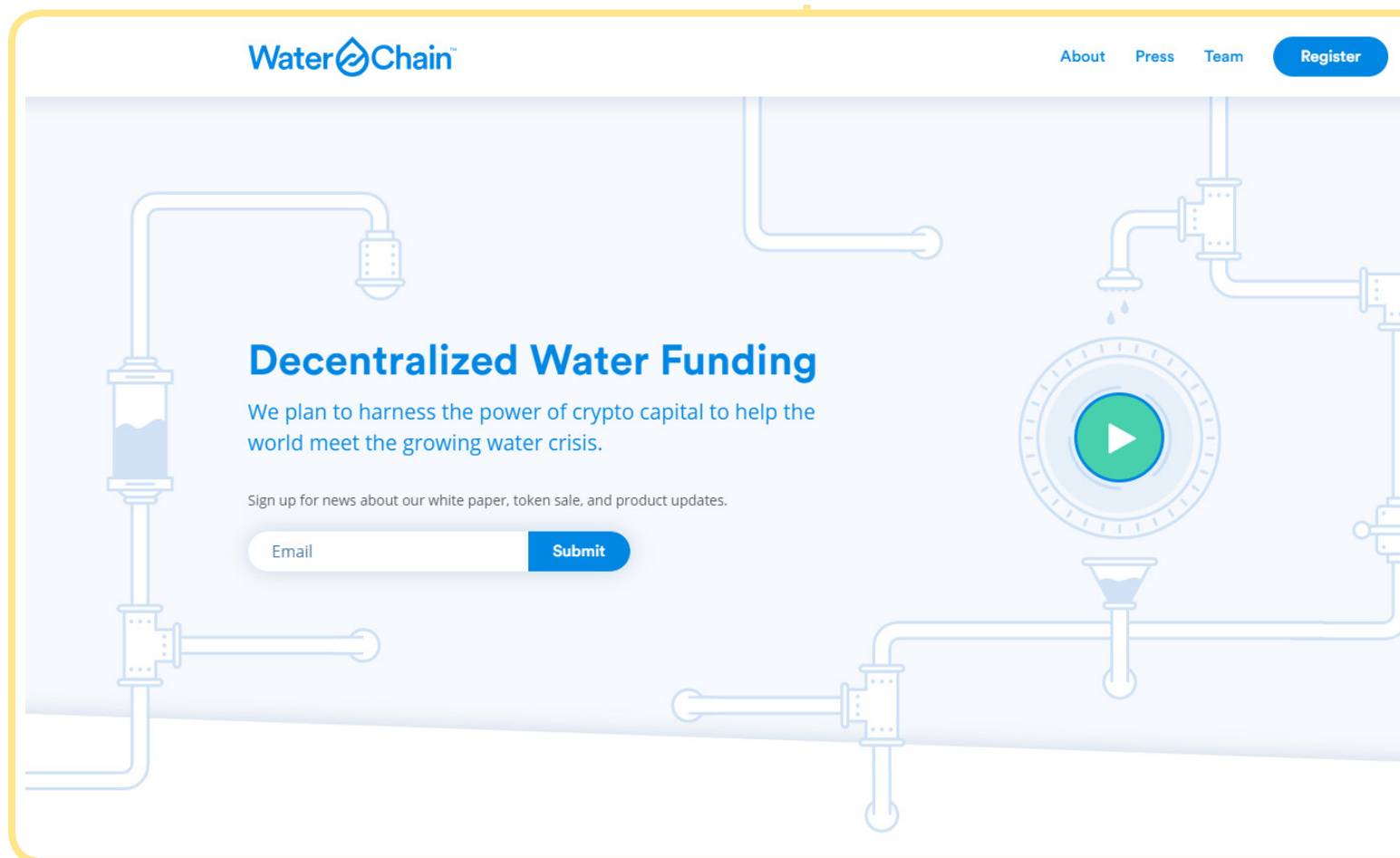
1. ACTORS WHO INTENTIONALLY ADDRESS THE QUESTION OF - WHAT SHOULD WE DO WITH CRYPTOCURRENCIES AND BLOCKCHAINS (continued)

D) ADDRESSING URBAN RELATED “USE CASES” - COMMUNITY SCALE PROJECTS

a. Energy Infrastructure / Commons

i. Brooklyn Microgrid

ii. Waterchain



* These actors are primarily a combination of software developers and entrepreneurs who may act in advisory roles.

COULD THE URBAN BE/DO/HAVE/SERVE/PRODUCE -

OBJECTS*

RESHAPING THE ENERGY FUTURE

L03 Energy is developing blockchain based innovations to revolutionize how energy can be generated, stored, bought, sold and used, all at the local level.

It's important to me that I'm involved with this Brooklyn Microgrid community because it's a ground level approach to establishing something that's gonna be much more common in years to come.

- Daniel Power, Brooklyn New York



ory capacity or pitching their products and services to governments and other non-blockchain companies.

TAXONOMY OF BLOCKCHAIN URBANIZATION

2. ACTORS WHO USE SPACE (AND ITS LEGALITIES) AS A TOOL WITH PURPOSE

A) WITH INTENT TO BUILD A NEW COMMUNITY, UTOPIA, OR NATION VIA C

a. Geographically Concentrated

- Individuals (such as Brock Pierce in San Juan and the “Puerto Rico” Jeffrey Berns in the Nevada desert)

b. Geographically Distributed

- Governments (such as E-Estonia, digital citizenship)
- #### c. Hybrid - Distributed with Concentrations



A rendering of what this blockchain-based community might become.
Design by Ehrlich Yanai Rhee Chaney Architects and Tom Wiscombe Architecture

guardtime

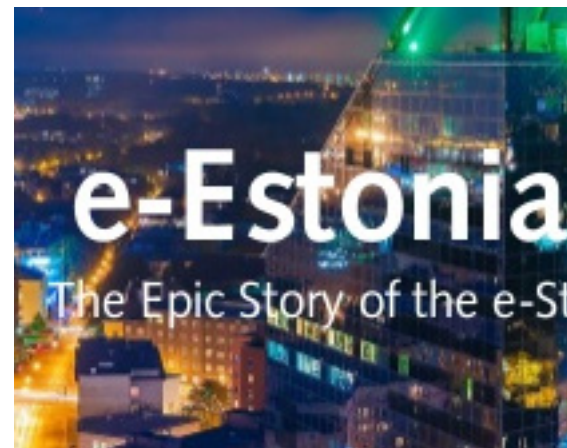
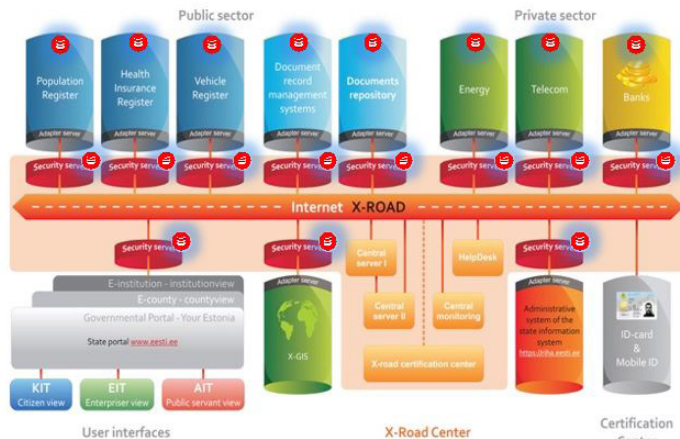
Blockchain Integration Points

Estonia: 100% Government Data on Blockchain

Blockchain is implemented as an integrity layer throughout Estonian Government Networks.

Network Segregation of Government Departments

There is complete transparency and accountability between citizens and government.



POSE

CRYPTOCURRENCIES AND BLOCKCHAINS

opians”; |.....

Making a Crypto Utopia in Puerto Rico



Brock Pierce inside the former Children's Museum in Old San Juan, P.R., which he and his colleagues hope to make part of a crypto utopia where the money is virtual and the contracts are all public. Erika P. Rodriguez for The New York Times



TAXONOMY OF BLOCKCHAIN URBANIZATION

2. ACTORS WHO USE SPACE (AND ITS LEGALITIES) AS A TOOL WITH PURPOSE

- B) WITH INTENT TO GAIN WEALTH WITH NO OVERT/APPARENT INTENT TO
 - a. Individuals or Companies Oriented around Cryptocurrency “Mining”
 - b. Individuals or Companies who Run their Crypto/Blockchain Business
 - i. Such as Puerto Rico, incentivized by Acts 20/22; but running t



Sichuan, a mountainous province in southwestern China, is home to an increasing number of bitcoin mining sites.

POSE (continued)

D CHANGE THE SPACE IN RETURN (BUT DO SO IN ACTUALITY)

esses in Areas of Maximum Incentive (Including Tax Incentives)
their mining operation in Upstate New York where energy costs are lower

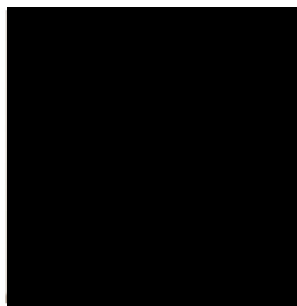


Image Sources: <https://news.8btc.com/new-miners-of-the-21st-century-what-do-they-look-like-in-sichuan-province>
<https://qz.com/1054805/what-its-like-working-at-a-sprawling-bitcoin-mine-in-inner-mongolia/>

3. ACTORS WHO OWN/OCCUPY SPACE AS A RESULT OF WEALTH ACCUMULATION

A) INDIVIDUALS, PRIMARILY, WHO BUY PROPERTY AND THINGS (“LAMBO”)

1 ‘Nakamoto’



This is the pseudonym used by the person who created bitcoin. There is considerable speculation on who “Nakamoto” might be, or whether it is more than one person. Either way, it is believed that he owns around one million bitcoins, worth approximately \$19bn, thus making him one of the richest people in the world.

3 Joseph Lubin



One of the Co-founders of the Ethereum platform, Joseph Lubin is the co-founder and managing director behind ConsenSys, a blockchain spin off cryptocurrency infrastructure company. Inspired by the “Nakamoto” in the cryptocurrency infrastructure principle for Earth, the world, the planet, a cryptocurrency net worth of between \$

2 Chris Larsen



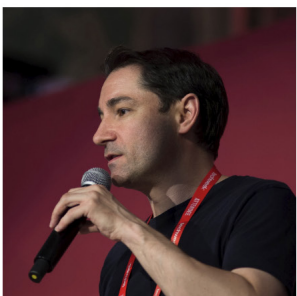
Chris Larsen made his crypto fortune, with a net worth of around \$7.5bn to \$8bn, harnessing cryptocurrencies for use by the major banks. He is the executive chairman and co-founder of Ripple, which uses blockchain technology and is a system for verifying and recording transactions of all kinds of assets, including its own currency, XRP. He had an impressive history of backing technology winners, including the first peer-to-peer lender in the US.

4 Changpeng Zhao



Known as just CZ to his admirers, he is the founder of the cryptocurrency exchange Binance, which now boasts six million users. He launched its own coin (BNB) – with a blockchain. CZ has accumulated a net worth of \$1.2bn following the launch of Binance in 2017.

7 Anthony Diiorio



One of Ethereum’s founders, Anthony Diiorio has been a champion of the cryptocurrency movement. His approach has been to seed new cryptocurrencies in their early stages, before moving out and redeploying capital in new ones. His other investments include Qtum, Vechain and Zcash. His cryptocurrency net worth is thought to be as high as \$1bn.

8 Brian Armstrong



If it’s true that the early days of crypto were the pickaxes and shovels for cryptos – as Brian Armstrong has said, he co-founded Coinbase, the first major exchange for cryptocurrencies. Founded in 2012, it has a brokerage side, where retail customers can open a bank account, and an exchange for large institutional orders. His net worth is around \$900m to \$1bn.

ULATED VIA CRYPTO, WITH NO APPARENT INTENT TO CHANGE THE SPACE

S")

Canadian founders of blockchain
reum, Lubin is also the power
nSys, which helps launch or
ocurrencies around the world.
a influential paper written by
n the early years of
y, Lubin believed that "shared
" could serve as "an organizing
". It is believed he has amassed
\$1bn to \$5bn.

5 Cameron and Tyler Winklevoss



The former Olympic Games' rowers famously sued Mark Zuckerberg, claiming he stole their HavardConnection (now ConnectU) idea when creating Facebook. The \$65m they secured in the lawsuit helped fund their subsequent venture capital projects, including bitcoin. A few years ago, it was claimed the brothers owned around 1 per cent of all the world's bitcoins, which would put their crypto-wealth today at more than \$1bn. In 2015, the pair launched a cryptocurrency exchange, Gemini. They also have holdings in other cryptocurrencies, including ether.

6 Matthew Roszak



Rosnak claimed that he was the first person to bestow bitcoins on Richard Branson and Bill Clinton. Then again, he can afford to be generous, having built up a portfolio worth around \$1bn. He was an early adopter of cryptocurrencies, having stumbled across bitcoin in 2011. He is also a founding partner of Blockchain Capital's first fund, Tally Capital, which now invests in around 20 start-ups.

9 Brock Pierce



Former child actor Brock Pierce founded venture capital firm Blockchain Capital (BCC) with Bart and Bradford Stephens in 2013. The company saw the largest ICO (initial coin offering) of 2017, raising around \$700m. He has since left Blockchain Capital, but has amassed considerable wealth from his Blockchain investments – a fortune believed to be in the region of \$700m to \$1bn.

t the real profiteers in the Gold
e people who made the
shovels, so it may well prove
and if that is the case then
olds pole position. His business,
nains the popular entry point
urrency trading in the US.
012, it has two main elements: a
can buy cryptocurrency using a
er traders. His cryptocurrency

4. ACTORS WHO DOCUMENT AND WRITE ABOUT THESE GROUPS AND PR

A) POPULAR WRITERS, POPULAR MEDIA OUTLETS

- a. *Blockchain Revolution* (Tapscott & Tapscott)
- b. *The Age of Cryptocurrency / The Truth Machine* (Casey and Vigna)
- c. New York Times
- d. Washington Post
- e. The Economist
- f. CNBC
- g. Forbes

B) DEDICATED CRYPTO/BLOCKCHAIN MEDIA OUTLETS

- a. CoinDesk
- b. CNN (Cryptocurrency News and Market Updates)
- c. Cointelegraph
- d. Bitcoin Magazine
- e. Bitcoin.com

C) SELF-PUBLISHING MEDIA OUTLETS

- a. Medium.com (big for Proof-of-Concept ICOs and Whitepapers)
- b. Youtube, Reddit, Twitter, Online forums run by crypto/blockchain p

D) ACADEMIC INSTITUTIONS

- a. With Blockchain Programs (including but not limited to)
 - i. MIT Sloan School of Management
 - ii. NYU Stern School of Business (FinTech MBA)
 - iii. Cornell “Initiative for Cryptocurrencies and Contracts”
- b. Engaging “Critical Blockchain Studies”

PROCESSES

proponents

Chapter 2 – Transactionary Publics and Crypto-Economic Geographies in Puerto Rico

This chapter empirically addresses the new socio-technical and political relationships around cryptocurrency and blockchain technology as they are forming on the archipelago of Puerto Rico, particularly in San Juan. I will describe how these relationships affect processes of economization, urbanization, and spatial contestation in the context of Puerto Rico's history of serial-colonization (Spanish, United States, now Crypto?), whose native residents are citizens of the United States, but who live on a land that contradictorily belongs to – but is not a part of – the United States. Digital feminist geographies are centered in recognizing the politics of difference, particularly in Puerto Rico as a 'constitutive outside' to the United States; as well as comparing male-dominated technopower with local women-led movements, both with vastly different ideas of a preferred economic future for Puerto Rico. I will address the new transactionary publics called into being around cryptocurrency and blockchain projects, and ask how is transactional capacity is changing (for lifelong Puerto Ricans and new resident crypto-entrepreneurs), whom does it exclude, and how does it affect new and existing services and markets (particularly real-estate, through the vehicle of Security Token Offerings - STOs)? The approach to digital geographies is threefold, questioning: one – how cryptocurrency and the new digital economic technology of blockchain brings into being new like-minded publics (investors; traders/crypto-businesses; and blockchain companies) and how these groups are incentivized to come to Puerto Rico both by preexisting U.S. legal economic policy structures, and local government cooperation in the name of economic development; two - how online forums, mapping tools, and digital media enable and facilitate these crypto-groups to discuss, plan, and interact online and in physical space; and three – how these new grafted digital/spatial crypto-economic power dynamics impact and entrench already-existing geographies of inequality. This chapter sets up the following chapter, which discusses emancipatory actionable strategies for an equitable economic future for Puerto Rico.

As was discussed in the introduction, for this chapter I use and modify methodologies in critical urban theory, feminist political economy, the new field of “critical blockchain studies,” and feminist digital geographies. As Ellwood and Leszczynski argue, any “scholarship identifying itself as a 'critical' enterprise *must* necessarily be explicitly feminist” (2018). As a white woman from New York, I am aware of my position as an outsider to Puerto Rico. After Hurricanes Irma and Maria in 2017, my work as an architect would take me to Puerto Rico for recovery projects, and during this time I became aware of what I considered a shockingly obvious socio-spatial injustice, that of self-proclaimed “Puertopians” – primarily white-male expats from the United States looking to build a “crypto utopia” in San Juan, Puerto Rico, oriented around their new crypto-trading and blockchain businesses (Bowles 2018). Over the course of two years I began an empirical research process that included talking to and learning from as many diverse perspectives in Puerto Rico as I could, both within the “blockchain space” and outside of it, from artists, academics, activists, legal experts, architects, and technologists. As is promoted in the methodologies of feminist political economy, and feminist digital geographies, I draw heavily from knowledge produced from the place of study - in Puerto Rico - from progressive economic and legal policy perspectives, to post-colonial studies, Caribbean studies, and Puerto Rican feminism and feminist studies. I come from a position within and amongst, a listener, and a collaborator. I also have the privilege of being in solidarity with Puerto Rico, while being able to view this from the outside, not having to be burdened with daily struggles on the archipelago. But as an architect and critical urban academic, I also came to blockchain as an outsider – I own zero cryptocurrency and have no stake in the game – which allows me to view this scenario from a critical perspective, one that is vastly overshadowed by positivist Medium articles, books, and publications on blockchain's “revolutionary potential.”

As a refresher from Chapter 2, key terms: *Cryptocurrency* is a digital representation of value. After the launch of the Ethereum blockchain in 2015, on which developers can create their own cryptocurrencies, what that value could represent is virtually limitless, from digital pets like cryptokitties, to voting stakes in a new company. A cryptocurrency “token” or “coin” is not a coin in the way we think of nickels, dimes, and dollars, or even the same as debit/credit cards which represent printed/minted money. Rather, a cryptocurrency coin is literally fixed, non-replicable *data*. Owning a crypto-coin, like a bitcoin, means you have a right to send that data on a ledger, and once sent, that right is transferred the new owner.

That ledger is known as a blockchain, which is a computational record or account of all these data transactions. An exact copy of this ledger is often distributed (as in the Bitcoin blockchain) on every computer that transacts on that blockchain¹. There are many types of blockchains now, but in the most common, a Proof-of-Work blockchain, one can elect to put their computers to work to computationally confirm transactions, and owners are rewarded for their energy expenditure by earning cryptocurrency coins (which is one way of “mining” bitcoin). In the “blockchain space,” there has been a big push to make a distinction between the speculative and at times illegal behavior arising from the anonymity that cryptocurrencies afford, from the underlying technology of the blockchain, which is praised for its’ increased security, immutability, and transparency, and I would agree that the behavior and intent behind each of these uses is different. However, whether it is being used to mine Bitcoin, or to enact “Smart Contracts” (computationally programmed ‘contracts’ with rules and agreements that are automatically enforced when the conditions are met), blockchains are fundamentally a new digital economic technology, with embedded and enacted ideologies and assumptions about human behavior. These ideologies and rhetorics focus on transactions², primarily transactions between individuals, advocating for freedom in terms of freedom for the individual and free markets; and decentralization, not in terms of Peer-to-Peer exchange for a collective commons, but rather for individual-to-individual gain. These narratives are espoused by what I refer to as new transactionary publics. I argue we need to bring blockchain’s techno-political-economic ideologies to the foreground instead of ignoring or embedding them deep in narratives of decentralization and claims of revolutionary potential.⁴¹

The socio-technical economic activity around cryptocurrencies and blockchains are also creating new distributed digital/spatial geographic networks, linking geographically distant places together across the globe, and enacting new versions of urbanization in service to crypto-proponents and the wider principles of crypto-economics. Although cryptocurrencies and the blockchains on which they run are *global*, the ways in which they manifest, and the relationships formed in specific places are highly *local* and context dependent – and they are all over the map. In early 2018, Venezuela launched a new government-supported cryptocurrency, “the Petro”, supposedly backed by the country’s oil, gas, gold, and diamond reserves, to allegedly circumvent US sanctions and open new forms of international financing³. Estonia has rolled out a new e-nation with digital citizenship, all planned to run on a blockchain⁴. North Korean dissidents are allegedly using the Ethereum blockchain to sell 200,000 crypto-tokenized ‘G-Visas’⁵. However, I argue that the socio-technical relations of cryptocurrencies and blockchains in Puerto Rico have the most extreme and observable complexities and contradictions, and the most at stake for residents who do not have a stake in cryptocurrency.

Many contradictions in this scenario were featured in a *New York Times* article by Nellie Bowles, published in February 2018, exactly four months after Hurricane Maria had finally dissipated as a storm system after making landfall in Puerto Rico in September 2017. I was well-aware of the varied discontents of opportunism and disaster capitalism, but this overwhelmingly male-dominated act of blatant spatial domineering conceived as an act of altruism was a whole new level. It was an absurd contradiction, to have over thousands of expats, from the US and elsewhere, many of whom are wealthy men with experience in venture capital, coming in with such an extractive business model using the Puerto Rican electrical grid and internet infrastructure, while at the same time the people who needed electricity most were left without it. Most investors and businesses that engage in cryptocurrency and blockchain technologies are implicit in massive extractions of power with huge electricity demands. Based on a projection from Digiconomist,³⁹ I calculated that the amount of carbon emissions produced in one bitcoin transaction is equivalent to driving four round trips around the perimeter of the main island of Puerto Rico. The amount of electricity consumed from one bitcoin transaction is approximately equivalent to the

¹ Other blockchains do not work in the same way, instead having a subset of the computers on the network maintaining the ledger.

² Analyzing the top two blockchains/cryptocurrencies (Bitcoin and Ethereum) - the original Bitcoin whitepaper uses the term “transaction” (or a variant of the word) 69 times. The Ethereum whitepaper (as of March 2019) uses the term 131 times. <https://github.com/ethereum/wiki/wiki/White-Paper>

³ “Venezuela Plans a Cryptocurrency, Maduro Says” The New York Times. 3 December 2017.

⁴ <https://e-estonia.com/>

⁵ <https://thenextweb.com/hardfork/2019/03/27/north-korea-cryptocurrency-ethereum-blockchain-visas/>

average daily energy use of sixty-four Puerto Ricans. Four months after Hurricane Maria, over 450,000 people were still without power. As of March 2018, six months after Hurricane Maria, roughly 150,000 homes and businesses were still without power, about 11% of PREPA customers.⁶ In March 2018, the average energy consumption of the Bitcoin network was 54.2 TWh. That is nearly three times (2.87x) the average annual energy consumption of Puerto Rico⁷. It is also approximately equivalent to the yearly energy consumption of 1,748 hospitals at one-million square feet each (a very large hospital). Puerto Rico has sixty-nine hospitals, fifty-eight of them were left without power or fuel after Hurricane Maria.

The *Times* article was revealing, but it made the situation seem more straightforward than I would come to understand it to be. This was not about disaster capitalism, though it may have given this crypto-movement more momentum, with #RestartWeek and the Puerto Crypto Conference, in the name of recovery for the island. Two blockchain companies, WaterChain⁸ and PowerLedger⁹, originally posed to use Puerto Rico as a test case for their blockchain-based infrastructure projects (distributed water service, and distributed photovoltaic). Neither of these projects have been implemented as of the time of this writing. In 2019 while many of the foreign companies, NGOs, and non-profits dedicated to “hurricane recovery” have since left the archipelago, the crypto-groups have remained and continue to increase in numbers, though their mission has become aligned not with “hurricane recovery” and more overtly with overall “economic development.” This is a new techno-economic transformation that involves the formation of relationships between the local government, US and foreign expats, and native Puerto Ricans both in favor of and in resistance to this situation.

This process is still very much in-process, constantly changing from day to day. There are not many empirical studies of how this new digital economic technology is playing out on the ground. The few academic papers that have been published on the subjects of bitcoin, cryptocurrencies, and blockchains tend to take a generalizing perspective, which is understandable because it is so new, technically complex, and fast-paced. Cryptocurrency whitepapers and articles on blockchain technology are filled with jargon, and the situations are actively evolving, technologically and politically. While there may be certain distinct similarities in various contexts for how this is playing out, one being that crypto-proponents are noticeably landing in areas of maximum financial incentive, and that they are tied to places of crisis or vulnerability (though in different ways), my aims for this paper are to focus on the specific situation unfolding in Puerto Rico, and calling attention to its new distributed cryptoeconomic geographies. This may be used in the near future to appeal to urban decision-makers to affect policy. If, as feminist scholars, we are aiming toward strategies for actionable emancipatory practice, as Kate Derickson suggests and with which I strongly agree, I believe we must find ways to have our work reach primary urban decision-makers, and those who influence them.

In many cases the primary decision-makers are government officials, even though we may be seeing more influence from the private sector, but something new is happening where cryptocurrencies and blockchain technology together are galvanizing new groups of like-minded people who are finding and exercising a new form of technopower, more specifically, cryptoeconomic power that in some cases is working outside of government power entirely. Many of these groups actively seek to escape government involvement and regulation, which should come as no surprise since bitcoin, the first cryptocurrency created in 2008, was a technological invention of right-libertarian learnings (Golumbia 2014), prioritizing individual freedoms and disparaging Central Banks, urging for a return to the gold standard that would come in the form of a digital token, with a limited number put into circulation (Nakamoto 2008). However, crypto-investors are coming to Puerto Rico precisely to work *within* legal frameworks and economic policy incentives such as Acts 20/22 which will be discussed more later in this paper.

⁶ Adrian Florido, “6 Months After Hurricanes, 11 Percent of Puerto Rico is Still Without Power,” <https://www.npr.org/2018/03/07/591681107/6-months-after-hurricanes-11-percent-of-puerto-rico-is-still-without-power>

⁷ <https://www.worlddata.info/america/puerto-rico/energy-consumption.php>

⁸ WaterChain - <https://medium.com/waterchainio/waterchain-issues-call-for-self-reliant-water-projects-in-puerto-rico-dcb2adc91d48>

⁹ PowerLedger

<http://fortune.com/2018/05/08/how-blockchain-could-help-restore-power-in-puerto-rico/>

As of March 2019, Bitcoin was the top one of 2,121 cryptocurrencies being traded on over 245 cryptocurrency exchanges.¹⁰ Many of these cryptocurrencies are not active, and some are outright scam tokens, the result of “pump and dump schemes”^{11,12} that have become almost synonymous with cryptocurrency. Seeing how governments have since cracked down on cryptocurrencies and fraud, some crypto-proponents have developed strategies to act within legal parameters, while still often seeking to maximize their own individual profits. Much of this activity plays out in digital spaces and platforms, digital enclaves for special interest groups, and as such it often goes under the radar for those uninitiated. However, these digital economic actions are affecting the climate, physical spaces, and real people on-the-ground.

As far as conducting research around complex processes in formation, as Gillian Rose argues, “it is necessary to move away from the attentive gaze on stable cultural objects,” and instead turn our attention to “the dynamics of the production, circulation and modification of meaning at digital interfaces and across frictional networks” (Rose 2015). I argue that these complexities and “frictional networks” relate not only to cultural production, but to the production and occupation of space and its economic, political, and socio-technical relations. This is supported by Ash, Kitchin, and Leszczynski (2016), who argue that digital technologies are having increasingly profound effects on other areas of concern to geographers including space economy and economic relations; and the production of space, spatiality, and mobilities. Particularly, there is uneven development (Smith 2008) and uneven geographies of underlying infrastructures, material forms, component resources (Lepawsky 2014; Zook 2005; Ellwood and Leszczynski 2018), and sites of creation and disposal, with distinct geographies of digital media (Ash 2015; Kitchin and Dodge 2011; Leszczynski 2014). However, the socio-technical relations around cryptocurrency and blockchains in Puerto Rico go beyond uneven development, and are rather examples of overt exclusions, and even actions of “crypto-colonialism”.

To the concept of friction - Rose cites Alexander Galloway who argues that friction is inherent to interfaces, defining interface as an “autonomous zone of interaction ... concerned as much with unworkability and obfuscation as with connectivity and transparency” (Galloway 2012: 120). It is this obfuscation and opacity, and its simultaneous contradiction to connectivity and transparency that I reference here in relation to the use of digital tools and media by cryptocurrency and blockchain proponents, and transactionary publics. On the one hand they want to spread their rhetoric, but on the other hand, anonymity of transactions is a key feature of cryptocurrencies. Many of their internal conversations that occur on online forums such as Reddit and YouTube are *technically public* while being *actually private* – targeting and viewed only by a certain special interest group of like-minded individuals.

To the point of complexities and contradictions in formation, and the call to shift attention from stable objects - cryptocurrencies and their evolving relations are not stable in the least, in fact, cryptocurrency's identity as a digital object is marked by instability, speculation, and risk. Research around this and other process-in-progress is difficult, but incredibly important in its formative stages. We cannot revert to making totalizing narratives and generalizations, but rather we must look at specific contexts. Ellwood and Leszczynski (2018) call for scholars to “[grapple] with the complexities of the significance and implications of digital technologies in the daily lives of actual people,” and this is what I attempt to do in the situation of Puerto Rico. Zook and Blankenship provide a useful review of “the basic parameters of [blockchain-based algorithmic governance’s] computer architectures, its connections to materiality and space and the complexity of its established practices”, however my aim is to provide an empirical, ethnographic perspective of how these connections are specifically formed in the context of Puerto Rico and its distributed cryptoeconomic geographies. I aim to identify and contextualize the exclusions of these digital and physical spaces in Puerto Rico, and feature as Coutard and Guy suggest, “the significant potential of contestation of, and resistance, to technology-supported forms of discrimination, and the deeply contingent nature of the processes of [technological] appropriation” (2007, 713).

¹⁰ See CoinMarketCap.org

¹¹ The Economics of Cryptocurrency Pump and Dump Schemes, https://www.tse-fr.eu/sites/default/files/TSE/documents/ChaireJL/Digital-Economics-Conference/Conference/gandal_neil.pdf

¹² <https://cointelegraph.com/news/study-pump-and-dump-schemes-account-for-7-million-of-monthly-trade-volume>

Building on scholarly work on how digital technologies, particularly those of the “smart city” reinforce existing power geometries and socio-spatial inequalities rather than eroding or reconfiguring them (Datta 2015; Shelton et al 2015; Mattern 2014; Greenfield 2013). I also look at new forms of technopower, particularly how “power is exerted subtly through distributed protocols that define and regulate access to resources and spaces and reshape behaviour” (Graham 2005), and furthermore, how this technopower may be enacting a new form of urbanization. As Graham and Marvin (2001) argue, new digital tools and mediated infrastructures were key components of the emerging neoliberal city, becoming increasingly privatized but also important for enacting governance and control and creating particular power geometries. However, I refrain from generalizing the “neoliberal city” and instead focus on the context specific politics of difference. Feminist urban scholars beginning with Ananya Roy have pointed out that the argument that urbanization is “increasingly generalized on a world scale” fails to acknowledge the politics of difference and how processes of urbanization affect specific contexts in different and diverse ways. Roy instead advocates for a critical urban theory “attentive of historical difference as a fundamental constituting process of global political economy” (Roy 2015). As opposed to overarching narratives and “conceptual frameworks that emphasize the urbanization of everything,” Roy references Chantal Mouffe (2000) on “paying attention to the “constitutive outside” of the urban and to the always incomplete process of becoming urban” (Roy 2015). The “constitutive outside,” I use to describe a place that is operationalized and constitutes the functioning of a larger system or place, while at the same time being excluded from (or outside of) said location and all entitled benefits of the system in the process. This is quite literal for Puerto Rico, as it is a land both *owned by* the United States, and used by the United States as an experiment in many ways, however, in its status as an *unincorporated territory*, the protections of the U.S. Constitution do not apply, nor are its citizens (despite being “citizens of the United States”) granted the same rights as those in the 50 states, including the right to vote for United States president. Puerto Rico is legally defined as property of the United States¹³. Its people are United States Citizens, but they live on a landmass that belongs to the United States, with legal and economic policies that as customizable to the will of the legislative bodies, and do not have to follow the US Constitution. There is perhaps no better example of a “constitutive outside” than this.

Transactionary Publics vs. Subaltern Counterpublics

Transactionary publics, as I define them broadly, are groups with certain discourses, ideologies, and rhetorics centered around *transaction*, and are closely linked to *how* they transact, amongst each other and with others¹⁴, within a wider economic and spatial context. Transactions in this case may include monetary or financial transactions, but may also include business deals, or non-financial transactions or exchange. In the context of Puerto Rico, I argue that a new transactionary “public” has been forming over the past five years, made up of primarily white male expats from the United States who are specifically affiliated with cryptocurrencies and blockchain technology. I put the “public” in quotations because the definition as it relates to this group is highly contingent and contradictory. Their discourse plays out in the public sphere, in Puerto Rico and across the globe, even reaching large media outlets such as *The New York Times* - but their transactionary behavior online and amongst each other often goes under the radar, and is even intentionally private and exclusionary. This makes sense, as the invention of cryptocurrency, beginning with Bitcoin, was meant to increase privacy of transactions and facilitate more anonymity.¹⁵

¹³ Article 9 of the Treaty of Paris; and the US Constitution - Article 4, Section 3, Clause 2, (The Territory Clause) whereby Congress has “the power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States.” It would not be until the Foraker Act of 1900 that Puerto Rico was allowed to establish a limited local government, with a Governor appointed by the US President, and with Congress holding ultimate veto power over any law approved by the newly created legislature.

¹⁴ In this video interview, Brock Pierce (widely acknowledged as the spearhead of the Puertopians) gives a primer on how he wants and does not want to “transact” with people, and make deals, in his own personally gamified system. For example, he says, “If you go to Burning Man, come up to me and tell me you’re a Burner, you just skip ahead to level 10.” <https://vimeo.com/254261805>

¹⁵ See the contradiction between public and private in the original Bitcoin whitepaper, in section “11. Privacy - The traditional banking model achieves a level of privacy by limiting access to information to the parties involved and the trusted third party. The necessity to announce all transactions publicly precludes this method, but privacy can still be maintained by breaking the flow of information in another place: by keeping public keys anonymous. The public can see that someone is sending an amount to someone else, but without information linking the transaction to anyone.”

As Mimi Sheller (2004) writes, there is an "increasing tendency to slip between private and public modes of interaction, as a result of the new forms of fluid connectivity enabled by mobile communication technologies." I argue that while digital communications and social media facilitate the formation of new publics and public modes of interaction both online and in physical space, they also conversely can be insular and exclusionary. Much of the "crypto-community" is indeed a group of like-minded individuals, but rather than a community of peers working together for a common goal, a designated subset are working in parallel, in mutually beneficial ways that help achieve their own *individual* goals and gains. As such, the "crypto-community" is far from uniform. It is one of distributed insularity, with varying degrees of intentional or unintentional removal and exclusion from the outside world or broader public sphere. At the same time, it is one of selective engagement, with varying degrees of involvement and inclusion of "outside" groups, governments, and organizations. If we consider the internet as a networked public sphere (Aslama and Erikson 2009; Benkler 2006; Castells 2000) with networked publics (boyd 2010; Varnelis 2008) we can consider the socio-spatial distributed insularity of some "crypto-oriented publics" as being facilitated and made possible through *technically public* but *practically private* digital enclaves or digital platforms of exclusivity.

Almost everyone I know who has committed interest in blockchain has referred to it at one point or another (often repeatedly) as an "ecosystem", or in Spanish "*ecosistema*," – the "blockchain ecosystem," the "Ethereum ecosystem," even as situated in the wider "digital ecosystem." When we hear about blockchain ecosystems, it seems to imply multiplicity; multiple "crypto-communities" unified under the umbrella of the blockchain – *The Blockchain Ecosystem*. Here, *The Blockchain Ecosystem* seems to imply a boundary or separation from, say, the "off-chain world". This imposed dualism is concerning – colonialism has a history of imagining forms of externality, for example "the New World". How blockchain can benefit the wider public is dubious when even basic digital access and digital literacy is lacking. I question, what would change if these publics were to consider their actions in terms of a broader ecosystem or network, of the environment, of life, of sentience and sapience – rather than individual transactions and incentivizations?

In this chapter, I refer to a specific transactionary "public," in Puerto Rico by their own term "Puertopians," for their self-professed claims of how they are going to turn Puerto Rico into a new "crypto-utopia." Brock Pierce is a venture capitalist and the widely acknowledged spearhead and leader of the Puertopians. In a video interview from December 2017 (two months after Hurricane Maria), he said, "I'm working on building kind of a city. [In] Puerto Rico. I'm moving there with a bunch of my friends." They believe their aims are altruistic. Pierce says, "I want to go roll up my sleeves and get some work down there and help out. I think those people need our help, and I think we're capable of so much. [...] When you experience great loss, it creates an opportunity to upgrade [...] quantum leaps of upgrades, because you've basically lost everything, so you have to start over. And when you start over from scratch you would do it very differently than if you have this big thing that has been building on top of itself for ages and ages."¹⁶ Although Pierce and the Puertopians see Puerto Rico as a blank-slate, what Pierce seems not to recognize is that Puerto Rico is not starting over from scratch. Their claims of desire to "help the Puerto Rican economy" may be sincere, but until they understand the varied and diverse problems, needs, and identities in Puerto Rico, their proposed solutions will be misguided. There is still a "big thing" that has been building on top of itself for ages and ages – that "thing" is called serial-colonialism and has dominated the archipelago for over 500 years – first Spanish, then (and now) United States, and perhaps new crypto-colonialism, though by very different power structures that are increasingly reliant upon digital technologies to galvanize like-minded individuals and enact their desires in space, on the ground. For Puerto Rico to truly start over from scratch would mean decolonization, and even then, the history of colonialism is part of the Puerto Rican identity that carries with it psychological effects.¹⁷

¹⁶ Tai Lopez interview with Brock Pierce, "Brock Pierce on Burners Building a Crypto-Utopia in Puerto Rico," <https://vimeo.com/254261805>; originally published on December 16, 2017

¹⁷ For more information and sources from within Caribbean studies and Puerto Rican feminist studies, see the Puerto Rican syllabus, curated by Yarimar Bonilla: <https://puertoricosyllabus.com/historical-context-for-the-debt-crisis-2/historical-context-for-the-debt-crisis/>

As can be expected, the Puertopians have vastly different visions for Puerto Rico than do a number of lifelong Puerto Rican residents who have been fighting around Puerto Rican issues for decades. As citizens of the United States who do not have the same rights, privileges, and protections as citizens born in the States, these local groups may be considered as *subaltern counterpublics*, what Nancy Fraser (1990) defines as "parallel discursive arenas where members of subordinated social groups invent and circulate counterdiscourses to formulate oppositional interpretations of their identities, interests, and needs". Many of these groups are led by women, and have vastly different discourses and ideologies, with vastly different rhetorical strategies, digital strategies, and spatial strategies than not only the crypto-crowd, but also the dominant political power. These women-led organization are groups such as JuntaGente, La Maraña, Colectiva Feminista en Construcción, Tara Rodríguez with El Departamento de la Comida. These women-led and grassroots groups are committed to slow, sustained work *with* communities - but they acknowledge that digital communications are important for spreading awareness of the diverse struggles and Puerto Rican issues. This contrasts with the fast-paced male-dominated crypto-activity coming in from the outside, which often does not consider local community input and needs, and rather uses digital technologies to intentionally obscure their activities from the broader public, and to directly facilitate their individual goals and gains – viewing everything as a transaction.

Digital means of knowledge production have been key to this process of raising awareness of issues in Puerto Rico, whether it is social media capturing and sharing with a wider audience the choreographed street-art performance of Piso Proyecto led by Noemí Segarra; or YouTube videos hosting the multimedia project of Defend PR whose goal it is to share stories of numerous women-led and native Puerto Rican activist projects and grassroots movements; or Twitter as a means to share the Puerto Rican Syllabus compiled by Yarimar Bonilla, with resources and teaching tools about Puerto Rico's colonial history and its current situation of economic crisis; or even the medium of audio recording and podcasting, such as Puerto Rico Forward!, hosted by Andrew Mercado-Vázquez, a podcast about the economic and legal structures at play between the United States and Puerto Rico.

Across various contexts, blockchain technology and cryptocurrencies are actively being pitched and sold to government officials by crypto-proponents. I argue that governments need to hear alternate critical perspectives as well. To some degree this is happening, particularly with critical blockchain studies in law (see Walch). Perhaps this includes presenting information in a specific way, "data-driven" statistical diagrams and figures, PowerPoint presentations and Excel documents. Although it may become part of my work in the future, right now I am working to unpack and understand this specific scenario in words and images, but the aim of reaching a new target audience should not be dismissed. This aspect of my methodology coincides with the methodologies of my Puerto Rican collaborators, who have targeted their methods towards potential allies outside of Puerto Rico, to span and reach new geographies, to bring awareness to their situation of over 500 years of colonialism, and of crisis layered upon crisis.

Specifically I mean the climate crisis as felt with Hurricanes Maria and Irma in 2017, which put a spotlight on Puerto Rico's public infrastructure crisis, layered on top of Puerto Rico's longstanding economic crisis, a symptom of which is their recent government debt crisis. After a while, crisis seems to become the status-quo. However, there are many differences in the narratives regarding the root of these crises as told from (typically white male) perspectives usually from the mainland United States which tend to blame the inefficiencies and mismanagement of the Puerto Rican government; versus those produced on the archipelago of Puerto Rico with point to its colonial status and forced dependence on United States foreign capital. As Andrew emphasizes to me, "Puerto Rico is not short of struggles, not short of outright battles." He refers to Puerto Rico's long history of labor movements, of people taking to the streets, and dying in protest lines. He does not debate the importance of these movements generated from within Puerto Rico that are fighting to overturn inequitable policies by putting pressure on local officials, but he says that this type of turmoil is constant, even expected, and to a degree loses its political influence. Additionally, there is only so much influence that even the Governor of Puerto Rico has on structural issues that are tied to Federal laws. This is why Andrew has taken a different strategy with Puerto Rico Forward, trying to bring attention from the outside in, to find a way to put pressure on the primary forces of political power – Congress, in the case of Puerto Rico.

Noemí has a similar approach, though her work and methodology is vastly different, connected to the scale of the body, using movement and dance, art and its relationship to public space. One hot summer morning, about eight months after Hurricane Maria, we sit together at a table in her living room in Santurce, San Juan. The first tropical storm of the season has been forecasted for the next day. Noemí admits to having a certain post-traumatic stress from the hurricane last year, but there's an undercurrent of a more constant stressor underneath. "The relationship of colonialism is in everything we [Puerto Ricans] do," she says, "We can't push it away, *entiendo, pero*, the good thing about [Hurricane] Maria is that it has lifted off something, so that we can look at 'it' from the inside out, *and* from the outside looking in." She mentions that the future is in trying to find your allies who are working perhaps in different ways within the same direction.

There are distinctly gendered differences that can be seen between women-led Puerto Rican subaltern counterpublics, and male-dominated transactionary publics. There is a direct relationship between gendered modes of power, what they value, and from whom/what they extract in order to keep the power, and attain that which they value. On the one hand, the often male-dominated technopower of the cryptopopians is fast-paced, opportunistic, with surface-level engagement if any at all. On the other hand, the gender power of women is deep, constant, steady, slow-moving, and consistent. This return to a matriarchal, feminist, spirit of mother earth evokes reflection upon indigenous ways of life. Déborah Berman Santana (2000) raises questions of how this return to roots can affect power for the people:

Without discounting the potentially problematic and divisive elements, it is worth considering how these movements might relate to the ongoing struggle for Puerto Rican independence. For example, how might recovery of indigenous, non-Eurocentric perspectives and practices not only help break Puerto Rico's colonial dependence upon the United States but also form a basis for a noncapitalist and sustainable Puerto Rico? More broadly, how might recovering indigenous values help rescue a people from destructive Western values such as separation from nature, individualism, and pursuit of profit? How might indigenous revival help reconnect people with nature and with one another and promote meaningful self-determination?

Many women-led groups continue to build a collective power at a local scale, but as Naomi Klein (2007) writes, "if Puerto Rico's people's movements are going to have a chance to provide this kind of global leadership, they will need to move fast. Because they aren't the only ones with radical plans about how the island should transform after Maria. Central to a shock doctrine strategy is speed — pushing a flurry of radical changes through so quickly it's virtually impossible to keep up."

Instead of asking grassroots movements to speed up, and acknowledging the futility of asking technopower to slow down, perhaps the question is how can power of the people step between time-scales by branching out its network to influence other forms of political power? How can local grassroots leaders insert their voices into conversations that are traditionally exclusive, conversations affecting systemic issues? At the same time, by slowly building local power, resiliency of communities can improve for the climate disaster, if or when technopower itself breaks down.

Noemí and her colleagues are involved with movements are committed to slow, sustained work at immediate local scales and with communities, but they do acknowledge that digital communications are incredibly important for getting messages out to wider audiences and spreading awareness of Puerto Rican issues. This contrasts drastically with the largely male-dominated, fast-paced crypto-activity coming in from the outside, which often does not consider or ask for local community input and needs, and rather uses digital technologies to intentionally obscure their activities from the broader public, and to directly facilitate their individual goals and gains.

The women-led movements in Puerto Rico are overwhelmingly cooperative, community-oriented, and looking for collective success for the land and its people. They want to share their stories, to prove that the capacity is there for Puerto Rican people to make their own decisions. The Puertopians on the other hand, want *contingent* publicity. They are quick to promote their actions as altruistic, but some prefer to hide their funding strategies with Confidentiality Agreements, including details about their plans to build a distributed private enclave in the city of Old San Juan, and with their own private food source as a farm in Las Marias, with ownership only for those who have been pre-qualified investors. The information I present is technically public, if you know where to look. But most of it is buried in the web, only available if

you are on the inside, part of this special interest group, or infiltrating their digital enclaves. These groups look at most everything as if it were a transaction. What I can do for you, what can you give to me? This also applies to the act of moving to Puerto Rico for the tax incentives, as these transactionary publics are individually motivated. As such, it makes sense why they're landing in Puerto Rico, and why they are here to stay at least for a while.

Incentivization and Economic Transformation

It was not the hurricane that began the initial influx of crypto-venturers to Puerto Rico. A smaller group was already there, incentivized by Act 20 (Export Services Act) and Act 22 (Individual Investors Act) which were passed in 2012 as a result of the openly neoliberal policies of then Governor Fortuño. Acts 20/22 were an attempt to generate economic activity following the disinvestment of mainland United States firms due to the phase out of earlier tax incentives which ended in 2006. Act 22 means that a qualifying new resident of Puerto Rico pays zero personal income or capital-gains tax after establishing *bona fide* residency. This includes capital-gains received on cryptocurrency investments and crypto-trading. Act 20 means that qualifying new businesses pay as low as a 4% fixed income tax rate, and get a whole host of other tax exemptions, but the stipulation is that their services must be exported to serve people anywhere outside of Puerto Rico. Types of businesses that qualify include telecommunications and other technology related companies, as well as cryptocurrency trading, consulting, and blockchain businesses. There is no minimum employee count, so conceivably a person could run his business as the sole-employee, out of his own apartment, and be benefitting from both Acts 20/22 at the same time. This is exactly what some crypto-people do.

Ash, Kitchin, and Leszczynski (2016) have identified that some digital discourses “actively promote, enable, secure, and materially sustain the increasing reach of digital technologies”. I argue that transactionary publics oriented around cryptocurrency have a clear discourse focused around transactions, and use rhetoric to promote cryptocurrency and blockchain technology. In Puerto Rico, this rhetoric to promote crypto makes sense not only because the more people who use it, the more valuable it becomes, but also because of Puerto Rico’s Act 20 – Export Service Act. Eligible services include not only export services as mentioned above, but also *promoter services*. According to an online article from the Porto Capital consultancy: “*Services for exportation* are services performed for non-resident individuals and/or foreign entities that have no nexus with Puerto Rico (that is the Eligible Service is not, and will not be, related to the conduct of a trade, business or other activity in Puerto Rico). *Promoter services* are services rendered to non-residents individuals and/or foreign entities related to the establishment of a new business in Puerto Rico, as defined by the Export Services Act.”¹⁸ Put more clearly, new crypto-expats are not only financially incentivized to come to Puerto Rico to establish their business -which they must prove does not benefit local Puerto Rican trade, business, or activity; they are also financially incentivized to promote *other* crypto-proponents to come to Puerto Rico to establish their new business as well. Combined, this is resulting in a techno- if not crypto-economic transformation for Puerto Rico.

It is worth noting that Puerto Rico has gone through three major economic transformations since it became a US territory, each establishing dependency on United States foreign capital investment, all of which involve land and labor. The first was agricultural – in the early 1900s with the transition to sugarcane production as a cash crop – which included raising property taxes on existing farmers as a way to push them out of production, many lost their land, some found employment on the sugarcane plantations. The second was industrial – in the 1950s and 60s with “Operation Bootstrap” and the Industrial Incentives Act, Puerto Rico gave tax incentives to US mainland manufacturing firms to establish themselves on the main island, also enticed by not having to pay laborers the same US minimum wage. The third was the process of deindustrialization, disinvestment, and outward-migration from 1976 to the mid-2010s. Now, we have a fourth economic transformation with Acts 20/22 in 2012, geared toward the technology industry and export services. With it, computationalization, datafication, and digitization involved with transitioning to a new technology-based economy, of which cryptocurrency/blockchain technology, companies, and investors have now become a key part.

¹⁸ <http://www.portocapital.com/puerto-rico-act-20-tax-incentives-export-services-act-tax-incentives-legislations/>

This turn toward exporting *digital* services is not without reason. Due to the Jones Act, formerly known as the Merchant Marine Act of 1920, imports and exports of physical goods in Puerto Rico that originate from or arrive at ports other than those of the mainland United States, are subject to significant markups.¹⁹ However, when it comes to digital services and geographies of labor, these services can be exported without shipping costs or physical entry to the country of export. Conversely, *because* these services can be sought after anywhere in the globe, companies can choose to go with the cheapest source of labor, which means more competition. There is even less reason for these crypto-companies to hire locally in Puerto Rico, as local expertise is not needed for this type of export service work. Digital geographies of work also are important to consider here (Richardson 2016). It is also important to note that cryptocurrencies and blockchains are different from what we see with digital services in telecommunications, or even “smart city” implementation and the “Internet of Things” in that blockchain is a digital economic technology itself, accounting and computationally recording, tracing, and even enacting transactions and exchanges of virtually any kind. Consider it a digital economic “operating system,” although this too is a topic for a different thesis.

The local Puerto Rican government has been engaged by crypto and blockchain proponents, and they have become involved, particularly in the name of economic development. Back in March 2018, when Puerto Rico was facing a serious health crisis with “patient attrition in the tens of thousands, increases in incidences of cardiac arrests and intracranial hemorrhages, higher rates of waterborne disease, suicides, and medical equipment and staff shortages,”⁴¹ in a seemingly alternate reality in San Juan at the Condado Vanderbilt hotel, an exclusive cryptocurrency conference was underway. This conference was originally called “Puerto Crypto,” though it was renamed to a less overtly imperial but perhaps more metaphorically suggestive (releasing the shackles and chains) “Blockchain Unbound.” The conference was a three-day event held on March 14-16, 2018, with the main goal of “connecting Puerto Rico with visionary entrepreneurs and investors in the blockchain, cryptocurrency and ICO vertical.”²⁰ This event coincided with the wider “Restart Week” activities, organized by CoinAgenda. The conference was promoted as a “nonprofit event” – all of the profits were supposed to go to a few local nonprofit organizations, including one called “Off-Grid Relief” where their goal is to “provide electricity to parts of the island that will not be restored anytime soon.” It is not clear how much of the cost of each ticket (from \$1,195 Early Bird to \$2,495 Exclusive) was deemed profit, especially when included conference activities included morning surf, sunrise yoga, stand up paddleboarding, cocktail hours, DJ parties, and after parties; but at least the last 5 hours of the last day included optional volunteer tours with local non-profits in the “hardest hit areas of Puerto Rico [to] deliver aid to those who need it most.”²¹ Sessions ran the gamut from the contradictory yet practical “Banking Bitcoin and Other Crypto Assets,” to the intriguingly named, “The Elephant in the Room: A Scalable and Repeatable Infrastructure to Deliver Blockchain Applications,” and “Crypto Island: The Human Cloud & The Future of Work,” to the more local oriented sessions including: “The Puerto Rico Blockchain: The New Frontier,” and the keynote, “How Free Markets and Blockchain Can Make Puerto Rico the Hong Kong of the Caribbean,” and most remarkably, “Remarks from the Financial Commissioner of Puerto Rico, George Joyner.”²² The conference was sponsored in part by the Puerto Rico Department of Economic Development and Commerce (DDEC), in conjunction with Lottery.com (a blockchain-powered lottery that is now donating proceeds to “rebuilding Puerto Rico”), and Blockchain Industries, whose mission includes “long-term results - in innovation that can help governments streamline their processes, rebuild struggling economies, transform legislative practices, revolutionize healthcare and education, and ultimately better humanity.” This mission seems admirable in and of itself, but when we read further it is revealed to be sustained by (venture) capitalism creating and feeding a new crypto-oriented market, “This capital - and not just financial capital; we're talking about time, energy, resources, human capital - can be reinvested into the technology to continue

¹⁹ UPR Economists Jeffry Valentin-Mari and José I. Alameda-Lozada have estimated a \$17 billion loss to Puerto Rico's economy as impacted by the Jones Act. By these reports, the public debt of Puerto Rico would not exist if the Jones Act did not exist. See <http://docplayer.net/494027-Economic-impact-of-jones-act-on-puerto-rico-s-economy.html>. Today there is an active movement from residents, business owners, academics, and local government leaders to repeal the Jones Act.

²⁰ Blockchain Unbound <https://blockchainunbound.com/>

²¹ Blockchain Industries, <https://www.blockchainind.com/>

²² Blockchain Unbound

expansion, innovation, and job creation." A Venn Diagram on Blockchain Industries locates BCI at the intersection between Wall Street "institutional investing experience," with Crypto "market access and technical understanding."²³

Between two of the most exclusive groups in society, finance and tech (combined fin-tech), it's hard to comprehend how this model can ever allow the people on the ground to engage in a meaningful way. Any type of engagement for people outside of fin-tech will require translations which will be filtered through "expert" recommendations. This is where the technologist power comes in. Perhaps BCI are the kind of experts Puerto Rico needs, at least according to the Puerto Rico Department of Economic Development and Commerce. This is, after all, a large-scale economic shift, which mirrors the likes of Operation Bootstrap in the 1940s – 1960s. How this transition from a manufacturing-industrial to a financial-technology economy will unfold in conjunction with regulation and policy is still being determined. As has been evidenced, the DDEC is willing to engage with blockchain advocates and businesses, but they appear to be proceeding with caution, wary of the hype of blockchain as a "catchphrase," while other businesses co-opt the blockchain narrative without actually implementing the technology (Long Blockchain). A new "Blockchain Advisory Committee" was launched by the Secretary of the DDEC, Manuel Laboy, at the Blockchain Unbound conference. The public sector is represented by Chief Information Officer, Luis Arocho, Commissioner of Financial Institutions, George Joyner, and the Secretary of Treasury, Raúl Maldonado; as well as several representatives of the private sector.²⁴

The act of envisioning a utopian future, however, is not a privilege afforded to everyone. Many Puerto Ricans especially have more immediate concerns to focus their energy on, and some are still dealing with the fallout of hurricane recovery. Still, in Puerto Rico it may be the white rich expats who draw the most attention, but at the same time, a fair number of Puerto Ricans, particularly young men with tech backgrounds, but some women as well, are engaging the blockchain space on their own. Digital platforms and social media sites do offer spaces for local people with internet access to look into this on their own, and try to find out more. As Meetup user JoseEscalante asks, "Hay la Capacidad para Botar 'Sufragio' por esta tecnología???" [translated: Is there the capacity for "suffrage" for this technology?] to which user Joshua B. responds, "Utilizando los smart contract si."²⁵ [translated: Using smart contracts, yes.] This is a loaded promise, yet a characteristic response of many blockchain enthusiasts: a bold "matter-of-fact" answer to an incredibly nuanced question.

The idea that blockchain technology can emancipate, release shackles and chains, is not only sensitive to Puerto Rico's history with slavery and serial colonization, but to a population that has been used time and again for experimentation, including the late '60s mass sterilization of women who did not understand the procedure was irreversible because of one-sided communication from a United States program that underwrote the pitch of a life free from the burden of childbearing to work in an industrialized workforce.⁴⁶ In the 1970s, Puerto Rican anti-colonialists with US feminists on the mainland formed a coalition to end the practice, but this is a part of the history of women in Puerto Rico. There are reasons why so few Puerto Rican women (far fewer than Puerto Rican men) walked the halls of the Condado Vanderbilt for the Blockchain Unbound conference, instead dedicating their time and efforts to the daily hard work that it takes to lead and nurture the real grassroots efforts to rebuild not as it was before, but better. And if any group is dedicated to building better, it is the women of Puerto Rico. They are the ones keeping the schools running, the ones teaching agro-ecological farming, the ones preparing food for communal meals. Elizabeth Yeampierre, Executive Director of UPROSE, Brooklyn's oldest Latino community based organization, spoke of the power of women and madre patria in her presentation "From Brooklyn to Puerto Rico: A Just Recovery."²⁶ This ethos starts from a young age. She spoke of traveling to a farm in Vieques, where there was one 11 year old boy that upon being asked if he wanted to be in Naomi Klein's film, said, "I think you should interview the girls. The girls really understand the respect for Mother Earth,

²³ Ibid.

²⁴ "Desarrollo Economico y Comercia crea consejo asesor sobre 'blockchain,'" El Nuevo Dia, March 15, 2018. <https://www.elnuevodia.com/negocios/economia/nota/desarrolloeconomicoycomerciocreaconsejoasesorsobreblockchain-2406800/>

²⁵ <https://www.meetup.com/San-Juan-Blockchain-Enthusiasts/> (accessed March 2018). This link is no longer active.

²⁶ "From Brooklyn to Puerto Rico: A Just Recovery," presentation by Elizabeth Yeampierre at The New School, April 18, 2018

and ecosystems, and how to plant the plants with variety of things so they support each other at different times during the year. The girls understand how corporations decided how we have to grow sun coffee and not shadow coffee." Yeampierre reflects, "I thought, 'He's a non-patriarchal 11 year old!' And then, the girls came out, and they were even more badass. And you know how that made me feel? It made me feel that Puerto Rico is going to be all right. That people have the answers."²⁷

Digital Publics and the San Juan "Crypto-Community"

In San Juan, if you are interested in blockchain or cryptocurrency and if you have access to the internet, it is not difficult to find a way to get involved or at least learn more. A quick Google search of the terms "san juan cryptocurrency," the third result down (after the NYT Crypto-Utopia article, and after a Rolling Stone article on Brock Pierce), there is a link to Meetup page, displaying cryptocurrency groups in San Juan. In addition, there are many digital platforms where there is a lot of crypto and blockchain related activity, particularly on Reddit, Facebook, YouTube, and Twitter.

I looked at these social media sites as a type of digital ethnography. I had noticed different social media sites being used to spread the narratives and claims about cryptocurrency and blockchain, but in very different ways. Reddit, for example, was more conversational or debates about certain topics. YouTube had tutorial videos from how to create your own blockchain to how to most effectively mine cryptocurrency in Puerto Rico. Twitter was somewhat of a free-for-all, and I undertook a separate data project to explore what I could learn by aggregating crypto- and blockchain- Tweets together rather than just seeing them pop up occasionally in my Twitter feed.²⁸

However, Meetup.com offered events for blockchain and crypto people to get together in person. Meetup was used to organize face-to-face meetings and events in places across San Juan (and other locations in Puerto Rico). These are organized and attended by a wide range of people, showing the "crypto-community" in San Juan is far from uniform. The Meetup groups are prone to change: in early 2018 there were groups such as "Cryptosomniac San Juan Blockchain Enthusiasts," and "Women in Blockchain Puerto Rico," – neither of which currently exist – their URLs are invalid. However, current Meetup groups include the "San Juan Tech Meetup Group," "Act 20/22 Meetup Group," "Government Blockchain Puerto Rico Meetup Group," "Blockchain Puerto Rico,"²⁹ and "Puerto Rico Crypto". In each of these groups, membership is heavily male dominated, just above 80%, with an exception for the Acts 20/22 Meetup group which sees a slightly higher percentage of women. I acknowledge that these groups are indicative of only a subset of the population in San Juan that are interested in cryptocurrency or blockchains, though the overall demographics confirm experiences I have had in person.

While some of the events advertised on the Meetup groups in San Juan were casual happy hours for programmers, developers, and entrepreneurs to hang out and discuss their projects; others were more formal presentations and panel discussions about specific applications of blockchain technology. Looking at the events held and planned by the Government Blockchain Association give the best indication of what questions they are asking about the technology, what issues are they addressing, and how do they aim to engage, in the legal and policy realms. The GBA's 2019 kickoff event was titled, "IFE's, Financial Regulation and FinTech Opportunities," held at Piloto 151 in Hato Rey. For some context, according to a

²⁷ Ibid.

²⁸ I really wanted to know, considering the character limitations of a tweet, was this platform being used for discussions? Was it free crypto-advertising? Was it linking to more specific news sites? Was it just hot take opinions? And were there patterns with the types of users? For some answers to those questions and more information, see my Crypto-Twitter data project (begun during Jon Thirkield's Transforming Data media studies elective) here: <http://crypto-twitter.glitch.me/>

²⁹ From their Meetup About section: "Blockchain Puerto Rico is an organization that is dedicated to promoting the use and development of blockchain technologies to solve contemporary issues. We seek to support blockchain startups by providing them a network of academics, professionals, and investors that can assist them with their endeavors. Whether it's an ICO or a blockchain startup, Blockchain Puerto Rico is here to help. We welcome: Traders, Miners, Developers, Enthusiasts, Academics, Beginners, Marketers, Attorneys, Doctors, Philanthropists, Entrepreneurs, Digital Consumers, Cryptopreneurs and anyone who wants to learn about blockchain!"

report in Bloomberg, in May 2018 there were more than thirty International Financial Entities (IFE) in Puerto Rico, at the time including Noble Bank which had approximately \$3.3 billion in cash and equivalents by the end of 2017.³⁰ However, the volatility of cryptocurrency is real, as is evidenced by Noble Bank looking for a buyer at the end of 2018.³¹ The most recent development as of the time of this writing, is that a new IFE has opened in Puerto Rico for crypto-traders, the San Juan Mercantile Bank & Trust International (SJMBT). President and COO of SJMBT, Nick Varelakis, explained, “As more liquidity venues onboard with SJMX to trade digital assets, SJMBT will provide critical services, such as real-time settlement and account re-balancing, in support of our customers’ trading activities.” In other words, the location of SJMBT and other IFEs in Puerto Rico fuel the activities of crypto traders and investors, providing them with banking services for both “fiat” and crypto.

In addition to looking at IFEs, the Puerto Rico Government Blockchain Association is considering the following possible presentations for the rest of 2019³²:

- A world without banks
- Money without inflation
- Money without borders
- Money without fractional reserve banking (Hard Money)
- crowdsourcing government in lieu of taxes
- What is THE LAW? Tracking the legal code, regulations, and judicial decisions to understand the LAW, now and in time.
- Law as code, no literally as software, Solidity
- Transparent earmarking/ radical transparency
- Sovereign Autonomous Organizations (SAO)
- Digital, not geographical, citizenship; citizenship without borders
- Voting
- Implicit voting ... (using proxies to determine the sentiment of citizens)
- Digital dignity implemented via MID's
- Digital sovereign rights, digital property.
- Privacy in a transparent world
- Privacy and identity implemented through personas
- Digital reputation and identity

Their most recently scheduled event for May 30, 2019 is called “The Economic Impact of Blockchain, Consensus Paradigm and Digital Currency.” Paul Wayland, economist and professor at the University of Puerto Rico will be leading the discussion. Part of the event details describe the ideological touchpoint:

If there is one thing that Economists agree on is that technological and organizational changes are the principal source of long-term economic growth and wealth creation. Innovation doesn't happen in isolation, it is cumulative, the result of pre-existing investments. What may appear as a radical advancement today is the fruit of years of hard work by researchers and entrepreneurs. Joseph Schumpeter coined “creative destruction” to describe the way that product innovations caused the dynamic process of renewal.

What this shows is that the local government in Puerto Rico, and the Government Blockchain Association, are not simply relying on outside opinions and narratives to drive the discussions and decisions about blockchain and crypto in Puerto Rico. The GBA is engaging with the technology itself and taking it upon themselves to formulate and engage with economic and political ideology by way of innovation and economic growth. In carrying forward Schumpeter’s arguments, however, the GBA is taking an ideological position, one that has another side that the GBA may or may not be considering. Schumpeter’s concept of “creative destruction” was informed by Karl Marx’s concept of “economic innovation” and the cycles of the market. Whereas Marx saw the constant search for technological upgrades and innovation as a means for the capitalist economy to more efficiently benefit from labor productivity gains and return on investments (Marx (1969) [1863]); Schumpeter celebrated the concept of

³⁰ Leising, Matthew, Lily Katz, and Yalixa Rivera, “One of the Biggest Crypto Exchanges is Heading to the Caribbean,” <https://www.bloomberg.com/news/articles/2018-05-24/bitfinex-said-to-find-bank-in-puerto-rico-after-wells-fargo-exit>

³¹ Leising, Matthew and Yalixa Rivera, “Puerto Rico’s Noble Bank Seeks Sale Amid Crypto Slide,” <https://www.bloomberg.com/news/articles/2018-10-02/puerto-rico-s-cryptocurrency-bank-noble-is-said-to-look-for-buyer>

³² GBA Puerto Rico Meetup Page: <https://www.meetup.com/Government-Blockchain-SJ-Puerto-Rico/events/nlrqyqzdblc/>, accessed May 5, 2019

“creative destruction” as the “fundamental impulse that sets and keeps the capitalist engine in motion [...] the opening up of new markets,” and what sustained economic growth (Schumpeter (1994)[1942]). Schumpeter’s concept would later become a fundamental concept for right-libertarian economics out of the Austrian school of free-market economic thought.³³

Transactionary Capacity: Practical Use of Cryptocurrency as a Mode of Exchange?

Moments of economic transformation imposed on the geography and people of Puerto Rico are visible in the landscape and urban form all across the archipelago. In San Juan what were once the edges of the city have sprawled inward with the expansion of roads and automobile-centric planning. Public and private housing developments, *urbanizaciones*, were constructed to keep up with population growth, and new luxury hotels and high-rise apartments were built along the coast-line, including the Hotel Caribe Hilton. Along the west and south of the main island, the CORCO oil refinery (now a Superfund site), factories, and sugar mills - now abandoned. Even the decommissioned nuclear reactor in Rincón tells a story of the island being used for experimentation.

Today in San Juan, it is not immediately obvious where the crypto-crowd has taken up residency and how it has affected the occupation of space, but – just like the designated spaces of the internet where cryptocurrency and blockchain content exists – its physical counterpart is also equally insular, but vast and distributed, almost an alternate reality. Once you are initiated and know where to look it becomes readily visible and it is almost all you can see. One hot summer day in June 2018, I walk up the coastline along Paseo Puerto de Tierra – to my right a dedicated bike land and a two-lane road, some gas stations interspersed between a number of midrise apartment buildings and office buildings. On one, a rental sign reads, “HIGHLY SECURE OFFICE SPACE, CAN PAY BY BLOCKCHAIN.” The listing is online, with an interactive map of other properties. Throughout the city, a few cafes and restaurants hang hand-written signs: “We Accept Bitcoin.” Reportedly, some cab drivers have also experimented with accepting cryptocurrency. A local Puerto Rican blockchain and technology startup called Link PR has even created an online map that indicates self-reported “crypto-friendly” locales in Puerto Rico. It is sparsely populated but not insignificant, including a number of restaurants, AirBnB listings, a fitness center, an A/V equipment store, even a dental office. However, it is not only outside cryptocurrencies that have found their way to the island. Puerto Rico also has a local cryptocurrency, Coqui Cash, (named after the native frog species in Puerto Rico) which runs on the Komodo blockchain (which uses a delayed Proof-of-Work (dPoW) mechanism to confirm transactions which is more energy efficient). Coqui Cash is a “local community driven cryptocurrency” with goals of being used to transact with and support local businesses and markets. These goals are not dissimilar from a local currency in Ithaca, New York, called the Ithaca HOURS, which is still in use today to exchange local services and goods. Its aims are more in line with a cooperative model, or at the very least a libertarian socialist model (Murray Bookchin) where freedom for a communal group or collective community is sought after, which is a refreshing change of pace from the right-libertarian anarcho-capitalist free-markets, freedom for the individual, Hayek, von Mises, Ayn Randian model.

I bring the local currency concept up to my Puerto Rican friends and collaborators and get mixed reactions. Noemí Segarra is a dancer and artist whose work with PISO Proyecto is about questioning the boundaries between the body and the city, navigating the “current socio-political economical environmental “crisis” in Puerto Rico to ponder relationships and placements: USA and the world.”³⁴ She is one of many women in Puerto Rico focused on creating more sustainable local economic futures. She

³³ The negative aspects of creative destruction have been described in relation to industrialization and modernization, for example Marshall Berman’s chapter on “Innovative Self-Destruction” in *All That is Solid Melts into Air* (1981); and David Harvey who writes of the double-edge sword of innovation: “The effect of continuous innovation [...] is to devalue, if not destroy, past investments and labour skills. Creative destruction is embedded within the circulation of capital itself. Innovation exacerbates instability, insecurity, and in the end, becomes the prime force pushing capitalism into periodic paroxysms of crisis.” (Harvey, *The Condition of Postmodernity*, 1990). Additionally, Manuel Castells writes, “The “spirit of informationalism” is the culture of “creative destruction” accelerated to the speed of the optoelectronic circuits that process its signals. Schumpeter meets Weber in the cyberspace of the network enterprise” (Castells 2000).

³⁴ <http://www.culturepush.org/noemi-segarra>

questions an alternative to the “Crypto-Utopia” – asking can we make an off-grid “network” (for lack of a better term) – understanding how we can collaborate and generate some local economy, “even though it’s going to be in US dollars!” she shakes her fists in exasperation. When I suggest an alternate local currency, Noemí equivocates. She has considered it before, but she emphasizes the importance of needing it to work in the real world. From her art, it is clear she is not interested in an insular secessionist movement cut off from the rest of the world. If you want to reclaim the idea of Utopia, go crazy, she suggests, “but at the same time, it has to be practical. [...] *Yo quiero arte practical*, I want practical art. Because yes, I am utopian in that I’m thinking about the future, but what I have is right now.”

In Rio Piedras, I spoke with Melissa Rosario, Founder and Director of CEPA (Center for Embodied Pedagogy and Action). CEPA is a collective focused on healing, embodied pedagogy, ecologically-light living, and cooperative economies. CEPA’s purpose is to “build an intellectual and political home that honors our earth, ancestors and the differences between us. It offers a place where Puerto Ricans—from island and diaspora—and their allies can construct an alternative together.” When I bring it up, Melissa is enthusiastic about an alternative currency, one that facilitates exchange between local businesses and services. She takes the position of an ecological economic cooperative, “Replacing a concern with profit and competition for the well-being of individuals, the earth, and communities is at the center of building a cooperative economy.”³⁵ Melissa acknowledges that her time spent in the United States, receiving a PhD in Anthropology and Latinx Studies in 2013 from Cornell University, and work as a postdoctoral fellow at Bowdoin College and visiting assistant professor at Wesleyan University, has conditioned her perspective and life experience in a different way than may have been experienced by lifelong Puerto Ricans.

As far as practical use of an alternate local currency or cryptocurrency becoming widely used as a new means of exchange in Puerto Rico – the precedents are not encouraging. Puerto Rico has a complicated history with new currencies. In the late 19th century under Spanish domination, while the Puerto Rican *peso* was trying to be established as a stable coin, its success was hindered due to various other coins being brought in from places like Venezuela, the Dominican Republic, and Mexico. Though these were initially authorized as acceptable for use, the later exchanges became an economic burden (Costa 2007). Additionally, as Andrew Mercado-Vázquez notes, in the early 19th century, Puerto Rico’s economy was exposed to the influence of different costs of production according to what coin you used. There are clear examples of what happens when individuals are allowed to come in with their own coin and when these coins are allowed to circulate in the economy, and he doubts it would be different even in the digital age. I press him a bit – what about a locally generated currency, one created from within the archipelago rather than brought in from outside? What about one that aims to support the local businesses, like Coqui Cash? He says it’s an interesting idea but hasn’t heard anyone on the ground talking about it.

It’s true – while there are people in Puerto Rico talking about and even using cryptocurrency as a means of exchange – these groups and discussions are highly segmented, insulated to varying degrees of intentionality, from the broader public sphere. Even some of the few native Puerto Ricans who are involved with blockchain businesses acknowledge the complications of cryptocurrency as a means of exchange. Fabián Vélez, the CEO of Link PR, emphasizes to me that many places in Puerto Rico, particularly in the countryside, still operate with a largely cash-based economy. Many places outside of the metropolitan areas in still do not take credit or debit card. Fabián is from Cidra, a small municipality in the Central region of the island. When he was in high school, he had a computer but most of his neighbors did not. This was typical for most of the Central and Western mountainous and rural regions of Puerto Rico, representative of the “digital divide” we see in the mainland United States between urban and rural areas, or communities of color in urban areas, but to an even more extreme degree. Even today many of the Central and Western municipalities lack access to broadband internet.³⁶

³⁵ <http://www.decolonizepr.com/cepa-three-principles.html#cooperativeeconomies>

³⁶ This is urban-rural divide in internet access is similar to what we see in the mainland United States, but at a much greater scale. For example, if we look at Montana, the state with the *least* broadband coverage, we see that 74% of the state has access to wired broadband internet (defined by the FCC as 25mbps download speed, 3mbps upload), and 25% of the population is “underserved” (the percentage of the population with access to less than 2 wired broadband providers). Comparatively, only 61% of Puerto Rico has access to broadband internet; and 56% of the population is underserved. About 1.3 million people in Puerto Rico do not have any access to *any* wired internet

Local Puerto Rican Blockchain Engagement

Fabián is a young, ambitious, social-conscious technologist, in his early twenties, as are a number of his team members. Their age is representative of the broader global crypto-space (at least in terms of Bitcoin engagement) which, according to coin.dance and Google Analytics, is overwhelmingly male at 91.22%, and overwhelmingly young, with over 62% of users between the ages of 18 and 34. Fabián confirms this gender imbalance in the technology and blockchain space in Puerto Rico, but points to groups such as Include Girls, who are actively working to address issues of gender marginalization and inclusivity. While there is much written about how Hurricane Maria drew attention from the outside to Puerto Rico, it also set the circumstances under which Link PR would form. The team met around November of 2017 while working at Parallel18, a tech-oriented startup incubator based in San Juan, which opened its doors to the wider community when power was still out after Hurricane Maria. They had heard about how big names like Brock Pierce and Michael Turpin had come into the island looking to create a new crypto-community. Fabián and his new colleagues thought it would be a good idea to get involved, in the hopes they could help direct some of the ideas, potential capital and resources in the direction that was needed by actual Puerto Rican communities. The first event hosted by Link PR was in January 2018, called “Let’s Talk About Blockchain Technologies,” held at Engine-4, a co-working space in Bayamón, which was again one of the few places that had power. At this time, power was still out on over half of the island, including where Fabián lived in Humacao. While their first event had a decent turnout at 40 people, their second event in February 2018, “Beers and Blockchain,” drew a much larger audience (perhaps due to its alcohol-oriented incentive mechanism) – over 200 people, including Brock Pierce. The audience was a mix of local Puerto Ricans, and people from the United States who had come for the first CoinAgenda RestartWeek.

Fabián has since spoken to Brock and his Puertopian compatriots, and has implored them to “stop partying around, thinking Puerto Rico is some tropical island where you can do whatever you want, and actually go to communities and build strong relationships.” To some degree they have listened. Together with CoinAgenda and RestartWeek, Link PR held a “hackathon” in Ponce called “Hack for Puerto Rico” where Fabián says a lot of the local people came out and some new projects emerged. He acknowledges that although he believes the Brock Pierce crypto-crowd has improved their communication with local communities, a lot of damage has already been done.

Sensing a bigger gap in digital literacy in Puerto Rico, Link PR has taken a step back from focusing on only blockchain education, and has shifted to technology education and STEM more broadly. However, their methodology remains consistent: “community co-creation” through education, seeking community empowerment with digital technology, and using methods of design-thinking in their practice. They offer their educational events and tools in Spanish as well as English. For funding, they have developed relationships not only with large technology corporations, startups, non-profits, and institutions local to and outside of Puerto Rico, but with the aim to impact real communities on the ground. After the hurricane and as a result of decreased public funding, many schools in Puerto Rico were shut down. Link PR partnered with HiveCube and non-profit Libraries Without Borders to donate mobile libraries to communities in some of the communities most adversely impacted from the hurricanes, including La Perla and Loíza. The University of Puerto Rico at Mayaguez is now pursuing research around blockchain as a result of a workshop Link PR held there in May 2018, and UPR Ponce is as well, in part due to the hackathon that Link PR held there. With this there is hope that within the tech-world and blockchain-space, native Puerto Ricans can steer the conversations, actions, and funding around this crypto-mania in a more equitable direction.

providers were they live, about 35% of the estimated total population. Wireless coverage with mobile broadband service, while better at 84.7%, is still far lower on average than any state in the United States. In Puerto Rico, the underserved areas are located primarily in the mountainous regions in the central and western areas of the main island, outside of Utuado and Adjuntas (including the barrios of Naranjo, Duey, Sierra Alta, Collores), as well as stretches and pockets of underserved areas along the south of the island, outside of Guyana, Santa Isabel, Coamo, and Yauco, as well as the entirety of the islands of Culebra and Vieques. (Maps can be found here: <http://map.connectpr.org/?q=map>).

It's important to note that as local companies with services benefitting Puerto Ricans, Link PR is not eligible for the tax benefits of Acts 20/22. However, some startups may be eligible for other benefits such as those under Act 135 – the Young Entrepreneurs Act – applicable to Puerto Ricans between the ages of 16 and 35. Introduced in 2014, under then Governor Alejandro García Padilla, Act 135 is meant to retain local talent (combatting the so-called “brain drain”) and to incentivize new startup companies. Its perks include low-interest loans, tax exemptions up to a certain income, expedited permitting process, and access to PRIDCO (Puerto Rico Industrial Development Company) real estate properties which can be searched on their online platform.³⁷ These are not the only Acts for which Puerto Ricans are eligible. Acts 239, 255, and 220 all relate to economic cooperativism, which may pose a preferable alternate economic opportunity for Puerto Ricans in resistance to the crypto-capitalist export service model. This explored in greater detail in Chapter 3.

Resistance and Contestation

However, not all Puerto Ricans feel the same way as Fabián and his tech-oriented colleagues. During the second RestartWeek, in Mayaguez and Rincon, there were protests at some of the panel discussions. Fabián was there, hearing local people voicing their concern and frustration that these expat crypto-people were coming to the island to take over and “push blockchain down our throats, whether we like it or not”. Other people in the crypto-community in San Juan mentioned this to me when I ask about an active resistance against “crypto-colonialism.” Reportedly, after four women interrupted an event at RestartWeek, in response Brock Pierce told them to go “eat a rainbow.”³⁸ This lackadaisical remark is emblematic of the Puertopian privilege, entitlement, power, and blatant misunderstanding of the varied needs and identities of Puerto Ricans. The resistance against crypto-colonialism, and the bad press the crypto-crowd has gotten, is something the Puertopians think is misguided and will fade over time. This group specifically believes their actions are altruistic, that they are here to fix the inefficiencies and mismanagement of the government and make the Puerto Rican economy soar in a way that without them they believe could not happen.³⁹ They refute the claim of being colonizers, “Clearly we’re not conquering Puerto Rico,” Pierce says, “It’s not even a realistic idea.” Their actions tell a different story, particularly through the vehicle of the STO which will be addressed later in this paper.

There are more than a few expats on the island from the mainland United States who do not consider themselves “Puertopians” or aligned with Brock Pierce and his mission. Some acknowledge straight-out they are here for the tax benefits. I’ve met many of these people at meetups such as the Crypto Happy Hour at Delavida. In a way, this honesty is refreshing. Some even admit that they think it is a shame that Puerto Ricans can’t enjoy the same tax incentives, but they hope that at least patronizing local businesses and restaurants can help contribute to the local economy. At the same time, if they own or operate a business that receives tax breaks from the Act 20 Export Service Act, their company cannot be benefitting the local Puerto Ricans. As such, one could easily challenge the feasibility of cryptocurrency and blockchain significantly benefitting Puerto Ricans, and instead argue that we should instead implore the government officials who think (or have been pitched to and attempted to be convinced) this could be a good thing for the economy, to strongly reconsider. For that, time is of the essence, particularly with a growing crypto-constituency that will have the power to lobby to keep these incentives in place for their own self-interest. Resistance and contestation will be discussed in more depth in the next chapter.

Cryptoeconomic Geographies

The digital is not only a tool for information sharing. The digital can call-into-being, constitute, and connect publics in specific ways, but the digital can also facilitate and enable the actions of these groups on-the-ground, in physical space, and their relations with other publics, institutions, and governments. With cryptocurrencies and blockchains - digital (crypto)economic transactions, physical interactions, and spatial appropriations are consequently linked - in what I refer to as *cryptoeconomic geographies*. These cryptoeconomic geographies comprise new networks with material and digital concentrations and distributions in service to cryptocurrency, blockchains, and their proponents, and can be considered at

³⁷ <https://prbusinesslink.com/act-135/>

³⁸ <https://thebaffler.com/outbursts/tales-from-the-cryptos-watlington>

³⁹ <https://www.theblockcrypto.com/2019/02/09/brock-pierce-is-looking-to-launch-a-5-million-vc-fund-to-invest-in-puerto-rico-based-entrepreneurs/>

multiple scales, dependent on the contextual lens (local, national, global, and permutations/intersections of each). Formations of new cryptoeconomic geographies can be both unintentional or consequential (for example, the energy consumption of mining), or highly intentional/planned (particularly through the mechanism of the Security Token Offering).

One example of distributed cryptoeconomic geographies networked to Puerto Rico are centered around mining operations and energy expenditure. In a YouTube video on how to make crypto-mining profitable in Puerto Rico, a young man who goes by the handle "Explordinaire" admits the contradictions of what he and his audience are setting out to do. Electricity in Puerto Rico is unreliable, and the cost is much higher than in the mainland United States (about 28 cents per kwh in Puerto Rico vs 12 cents per kwh on average in the United States. This is a result of reliance on oil imports, another Operation Bootstrap era shift, transitioning from hydropower to oil power plants, refineries, then deindustrialization with CORCO oil refinery shutting down.). He talks about the options of setting up a windmill or a solar farm, but points out that those are expensive - you have to get the land and build the facility - not easy to do on one's own, so he doesn't recommend this unless you have wealth from investments outside of cryptocurrency. Also, there's the pesky condition of the Caribbean climate - heat and humidity don't play well with mining rigs which are just computers with dedicated powerful computing chips that generate heat on their own, and require ventilation and dehumidification. Instead, for young individuals like himself, he advocates for a geographically distributed solution - "you have a mining machine located in Puerto Rico, connected to a mining pool that is outside of Puerto Rico, and you're renting hashpower, or selling hashpower, out to these mining pools."⁴⁰ The reasons for doing so are the tax benefits, the logic of which even he seems to think is dubious, when he says, "In a weird, awkward new way, you're exporting a service from Puerto Rico. In Puerto Rico's eyes, that is a good thing," he grins while flashing two thumbs up.

Those mining pools are geographically distributed all over the globe, but the largest concentrated mining operation (warehouses packed with computers running calculations), is Bitmain, headquartered in Beijing, with facilities throughout China such as Inner Mongolia on the outskirts of Ordos. Bitmain also has branches in Texas and Washington State. They also are the largest producer of ASIC chips and dedicated Antminer mining rigs. These Antminers can be purchased on Amazon and shipped essentially anywhere in the world. However, for large-scale mining operations under the current crypto-mining craze (no longer contained to bitcoin, but other alt-coins that are also ripe for speculation), these operations land in areas of maximum incentivization – to get the biggest profit from one's energy expenditure, one wants to run his mining operation in an area with the cheapest energy costs.

Case in point, in upstate New York on the St. Lawrence River, the hydroelectric energy cost is comparatively inexpensive.⁴¹ Coinmint is a self-proclaimed, "private Bitcoin mining firm, exclusively for high net worth private investors." The company was able to get a discounted rate from the government to occupy the abandoned Alcoa aluminum smelting warehouses⁴² which was just recently environmentally remediated.⁴³ This move is also in hopes for economic development in the town of Massena that has also seen disinvestment and resulting unemployment in the 90s and early 2000s. "The thought of 150 jobs and revitalization of the Alcoa East Facility is exciting," said Steve O'Shaughnessy, Massena town supervisor. "We are ready to provide any assistance we can to move this project to its full potential."⁴⁴ Curiously, Coinmint's business address is registered in Puerto Rico, bringing this distributed cryptoeconomic geography back full-circle.

Spatial Occupation on the Archipelago

⁴⁰ <https://www.youtube.com/watch?v=cVCe3nq3qi8>

⁴¹ Katz, Lily. "Bitcoin mining banned for first time in Upstate New York town," Bloomberg, March 16, 2018, <https://www.bloomberg.com/news/articles/2018-03-16/bitcoin-mining-banned-for-first-time-in-upstate-new-york-town>

⁴² <https://www.ccn.com/700-million-bitcoin-mining-farm-coming-to-upstate-new-york/>

⁴³ Cheng, Evelyn, "Bitcoin mining firms getting pushback from New York state for trying to profit from cheap electricity," CNBC, March 16, 2018. <https://www.cnbc.com/2018/03/16/bitcoin-mining-firms-getting-pushback-from-new-york-state.html>

⁴⁴ <https://www.ccn.com/700-million-bitcoin-mining-farm-coming-to-upstate-new-york>

Whereas dedicated mining farms tend to be located in more rural areas, re-inhabiting abandoned warehouses or areas where a lot of contiguous space is available, business-related cryptocurrency operations tend to be concentrated in urban areas. For Puerto Rico, this is concentrated in San Juan. For business communications purposes, internet access is necessary, and in Puerto Rico, this is concentrated in urban areas. Rural mountainous regions still lack adequate internet access.

At the scale of the city, in San Juan, a number of locations are crypto-hot spots. These include Monastery Arts Suites, Delavida, Piloto 151, Engine4, Parallel18. Sometimes the crypto-world actively creates an alternate reality in physical space, renaming already existing spaces, such as Poet's Passage which has become host to Satoshi Café (named as an homage to the pseudonymous creator of Bitcoin). However, these spaces alone are not enough to constitute a crypto-utopia. Is there even a need for concern?

Since 2017 there has been talk of the Puertopians starting a "crypto-utopia" in Old San Juan, however, how they were actually going to build said crypto-utopia was unclear. Many people thought it was all talk; even in the crypto-space online there was skepticism. Reddit users commented: "Structural development is enormously complex," ... "We shouldn't believe anyone who's a billionaire and ... states he's going to turn the place in an utopia." Of course one person could not do it alone; it takes coordination, funding, and intentional planning. However, crypto-proponents in Puerto Rico have found a way to achieve this by combining venture capital with cryptocurrency investment, via the digital mechanism of the Security Token Offering (STO).

Before I describe the STO, I will give an overview of its predecessor, the ICO (Initial Coin Offering). An ICO is a type of funding, often crowdfunding, but also private. ICOs have been used as a source of capital for blockchain startups. In this process, a newly created cryptocurrency (in the form of tokens or crypto-coins) is sold to investors (or speculators) with the premise of being able to use said tokens as units of exchange/currency or utility in the future (such as voting rights), or in the case of speculators – the chance to sell it at a higher value, should the project's fundraising goals be met. ICOs were initially met with regulatory confusion and complications. In some cases ICOs allow startups to avoid regulatory compliance, in other cases ICOs are banned outright⁴⁵. Many ICOs are outright scams, and are prone to securities laws violations⁴⁶. In 2017, nearly half of ICOs released failed by the following year⁴⁷. Despite this, however, a significant \$7 billion was raised with ICOs in just six months from January to June of 2018⁴⁸.

Past ICOs even included blockchain-based geography / GPS platforms such as XYO and FOAM, which Shannon Mattern (2018) wrote about in an article for *The Atlantic*. However, in the year 2019, ICOs are fading out (too many regulatory complications, and too much risk involved for potential investors, since they are buying into the premise of a future proposition). Recently a new digital/crypto fundraising mechanism has been invented that addresses those two primary concerns - the Security Token Offering (STO). In a presentation titled "Security Token Offerings: The Evolution of Capital Formation," by the group Node Blockchain, they define the STO as: "a financial security issued in the form of a digital asset; which typically represent ownership rights in an underlying company and/or its assets. This is distinctly different than the aforementioned ICOs, which were "Utility Tokens" or digital tokens that provided access to a project's future product/service with no tangible claim to an asset or equity ownership."⁴⁹ Put more simply, a STO combines typical Venture Capital with cryptocurrency to create a "tokenized venture capital fund."⁵⁰

⁴⁵ <https://www.bitcoinmarketjournal.com/ico-regulations/>

⁴⁶ "Company Halts ICO After SEC Raises Registration Concerns". SEC.

⁴⁷ Hankin, Aaron (February 26, 2018). "Nearly half of all 2017 ICOs have failed". Fortune.

⁴⁸ Robertson, Benjamin (2 August 2018). "Crypto Bulls Pile Into ICOs at Record Pace Despite Bitcoin Rout". Bloomberg.

⁴⁹ <https://drive.google.com/file/d/1ClwOko6mgw3HM3rsolkhdjwi7LuMk-ya/view>

⁵⁰ <https://sharespost.com/insights/articles/cityblock-capital-venture-capital-for-the-digital-age/>
<https://sharespost.com/insights/articles/security-tokens-set-to-take-center-stage-in-2019/>

The STO is a new digital vehicle being used for planned spatial appropriation in Puerto Rico. For a technology whose predominant narratives espouse its technical “transparency,” the actual interworkings and technical vehicles for spatial appropriation, like the STO, are incredibly opaque. In Puerto Rico, that tokenized venture capital fund is called “Viejo San Juan Comunidad Re-Fund”. Though its name is in Spanish, the organizers of the STO are two Americans with experience in venture capital and real estate in New York. In true “crypto” style, this crypto-enclave⁵¹ is a *distributed* one, taking up presence in key pieces of real estate, city properties distributed throughout Old San Juan, as well as a farm in Las Marías, where they intend to harvest their own food source to be sold at the Old San Juan farmer’s market, with prioritized access to the crypto-community. Architecturally, the planning ethos reminds me of a citadel, with a command center, located high up looming over the city. The VSJ Fund is advertising their “HQ” headquarters to be located on the highest floor of the tallest building in Old San Juan. On their webpage: “The VSJ Fund intends to move its headquarters to the 7th floor where the view from the balcony [of the Gonzalez Padin Building] is the highest point in Old San Juan.” And even though there are no literal walls in their plan yet, there are clear digital walls and gates that keep anyone out from investing unless they are “accredited investor”⁵² and on the inside in the crypto world. This is not too dissimilar from the process of redlining and gatekeeping loans/mortgages, but at the same time vastly different in that the STO does not require the intentional coordination of banks and governments – it can be done by the individual crypto-investors themselves, and their digital crypto-economic frameworks.

This mechanism of the STO is groundbreaking for cryptocurrencies taking off, because the investment is backed to a real tangible asset, such as real estate. So many ICOs failed because of they were only offering a potential future premise, which was too much uncertainty and risk for most investors. The soft-cap for the VSJ Re-Fund is \$1 million, although their goal is \$50 million. If they meet that goal, the prophesy of a crypto-utopia will one step closer to being fulfilled.

It is one thing for communities to establish geographical and spatial continuity over time by moving to an area that has a common racial makeup, or areas that facilitate common interests, even common ideologies. Though at times problematic, this way of community organization is far less insidious than the intentional appropriation of space to create a new city within an already existing city, privatizing it from the inside out. Collective private ownership of real estate in Old San Juan (if under Acts 20 – with a 90% property tax exemption) with preferential rent for the crypto-community is not a commons – it is a private enclave, not concentrated in one area but distributed around the city. Private “collective” ownership of land in the form of natural resources for the farm, with resources sold to a preferential community of high-net-worth individuals is not a commons, it is a right-libertarian utopia.⁵³ These are not just random distributions of capital, but rather highly coordinated actions through intentionally exclusive digital networks.

Contestation can only happen insofar as the situation is brought to light. As of now, with few exceptions, this is insular, not well known in Puerto Rico, and certainly not well-known to the broader United States. This is not simply “digital capitalism;” this is a mix of venture capital with digital infrastructure and architectures that enable new forms of power and spatial appropriation, and deliberately shuts out those

⁵¹ I owe the “enclave” analogy here to Andrew Mercado-Vázquez, whom I also owe for bringing this phenomena to my attention. Together we have looked at this VSJ STO from a critical perspective, trying to make sense of it – he from a legal perspective, and me from an urban and spatial perspective. Together, the biggest aspect that has become clear is that this is a much more sophisticated mechanism for individuals to buy up large swaths of land and city properties in order to create an exclusive private crypto-community, doing so all technically out in the open but without many people knowing, even without the government having to know or have jurisdiction. With this intentionality, it is difficult to see how this is not an overt colonial act.

⁵² From the VSJ Re-Fund Token Sale Agreement: “The Token Member is (i) an Accredited Investor as such term is defined in Rule 501 of Regulation D under the Securities Act; (ii) an eligible person listed under Rule 701(c) of the Securities Act; or (iii) not a U.S. person within the meaning of Rule 902 of Regulation S under the Securities Act.” <https://storage.swarm.fund/dpurehuinhwbjihcost7fvkparftvjgspe6yxt544hn32cwfxwytxs4o>

⁵³ “Right-wing libertarians argue that the right of self-ownership entails the right to appropriate unequal parts of the external world, such as unequal amounts of land”. Kymlicka, Will (2005). “libertarianism, left-”. In Ted Honderich. *The Oxford Companion to Philosophy* (New ed.). New York: Oxford University Press.

who do not have access to the technology, and who are not qualified investors or high net-worth individuals. Both in tension and cooperation with governmental regulation, the Puertopians are settlers in new lands, at the same time, they are nomadic in their ability to find the geographical location where they find the greatest financial incentive. This poses real impacts to people living in these areas, further marginalizing and excluding. Furthermore, with their own source of housing, their own source of income, with rent extraction, and even with their own food source, this group is intentionally trying to become a self-sufficient, insular yet distributed enclave, that does not have to contribute to the Puerto Rican economy in the way of taxes, in the way of providing services that benefit local Puerto Ricans, in the way of hiring locally, and even in the ways of simply purchasing food from the already existing farms that already sell to the local farmer's market in Old San Juan. Governments and policy-makers should be made aware of this behavior, and be implored to see how this particular situation is not set up to benefit the local Puerto Rican economy, and be pressed to affect regulatory change. This is one strategy of resistance and contestation that will be expanded upon in the next chapter.

CONTESTATION IN PUERTO RICO



Gov. Rosselló told a business audience in New York that Maria had created a “blank canvas” on which investors could paint their very own dream world.

**PUERTO RICANS AND UL
“PUERTOPIANS” ARE LO
STRUGGLE OVER HOW TO
ISLAND**



Naomi Klein

March 20 2018, 12:30 p.m.

Making a Crypto
Utopia in Puerto Rico



Brock Pierce inside the former Children's Museum in Old San Juan, P.R., which he and his colleagues hope to make part of a crypto utopia where the money is virtual and the contracts are all public. Erika P. Rodriguez for The New York Times

By Nellie Bowles

Feb. 2, 2018 Leer en español

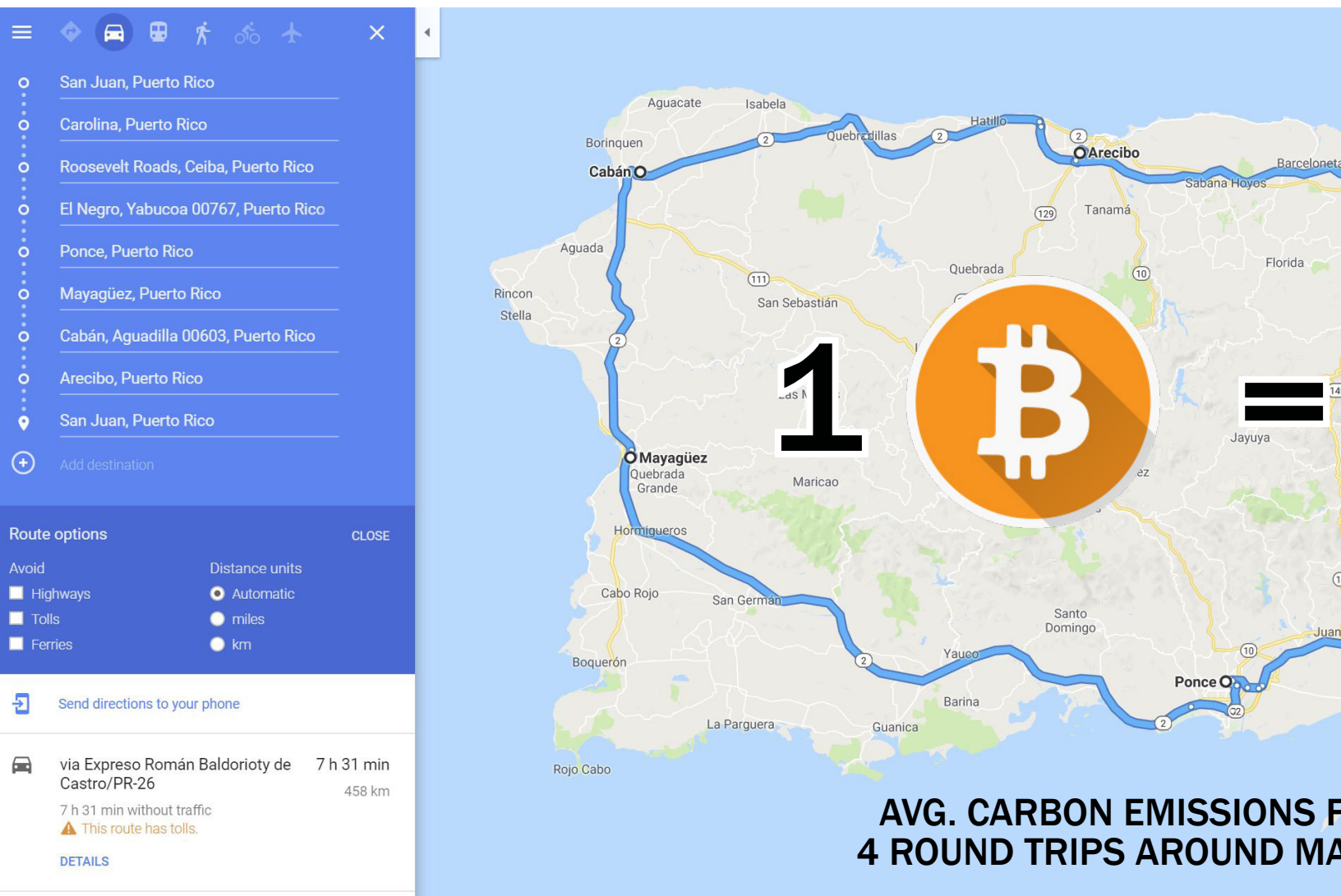


**TRARICH
CKED IN A PITCHED
O REMAKE THE**

**██████ “We are not
supposed to be
dreaming; we are not
supposed to be
thinking about even
governing ourselves.”**

**“if there is to be a grand new experiment in Puerto Rico,
one genuinely in the interest of its people, then Puerto
Ricans themselves will have to be the
ones to dream it up and fight for it —
“from the bottom to the top,” as Casa Pueblo
founder Alexis Massol-González told me.”
- Naomi Klein for The Intercept**

EXTRACTIONS OF POWER



the average carbon footprint of ONE bitcoin
this is roughly equivalent to driving 1,138 miles in an average gas fueled passenger vehicle

* Data taken on April 30, 2017 from <https://www.btc.com>

EXTRACTIONS OF POWER

AVG. ENERGY CONSUMPTION FOR
AVG. DAILY ENERGY CONSUMPTION

$$1 \text{ Bitcoin} = 6 \text{ Megawatts}$$

Average electricity consumed per transaction = 929 kWh*

* Data taken on April 30, 2017 from
<https://digiconomist.net/bitcoin-energy-consumption>

Four months after Hurricane Maria, over 1 million people were still without power.
As of March 2018, six months after Hurricane Maria, roughly 150,000 homes were still without power.

As of March 2018, the estimated average annual energy consumption of Puerto Rico is 1,700,000 MWh.
.....that is **2.87** times the **average annual energy consumption of the United States**

.....or approximately the equivalent yearly energy consumption of 1,700,000 homes.

Puerto Rico has 3.5 million people.
58 of them were left without power.

Puerto Rico is still facing a serious health crisis: “patient attrition in the tens of thousands, shortages of waterborne disease, suicides, and medical equipment and staff shortages. Better disaster preparedness and more disaster-related data are needed.”

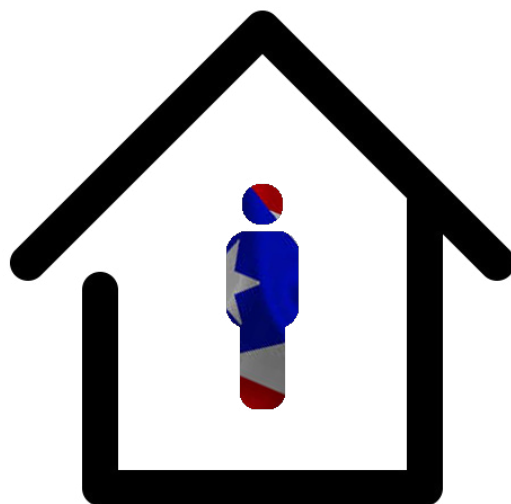
*Source: FEMA Secretary

**Source: Dr. Wendy Matos, FEMA

<https://www.nrdc.org/experts/mekela-panditharatne/s>

FOR ONE BITCOIN TRANSACTION =
EQUATION OF 64 PUERTO RICANS

64 X



Average daily energy consumed per capita in Puerto Rico = 15.2 kWh*

Average daily energy consumed per capita in US = 35.5 kWh**

* Statistic from CIA World Factbook 2015

<https://www.cia.gov/library/publications/resources/the-world-factbook/geos/rq.html>

** Statistic from World Bank Data 2014

450,000 people were still without power.

es and businesses were still without power, about 11% of PREPA customers.

ergy consumption of the Bitcoin network was 54.2 TWh

energy consumption of Puerto Rico

748 hospitals at 1 million square feet each (a very large hospital)

s 69 hospitals.

ver or fuel after Hurricane Maria.

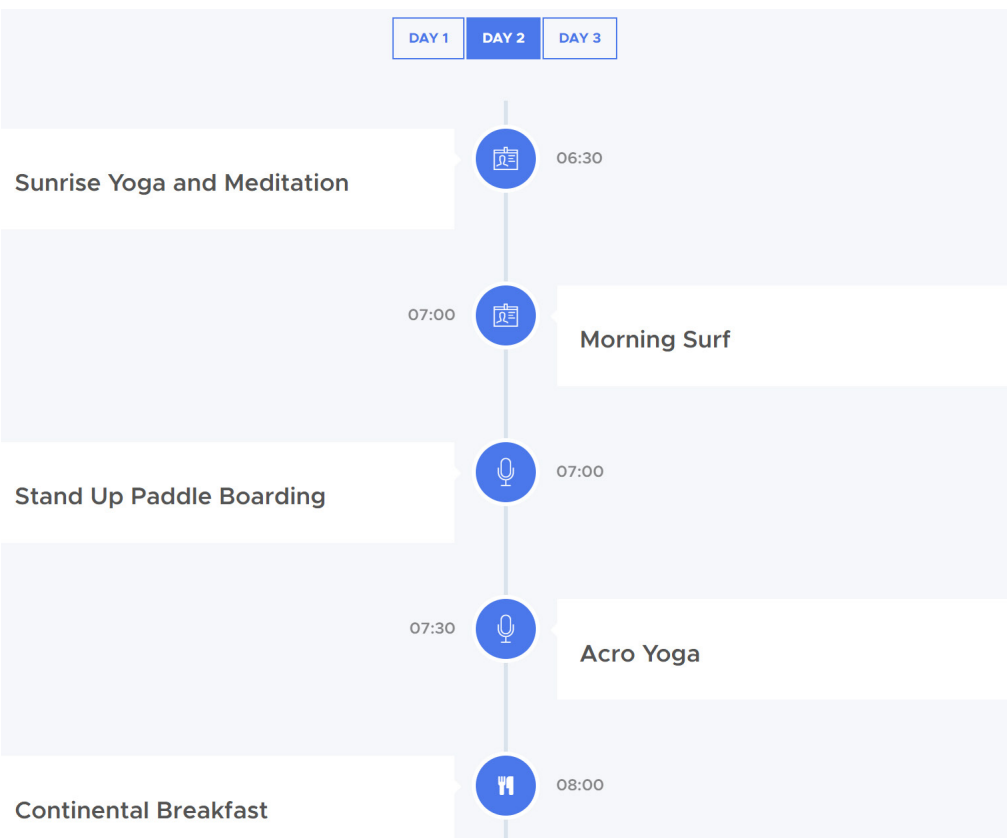
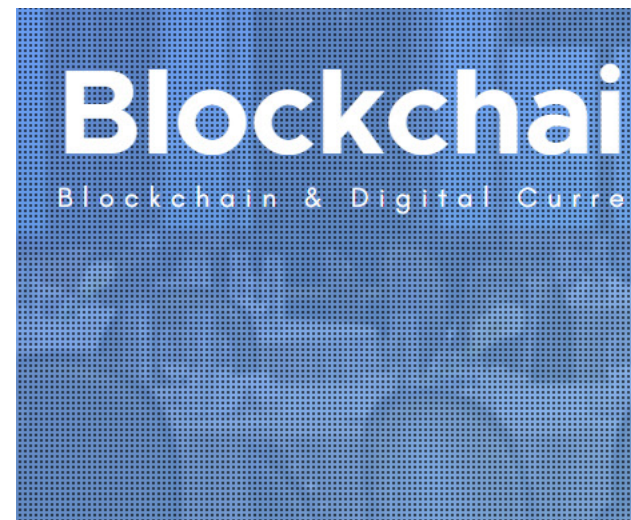
ds, increases in incidences of cardiac arrests and intracranial hemorrhages, higher rates
ata collection and more federal aid is needed by Puerto Rico's health sector to prevent
eaths and illnesses."**

ptember 26, 2017

Puerto Rico Medical Sciences.

ix-months-after-maria-puerto-ricos-growing-health-crisis

MEANWHILE, IN MARCH 2018...



Blockchain Unbound is a non-profit event and 100% of profits

Blockchain Unbound is a conference designed to showcase Puerto Rico as the blockchain technologies that will shape the future. All profits from the conference will be used to help people recover from the devastating hurricanes that struck the island in 2017.

Conference participants are invited to spend part of Saturday, March 17, working and deliver aid to those who need it most.

To participate, please email impact@blockchainind.com and a member of our team

n Unbound:

ncies



CONDADO VANDERBILT HOTEL

Blockchain Unbound:

How Blockchain & Digital Currencies will
Rebuild Puerto Rico

Location

1055 ASHFORD AVENUE SAN JUAN,
PUERTO RICO 00907

Telephone

787.721.5500

Web

We have negotiated a discounted rate
of \$315 per night for conference
attendees. [Please click here to book
now.](#) Availability is limited.

s will be donated to Puerto Rico's hurricane recovery efforts.

preeminent destination for companies, entrepreneurs, and investors building the
nce will be donated to a select group of local charities that are helping the Puerto Rican

g with our local non-profit partners listed below to visit the hardest hit areas of Puerto Rico

eam will confirm your attendance within a few days.

1493 - Spanish Colonization
1898 - American Colonization
2018 - Crypto Colonization?

Puerto Rico Act 22: How to Pay ZERO Capital Gains Taxes on Gold, Bitcoin and Stocks

Published on April 4, 2018



Bobby Hunt III | [Follow](#)

Author of The Blue Light Diet & Stack Silver Get Gold Buy Bitcoin, I...



1



0



0



How would you like to legally pay ZERO capital gains taxes on your precious metals, cryptocurrencies or even any mining stocks you own?

That's a serious question.

¹⁰⁴And entirely possible.



Max Keiser

@maxkeiser

Naomi [@NaomiAKle](#)

large, vibrant, local community of people starting new businesses, skill jobs (solving issues), loved having the presence of and fresh capital. ||



Puerto Ricans and Ultrarich "Puerto

Six months after Hurricane Maria, Puerto Ricans defend their island. Politicians and business leaders...
[theintercept.com](#)

8:04 AM - 23 Mar 2018

12 Retweets 47 Likes



5

12

47

The movement is alarming and... like the hedge fund manager R... taking advantage of the tax inc...
"They call me up saying they're... incorporate their own city, literally... own crypto world," said Mr. Ri... engage in that."

The newcomers are still debating... take. Some think they need to... move into Old San Juan. Puerto... move very fast.

Follow

in is blind. We found a community of young ventures; creating high values like energy); who sense of tech veterans



“Puertopians” Are Locked in a Pitched Struggle ...
Puerto Ricans are designing a recovery that
Bitcoin billionaires have other ideas.



earlier generation of Puerto Rico tax expats
Robb Rill, who runs a social group for those
centives.

re going to buy 250,000 acres so they can
rally start a city in Puerto Rico to have their
all, who moved to the island in 2013. “I can’t

ing the exact shape that Puertopia should
make a city; others think it’s enough to
Puertopians said, however, that they hoped to

“When Brock said, ‘We’re moving to Puerto Rico for the taxes and to create this new town,’ I said, ‘I’m in,’” Mr. Collins said. “Sight unseen.”

Later on, at a dinner in a nearby restaurant, the group ordered platters of octopus arms, fried cheese, ceviche and rum cocktails. They began debating whether to buy Puerto Rico’s [Roosevelt Roads Naval Station](#), which measures 9,000 acres and has two deepwater ports and an adjacent airport. The only hitch: It’s a Superfund cleanup site.



mm xx 1 month ago

You want a car? Just go to the airport. The jobless leaving the island are leaving t
with the keys in the ignition in the parking. I guess they're not planning on coming

👍 2 🗨️ REPLY

Hide replies ^



Explordinaire 1 month ago

mm xx wow. I didn't know that. :-/

👍 🗨️ REPLY



TurboTomPlays 1 week ago

Better than Uber.

👍 🗨️ REPLY

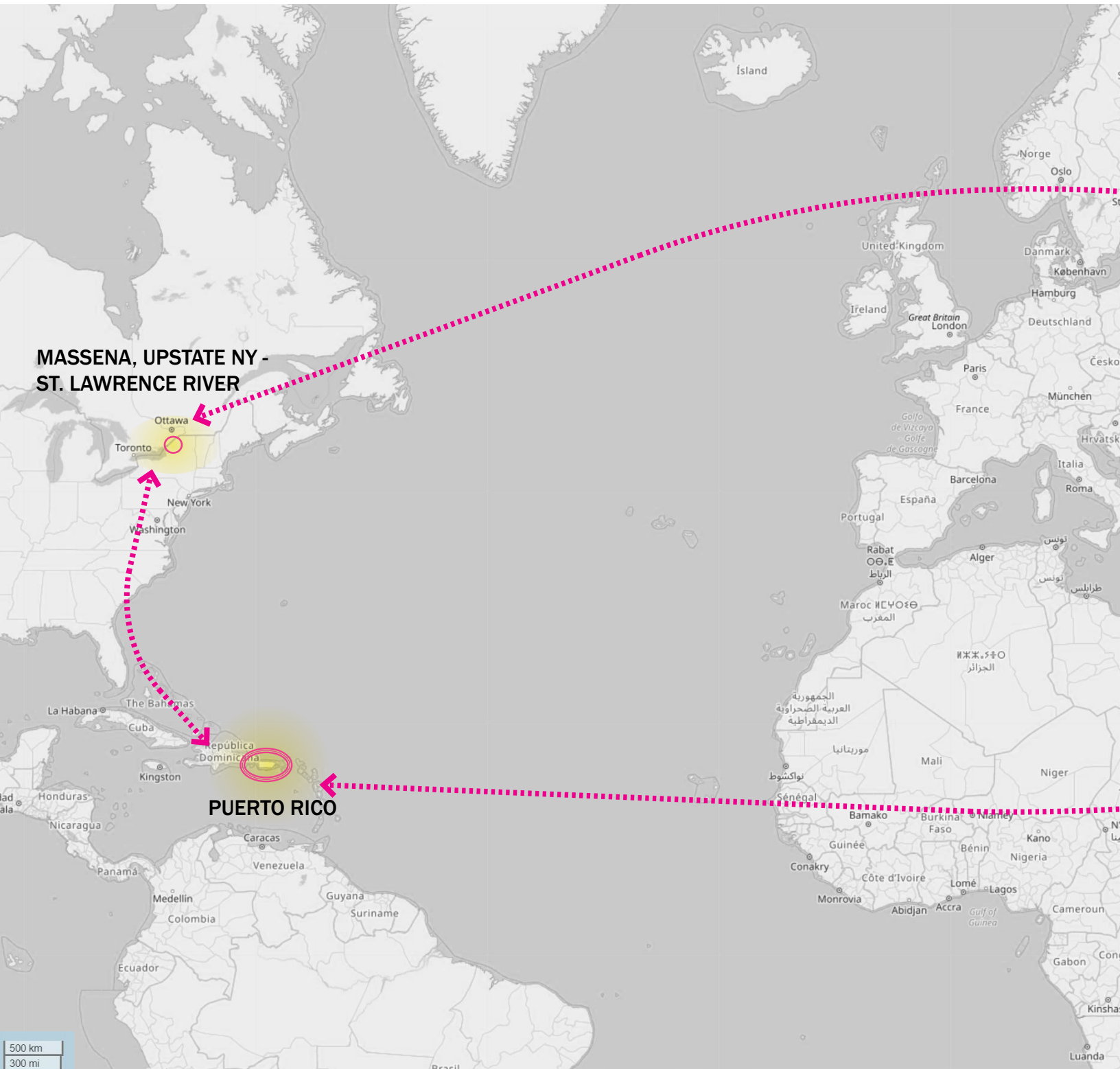
“We’re going to make this crypto land,” Mr. Larkin said.

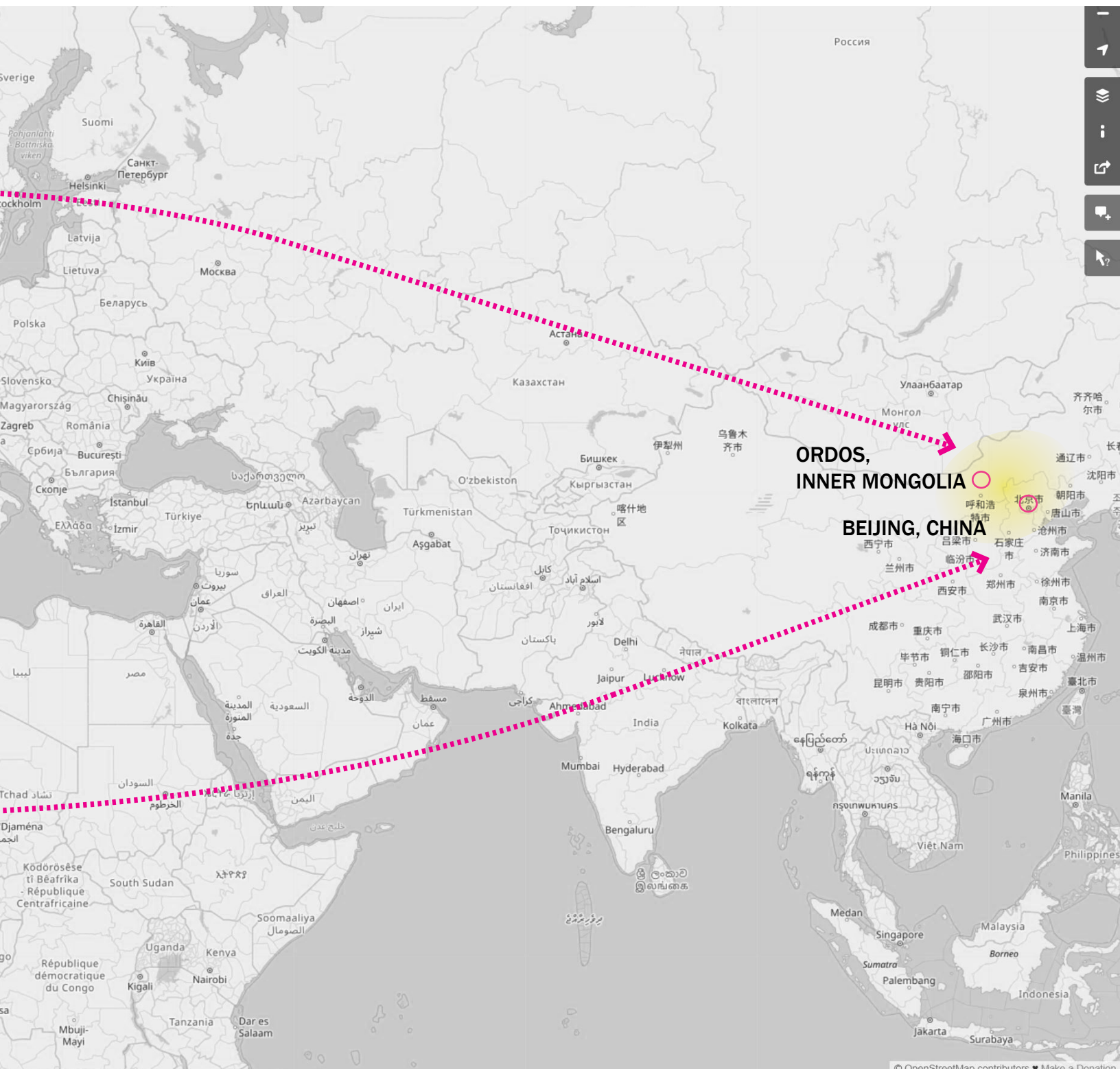
Mr. Larkin has mined about \$2 billion in Bitcoin and is the chief technology officer of Blockchain Industries, a publicly traded company based in Puerto Rico.

Moreover, for some in the crypto crowd, the appeal of relocating to Puerto Rico goes well beyond Laboy’s version of paradise. Post-Maria, with land selling for even cheaper, public assets being auctioned at fire-sale prices, and billions in federal disaster funds flowing to contractors, some distinctly more grandiose dreams for the island have begun to surface. Now rather than simply shopping for mansions in resort communities, the Puertopians are looking to buy a piece of land large enough to start their very own city – complete with airport, yacht port, and passports, all run on virtual currencies.

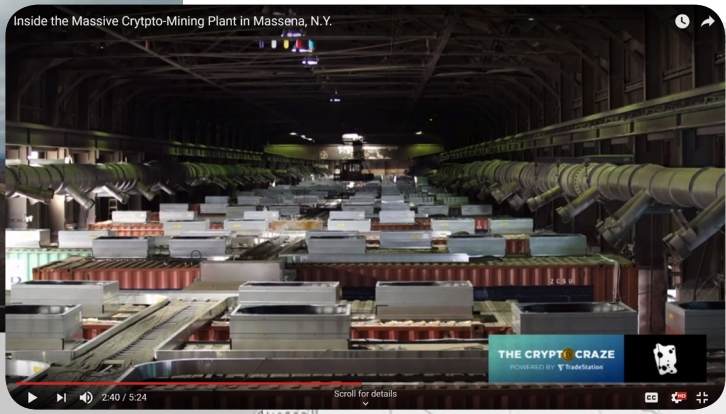
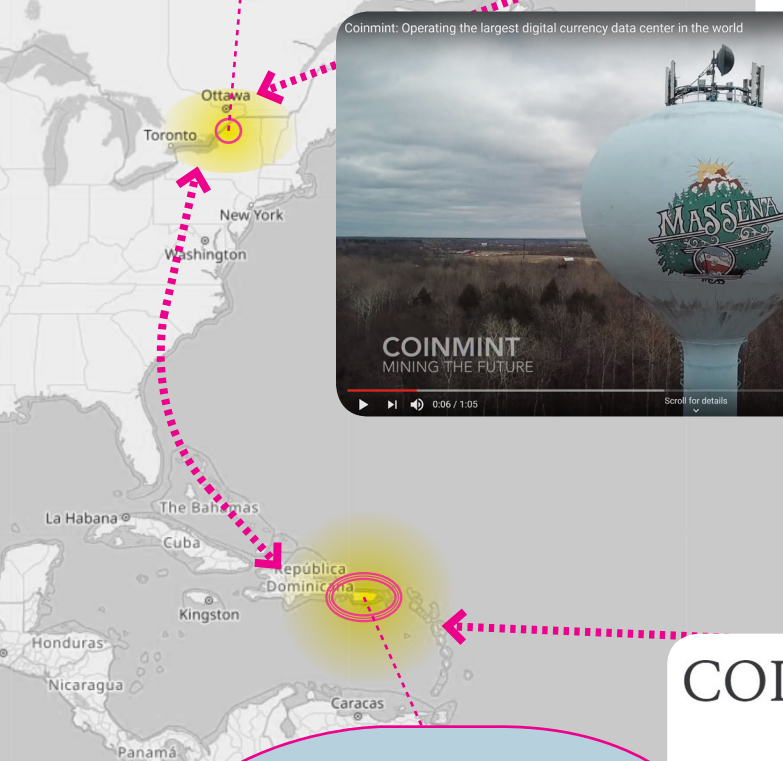
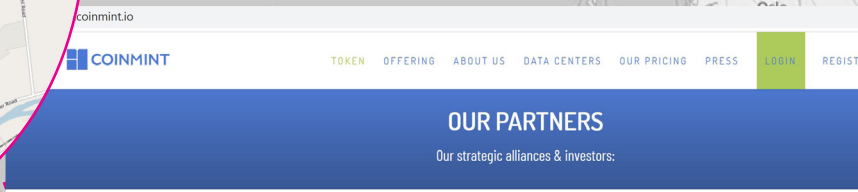
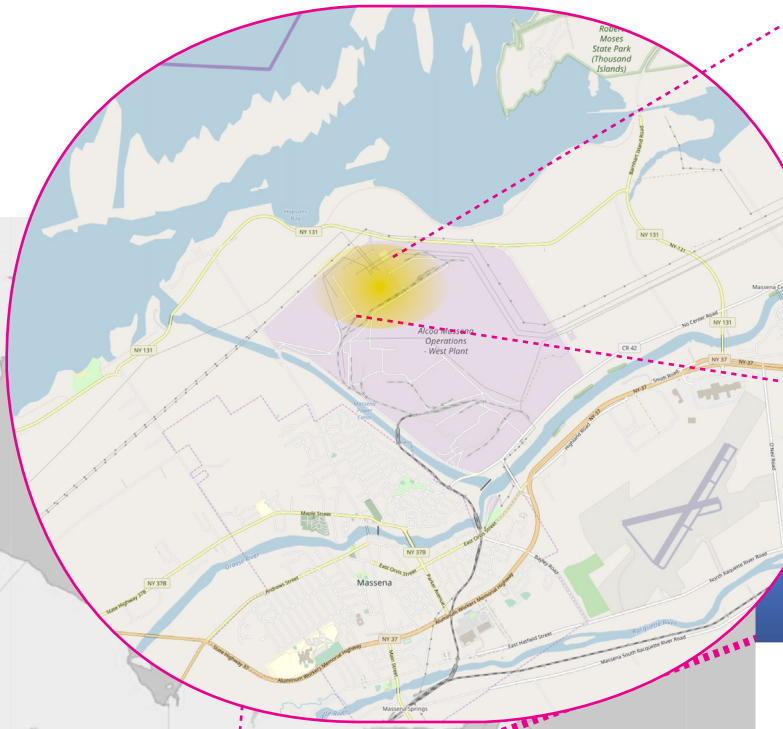
“We’re the tax playground for the rich,” she said. “We’re the test case for anyone who wants to experiment. Outsiders get tax exemptions, and locals can’t get permits.”

(Ex. cryptocurrency mining operations, production, incentivization)



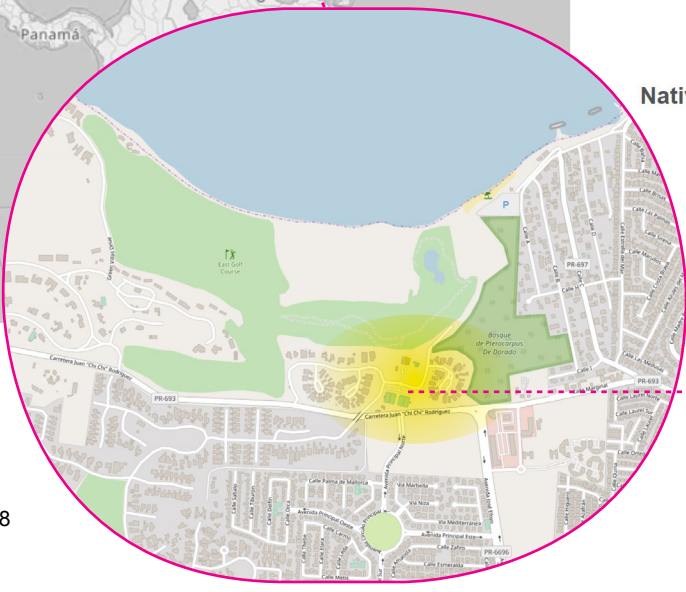


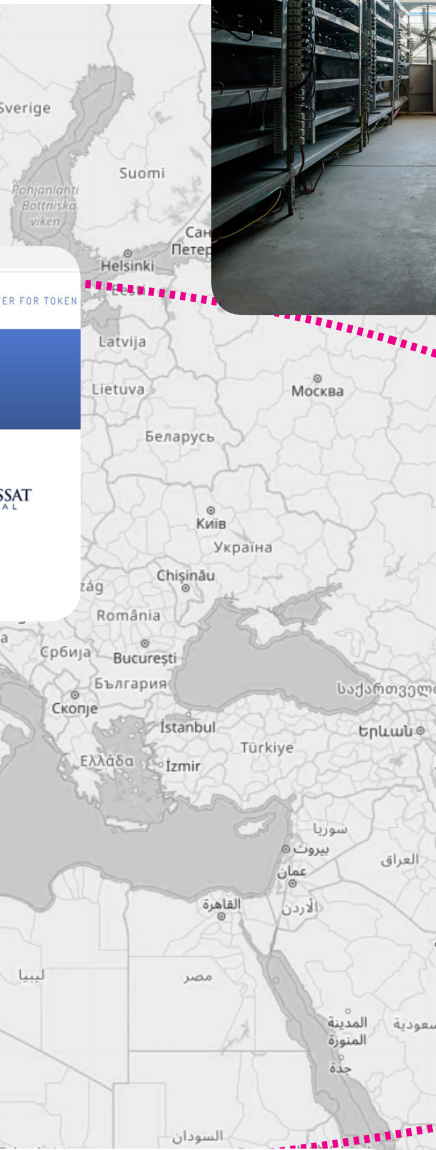
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COINMINT, LLC

Company Number 404023-1511
 Native Company Number 404023
 Status Active
 Incorporation Date 25 January 2018 (about 1 year ago)
 Company Type Limited Liability Company
 Jurisdiction Puerto Rico
 Registered Address 8 Dorado Beach East
 8 Dorado Beach East
 DORADO, PR 00646
 Puerto Rico





Mining For Free In
Puerto Rico - How To
Make Crypto Mining
Profitable

explordinaire
YouTube - May 17, 2018

BITMAIN

Antminer · Blog · Support

ANTMINER Z11

EXCEPTIONAL COMPUTING POWER
IMMENSE ENERGY SAVINGS

135K Sol/s

10.5J/K

12nm

Get

Sign in / Sign up

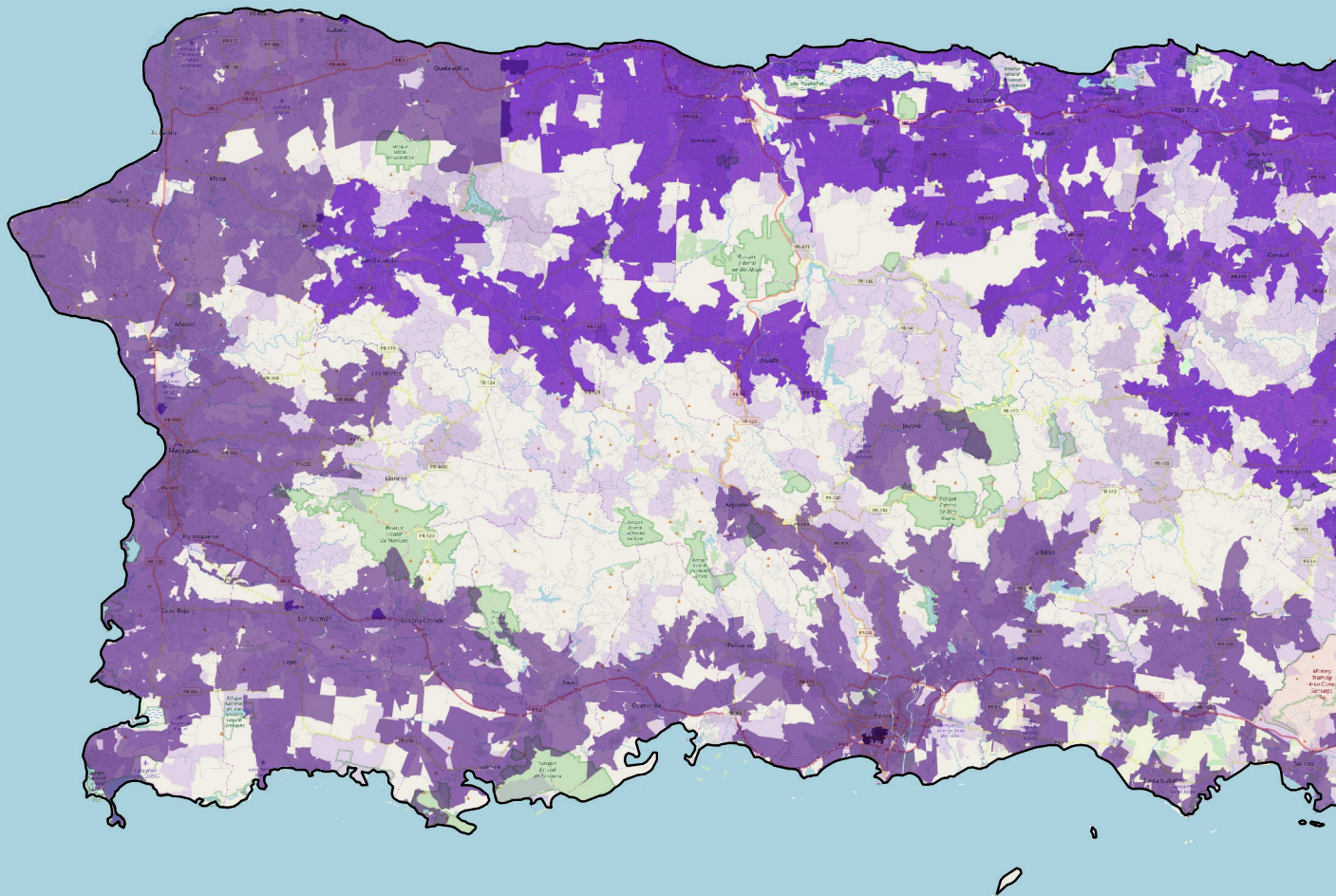
EN

Getbook page or Antminer Twitter page for full details.

Bitmain has released 2 sets of coupons to customers who have purchased

109

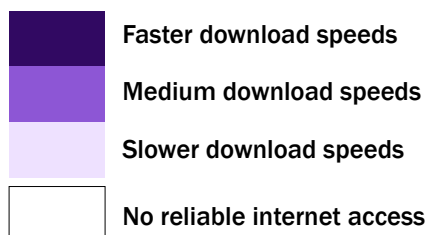
Digital Divide - Internet Access in Puerto Rico



Data Source: <http://map.connectpr.org/?q=map>
Source Year: 2014

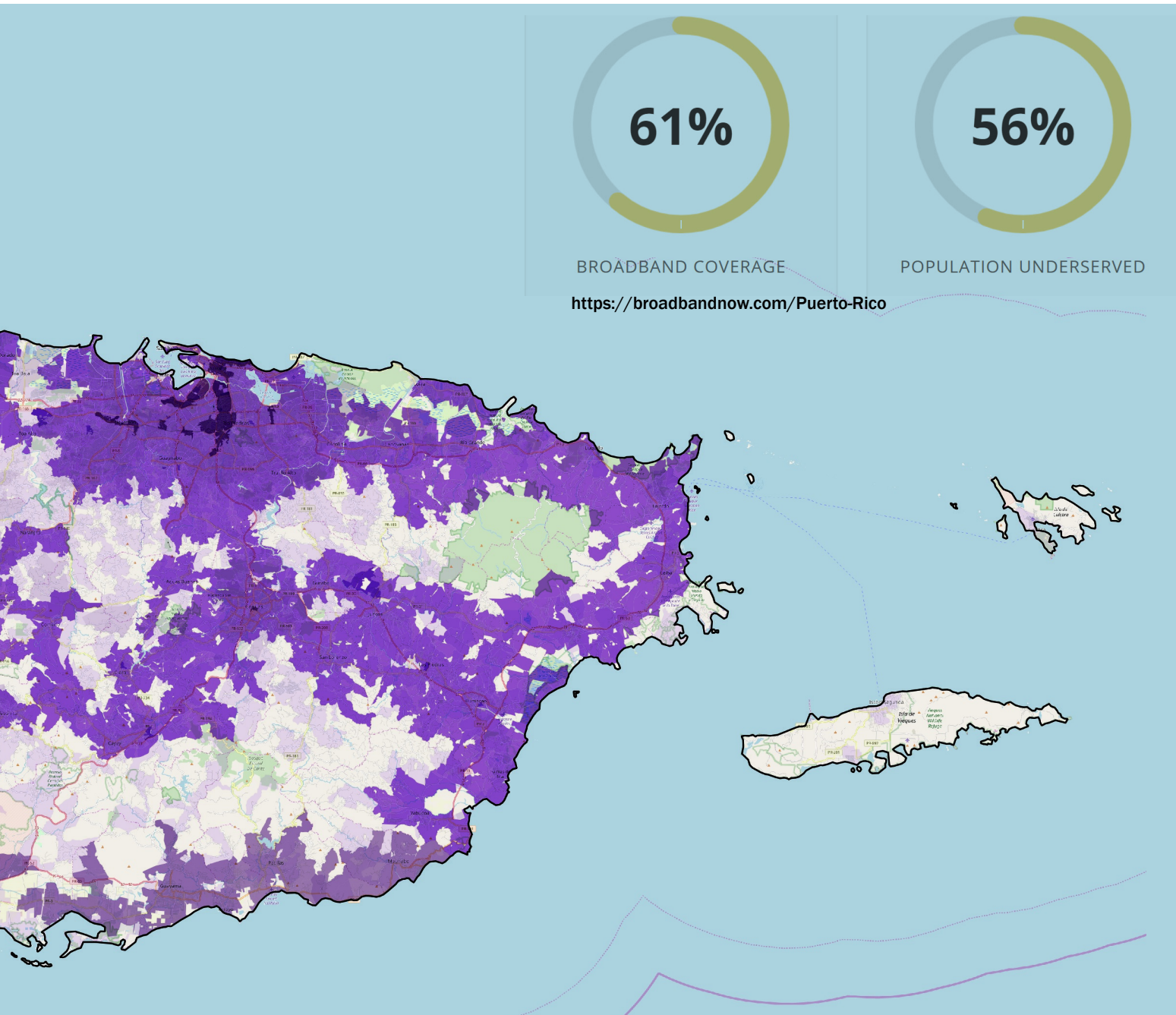
19.4 Mbps
average internet
download speed in
Puerto Rico

FCC defines "broadband"
as 25 Mbps download /
3 Mbps upload



More "urban," metropolitan regions

*More "rural," mountainous regions,
also Vieques, Culebra*



The current estimated population of Puerto Rico is 3,656,262 people.
About 35% of the estimated total population does not have any wired internet providers where they live.
<https://broadbandnow.com/Puerto-Rico>

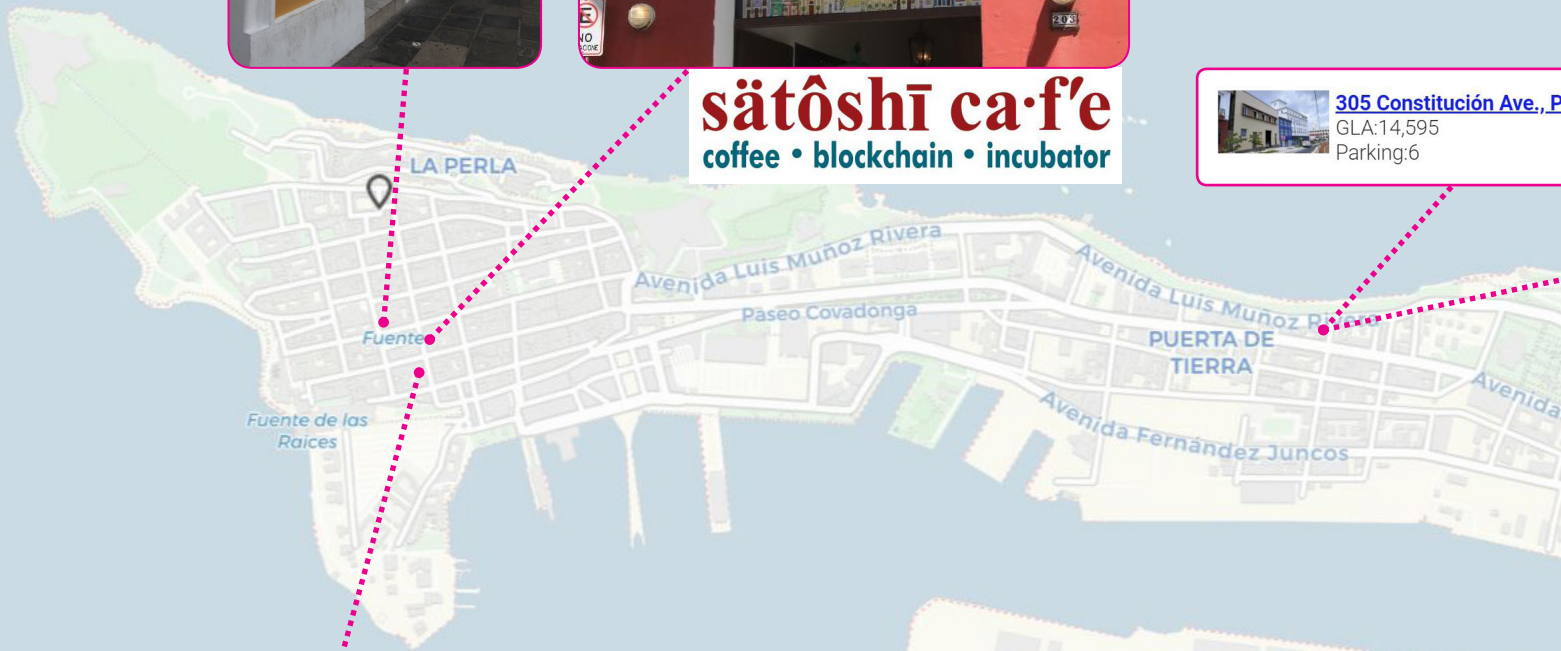
Distributed Cryptoeconomic Geographies - San Juan - City



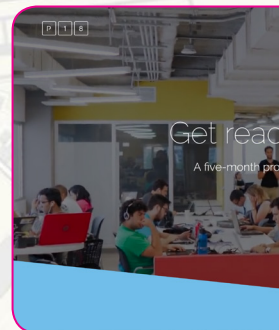
sātōshī ca'f'e
coffee • blockchain • incubator



305 Constitución Ave., P.R.
GLA:14,595
Parking:6

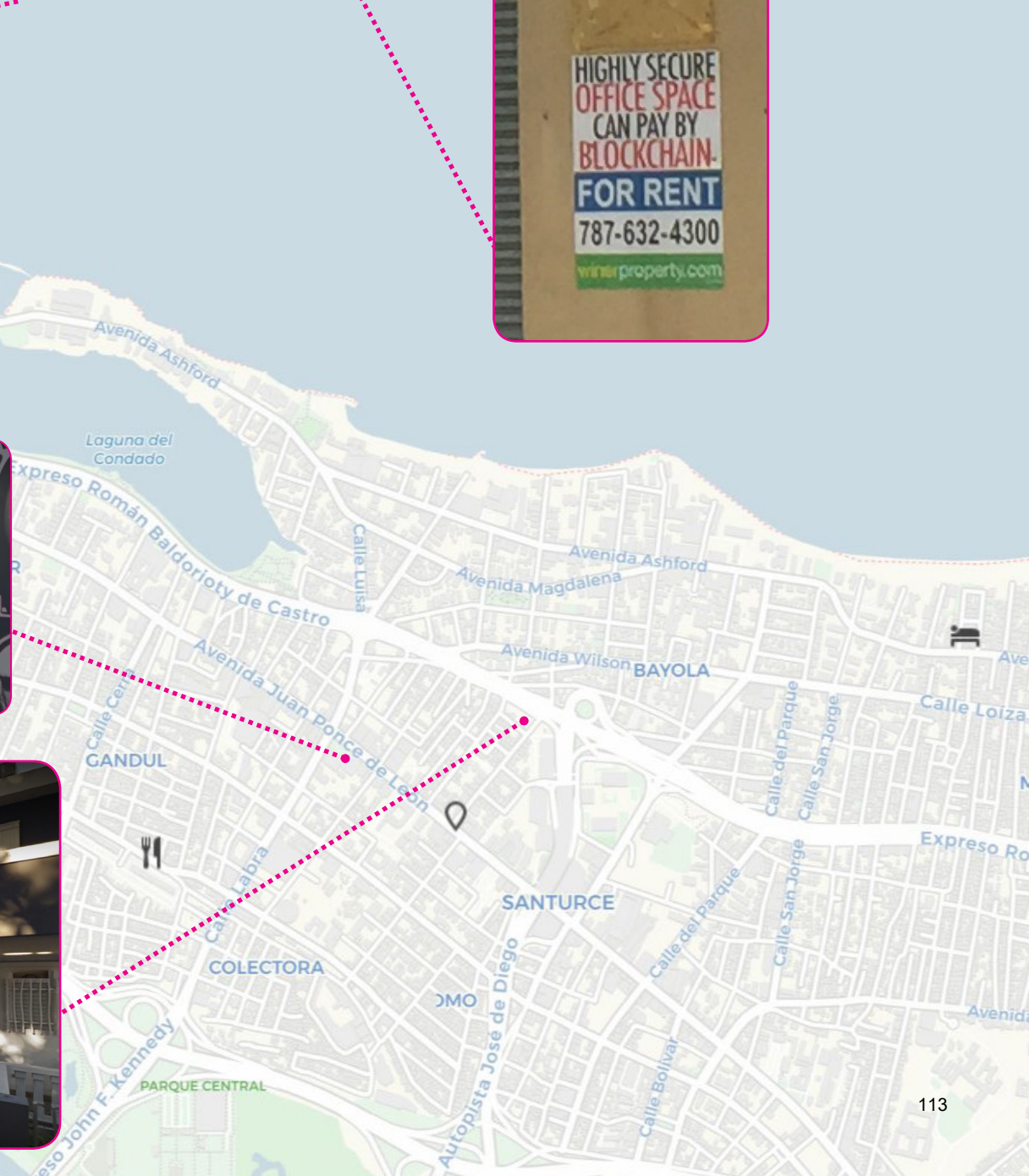
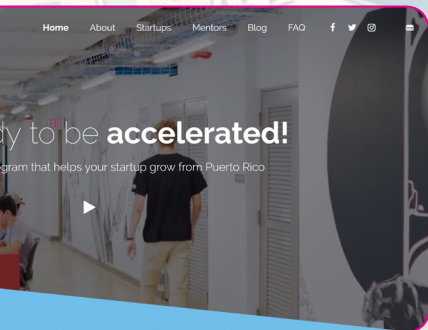


(L-R) Brock Pierce, Josh Boles, Robert Anderson speaking inside the Monastery Art Suites
Source: José Jiménez-Tirado for The New York



y Scale

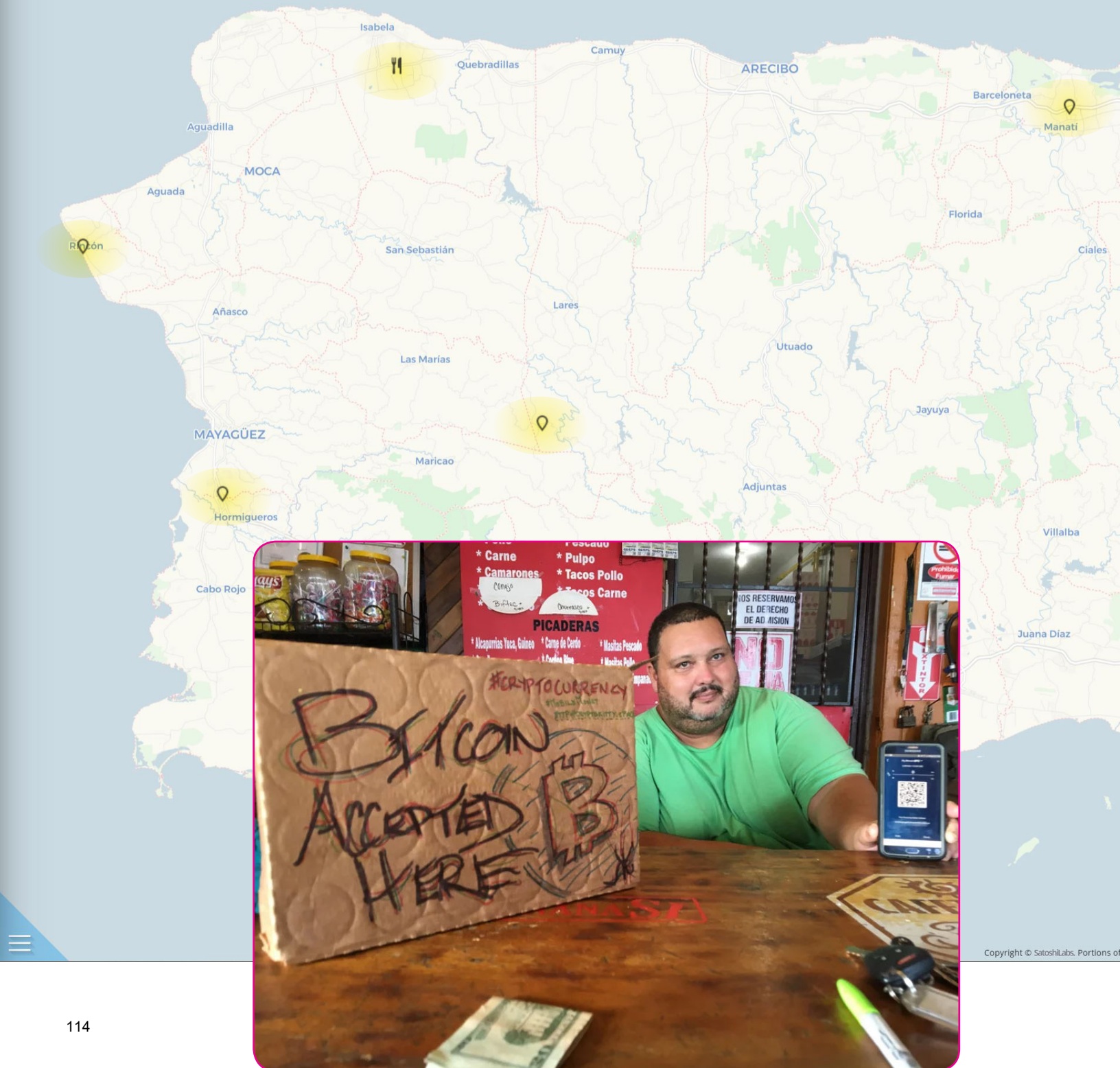
[Puerta de Tierra \(San Juan\)](#) ✕



Cryptocurrency as Mode of Exchange? - “Crypto-Friendly”

← → ↺ <https://xbtpr.com/crypto-locales/>

coinm

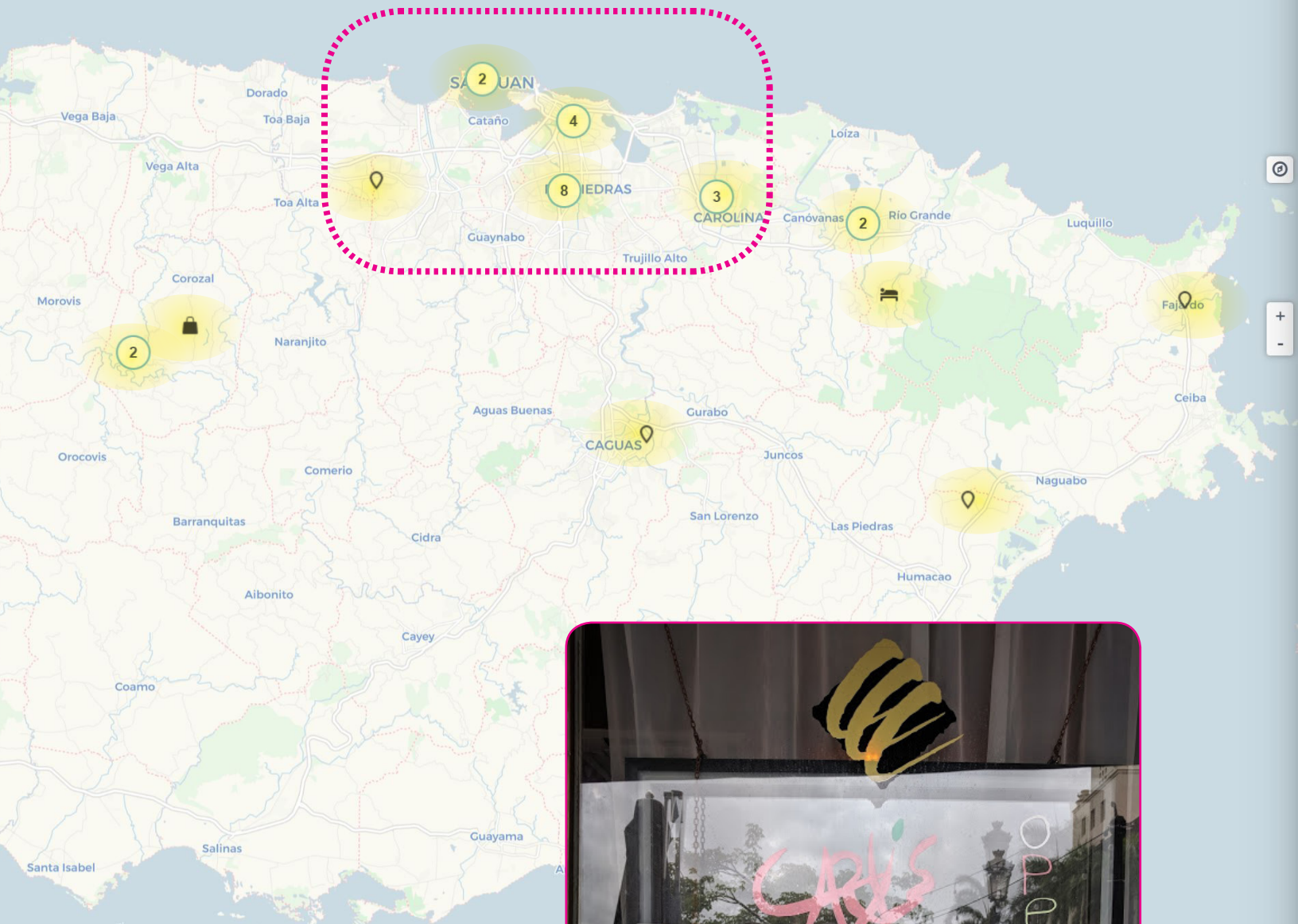


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What is COQUI CASH?

COQUI Cash is a community driven cryptocurrency that wants to expand the horizons of blockchain technology in Puerto Rico through creative and decentralized economic strategies, so that together we can forge a new path of open sourced community led development in the Island.



Cryptocurrency as Mode of Exchange? - “Crypto-Friendly”

← → ↺ https://xbtpr.com/crypto-locales/

Fasttech.com

- Shopping
- <http://www.fasttech.com>
- since 2/1/2017
- Online store accepting Bitcoin.

ACTIONS

Estancia Verde Luz

- Default
- Calle Norzagaray 150, 00901 San Juan
- Puerto Rico, United States
- +1-787-900-5096
- <http://bitcoinpuertori.co/listings/estancia-verde-luz>
- since 11/11/2013

ACTIONS

El Printing

- Default
- Piñero Avenue 1036, 00921 Puerto Nuevo
- Puerto Rico, United States
- (787) 756-6197
- elprintingpr@gmail.com
- <https://www.facebook.com/elprintingpr>
- fb.com/elprintingpr
- since 2/15/2018
- Signs & Banner Service · Shopping & Retail · Graphic Designer

ACTIONS

NocRoom PBX VOIP System

- Default
- Calle Alhambra 16-18, 00966 Frailes
- Puerto Rico, United States
- info@e.nocroom.com
- <https://nocroom.com>
- [@nocroom](https://twitter.com/nocroom)
- since 5/25/2016
- NocRoom Networks - PBX, VOIP, Colocation, Servers and VPS - Bitcoin Accepted Business

ACTIONS

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Locales - San Juan

ap.org

The map displays San Juan, Puerto Rico, with several locations highlighted by yellow circles and numbered 1 through 4. Each location has a corresponding information card. The map includes labels for various streets, landmarks, and bodies of water.

Location 1: OceanWalk Beach Apartm

- Lodging
- Calle Pacific 14, 00911 Santurce
- Puerto Rico, United States
- gvazquez1991@gmail.com
- <https://www.airbnb.com/rooms/35064>
- since 9/9/2015
- ACTIONS

Location 2: Dental office Dr. Pedro Pe

- Default
- Calle 110 110, 00983 Sabana Abajo
- Puerto Rico, United States
- +1 787 768 3500
- since 8/13/2015
- ACTIONS

Location 3: Audiolab

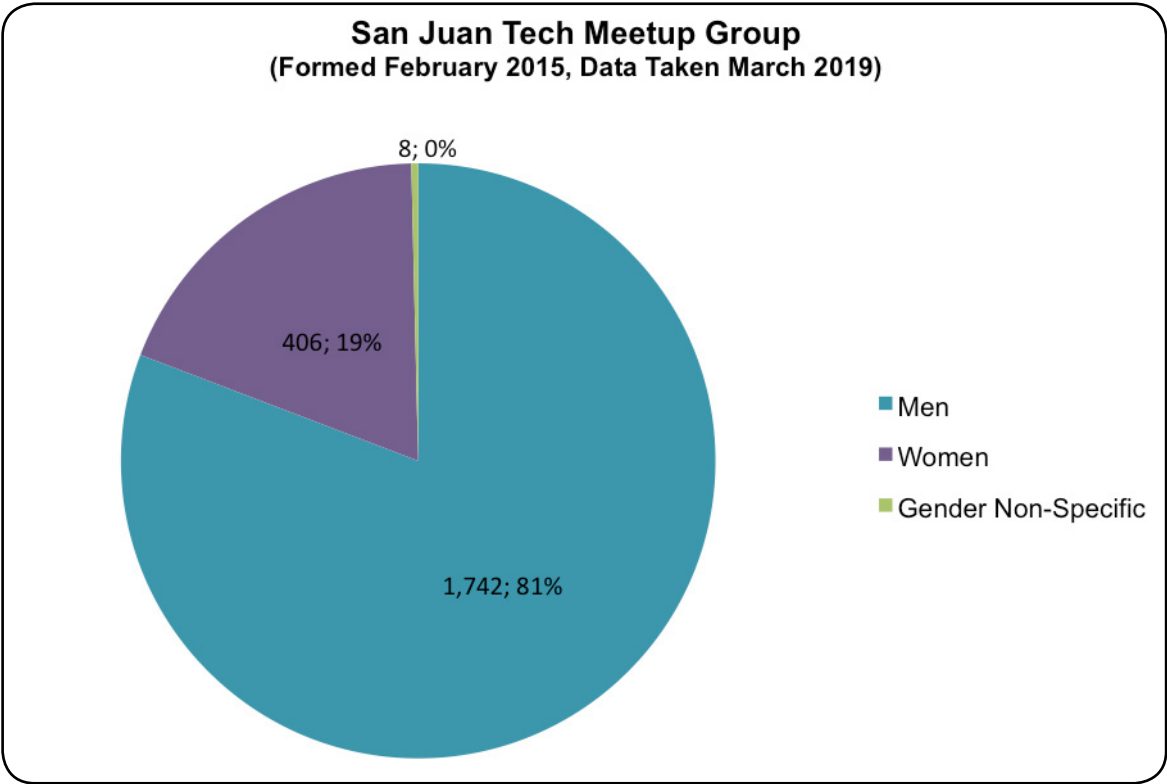
- Default
- Calle Via 63 5D1, 00983 Carolina
- Puerto Rico, United States
- 7875505428
- ddcuevasmail.compr@g
- since 6/6/2017
- Small project audio recording studio
- ACTIONS

Location 4: RÍO PIEDRAS

The map also shows other landmarks such as Laguna La Torrecilla, Laguna San José, and Laguna Grande. Streets like Expreso Román Baldorioty de Castro and Avenida Regimiento 65 de Infantería are visible.

data © OpenStreetMap contributors.

Digital Publics in San Juan - Tech Community



What we're all about

The San Juan Tech Meetup Group is a community of entrepreneurs, developers, designers, and marketers who meet regularly to connect all players in the local tech scene. We focus on networking, sharing ideas, and discussing a range of topics surrounding the tech industry.

SJTM would not be possible without the SJTM Advisory Board.




[Read more](#)

Past events (2)

WED, FEB 28, 6:00 PM

No Power. No Problem.

📍 Universidad del Sagrado Corazón

 52 attendees

THU, AUG 31, 6:00 PM



San Juan Tech Meetup

San Juan, PR
2,168 members · Public group
Organized by Isabel C. F. and 5 others

Share:

About Events Members Photos Discussions More


Join this group ...

About

San Juan Tech Meetup (SJTM) is for the art, design, university, and tech communities in San Juan, Puerto Rico. SJTM's goal is to connect creators in the creative economy (not only tech) through sharing, collaboration, and feedback. SJTM events cover a wide range of topics such as: entrepreneurship, art, education, and technology.

It wouldn't be possible without the active support and participation of our Advisory Board, which is composed of leaders of the Puerto Rican...

Organizers



Isabel C. F. and 5 others
[Message](#)

Members (2,168) [See all](#)

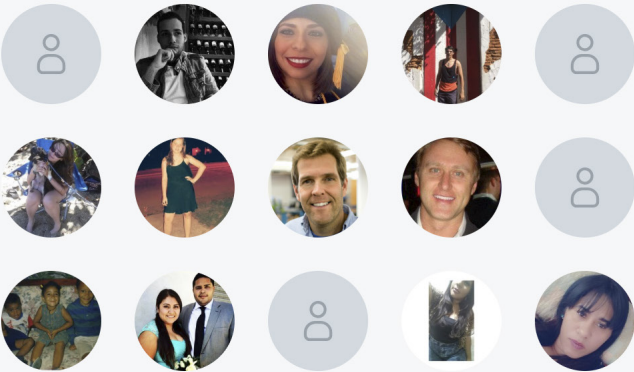
21) [See all](#)

00 PM

No Water. No Telecomm ...NOW WHAT?

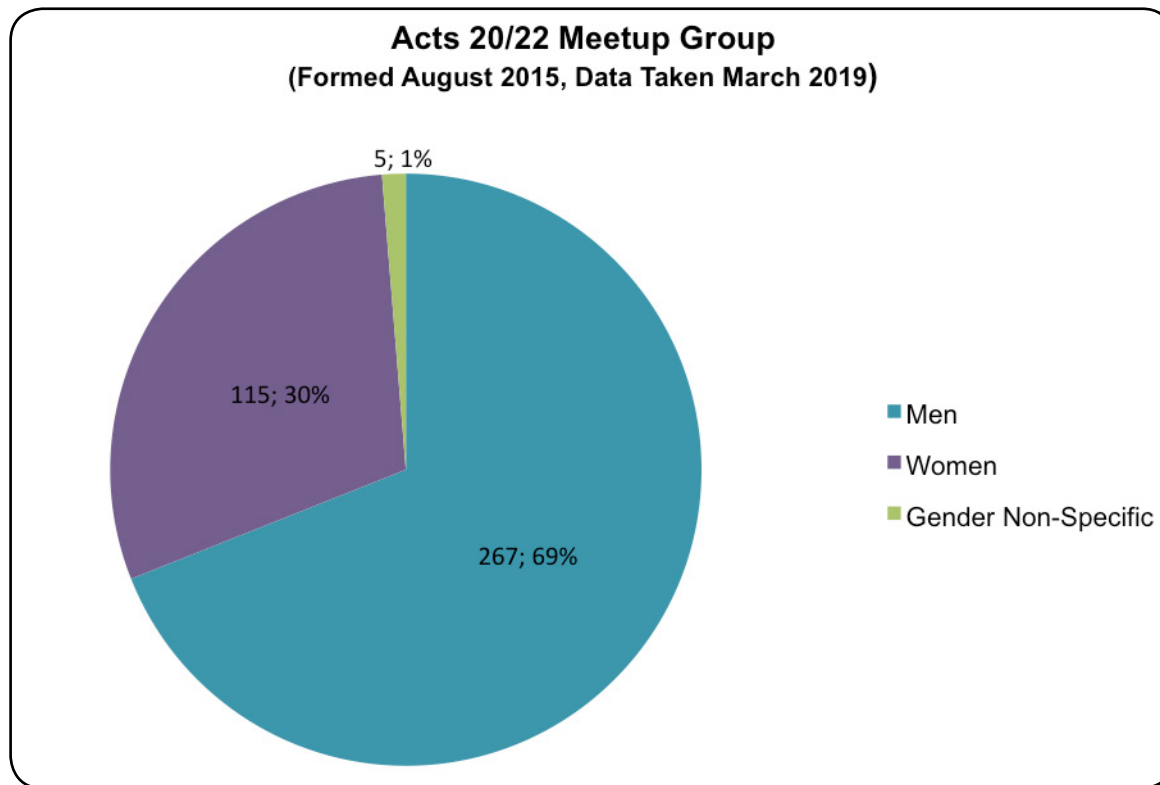
del Sagrado Corazón, Centro de Adiestramiento Profesional (CAP)

attendees



00 PM

Digital Publics in San Juan - Act 20/22



<https://www.dorado beach.com/real-estate-puerto-rico/act-20-22-tax-advantages>



RESERVE NOW

Take Advantage of Tax Incentives for Owning Real Estate in Puerto Rico

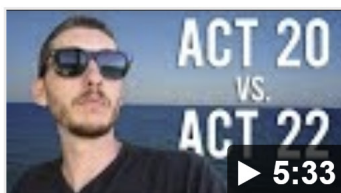
Extraordinary new tax incentives make living and working in Puerto Rico more enticing than ever before for U.S. citizens. They create a sense of urgency for investors to move to PR and bring their business here.

Act 20 and 22

In January 17, 2012, Puerto Rico passed legislation making it a tax haven for U.S. citizens that become residents of Puerto Rico. The tax laws, known as Act 20, the Export Services Act, and Act 22, the Individual Investors Act, shields new residents residing in Puerto Rico for at least half of the year from paying most federal income taxes. The U.S. Tax Code generously exempts Puerto Rico sourced income from federal tax and, under the law, residents pay minimal or possibly no taxes on interests and dividends, as well as capital gains. Additionally, property taxes are significantly lower than property taxes in the mainland U.S. Thus, making Puerto Rico a mecca for exportation of international services worldwide.

ACT 20 vs. ACT 22 - What's the Difference? - YouTube ✓

<https://www.youtube.com/watch?v=VHlgpOEKRal>



Apr 10, 2018 - Uploaded by Explordinaire

I get a lot of questions about the **act 20/22** qualifications, and many people struggle to grasp the difference between ...



The 20/22 Act Society

@the2022actsociety

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Create a Page

Like Follow + Create Fundraiser ...



The 20/22 Act Society

March 28 at 3:16 PM · 🌐

To all our members, thank you so much for attending the Cocktails & Compliance event in Viejo San Juan last Friday, March 22nd. It was a big success, and your participation meant a lot to us. You can check out the PowerPoint slides from our guests in The 20/22 Act Society Forums. See you again at our next event in April 2019!

8

Like

Comment

Share



Write a comment...

😊 GIF 🗨️



The 20/22 Act Society

March 26 at 11:58 AM · 🌐

Puerto Rico lures tech developers as hurricane season looms



About this website

FOXBUSINESS.COM

Puerto Rico lures tech developers as hurricane season looms

https://www.reddit.com/r/fatFIRE/comments/9gz1o7/has_anyone_looked_at_puerto_ricos_act_22/



reddit

r/fatFIRE

Search r/fatFIRE

SecularCryptoGuy 21 points · 6 months ago

I am a PR Act 20/22 guy.

This is what you need to know about whether you can benefit from this in your fatFIRE situation.

Prerequisites:

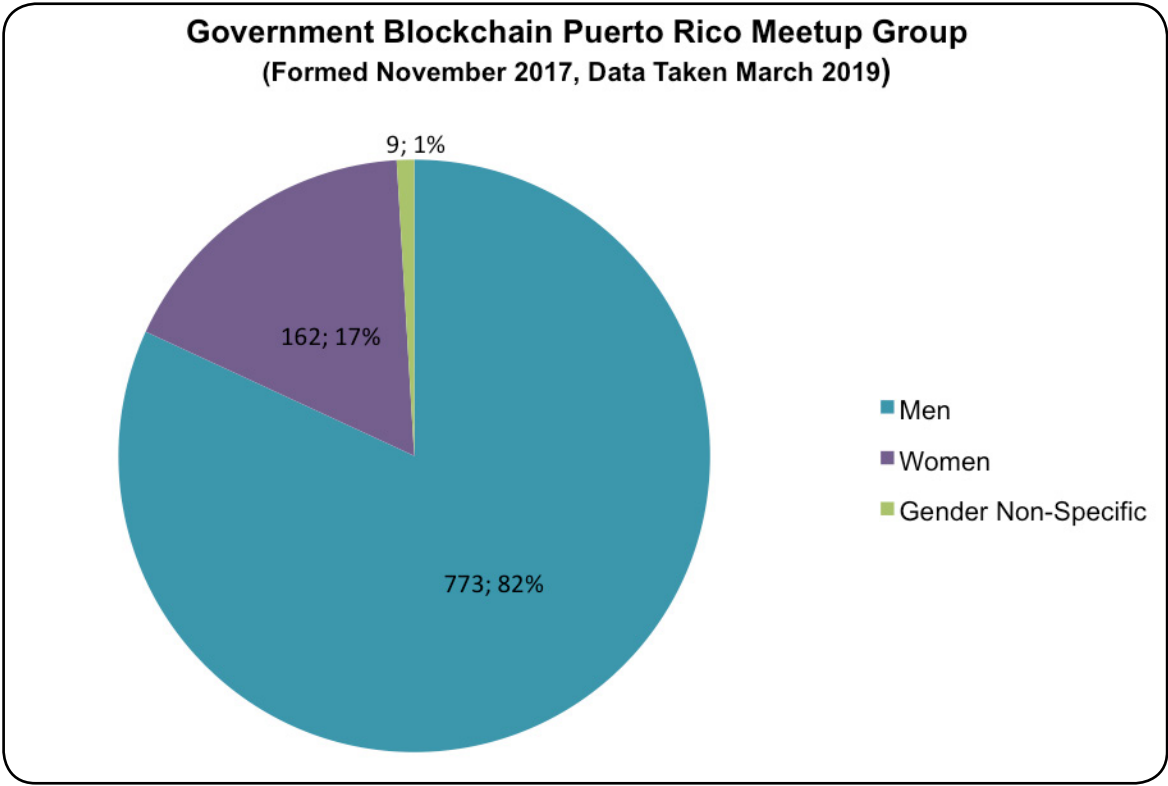
- Ability to live in PR. First read up more about life in PR, and then make up your mind if (everything else works out, then) weather you're willing to live in PR (for at least half a year). Keep in mind, there is rarely who comes visits the island and changes his mind in the other direction, nearly everyone realizes that they had much more negative opinion of the island than the reality.
- Having a business structure which can benefit from the Act 20 incentives. That is, if you can work from Puerto Rico but serve mainland customers (essentially, these acts are aimed at trying to get 'permanent tourists' from the mainland). If you are a digital nomad, remote worker, etc, you're good to go. If you are an entrepreneur with a dropshipping business, you're good to go, and so on.
- Or if you have assets which mostly gain value through capital gains (excluding real estate, which can be done, but for this statement, exclude it), like if you are a stock market trader, energies trader, derivative trader, then you should have moved to PR and apply for Act 22 yesterday. Seriously look into it.

Main points:

- You will be living on the island for at least 183 days a year. In addition to that you need to show close ties to the island (Like join the local clubs, have a lease here, have a car here, etc). Don't try to fake being here.
- You pay 4% corporate income tax in Act 20. You can work as a contractor for your own company, but you must pay yourself a reasonable salary. Which means your income tax won't be 4% but it could be around 10% (and keep in mind, this is not state income tax or federal income tax, we're talking about total income tax). If you have a legitimate business, then in order to benefit properly from this, you need to have all this work done FOR mainland clients, and ON the island. That means if your employees live on the mainland, then sorry this won't qualify.
- You pay 0% capital gains under Act 22. If you do trading for a living (Crypto or stocks) you should move here ASAP under Act 22. Keep in mind, you do have to pay \$5K per year to a charity of your choice on the island. Keep in mind no short term cap gains is an amazing deal. This is why majority of Act 20/22 people here are traders.

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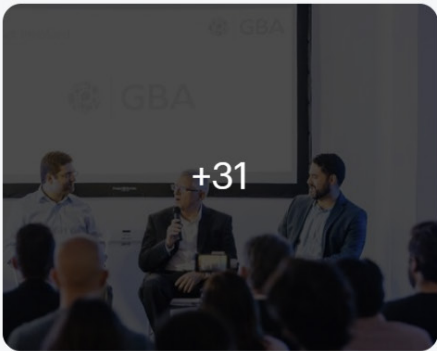


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THU, JUL 25, 7:00 PM

2019 GBA Topics

PILOTO 151



Some possible tracks or presentations for 2019 - open to participation: - A world without banks - Money without inflation - Money without borders - Money without fractional reserve banking (Hard Money) crowdsourcing government in lieu of tax...

2 attendees

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THU, MAR 7, 6:00 PM

2019 GBA Kickoff - IFE's, Financial Regulation and FinTech Opportunities

Piloto 151 Milla de Oro, Hato Rey



117 attendees

Digital Publics in San Juan - Blockchain Puerto Rico



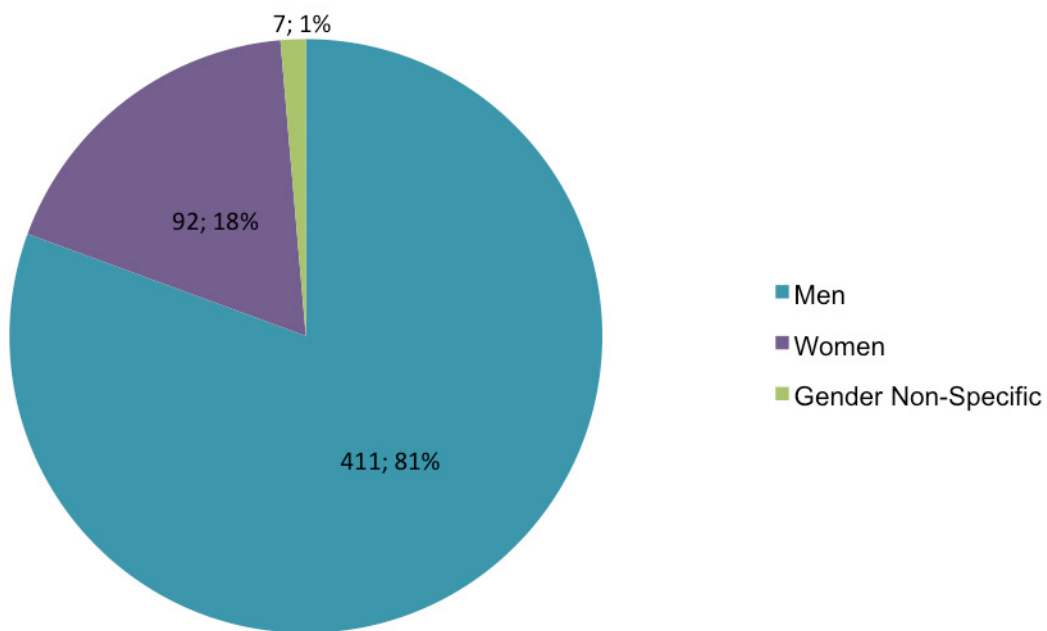
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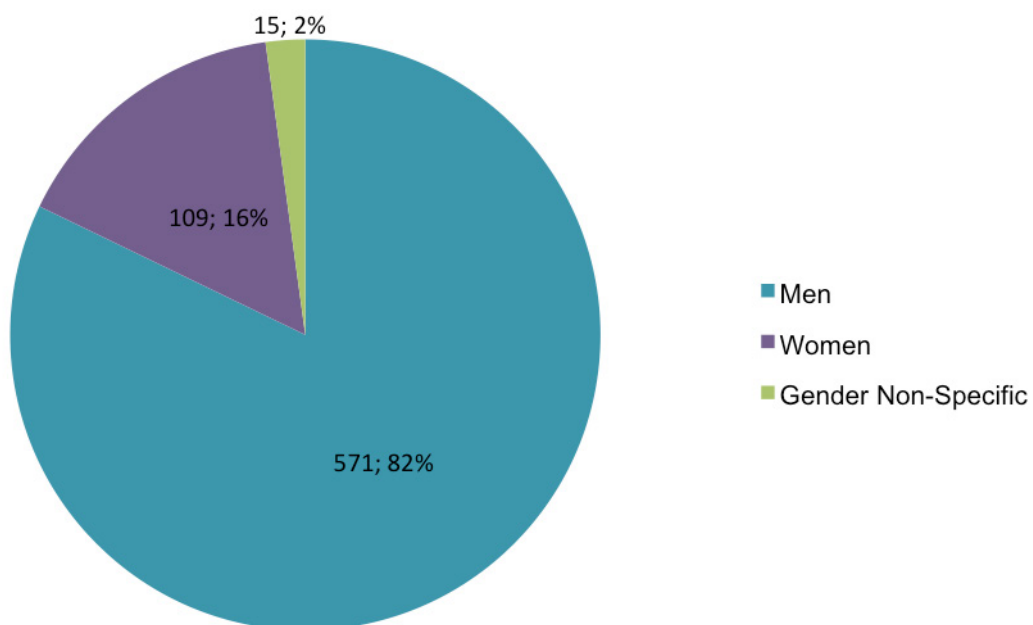
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Blockchain Puerto Rico is a community of people who use and develop blockchain technology to solve real-world issues. We seek to create a network of academics, professionals, and entrepreneurs who are passionate about blockchain. Whether you are a beginner or an expert, Blockchain Puerto Rico is here to help you.

Blockchain Puerto Rico Meetup Group
(Formed December 2017, Data Taken March 2019)



Puerto Rico Crypto Meetup Group
(Formed January 2018, Data Taken April 2019)



Blockchain Puerto Rico



San Juan, PR

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Blockchain Puerto Rico is an organization that is dedicated to promoting the development of blockchain technologies to solve contemporary problems. We support blockchain startups by providing them a network of professionals, and investors that can assist them with their projects. Whether it's an ICO or a blockchain startup, Blockchain Puerto Rico can help.

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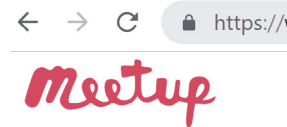
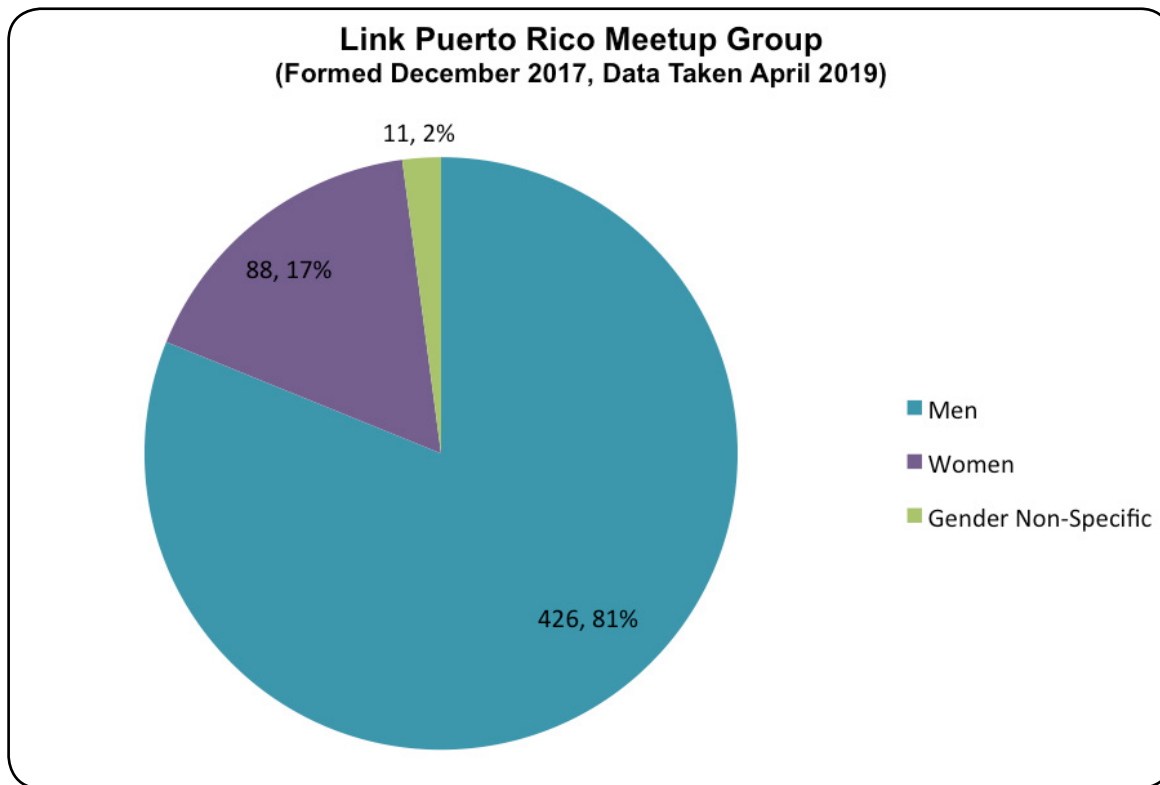
Wed, Jun 19, 6:30 – 9:00 PM



Delavida

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Digital Publics in San Juan - Link Puerto Rico



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Link Puerto Rico es una organización sin fines de lucro que educa, capacita y apoya a individuos y empresas en el área de STEM (Ciencia, Tecnología, Ingeniería y Matemática) mediante la educación y co-creación comunitaria. Esto mediante la creación, customización, distribución del contenido por

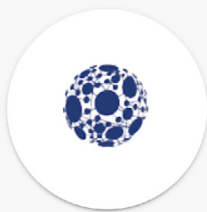
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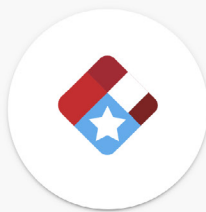
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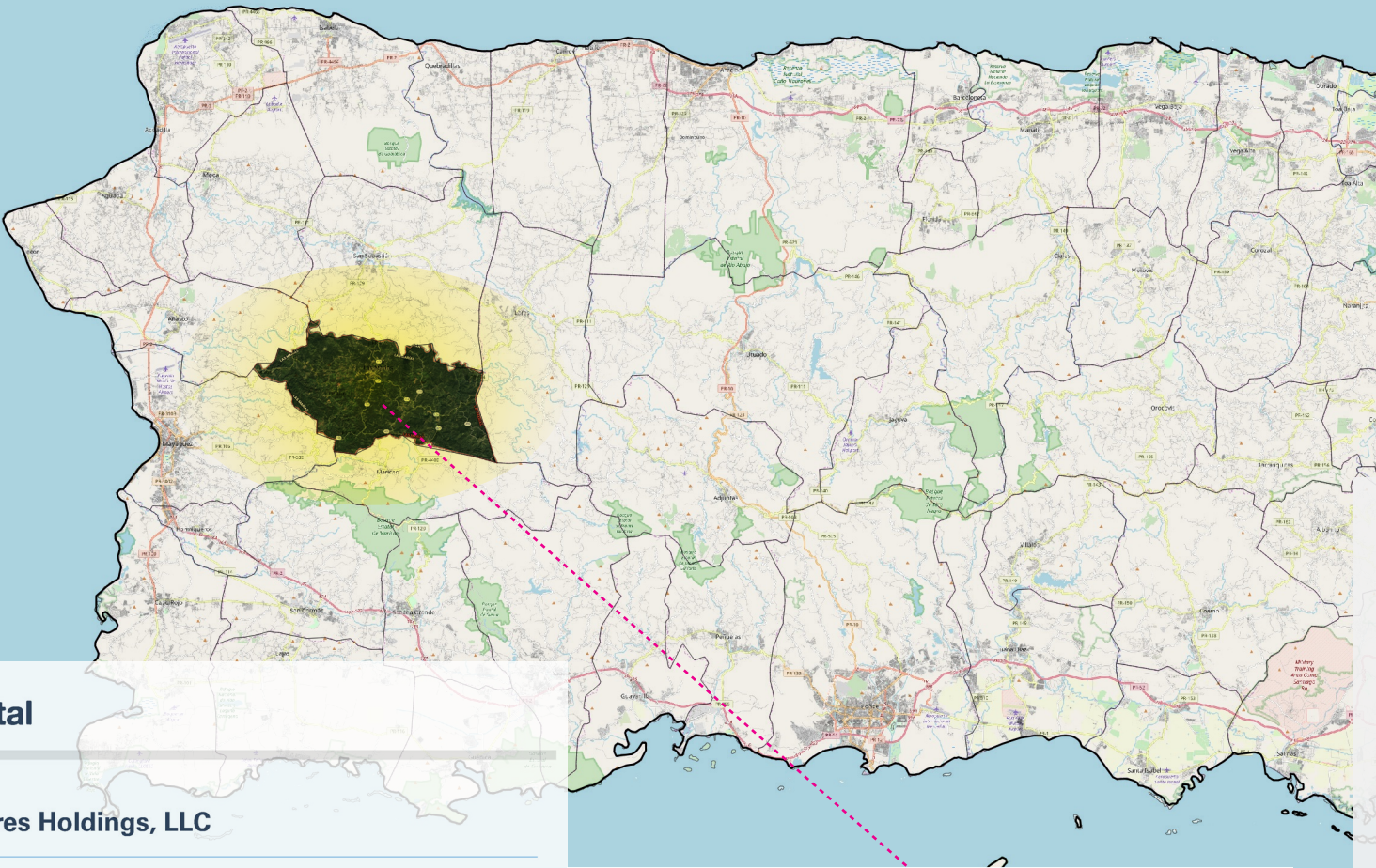
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Distributed Digital & Physical ‘Enclaves’ - Viejo San Juan Comunidad Re-Fund (Security Token Offering)



Green Acres Holdings, LLC

Green Acres Holdings LLC Series: Jose Mercado Farm , is one of a series of Puerto Rican limited liability companies established to acquire and develop agricultural properties. The Jose Mercado Farm development will have a crop portfolio with 2 acres of plantains, 25 acres of bamboo, 12 acres of turmeric, 20 acres of vanilla orchids, 10 acres of mangosteens, 10 acres of rambutan & 6 acres of longan.

The Fund's holdings will form a portfolio of properties whose value and cash flows will be increased through creative development and marketing seeking a sustainable return while preserving capital.

The value proposition for Puerto Rican agricultural land is compelling. Much of the prime farm land lies fallow, and with the local Puerto Rican and US Department of Agriculture incentives, opportunities abound. The Fund targets land that



Industry
Agriculture

Asset Class
Real Estate

Value of Investment
\$500,000 of Green
Acre Tokens
through an INPR
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Las Marias Sustainable Bamboo Processing and Exotic Fruit Farm

http://inportalusa.com/green_acres

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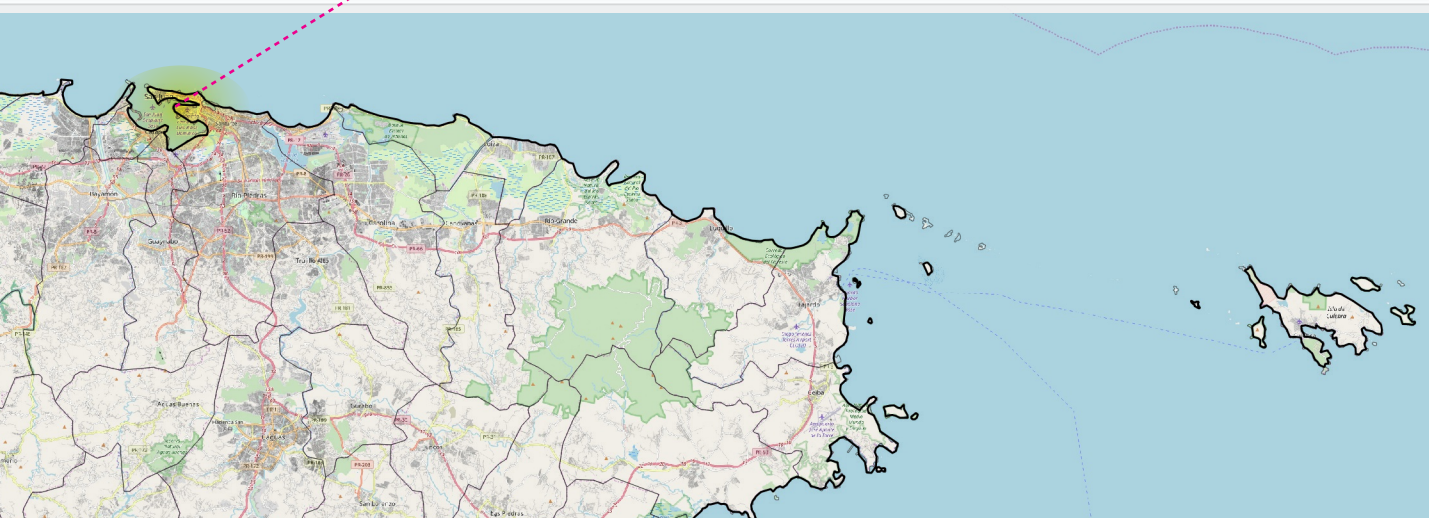

Viejo San Juan Comunidad RE Fund

The VSJ Fund is developing commercial real estate by repurposing buildings to match the needs of local business to further Old San Juan as a vibrant business center.

Industry: [Venture Capital Fund](#) | **Jurisdiction:** Cayman Islands

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Viejo San Juan Comunidad RE Fund is founded by resident Puerto Ricans on the belief that Old San Juan offers a unique opportunity for investment, with a lifestyle offering that will continue to attract new residents as arguably the most livable urban neighborhood in America. VSJ's channeling of investments into the Old Town will buttress the culture and lifestyle of this historical Caribbean setting. The founders of the Fund view the investments from a social impact perspective, while mindful of the IRR.

The Fund has targeted, and is in contract with properties for both redevelopment and current rental income. In particular, the Fund intends to redevelop a landmark building for the crypto/blockchain community.

Strategy / Model

There is a heady renewal going on in historical Old San Juan real estate. Old San Juan is a unique and distinct community from Greater San Juan. The Viejo San Juan Comunidad RE Fund will focus on commercial properties in Old San Juan and Paseo de Puerta Tierra with opportunistic investments in residential properties, and in farmland to provide a regular pipeline of organic produce for VSJ residents and restaurants.

The VSJ Fund is differentiated by its strategy of matching building development to end users. As an example; a 17,000 sq ft ocean view warehouse is being renovated by a new rum distillery as a tourist destination for the cruise port. The Rum company is financing the renovation of the building with an agreed upon mark-up to The VSJ Fund and a long-term lease to the VSJ Fund. The strategy being not to develop or invest in properties that are pre-leased/sold.

A cornerstone investment of the Fund is a property with commanding presence in the heart of Viejo San Juan to cater to the crypto/blockchain community, offering premium office space at current market lease rates. This target has not entered into contract pending lining up companies to lease the space. Complementing the urban properties is the purchase 44.6 acres (48 cuerdas) of excellent fallow farmland in Las Marias, about 25 minutes from Mayaguez to grow organic produce for sale at the Mercado Agrícola Natural in Viejo San Juan, thus adding an element of urban self-sufficiency. This property is in contract and is an exception to the pre-lease strategy, but at it is being funded through an EB-5 investment, it will create 10 full time jobs.

While the Fund is acquiring properties for current cash flow, rejuvenation and capital appreciation following a portfolio optimization approach, there is also a conscious impact investment aspect to the Fund. The partnership with Mercy Zayas, founder of Value Added Commercial Real Estate Services, PSC, the Fund has access to several "off market" properties and benefits from Mercy's decades of experience in the neighborhood, the Fund a competitive advantage. Target acquisitions are posted in the Fund's data room on InPortal: http://inportalusa.com/viejo_san_juan_re

ANALYSIS



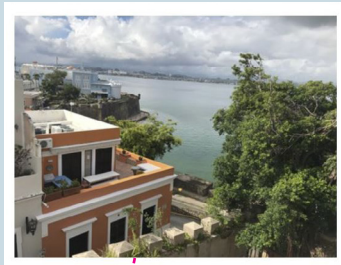
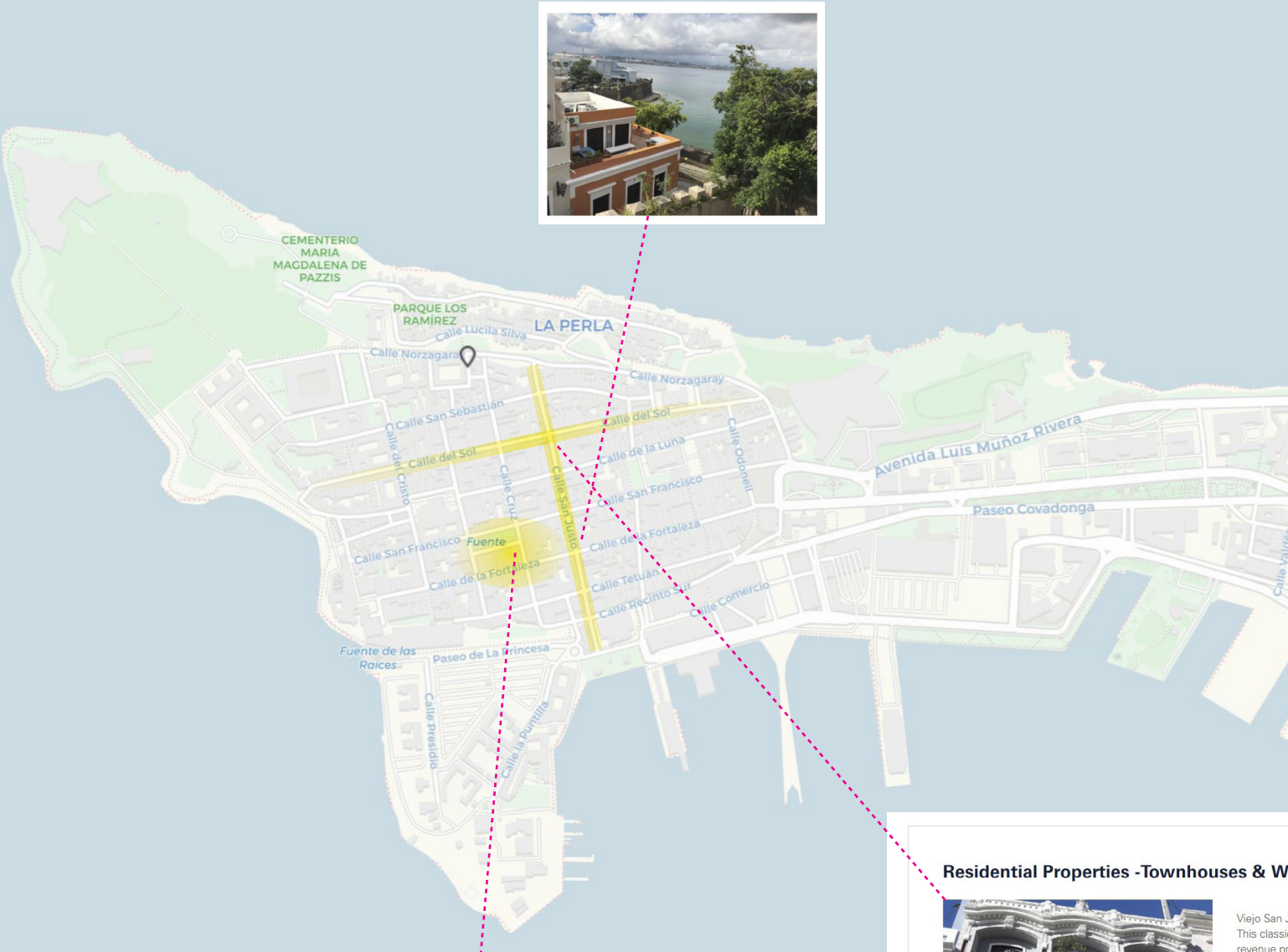
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Distributed Digital & Physical ‘Enclaves’ - Viejo San Juan Comunidad Re-Fund (Security Token Offer)



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The Gonzalez Padin Building -The Future HQ for the VSJ Fund

The Gonzalez Padin Building has a commanding presence over Old San Juan on the south corner of the Plaza de Armas. It has been touted as a global headquarters for virtual currency banks and blockchain enterprises. Until last year the government was the biggest tenant, and after the downsizing, the 88,000 square foot building is now half vacant. Surprisingly with just Marshalls as an anchor tenant and the roof top cell towers, based on the \$12 million asking price, the Gonzalas Padin Building has a 9pct yield.

The VSJ Fund has completed extensive due diligence on the building and is aware of other parties making offers. VSJ Fund will be in a strong position to purchase this property once discussions with a major new tenant capable of leasing out 30,000 sq ft of vacant space are concluded.

The VSJ Fund intends to move its headquarters to the 7th floor where the view from the balcony is the highest point in Old San Juan.

The due diligence is available in the InPortal deal room by Applying for Membership



Residential Properties -Townhouses & W



Viejo San Juan
This classic
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giving it an
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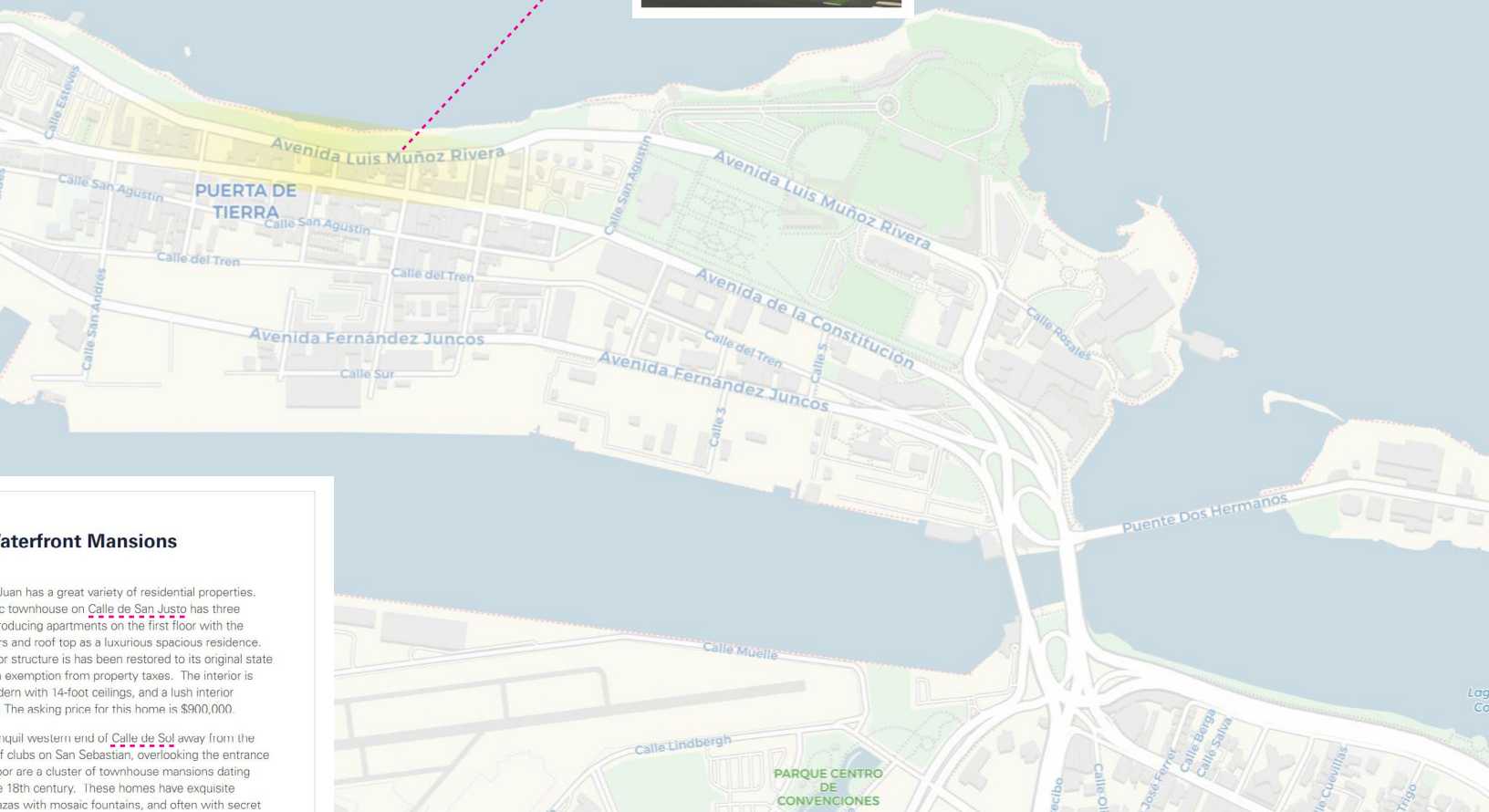
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Artesano Rum Distillery Build Out in Paseo de Puerta Tierra



VSJ is entering into contract with Artesano Rum to purchase and build out for leaseback a 17,000 sq foot historical warehouse in Paseo de Puerta Tierra with ocean views, minutes from the cruise ship terminal which brings as many as 10,000 passengers a day. This project has a built in return on the construction and renovation which includes a distillery, a warehouse for aging the casks, a rum bar and restaurant, and a souvenir shop. The target date for completion is May 2019. Details are available in the deal room by Applying for Membership.



Waterfront Mansions

San Juan has a great variety of residential properties. A historic townhouse on Calle de San Justo has three floors and roof top as a luxurious spacious residence. The structure has been restored to its original state and is exempt from property taxes. The interior is modern with 14-foot ceilings, and a lush interior garden. The asking price for this home is \$900,000.

On the quiet western end of Calle de Sol away from the party clubs on San Sebastián, overlooking the entrance to the harbor are a cluster of townhouse mansions dating from the 18th century. These homes have exquisite tile floors with mosaic fountains, and often with secret passages to the street. Most have cisterns under the floors where rain water is collected and are currently used as a backup water supply. What really sets this historic architecture apart are the terraced roof tops with panoramic views to watch the ships come and go through the

Membership to access the VSJ Deal Room.

Distributed Digital & Physical 'Enclaves' - Viejo San Juan Comunidad Re-Fund (Security Token Offer) *Technically Public, Actually Private*



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Step 2
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Chapter 3 – Resistance and Contestation: Alternate Techno-Economic Visions

In this chapter I discuss the resistance and contestation against crypto-colonialism and economic injustice in Puerto Rico, and highlight strategies for resistance both with and without digital technology. I discuss a number of contesting visions for the economic future of Puerto Rico, and the different groups who hold these visions. From a feminist perspective, I address who each of these economic visions seek to benefit, and who are excluded. For techno-economic strategies posed as being “emancipatory”, I break down the claims, citing varied case studies from around the globe. In relation to Puerto Rico I specifically consider two models – blockchain-based businesses vs. platform cooperatives. I address the challenges, constraints, and feasibility of each as they relate to the political, social, and cultural context of Puerto Rico. By briefly analyzing a number of case studies from outside of Puerto Rico that aim to combine blockchain with platform cooperatives, I question if the inherent or embedded politics of blockchain technology are compatible with those of cooperativism. I conclude with a number of speculative future scenarios for how these strategies may play out in Puerto Rico, and what their consequences may be.

There are two separate but related issues that I address in this chapter when talking about resistance and contestation. One is resistance and contestation against crypto-colonialism, the exploitation of Puerto Rico’s land and laws to disproportionately benefit high-net worth individuals affiliated with cryptocurrency, notably the group looking to build a “crypto-utopia” in Old San Juan. Additionally, new blockchain businesses, startups, and accelerators are increasing Puerto Rico, and while there are key exceptions with local companies, many act in isolation to their surroundings, not taking into consideration what communities actually need or want. At the same time, blockchain is posed as an “emancipatory” technology, but in this chapter I question what this really means, both globally, and in the context of Puerto Rico. The second issue is a wider systemic problem: the economic inequality that comes with over 500 years of colonialism. Under the United States specifically, Puerto Rico’s economy has undergone a number of intentional, planned transformations over the years, each time structured to benefit United States and foreign capital interests over the native people of Puerto Rico. The current crypto-craze and blockchain-buzz has landed in Puerto Rico in alignment with its most recent economic transformation towards a new techno-economy, oriented around digital export services.

United States Driven Economic Transformations in Puerto Rico

During United States colonialism, Puerto Rico has undergone three major economic transformations via intentional economic policy implementation from the United States and local Puerto Rican government. This is a highly complicated and nuanced topic that I will only briefly summarize, but for a deeper understanding I suggest listening to the podcast Puerto Rico Forward by Andrew Mercado-Vázquez and hosted by Democracy at Work (<https://www.democracyatwork.info/prforward>), as well as reading academic papers by José Caraballo-Cueto and Juan Lara, economics professors at the University of Puerto Rico (Caraballo and Lara 2018). The first major economic transformation was in the project of modernization and industrialization during the New Deal Era and under President Franklin D. Roosevelt’s appointment of Governor Rexford Guy Tugwell. Industrialization was seen as an economic political project, spurring the growth of the private sector while increasing urbanization in the form of large shopping centers, construction of highways and roads, industrial factories, apartment housing projects called *urbanizaciones*, as well as hotels and waterfront development. The Roosevelt era project of state capitalism in Puerto Rico faded, but the drive toward industrialization continued regardless. Economic growth and efficiency soon became the primary goals for policymakers. Quantifiable, measured and metricized statistical results (data) were prioritized over non-monetary, qualitative social issues. Andrew Mercado-Vázquez explains how this makes sense, considering the dominant economic theories that were influencing the Popular Democratic Party (PPD) were classical/neoclassical economics and methodological individualism.

The PPD political program had increasingly promoted industrialization as a goal. Increased effort beginning in 1945 made it more enticing for mainland investors influenced by classical and neoclassical

economics which puts forth that self-interested behavior in the context of a competitive economic market is the way to achieve socially desirable results. This economic ideology became the foundation of a series of laws and tax policies "Operación "Manos a la Obra" (1947)" - or Operation Bootstrap (see also Berman 2000). Muñoz really believed that trickle-down economics could benefit all classes. The logic was that if US capital is necessary to attain rapid growth and output, and if rapid growth and output was to help Puerto Rico's economy, the strategy would be to make it attractive to US investment. However, the private sector had already destroyed the government subsidiaries, and the project of a government capitalist state was unsuccessful, so the next step was to try to help direct the private sector work in favor of Puerto Rico's interests, rather than attempt to resist its natural inclinations. In 1948, a year after Muñoz's election the Puerto Rican legislature passed the Industrial Incentives Act, a bill that allowed qualifying businesses to be exempt from property tax, excise tax, municipal tax, license fees, insular income tax for 10 years followed by partial exemption for 3 years. This was complemented by subsidized workspaces and low interest loans offered by the Puerto Rican government. This worked together with the already existing Section 931 from Internal Revenue Code, which allowed corporations to exclude income generated by subsidiaries in Puerto Rico. Together, the US Government and Puerto Rican government set up the most favorable conditions to attract private investment.

For as attractive as the tax benefits were, so were the lower wages that could be paid - in 1950 the hourly wage in manufacturing in Puerto Rico was 28% of that in the mainland US. At the time, prices for goods were higher in Puerto Rico than those in the US. US firms had no incentive to raise wages because their output was destined to consumption in the mainland. But in the 1960s policymakers in PR looked to raise wages by shifting to capital intensive firms/industries (characterized by being a system of production that relies on capital heavy assets such as land, buildings, plants, equipment, machinery) rather than labor intensive practices (such as agriculture, mining, hospitality/food service). The goal was that capital-intensive firms would purchase their raw products/goods from local firms (leading to indirect employment). Local businesses would then purchase the outputs from the capital-intensive firms, hypothetically establishing a locally beneficial circuit of capital. What actually happened, however, was that capital-intensive firms arrived in Puerto Rico with already established production and distribution networks in the mainland United States. These enterprises did not have any interest in shifting their supply chains to support a more local economic circulation. Furthermore, with the reduction of labor-intensive firms came a decrease of employment opportunities in these jobs. Mercado-Vázquez explains, "as wages on the island increased and other emerging sectors began to industrialize, the manufacturing jobs that had attracted so many Puerto Ricans from the countryside began to disappear. [...]" Unemployment rates on the island were persistently higher than in the U.S., pushing hundreds of thousands of Puerto Ricans in mid-century and beyond to leave the island for better economic prospects on the mainland."¹ A migration to the mainland United States occurred as a result.

Meanwhile, corporations found a way to completely avoid taxes. Corporations could not repatriate profit from Puerto Rican subsidiaries until the end of the exemption period, so they would accumulate profits until the very end, and then liquidate the Puerto Rican subsidiary company, and have the parent company absorb it, thus escaping all tax from Puerto Rico and the US. Catching on to these tax skirting practices led to the 1976 Federal Tax Reform Act which replaced Section 931 with Section 936. This allowed subsidiaries to remit their profits to their parent company without payment of Federal Corporate Income Tax. Their only obligation was to pay a "tollgate tax" to the Puerto Rican government on any dividends paid to the parent company. The colony's economy at this point sufficiently revolved around buying *from* the US, and producing *for* the US.

This dovetails into the second major economic transformation for Puerto Rico under the United States: deindustrialization, the response with manufacturing and pharmaceutical tax incentives, the rescinding of those incentives, and the public debt crisis. In 1976, Congress passed Section 936 of the federal tax

¹ See also: <http://lcw.lehman.edu/lehman/depts/latinampuertorican/latinoweb/PuertoRico/Bootstrap.htm>

code², granting U.S. corporations a tax exemption from income originating from U.S. territories. Manufacturers, most from the pharmaceutical industry, came to Puerto Rico for the tax benefits as a result. The archipelago enjoyed an economic boom period until the tax incentives were phased out in 2006 (Congress voted in 1996 to rescind them). Without the tax incentives, most pharmaceutical companies left the archipelago, and since 2005, Puerto Rico has seen negative growth eight out of 10 years³. Puerto Rico has since had a net population loss of 64,000 in 2014, according to the Pew Research Center⁴. In April 2015, the archipelago had for the first time in history, more Puerto Ricans living in the mainland United States than on the archipelago⁵.

According to Caraballo and Lara (2018), "By 2005 the central government acknowledged the existence of a structural deficit approaching 2% of gross national income and debt rating agencies began to press for corrective action and threatened to downgrade the government's bonds." Without incentives, US investors had other globalized trade connections to go to. Caraballo and Lara conclude, "Using econometric analysis, we found that Puerto Rico's government indebtedness is, to a large extent, connected to a sharp decrease in manufacturing employment (i.e. deindustrialization) suffered by this economy, and weak evidence that it was caused by an excessive government payroll or overgenerous federal programs."

People from outside of Puerto Rico are quick to victim blame Puerto Rico for its own crisis. Mercado-Vázquez points out that "one of the most repeated and falsely affirmed justifications for holding Puerto Rico fully responsible is its supposed fiscal mismanagement and corruption. However, this reasoning is flawed." Quoting Caraballo and Lara (2018):

To persons unfamiliar to Puerto Rico's economic history, most persons in fact, it may come as a surprise that the island had been a model debtor in the municipal bond market for decades. It is only since the mid-2000s that the Commonwealth's credit image has been tarnished. As with Greece, casual observers are quick to blame this fall from grace on rampant fiscal mismanagement. Fiscal mismanagement certainly played a significant role, not because there is any evidence that recent authorities managed worse than those in charge in the 1970s or 1980s, but in the sense of not adjusting in a timely fashion to the structural change of the economy. Contagion was also to blame in part. The first real plunge in the value of the Puerto Rican bonds followed soon after Detroit's default in 2013. [...] However, our research points to a deeper cause in the economic structure: deindustrialization, brought about in a change in the US tax policy and the subsequent failure of the island's government and private sector to reshape the economy's fundamentals.

By June 2015, Puerto Rico's then governor Alejandro Garcia Padilla stated that Puerto Rico's debt could not be paid. In a succinct summary of these points, Andrew Mercado-Vázquez states, "Rarely can anyone reasonably argue that a country's economic downfall can be traced to a single specific event, and the colonial tax haven like Puerto Rico is no exception. The archipelago's financial crisis is an outcome that could not be possible if not for a mix of colonialism, economic dependency, and neoclassical policies. In the end, profits were made, debt was increased, and the people of Puerto Rico are now forced to foot the bill."

This leads us to the current economic transformation of Puerto Rico – towards a new techno-economy. Puerto Rico is currently trying to bring back corporations through a series of tax incentives⁶, which have been signed into law since 2008. Two laws in particular, Act 73 (2008) and Act 20 (2012), set a fixed income tax rate of 4 percent for commercial manufacturers and companies exporting services from the island, respectively. A 50 percent tax credit for research and development activity costs has also been instituted under Act 73. According to Puerto Rico Secretary of Economic Development and Commerce, Alberto Bacó Bagué, "20% of the companies that operate under [Act 20] are tech oriented ... and the rest

² <https://taxfoundation.org/tax-policy-helped-create-puerto-rico-s-fiscal-crisis>

³ <https://prospect.org/article/how-hedge-funds-are-pillaging-puerto-rico>

⁴ <https://www.pewresearch.org/fact-tank/2015/10/14/puerto-ricans-leave-in-record-numbers-for-mainland-u-s/>

⁵ Sam Oakford, "Why Are So Many Young Puerto Ricans Leaving Home?" Vice, https://news.vice.com/en_us/article/59anxk/why-are-so-many-young-puerto-ricans-leaving-home

⁶ <http://puertoricotaxincentives.com/>

have a tech-related component.” New tech-programs include the Puerto Rico Technoeconomic Corridor (Western Puerto Rico - non-profit partnering with University of Puerto Rico, Mayagüez)⁷. In 2014 the PRTEC received \$7M in grant money from the US Department of Labor to help curb long-term unemployment (Mayagüez, Aguada, Aguadilla, Anasco, Moca, Rincón, Cabo Rojo, Lajas, Hormigueros, Maricao, Las Marías, Mayaguez, San German, Sabana Grande, Isabela, Guánica, Quebradillas and San Sebastián) with strategies such as outreach; training; and placement. As part of the new technoeconomic initiative, a number of startup/tech-incubators/accelerators have been established in Puerto Rico, including Parallel18; Engine4 Bayamon; Startup PR; and the blockchain incubator Renovatio PR. Additionally, a number of co-working spaces have been established, including Piloto 151 (home of the Government Blockchain Association); Engine4; Sphence; and District View.

In July 2016, Puerto Rico’s economy was drastically changed by the imposition of the economic oversight board (*Junta del Control Fiscal*) by then President Obama, with the intent to restructure Puerto Rico’s \$123 billion unaudited debt. Since then, everyday life has been affected in Puerto Rico, from pension cuts, to reduction of government jobs, to rising costs in electricity and water services, to closing down many public schools, and privatizing public services such as PREPA.

On top of all of this, in September 2017, Hurricanes Irma and Maria hit archipelago, and set up the environment for disaster capitalism combined with “altruistic” proposals from crypto-tycoons such as Brock Pierce. This created a situation where outside interests consider Puerto Rico a blank slate for “re-making” / dreaming up a utopia, and not necessarily for Puerto Ricans.

Current Resistance in Puerto Rico – Towards a Just Transition

There is a strong resistance movement in Puerto Rico that advocates for a just transition for Puerto Rico’s environment and economy. The 2017 hurricanes have opened these conversations and given them new urgency, however, these discussions have been ongoing well before Maria. Journalist Luna Olavarría Gallegos with photographer Arianna Cuesta together feature the work of Puerto Rican organizers who are looking to build a better future for the archipelago (Olavarría Gallegos 2017). Jocelyn, a spokesperson for the activist group JORNADA: SE ACAMBARON LAS PROMESAS explains why Puerto Rico must not return to normal, to the status quo. She says:

Although we are living in a country with a deep crisis, it is also developing a new movement. We have had the opportunity to see this movement all across the island, from agriculturalists and small businesses that are *proposing a new economy* and a new country outside of the colony. ‘Independence’ has to be rooted in those projects. If we want to grow a successful movement, we need to create a huge front and have a new economic proposal to effectively respond to the Junta and reclaim our independence. If you go to Peñuelas, you see peers fighting against the deposit of toxic ashes [in a local landfill]⁸. In Playuelas they’re fighting against the construction of new hotels.⁹ We have collaborators from the Colectiva Feminista en Construcción¹⁰, Movimiento Niñ Negrón¹¹, and the student movement. We are trying to connect the fights, give them unity and coherence to be able construct a national movement that proposes something new within a framework of independence. (Olavarría Gallegos 2017)

Jocelyn argues it is not only political independence, “it is also a social and cultural independence. We can’t get free if we maintain the same level of consumption that we have right now. We can’t advocate for independence to continue the same inequality where there are very rich, powerful people and disadvantaged people. *We need to advocate for an independence that allows us to create another economic model — not capitalist — because this is destroying our economy, our planet and the people*” (Olavarría Gallegos 2017).

⁷ <http://www.prteconline.com/index.php/about/we-are-prtec/>

⁸ <https://www.opendemocracy.net/en/democraciabierta/coal-ash-contamination-in-puerto-rico/>

⁹ <https://repeatingislands.com/2017/06/17/environment-resistance-strengthened-in-playuela-puerto-rico/>

¹⁰ <https://www.facebook.com/Colectiva.Feminista.PR/>

¹¹ <https://movimientoninnegron.wordpress.com/>

There are challenges however, to galvanizing this movement widely. There are many interested in keeping the status quo in Puerto Rico. Luz, owner of Cosecha Mia explains, “Puerto Rico doesn’t have the education or system to be free. We aren’t sustainable — we’ve always lived supported by someone else. I think it’s possible but there needs to be long-term education around decolonization so that the people can understand. Before we get out of this relationship we should have classes starting in kindergarten about what it means to be decolonized and we need to have a government plan for how to decolonize. *To be free means changing everything, including our money, and it’s a long-term process of understanding that we should have already started*” (Olavarria Gallegos 2017).

Although the way it should play out is highly contested, there is consensus that the economic needs to be addressed. Some argue to draw even more from the tourist industry; others a restructuring of agricultural production; others centered in technology. Blockchain is emerging as a response to economic crisis, but also involving new (expat, male, tech-bro) colonizers in action to reinforce the status quo. It is curious in the emergence of new partnerships with the government, existing institutions, new institutions and groups. Blockchain is a new economic technology, and works in different ways than the central bank, etc. Can blockchain be used here as a means for emancipatory freedom? Or is it further perpetuating status quo?

This situation is extractive and marginalizing in many ways. People and companies outside of Puerto Rico are disproportionately benefitting from laws imposed on Puerto Rico. There is high unemployment and local labor wages exploitation, and the new initiatives toward digital export services don’t require local labor (can be outsourced for the cheapest wage) so this isn’t even solving the unemployment problem. Additionally, there is a lack of momentum toward generating a local economy governed democratically by Puerto Ricans (organized, operated, and owned).

This chapter acknowledges that what it means to be “for the people” is contingent, there is no one Puerto Rican person/identity – however, when I refer to being for the Puerto Rican people, I am particularly referencing people who are in the most vulnerable and precarious positions under the current economic crisis. Indeed, the Puerto Rican people are only a unified body insofar as geographical location of birth; many more aspects are indicative of diversity and difference. There are many identities and publics in Puerto Rico, many of which exist along cultural, gender, and racial lines, others of which come together around social, political, and economic issues. Clearly defined racial dichotomization, imposed by dominant (white) sectors in the mainland United States on African Americans and unassimilated immigrants, is not consistent with the experience in Puerto Rico, where, as Alice E. Colón Warren writes, “race ranges along a continuum from white to Black, running through a variety of categories related to the presence of particular phenotypical traits, such as mulatto, *trigueño* (lighter skinned or as a euphemism for Black), or *grifo* (tight, curly hair)” (Colón Warren 2003: 668). Ancestry includes the native Taíno, Spanish colonizers and others of European descent, as well as African slaves imported from the slave trade during Spanish colonization. Furthermore, race in Puerto Rico is not only seen along lines of physical appearance, but also along social and behavioral lines, and is even something that can be “improved” by “whitening” through intermarriage, to “*mejorar la raza*,” translated - to better the race (Colón Warren 2003, Suárez Findlay 1999). *Mestizo*, for example, is a term for native Taíno and Spanish/European miscegenation. This varied spectrum of race does not conform to the version of racial segregation as known in the mainland United States, and as such, the “denial of existing racial identities (and racist practices) [in Puerto Rico] has also been but another way to reproduce racial hierarchies” (Colón Warren 2003: 668).

As Michelle Buckley writes, “The point of attending to questions about the politics of ethnicity and race, citizenship, class or gender is not to map how such social axes are simply attributes attached to particular bodies participating in the urbanization process but to illuminate how the material production of urban built environments can depend on parallel production of complex inequalities and intersecting forms of social difference” (Buckley 2014). This has long been the charge of feminist social research in Puerto Rico, which has “placed women’s participation in the context of [Puerto Rico’s] macroeconomic, political, and social processes, particularly influenced by broader state involvement and colonial relations” (Colón Warren 2003: 671). This includes the experimentation done on Puerto Rican women, with forced

sterilization as an experiment on population control during the 1960s under a United States program that underwrote the pitch of a life free from the burden of childbearing to work in an industrialized workforce.⁴⁶ It also includes the largely unrecognized labor of women, particularly in the “unmeasurable informal economy” which has gendered dimensions (Colón Warren 2003: 667).

Current means of resistance to systemic economic injustice include protests (PROMESA); and lobbying for more equitable federal legislation, including repealing the Jones Act. Puerto Rico has a long history of resistance, protests and they have had success in the past after a great deal of struggle. However, precisely because resistance and protesting is the norm, at times it loses its effect. The same voices continue not to be heard; at the local level it can only go so far. This is why some Puerto Ricans are actively raising awareness to reach wider audiences, to put pressure on Congress who has the real power. Methods include feminist street/public space performances; as well as digital means such as podcasts, video/multimedia web projects, education (with the Puerto Rican Syllabus).

Other means of resistance include active alternate practice, with women-led movements leading the way in supporting local communities with dedication and care in the solidarity-economy. This includes CEPA embodied practice and pedagogy, Tara Rodríguez Besosa, founder of El Departamento de La Comida,” and a shift toward a community-supported agro-economy; and renewable-energy community owned solar projects such as Casa Pueblo with Arturo Massol-Deyá and founder Alexis Massol González. These projects are doing something, proving that another way is possible and preferable. These projects are locally run, managed, and owned and seeks to benefit those who need it most. They are started by Puerto Ricans – not imposed by people from the outside. There is a level of “unmeasurable/unquantifiable” benefits that come with a sense of care, belonging, intimacy, emotion - more than just transactions between person A and person B as is so often seen with crypto and blockchain projects. At the same time, the challenge is that these are slow-moving initiatives that may not be able to keep up with technological acceleration, and the fast-paced predatory interests coming in, buying up land, making farms for exclusive use, or otherwise building insular crypto-enclaves.

Another form of resistance can be seen in recent radical “utopian” projects within Puerto Rico to raise awareness and enact change, for example with proposed alternate currencies to the US dollar. Valor y Cambio is “a story-telling, community-building, and solidarity economy project started by the artists Frances Negrón-Muntaner and Sarabel Santos Negrón.”¹² From their own words:

The project emerges in response to the island’s more than decade-old debt crisis and the punitive austerity measures imposed by the U.S. government since 2016. It calls attention to the fact that for almost all of its history Puerto Rico has been denied the right to create its own currency, and its economy has been organized to benefit other nations and states. The project introduces a “community currency”—pesos of Puerto Rico— that can be adopted autonomously by communities to meet their own needs for cooperation and exchange. It does not require the backing of the state, corporations, or other entities. In February of 2019, a mobile “valorycambio” or VyC machine, an ATM-style device, began traveling to various locations distributing bills and, in return, gathering stories on video about what people value. Each time a person shares a story, he or she will receive pesos. With these bills in hand, participants will be able to receive a discount in more than 40 small businesses in several towns and cities. The pesos feature athletes, activists, writers, and communities that have acted on their values to enrich peoples’ lives and in that way asserted that, “change is in our hands.”

The positive aspects of this project are in its intent to acknowledge Puerto Rico’s history, and raise awareness of inequalities (both of the economic inequity in Puerto Rico AND as an explicit resistance to bitcoin and digital currencies which creates new inequalities). The project enacts steps toward supporting a local economy and valuing local labor and otherwise unrecognized forms of exchange; it is an alternate outside of capitalism. In terms of actual use value, local currencies such as the Ithaca HOURS continue to successfully work as a means to exchange local goods and services in the community of Ithaca, New York. At the same time, Puerto Rico has a complicated history of alternate currencies devaluing local currency (as during Spanish colonialism when the Puerto Rican peso was trying to be adopted, stronger Venezuelan currencies were brought in from the rich and hindered the peso – see more in Chapter 2). The most important aspect for a currency to succeed is in its capacity to be used – if it is not more widely

¹² <https://www.valorycambio.org/>

adopted outside of a small circle, and if it can't be used practically for goods and services then it can only go so far.

Another recently proposed alternate local currency project is “Coquí Cash.”¹³ Its aspirations are similar to Valor y Cambio, in terms of generating a community-based local economy, but it is different in one key way: it is a cryptocurrency. Coquí Cash strategically captures the momentum of the blockchain buzz and crypto-craze. The positives to this project are that it is an alternate to the global scale of bitcoin and crypto at large while advocating for a local economy that can benefit native Puerto Rican businesses and services. Its audience is perhaps wider than Valor y Cambio, both geared toward crypto-oriented publics coming in from the outside, and those who have interest in crypto from within Puerto Rico. The challenges here are similar to Valor y Cambio - if it is not more widely adopted outside of a small circle, if it can't be used practically for goods and services there is no point other than a concept piece. This is even more relevant for Coquí Cash than Valor y Cambio because Puerto Rico's rural areas are still a primarily cash-based economy – crypto is confusing, relies on the internet which many people still do not have; and lastly crypto adoption in any form is still within a wider predatory system. This project is really not resistance but rather contestation, disputing or arguing how crypto should work, who it should be for, and what it should do – rather than asking the question: is blockchain and crypto right for Puerto Rico? There is also the question of if any resistance can work within blockchain and crypto, which will be discussed later in this chapter.

Puerto Rico: A New Crypto and Blockchain Haven for United States and Foreign Interests

In the previous chapter, I discussed how over the past two years since 2017, an increasing number of people are moving to Puerto Rico from around the world to engage in cryptocurrency and blockchain related activities. These individuals are incentivized by the tax benefits available under Acts 20/22, which includes the Individual Investors Act, with zero capital gains tax on cryptocurrency investments after moving to Puerto Rico, and the Export Service Act, with a low 4% corporate tax rate for new businesses that export their digital services to anywhere *outside of* Puerto Rico (among other benefits). These groups participate in the new capitalist industry of cryptocurrency, not only in terms of mining, speculation, and trading crypto as an asset, but also with blockchain as a technology around which new businesses and startups are formed. While some have come to Puerto Rico for the individual tax benefits, others have come together as a group with similar-interests to create a “crypto-utopia” in Old San Juan. These “crypto-utopians” are actively acquiring private land, property, and resources with privileged access for themselves and other crypto-affiliated individuals, for example, through the Viejo San Juan Re-Fund “Security Token Offering” (see Chapter 2 for more details). Although “technically public,” these actions go under the radar online, and are not known by many Puerto Ricans. This is both exclusion of Puerto Rican people (from those who are not “high net worth individuals,” to those without internet), and exploitation of Puerto Rico's land and laws.

At the same time, local Puerto Rican government officials are in discussions with some of these crypto-proponents on how they can work together for the economic development of Puerto Rico. The local government is actively partnering and collaborating with crypto-proponents, private companies, and investors. This is evidenced by the government's attendance at the Blockchain Unbound and CoinAgenda conferences, the creation of the Government Blockchain Advisory Committee of the Department of Economic Development and Commerce (DDEC), and the Government Blockchain Association. What does “economic development” mean in this context, and for whom? Would the government be engaging so readily were it not responding to a situation of crisis layered upon crisis (the climate crisis enacted through Hurricanes Irma and Maria, on top of the public debt crisis)?

Outside of crypto-colonialism, a number of new blockchain based businesses have been established in Puerto Rico and are insular to the communities in which they are geographically located. A key example of this is with Renovatio Puerto Rico. Renovatio PR is a fintech incubator “focused on blockchain technology and its limitless potential and application.”¹⁴ In Puerto Rico, the company is focused on “creating an economic and regulatory environment that encourages digital technology companies to

¹³ <https://coqui.cash/>

¹⁴ <https://renovatiopr.com/>

locate and build businesses in Puerto Rico.” Furthermore, they also partake in the altruistic attitude of remaking Puerto Rico, saying “Renovatio means “new life” or “rebirth”. Renovatio PR represents our commitment to innovation, entrepreneurship and economic development in Puerto Rico.” In no uncertain terms, Renovatio PR cites the tax benefits of Acts 20/22 to encourage new companies to move to Puerto Rico. Their position in this techno-economic transformation they envision as such: “Renovatio PR is working toward being an elite contributor to the development of Puerto Rico, and recognizes the immense possibilities to grow the economy and create advancements. We are utilizing our incubator initiative to help make Puerto Rico the next Silicon Valley of the fintech industry.”¹⁵

The crypto and blockchain industries have become a part of the wider technocapitalist system, but with the added enormous extraction from the environment (crypto-mining), and specifically in Puerto Rico taxing an electricity grid that is already vulnerable. This is an exploitation of Puerto Rico’s situation of crisis layered upon crisis (public debt and post-hurricane crisis) where outside companies believe they can remake the archipelago to their liking, rather than considering what actual communities need. As discussed in Chapter 2, crypto-proponents are literally making distributed enclaves, closing themselves off from integrating in the community in any way, even giving themselves their own food source rather than buying from the existing farms that sell to the Old San Juan Farmer’s market. These are vastly uneven cryptoeconomic geographies tied to Puerto Rico that encourage the exploitation of laws and land, using blockchain and crypto to benefit themselves and export services anywhere outside of Puerto Rico. This is all posed to lead to further capital accumulation by those already in power, as well as increased datafication and computationalization, and depersonalization, viewing people not as people, but as transactions to be recorded.

Resistance and Contestation Against Crypto-Colonialism and Self-Interested Transactionary Publics

Strategies Outside of Technology

Resistance against crypto-colonialism and self-interested transactionary publics, outside of technology, includes the following. As mentioned in the previous chapter, women have protested at blockchain conferences in Puerto Rico. Others refuse to adopt cryptocurrency. These protests, hypothetically, should help outsiders realize that their words don’t match reality – they talk about their altruistic acts, but protests may help unsettle their feel-good attitude. On the other hand, this will likely not sink in and will perhaps further embolden the attitudes of crypto-proponents.

Other resistance methods may include lobbying for better economic policy in relation to Acts 20/22, cryptocurrency regulation, or outright banning crypto-mining. If this is successful, it has potential to affect change. The crypto-proponents presence in Puerto Rico is primarily because of the tax incentives. No incentives, no crypto-colonizers. Alternately, if they want to stay, there are policies that can be put in place to help generate a local economy, which will be discussed later in this chapter. The challenges with this is that many of the actions of crypto-colonizers are actually done without the government knowing, and are outside of government control. This is intentional and is creating a new form of (techno)power as discussed in the prior chapter. Additionally, now that enough people have come to Puerto Rico for the tax incentives, there are vested interests in lobbying to keep these incentives in place.

Other strategies for resistance include actively supporting and raising up existing alternative practices such as the ones mentioned above, that act for the benefit of the people.¹⁶ This shows that there are self-sufficient, alternate economic models that work equitably. At the same time, this does nothing to stop the momentum of the outside crypto-proponents and the blockchain businesses looking to create Silicon Valley in Puerto Rico.

Strategies With Technology

Key to resistance is raising awareness of predatory, exploitative crypto practices, and learning to differentiate the claims of blockchain from the realities (this relates to wider digital literacy so more people can benefit from digital technology in general). Not many people outside of Puerto Rico and even inside

¹⁵ <https://renovatiopr.com/about/puerto-rico/>

¹⁶ See also <https://defendpr.com/> for more

of Puerto Rico know what is happening, and more awareness can bring more voices to resistance and contestation. However, once awareness is spread – then what?

Some strategies include directly appealing to and working with the new crypto-proponents who have come to Puerto Rico. The idea here would be to help direct the capital where it is needed, imploring them to work with communities and take it seriously (ex. Link Puerto Rico, Government Blockchain Advisory Committee). The positives to this is that real capital from these high-net worth individual crypto-investors means real things can be built on the ground for people who need them. The negative side is, like disaster capital, these “donations” usually come with a price (nothing is ever free, maybe its data, maybe its in encouraging blockchain or crypto adoption). Also, working together with blockchain advocates, even the most progressive ones, may be seduced by the jargon and claims and could be unknowingly perpetuating misinformation.

Alternately, some projects have used the momentum of cryptocurrency and blockchain to make a statement (like Coquí Cash mentioned above) or to help direct the blockchain space in a more equitable direction (including Link PR). To that point, there are many people across the globe who claim that blockchain technology offers “emancipatory potential,” but and what does this mean in actuality?

Emancipatory Potential of Blockchain?

From reports by McKinsey to the UN Development Program to Stanford University, there have been claims about how blockchain is a technology with “emancipatory potential” which can be used for “social good” or “social impact.” However, different groups with varying intents are making these claims – so I ask what does emancipatory potential mean in each situation? I will review a few examples across the globe and bring it back to Puerto Rico to see where the similarities and differences may be. The first example of what people often mean when they say blockchain has “emancipatory potential,” is in its capacity to facilitate financial transactions or payments, particularly across borders, for those who would otherwise be unable. This falls into the broader category of “financial inclusion,” which includes banking the unbanked, and effectively aims to open up the doors of capitalism to the poor. One example is Mojaloop, a Bill and Melinda Gates Foundation software project developed with fintech companies such as Ripple,¹⁷ using the Interledger protocol¹⁸ (a network to connect multiple different blockchains and payment networks). Mojaloop (building off the Swahili word “moja” meaning “one”) aims to “enable seamless, low-cost transactions between individual users, merchants, banks, providers, and even government offices - helping connect poor customers with everyone else in the digital economy.”¹⁹ To its credit, the code is open-source, free to be used and adapted by any institution or organization, particularly for “central banks, market infrastructures, payment processors, and fintech firms to accelerate the creation and deployment of interoperable payment platforms that can scale in serving the poor.”²⁰ This is a software that can be used on mobile devices, acknowledging that low-income communities often lack broadband internet access, but that mobile connectivity (3G/4G) is more readily available. Mojaloop documentation references the foundations laid by earlier mobile infrastructure projects such as Safaricom’s M-Pesa. In a press release about this project on the Bill and Melinda Gates Foundation website²¹, the proposition is as follows:

Current data from the World Bank shows that nearly two billion people in developing economies lack bank accounts and miss out on the benefits and security that basic financial services provide. Digital financial services, such as mobile money on cell phones, have rapidly expanded over the last two decades because they are convenient for users and cost-effective for companies aiming to serve new markets. In Kenya, an estimated 194,000 households have moved out of extreme poverty due in part to their access to M-Pesa, a mobile money platform, and users’ ability to save money more effectively. Digital financial services are now

¹⁷ <https://ripple.com/>

¹⁸ <https://interledger.org/>

¹⁹ <http://mojaloop.io/documentation/>

²⁰ <http://mojaloop.io/>

²¹ <https://www.gatesfoundation.org/Media-Center/Press-Releases/2017/10/Bill-Melinda-Gates-Foundation-Releases-Open-Source-Software-to-Expand-Access-to-Financial-Services>

available in nearly 100 countries according to GSMA, an organization representing mobile network operators. However, global expansion of these services—especially to the world’s poor—has been hampered, in large part, by a lack of interoperability between digital financial services and payment platforms.

This interoperability issue is what Mojaloop attempts to resolve, for a two-fold purpose: first, to bring corporate digital financial services into developing markets; and second, to allow the poor to benefit financially from these services and see some sort of upward mobility. While reducing the number of people in extreme poverty is to be commended, this is all very strongly situated within a capitalist system, where the capital accumulation of corporations often comes before the needs of people.

It is important to note that the “success” of M-Pesa (the precedent to both Mojaloop and another blockchain financial service in Africa, BitPesa²²) is contextually and culturally contingent. Emma Park has completed ethnographic research in Kenya around (post)colonial infrastructures, and has written about the complicated cultural, political, and corporate relationship of Safaricom with Kenyan publics. What began as a “Corporate Social Responsibility” project with Safaricom has transformed Kenya into a global corporate nation-state (Park and Donovan 2016), now highly reliant upon Safaricom’s digital infrastructure. With M-Pesa, what was once a risky developing market is now a body of captive consumers. Those consumers can make certain demands on the corporate giant, such as respect for cultural traditions.²³ For Safaricom, these (relatively minor) demands are worth it. Park explains it is strategic, “For a contemporary development industry that sees connectivity as a human right, simply selling airtime bundles is framed as a means of securing the public good. [...] It is through the work of “building communities” and “transforming lives” that new markets and new profits result (Safaricom Foundation 2014).” Based on this precedent, cryptocurrency and blockchain projects for financial transactions such as Mojaloop and BitPesa have more readily taken off in Africa than in other locations. As Michael Kimani, chairman of the Blockchain Association of Kenya, says, “In Kenya, there’s not really a need for a bank account—once you have a mobile phone you already have a bank account. People here are already familiar with value on their mobile phones.”²⁴ As we have seen, (post)colonial geographies are early test cases for new technological projects. Building on top of earlier pilot projects, Kenya may be more readily primed to adopt blockchain technology. This is evidence that blockchain and cryptocurrency implementation is highly context specific.

Related to the concept of financial mobility, the second example of what people mean when they say blockchain has “emancipatory potential” is the concept of “digital self-sovereignty”. “Self-sovereign identity” (SSI) is where individuals control their own data about their own identity. The idea is that with a global digital identity recorded on a blockchain, individuals who would not be able to get a passport or travel freely from Country A to Country B would otherwise be able to do so with “digital global citizenship”. Other use cases include “identity management” for refugees, as identified by the UN and the World Hunger Program during their pilot program for tracking humanitarian aid using a private permissioned

²² BitPesa is a digital financial-exchange platform running on blockchain to “to significantly reduce the cost and increase the speed of business payments to and from frontier markets.” <https://www.bitpesa.co/> ; see also Andy Reed, “A Look at BitPesa: Powering African Business with Bitcoin,” <https://medium.com/wolverineblockchain/a-look-at-bitpesa-powering-african-business-with-bitcoin-8b84f2140106>

²³ As Park and Donovan write, “The unwieldy entangling of this multinational corporation and the postcolonial state are refiguring notions of citizenship and bringing Safaricom into a direct, even intimate, relationship with Kenyans. Many Kenyans will tell you, with a hint of pride, that their countrymen are “peculiar,” and Safaricom invests considerably in the cultural work of fitting this distinctiveness. In doing so, Safaricom has established itself as a corporation deeply attuned to a national milieu, in large part through the calling forth of Kenyan publics as new markets. Put another way, as it extends its infrastructures to a growing body of paying customers, Safaricom invokes a seemingly noncommodified public: the nation.”

²⁴ Andy Reed, “A Look at BitPesa: Powering African Business with Bitcoin,” <https://medium.com/wolverineblockchain/a-look-at-bitpesa-powering-african-business-with-bitcoin-8b84f2140106>

blockchain.^{25,26} Essentially, the blockchain would serve as a large database storing information about an individual's identity, and tracking transactions made to and by that individual. This is already being implemented with the blockchain-based "Sovrin Network," run by a non-profit organization. Sovrin has "stewards" such as tech-companies IBM and Cisco; a number of credit unions and financial institutions including ABSA Group (Barclays Africa); fin-tech, legal, telecom, and blockchain advisors/consultants, from Aalto University in Helsinki to Swisscom Blockchain; and new blockchain companies such as Evernym²⁷. The UN and WFP are also looking into blockchain as a way to improve efficiency, and reduce cost and transaction fees from banks and outside institutions. Director of Innovation at the WFP, Robert Opp said, "Before WFP had to exclusively rely on external sources of data," he said. "Now we have our own immutable record of everything that happens"²⁸.

Conceivably, SSI would link an individual with the property that they own, stored on a land registry on the blockchain. This is already being implemented and tested in India (Chandra 2017), Ghana²⁹, and Colombia³⁰. The UN Development Programme has discussed how blockchain land registries could be a reliable record of ownership in the event of a natural disaster, such as in Haiti,³¹ and could more quickly facilitate aid distribution. This is a problem that occurred in Puerto Rico after Hurricane Maria, where receiving FEMA aid was a difficult process. Forms were online and electricity and internet access was slow to return. Furthermore, many families had their home passed down from generation to generation, with many having a lack of legal documentation proving ownership. While streamlining recovery aid distribution is beneficial, we have to consider the trade-offs. Land registries and property surveys (digital or otherwise) have long been tied to monitoring for taxation purposes, and gathering data to set insurance rates. Having a digital identity tied to blockchain land registry would place an even greater emphasis on private property ownership. It would seek to formalize informal spatial networks, challenging their very existence (squatters, informal settlements).

While these technological "solutions" may be coming from a genuine place of concern about human need, they also come with the caveat of increased digital surveillance, control, and dehumanizing tech which considers refugees not people, but data to be monitored. Chris Jagers of the company "Learning Machine" boldly claims, "While it is true that the blockchain affords emancipatory potential never before known in human communities, it also creates opportunities for micro-control of human movement and transactions on an unprecedented scale." He continues with some important warnings, "This is the double-edged sword of any new technology: it can be used to liberate or control. This is why using the blockchain, in and of itself, is not enough to guarantee human freedom and mobility. Rather, self-sovereignty must be explicitly architected into any blockchain-based social infrastructure."³² These statements are representative of a number of aims and concerns with SSI. Although Jagers becomes critical of the unintended consequences if control falls into the wrong hands, he begins, as many blockchain-proponents do, with an uncritical and unsupported claim that blockchain "affords emancipatory potential," even going so far as to claim "never before known in human communities." This not only perpetuates the "blockchain is revolutionary" claim, but also suggests that both human and community-based solutions to problems are inferior to technological solutions such as those posed by blockchain.

²⁵ The Building Blocks program used the Parity Ethereum client and Proof-of-Authority consensus mechanism. For more information on the program, see the report here:

https://unite.un.org/sites/unite.un.org/files/session_2_wfp_building_blocks_20170816_final.pdf

²⁶ Caroline Rustin, head of the UN Women's humanitarian unit said: "blockchain could be used to create a secure, paperless record of skills and education that refugees can carry with them, to which information can be added as they are on the move, [allowing] people to be appreciated for who they are and the qualifications they have and not just seen as refugees." <https://www.reuters.com/article/us-un-refugees-blockchain/u-n-glimpses-into-blockchain-future-with-eye-scan-payments-for-refugees-idUSKBN19C0BB>

²⁷ <https://sovrin.org/>

²⁸ Ibid

²⁹ <https://www.bigchaindb.com/usecases/government/benben/>

³⁰ <https://coinrivet.com/colombia-launches-a-time-saving-blockchain-land-registry-pilot-project/>

³¹ <https://www.undp.org/content/undp/en/home/blog/2018/Using-blockchain-to-make-land-registry-more-reliable-in-India.html>

³² <https://medium.com/learning-machine-blog/digital-identity-and-the-blockchain-10de0e7d7734>

Second, there is a focus on how already-existing powerful institutions, non-profits, and organizations, can more efficiently operate via digital technology. Third, there is a tendency to focus on human *transactions*, rather than humans as people. This is a computational way of viewing the world, so that humans and their actions can become machine-readable, more easily recorded, and stored as data to be operationalized³³.

With SSI there is a tendency to emphasize *individual* freedoms and *self*-sovereignty rather than collective freedoms, or *collective* sovereignty for a marginalized group; or how groups can cooperatively work together to benefit as a whole. However, this is not always the case, particularly when people discuss blockchain's potential for "decolonization." This is most often referenced in conjunction with rights for indigenous communities (Alcantara and Dick 2017). For example, the Canadian non-profit "Blockchain for Reconciliation," is dedicated to bringing the United Nations Declaration on the Rights of Indigenous Peoples³⁴ as a reconciliation framework to technology companies, while also seeking how blockchain can be used to benefit indigenous communities. Why blockchain? On their website they argue, "There's no better argument for trustless systems than the relationship between Indigenous people and the Canadian government. It may seem like adopting technology is a step in the wrong direction towards a return to traditional systems of governance and Indigenous knowledge, but it's just a tool. From AI applications for language, to blockchain applications for tracking traditional medicines, there are infinite possibilities for how technology can be used to enhance and preserve Indigenous culture."³⁵ Why indigenous communities? They state, "Mass adoption of distributed ledger technology isn't going to work from a top down level. It is a disruptive technology, and the average person would prefer not to be disrupted. As a result, the first adopters won't be the people who trust the current system. It will be through disenfranchised communities who understand why the current system doesn't work (and in some cases, how it doesn't exist at all). [...] Creating equity between Indigenous and non-Indigenous Canadians will allow us to demonstrate the inequality of the initial system. We can show North Americans how the increased transparency created by distributed ledger technology can lead to better outcomes for everyone, both socially and economically."³⁶

Although the aspirations of Blockchain for Reconciliation are admirable, these statements are indicative of a number of assumptions about blockchain technology that may or may not hold true. First is that blockchain creates "trustless systems." This is an oft-repeated claim³⁷, but has been widely challenged³⁸ and outright disproven³⁹. With blockchain, trust is not eliminated, merely reassigned to computational systems and those who govern them. The second assumption is that blockchain is a "disruptive" technology, and that the first adopters won't be the ones who trust the current system. However, as I have indicated with examples above and in Chapter 1, the overwhelming majority of actually-implemented blockchain projects are coming out of existing banks, corporations, and institutions. These groups dedicate time and funding to maintaining the status quo, and even more, how blockchain can make their own operations much more efficient.

³³ This is an ongoing conversation. Of course, how digital-identities are implemented could go in many directions. The Ten Principles of SSI include "Control," "Access," "Consent," and "Protection." The aims are to put the power in individual's hands, but many acknowledge this power could be abused if put in the wrong hands.

<https://github.com/ChristopherA/self-sovereign-identity/blob/master/ThePathToSelf-SovereignIdentity.md>

³⁴ United Nations Declaration on the Rights of Indigenous Peoples:

https://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

³⁵ <https://blockchainforreconciliation.ca/who-we-help-1>

³⁶ Ibid

³⁷ Goldman Sachs: <https://www.goldmansachs.com/insights/pages/blockchain/>; Vigna and Casey in MIT's Technology Review: <https://www.technologyreview.com/s/610781/in-blockchain-we-trust/>; Linux Foundation: <https://www.linuxfoundation.org/blog/2019/01/how-blockchain-changes-the-nature-of-trust/>; Lisk Academy: <https://lisk.io/academy/blockchain-basics/benefits-of-blockchain/why-is-blockchain-trustless>

³⁸ <https://mitpress.mit.edu/books/blockchain-and-new-architecture-trust>; As Kevin Werbach writes, "Blockchain, as it turns out, doesn't herald the end of the need for trust. Most people will want laws and regulations to help make blockchain-based systems trustworthy." <https://theconversation.com/people-dont-trust-blockchain-systems-is-regulation-a-way-to-help-110007>

³⁹ <https://www.wired.com/story/theres-no-good-reason-to-trust-blockchain-technology/>. As Schneier writes, "Most blockchain enthusiasts have a unnaturally narrow definition of trust. They're fond of catchphrases like "in code we trust," "in math we trust," and "in crypto we trust." This is trust as verification. But verification isn't the same as trust."

The aspirations of Blockchain for Reconciliation and their belief in blockchain technology show that repeated claims about the technology have weight, and are powerful in and of themselves. With mimetic transmission, repeating these claims carries them forward⁴⁰ to the point where decisions are being made around the *claims* and dominant *narratives* rather than actualities as observed in action. I believe this is one reason why three seemingly contradictory ideological groups are galvanized around blockchain technology for very different reasons. One group is dedicated to right-libertarian freedoms for the individual, free-markets, anti-regulation, anti-central banks or third-party intermediaries; one group is dedicated to maintaining the status quo under capitalism, increasing the role of institutions, multinational organizations, and private companies via computationalization and datafication; and one group is dedicated to disrupting the status-quo, hoping to use the technology to expose inequalities in existing systems and gain power for marginalized groups. Each of these groups argue that their approach to blockchain can be “emancipatory” or have “social impact,” but their ideological and structural frameworks drastically differ. If blockchain is really just a digital distributed ledger or record, just a technological tool, it would follow that the priority focus should not be the technology itself, but instead on critical ethical and operational frameworks for how that tool will be used, by whom and for whom. Other key narratives include decentralization and democratization, but as I have argued in Chapter 1, decentralization is not *de facto* democratic. Decentralized organization can still occur undemocratically.

One problem with “emancipatory” projects, across the board, is that they are often posed from the outside looking in – originating from positions of privilege aiming to implement their projects in marginalized communities, rather than projects originating within these communities. This is not always the case, however. Blockchain has enabled a new form of power to emerge, a type of technopower that enables technologists, programmers, software developers, and those who consult with them, to form new startups, businesses, and vision new projects for change. For example, in Africa, where so many outside interests are looking to pilot their projects, a new organization called Satoshicentre has formed as a community-owned blockchain startup accelerator, by and for people of Africa. CEO Alakanani Itireleng has an active public presence and has delivered impassioned talks about achieving economic freedom from oppression. At a presentation at Black Blockchain summit in Washington DC in 2018, Itireleng said their goal is to “build a strong blockchain ecosystem,” but in doing so her advice is this: “Take your time. Don’t be in a hurry. It’s very important. Take your time to understand things. To do things with understanding.”⁴¹ Economic freedom in this case means freedom to enter a competitive capitalist market, however, with this intentional and measured approach, there is hope that critical thinking prevails over hype and uncritical technological solutionism.

Local Blockchain/Crypto Projects – Contestation and Reaction to Exploitative Outside Interests

As I have discussed in Chapter 2, in Puerto Rico there is a majority of outside individuals and companies coming to Puerto Rico to implement their blockchain projects and crypto-businesses. Many of these outside-originating businesses and projects do not practice sustained community engagement or address immediate community needs, perhaps in part because if they are there for the tax incentives, and their services are not meant to benefit the Puerto Rican people due to the *export* service stipulation of Act 20 (as was reviewed in detail in the previous chapter). At the same time, the local Puerto Rican government is actively engaging these groups in the name of broader economic development for the archipelago. There is a critical eye, with the Blockchain Advisory Committee established as part of the Department of Economic Development and Commerce (DDEC), but this is primarily to filter scam proposals with actual projects. The problem is the government is also being pitched a narrative that can often be swayed in the direction of the interests of blockchain and crypto-proponents. The Blockchain Advisory Committee also has a private sector component that, according to the DDEC, includes, “several investors, entrepreneurs,

⁴⁰ Including at events for Women in Blockchain, at the NYC Blockchain Center https://www.meetup.com/WomeninBlockchainCommunity/events/260511188/?rv=md1&_xtid=gatlbWfPbF9jbGlja9oAJGNjNmE5ODZkLWNmZDctNDA3Zi1iOTRhLTg3M2I4NDAYYTk4Yw&af=event&af_eid=260511188

⁴¹ Alakanani Itireleng, “Building a Blockchain Ecosystem with Integrity and Without Scams!” conference presentation at Black Blockchain Summit, Washington DC, 2018 <https://www.youtube.com/watch?v=t5tCTW9KPdk&feature=youtu.be>

and Blockchain technology experts who have moved to Puerto Rico in recent months, as well as industry leaders from the United States.”⁴²

However, in response to the outside interests landing in Puerto Rico, there are also new native Puerto Rican crypto and blockchain-affiliated organizations, businesses, and startups who have contesting methods and project proposals. A number of projects generated from within Puerto Rico, for Puerto Ricans, are far more locally-focused and community-oriented, versus the grandiose global aspirations of the expat organizations and those who seek to make Puerto Rico the “next Silicon Valley of the fintech industry.”⁴³

One local example using cryptocurrency and blockchain in Puerto Rico was a direct response to the outside interests coming in, both disaster capital and the crypto-oriented expats. To help direct the capital in a more equitable direction (to Puerto Rico rather than being exported outside), Fabian Velez and Guillermo J. Aviles conceptualized a project where individuals from around the world could donate cryptocurrency to an organization of local non-profits for recovery efforts. Their ICO (Initial Coin Offering, see Chapter 1 and 2) was called “TokenFund.” In an article published on LinkedIn on December 26, 2017, Fabian explains their process, “These last months have been extremely hard and challenging for all Puerto Ricans. With much of Puerto Ricans still without power and struggling in many ways after hurricane María made landfall in Puerto Rico it is vital for us to continue to look for ways to help Puerto Rico stand up from this catastrophe. This is why Guillermo J. Aviles and I decided to create an organization called TokenFund after all of this happened. TokenFund is a non-profit organization that has partnered with other Puerto Rican non-profit organizations like ConPRmetidos, Foundation for Puerto Rico, Flamboyant Foundation DC and Power4PR that aims to gather funds from donors all around the world through cryptocurrencies, like bitcoin. With much effort and long nights, we were able to create the organization along with its website,”⁴⁴ he says, even without having power at his own home. Though an interesting proof-of-concept, in an interview Fabian tells me the implementation did not take off. There were a number of challenges facing the project. Javier Dastas, a computer science professor at University of Puerto Rico commented that he thought the idea was good but “there is a lot of uncertainty. I think it's better to send dollars because the cost of the bitcoin exchange rate is still varied. In a transaction there may be a loss of dollars, they are two things that must be treated with prudence. The crisis in Puerto Rico and the donations that are made.” Fabian and his team had considered that issue and had posed a number of solutions, referencing other projects around the globe that were successful⁴⁵, but TokenFund was ultimately shelved. However, Fabian and Guillermo would go on to found the non-profit “Link Puerto Rico,” dedicated to blockchain and broader tech education in Puerto Rico for Puerto Ricans (see more in Chapter 2). Link PR currently accepts donations in dollars on Patreon⁴⁶, and in cryptocurrency on Coinbase⁴⁷.

Other local blockchain startup companies in Puerto Rico working on actually-implemented projects have a mix of leadership from the United States with employees from Puerto Rico. For example, the startup RedCat⁴⁸ was founded in 2016 in the mainland United States (Jeff Thompson and Bryan Larkin are now respectively the CEO and CTO), but the company moved to Puerto Rico later that year and began a partnership with the University of Puerto Rico. Instead of importing a labor force from the United States,

⁴² <https://cointelegraph.com/news/puerto-rico-creates-blockchain-advisory-council-reportedly-to-filter-legitimate-projects>

⁴³ <https://renovatiopr.com/about/puerto-rico/>

⁴⁴ <https://www.linkedin.com/pulse/how-bitcoin-can-beat-hurricane-mar%C3%ADa-fabi%C3%A1n-v%C3%A9lez-vicente/>

⁴⁵ Such as Pineapple Fund - <https://pineapplefund.org/>; Fidelity Charitable - <https://www.fidelitycharitable.org/giving-account/what-you-can-donate/donating-bitcoin-to-charity.shtml>; and The Water Project - <https://thewaterproject.org/donate-cryptocurrency>

⁴⁶ <https://www.patreon.com/join/LinkPuertoRico?>

⁴⁷ <https://commerce.coinbase.com/checkout/3f686f84-19c1-4dcd-93f9-aab65e79b3ad>

⁴⁸ RedCat uses “Blockchain Black Box” as a drone flight recorder – in their words, “the first distributed system with security and encryption that regulators and insurance companies can trust. Our drone analytics and storage allow flight replay with customizable reports that can determine fault or performance issues.” <https://www.redcatpropware.com/#/>

most of the key team members of RedCat are Puerto Rican born and educated. These partnerships are hopeful for generating a local economy in Puerto Rico for Puerto Ricans. At the same time, caution should be taken to ensure workers' rights and fair wages. Puerto Rico has been seen as an attractive place to run a business, not only because of its tax incentives but also due to its low wages, which has been capitalized upon by US corporations during each of Puerto Rico's US-driven economic transformations (Machpherson 2017)⁴⁹. In 2018, the average median annual income of a household in Puerto Rico was \$19,343, which is *three times less* than the median annual income of \$60,336 across the entire United States.⁵⁰ While some may argue that cost of living is less expensive in Puerto Rico, this is not necessarily true. Due to the reliance on oil imports as a result of Operation Bootstrap (Ruiz Toro 2013), the average residential energy cost in Puerto Rico is 22.77 cents per kWh, versus the 12.47 cents per kWh on average for the United States,⁵¹ and rents in urban areas of Puerto Rico are comparable to the national average, with a median gross rent of \$1,012 in 2017.⁵² These are systemic issues that blockchain will certainly not solve on its own.

Another local startup in Puerto Rico is actively working with blockchain technology to address systemic issues in the health industry – Abartys Health. As opposed to RedCat, Abartys Health was co-founded by two women, one from Florida (Lauren Cascio) and one from Puerto Rico (Dolmarie Mendez). Abartys Health also employs a team of mainly Puerto Rican born and educated advisors, engineers, developers, managers, and administrators. Abartys Health was not formed because of blockchain, but rather with a mission of helping solve the “global healthcare crisis with smarter, faster care achieved by use of a unique, centralized data hub that allows medical record portability and universal patient identification.”⁵³ Though its aims are grand, they stem from deeply personal experiences from its founders, including a misdiagnosis of Dolmarie which led to incorrect treatment and health repercussions that went on for months before the issue was identified.⁵⁴ Lauren Cascio describes the different problems that arise in different contexts, explaining, “in Latin America, you have a lot of PDFs, a lot of receipts, a lot of scans. No OCR, optical character recognition, pulling data off of that. In the U.S., you have a lot of internal patient identification, meaning you have a number in your insurance company or with your doctor but actually doesn't mean anything.”⁵⁵ The use of blockchain technology for health records is a controversial topic⁵⁶. However, Abartys Health intends to explore a variety of emerging technologies to help create a more transparent and accurate health record system. Here, concept and critical implementation will be crucial over technological positivism, or avowedness to a single technology itself.

As Lana Schwartz (2017) posits, “the blockchain is meaningful as an inventory of desire. It is an engine of alterity: an opportunity to imagine a different world and imagine the mechanics of how that different world might run. Embedded in those dreams is another question: How will this future be brought about? What is the link between today's vision and tomorrow's reality?” The situation is this: new technologies like blockchain and their proponents envision a “better” city and infrastructure for the future, plus the climate disaster of Maria necessitates quick decisions to be made about the future, but we must ask who has the power to dream (particularly at this speed) – and by extension, who is the city for? This is also the question Naomi Klein (2018) asks in her article for *The Intercept*, “Who is Puerto Rico for? Is it for Puerto Ricans, or is it for outsiders? And after a collective trauma like Hurricane Maria, who has a right to decide?” The local residents are feeling guilty about dreaming, as a people used to serial colonization, they acknowledge they are not even supposed to be thinking of how to govern themselves.

⁴⁹ Listen also to Andrew Mercado-Vázquez's *Puerto Rico Forward* podcast at

<https://www.democracyatwork.info/prforward>

⁵⁰ <https://datausa.io/profile/geo/puerto-rico/>

⁵¹ <https://www.eia.gov/state/print.php?sid=RQ>

⁵² <https://www.deptofnumbers.com/rent/us/>

⁵³ <https://www.abartyshealth.com/about/>

⁵⁴ <https://mixergy.com/interviews/abartys-health-with-lauren-cascio/>

⁵⁵ Ibid

⁵⁶ <https://www.medpagetoday.com/practicemanagement/informationtechnology/74695>;

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5977675/>;

<https://www.forbes.com/sites/forbestechcouncil/2018/04/13/blockchain-in-health-care-the-good-the-bad-and-the-ugly/#67e0a6d26278>; <https://bmcmmedicine.biomedcentral.com/articles/10.1186/s12916-019-1296-7>

The question of “who is the city for?” is tied up with the question “who has the power to dream” as well as “who makes the city, and in what ways?” Making the city is not just the design or physical construction of buildings, infrastructure, or urban spaces – it is also the way they are used, inhabited, worked in, lived in. I draw upon the concept of the “right to the city” as posed by Henri Lefebvre in *Le Droit À La Ville*, and described by Harvey (2008):

The right to the city is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization. The freedom to make and remake our cities and ourselves is, I want to argue, one of the most precious yet most neglected of our human rights.

The right to the city is a common, dependent on a collective power, a collective sovereignty rather than an individual sovereignty. With so many competing interests in Puerto Rico, how can collective power for the people be attained and retained?

The fact is that the blockchain has come to Puerto Rico and is there to stay, for at least a brief time. The question is, how can the voices of those who are not currently invested in the technology be heard? The answer will not be in the blockchain itself, but in its ability raise awareness around systemic issues. If the blockchain technology is to be used democratically, this means opening it up to the collectives who are already these addressing systemic issues in a serious way. Using blockchain language can raise the profile of Puerto Rican autonomous collectives, however it requires a certain knowledge capital that may be spent elsewhere. Local academic institutions may prove helpful in this regard. We must also be clear about what we mean by “democratic” and “democracy.” Blockchain proponents often espouse the technology as inherently democratic because it is decentralized, but this democracy is only applicable to the blockchain users, and leaves out those who are not on the blockchain. This is more akin to a voluntocracy, or at best a partially representative democracy that represents only a subset of the people. Can this coexist with a more direct, empowered, deliberative and participatory democracy – not just of blockchain users, but of all of the Puerto Rican people?

David Golumbia (2016) is right that many of the main supporters of Bitcoin are right-wing libertarians. But while he suggests a connection of the blockchain to the commons, he does not go into detail as to how this may unfold. Here there is an opportunity to address contrasting priorities of right-wing libertarians with left-wing libertarians who have also found the blockchain appealing. The former prioritize the free market (*laissez-faire* capitalism) and private property; and the latter (perhaps more libertarian socialist) prioritize the commons. If the blockchain were to work to create a commons for the people of Puerto Rico, with collective sovereignty, it would have to be equitably organized, operated, and owned. It also cannot be viewed independently from the existing politics, governance models, and contesting uses of blockchain technology on the island. To be truly beneficial, blockchain would require new transdisciplinary relationships. To be truly open will be to actively seek out, listen to, and respond to criticism that comes from outside the inner circle, to the widest degree and diversity possible. As this situation unfolds, if it becomes apparent that the bitcoin/blockchain powers are unwilling to cooperate with actual tenants of democracy and equity, opposition is the only way forward.

Alternate Techno-Economic Models:

Questioning the Compatibility of Platform Cooperativism and Blockchain

While the previous business models engage with Puerto Rico in a more inclusive and equitable way than outside companies that do not hire locally and do not provide services to Puerto Rico, they are still working within the same frameworks of techno-capitalist industry. If new startups wanted to enact structural change while also focusing on generating an equitable local tech economy, alternative models that could be engaged include ones focused on the commons, collectives, and cooperatives, rather than individually driven profit-seeking and capital accumulation. Specifically, I pose the platform cooperative model and movement.

Platform cooperativism is a growing international movement focused on building a fairer future of work. It is fundamentally a social justice movement with cooperativism at its core – digital platforms with collective

ownership and governance by and for those who need it most – workers, users, and stakeholders. “Rooted in democratic ownership, co-op members, technologists, unionists, and freelancers” join together to enact an “alternative to the extractive sharing economy.”⁵⁷ In addition to challenging the exploitative practices of platform capitalism and the sharing economy, platform cooperativism also challenges the “often misogynist ‘win at all costs’ culture of Silicon Valley.”⁵⁸ Platform cooperatives cast a wide net, as an alternative to venture-capital funded models⁵⁹, to cooperatively owned online marketplaces,⁶⁰ to data-protection platforms⁶¹. Examples of current active worker cooperatives include Up & Go and Brightly Cleaning, home-cleaning service platforms; and ride-hailing platforms such as Green Taxi Cooperative, The People’s Ride, and Yellow Cab Cooperative. Each of these cooperative platforms take much less of a percentage of workers’ incomes than other home-service or ride-hail platforms, typically around 5% for maintenance fees versus 25-30% percent of traditional platforms.

In addition to more pocketable income for workers, benefits of platform cooperatives are shared by shareholders/owners, communities, and cities in a solidarity economy. Platform cooperatives are not just about reducing the role of corporate intermediaries, or posing an alternative to big tech monopolies and venture-capital funded projects. Platform cooperativism is against technological solutionism. It is fundamentally about building a more equitable digital, social and economic ecosystem, opening up democratic participation, not in the existing form of capitalism, but by bringing benefits and decision-making power to people who would not otherwise have the opportunity.

Some of the challenges with platform cooperativism in general is that, while worker cooperatives have a strong precedence since 1844 in Rochdale, England⁶², the idea of combining them with emerging technology and the digital economy is relatively new, within the last five years⁶³. Challenges also include difficulty in securing initial funding for new platform cooperatives, particularly given the ideological foundation that vast profits should not be generated for investor-shareholders (Sundararajan 2016: 198). However, there are increasing strategies and examples of how non-traditional funds can be generated for platform cooperatives⁶⁴. Critics also argue that already vested corporate interest and monopolies will fight off any co-op arrival (Srnicek 2017: 127), but while this is likely true, such a fatalistic attitude should not stop attempts towards an alternative. This also minimizes the already-experienced improvements to coop workers lives. Some argue that while platform cooperatives can produce “impressive and ethical local projects,” that can locally beat monopolies such as Uber or Amazon, they cannot scale up to beat monopolies globally (Morozov 2016). This is either because of their apparent “inefficient decision-making processes,” and/or their lack of massive capital for investment that increases competitive odds (Pollock 2018). While efforts have been made to scale platform coops up globally (particularly using blockchain which I will return to in a moment), I argue that it is precisely in the local scale where platform cooperatives should remain and thrive. Perhaps the aim should not be a global totality; perhaps local

⁵⁷ <https://platform.coop/about>

⁵⁸ Ibid. See also (Tokumitsu 2018)

⁵⁹ Nithin Coca, “Innovative Funding Models for Worker-Owned Platform Cooperatives,”

<http://www.geo.coop/story/innovative-funding-models-worker-owned-platform-co-ops>

⁶⁰ Such as Fairmomdo, a co-op alternative to Amazon or Ebay.

⁶¹ Such as the Data Commons Cooperative - http://wiki.p2pfoundation.net/Data_Commons_Cooperative

⁶² 1844 was when the Rochdale pioneers of England (weavers and skilled workers) formed the first recognized coop in opposition to market driven demands and exploitations along with the emergence of mass production. Later in 1895 the International Co-operative Alliance (ICA) was founded, which gave the cooperative movement global recognition. According to the ICA figures, at least 12% of the world population are part of one of the 3 million cooperatives across the globe. <https://www.ica.coop/en/cooperatives/facts-and-figures>

⁶³ The foundations began to be discussed at the Digital Labor conference at The New School in November 2014 (<https://digitallabor.org/>). Trebor Scholz would follow with an article, “Platform Cooperativism vs. the Sharing Economy,” December 2014 (<https://medium.com/@trebors/platform-cooperativism-vs-the-sharing-economy-2ea737f1b5ad>). In 2015, a primer was published in five languages, to help workers start their own platform cooperatives, “The Platform Cooperativism Primer”. *platform.coop*. Another event was held at The New School, in 2015: “Platform Cooperativism. The Internet. Ownership. Democracy”. *platform.coop*. A report would be released in 2016: Trebor Scholz, “Platform Cooperativism: Challenging the Corporate Sharing Economy,” Rosa Luxemburg Stiftung New York Office, 2016; as well as an edited anthology (Scholz and Schneider 2016).

⁶⁴ See Coca

change is enough to affect people's lives, and if we wanted to think more broadly, perhaps building a network of distributed local coops is enough to affect global change.

In Puerto Rico, at a local scale, I ask - could platform cooperatives work in resistance to crypto-colonialism, hyper-capitalist blockchain companies, and self-interested, individualistic transactionary publics? If we are to consider the feasibility of implementation in Puerto Rico, we should take into consideration that how cooperatives are implemented, and how well they take off, is dependent on the local context – culturally, socially, politically. In its favor, there is a historic precedent for cooperatives in Puerto Rico. In the early 20th century, the first cooperatives began to form in Puerto Rico initiated through the New Deal era Puerto Rico Reconstruction Administration (PRRA), including a women-owned needlework cooperative, as well as agricultural, industrial, housing cooperatives, and credit unions. New Deal era government agencies financially supported these cooperatives, as well as the expansion of the University of Puerto Rico, with the idea that Puerto Ricans via labor and education, could shape their own reconstruction (Burrows 2014). However, with the dissolution of those programs, the cooperative movement in Puerto Rico fell under the radar until recently in the early 2000s where it is beginning to gain momentum. As a key example, the world's first worker cooperative comprised solely of prisoners was formed in 1993 in Puerto Rico – Cooperativa de Servicios ARIGOS⁶⁵. Studies have shown that the coop has helped reduced the recidivism rate by over 80% in Puerto Rico.⁶⁶ Academic research and literature produced in Puerto Rico about cooperativism has also seen a recent resurgence, including around environmental-technology cooperatives (Mercado-Vázquez 2017), and cooperative entrepreneurship (Aponte and Álvarez 2017). In terms of funding, some post-Maria disaster relief has been granted to Puerto Rican food/grocer co-ops⁶⁷, from National Co-op of Grocers and Cooperative Development Foundation, working with Liga de Cooperativas de Puerto Rico⁶⁸.

Recent legislation has also been approved in Puerto Rico to support cooperatives, including the General Cooperative Associations Act 239 (approved in 2004). Act 239 acknowledged “the cooperative movement is a socioeconomic system which pursues the enfranchisement of human beings and their integrated betterment through economic justice and social cooperation.” Furthermore, it acknowledges that cooperatives, “promote the democratization of the Puerto Rican economy,” since the people produce, work on, and consume the goods of the enterprise of which they are also proprietors, and members exercise the decision-making power in equal standing, regardless of the amount of capital they have contributed (Act 239, Statement of Motives)⁶⁹. Some of the key benefits and incentives in Act 239 include income and property tax exemptions for Puerto Rican cooperatives (Act 239, Section 23). Other Acts that benefit cooperatives in Puerto Rico include the Cooperative Savings and Credit Association Act (Act 255, October 2002), and the Youth Cooperatives Act (Act 220, August 2002). Agencies that help initial cooperative startup and continued growth include the Puerto Rico Cooperative Development Commission (CDCOOP), the Public Corporation for the Supervision and Insurance of Cooperatives in Puerto Rico (COSSEC), and the Investment and Cooperative Development Fund of Puerto Rico (FIDECOOP). Other supporting groups include the Cooperative Bank (Act 88, June 1966), the Cooperative Institute at UPR, Río Piedras, and the Liga de Cooperativas.

Despite these recent turns, compared to other geographical locations such as in Brazil, Spain, Norway, Uruguay, Canada, and the UK⁷⁰, Puerto Rico's current cooperative movement is relatively weak. Intuitively, Andrew Mercado-Vázquez tells me this could be because the Puerto Rican people have never been given the chance to govern themselves, having been subject to serial-colonization and used for economic experimentation to the benefit of United States and foreign capital investment. In a comprehensive study recently conducted by Marinés Aponte and Marta Álvarez, it was found that despite

⁶⁵ Ajowa Nzinga Ifateyo, “The World's First Prisoner Worker Co-Op: Transforming prisoners lives through cooperation in Puerto Rico,” <http://www.geo.coop/story/worlds-first-prisoner-worker-co-op>

⁶⁶ Nina Misuraca Ignaczak, “Prisoner-run Coop Slashes Recidivism Rate by over 80% in Puerto Rico,” <https://charterforcompassion.org/restorative-justice/prison-run-coop-slashes-recidivism-rate-by-over-80-in-puerto-rico>

⁶⁷ <https://www.cdf.coop/2018/08/02/ngc-and-partners-raise-150000-to-rebuild-cooperatives-in-puerto-rico/>

⁶⁸ <https://www.liga.coop/>

⁶⁹ <http://www.oslpr.org/download/en/2015/A-220-2015.pdf>, see also Aponte and Álvarez

⁷⁰ “Which are the world's most co-operatively minded countries?” <https://www.thenews.coop/119989/topic/development/worlds-co-operatively-minded-countries/>

the existing “comprehensive framework for the support and development of the cooperative sector” from the regulatory side, there are still key areas of improvement to increase involvement in cooperatives. These include “1) education and training in cooperative entrepreneurship on the primary and secondary levels; 2) financial support; and 3) commercial and legal infrastructure (legal and professional support in the process of cooperative startups).”⁷¹

While the legislative framework is in place for platform cooperatives to be supported in Puerto Rico, it will be important to address the areas identified for improvement if platform coops are to have a chance at success. With a turn toward a new digital techno-economy for Puerto Rico, and with so many benefits witnessed already outside of Puerto Rico from Acts 20/22, platform cooperativism offers an alternate economic model that can facilitate a local economy benefitting local Puerto Rican workers. However, I pose the question – both broadly as a technology, and specifically in the context of Puerto Rico, is blockchain compatible with platform cooperatives?

As I mentioned above, some groups pose to use blockchain with platform cooperatives as a means to address scalability and increase efficiency in governance, or to provide alternate funding models. For example, the Platform Cooperative Consortium Circle of Cooperators is looking into how distributed ledgers such as blockchains can help with dispersed co-op membership and governance⁷², including Distributed Autonomous Organization (DAOs). The blockchain project Aragon has expressed interest in creating an Aragon Community Cooperative, where members have a platform to be effectively heard irrespective of how much ANT (the crypto-token associated with Aragon) they own⁷³. Equal votes per person is of key importance for cooperatives. Other blockchain-based voting mechanisms work on the principle of the more cryptocurrency/tokens a user owns, the more voting-stakes they have. This type of voting model (more tokens more votes) takes vote-buying to a new level. This is not a democratic voting system, but one that parades crypto-plutocracy as democracy. For example, this method is used with a DAO called “Colony.” As the name might suggest right away, there are enormous problems with their propositions. In their whitepaper, there is no mention at all of the term “cooperative.”⁷⁴ Instead, they state, “Each Colony has its own token. You own tokens by doing work. The more tokens you own, the more of the colony you own.”⁷⁵ This is literally antithetical to the values of cooperativism, where irrespective of how much capital a single worker contributes to the coop, they have the same decision-making power – equal votes per person.

Colony is featured in a recent paper titled, “Fostering Worker Cooperatives with Blockchain Technology: Lessons from the Colony Project.” The author correctly identifies that the ambition of the Colony project is to coordinate a group through its platform “in a meritocratic manner through the dynamic allocation of *reputation*. Reputation is a number that is associated with a person, reflecting the value of their recent contributions to a colony.” However, where I have to disagree is when the author indicates the similarities of Colony to a worker cooperative. First, he argues the economic activities of Colony are for the benefits of its participants. This may be true, however, many economic systems with vastly different ideological positions would argue that their system is for the benefit of its participants. Worker cooperatives aim to equally benefit all its workers, not just the ones who are valued most highly or who contribute the most labor. Secondly, the author argues that Colony is like a coop because the “capital of the organization is held by the participants. [...] This is akin to the common practice in the start-up technology sector of granting employees stock options, but in this instance it is coupled with the right to have a voice in significant strategic decisions.” Again, stock options and even decision-making power (as a partner or owner in a corporation) is not unique to cooperatives, and in fact is seen as the author astutely pointed out, in capitalist corporations and tech-startups. Thirdly, the author says that Colony is similar to cooperatives because “as currently designed, colonies have voluntary, open membership by default.”

⁷¹ Aponte and Álvarez

⁷² Trebor Scholz at a recent Platform Cooperative Consortium “Institute for the Digital Economy” launch event at The New School, April 2019.

⁷³ <https://forum.aragon.org/t/community-initiative-aragon-cooperative/356>

⁷⁴ Alex Rea, Aron Fischer, Jack du Rose, “COLONY Technical White Paper,” June 27, 2018. <https://colony.io/whitepaper.pdf> Accessed March 5, 2019.

⁷⁵ <https://colony.io/>

This may be true on the surface, as he goes on to argue, “restricted membership is not mentioned in the Colony White Paper.” Indeed, the code is open-source, and free to use for developers. However, there are no guidelines explicitly saying that membership should be open to anyone who wants to be involved. Often in practice, due to the regulatory risks that investing in cryptocurrency and token projects, there are legal barriers that prevent anyone other than high net worth individuals from participating. In its current nascent stage, token systems inherently privilege both technologists (at a bare minimum those with internet access and awareness of the project), and wealthy individuals, *unless steps are taken to explicitly act otherwise*.

Although the author’s article provides an illuminating analysis of the technical methods of the Colony project, I believe it is highly inaccurate and damaging to equate Colony’s model with platform cooperativism. As Amelia Evans points out, to be truly equitable, platform cooperatives *must challenge the corporate form*. Colony instead reproduces the status-quo in computational form, perhaps introduces more inequality. With systemic racism, classism, sexism, and other biases that give people unequal advantages, meritocracy only perpetuates inherited privileges and deepens inequality, lessening economic and social mobility.

This does not mean that all blockchain projects are inherently incompatible with the goals and ideological values of platform cooperatives. However, I am concerned that others looking to create a platform cooperative will look to the Colony project as a model of how blockchains and platform cooperatives can work together. Alternately, those looking to create a blockchain project may look to the Colony model to implement a so-called “platform coop” in name only, without adhering to its fundamental mission. I would also challenge the compatibility of blockchain with platform cooperatives for the following reasons. In no uncertain terms, cooperatives have key values of **“self-help, self-responsibility, democracy, equality, equity, and solidarity**. In the tradition of their founders, cooperative members believe in the ethical values of honesty, openness, social responsibility and caring for others.”⁷⁶ This element of care is so crucial to the success of cooperatives, making members feel respected as people, not just as a cog in the wheel of an economic or computational system. In the most successful cooperatives, there are true emotional connections. Decisions are made collectively, with discussions face-to-face, and with room for nuance and flexibility. Sometimes it is imperfect and messy, but that is the human element. Though blockchain offers to scale decision-making up and across wider geographical distances, there is a risk of losing that sense of community, that human element, and particularly that flexibility if we are talking about implementing Smart Contracts on the blockchain.

As I reviewed earlier in this chapter, many blockchain projects are primarily concerned with *individual* transactions and exchange, and how human behavior can be incentivized by cryptoeconomics/token-economics. These understandings explicitly draw from classical/neoclassical economics and game theory, and often advocate for the ultimate free market. These understandings have hyper-capitalist if not right libertarian leanings, and are generally at odds with cooperative political economics. However, as I have mentioned earlier in this chapter, the claims of decentralization that come with blockchain have also enticed people on the left, looking to break up monopolies and democratize access to economic benefits. In this respect, blockchain is technically compatible with both right libertarian capitalism, where individuals benefit, and left libertarian socialism, where cooperatives collectively benefit.

However, the biggest advocates for blockchain projects are usually advocates of blockchain technology itself, looking to increase adoption of the technology, or seeking to make their own operations more efficient. For blockchain to work with platform cooperatives, I believe that advocating for cooperative principles must take precedence, and that advocating for blockchain technology should be kept to a minimum. Some projects have been successful in this, such as Brooklyn Microgrid. Brooklyn Microgrid is not a cooperative but a registered “benefit corporation – a for-profit corporate entity that aims to positively impact society, workers, the community and the environment.” Blockchain is an effective tool in this instance but is not the focus of the company. It allows a distributed network that connects people in Brooklyn who own solar arrays (“prosumers” who are producing and consuming) with people who want to purchase local solar. Their aims are similar in many ways to platform cooperatives, including supporting a

⁷⁶ <https://www.ica.coop/en/cooperatives/cooperative-identity>

local economy; offering users choice over where energy is sourced. “Smart-meters” are installed on the photovoltaic systems on the network that monitor energy production and consumption, which is recorded on the blockchain that can be accessed and traced by consumers so that they can be assured their energy is coming from where they understand it to be coming from. Part of LO3 Energy, Exergy is the blockchain project that Brooklyn Microgrid uses. In Exergy’s technical whitepaper, the term “blockchain” comes up only thirteen times, fewer than terms like “energy” (278 times); “grid” (180 times); “system” (149 times); “service” (124 times); “transact/transaction/transactive” (123 time); “value” (83 times); and “electric/electricity” (73 times). The concept of “tokens/tokenization” comes up 71 times, but in reading the whitepaper, it becomes clear this project is focused on the content, strategy, and practical application rather than the pure *hype* of blockchain technology.

A careful, methodical, critical consideration about the *need* for blockchain technology over *any other* technology is essential in creating a platform cooperative using blockchain. Numerous platform cooperatives have been proven to work successfully (by all accounts of the members participating in them) without using blockchain. Articles have been written by technical experts who also argue that almost every idea that can be conceived is better suited to work with any other technology over blockchain⁷⁷. However, if some groups want to strategically capture the hype, particularly for funding via cryptocurrency, perhaps this can be used strategically. Caution should be exercised though, particularly if a project does not want to be swayed by the interests of certain individual crypto-investors, or if they do not want to be affiliated with a broader industry that currently contributes to an exorbitant amount of carbon emissions and energy consumption, equivalent to that of entire countries.⁷⁸

The situation in Puerto Rico is even more nuanced, with already-existing contesting blockchain and crypto interests at stake. In addition to the arguments above, we must also consider this context if we are to determine if platform cooperatives and blockchains are compatible in Puerto Rico. Here I ask, what is the most effective means of resistance against crypto-colonial behavior, distributed crypto-enclaves, insular spatial occupation, and exploitative cryptoeconomic geographies?

However, blockchain used in conjunction with platform cooperatives may see success in limited specific applications, *if and only if* the principles of cooperatives take priority. I conclude with the following speculative future scenarios.

Speculative Future Scenarios

Platform Cooperatives with Blockchain

A best-case scenario: Carefully planned from the beginning, and continually checked against ethical frameworks even as its success takes off. Its success raises the visibility of the cooperative model for other groups who may not know about it. It poses an alternate to the right-libertarian politics of blockchain and realigns the technology with the collective sovereignty of cooperatives. It occurs in a limited application with a specific use that blockchain brings some reason for connecting people on a distributed grid network (ex. a local distributed energy network such as Brooklyn Microgrid). Blockchain can also bring scalability and non-local governance but this is done with caution, still retaining the local component and community connection of care, but scaling up occurs in terms of forming a solidarity network with other energy cooperatives. The cooperative model is prioritized above the concept of blockchain. It gets funding from people who are interested in blockchain doing actual work rather than just being a buzzword. The organizers of the project are local Puerto Ricans and made sure to work with communities

⁷⁷ “You Don’t Need a Blockchain,” GitHub <https://gist.github.com/joepie91/a90e21e3d06e1ad924a1bdfc3c16902>; also William Suberg, “We Don’t Need Blockchain: R3 Consortium after \$59 Million Research,” <https://cointelegraph.com/news/we-dont-need-blockchain-r3-consortium-after-59-million-research>; and Thomas LaRock, “No, You Don’t Need a Blockchain,” <https://dzone.com/articles/no-you-dont-need-a-blockchain> are a few of the many articles

⁷⁸ This includes not only the bitcoin blockchain: <https://digiconomist.net/bitcoin-energy-consumption>, but also the Ethereum blockchain, on which many spinoff blockchain projects are based: <https://digiconomist.net/ethereum-energy-consumption>

to see if this was something they wanted, made sure to train everyone on how to use any apps necessary, and educating them about cooperatives and what their rights and entitlements are.

A middle-of-the-road scenario: Begins well and acts as a real platform cooperative, but in using blockchain's ability to "scale up" governance to be non-local, other competing interests get involved and there is a lack of physical connection for the community. Governance becomes depersonalized and computationalized, where people are seen not as people but as tokens and transactions. The frameworks for cooperatives begin to lose strength because of this, and the technical architecture of blockchain begins to take precedence over the cooperative. Some who were in it for the community connection and friendship aspect get frustrated with this change of direction and relinquish their membership.

A worst-case-scenario: This case was perhaps intended to be for social impact, but the "cooperative" component was used in name only, as an appropriation of the term to get the Act 239 tax breaks in addition to the Act 20/22 tax breaks. This was started by outsiders who sold the local government a narrative. Ownership was only opened up to exclusive privileged members. In truth, the organization operates quite exclusively and not democratically. Funders from outside, including non-profits, invest in the project but are driven by their own personal gain. Voting stakes are tied to the amount of tokens a member has, so the people who bought tokens early have more voting power and can effectively control decision-making. This turns the "coop" into an aristocracy, benefitting only a few, rather than what the community on the ground want or needs. Capitalism is made more efficient.

Platform Cooperatives without Blockchain

I argue it would be a far more effective means of resistance to implement platform cooperatives *without blockchain* as a techno-economic alternative to crypto and blockchain-based businesses in Puerto Rico. The barriers to entry are far fewer than those of blockchain which is technically quite complex, particularly if digital literacy is lacking. The very nature of cooperatives is that they are collectively owned, governed, and managed by their workers, in solidarity, with a strong sense of community and care. If there is anything that has kept Puerto Ricans strong in their situation of crisis layered upon of crisis, it is a strong sense of community, care, self-sufficiency, and solidarity. Platform cooperatives can align with the recent techno-economic shift in Puerto Rico, while supporting a local economy that is collectively owned, run, managed, and organized. For example, Uber is the dominant (only) ride-sharing platform in Puerto Rico, and is heavily used due to its lack of public transportation and car-centric planning. Though it is not a substitute for building adequate public transportation, a near-future temporary solution could be a platform cooperative ride-hailing service. This would pose a local alternative to the exploitative business model of Uber, with more money in the workers/owners pockets at the end of the day.

Platform cooperatives could work together with the local, community-oriented work of care that is being championed by women-led and solidarity movements, in the local agro-economy, or community-owned solar. For Puerto Rican creators of art, music, textiles, and more, platform cooperatives can connect their products and services to a wider audience online. New tech startups, particularly started by young entrepreneurs coming out of the Cooperative Institute at UPR, could benefit from Act 239 and Act 220, while creating a cooperative that any Puerto Rican can join. Parallel18 could incorporate education around cooperatives, and provide legal support, as part of their five-month tech startup accelerator program. For interested donors outside of Puerto Rico looking to support Puerto Rico's post-hurricane recovery, the Platform Cooperative Consortium would work together with Liga de Cooperativas, CDCOOP, COSSEC, and FIDECOOP, to direct revenue to cooperative projects that need funding. This process would challenge the current efforts toward making Puerto Rico into the Silicon Valley of the Caribbean, and would instead form a cooperative paradise, *un paraíso cooperativo para* Puerto Rico. This effort would take coordination and dedication to equitable and ethical frameworks, and would not be without its challenges, but it would decidedly be more aligned to work for Puerto Rican workers and those in solidarity.

Bringing it Together

To conclude, I return to the earlier chapters to bring the arguments together. In Chapter 1, I argued that blockchain technology is affecting and altering processes of urbanization as a new digital economic technology, as a capitalist industry, and as a platform for new urban imaginaries. Together, these are forming new socio-technical relationships with both existing institutions, governments, and organizations; as well as with new groups with new technopower. Blockchain urbanization, I argue, is a type of urbanization enacted as a result of, and in service to, the blockchain, its encoded principles and assumptions, and the ideas and desires of its proponents. Blockchain urbanization is distinct from but affected by “blockchain urbanism” (how the blockchain is intentionally championed to be used in the urban realm, ex. for urban development, urban transportation, smart cities, etc.). It is also different from but affects the “urban experience” or how the urban is lived, interacted with, experienced on the ground. Blockchain urbanization is shaped by the tendency of blockchain proponents to view everything as a transaction to be recorded or accounted for on a distributed ledger, towards the economization of everything. Blockchain urbanization is characterized by a tendency toward decentralization, while simultaneously concentrating certain material and spatial digital infrastructures in area with maximum incentives. Blockchain urbanization is about the transgressing of certain boundaries, while simultaneously creating new boundaries and barriers. Blockchain urbanization is imbricated with cryptoeconomic and political assumptions about individual human behavior, asking what will (financially and computationally) incentive individuals to make the “right” choice. Blockchain urbanization takes these economic and ideological assumptions and combines it with computationalism, building inflexible digital architectures that can only act as coded. As discussed in Chapter 3, these systems may have success in limited applications if and only if careful ethical and operational frameworks are considered and continually maintained.

In Chapter 2, I discussed how blockchain is simultaneously global, yet has highly local impacts. It intentionally transgresses certain boundaries, while simultaneously reinforcing or imposing new digital barriers. Exactly how cities, governments, and localities engage with cryptocurrencies and blockchains is highly context-dependent. Blockchain architectures are widely distributed, yet they have noticeable geographical concentrations. For example, we see consistencies such as mining operations landing in areas with the cheapest energy costs, and crypto-investors landing in locations with the biggest tax incentives (such as Puerto Rico). To understand how cryptocurrency and blockchain are playing out on the ground in Puerto Rico, I empirically describe the multiple contesting groups who are engaging in different ways. These contesting groups have different visions for what Puerto Rico should be and for whom. This includes a new transactionary public, who have a tendency to view the world from the point of individual transactions and exchange, rather than with deeply engaged community input and cooperation. These transactionary publics include the male-dominated US expats coming to Puerto Rico to create their own “crypto-utopia”. However, there are also local blockchain-startups hoping to steer the incoming capital in a more equitable direction; and local Puerto Ricans protesting exploitative crypto-colonialism; as well as the local government forming new ideological perspectives on how crypto and blockchain can be used for economic development.

In Chapter 3, I discussed how blockchain has been operationalized as a technology used both for economic development and for its apparent “emancipatory potential.” I discuss how claims of “revolutionary potential” are contradictory to the reality that blockchain is a largely capitalist-industry, engaged by existing institutions, banks, corporations, and organizations with existing power – for the purpose of making their operations far more efficient. At the same time, there are three seemingly contradictory ideological groups galvanized around blockchain technology for very different reasons. One group is dedicated to right-libertarian freedoms for the individual, free-markets, anti-regulation, anti-central banks or third-party intermediaries; one group is dedicated to maintaining the status quo under capitalism, increasing the role of institutions, multinational organizations, and private companies via computationalization and datafication; and one group is dedicated to disrupting the status-quo, hoping to use the technology to expose inequalities in existing systems and gain power for marginalized groups. Each of these groups argue that their approach to blockchain can be “emancipatory” or have “social impact,” but their ideological and structural frameworks drastically differ. If blockchain is really just a digital

distributed ledger or record, just a technological tool, it would follow that the priority focus should not be the technology itself, but instead on critical ethical and operational frameworks for how that tool will be used, by whom and for whom. Other key narratives include decentralization and democratization, but as I have argued in Chapter 1, decentralization is not *de facto* democratic. Decentralized organization can still occur undemocratically. In relation to the complex situation unfolding in Puerto Rico, I discussed a number of contesting visions for the economic future of Puerto Rico, and the different groups who hold these visions. From a feminist perspective, I address who each of these economic visions seek to benefit, and who are excluded. For techno-economic strategies posed as being “emancipatory”, I break down the claims, citing varied case studies from around the globe. In relation to Puerto Rico I specifically consider two models – blockchain-based businesses vs. platform cooperatives, and question their ideological compatibility. I argue that blockchain used in conjunction with platform cooperatives may see success in limited specific applications, *if and only if* the principles of cooperatives take priority. However, the relative potential for success must be considered in relation to the political, social, economic, and cultural context. Projects that may see “success” in one context may fall apart in another. Particularly in the case of Puerto Rico, the situation is more nuanced, with already-existing contesting blockchain and crypto interests at stake. In this case I argue the most effective means of resistance against crypto-colonial behavior, distributed crypto-enclaves, insular spatial occupation, and exploitative cryptoeconomic geographies is not necessarily by working within blockchain and crypto space, but by supporting and enacting alternate techno-economic strategies, such as platform cooperatives, outside of blockchain. If any project, blockchain or otherwise, claims to be emancipatory, the foremost step is to abandon the *claims* of a technology as a starting point, and instead give autonomy and agency to local communities and their trusted organizers/leaders to design and manage their own future, rather than having outside interests, or technologies themselves, determine a future for them.

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Defend PR is a multimedia project designed to document and celebrate Puerto Rican creativity, resilience, and resistance. Recognizing the complex and dynamic landscapes that comprise Puerto Rican daily life and struggle, Defend PR seeks to deepen connections between Puerto Ricans on the island and throughout the diaspora, in the hopes of nurturing greater solidarity, collaboration, and kinship.

Puerto Rico Syllabus

U.S. Colonialism and Puerto Rican Identity

Efrén Rivera Ramos, [*The Legal Construction of Identity: The Judicial and Social Legacy of American Colonialism in Puerto Rico*](#) (American Psychological Association, 2001).

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HISTORICAL CONTEXT

1898 and the Un-Incorporation of Puerto Rico

U.S. Colonialism and Puerto Rican Identity

Development and its Discontents

THE EXPLOSION OF THE DEBT CRISIS

"La Medicina Amarga" and the Unleashing of Austerity

"The Death Spiral"

Deep Debt, Wall Street Wealth

PROMESA and Imposition of a Fiscal Control Board

"La Quiebra": Puerto Rico files for Title III

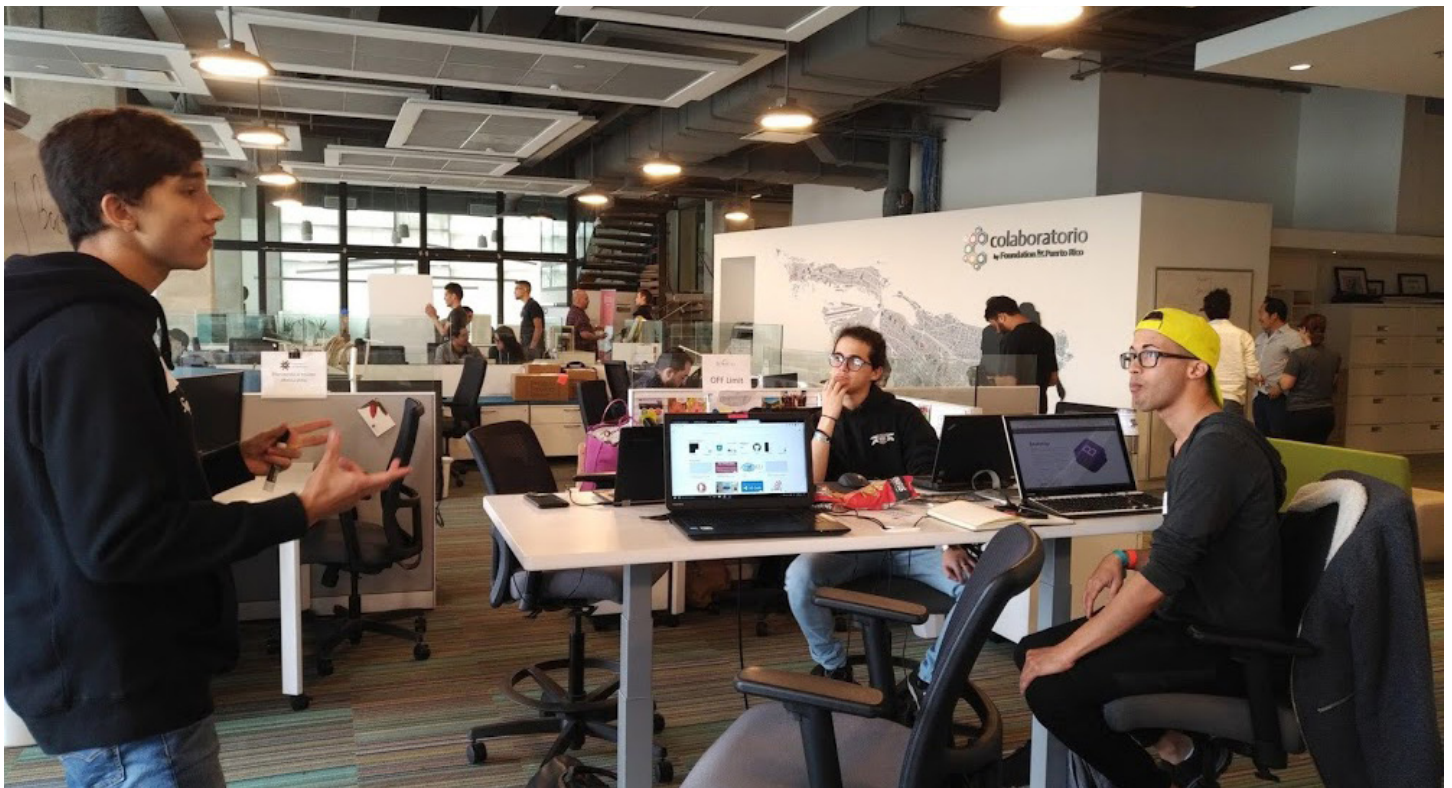
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Community Led Alternatives Within Technology/Blockchain



Photos Courtesy of Fabián Vélez, CEO of Link Puerto Rico

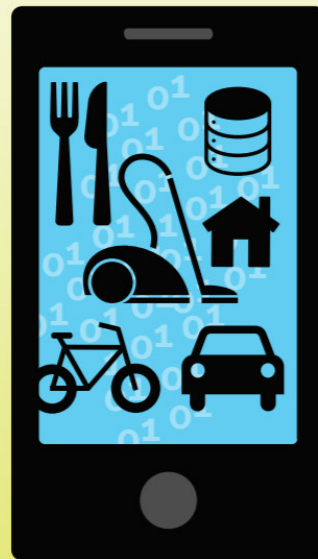
ain - Link Puerto Rico



Platform Cooperativism - Techno-Economic Alternative, Working with the Cooperative Movement in Puerto Rico

PLATFORM CO-OPs

We connect cooperatives with
the digital economy



Source: https://platform.coop/downloads/PLATFORM-COOPERATIVISM_graphic-individual-letter-size-pages.pdf

(Approved December 15, 2015)

AN ACT

To add a new Chapter XI; add new Sections 11.01, 11.02, 11.03, and 11.04 to Chapter XI; renumber current Chapter XI as Chapter XII; and renumber current Sections 11.01, 11.02, 11.03, 11.04, 11.05, and 11.06 as Sections 12.01, 12.02, 12.03, 12.04, 12.05, and 12.06, respectively, of Act No. 255-2002, as amended, known as the “Cooperative Savings and Credit Associations Act of 2002,” in order to establish the accounting requirements for Special Investments in Savings and Credit Unions; and for other related purposes.

STATEMENT OF MOTIVES

The cooperative movement is a socioeconomic system which pursues the enfranchisement of human beings and their integrated betterment through economic justice and social cooperation. A cooperative is an autonomous association of persons who have united voluntarily to address their common economic, social and cultural needs and aspirations through a jointly-owned and democratically controlled enterprise.

It is the public policy of the Commonwealth of Puerto Rico to direct the path of the social and economic development of Puerto Rico predicated on the tenets of social justice, personal effort, and democratic control of the cooperative movement. This public policy is established in Section 2.0 of Act No. 239-2004, as amended, known as the “General Cooperative Associations Act of 2004,” which provides that,

Source: <http://www.oslpr.org/download/en/2015/A-220-2015.pdf>

Source: <https://www.liga.coop/>



METE MA
ESTA LUC

Murals of Resistance - Students of the School of Plastic Arts in Resistance

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