

Criptociudades

Historia y futuro de los modelos urbanos en la era de la tecnología de la contabilidad descentralizada (ca. 2020)

Universidad Torcuato Di Tella

Escuela de Arquitectura y Estudios Urbanos

Maestría en Historia y Cultura de la Arquitectura y la Ciudad

Cripto-ciudades: Historia y futuro de los modelos urbanos en la era de
la tecnología de la contabilidad descentralizada (ca.2020)

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Abstract

La tesis se sumerge en el estudio de las criptociudades explorando tres proyectos en curso: Bitcoin City, CityDAO y Decentraland. Se examinan sus narrativas, estructuras espaciales y organización para establecer un muestrario de sus dimensiones temáticas, tecnológicas, territoriales e ideológicas. Con el fin de organizar y comentar el material disponible, el análisis se basa en las imágenes y proposiciones discursivas generadas por los autores de cada proyecto. Inscribiendo estas iniciativas en un linaje urbano de largo alcance, la pregunta central que impulsa la investigación es: ¿Qué hay de nuevo en los proyectos de criptociudades y qué continuidades pueden trazarse con modelos urbanos del pasado? La hipótesis es que, dada la intensa polarización en torno a la tecnología blockchain y su peso ideológico, revisar el marco histórico y establecer interconexiones contribuirá a una mirada perspicaz, despojada de la euforia que manifiestan tanto sus promotores como sus críticos.

Agradecimientos

Durante el encierre pandémico esta tesis nació como mi *guilty pleasure*: atrapada en la red de hipervínculos, habilitó sin escrúpulos la pérdida absoluta de la noción del tiempo, cuando el tiempo parecía ser lo único que había. Se volvió coraza, armadura, en mi vertiginoso destierre, facilitando (pero también entorpeciendo) el desgarrador autodescubrimiento que impone todo viaje. En esa travesía fue mi mochila, pesada acompañante; mi puente con Buenos Aires; mi bitácora de desarrollo; mi brújula sin norte; portal a lo transdisciplinar. Fue la estructura líquida de un mapa cultural y lingüístico. Fue refugio en el duelo de un amor que no fue; estorbo en uno que inicia.

En ese desestabilizante recorrido, quiero agradecer, sobre todo a Julián, por su rigor, meticulosidad, apertura a un tema foráneo, el cual se apropió con diligencia, y por haberme guiado e impulsado a la formación de una mirada crítica. Gracias por el tiempo dedicado, la paciencia, la flexibilidad, la insistencia, el esfuerzo, el profesionalismo y el compromiso.

A UNStudio (A Gerard, a Crystal, a Harlen): por incitarme a completar la investigación, y proporcionarme de los recursos para la redacción final. A Pietro Scarpa y a Harlen Miller, por su generosidad en mi crecimiento profesional, por haber sido mis confidentes, mentores, cuyas conversaciones –sobre blockchain, tecnología, arquitectura– fueron inspiradoras.

A los profesores de la maestría, en especial a Pablo Elinbaum y Guillermo Jajamovich, por su lectura de un borrador incipiente, cuyos comentarios y sugerencias fueron determinantes para afinar el enfoque. A Adriana Amante, por estimularme con la literatura y ejercicios de escritura indicados, aun cuando el tema parecía ser críptico. La forma en la que habito el inglés, académica, fría, cuasi robótica es muy diferente a la que habito el castellano, notoriamente más frenética. Primero escrita en inglés y luego traducida, esta tesis es el primer paso en la exploración de una voz propia dual: una búsqueda que Adriana validó antes que yo.

A mis padres y hermana, que me animaron, me entendieron, me cobijaron en momentos de catarsis, me hospedaron con amor, siempre impulsándome a terminar. A mi red de acá y de allá, en especial a Gabriela Tratzenberg, Sol Batistti, la gente del Lincoln (Sarita incluida), mis primas, mis colegas de UTDT, quienes, cada uno a su manera, me dieron perspectiva para descifrar mis *e-mociones* en el proceso de escritura. A Sonia Boustani, Ignacio Dostal, Candela Galarza, Luciana Capozzoli, Jose Miguel Polanco, Jennifer Namm, Liva Sadovska, Rahul Girish, y Julia Durand, que hicieron de esta ciudad un hogar. A Federico, quien con humor y cariño empatizó con la priorización de la tesis durante estos últimos, muy intensos, meses y me iluminó con energías para el *sprint* final.

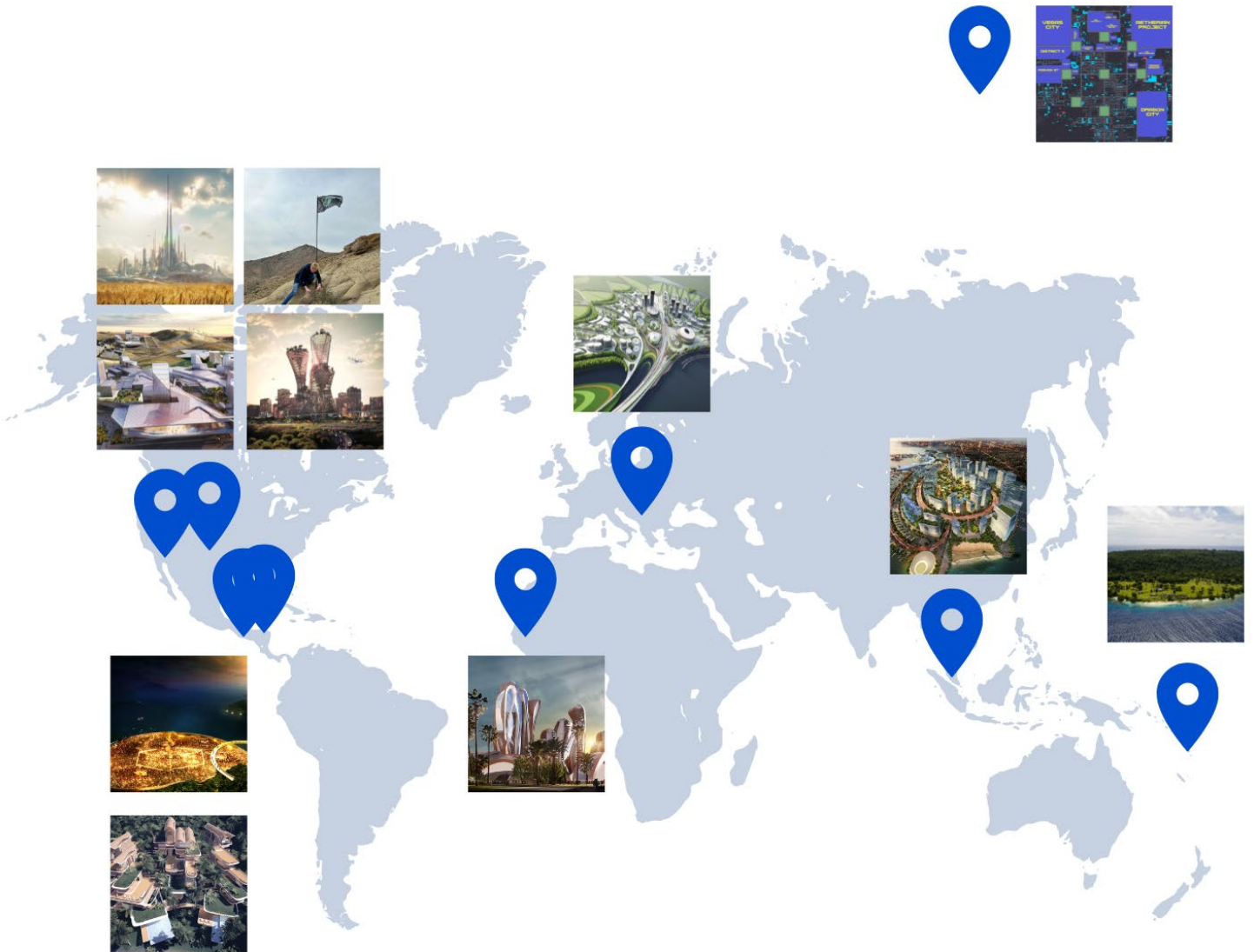
Abreviaturas

IA	Inteligencia Artificial
BTC	Bitcoin
DAO	Organización Autónoma Descentralizada (<i>Decentralized Autonomous Organization</i>)
DLT	Tecnología de Libro de Contabilidad Distribuida (<i>Distributed Ledger Technology</i>)
ETH	Ethereum
IoT	Internet de las Cosas (<i>Internet of Things</i>)
NFT	Token No Fungible (<i>Non-Fungible Token</i>)
P2P	Par-a-par (<i>Peer-to-Peer</i>)

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Inauguración

Criptomanía

Los debates sobre criptomonedas han ganado centralidad en el marco de las noticias globales y debates públicos, elevando lo que había surgido como una cultura casi clandestina al centro de la agenda internacional, y de la preocupación de gobiernos, empresas y particulares. En medio de un frenesí de acontecimientos impredecibles, tanto los mercados bajistas como los alcistas han colocado las fluctuaciones de las criptomonedas en los titulares de los principales medios de comunicación con un alarmante sentido de relevancia y urgencia. Cuando el precio sube, nuevos inversores quieren entrar y los primeros en adoptarlas se jactan de su visión. Al llegar el “invierno”, los escépticos redoblan sus críticas. No obstante, si la volatilidad de los precios es intrínseca a las principales criptomonedas, esa dinámica representa sólo una parte muy pequeña del panorama general dentro del paisaje evolutivo de las tecnologías digitales contemporáneas.

En 2008, en una lista de correo de debate sobre criptografía, un participante (o grupo anónimo) que utilizaba el seudónimo de Satoshi Nakamoto publicó el *whitepaper* de Bitcoin anunciando: “I have been working on a new electronic cash system that is entirely peer-to-peer, without a trusted third-party validator.”¹ Así surgió Bitcoin como una crítica al sistema monetario tradicional² y sus conocidas asociaciones con la ideología del tecno-libertarismo,³ que lo promueve como una vía hacia la libertad y la autonomía individual.

Diseñado específicamente para resistir los ataques que pretenden desestabilizarlo, Bitcoin ha evolucionado en menos de dos décadas hacia una amplia gama de usos, desde el contrabando a la justicia social, a medida que diversos grupos ideológicos competían por apropiarse de su potencial. Por ejemplo, en 2011 se puso en marcha un mercado online llamado *Silk Road* para la venta de bienes y servicios ilegales (drogas, documentos de identidad falsos, herramientas de piratería informática); luego se utilizó para recaudar dinero para la resistencia ucraniana en la guerra entre Rusia y Ucrania, sorteando los bloqueos financieros de los Estados. De modo similar, los casos de WikiLeaks⁴ y Sci-Hub⁵

¹ “The Next Big Thing. Or is It?” *The Economist*, 7 de Mayo, 2015. [Link](#)

² Joshua Davis “The Crypto-Currency. Bitcoin and its mysterious inventor” *The New Yorker*, 10 de Octubre, 2011. [Link](#)

³ El tecno-libertarismo es una ideología política y filosófica que combina elementos del libertarismo con una fuerte creencia en la importancia de la tecnología, en particular las tecnologías digitales e Internet, como medio para promover la libertad individual, la privacidad y la autonomía. Tiene sus raíces en los movimientos libertarios y ciberpunk de finales del siglo XX. Surgió como respuesta al rápido crecimiento de las tecnologías digitales e Internet, junto con la preocupación por la regulación gubernamental y el poder corporativo.

⁴ WikiLeaks ha publicado más de diez millones de documentos censurados sobre crímenes de guerra, espionaje, violación de tratados internacionales y corrupción. Joshua Dávila, *Blockchain Radicals: How Capitalism Ruined Crypto And How To Fix It* (London: Repeater Books, 2023), 40.

⁵ Sci-Hub es un sitio web que proporciona acceso gratuito a millones de trabajos de investigación científica y artículos académicos. Su objetivo es facilitar el acceso a quienes no pueden permitirse sus costosas suscripciones. La Facultad de Harvard reveló que la universidad destinaba 3,75

ilustran usos políticamente legítimos (aunque polémicos y de dudosa legalidad) de la tecnología.

Es importante destacar que, con la creación de la primera moneda digital en 2008, se dio una combinación de diferentes tecnologías, que ahora se denominan bajo el nombre genérico *blockchain*, de las cuales Bitcoin es sólo una aplicación particular. Blockchain es un sistema que garantiza la fiabilidad de las transacciones digitales mediante la marca temporal de los datos. Su teoría fue desarrollada en 1991 por Haber y Stornetta,⁶ y también fue propuesta para el precursor de Bitcoin, BitGold⁷.

Las aplicaciones de blockchain van más allá del limitado ámbito de los inversores e impulsores del tecno-libertarianismo.⁸ Los experimentos incluyen también aplicaciones en la gestión de las cadenas de suministro, la atención sanitaria y la votación, entre muchas otras. Dentro del actual sistema de gobernanza, los organismos reguladores globales están explorando su uso para diversos fines, como mejorar los servicios públicos, aumentar la transparencia y reducir el fraude.

Esta investigación invita al lector a suspender la idea preconcebida de que el criptoespacio está siendo moldeado por la derecha y adaptado principalmente a ella. Aunque los debates suelen girar en torno a la probabilidad de que las criptomonedas se conviertan en la corriente dominante, los siguientes capítulos pretenden demostrar que la tecnología blockchain tiene el potencial de trastornar las convenciones culturales y sociales, y cuestionar así las ideas contemporáneas de lo que puede ser una ciudad.

Pero, ¿qué es la tecnología blockchain? La literatura sobre el tema suele ser de naturaleza técnica y difícil de seguir para los no iniciados. Por eso, se busca minimizar el uso de términos esotéricos y ofrecer explicaciones cuando esa terminología resulta inevitable. Al final se incluye un glosario como referencia.

He aquí una primera definición de blockchain: se trata de un *ledger* (libro de contabilidad) digital que registra transacciones de forma secuencial mediante cifrado. Este libro es distribuido, lo que significa que existen múltiples copias, en lugar de estar controlado por una administración central.

millones de dólares anuales a suscripciones de revistas académicas, sin que los autores de los artículos comprados se beneficiaran económicamente de las ventas de sus publicaciones. Dávila, *Blockchain Radicals*, 47.

⁶ Haber, S.; Stornetta, W.S. "How to Time-Stamp a Digital Document" *Journal of Cryptology* 3,9-111 (1991).

⁷ BitGold es un intento de moneda digital, desarrollada por Nick Szabo en 1998. Fue solo una postulación teórica que nunca se llegó a implementar. Mencionaba la idea de una cadena de datos, pero faltaba el incentivo económico para que los distintos nodos de la red funcionaran. Ver: Nick Szabo, "Bit Gold," *Unenumerated* (blog), 27 de Diciembre, 2008, <https://unenumerated.blogspot.com/2005/12/bit-gold.html>.

⁸ No todas las tecnologías de contabilidad distribuida son, como Bitcoin, públicos y accesibles. También pueden diseñarse con permisos privados, lo que significa que las adiciones y modificaciones de datos requieren permisos de un administrador centralizado. Estonia es uno de los ejemplos más citados de aplicaciones gubernamentales de blockchain. Para más información sobre este tema, véase David Rozas Silvia Semenzin, Samer Hassan, "Blockchain-based application at a governmental level: disruption or illusion? The case of Estonia," *Oxford University Press* (Abril 2022), 1-16.

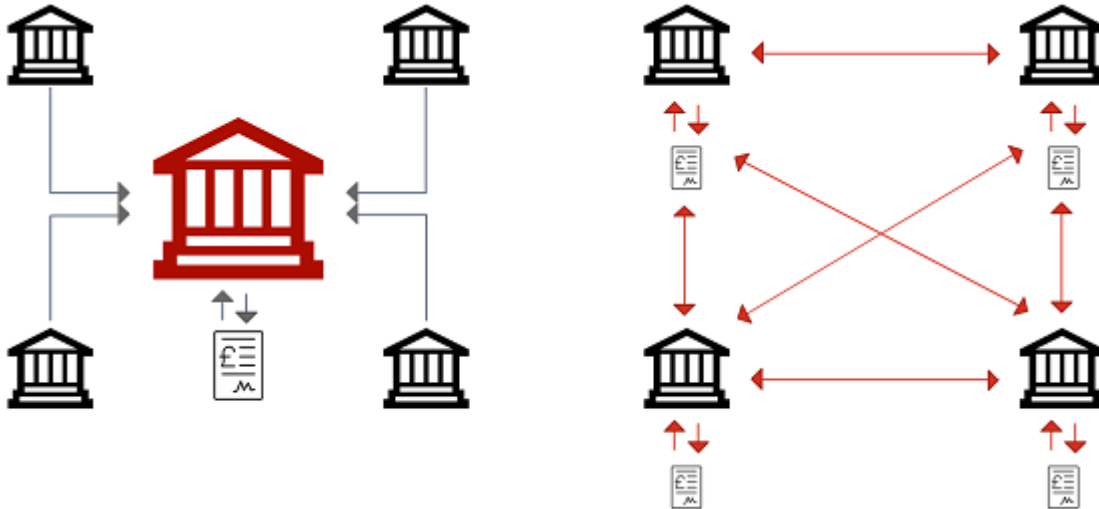


Figura 1: A la izquierda, un sistema bancario tradicional basado, en el que un tercero centralizado y de confianza actúa como intermediario entre las personas de la red. A la derecha, un sistema descentralizado, en el que cada participante de la red tiene una copia de la base de datos, lo que garantiza la inmutabilidad.

Se dice que la tecnología Blockchain está en su infancia y probablemente también lo esté el debate sobre cómo debe implementarse. Parte de ese debate es estrictamente técnico, por ejemplo, cómo deben avalarse las transacciones, o cuántas deben validarse en un determinado periodo de tiempo, etc. Como el código de Bitcoin es inalterable, quienes no están de acuerdo con las decisiones incorporadas por Nakamoto crean nuevas criptomonedas con esas alteraciones. Las posturas respecto a estas cuestiones tienen, no obstante, amplias repercusiones: sociales (eficiencia energética, protección de la identidad, privacidad de los datos), económicas (inflación, desigualdad, estabilidad) y políticas (modos de gobierno, soberanía y regulación). Esta tesis se centra específicamente en las especulaciones que están teniendo lugar en relación con la arquitectura y el urbanismo sobre las posibilidades que abre blockchain. Al 2024, todos los continentes han sido escenario de al menos un proyecto de criptociudad, y renombrados estudios de arquitectura como BIG y ZHA se han involucrado en versiones de alto perfil de tales iniciativas. Blockchain ya se ha convertido en tema de programas académicos en escuelas de arquitectura como el SCI Arc⁹ y el MIT.¹⁰

En ese contexto, se vuelve necesario intentar profundizar en la investigación sobre el estado del cripto

⁹ El Máster en Ciencias en Tecnologías Arquitectónicas de SCI-Arc participa activamente en nuevos modelos de emprendimiento desarrollando investigaciones y aplicaciones en IA, blockchain y medios interactivos. Uno de los profesores del programa, Tom Wiscombe, tiene un proyecto de criptociudad en Nevada. Ver: Nathaniel Popper, "A Cryptocurrency Millionaire Wants to Build a Utopia in Nevada" *The New York Times*, 1 de Noviembre, 2018; "MS Architectural Technologies" SCI-ARC, Consultado 26 de Mayo, 2024 [Link](#)

¹⁰ Los investigadores del MIT CityScope están desarrollando varias plataformas dedicadas a la planificación urbana utilizando blockchain. Algunos de los proyectos incluyen movilidad, fiscalidad, creación de equidad sin zonificación, entre otros. "Looking Beyond Smart Cities" *MIT Media Lab*, Consultado 26 de Mayo, 2024. [Link](#)

urbanismo en la actualidad. ¿Cuáles son los proyectos relevantes? ¿Dónde reside su potencial? ¿Cuál es el bagaje cultural de las (aparentemente) radicales criptociudades que se están desarrollando actualmente? ¿Qué modelos históricos intervienen en sus matrices conceptuales, operativas y organizativas? ¿Cuáles podrían ser los medios pertinentes para investigar fenómenos tan dinámicos como las criptociudades, que hasta ahora apenas existen fuera del volátil ámbito de los medios digitales?

Trabajo de Base

El incipiente territorio académico del criptourbanismo consiste en trabajos recientes y de alcance limitado. Su condición emergente, su naturaleza interdisciplinar y su rápido ritmo evolutivo traspasan los límites de los campos tradicionales. Además, la complejidad de la tecnología blockchain, con su carga ideológica y su jerga oscura, sigue disuadiendo a los investigadores procedentes de las humanidades, lo que plantea dificultades a la hora de formular un enfoque normalizado del tema. En consecuencia, aquí se ha optado por trabajar desde la base, a partir del análisis de tres casos de estudio relevantes: Bitcoin City, CityDAO y Decentraland.

Esta selección no agota en absoluto el universo de criptociudades: periódicamente nacen nuevos proyectos en el terreno movedizo en el que la arquitectura se encuentra con los negocios, la política y la tecnología. De hecho, un borrador anterior de esta investigación incluía el estudio de otros tres proyectos: Telosa, Liberland y Akon City. La selección se redujo finalmente para permitir un tratamiento más extenso de la tecnología en sí, siendo la muestra restante lo suficientemente heterogénea como para presentar distintas aplicaciones de la tecnología (como dinero, como aplicación), centrarse en distintas tendencias sociales (que se presentarán en el Capítulo I), así como explorar su aplicabilidad en distintas condiciones económicas y sociales (país emergente, país desarrollado, espacio virtual).

La bibliografía utilizada para la tesis abarca tres tipos de materiales. El primer grupo consiste en escritos de historia de la arquitectura y el urbanismo, que proporcionan una columna vertebral para la formulación de un marco conceptual. Se trata de autores que van desde Leonardo Benévolo a Kenneth Frampton, pero también de trabajos académicos más recientes que profundizan en el tema de forma oblicua, examinando las experiencias urbanas (no criptográficas) que se han ido configurando a lo largo de las últimas décadas. El segundo grupo está formado por bibliografía relacionada con la evolución contemporánea de la tecnología y la economía, centrada principalmente en blockchain, pero que también aborda la cultura de las *startups* y otros fenómenos asociados. La selección de esta literatura planteó un reto metodológico por varias razones, principalmente el tema me obligó a negociar la línea que separa los hechos del sensacionalismo publicitario, y su rápida evolución hizo que los conceptos amenazaran con quedar continuamente al borde de la obsolescencia. Para hacer frente a esto, leí a autores de diversos orígenes ideológicos y campos de especialización, ayudado por el curso del MIT de Gary

Gensler sobre blockchain.¹¹ Estudié autores cuyos nombres se repetían en podcasts, blogs y redes sociales dentro de la *criptoesfera*, como por ejemplo Balaji Sirinivasan, James Dale Davidson y William Rees-Mogg, entendiéndolos no como fuentes definitivas de la verdad, sino como indicadores de los sentimientos predominantes dentro del campo. El último grupo de materiales está compuesto por fuentes específicas para el análisis de cada caso de estudio. La cantidad y seriedad de la información disponible no es equivalente en todas las ciudades analizadas: algunas han tenido una repercusión mediática mucho mayor que otras. En algunos casos, la difusión de imágenes está emparejada a una agenda política, como en el caso de Bitcoin City. Otros proyectos, como CityDAO y Decentraland, se lanzan primero como versión de prueba y se construyen progresivamente a medida que disponen de recursos. Con un invierno prolongado en el panorama de las criptomonedas en 2022, muchos de estos proyectos carecieron de financiación o empuje político para continuar su desarrollo. Para tratar con campos de información tan dispares e inestables, he incluido en el cuerpo de la investigación las pruebas de las que parte el análisis. En reconocimiento de los desafíos que esto podría suponer para construir mi caso, he guardado una copia local de los materiales en línea tal y como se ofrecen actualmente, y la he incluido parcialmente como anexo.


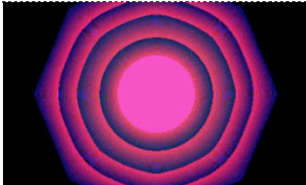
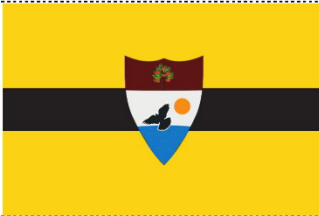

Hoja de Ruta

Esta investigación consta de cuatro capítulos. El primero plantea la cuestión de las criptociudades y explica cómo funciona la tecnología blockchain. Los tres siguientes analizan estudios de casos concretos, profundizando en sus diversos componentes. La definición elaborada en el Capítulo I se basa en el examen de una serie de ejemplos, extrayendo temas comunes. Explora la evolución de la cultura emprendedora y su impacto en la gobernanza urbana, reconociendo que muchas figuras de este ecosistema proceden del ámbito de las *startups*, una tendencia que empezó a aflorar en los años setenta y ochenta, según David Harvey. Esta definición abarca también una explicación técnica del funcionamiento de blockchain, cuya comprensión se traduce posteriormente en leitmotivos transversales a todos los casos de estudio. El capítulo I también sitúa esta investigación dentro de un marco conceptual más amplio, abordando las nociones de modelos, utopías y ciudades nuevas. El objetivo es especificar estos conceptos e ilustrar su importancia para comprender los casos de estudio que se presentarán a continuación. En última instancia, el examen de la evolución de la teoría urbana y la identificación de las tendencias predominantes en las nuevas ciudades contemporáneas ilustran la redefinición de los valores sociales que está teniendo lugar, tanto de forma independiente como en proximidad a la tecnología blockchain. Estos actúan como una matriz ubicua, reapareciendo de forma intermitente en los siguientes capítulos. El capítulo II se centra en el análisis de Bitcoin City, en El Salvador. Esta es presentada como

¹¹ Todas las clases están disponibles en YouTube. Gensler fue banquero de inversión de Goldman Sachs y actualmente preside la Comisión del Mercado de Valores de Estados Unidos (*Securities and Exchange Commission* SEC).

innovadora por sus promotores por dos razones: la adopción de la criptomoneda que le da nombre como medio para financiar el proyecto, y la iniciativa pionera en el aprovechamiento de la energía geotérmica. Su análisis discierne el papel que desempeñan estas empresas en la formulación de una narrativa en un intento de remodelar la imagen global del país. El capítulo III examina CityDAO como un modelo en el que la propiedad de la tierra se reparte entre los miembros de una comunidad desterritorializada tras un cambio en la normativa del Estado de Wyoming. Profundizando en las especificidades de la tecnología que lo hace posible, junto con sus oportunidades, desafíos y riesgos, el análisis trata de desentrañar cómo un sentido participativo de pertenencia codifica valores sociales que redefinen el concepto de ciudadanía. El último capítulo se adentra en el reino virtual de Decentraland, examinándolo como la simulación de un modelo económico alternativo, que escapa a la monopolización en la industria de la realidad virtual de grandes empresas tecnológicas tales como Meta, y propone un nuevo tipo de capital, creado y poseído por los usuarios.

Línea de tiempo de crypto ciudades

Fecha	Evento	Fuente
1/1/1991	La idea de una cadena de bloques criptográficamente segura fue propuesta por Stuart Haber y W. Scott Stornetta	Haber, S; Stornetta, S. "How to Time-Stamp a Digital Document" <i>Journal of Cryptology</i>
1989	David Chaum crea DigiCash, una forma de pago electrónico que utilizaba criptografía de clave pública y privada para ser irrastrable por terceros. Quebró al entrar en el mercado antes de que el comercio electrónico estuviera plenamente integrado en Internet.	Chaum, D. "Blind Signatures for Untraceable Payments" <i>Springer-Verlag</i> (1989).
1996	Nick Szabo acuña el término «contrato inteligente» y escribe extensamente sobre el tema	Szabo, N. "Smart Contracts: Building Blocks for Digital Markets" (1996).
1998	Nick Szabo publica la teoría de una moneda digital descentralizada «BitGold»	Szabo, N. "BitGold" <i>Unenumerated</i> . (2008)
10/31/2008	Satoshi Nakamoto publica el WhitePaper de Bitcoin «Bitcoin: A Peer-to-Peer Electronic Cash System».	Nakamoto, Satoshi. "Bitcoin: A Peer-to-Peer Electronic Cash System" (2008).
1/3/2009	Nakamoto crea el primer bloque de Bitcoin, llamado Bloque Génesis, que da origen a la cadena de bloques de Bitcoin.	
5/22/2010	 Primera transacción con Bitcoin para comprar un bien en el mercado. Un hombre de Florida pagó 10.000 BTC por dos pizzas.	Kamau, R. "What Is Bitcoin Pizza Day, And Why Does The Community Celebrate On May 22?"
2014	Vitalik Buterin publicó el Libro Blanco de Ethereum, que presentaba una plataforma de programas informáticos autoejecutables descentralizados (conocidos como contratos inteligentes), que permiten aplicaciones descentralizadas (DApps) en su blockchain.	Buterin, V. "Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform"
6/10/2014	 El primer NFT del mundo llamado «Quantum» es acuñado por Kevin McCoy y vendido a través de Sotheby's por 1,47 millones de dólares	McCoy, K. "Quantum" <i>Sotheby's</i> (2014).
2015	Esteban Ordano y Ariel Meilich empiezan a trabajar en Decentraland, un mundo virtual sobre la blockchain	Zin, Herman. ¿Por Qué No Te Habrá Hecho Caso? Podcast audio. <i>La Prodigiosa Historia de Decentraland 2022</i>
2015	 Liberland convoca un concurso para su Masterplan	Rosenfield, K. "Design Liberland: Competition Seeks to Masterplan New European Micronation" <i>ArchDaily</i> (2015).
2016	 RAW-NYC Architects gana el primer premio del concurso para Liberland	RAW-NYC Architects. "Liberland" (2016).

Fecha	Evento	Fuente
2017	 <p>Se publica el Libro Blanco de Decentraland</p>	Esteban Ordano, Ariel Meilich, Yemel Jardi, Manuel Araoz. "Decentraland Whitepaper." (2017)
2/1/2020	 <p>Lanzamiento de Decentraland</p>	
7/1/2020	 <p>Akon publica el Libro Blanco de Akoin y anuncia Akon City. Los medios de comunicación publican imágenes de otros proyectos</p>	Akoin Inc., "Akoin. One Africa. One Koin". (2020)
12/1/2020	 <p>Akon City publica nuevas imágenes de BAD Consult</p>	BAD Consult. "Akon City"
3/1/2021	 <p>Beeple vendió el NFT más famoso llamado Everydays: The First 5000 Days por 69,3 millones de dólares. El acontecimiento creó un efecto de bola de nieve en los principales medios de comunicación, sentando las bases para un boom de las NFT</p>	"Beeple's Opus" <i>Christie's</i> "SF0038 - Decentralized autonomous organizations" <i>State of Wyoming 67th Legislature</i> (2021)
7/1/2021	<p>La ley de Wyoming acepta DAOs, y Fitsimones inicia CityDAO</p>	
9/1/2021	 <p>Bjarke Ingels y Marc Lore anuncian la Ciudad de Telosa</p>	Ravenscroft, T. "Bjarke Ingels designing "new city in America" for five million people" <i>Dezeen</i> (2021).
10/31/2021	 <p>Vitalik Buterin publica una entrada en su blog sobre CryptoCities en la misma fecha en que CityDAO planta su bandera</p>	Buterin, V. "Crypto Cities"

Fecha	Evento	Fuente
11/20/2021	 <p>Bukele anuncia Bitcoin City</p>	<p>"Bitcoin City & Bitcoins Bonds announcement by El Salvador's President Nayib Bukele"</p>
2022	 <p>Zaha Hadid Architects publica un nuevo proyecto para Liberia</p>	<p>Finney, A. "Zaha Hadid Architects designs virtual Liberia Metaverse city" <i>Dezeen</i> (2022).</p>
5/10/2022	 <p>Bukele publica a través de Twitter nuevas imágenes de Bitcoin City</p>	<p>Bukele, N. "Bitcoin City is Coming Along Beautifully"</p>

Capítulo I. ¿Qué son las Cripto-ciudades?

La corta historia de blockchain en el ámbito de la arquitectura y el urbanismo puede explicar la ausencia de una definición establecida de lo que es una criptociudad. Gran parte de la literatura¹² disponible sobre blockchain y arquitectura explora cómo la adopción de la tecnología podría fomentar una economía participativa para enmendar los inconvenientes de las ciudades inteligentes.¹³ Sin embargo, esta investigación difiere en el reconocimiento de que las ciudades inteligentes y las criptociudades tienen objetivos diferentes: las inteligentes pretenden interiorizar mecanismos de aprendizaje y razonamiento a través de la recopilación de datos.¹⁴ Aunque esto no excluye necesariamente a las criptociudades, no es constitutivo de ellas. A continuación se aborda una definición mediante el examen de un conjunto de casos de estudio (Bitcoin City, CityDAO, Decentraland, Liberland y Telosa), sobre los cuales se crea una base común. El objetivo es explicar los aspectos técnicos intrínsecos a blockchain y cómo se traducen en la narrativa de cada propuesta. Antes de entrar en los aspectos específicos, hago una revisión de la cultura empresarial que le dio origen.

¹² Ver Jianjun Sun; Jiaqi Yan; Kem Z. K. Zhang, "Blockchain-based sharing services: What blockchain technology can contribute to smart cities," *Financial Innovation* 2, 26 (2016).

¹³ Las ciudades inteligentes han sido criticadas por autores como Anthony Townsend y Richard Sennett por varias razones. Algunas de ellas son: la abolición de la espontaneidad y la serendipia, que hacen de las ciudades un lugar en el que nadie quiere vivir; el preocupante papel de las inversiones privadas de las grandes corporaciones, que, tras la crisis de 2008, podrían volver a caer; el papel desempeñado por otra categoría de actores, los desarrolladores de software, que trabajan de forma independiente y utilizan cantidades masivas de datos para promover prácticas urbanas colaborativas; entre otras. Véase Anthony M. Townsend, *Smart Cities: Big data, civic hackers, and the quest for a new utopia* (United States: W. W. Norton & Company, 2013).

¹⁴ Antoine Picon, *Smart Cities: A Spatialised Intelligence* (Italy: Wiley, 2015), 29.



Figura 2: De izquierda a derecha, de arriba abajo: Akon City de Bakri & Associates Development Consultants, Bitcoin City de Fernando Romero Enterprise, City of Telosa de Bjarke Ingels Group, Liberland de Raya Ani.

I.a Del emprendedurismo de Harvey al *startupismo* de Graham

Los principales promotores de las criptociudades suelen proceder del mundo de las *startups*.¹⁵ Podría entonces deducirse que la cultura que dio origen a las criptociudades (y que está siendo fomentada por ellas) puede identificarse con el concepto de espíritu empresarial. Como mostraré, comparten ciertos objetivos, mentalidad y valores. Esta tendencia no es completamente novedosa, ya que, según David Harvey, la gobernanza urbana pasó gradualmente de un «estilo de gestión» predominante en los años sesenta a un modo de actuación más innovador y emprendedor durante los años setenta y ochenta.¹⁶ Para entender esta cultura, es necesario revisar la transición de gobernanza urbana gerencial a emprendedora, y desentrañar cómo el concepto de emprendimiento ha evolucionado, volviéndose intrínseco a la dinámica de la criptociudad.

El empresariado urbano de los años setenta y ochenta se basó inicialmente en un esfuerzo de

¹⁵ El multimillonario fundador de City of Telosa, Marc Lore, por ejemplo, ha creado y vendido cuatro empresas, la más reciente Jet.com, que vendió a Walmart por 3.300 millones de dólares. El fundador de CityDAO, Scott Fitsimones, recibió la beca Thiel por fundar AirGarage, una aplicación que gestiona aparcamientos. Los fundadores de Decentraland trabajaron anteriormente en BitPay.

¹⁶ David Harvey, "From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism," *Geografiska Annaler. Series B, Human Geography* 71, no. 1 (1989), 3.

colaboración, una asociación público-privada, que hacía hincapié en la inversión y el *crecimiento*.¹⁷ Su objetivo inmediato se centraba en crear las condiciones previas necesarias para atraer y promover la empresa privada. Es decir, se utilizaron los poderes gubernamentales locales para atraer fuentes de inversión y empleo con el objetivo de financiar un ciclo especulativo. El enfoque urbano pasó de los proyectos destinados a mejorar las condiciones de vida y de trabajo de la región (como la vivienda y la educación) a la construcción de infraestructuras culturales, de ocio, comerciales, nuevos parques y centros cívicos que mejoraran *la imagen* de la ciudad al mundo.¹⁸

Algunas estrategias identificadas con el crecimiento urbano en el marco empresarial de los años setenta y ochenta¹⁹, siguen siendo pertinentes para las criptociudades. Entre ellas se incluyen:

- (1) Estimular la competencia en (a) el ámbito internacional -fomentando inversiones privadas para infraestructuras sociales que refuercen la base económica de la región como exportadora de bienes y servicios (por ejemplo, el petróleo que permitió el florecimiento de Texas en los años 70)- y (b) en la distribución de los patrones de consumo (es decir, la ciudad debe parecer innovadora, segura, vibrante);
- (2) Crear la impresión de que la ciudad del futuro se caracterizará principalmente por funciones de mando y control, recopilación y procesamiento de información, transformándola en un centro postindustrial, donde la exportación de servicios se convierta en la base económica de la sostenibilidad urbana,
- (3) Aprovechamiento, a través del gobierno central, de la oportunidad redistributiva (por ejemplo, la prosperidad urbana de Long-Beach-San Diego estaba relacionada con sus contratos militares y de defensa).

Su nueva manifestación consiste en estimular la competencia -también en el ámbito local e internacional- estableciéndose en regiones que fomentan el criptodesarrollo, confiando en la expectativa de un entorno más propicio para la innovación futura. Con ello se pretende atraer a desarrolladores que quieren experimentar con diferentes implementaciones de blockchain pero no pueden hacerlo con las regulaciones actuales. CityDAO, por ejemplo, se fundó el día después de que el estado de Wyoming anunciara el reconocimiento legal de las empresas basadas en blockchain -una decisión leída por el fundador del proyecto como una demostración de que pretende ser «el estado más favorable a la criptoinnovación»²⁰. Otra nueva configuración de la misma idea es promover la ciudad como

¹⁷ *Op. Cit.*, 4.

¹⁸ *Op. Cit.*, 7.

¹⁹ *Op. Cit.*, 8.

²⁰ @PODOFJAKE, Podcast Audio. "Scott Fitsones," Pod of Jake, episodio 78, Septiembre 14, 2021, [Link](#). Transcripción descargada, disponible bajo solicitud.

económicamente autosuficiente, es decir, un paraíso que atraerá a todo tipo de nuevos residentes en busca de una forma de aliviar las cargas fiscales existentes. Tal es el caso de Bitcoin City, según anunció el presidente de El Salvador, Nayib Bukele:

“Zero income tax. Zero capital gains tax. That’s all. Invest here. Make all the money you want. We’re fine. Trade whatever you want. Zero property tax. I mean, if you’re making a huge building you don’t want to pay property tax for that, so you don’t pay anything. It’s your payroll tax. We want you to hire people, not to pay taxes for hiring people.”²¹

Del mismo modo, las ciudades cripto buscan posicionarse como activos futuros a través de tecnologías innovadoras orientadas a la recopilación y procesamiento de información. La ciudad de Telosa, por ejemplo, presenta un sistema de movilidad de vehículos eléctricos autónomos, un sistema inteligente de gestión de residuos enterrado, junto con una red eléctrica inteligente.

Pero ¿quién se lanzará a invertir en estas iniciativas? Varios proyectos han reclutado a desarrolladores de criptomonedas, jugadores y coleccionistas de arte digital como su cliente inicial ideal. La nueva urbanidad comienza con una estrategia de marketing: una trama para transmitir un plan de juego general que pueda convertir a los potenciales inversores en clientes de sus productos y servicios. La *NFT Plaza* de Liberland (véase Figura 3) es un buen ejemplo: una región del mapa dedicada exclusivamente a plazas y centros de exposición de arte digital. El arquitecto de la ZHA Patrick Schumacher señaló en una conferencia reciente que la estrategia de Liberland se ha apropiado del «criptovalley» de Decentraland.²² De forma similar, en la plaza central de Bitcoin City se encuentra un museo que fue definido por el arquitecto como parte del ADN de la ciudad, dedicado a mostrar la historia del dinero²³.

²¹ “Bitcoin City & Bitcoins Bonds Announcement by El Salvador’s President Nayib Bukele.” YouTube. Postado por @surfinbitcoin. 2021. 21 de Noviembre, 2021. [Link](#)

²² “LIBERLAND METAVERSE ArchAgendaDebate: Cyber-urban Incubators in the Blockchain Metaverse,” YouTube. Postado por @patrikschumacher2844. 17 de Enero, 2022, [Link](#).

²³ “Milan Design Week with Fernando Romero | MINDED Podcast,” YouTube. Postado por @createurs_design_association. 24 de Abril, 2023. [Link](#).

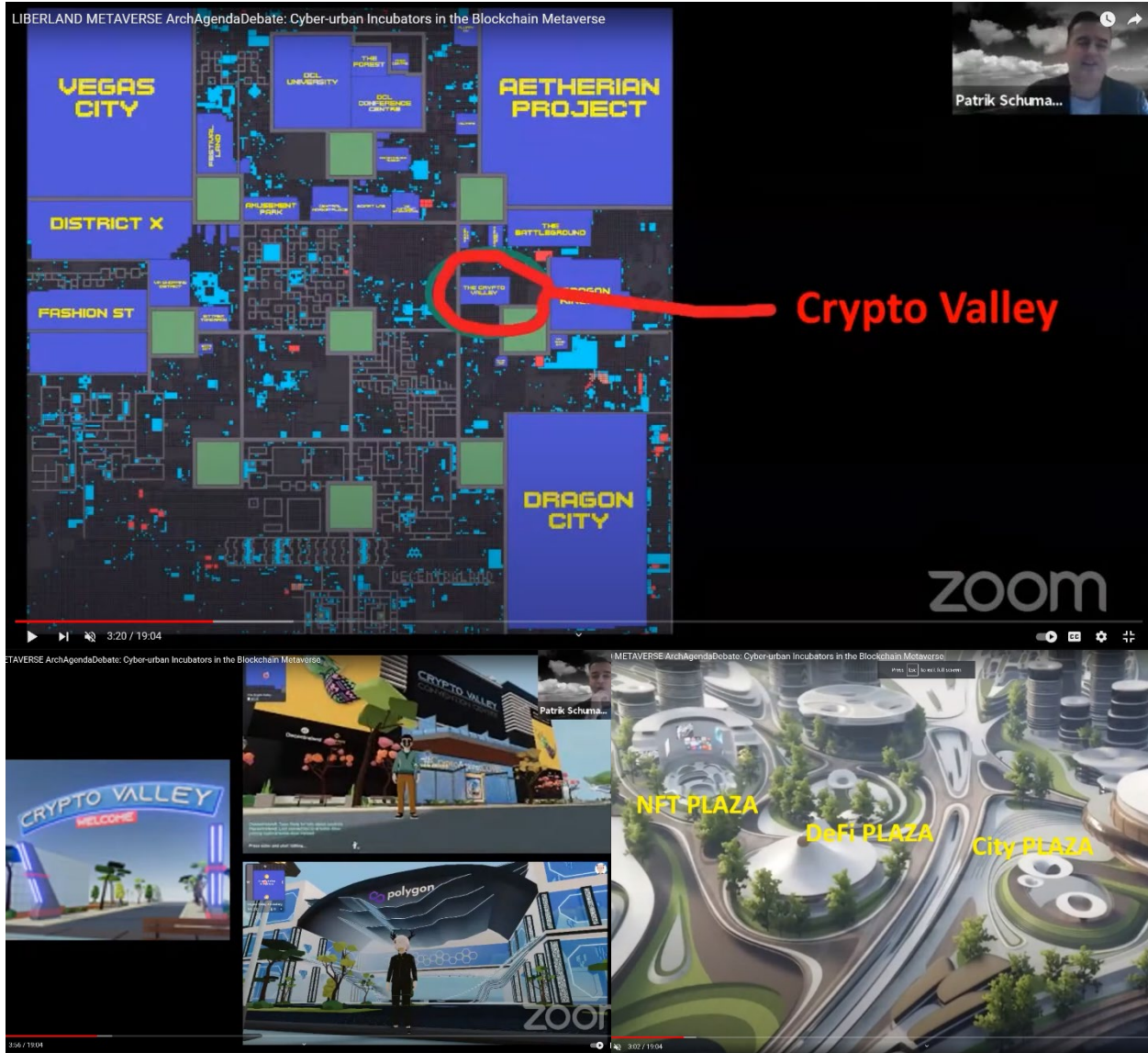


Figura 3: Capturas de pantalla de la conferencia de Patrick Schumacher. Decentraland fue una referencia en el diseño de Liberland, sobre todo a la hora de dirigirse a la comunidad de criptomonedas y crear una identidad adaptada a ellos. Fuente: @patrikschumacher2844. 2022. "LIBERLAND METAVERSE ArchAgendaDebate: Cyber-urban Incubators in the Blockchain Metaverse," YouTube. 17 de Enero, 2022, [Link](#).

Tab. 1 Summary of Urban Entrepreneurialism. Public-private partnership strategies to foster economic growth

Strategies	1970s and 1980s (Traditional businesses)	Stimulating competition (exports, consumption patterns, fostering private investments for social infrastructure)	Towards gathering and processing information	Redistributed opportunity	
	2020s (Startups)	Stimulating competition (promise of deregularization of crypto, tax haven)	Sustainable waste management system, Self driving cars	Crypto art galleries to attract a certain target group, banking on the expectation they will bring urban prosperity; the land appreciation will fund economic growth for all stakeholders; the appreciation of Bitcoin will fund social services	
Examples	1970s and 1980s (Traditional businesses)	the oil that allowed Texas to bloom		Long-Beach-San Diego's urban prosperity was related to its military and defense contracts	
	2020s (Startups)	Bitcoin City			
		"Zero income tax. Zero capital gains tax. That's all. Invest here. Make all the money you want. We're fine. Trade whatever you want. Zero property tax."	"We have digital and physical arts and culture, equality, infrastructure to the digital system, geothermal energy. They will power the entire city and the bitcoin mining and, of course, will facilitate business and technology investment and sustainable and efficient public transportation."	"the first country to do [Bitcoin bonds], which will be El Salvador, will have a massive advantage. If bitcoin at the five-year mark reaches one million dollars they will sell bitcoin in two quarters and recoup that 500 million dollars. In three and a half quarters they can get enough money to pay back the entire bond"	
		Telosa			
		"With Equitism, Telosa aims to create a much higher level of social services offered to residents, without additional burdens on taxpayers"	Garbage will be buried underground; "Autonomous cars create safe, flexible streetscapes to create a collective and active transportation system that is more enjoyable, greener and universally accessible"	"The project also envisions transparent governance and a new model for society: Equitism, a new economic model based on the premise that citizens should have a stake in the land and as the city does better, the residents do better."	
		Liberland			
		"Now I'm starting to call it Liberland cyber urban incubator and basically it connects up with the idea of anticipating the creation of a place like Liberland, a big real estate project, a free trade zone, maybe some kind of incubator startup cluster of the kinds."	"A prior digital city and community building game (...) could also be layered and involve not only developers playing a competitive and synergetic "monopoly" with each other but could already involve end users. The idea here is that all those who consider joining Liberland would evolve an emergent order together prior to purchase and construction."	"In a way, I think that we are going to focus with the Liberland method was addressing and at least initially that crypto ecosystem community and focus on that, so as a kind of crypto valley is interesting (...) this focus on the crypto ecosystem on networking and collaboration rather than on the entertainment as city functions "	
CityDAO					
"Wyoming is trying to be the most crypto innovation friendly state. For context, Wyoming was the first state to legalize or to create the LLC, the limited liability company that is now a mainstream staple of business. And other states basically copied it, started adopting it."	"A lot of the ideas come from a book called <i>Radical Markets</i> by Glenn Wilde. They talk about things like quadratic voting, quadratic funding mechanisms to allow people to vote and govern decentralized communities and ideally make our democracy stronger by giving people more input."	"Most DAOs raised initial funding by selling a governance token that gives holder voting rights over DAO activities. You can either buy these tokens on the market or you can earn them by contributing to the DAO. For example, things like designing a logo, researching or writing some code."			

En las últimas décadas, el concepto de emprendimiento ha evolucionado con la globalización, Internet, el trabajo a distancia y la flexibilidad, entre otros factores.²⁴ Aunque en los años ochenta el concepto se asociaba a modos de negocio tradicionales, a menudo de ámbito local o nacional, menos atractivos para el capital y raramente centrados en tecnologías innovadoras, su núcleo sigue siendo consistente: el crecimiento es su motor principal. Las startups de hoy son formadas por profesionales y líderes empresariales (más que por economistas o académicos) que comparten sus valores y fórmulas de éxito. Suelen estar vinculadas a empresas tecnológicas en fase inicial, aunque como señala Paul Graham, no toda empresa de reciente creación es una startup, ni tampoco es necesario que trabaje en tecnología para que lo sea.²⁵ En su lugar, sugiere es «una empresa diseñada para crecer rápido».²⁶ El crecimiento es lo único esencial, la brújula que debe guiar toda decisión.

“For a company to grow really big, it must (a) make something lots of people want, and (b) reach and serve all those people. Barber shops are doing fine in the (a) department. Almost everyone needs their hair cut. The problem for a barbershop, as for any retail establishment, is (b). A barbershop serves customers in person, and few will travel far for a haircut. And even if they did, the barbershop couldn't accommodate them.(...) Most businesses are tightly constrained in (a) or (b). The distinctive feature of successful startups is that they're not.”

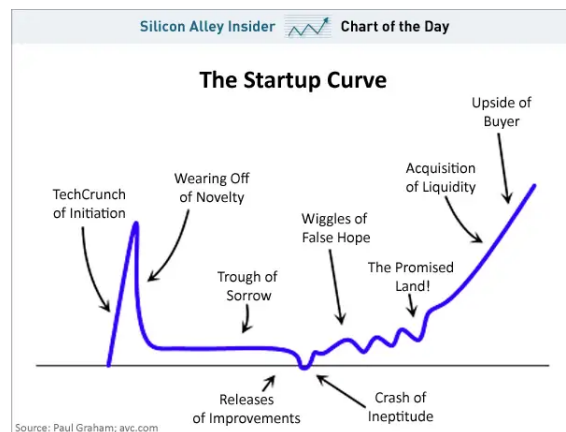


Figura 4: Gráfico que muestra cómo deberían ser las expectativas de crecimiento de las startups. Un entusiasmo inicial elevado, seguido de una crisis y finalizando con un crecimiento exponencial una vez que despegan. Fuente: Paul Graham, "The Startup Curve," AVC, 14 de Marzo, 2012, [Link](#).

²⁴ R. Daniel Wadhvani Geoffrey Jones, "Entrepreneurship and Business History: Renewing the Research Agenda " *Harvard Business School* 07-007, (Enero 2006).

²⁵ Paul Graham es programador, escritor, inversor y cofundador de *Y Combinator*: la primera incubadora de startups que ha financiado más de tres mil empresas emergentes, entre ellas Airbnb y Dropbox. Paul Graham, "Startup = Growth," *Paul Graham*, Septiembre 2012. Consultado 24 de Mayo, 2023. [Link](#).

²⁶ La palabra «diseñado» tiene un doble sentido. En primer lugar, significa intencionado, reconociendo que la mayoría de las startups fracasan debido a su alto riesgo. En segundo lugar, señala que cada startup es única por naturaleza.

El crecimiento también suele ser la razón por la que las startups se asocian a las nuevas tecnologías, ya que es la mejor fuente de cambio rápido. Dado que la innovación está asociada a un territorio desconocido, la mentalidad emprendedora suele ser flexible, dispuesta a experimentar diferentes métodos y a asumir riesgos, pero con una fuerte visión de una idea para lograr un crecimiento tan elevado.

¿Cómo puede el espíritu emprendedor, que ha evolucionado de los negocios tradicionales a las tecnologías pioneras, impulsadas por la innovación, dar forma a los experimentos de las ciudades basadas en blockchain?

Una hipótesis es que la búsqueda de la innovación, fomentada por la cultura de crecimiento, podría ser el principal incentivo para que los experimentos de las ciudades basadas en blockchain naveguen a través de contextos normativos y tasas de adopción inciertos. Suelen centrarse en las zonas grises de la regulación, explotando las lagunas de los sistemas actuales, como en el caso de CityDAO, que se puso en marcha sin una comprensión clara de sus detalles operativos, o de cómo la nueva normativa reconfiguraría las oportunidades en el futuro. Como se analizará en el capítulo III, las desventajas que estas incertidumbres podrían acarrear se ven compensadas por el impulso de la cultura de las startups hacia el crecimiento rápido y la innovación porque, aunque terriblemente arriesgado, promete unos beneficios extremadamente altos.

Una segunda hipótesis es que las criptociudades, consideradas como entidades de nueva creación, no sólo emplean tecnologías de vanguardia, como las criptomonedas, sino que también tratan activamente de ser pioneras en tecnologías novedosas por sí mismas. En otras palabras, pretenden (a) crear un producto o servicio muy demandado por un público amplio, y (b) servir a ese público. Decentraland fue de los primeros en crear la necesidad de comprar y vender activos y creó un nuevo tipo de mercado. Esta idea se desarrollará en el capítulo IV.

Las hipótesis anteriores están relacionadas con los objetivos (crecimiento), la mentalidad (toma de riesgos, flexibilidad) y los valores (innovación) de las startups. La tercera tiene que ver con la precariedad de su visión. Dado que las startups buscan instalarse como proveedoras de servicios orientados a satisfacer *necesidades existentes reales*, deben desarrollar resiliencia frente a las críticas que intentan desacreditar su relevancia. Además, la cultura de las startups reconoce que pocas empresas surgen equipadas con todos los elementos para su éxito. Es mucho más típico que un concepto imperfecto catalice su transformación en exitoso que el hecho de que una idea de éxito surja de la nada: la mayoría de las startups acaban no pareciéndose en nada a su idea inicial.²⁷ Algunas de estas criptociudades

²⁷ Paul Graham, "How to Get Startup Ideas." *Paul Graham*. Noviembre 2012. [Link](#)

también se están formando sobre la marcha.

I.b El modelo urbano *peer-to-peer*

El principal avance de Bitcoin radica en la combinación de diferentes tecnologías para resolver el antiguo problema del doble gasto en las divisas digitales, garantizando que cada moneda sólo pueda gastarse una vez. Cuando se envía un correo electrónico de persona A hacia B, el correo electrónico se duplica y ambas tienen una copia del mismo correo. Los bancos resuelven esto digitalmente teniendo un libro de contabilidad centralizado, asegurando su integridad y validando sólo la segunda moneda. Bitcoin, en cambio, lo resuelve utilizando lo que se llama una red *peer-to-peer* (p2p): esta red entre pares puede ser pensada como una cena de barrio donde todos los vecinos traen un plato para compartir. Una red centralizada es como ir a un restaurante donde hay un chef encargado de preparar toda la comida. Uno hace un pedido al chef para disfrutar de un plato, pero si el chef está ocupado no se puede servir la comida. En la versión compartida, en cambio, cada persona aporta un plato. Todos contribuyen y consumen. Si alguien no participa, el evento puede igualmente continuar: seguirá habiendo otros platos disponibles. Así, cada persona (*peer*) del vecindario (red) comparte y recibe comida (datos) directamente con los demás, sin chef (autoridad central).

Garantizar la integridad de una red frente a participantes potencialmente engañosos se conoce en el mundo de la programación como resolver el Problema de los Generales Bizantinos. Un grupo de soldados planea una invasión sorpresa a un castillo, pero algunos podrían ser poco fiables²⁸. Para que la invasión funcione, todos los soldados deben ponerse de acuerdo sobre la fecha y el lugar sin comunicarse directamente entre ellos. Sólo pueden enviar mensajes a través de un mensajero, y saben que algunos de estos mensajes podrían ser deshonestos, difundir información falsa o intentar sabotear la operación. La solución de Bitcoin es dar a cada soldado un sello especial, infalsificable, que se incluye con los mensajes. En lugar de confiar en un único mensajero, se basan en la probabilidad de que la mayoría de los soldados son honestos. Por tanto, si la mayoría de los mensajes coinciden y tienen el mismo sello, confían en esa información. Si unos pocos mensajeros difunden datos contradictorios o falsos, no los tienen en cuenta y se centran en la información coherente con el sello correcto. Es decir, el sello minimiza la cantidad de mensajes a los que estos soldados desleales pueden acceder.

²⁸ Leslie Lamport, Robert Shostak, and Marshall Pease, "The Byzantine Generals Problem," ACM Transactions on Programming Languages and Systems 4, no. 3 (July 1982): 389.

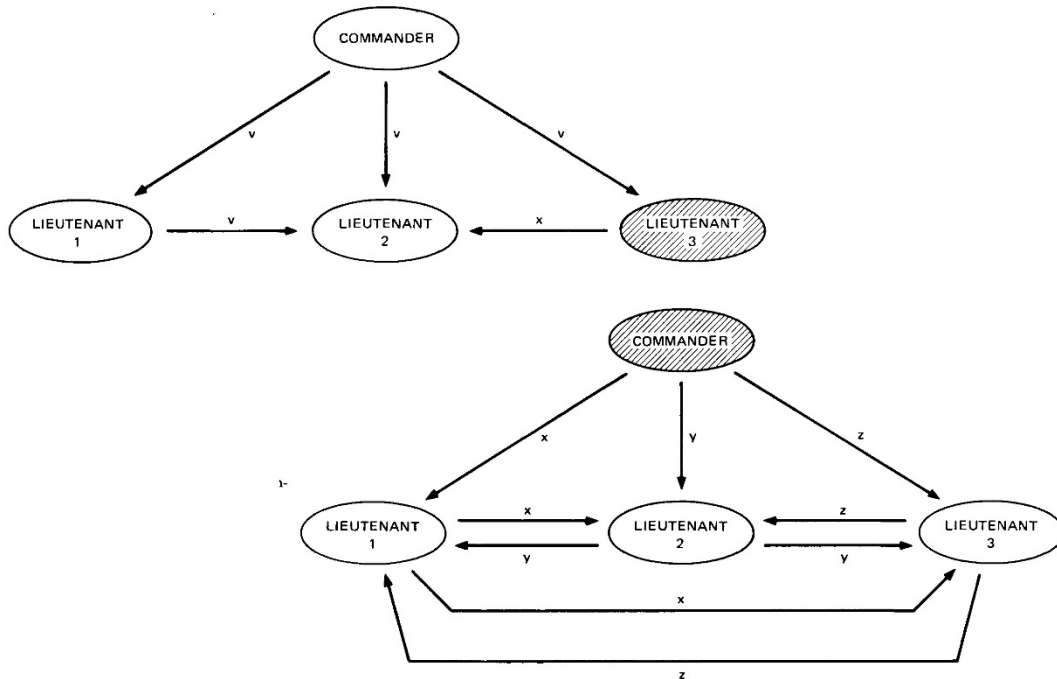


Figura 5: Diagrama que ilustra la coordinación del problema del general bizantino. Aunque el teniente 3 sea un traidor, el teniente 2 recibe la mayoría de los mensajes fieles, pero esto solo funciona porque el traidor no es el comandante. En el segundo escenario, el comandante es el traidor y no hay coordinación posible. Para crear resiliencia, es necesario que todos los nodos se comuniquen entre sí y no dependan de una única entidad. Fuente: Robert Shostak Leslie Lamport, Marshall Pease, "The Byzantine Generals Problem," ACM, Vol. 4, No.3. (1981), 389.

El nombre técnico de este sello es *hash*: una huella digital única generada por un algoritmo capaz de comprimir datos (palabras, cifras, imágenes, etc.) en un número de salida de tamaño fijo. Incluso el cambio más pequeño, como una coma de más, generará un *hash* completamente nuevo.²⁹ Este algoritmo es unidireccional: no hay forma de descifrar la entrada cuando sólo se conoce la salida, siendo una técnica importante para ocultar mensajes.

²⁹ Aunque es posible que dos entradas diferentes creen la misma salida exacta, las probabilidades de que esto ocurra son astronómicamente bajas y se necesitaría una cantidad significativa de energía para encontrar una a propósito. Cuando se generalice la computación cuántica, muchos algoritmos hash quedarán probablemente obsoletos, pero ya hay muchos resistentes a la cuántica. Dávila, *Blockchain Radicals*, 302.

Entrada	Salida
Crypto cities: History and future of urban models in the era of distributed ledger technologies (ca.2020)	0bf8b7e35e9f41d4435465e10bca4362b4df3046a2f32f3052146aa6a1405c87
Crypto cities: History and future of urban models in the era of distributed ledger technologies (ca.2020)	fac700bcd7cc789af7694221d1898da560f3148c59a75ac2200170c6dd588977
Crypto Cities	1ee511589a65c7345d6e3b5787b3555df5e9af2d4750b406600b2bda293d12a9
Crypto cities	70ade6f65c7da17db731ef1eab56689dac9263822f22f80af65bc12558ba08d4

Tab. 2: Ilustración de algoritmos hash. La más mínima diferencia -un paréntesis o una mayúscula- cambia por completo la salida. Fuente: elaboración propia usando "Sha-256 Cryptographic Hash Algorithm." 2005, [Link](#).

Los hashes son importantes porque proporcionan el vínculo irrompible entre los distintos segmentos de la cadena de bloques. Cada bloque contiene dos hashes: el generado con las transacciones como entrada y el del bloque anterior (véase Figura 6). Dado que cualquier cambio en la entrada afectará al hash, esto significa que es imposible alterar los datos de las transacciones de un bloque que ya se ha añadido a la cadena sin romper el vínculo. Como todos los nodos de la red almacenan una copia de la cadena completa, los bloques con enlaces rotos serán rechazados por la mayoría (a menos que se produzca una conspiración muy poco probable). Como resultado, se puede confiar en el sistema en su conjunto, aunque algunos de sus usuarios no sean fiables.

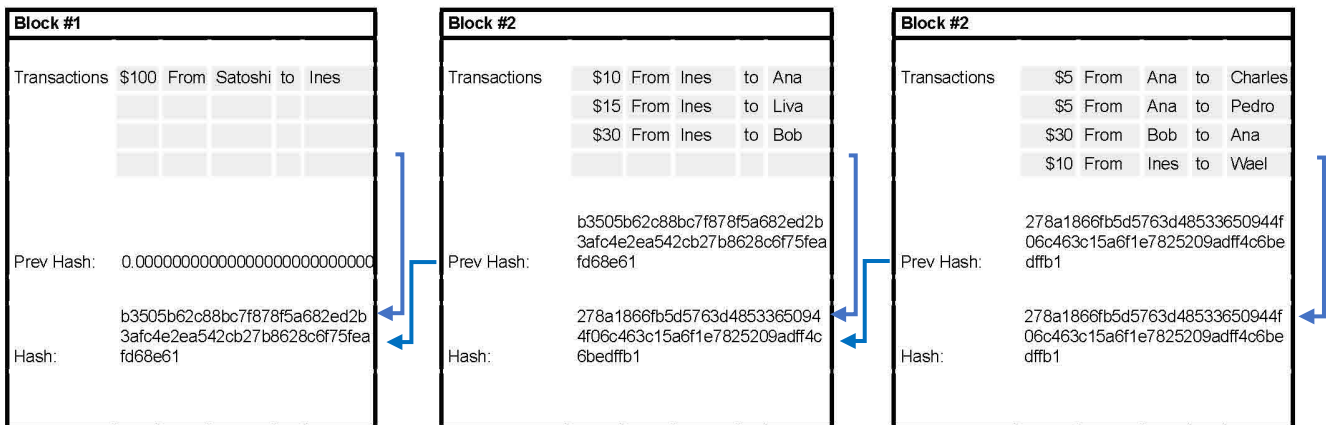


Figura 6: Diagrama de una cadena de bloques. Las transacciones son la entrada para crear un hash, que se incluye en el bloque actual, pero también en el siguiente, creando una cadena. El hash se crea con un algoritmo. El mínimo cambio en la entrada creará un hash completamente diferente, rompiendo la cadena. Fuente: Elaboración propia.

Entre los entusiastas de blockchain surgieron varias cuestiones sobre el enfoque del código de Nakamoto, por ejemplo, sobre la economía de oferta fija (sin inflación), la cantidad de transacciones que pueden aprobarse por bloque o el método utilizado para validar cada bloque, entre otros. El debate principal es si las criptodivisas pueden considerarse dinero o no.

Al argumentar que Bitcoin es la forma de resolver el problema de los gobiernos que imprimen dinero a costa de la inflación, sus defensores tienden a pasar por alto el papel que estos desempeñan a la hora de proporcionar un marco para una organización social estable y coherente.³⁰ Además, la narrativa de que blockchain es a prueba de manipulaciones omite con frecuencia mencionar cómo las criptodivisas pueden ser y han sido objeto de censura: EE.UU. impuso penalidades a los países que utilizaban criptomonedas para eludir sus sanciones³¹ y China prohibió la minería de Bitcoin, que pudo detectar a través de cambios en los patrones de consumo de la red energética.³² Los recientes escándalos en torno a las criptomonedas también han demostrado que la tecnología no es tan transparente y segura como afirman sus defensores y que la falta de regulación no siempre es favorable.³³ Los escépticos de Bitcoin, su parte, tienden a descartarlo como una estafa, pasando por alto las funciones del dinero que Bitcoin sí cumple. Por tanto, podría ser útil preguntarse no «¿Es Bitcoin dinero?», sino «¿Qué funciones del dinero desempeña Bitcoin?».

Funciones del dinero³⁴:

- Medio de intercambio: medio a través del cual se pueden intercambiar bienes y servicios.
- Depósito de valor: para almacenar riqueza a lo largo del tiempo, permitiendo a los individuos ahorrar poder adquisitivo para su uso futuro.
- Unidad de cuenta: medida común de valor para bienes y servicios, permitiendo la estandarización de precios entre bienes y servicios.

La fluctuación intrínseca del precio de Bitcoin ha llevado a escépticos como el economista y Premio Nobel de Economía Paul Krugman³⁵ a afirmar que se asemeja más a un producto de inversión especulativo (como las acciones) que al dinero como unidad de cuenta o depósito de valor. El maximalista de Bitcoin, Saifedean Ammous,³⁶ por su parte, sostiene en su libro *The Bitcoin Standard* que

³⁰ Dávila, *Blockchain Radicals*, 61.

³¹ Virgil Griffith fue condenado a cinco años de prisión por ayudar al Estado norcoreano a utilizar criptomonedas para eludir las sanciones impuestas por EE.UU. "U.S. Citizen Who Conspired to Assist North Korea in Evading Sanctions Sentenced to Over Five Years and Fined \$100,000," *Office of Public Affairs*, 12 de Abril, 2022. [Link](#).

³² Roger Huang, "After China's Bitcoin Mining Ban, Bitcoin Is Stronger Than Ever," *Forbes*, 31 de Octubre, 2023.

³³ En particular, las que revelaban que grandes plataformas de intercambio como FTX eran una estafa.

³⁴ Tanto los defensores de Bitcoin (Ammous) como sus críticos (Krugman) coinciden que son estas las funciones del dinero.

³⁵ Paul Krugman "How Crypto Became the New Subprime" *The New York Times*, 27 de Enero, 2022.

³⁶ Saifedean Ammous es economista de la Universidad Americana del Líbano.

el precio futuro se estabilizará. Sin embargo, al día de hoy, el valor de Bitcoin sigue dependiendo de su conversión al precio del dólar estadounidense, por lo que no cumple plenamente la función de unidad de valor. Aunque nunca alcance esta estabilidad, o sea globalmente adoptado, los ejemplos de WikiLeaks, Sci-Hub, Ucrania y otros son una prueba del potencial de Bitcoin como medio de intercambio.

Otro aspecto de la criptofilosofía es que blockchain puede ser una vía hacia la inclusión financiera al facilitar el acceso a los servicios a las poblaciones con escasa bancarización, como se argumenta en *Blockchain Revolution*:

“According to UNICEF, ‘the births of around one fourth of children under the age of five worldwide have never been recorded.’ Not getting a birth certificate can have life-shattering consequences: these children may have trouble receiving an education or health care. Worse, they may be married off, indentured into labor, or conscripted into the military before they reach the legal age (...) As adults, they may not be able to inherit property, vote in elections, or get jobs or passports, let alone bank accounts. The World Bank estimates that 1.5 billion people on the planet lack a legal identifier”.³⁷

Las estadísticas utilizadas son de 2017, pero el mensaje subyacente sigue siendo pertinente. En 2022, la posesión de tarjetas de crédito en el Sudeste Asiático era insignificante, aunque alrededor del 75% de la población poseía un teléfono móvil. Solo la mitad de la población tenía una cuenta bancaria.³⁸

En síntesis, el principal avance de Bitcoin consiste en resolver el problema del doble gasto sin necesidad de una autoridad centralizada. La idea de descentralización, una red p2p sin intermediarios, significa que no hay un «chef» que guíe o controle lo que cada uno prepara. La «receta» es pública (código abierto) y cada cual tiene libertad para cocinar (codificar) algo diferente. Un caso ilustrativo de aplicación descentralizada sería una versión blockchain de Spotify.³⁹ Frente al servidor centralizado actual, los artistas subirían su música a una red a prueba de manipulaciones. En lugar de que los oyentes pagasen a una gran corporación (que se quedaría con la mayor parte de los ingresos y decidiría qué artistas se promocionan), los pagos podrían ir directamente a los artistas, permaneciendo público el algoritmo responsable de elegir los contenidos destacados. Podrían aplicarse nuevos modelos de monetización, como micropagos por reproducciones individuales de canciones o ayudas directas a los artistas favoritos, evitando la recopilación centralizada de información.

El paraguas conceptual de redes descentralizadas bajo el que han surgido las criptociudades está

³⁷ Don Tapscott and Alex Tapscott, *Blockchain Revolution: How the Technology behind Bitcoin and Other Cryptocurrencies Is Changing the World* (New York, NY: Portfolio/Penguin, 2019), Loc. 805, Kindle.

³⁸ Kell Jay Lim “How to close Southeast Asia’s financial inclusion gap” *World Economic Forum*, 7 de Febrero, 2022. [Link](#)

³⁹ Don Tapscott and Alex Tapscott, *Blockchain Revolution*, 2253.

cargado de narrativas fuertemente idealistas de inclusividad y reducción de la desigualdad.⁴⁰ Bitcoin City promueve la libertad financiera utilizando las criptodivisas como medio de intercambio y como discurso general para atraer residentes en el contexto de El Salvador. En CityDAO y Decentraland, la resistencia a la censura no se centra en la economía o la situación financiera de los individuos, sino en el discurso del empoderamiento de la comunidad y la gobernanza resiliente.

Una criptociudad podría enmarcarse como un proyecto de ciudad diseñado para explotar la tecnología de contabilidad distribuida con el fin de restringir a las autoridades centralizadas en algunos de sus procesos, incluidos la moneda, la propiedad de la tierra y el gobierno. Tal recorte de la centralización pretende empoderar a los adoptantes (individuos y comunidades) fomentando el crecimiento, la libertad y la igualdad.

I.c Especificaciones léxicas

I.c.i Modelos urbanos

En el debate sobre las criptociudades, la noción de modelo es importante como método y como marco. Se justifica, por tanto, una breve revisión del debate sobre su significado, especialmente en relación con un término relacionado -y cuyo uso puede confundirse- como el de *tipo*.

La afirmación canónica de Quatremère de Quincy (en su *Dictionnaire historique d'architecture*) de que «todo es exacto y dado en el modelo, todo es más o menos vago en el tipo»⁴¹ opuso el *modelo* como singular y evocador de un ejemplo primordial, al *tipo* como figura que no tiene sentido imitar. El *tipo* se entendía como una forma abstracta y lógica de clasificar selectivamente una serie de obras distintas, basándose en la historia.⁴² Según esta definición, la basílica centralizada representa un tipo (vago, sin imagen) mientras que la basílica de San Pietro in Montorio de Bramante constituye un modelo (máxima especificidad, digna de imitación, original).

A principios del siglo XIX, Jean-Nicholas-Louis Durand propuso un sistema compositivo como método de

⁴⁰ Telosa, una iniciativa de criptociudad en Estados Unidos, tiene como pilares la apertura, la equidad y la inclusión, pretendiendo crear «*equitism*», un sistema basado en el capitalismo pero sin desigualdades. Basado en la tesis de Henry George de 1897 en *Progress and Poverty*, que afirma que el progreso económico y creciente escasez de tierras generaba mayores ganancias para el terrateniente inactivo, a expensas de los factores productivos del trabajo y el capital. Según George (y ahora también el fundador de Telosa, Marc Lore), la solución a la pobreza pasa por captar la renta de los recursos naturales y los títulos de propiedad de la tierra.

⁴¹ Cita original: Le modèle, entendu dans l'exécution pratique de l'art, est un objet qu'on doit répéter tel qu'il est; le *type* est, au contraire, un objet d'après lequel chacun peut concevoir des ouvrages qui ne se ressembleroient pas entre eux. Tout est précis et donné dans le modèle; tout est plus ou moins vague dans le *type*. Quatremère de Quincy, *Dictionnaire Historique d'Architecture: Les Notions Historiques, Descriptives, Archéologiques, Biographiques, Théoriques, Didactiques et Pratiques de cet Art*, vol. 2 (Paris: Librairie d'Adrien le Clere et Cie, 1832), 629.

⁴² Ludovico Quaroni, *Proyectar un edificio: ocho lecciones de arquitectura* (Madrid: Xarait, 1987), 87.

diseño, que más tarde se convirtió en la herramienta para dar cabida a la gran variedad de nuevos programas que exigía el desarrollo moderno. Describió una serie de edificios y los clasificó según su función (hospitales, cárceles, palacios, teatros, universidades, etc.), y analizó casos prácticos conocidos para destacar qué composición era más adecuada para cada uno. Aunque no utilizó la palabra tipo, esto sentó las bases de una actitud que se extendió a lo largo del siglo: el conocimiento se basaba en el material disponible (la historia), entendiendo los casos ya construidos como los principios que daban forma a la tradición. Según Carlos L. Marcos, el revivalismo y el eclecticismo colonial del siglo XIX agotaron la disciplina con estrategias de repetición, provocando una crisis: «La modernidad no cabía en el corsé tipológico»⁴³.

La noción de tipo tuvo una reaparición en los años sesenta y setenta, pero volvió a perder vigencia como herramienta de producción debido a su carga histórica con la llegada de las herramientas digitales que permitieron a los arquitectos, como dice Alejandro Zaera Polo, «imaginar alternativas para activar sectores emergentes del mercado».⁴⁴ La digitalización desempeñó un papel fundamental en el cambio hacia la idea del modelo científico, ya que facilitó la creación de organizaciones complejas que podían probarse en condiciones específicas. Gracias a la simulación, los diseñadores pudieron reproducir y observar infinidad de escenarios y condiciones, lo que permitió comprender mejor cómo se comportarían los diseños en contextos reales. Se volvió posible acumular conocimientos más allá de lo que se tenía a mano a partir de sistemas urbanos y arquitectónicos históricos. La definición de Quatremère de Quincy -singular, original, digna de imitación- se sustituyó así por un concepto más abstracto y diagramático: los modelos digitales dan prioridad a la relación entre componentes en lugar de simular todos los aspectos de la realidad. Se vuelven adaptables, generativos y potencialmente normativos. La idea de los modelos en la arquitectura y el urbanismo se alejó del proceso artístico, de la idea de copiar, acercándose más a una comprensión científica. En la ciencia, los modelos actúan como mediadores entre las teorías y el mundo, permitiendo a los científicos explorar sus implicaciones y comprobar su compatibilidad con los datos empíricos.⁴⁵ Proporcionan un medio para articular hipótesis y predicciones, y hacen posible visualizar y manipular aspectos del mundo que no son directamente accesibles, como las estructuras atómicas o los acontecimientos cosmológicos, o las estructuras no construidas en el caso de la arquitectura. Con estas funciones, los modelos contribuyen profundamente a la formulación, comprobación y perfeccionamiento de teorías, lo que los convierte en pilar de la ciencia, pero también de la arquitectura y la práctica urbana.

⁴³ Marcos, "Typologies or Topologies? On the Typologically Based Form in Architecture," *EGA Revista de Expression Grafica Arquitectonica*, Marzo 2012, 106.

⁴⁴ Alejandro Zaera-Polo, "Generative Processes and New Material Agencies," in *The Sniper's Log: Architectural Chronicles of Generation-X* (Actar, 2012), 167.

⁴⁵ Roman Frigg; Stephan Hartmann, "Models In Science," in *Stanford Encyclopedia of Philosophy* (Stanford University, 2020). [Link](#).

A partir de esta definición, los capítulos siguientes destilan las especificidades de cada caso de estudio para ilustrar la aplicación práctica y el significado de las teorías del ecosistema cripto cuando se aplican a la condición urbana. Actuando como mediadores entre las teorías y el mundo, estos modelos establecen los parámetros del marco en el que las criptociudades podrían conceptualizarse y volverse operativa una discusión de sus posibilidades.

Sugiero, además, que mientras el concepto de tipo tiene connotaciones representacionales, los modelos urbanos no constituyen representaciones, sino *diagramas rizomáticos* de un mundo que se está remodelando. El concepto de «mapa rizomático» de Gilles Deleuze y Félix Guattari ilustra una red de nodos interconectados sin un centro fijo ni caminos predefinidos. Hace hincapié en la conectividad, la heterogeneidad y la multiplicidad, permitiendo que cualquier nodo se conecte (potencialmente) a cualquier otro punto de la red. Este pensamiento rizomático es crucial para forjar mapas del criptoterritorio,⁴⁶ que, a pesar de su corta historia, ya está cargado de categorizaciones estáticas y binarias.

I.c.ii Episodios de utopía

If the story of utopia throws any light upon the story of mankind it is this: our utopias have been pitifully weak and inadequate; and if they have not exercised enough practical influence upon the course of affairs, it is because, as Viola Paget says in Gospels of Anarchy, they were simply not good enough. We travel through utopia only in order to get beyond utopia: if we leave the domains of history when we enter the gates of Plato's Republic, we do so in order to re-enter more effectively the dusty midday traffic of the contemporary world.

—Lewis Mumford, *The Story of Utopias* (1922).⁴⁷

La noción de utopía es sin duda relevante para comprender la procedencia histórica de los modelos contemporáneos de criptociudad. Sin embargo, esta afirmación obliga a excavar en su historia y sus múltiples significados. En el lenguaje común, la idea de lo utópico suele emplearse para denotar un concepto por impracticable e inalcanzable, aunque también puede utilizarse en un sentido propositivo para denotar una condición deseable, un proyecto para una (co)existencia armoniosa.⁴⁸ Como han

⁴⁶ Dávila, *Blockchain Radicals*, 8.

⁴⁷ Lewis Mumford, *The Story of Utopias* (New York: Barnes & Noble, 2011), 34.7. Publicado originalmente en 1922.

⁴⁸ Patrick Geddes califica la Utopía de Thomas More como modelo tanto de Eutopía -lugar bueno- como de Outopía -ningún lugar-. Mumford recoge más tarde esta distinción en su libro *The Story of Utopias*.

afirmado Leonardo Benevolo y otros autores posteriores, las utopías han desempeñado un papel fundamental en el desarrollo del urbanismo moderno.⁴⁹ Esta influencia puede apreciarse en los marcos que los estudiosos han utilizado para categorizar los distintos tipos de visiones utópicas. Benevolo distinguió entre el modelo preurbano y el urbano;⁵⁰ François Choay, el progresista y el cultural;⁵¹ y Lewis Mumford, las utopías de evasión y las de reconstrucción.⁵² A nuestros efectos, se ha ordenado cronológicamente un recorrido por los proyectos utópicos que tienen mayor influencia en la genealogía de la criptociudades (ver diagrama en página 28).

El término «utopía» fue acuñado por Sir Thomas More en 1516 como título de su libro en el que describía una sociedad imaginaria e ideal. La «Utopía» de More marcó el inicio de una exploración más sistemática de las sociedades ideales, que influiría en otros pensadores del Renacimiento, como Campanella y Bacon. Sin embargo, hasta principios del siglo XIX, con figuras como Owen, Saint-Simon y Fourier, estos proyectos sociales no empezaron a desarrollar una imagen, o un reflejo en forma de organización física.

⁴⁹ La tesis de Benevolo en *Le origini dell'urbanistica moderna* (1963) es que el urbanismo, aunque nacido en el siglo XX, tiene sus orígenes en las utopías configuradas el siglo anterior. Sostiene que las descripciones esbozadas por Owen, Fourier y Cabet tenían elementos que siguieron recogiendo generaciones después, entre ellos la unidad de vivienda con número fijo de personas, la centralización de las instalaciones, la concentración de edificios, la circulación en planta baja, la organización del paisaje urbano sobre la base de las relaciones sociales y económicas. El número de ciudadanos ideales que imaginaron Owen (1200) y Fourier (1620) tiene un parecido con la *Unite d'habitation* de Le Corbusier (1600).

⁵⁰ Dos principales diferencias entre ambos son: el preurbanismo es amplio, moldeado por historiadores, economistas y políticos, mientras que el urbanismo, tanto en la práctica como en la teoría, está moldeado por especialistas, principalmente arquitectos. En segundo lugar, el urbanismo deja de insertarse en una visión global de la sociedad. Mientras que el preurbanismo está vinculado a una serie de ideologías políticas, el urbanismo surge despolitizado.

⁵¹ Mientras que el modelo progresista (representado por Owen, Fourier, Cabet) rechaza todo legado artístico del pasado, y es aplicable a cualquier grupo humano en cualquier lugar y época –sus propuestas buscan el progreso del individuo–, el modelo culturalista, (Ruskin, Morris, Howard), se basa en el testimonio de la historia, su punto de partida no es el individuo, sino la sociedad como grupo.

⁵² La primera deja el mundo exterior sin cambios, mientras que la segunda intenta alterarlo para relacionarse con él en sus propios términos.

..... 1825 1885 1905 1925 1945 1965 1985 2005 2025

New Harmony
1825 - 1,200 Residents

Broadacre City - Wright
1935 - 5,000 Residents

Plan Piloto - Costa
1957 - 500,000 Residents

A Walking City - Archigram
1964 - 2,000,000 Residents

Comprehensive City - Mitchell & Boutwell
1969 - 1,000,000 Residents

Telosa-BIG
2021 - 5,000,000 Residents

Bitcoin City - Fr-EE
2021 -

AMERICA

Linear City - Soria y Mata
1882 - 45,000 Residents

Familistery - Godin
1886 - 400 Families

Carden City - Howard
1890 - 32,000 Residents

Phalanstery - Fourier
1902 - 100 Families

Industrial City - Carnier
1904 - 35,000 Residents

City of the Future - Hénard
1910 -

Plan Voisin - Le Corbusier
1925 - 78,000 Residents

Ville Radieuse - Le Corbusier
1935 - 3,000,000 Residents

Liberland - ZHA
2022 - 700,000 Residents

EUROPE

Ville Spatiale - Friedman
1958-1963

Marine City - Kikutake
1958-1963

Floating City - Tange
1960

Agricultural City - Kurokawa
1960

ASIA

Durante la revolución industrial del siglo XIX, varias transformaciones desestabilizaron la dinámica entre la ciudad y el campo. Estos cambios incluyen: el aumento de la densidad -principalmente debido al descenso de la tasa de mortalidad infantil-; el cambio en la distribución de la población -como consecuencia del asentamiento de las oportunidades laborales en las zonas urbanas centrales-; el progreso técnico que permitió un aumento ilimitado de la producción industrial y la creación de redes de transporte público. A su vez, estas transformaciones conllevaron las conocidas externalidades que caracterizaron a las metrópolis industriales de mediados del siglo XIX: hacinamiento, ventilación e iluminación natural insuficientes, calles irregulares, falta de drenaje, exceso de humo y contaminación industrial, hedor, humedad, suciedad. Aunque tales descripciones se referían a escenarios extremos, la opinión pública consideraba estas condiciones inaceptables, independientemente de su difusión estadística, siendo así, el motor de denuncias literarias y acciones reformistas.⁵³

Las iniciativas utópicas destinadas a rectificar las deficiencias de la ciudad industrial abogaban a menudo por una revisión completa –como si la hoja en blanco fuera posible– en lugar de cambios graduales. Existían como contraste de la ciudad existente, con formas de convivencia dictadas por modelos puramente teóricos. El urbanismo y la arquitectura no eran el objetivo principal de tales proyectos, sino mediaciones realizadas *a posteriori*, que facilitaban la amplificación del mensaje utópico.⁵⁴ «If we return to Fourier’s phalanstery», en palabras de Picon, «what definitely matters is not the details of its spatial configuration and its material construction –apartments, glazed arcades, and winter garden– but the hope it embodies and the circuits that allow for this hope to circulate».⁵⁵



Figura 7: A la izquierda, Falansterio de Charles Fourier. A la derecha, Chateau de Versailles. Fuentes: Choay, F. *El Urbanismo Utopías y Realidades*, (1965); [Desconocido] Cetadi Prod “Drone château de Versailles” [Link](#)

Mientras se llevaban a cabo los primeros intentos de establecer una nueva estructura social organizada, el mercado se dedicó simultáneamente a mitigar las condiciones más graves de los barrios marginales mediante una amplia construcción del suburbio. La respuesta canónica a la ciudad victoriana,

⁵³ Antoine Picon, “Notes on Utopia, the City, and Architecture,” *Grey Room* 68, (Verano 2017): 104.

⁵⁴ *Op. Cit.*, 95

⁵⁵ *Op. Cit.*, 104.

desarrollada entre 1880 y 1898, surgió a través del concepto de ciudad-jardín de Ebenezer Howard.⁵⁶ La idea se centraba en abordar, o al menos aliviar, los desafíos de la ciudad mediante el traslado de una parte sustancial de su población y de las oportunidades de empleo a grupos autónomos de nuevas ciudades, que debían construirse en campo abierto, lejos de los barrios marginales, la contaminación y, sobre todo, los elevados valores del suelo asociados a la metrópolis en expansión. Su organización central, que pretendía acortar el trayecto al trabajo, fue ampliamente más adoptada que el modelo lineal auspiciado por Soria y Mata.⁵⁷

Hacia finales de la década de 1920, con la agudización de la crisis económica y la generalización de la propiedad y el uso del automóvil, surgió otra tradición, entrelazada tanto con el concepto de ciudad jardín como con el de ciudad monumental. Había una necesidad acuciante de distinguir entre la construcción de monumentos singulares (determinación formal) y los beneficios potenciales de emplear métodos de producción estandarizados y a gran escala para la provisión generalizada de viviendas. Esta contradicción entre lo monumental único y la necesidad de producción en serie parece haber sido la motivación de Le Corbusier para abandonar su bloque perimetral, también conocido como *Immuable-Villa*, que se preveía como una unidad autónoma, con un jardín cualitativo y una sala de estar de doble altura, para adoptar un departamento diseñado para ser modular, eficiente, con estándares de espacio mínimos y equipamiento normativo, que pobló su visión de *Ville Radieuse* en 1935. Este plan, su visión de la ciudad de la era de las máquinas, supuso un alejamiento significativo del modelo centralizado de Howard para dar paso a un crecimiento teóricamente ilimitado. El principio de este modelo lineal se basaba en la zonificación de las diferentes funciones en bandas paralelas.⁵⁸ El automóvil desempeñó un papel fundamental en la formulación de la «supermanzana» de Le Corbusier y en la redistribución de la concentración de las ciudades del siglo XIX.

La narrativa de las utopías hizo una pausa durante los años de la Segunda Guerra Mundial, sobre todo en Europa, y el posterior periodo de reconstrucción para resurgir a finales de la década de 1950 en forma de megaestructuras, que, en esencia, tal y como las ha definido Banham,⁵⁹ eran edificios extensos de una naturaleza distintiva, aunque definir con precisión qué tipo de naturaleza resulta todo un desafío. Curiosamente, Banham ha definido su precursor general como el proyecto *Fort l'Empereur* de Le Corbusier de su plan de Argel de 1931. Entre las continuidades entre ambos, Banham destaca una enorme y colosal subestructura de hormigón armado, que permite a los habitantes construir su espacio según sus preferencias individuales. La estructura, representada en sus dibujos en una perspectiva curva y acelerada, discurre sobre una superautopista elevada. La siguiente proliferación de

⁵⁶ Peter Hall, *Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880*, IV ed. (Chichester: Wiley Blackwell, 2014), 7.

⁵⁷ Kenneth Frampton, *Modern Architecture: A Critical History*, Third Edition ed. (London: Thames and Hudson, 1996), 28.

⁵⁸ *Op. Cit.*, 182.

⁵⁹ Reyner Banham, *Megastructure: Urban Futures of the recent past* (London: Thames and Hudson, 1976), 8.

megaestructuras mantuvo esta distinción entre las partes antes determinadas de la construcción urbana de alta densidad -marco masivo y monumental- y, a menor escala, contenedores habitables que incrustan la espontaneidad urbana, fuera del control del arquitecto.

Los clientes solían ser universidades, exposiciones, municipios y gobiernos centrales, pero pocos proyectos llegaron a materializarse y, en ocasiones, la construcción tuvo que interrumpirse bruscamente (algunos ejemplos de edificios terminados son la Expo 67 de Montreal y el Cumbernauld Town Centre). Incluso las estructuras terminadas se enfrentaron a una recepción predominantemente negativa y a una cobertura desfavorable por parte de los medios de comunicación. El prolongado periodo de construcción, debido a su inmensa escala, hizo que la corriente intelectual que las había originado se hubiera desvanecido para cuando estuvieron terminadas. En particular, las propuestas de megaestructuras eran más comunes en los regímenes socialistas de Europa del Este, e incluso en Cuba, donde no entraban en juego las presiones convencionales del mercado y las fortunas inmobiliarias no eran la fuerza motriz. Cuando los que vivieron esa época están dispuestos a hablar con franqueza, muchos reconocen que la seguridad en sí mismos, rozando la arrogancia, para sugerir proyectos tan monumentales emanaba principalmente de la propia profesión del arquitecto.⁶⁰

⁶⁰ *Op. Cit.*, 10.



Figura 8: De arriba hacia abajo: El Plan Obus de Le Corbusier para Argel. Perspectiva. 1932; Comprehensive City de Mike Mitchell and Dave Boutwell. 1969; La Ciudad que Necesita la Humanidad de Amancio Williams. 1974-89. Fuentes: Fundación Le Corbusier, Paris. FLC 14345; Reyner Banham, *Megastructure*, 197; Archivo Amancio Williams, [Link](#).

La decadencia final del movimiento de las megaestructuras llegó en la década de 1970. Banham lo atribuye a una contradicción intrínseca que se hizo visible hacia 1968: que una ciudad, o una parte sustancial de ella, concebida por un solo individuo o un grupo suficientemente unificado para un diseño

coherente, daría como resultado un entorno excesivamente carente, exiguo y culturalmente empobrecido, tanto en lo visual como en dimensiones culturales más amplias y menos definidas. Este debate se había iniciado años antes, liderado por figuras como Jane Jacobs.⁶¹ En otras palabras, existía un conflicto entre el compromiso con un espacio compartido vasto, uniforme, monumental y totalmente diseñado y el atractivo de su posible fragmentación.

La historia de la utopía continúa con concepciones de ir «más allá» de ella. Es decir, una vez que el urbanismo aceptó que ya no podía dar una respuesta unitaria para resolver *todos* los problemas de la ciudad, declaró su muerte.⁶² La tarea del urbanismo, pues, después de la utopía, era crear y defender la pluralidad dentro de cada región. Tal ha sido la tesis de Robert Fishman, quien ha explorado la idea de que el desarrollo suburbano no fue una mera respuesta a los problemas urbanos, sino más bien un experimento social y espacial distinto e intencionado, moldeado por ideologías culturales específicas. Sugiere que los suburbios se concibieron como paisajes utópicos, que encarnaban una visión particular de la buena vida, caracterizada por el orden, la estabilidad y un fuerte sentido de comunidad. Esta visión se remonta claramente a las mismas utopías que se opusieron con vehemencia a los suburbios: las de Howard, Wright y Le Corbusier.⁶³

En síntesis, un hilo común que ha unido a los proyectos utópicos mencionados ha sido su intención de responder a los males sociales percibidos -ya sea como una forma de escapar de ellos o con la intención de enmendarlos-. Al explorar el espacio de las soluciones, sus propuestas van desde organizaciones centrales, a lineales y cuadrículadas. Oscilando entre la nostalgia por un urbanismo que nunca fue y una narrativa excesivamente optimista en torno a la tecnología,⁶⁴ las utopías afirman sistemáticamente que la ciudad que una vez se imaginó ahora es posible.

Tal es la genealogía de las criptocidades. Como demostrarán los capítulos siguientes, a veces la narrativa que presentan también puede considerarse un renacimiento de la visión excesivamente optimista (utópica) de que la tecnología actual podría resolver nuestros problemas.

⁶¹ El libro de Jacobs *Death and Life of Great American Cities*, publicado en 1961, fue una obra pionera en la enunciación y crítica de las políticas de planificación urbana imperantes a mediados del siglo XX. En él aboga por un enfoque centrado en la comunidad. Criticó la zonificación como estrategia predominante del urbanismo del siglo XX, así como la ambición del arquitecto maestro de diseñarlo todo.

⁶² Robert Fishman, "Beyond Utopia: Urbanism After the End of Cities," in *Ciutat real, ciutat ideal. Significat i funció a l'espai urbà modern* [Real City, Ideal City. Signification and Function in Modern Space], "Urbanitats" no. 7, (Barcelona: Centre of Contemporary Culture of Barcelona, 1998).

⁶³ Robert Fishman, *Bourgeois Utopias: The Rise and Fall of Suburbia* (New York: Basic Books, 1987).

⁶⁴ Nuevos métodos agrícolas en la Ciudad Jardín de Howard, métodos de construcción en serie en la Ville Radieuse de Le Corbusier, el automóvil en la Broadacre City de Wright, la computación en los proyectos «plug-in» y «clip-on» de los años sesenta.

I.c.iii Ciudades nuevas

Most sustained projects are poly-authored anyway because their trajectory, even for new projects, comes from a legacy of those previous –even if in reaction against that legacy, always from others.

–Reiser+Umemoto, *Projects and Their Consequences* (2019)⁶⁵.

Desde finales del siglo XX han proliferado en todo el mundo más de 150 nuevos proyectos de ciudades planificadas, supuestamente «desde cero», como estrategia de crecimiento económico.⁶⁶ Este fenómeno ha dado lugar a un floreciente subcampo dentro de los estudios urbanos dedicado su análisis.⁶⁷ La terminología empleada para definir estos experimentos urbanos también se ha diversificado, incluyendo sugestivos apodos como «smart city»,⁶⁸ «15-minute-city»,⁶⁹ «ecocity»,⁷⁰ «libertecture»,⁷¹ «charter city»,⁷² «powerpoint city»,⁷³ «hackable city»,⁷⁴ «shelter city»⁷⁵ (véanse las tablas 4 y 5 en el anexo).

Un examen más detenido de esta literatura muestra que, si bien esos términos hacen hincapié en una categoría particular del objeto urbano, los modelos correspondientes no se excluyen necesariamente entre sí (un mismo proyecto puede encajar tanto en el marco de una ciudad inteligente como en el de una ciudad de 15 minutos). Aunque el uso de estos nombres es útil para destacar aspectos específicos, el término «criptocidad» (expresión introducida por el fundador de la red Ethereum, Vitalik Buterin⁷⁶) comparte algunas de sus ambiciones con otros modelos mencionados. Sin embargo, ¿por qué se centra la atención en las ciudades y no en las regiones, los estados, las naciones, los reinos, las colonias, las

⁶⁵ Jesse Reiser, Nanako Umemoto, *Projects and Their Consequences* (New York: Princeton Architectural Press, 2019), 25.

⁶⁶ Sarah Moser y Laurence Côté-Roy analizan los desafíos y oportunidades de investigar nuevas ciudades planificadas en el Sur Global. Los autores reflexionan sobre la falta de un examen explícito de los retos metodológicos, basándose en sus experiencias de trabajo de campo en diferentes contextos geográficos. El documento se centra en cuatro temas clave: las dimensiones internacionales de las nuevas ciudades, los retos para acceder a la información en proyectos impulsados por empresas, la seguridad en contextos autoritarios, y las complejidades logísticas del trabajo de campo en estos espacios excepcionales. Sarah Moser & Laurence Côté-Roy, "Reflections on researching new cities underway in the Global South," *Journal of Urban Affairs* (2022): 1.

⁶⁷ Ver por ejemplo, Avery & Moser, 2022; Caprotti & Gong, 2017; Chitti & Moser, 2019; Datta & Shaban, 2017; Keeton, 2011; Keeton & Provoost, 2019; Moser, 2019; Moser & Côté-Roy, 2021; Rizzo, 2020; Van Noorloos & Kloosterboer, 2018.

⁶⁸ Picon, *Smart Cities: A Spatialised Intelligence*.

⁶⁹ Zaheer Allam Carlos Moreno, Didier Chabaud, Catherine Gall and Florent Pratlong, "Introducing the "15-Minute City": Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities," *Smart Cities* 4, no. 1, (2021): 93-111.

⁷⁰ Rachel Keeton, *Rising in the East: Contemporary New Towns in Asia* (Amsterdam: SUN, 2011).

⁷¹ Liam O'Farrell Rowland Atkinson, "Libertecture: A catalogue of libertarian spaces," *Urban Studies* 0, (2023).

⁷² Matthew McCartney, "Paul Romer, charter cities and lessons from historical big infrastructure?," *Elsevier* 131, (Diciembre 2022).

⁷³ Côté-Roy, "Reflections on researching new cities underway in the Global South."

⁷⁴ Michiel de Lange, "The Hackable City: Digital Media and Collaborative City-Making in the Network Society," ed. Martijn de Waal (e-Book: Springer, 2019).

⁷⁵ Keeton, *Rising in the East: Contemporary New Towns in Asia*.

⁷⁶ Vitalik Buterin, "Crypto Cities," *Vitalik*, 31.10.2021, 2021, [Link](#).

repúblicas? El *post* fundacional de Buterin sobre las criptociudades da las pistas:

Cities and states, as we've seen from the examples at the start of this post, are at least in theory capable of genuine **dynamism**. There are large and very real differences of culture between cities, so it's easier to find a single city where there is public interest in adopting any particular radical idea than it is to convince an entire country to accept it. There are very real challenges and opportunities in local public goods, urban planning, transportation and many other sectors in the governance of cities that could be addressed. **Cities have tightly cohesive internal economies where things like widespread cryptocurrency adoption could realistically independently happen**. Furthermore, it's less likely that experiments within cities will lead to terrible outcomes both because cities are regulated by higher-level governments and because cities have an easier escape valve: people who are unhappy with what's going on can more easily exit.⁷⁷

Los argumentos de Buterin convergen con los de Saskia Sassen: La clave es la escala, pero no en por cantidad de habitantes o superficie. Una ciudad es (debe ser) lo suficientemente grande para albergar complejidad, pero lo convenientemente pequeña para ser autónoma y permitir el cambio. Debe tener un carácter multiescalar: su infraestructura política tiene que poder controlar la legislación nacional cuando la urgencia lo exige.⁷⁸ Debe poder incidir en los retos sociales, políticos y medioambientales a escala mundial y nacional. Esto se debe, en parte, a que la gestión a nivel nacional o internacional está demasiado desvinculada de los procesos que pretenden transformar, lo que da lugar a políticas incapaces de atender a las realidades a las que se enfrentan las ciudades.⁷⁹ Como objeto de estudio, las ciudades podrían considerarse la unidad mínima que puede actuar como probeta de ensayo para la adopción de tecnologías innovadoras como blockchain. Las ciudades no son unidades cerradas, sino circuitos, procesos, sistemas, que instancian diferentes marcos políticos –supranacionales, nacionales, subnacionales–.⁸⁰ La escala de la ciudad tiene ventajas específicas: es manejable, resistente, susceptible de cambio debido a la eficiencia de los recursos –dinero, personal, tiempo–, permite la simulación de ciclos de iteración rápidos, facilita la recopilación y el análisis de datos, posibilita la evaluación de marcos normativos y políticas. En resumen, proporciona un entorno semi controlado que permite tomar decisiones con conocimiento de causa antes de aplicarlas en regiones más extensas, tiene impacto global, y da una respuesta rápida a la reestructuración en curso de una sociedad dinámica.

⁷⁷ Buterin, "Crypto Cities". Énfasis agregado.

⁷⁸ Saskia Sassen, "Cities are at the center of our environmental future," *Revista de Ingeniería* n. 31, (Mayo 2010): 73.

⁷⁹ *Op. Cit.*, 73.

⁸⁰ *Op. Cit.*, 82.

I.d Narrativas de la ciudad: Sassen, Castells y la urbanidad posthumanista

Panofsky on Gothic cathedrals, Tafuri on American skyscrapers, Venturi on the surprisingly kitsch American city, Lynch on city images, Harvey on postmodernism as the expression of time/space compression by capitalism, are some of the best illustrations of an intellectual tradition that has used the forms of the built environment as one of the most signifying codes to read the basic structures of society's dominant values.

—Castells, *The Rise of the Network Society*, (1996)⁸¹

La ciudad, con su región metropolitana, se ha destacado históricamente como lugar estratégico donde se materializan importantes tendencias macrosociales, convirtiéndolas en objeto de examen académico.⁸² A finales de la década de 1960 surgió un análisis crítico, encabezado por el sociólogo catalán Manuel Castells, que afirmaba que las cuestiones urbanas eran fundamentalmente societales. En las décadas de 1970 y 1980, influidas por la teoría marxista, las obras de teóricos como Castells, Lefebvre y Harvey hicieron hincapié en la ciudad como teatro de la lucha de clases, la redistribución de la riqueza y el activismo político vinculado a los derechos de ciudadanía y los recursos. La década de 1980 aportó además perspectivas feministas y raciales, junto con un creciente interés por el sistema urbano global y la política urbana. En la década del 2000 surgieron las críticas poscoloniales, que cuestionaron el carácter globalmente norte-céntrico de la teoría urbana, incluyendo otras dimensiones en la investigación, como el impacto de la globalización en las estructuras urbanas y las indagaciones sobre política urbana, gobernanza y dinámica interna de las ciudades.

¿Cuáles son las tendencias macrosociales que se materializan en las ciudades nuevas y cómo puede contribuir, potenciar o cambiar su desarrollo la tecnología blockchain? Su breve historia plantea desafíos a la hora de definir estas tendencias: probablemente se definan con mayor precisión en retrospectiva, dentro de unos años. Sin embargo, Saskia Sassen⁸³ presenta un interesante punto de partida, que he agrupado en cuatro grandes categorías. La ciudad puede entenderse como un lugar clave⁸⁴ de 1) la

⁸¹ Manuel Castells, *The Rise of the Network Society*, Second Edition ed. (Chichester: Wiley Blackwell, 2010), 448. Publicado originalmente en 1996.

⁸² Saskia Sassen, "The city: Its return as a lens for social theory," *Elsevier* 1, (2010): 1.

⁸³ Sassen, "The city: Its return as a lens for social theory.", 2

⁸⁴ El trabajo de Sassen muestra cómo el entorno urbano no sólo se ve afectado por estas dinámicas, sino que contribuye activamente a darles forma.

globalización y las nuevas formas de ciudadanía; 2) el creciente efecto que las nuevas tecnologías de información tienen sobre la diversidad sociocultural; 3) el impacto medioambiental;⁸⁵ 4) la profundización de las dinámicas transnacionales y el desplazamiento del poder. Estas trayectorias complejas y multilaminares deben entenderse como meros patrones, incipientemente identificados, más que plenamente establecidos, en los que lo urbano representa sólo un momento singular.

Al presentar estas tendencias con el prefijo «post» se pretende insinuar que los conceptos hoy naturalizados (lo nacional, lo humano, lo sostenible, el capitalismo) inevitablemente tenderán a evolucionar y que esos desarrollos posiblemente estén latentes en el sistema actual. El objetivo es comprender los cambios ideológicos que se están produciendo y evaluar su potencial impacto en el paisaje urbano.

1. Posnacionalidad: De los nodos de glamour de Martinotti a la cripto-extravagancia

Social media's saturation has also enormously amplified and increased the complexity of what was once termed 'site and context' in the same measure that it has shrunk the half life of images to almost nothing.

–Reiser+Umemoto, *Projects and Their Consequences* (2019)⁸⁶.

Lo que hasta hace unas décadas se consideraba nacional (empresas, capital, cultura), hoy puede situarse en un país extranjero o en plataformas digitales.⁸⁷ Una ciudad se vuelve global cuando su influencia económica, cultural, social y política deviene un nodo clave dentro de la red de empresas transnacionales, instituciones financieras y de intercambio de información. La globalización es específica y parcial, en lugar de abarcarlo todo: conecta las ciudades a través de la intensidad de los flujos de capital, personas, o información, en vez de conectarlas por proximidad. Esta reconfiguración de la centralidad resignifica espacios emergentes como el digital y cuestiona las nociones tradicionales de ciudadanía ligadas al Estado-nación. Uno de los procesos constitutivos de la globalización es la inmigración; las comunidades extranjeras reconfiguran las identidades políticas y sociales, trascendiendo las fronteras nacionales.⁸⁸ La transmigración de personas de cualquier estrato social reterritorializa las subculturas locales, dando lugar a nuevas reivindicaciones del espacio, nuevos derechos y nuevas

⁸⁵ Sassen, "Cities are at the center of our environmental future.", 1

⁸⁶ Reiser+Umemoto, *Projects and Their Consequences*, 22.

⁸⁷ Sassen, "The city: Its return as a lens for social theory," 4.

⁸⁸ *Op. Cit.*,5.

formas de ciudadanía.⁸⁹

¿Qué implicaciones tiene este cambio en la idea de nación, con sus migraciones sociales, económicas, políticas y culturales, sobre la transformación del paisaje urbano? Martinotti sugiere que la ciudad global presentará continuidades con los órdenes sociales preexistentes, pero se diferencia en que, en lugar de centrarse principalmente en sus residentes, se convierten cada vez más en el lugar de acogida de visitantes que las muestran a través de las redes sociales.⁹⁰ En su ambición por globalizarse, las ciudades fomentan los espacios atractivos para el grupo social que constituye la red (es decir, debe ser *instagramable*): aeropuertos, hoteles de lujo, oficinas, lugares de reunión, restaurantes Michelin y centros comerciales proliferan para atender a esta población transnacional de viajeros urbanos. Esto es lo que Sassen ha denominado la Zona de Glamour Urbano, caracterizada por la indiferencia y la codicia de las élites.⁹¹

La idea de posnacionalidad está también arraigada en el discurso del mundo cripto: si las criptomonedas pudieran efectivamente servir como dinero, el poder simbólico y las jerarquías sociales de las instituciones centralizadas de hoy (bancos centrales y gobiernos) podrían desestabilizarse mediante la reducción de su esfera de influencia en las tasas de interés, la oferta monetaria y las políticas de cambio de divisas. La idea de una moneda descentralizada y resistente a la censura cuestiona, por tanto, el monopolio de los bancos centrales y pretende remodelar el panorama financiero mundial. Esta tesis, ampliamente citada y debatida en el ecosistema de las criptomonedas, fue formulada antes del auge de la tecnología blockchain, ya en 1997. En su libro *The Sovereign Individual*, James Dale Davidson y Lord William Rees-Mogg proponen que la ciber-economía podría desplazar el poder de estados nacionales tradicionales para empoderar a los individuos en el control de sus propias finanzas.⁹² Su sucesor ideológico se encuentra en el libro de Balaji Srinivasan, *The Network State*, también de gran impacto en los debates sobre blockchain.⁹³ Srinivasan diverge de Davidson y Rees-Mogg en la búsqueda de una narrativa política más amplia: en lugar de aspirar a *sustituir* a otros tipos de gobierno, los estados red son pequeñas comunidades organizadas en torno a una visión compartida sobre cómo dirigir su propia sociedad, que crecen lo suficiente como para aclamar la autonomía política y el reconocimiento diplomático.

Esta tendencia a la descentralización de la nacionalidad y la refocalización del tema de la autonomía en

⁸⁹ *Op. Cit.*, 7.

⁹⁰ Guido Martinotti, "Social Morphology and Governance in the New Metropolis," en *Cities of Europe: Changing Contexts, Local Arrangements, and the Challenge to Urban Cohesion*, ed. Yuri Kazepov (Malden: Blackwell, 2005), 91.

⁹¹ Sassen, "The city: Its return as a lens for social theory," 8.

⁹² Este libro ha tenido gran influencia en el discurso de las criptomonedas, siendo citado por figuras como, entre otros, el fundador de Ethereum, Vitalik Buterin, el economista Saifedean Ammous, el autor y empresario Balaji Srinivasan. Véase: James Dale Davidson; Lord William Rees-Mogg, *The Sovereign Individual: Mastering The Transition To The Information Age* (Nueva York: Touchstone, 2020).

⁹³ Fue citado por Vitalik Buterin en Twitter, que ha sido una figura clave liderando los debates en torno a las criptomonedas.

torno al individuo es un tema que adopta un lugar central en la narrativa de algunos proyectos seleccionados, aunque con variaciones en su interpretación y enfoque.

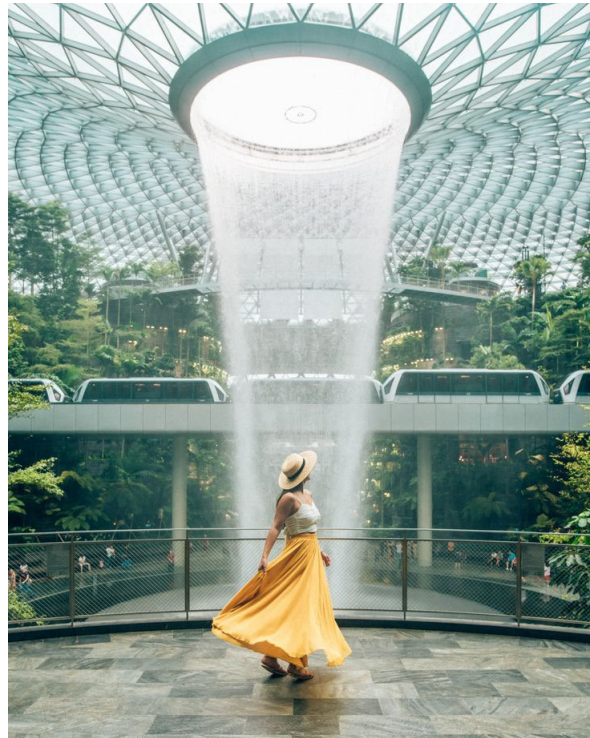


Figura 9: Influencer @jasminalley en el aeropuerto de Singapore, Changi Jewel Vortex. Fuente: Jasminalley "Changi Jewel Vortex - My favorite Singapore Instagram Spot!" [Link](#).

2. Post-humanos: De la decoración estandarizada a los memes galácticos

Bruno Latour ha cuestionado, a raíz de las nuevas tecnologías, los límites tradicionales entre categorías aparentemente binarias –humano y máquina, naturaleza y cultura, mente y cuerpo–. Sugiere que humanos y no humanos se articulan intrincadamente porque los valores sociales y la subjetividad se han incorporado en su diseño.⁹⁴ Siguiendo la misma línea, Yuval Noah Harari en su libro *Homo Deus*, sugiere la difuminación del límite de lo humano debido a que la misma tecnología utilizada para enmendar enfermedades (por ejemplo, cognitivas) puede aplicarse para mejorar los atributos del ser humano,

⁹⁴ En su ensayo *Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts*, el sociólogo y filósofo Bruno Latour presenta la puerta como un ser no humano: desestabiliza la noción convencional de un artefacto técnico, un objeto mundano, para demostrar que en realidad es un actor social. Su exhaustiva descripción de las bisagras muestra el modo en que las actitudes selectivas humanas, como sostener la puerta para otra persona que está detrás, son asumidas por el no-humano diseñado. Retoma luego esta idea en su libro *We Have Never Been Modern*. Bruno Latour, "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. Wiebe E. Bijker; John Law (Cambridge: MIT Press, 1992).

aunque este no padezca deficiencias.⁹⁵

Algunas preguntas que esto trae son ¿cómo transforma el sujeto poshumano a la ciudad? ¿Cuáles son las tendencias incipientes en la caracterización de los espacios ocupados por él? es decir, ¿cómo se expresan espacialmente? Según Sassen, bajo el contrato fordista de fabricación y consumo masivos, la fábrica, en las afueras de la ciudad, emerge como un lugar clave para el trabajo político; esto condujo a la pérdida de la relevancia de la ciudad como lugar de escala estratégica para la política y las innovaciones institucionales creativas.

The historicity of this process rests in the fact that under Keynesian policies, particularly the Fordist contract, and the dominance of mass manufacturing as the organizing economic dynamic, cities had lost strategic functions and were not the site for creative institutional innovations. The strategic sites were the large factory at the heart of the larger process of mass manufacturing and mass consumption, and the national government where regulatory frameworks were developed and the Fordist contract instituted. The factory and the government were the strategic sites where the crucial dynamics producing the major institutional innovations of the epoch were located. With globalization and digitization – and all the specific elements they entail – global cities emerge as such strategic sites. While the strategic transformations are sharply concentrated in global cities, many are also enacted (besides being diffused) in cities at lower orders of national urban hierarchies.⁹⁶

Aunque es posible que esta tendencia se profundice con la digitalización debido al auge del trabajo a distancia, las compras online, el chat virtual, etc., según Castells, tanto la concentración como la dispersión se están produciendo al mismo tiempo.

For instance, telebanking is spreading fast, mainly under the impulse of banks interested in eliminating branch offices and replacing them by on-line customer services and automated-teller machines. However, the consolidated bank branches continue as service centers, to sell financial products to their customers through a personalized relationship.⁹⁷

¿Cómo son esos espacios? Aunque el concepto del sujeto poshumano no está unificado, se puede identificar una tendencia a crear un diseño espacial globalmente unificado *dentro de marcas específicas*.⁹⁸ Algunos ejemplos son los hoteles internacionales con una decoración estandarizada, con familiaridad en su interior, las salas VIP de los aeropuertos, y la creación de identidad de marcas, sobre todo de productos tecnológicos, que establecen una estética específica e intentan posicionarse como pioneros referentes del futuro. Apple, por ejemplo, es mundialmente reconocible por el uso de grandes ventanales, su énfasis en la luz natural, interior minimalista, superficies blancas y las mesas de madera

⁹⁵ Harari define un algoritmo como «un conjunto metódico de pasos que pueden utilizarse para hacer cálculos, resolver problemas y tomar decisiones. Un algoritmo no es un cálculo concreto, sino el método seguido al hacer el cálculo». Según esta definición, un organismo también puede entenderse como tal. Yuval N. Harari, *Homo Deus: A Brief History of Tomorrow* (HarperCollins, 2017), 293.

⁹⁶ Sassen, "The city: Its return as a lens for social theory," 9.

⁹⁷ Castells, *The Rise of the Network Society*, 427.

⁹⁸ *Op. Cit.*, 448.

con tecnología integrada. Este tipo de imágenes se asocian con tecnologías innovadoras, pero no excluyen otras expresiones formales (como los espacios con aspecto de ciencia ficción que sustituyen la luz diurna por luces de neón) de asociaciones similares.

Repetir elementos para crear identidad más allá del contexto local también resuena con los espacios blockchain. Las tendencias proliferan con mayor velocidad en el arte digital y la gráfica de logotipos y páginas web, sentando una base de colores vibrantes y composiciones impactantes. Predominan el dorado y el verde (asociados a la rentabilidad económica) y el azul (evocando seguridad). Los diseños suelen recordar a imágenes de la ciencia ficción y los videojuegos, incorporan temas violetas y galácticos, propios de la naturaleza etérea de las criptomonedas. Con múltiples pantallas interactivas, o experiencias de realidad virtual y aumentada, a menudo se muestran memes que apelan al humor con el que la comunidad se identifica.



Figura 10: A la izquierda, Apple Store en Nueva York, por Foster+Partners, 2019. A la derecha, una galería NFT diseñada por ZHA. Fuentes: Pintos, P. “Apple Store Fifth Avenue / Foster + Partners” ArchDaily; Stouhi, D. “Zaha Hadid Architects Presents Virtual Gallery Exploring Architecture, NFT’s, and the Metaverse” ArchDaily.



Figura 11: A la izquierda, imágenes de videojuegos (PUBG Battlegrounds arriba, Fortnite abajo). A la derecha, imágenes de criptociudades con un aspecto similar de ensueño y ciencia ficción (Telosa arriba, Bitcoin City abajo).

3. Post-sostenibilidad

En medio de la urgencia medioambiental, las ciudades han estado cada vez más en el centro del debate, focalizándose en sus recursos para producir un impacto climático positivo.⁹⁹ Ha proliferado el término «sostenible», haciendo referencia a la capacidad de *mantener* prácticas (como la urbanización) a largo plazo. Estas prácticas incluyen la generación de energía renovable, el reciclaje de residuos, la selección de materiales ecológicos, la integración de espacios verdes, el desarrollo de comunidades orientadas al peatón, el incentivo de la reutilización de edificios existentes y estrategias para el ahorro de agua.

No obstante, los niveles actuales de consumo y crecimiento están reñidos con cualquier noción de sostenibilidad. Jane Jacobs se burlaba ya en 1961 de las simplificadas imágenes modernistas del verde urbano: “the first necessity in understanding how cities and their parks influence each other is to jettison confusion between real uses and mythical uses –for example, the science-fiction nonsense that parks are ‘the lungs of the city.’ It takes about three acres of woods to absorb as much carbon dioxide as four

⁹⁹ Sassen, "Cities are at the center of our environmental future," 1.

people exude in breathing, cooking and heating.”¹⁰⁰ A pesar de ello, la idea de las prácticas sostenibles se ha ido incorporando cada vez más a la agenda de la arquitectura y el diseño de ciudades. Las certificaciones ambientales, como muestra Reinier de Graaf, se aplican de forma crecientemente sistemática y generalizada, sobre la base de un sistema de ponderación de dudosa credibilidad, pero cuyos beneficios económicos han sido reconocidos por promotores que admiten que supone alquileres más altos y menor desocupación. Este mayor lucro deriva en que se persiga la obtención de puntajes mediante recursos aparentemente absurdos como el uso de pinturas de bajas emisiones y la instalación de salas de videojuegos para empleados.¹⁰¹

Mohsen Mostafavi¹⁰² insta a un enfoque más complejo a la sustentabilidad, superando el mero rendimiento técnico. En su lugar, promueve una concepción ecológica: la interacción de los sujetos entre sí y con su entorno, que ya no es solo natural u orgánica, sino social. Esta perspectiva señala la esencia polifacética de los sistemas urbanos, que incorporan dimensiones sociales, políticas, económicas y culturales. Subraya la importancia de comprender las interacciones entre agentes humanos y no humanos (y ahora también posthumanos) junto con procesos como la biodiversidad, la resiliencia y la adaptación.¹⁰³ En esta transición, las operaciones de diseño evolucionan más allá de la funcionalidad para circunscribirse también a la experiencia del usuario: una fuente de agua pasa de ser una necesidad urbana a una fuente de placer.

La sostenibilidad de la tecnología blockchain también ha sido cuestionada: el proceso de validación de transacciones en la red de Bitcoin requiere gran potencia de cálculo y consume cantidades exorbitantes de energía, llevando a que se compare su consumo con el de países enteros.¹⁰⁴

El debate sobre la sostenibilidad de Bitcoin se ha visto, en muchas ocasiones, ofuscado por la desinformación.¹⁰⁵ Su cálculo es complejo: en general se hace a partir de las ganancias producidas, asumiendo que una parte fija se destina a gastos como electricidad y *hardware*. Esta metodología es cuestionable debido a la alta fluctuación de su precio. Jonathan Koomey, un reconocido experto en la comprensión del impacto medioambiental de la tecnología de la información¹⁰⁶ estimó que Bitcoin

¹⁰⁰ Jane Jacobs, *The Death and Life of Great American Cities* (New York: Vintage Books Edition, 1992), 91.

¹⁰¹ Reinier de Graaf, *Architect, verb: The New Language of Building* (London: Verso, 2023), 67.

¹⁰² Gareth Doherty, Mohsen Mostafavi, *Ecological Urbanism* (Zürich: Lars Müller Publishers, 2016), 5.

¹⁰³ El concepto de la ecología como sistema dinámico e intrincado de relaciones está directamente tomado de Félix Guattari, quien rechazaba la separación dualista entre humanidad y naturaleza, abogando por una comprensión matizada de su interconexión.

¹⁰⁴ Véase Dávila, *Blockchain Radicals*, 196. Ethereum, sin embargo, utiliza un mecanismo de validación de colaterales, en el que cualquier billetera con un mínimo de monedas puede ejecutar los nodos utilizando una computadora no especializada.

¹⁰⁵ Dávila, J. *Blockchain Radicals*, 191.

¹⁰⁶ Chris Calwell Jonathan G. Koomey, Skip Laitner, Jane Thornton, Richard E. Brown, Joseph H. Eto, Carrie Webber, and Cathy Cullicott, "Sorry, Wrong Number: The Use and Misuse of Numerical Facts in Analysis and Media Reporting of Energy Issues," *Annual Review Of Environment And Resources*, 27, (2002).

consume alrededor del 0,2% del uso mundial de electricidad, casi la mitad de lo que se ha afirmado.¹⁰⁷

A medida que el debate medioambiental consolidaba su lugar en la agenda política, en la década de 1990, la economía se convirtió en el medio para abordar estos problemas.¹⁰⁸ En lugar de revisar las empresas transnacionales por su impacto, éstas instalaron los parámetros a los que debían ajustarse las preocupaciones medioambientales. El discurso de la sostenibilidad, así, se convirtió en uno de tecnología e innovación.

La idea del diseño sostenible ha estado presente en las criptociudades, con iniciativas para el uso de fuentes de energía renovables, infraestructuras para movilidad verde, etc. Estas prácticas bienintencionadas arrastran distorsiones argumentales, pues omiten que los cambios dependen del poder de instituciones que, movidas por intereses económicos, llevan medio siglo retrasando el abandono de los combustibles fósiles.¹⁰⁹

Los próximos capítulos tratarán de desvelar cómo estas iniciativas contribuyen a la descentralización, desviando la atención de sus detalles técnicos o sus huellas de carbono, y dilucidando en cambio su papel en el fomento de la acción colectiva contra la centralización que dio lugar a la explotación de los recursos finitos de la Tierra.

4. Postcapitalismo: Una alternativa al tecnofeudalismo de Varoufakis

Feudalism had died and gradually but fast was replaced by something called capitalism. The magnificent shift of power from the owners of land to the owners of machinery (...). My view is that we are already experiencing a similar transformation(...) to something like feudalism but a very technologically advanced version of it. Markets have been replaced by platforms.

—Yanis Varoufakis, “Capitalism as we know it is over” (2023).¹¹⁰

Allow me to give you the economic definition [of capital]: it's not money. Capital used to be something really simple before capitalism. It used to be a produced means of production. (...) A plow steel, a fishing rod, these are produced means of production. That's what capital used to be. Now what capitalism did was (because capital predates capitalism by millennia) [to] transfer social power from those who had

¹⁰⁷ Jonathan Koomey, "Estimating Bitcoin Electricity Use: A Beginner's Guide," *Coin Center*, 1, (Mayo 2019).

¹⁰⁸ Graaf, *Architect, verb*, 76.

¹⁰⁹ Dávila, J. *Blockchain Radicals*, 201.

¹¹⁰ "Capitalism as we know it is over, so what comes next? | My Wildest Prediction with Varoufakis" Youtube Video. Posteadó por @euronews. 20 de diciembre, 2023. [Link](#).

land to those who owned capital. Up until the end of the late feudal era, power emanated from land ownership with the creation of the working class. The erection of the first factories were machine-based. You had a shift of power from the owners of land to the owners of capital.

–Yanis Varoufakis, “Technofeudalism and Cloud Capital” (2022).¹¹¹

El panorama económico contemporáneo, sostiene Yanis Varoufakis, está marcado por desviaciones significativas respecto a lo que preveía el capitalismo clásico, dando lugar al llamado poscapitalismo.¹¹² Los párrafos siguientes desarrollan esta idea, mostrando la aparición de un nuevo tipo de capital -el capital-nube-. La cuestión que se plantea es: si, como dice Sassen,¹¹³ las ciudades han funcionado históricamente como arenas en las que se manifiesta espacialmente el poder, entonces ¿cómo repercuten estos desplazamientos de propietarios del capital en el espacio construido? ¿Qué caracteriza a los elementos espaciales del actual sistema económico, dominado por el capital digital? Hace falta, antes de abordar estas preguntas, revisar la evolución del capitalismo y los motivos por los que Varoufakis argumenta su fin.

El modelo keynesiano de crecimiento económico,¹¹⁴ que proporcionó una prosperidad económica excepcional y estabilidad social durante casi treinta años tras la Segunda Guerra Mundial, encontró sus limitaciones inherentes a principios de la década de 1970.¹¹⁵ El sistema de *Bretton Woods*, que había fijado los tipos de cambio al dólar estadounidense, vinculado al oro, había regido las relaciones monetarias internacionales desde el final de la Segunda Guerra Mundial. Sin embargo, para que el dólar fuera la moneda del mundo a tasa fija, EE.UU. tenía que vender más bienes y servicios de los que consumía. Sin embargo, en la década de 1960, se convirtió en una economía crónicamente deficitaria,¹¹⁶

¹¹¹ Las teorías de Varoufakis están en gran parte influenciadas por la visión marxista de que el capital no es sólo acumulación de riqueza, sino una relación social, que lleva a la explotación del trabajo por el capital. Ver: Varoufakis, *Technofeudalism*, 182; “Technofeudalism and Cloud Capital: A Conversation with Yanis Varoufakis” Youtube video. Posteador por @stanfordingovernmentsig5480. 11 de Julio, 2022. [Link](#).

¹¹² Economista y ex Ministro de Finanzas de Grecia.

¹¹³ Sassen, “The city: Its return as a lens for social theory,” 6.

¹¹⁴ John Maynard Keynes (economista británico) lideró un cambio significativo en el pensamiento económico al cuestionar la noción entonces imperante de que el libre mercado podía garantizar el pleno empleo, justificando la intervención del gobierno para promover la estabilidad de precios. Ver Ahmed Saber Mahmud Sarwat Jahan, and Chris Papageorgiou, “What Is Keynesian Economics?,” *Finance & Development* 51, no. 3 (2014).

¹¹⁵ Aparte del sistema de Bretton Woods, otros componentes que contribuyeron a la demanda constante de la divisa estadounidense fueron la creciente globalización del comercio, las finanzas y la inversión, el crecimiento de la industria de la tecnología de la información y los acuerdos entre Estados Unidos y los principales países exportadores de petróleo que establecieron el dólar como moneda para la exportación de petróleo. Estos factores posicionaron el dominio y la estabilidad del país (símbolo del capitalismo) como gran potencia mundial. Desde entonces, Estados Unidos ha absorbido gran parte del excedente de producción industrial del resto del mundo, que volvería a Wall Street en forma de inversión directa a las empresas estadounidenses, creando un flujo circular mundial de bienes y capitales.

¹¹⁶ Tres acontecimientos que contribuyeron a este déficit fueron: el importante gasto militar en la guerra de Vietnam; las fábricas de otros países - como Japón y Alemania-, que superaban en calidad y eficiencia a las estadounidenses (en parte debido al apoyo que estos países recibieron de los gobiernos de Estados Unidos); y la puesta en marcha de ambiciosos programas sociales bajo la presidencia de Lyndon B. Johnsons.

dando paso a una inflación galopante y al colapso de Bretton Woods.

Surgió así un nuevo tipo de capitalismo, caracterizado principalmente por la reducción de políticas económicas y orientándose más en las regulaciones del mercado, convirtiendo a la privatización en un principio central. En este contexto, consiguió mantener su rol de líder mundial, a pesar de que consumía más de lo que producía: mediante déficits comerciales, principalmente con Europa y Asia, que absorbieron los superávits. Como Estados Unidos gastaba cada vez más en productos extranjeros, en dólares, los países extranjeros tienen un exceso de ahorro, que luego reinvierten de nuevo en Estados Unidos. Así paso a depender en gran medida de las entradas de capital del exterior para financiar su déficit, en forma de acciones, bonos, bienes inmuebles o compra de títulos del Tesoro estadounidense por bancos centrales extranjeros. Esta dinámica, intrínsecamente desequilibrada, dependía de un endeudamiento y un consumo cada vez mayores. Varoufakis sostiene que este capitalismo, creado a partir de 1971, se vino abajo con la quiebra de Lehman Brothers en 2008.

Para evitar una segunda Gran Depresión, el banco central pretendió salvar el capitalismo imprimiendo dinero y devolviéndoselo a los mismos banqueros «cuyas actividades cuasi-criminales llevaron miseria a la mayoría»,¹¹⁷ por decirlo en palabras de Varoufakis. Este flujo de dinero en efectivo nunca volvió en forma de inversiones que generaran empleos de calidad, principalmente porque los tipos de interés se hundieron y los capitalistas se abstuvieron de realizar tales inversiones. En su lugar, los accionistas dirigieron su dinero a la compra de arte, terrenos, almacenes, clubes, superyates, desvinculando el trabajo duro de la mejora de la calidad de vida.

Como el dinero del banco central fluía sin resistencia, y cada acción, bono o activo subía, empresarios con talento como Jeff Bezos y Elon Musk pudieron construir sus empresas ultrapoderosas sin necesidad de vender grandes porciones de su negocio a otros, generar grandes beneficios para pagar nuevo capital social o pedir dinero prestado al banco (las tres cosas que los capitalistas tradicionales tenían que hacer para expandirse). Con el banco central atrapado en la impresión de más dinero, y la pandemia impulsando el sistema, las acciones de las empresas se dispararon, independientemente de si obtenían ganancias o no. Esta fue la oportunidad de establecer un dominio total del mercado. Utilizando sus acciones como garantía, pagaron por la investigación en inteligencia artificial, formaron a desarrolladores de software e ingenieros, compraron *startups* prometedoras, no en busca de ganancias, como harían los capitalistas, sino en busca de un nuevo tipo de capital (capital-nube).

Esto cambia radicalmente la estructura de poder, porque es un medio de producción que no se crea a través del trabajo asalariado, sino mediante *likes* en Instagram, búsquedas en Google, compras en Amazon, posts en Twitter. Es producido por una gran parte de la humanidad, a través de contenidos,

¹¹⁷ Yanis Varoufakis, *Technofeudalism: What Killed Capitalism* (London: The Bodley Head, 2023), 99.

pero sólo unos pocos individuos cobran por ello. Tal concentración de riqueza contradice el mercado competitivo ideal, sello distintivo del capitalismo. De ahí el nombre tecno-feudalismo: por su marcada semejanza con un sistema en el que la acumulación de riqueza está controlada por una minoría.

Los dos pilares del tecno-feudalismo son: (1) el elevado involucramiento de gobiernos y bancos en los asuntos económicos, que va en contra de los principios del capitalismo porque, a medida que se imprime dinero, el salario de todos pierde poder adquisitivo, reemplazando las ganancias de los capitalistas (2) la sustitución de los mercados por plataformas, con algoritmos híper customizados a cada consumidor, capaces de persuadir a los individuos a que consuman determinados productos.

Una pregunta que surge de esto es, ¿plantea la tecnología blockchain una alternativa a esta tendencia de concentración de poder? La cuestión no es si blockchain es o no la *solución*, ya que sus numerosos inconvenientes han impedido que adquiera importancia económica. Su incapacidad para superar los desafíos podría incluso significar que nunca se convertirá en una corriente dominante. No obstante, dado que funciona sin una única autoridad central, cabe preguntarse cómo esto podría permitir un cambio de los derechos de propiedad sobre, entre otros, la información, la red, la tierra, los vehículos, el arte y la energía, es decir, el capital. Incluso si cripto es realmente una falsa promesa, los experimentos con blockchain podrían ayudar a dilucidar qué tendencias sociales se están configurando como alternativa al tecno-feudalismo.

¿Cuáles son las implicancias espaciales del actual sistema económico, caracterizado por su consolidación del capital en la minoría? Sassen defiende que las ciudades se convierten cada vez más en el lugar preferido de las funciones centrales, incluidas la necesidad de coordinación de fábricas y puntos de servicio, asistencia financiera y corporativa, proximidad a infraestructuras de apoyo como universidades e instituciones de investigación que hacen atractiva la ciudad como centro. Es difícil predecir si un cambio en la propiedad del capital, de las empresas privadas a la red, repercutiría radicalmente en esa necesidad de concentración física, porque la dinámica de la innovación tecnológica, las leyes regulatorias y los factores socioeconómicos desempeñarían un papel crucial. No obstante, los modelos digitales ponen a prueba rápidamente algunas de estas transferencias de propiedad. CityDAO, por ejemplo, explora la descentralización de la propiedad de la tierra; Decentraland simula la descentralización del dinero, la tierra y el arte. Los capítulos siguientes tratarán de desentrañar estas alternativas.



Capítulo II. Historia volcánica: La identidad de Bitcoin City

II.a Introducción al capítulo II

Como se mencionó en la introducción, el objetivo de esta tesis es comprender tanto el estado actual de las iniciativas de las criptociudades como su inserción en una genealogía más larga del desarrollo de modelos urbanos -ya sea habilitada o fomentada por nuevas tecnologías como blockchain-. Esta búsqueda consiste en determinar si las criptociudades han seguido, se han ajustado o han introducido novedades en las tendencias predominantes de la producción urbana a nivel mundial, y cómo lo han hecho.

El capítulo II analiza Bitcoin City, un proyecto impulsado por Nayib Bukele, presidente de El Salvador, y diseñado por el estudio de arquitectura mexicano Fernando Romero Enterprise (FR-EE). Este proyecto se promociona como innovador por su supuesta capacidad para operar con Bitcoin y extraerlo utilizando la energía geotérmica de un volcán cercano. Aunque gran parte del debate en torno a él salta a la pregunta *¿es deseable?* Yo sugiero preguntarse: *¿por qué sus promotores lo consideran deseable?* En otras palabras, ¿qué objetivos se persiguen y cómo se pretende que la tecnología digital los cumpla? La visión que subyace a la propuesta se expresa en la narración del presidente Bukele y el arquitecto Romero. Para entender los orígenes y el propósito de Bitcoin City, también examinaré el contexto de El Salvador, su economía y su política, así como el legado de modelos urbanos que sirven de sustrato para su desarrollo.

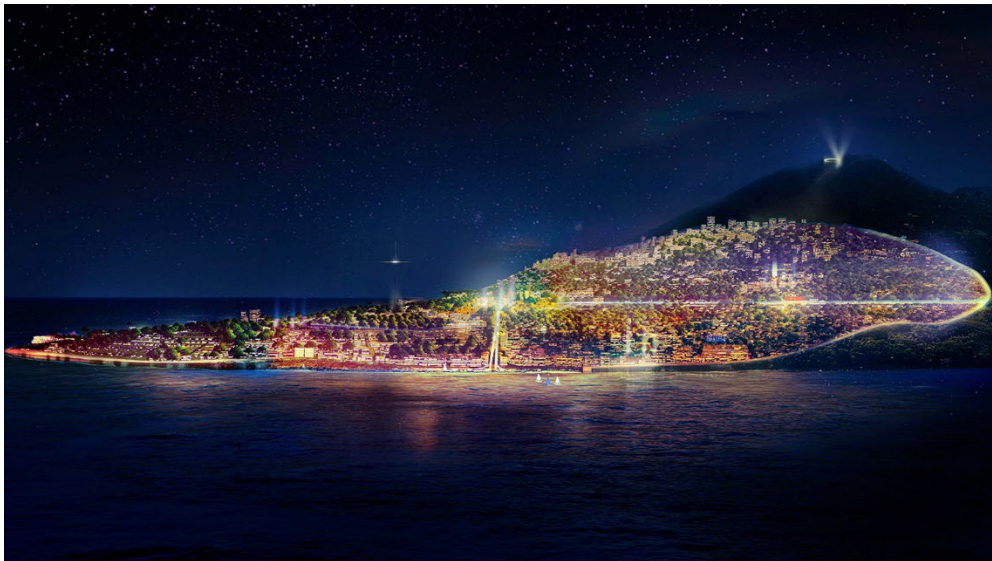


Figura 12: Render de Bitcoin City de noche. La imagen muestra colores vibrantes, casi irreales, destacando el volcán en el fondo y el puerto en primer plano. Fuente: Ravenscroft, Tom. 2022. "El presidente de El Salvador revela el diseño de la ciudad volcánica de Bitcoin". Dezeen. 12 de mayo de 2022. [Link](#).

II.b La apuesta de Nueva Alejandría por la hegemonía financiera

Bitcoin City fue anunciada por el presidente Bukele el 20 de noviembre de 2021 en la clausura de *la Bitcoin Week*, una conferencia celebrada en San Salvador casi seis meses después de que el país sancionara la criptomoneda como moneda de curso legal. Diseñada para ser construida en el Golfo de Fonseca, en la costa sur de la ciudad, la ciudad fue presentada por Bukele ante una multitud que lo aclamaba con confianza, hablando en inglés, animado por una gran cantidad de fuegos artificiales, gráficos led y una canción de AC/DC que sonaba a todo volumen de fondo:

When Alexander the Great was conquering the world, they established these Alexandrias and the whole point of the Alexandrias [is that they] were very small pieces of land. If you would think about cities at that time, they established 20 Alexandrias all over the empire. The idea of these Alexandrias was not to cover the territory –which was immense–. The Alexandrias were actually very small, but the idea behind it was to make these Alexandrias be the **beacons of hope** for the rest of the world. That all of the world could be like that. Of course, Alexander the Great died and the empire divided. You know the rest of the story. But that was the idea. So, I thought, if you want **Bitcoin to spread all over the world**, we should build some Alexandrias, right?¹¹⁸

Al crear su "Alejandría" de la era moderna, extendería la adopción de la criptomoneda por todo el mundo, de forma muy similar a la influencia que pretendían ejercer las antiguas Alejandrías. Sin embargo, presentando en una conferencia sobre Bitcoin, Bukele dio por sentados conceptos y opiniones. ¿Cuáles eran sus hipótesis? ¿Por qué consideraba Bitcoin "un faro de esperanza" y esperaba que se extendiera por todo el mundo? ¿Qué otras agendas sustentaban su proyecto? Recapitulemos algunos conceptos técnicos subyacentes a Bitcoin.

¹¹⁸ "Bitcoin City & Bitcoins Bonds Announcement by El Salvador's President Nayib Bukele." YouTube video. Posteador por @surfinbitcoin. 21 de Noviembre, 2021. [Link](#).

- El creador de Bitcoin, un personaje o grupo desconocido bajo el seudónimo de Satoshi Nakamoto, pretendía crear un sistema de dinero digital en 2008.
- El principal avance fue la combinación de tecnologías ya existentes para resolver el problema del doble gasto, garantizando que una moneda no se duplica, sino que se transfiere legítimamente una sola vez cuando se utiliza.
- Bitcoin puede validar y registrar transacciones sin autoridades centralizadas, es decir, automatiza mediante software las funciones de los bancos centrales modernos.
- Como todo el mundo puede acceder al libro contable y auditarlo, el código es casi imposible de alterar.
- Las transacciones se registran en una serie de bloques, vinculados entre sí mediante huellas digitales (hashes), para garantizar que el historial (libro mayor) sea inmutable incluso en presencia de actores poco fiables.
- Las tres funciones del dinero, que Bitcoin pretende cumplir, son:
 - Servir como medio de cambio
 - Servir como depósito de valor
 - Servir como unidad de cuenta
- El bitcoin se promociona como una vía hacia la inclusión financiera porque para utilizarlo basta con un smartphone y una conexión a Internet, con lo que (teóricamente) se evitan las restricciones impuestas por el sistema bancario.

La mayoría de los defensores de Bitcoin desconfían de los gobiernos enfáticamente. Para que las monedas sean un depósito de valor fiable, argumentan, tienen que superar la trampa del "dinero fácil": la moneda debe aumentar de valor cuando la gente la busque para almacenar riqueza, mientras que su oferta debe ser limitada para evitar que su precio caiga. Vencer esta trampa es esencial.¹¹⁹ Aunque Bitcoin está diseñado para superar este obstáculo, sus defensores pasan por alto la importancia del papel que desempeñan los gobiernos –a través de la política monetaria y la fiscalidad– para garantizar la estabilidad del mercado.¹²⁰

A lo largo de la historia moderna, el oro ha mantenido sistemáticamente su dominio en el ámbito monetario. Esto se debe, por un lado, a su estabilidad química inigualable y, por otro, a su escasez y lenta tasa de crecimiento. En los últimos setenta años, la tasa de crecimiento del oro ha rondado el 1,5%, sin superar nunca el umbral del 2%. Esto ha hecho prácticamente inviable que los mineros de oro extraigan cantidades lo suficientemente sustanciales como para ejercer una presión significativa a la baja sobre su precio.¹²¹ Copiando este modelo, Bitcoin tiene un calendario de producción establecido. Su suministro está limitado por diseño a 21 millones, y la oferta disminuye gradualmente (también por

¹¹⁹ Saifedean Ammous, *The Bitcoin Standard: Sound Money in a Digital age* (Newark: John Wiley & Sons, Incorporated, 2018), 899. Kindle.

¹²⁰ Dávila, *Blockchain Radicals*, 61.

¹²¹ Ammous, *The Bitcoin Standard*, 904.

diseño) hasta agotarse; según las estimaciones será en el año 2140. Mientras que las monedas físicas se acuñan, los nuevos bitcoins se crean a través de un proceso llamado minería. Nodos con hardware especializado compiten entre sí en el cálculo de números, consumiendo grandes cantidades de energía eléctrica (el software tiene que probar muchas combinaciones). Una vez que un nodo descifra el código, el resto de nodos puede validarlo como correcto.¹²² Los ganadores de esta carrera consiguen añadir un nuevo bloque a la cadena y son recompensados con nuevos Bitcoins. El valor de la recompensa por añadir el nuevo bloque se reduce a la mitad cada 210.000 bloques.¹²³ Como los bloques se crean cada 10 minutos aproximadamente, los eventos de reducción a la mitad tienen lugar cada cuatro años aproximadamente. Así, el ritmo de creación de bitcoins disminuye con el tiempo hasta que se alcanza la oferta máxima.

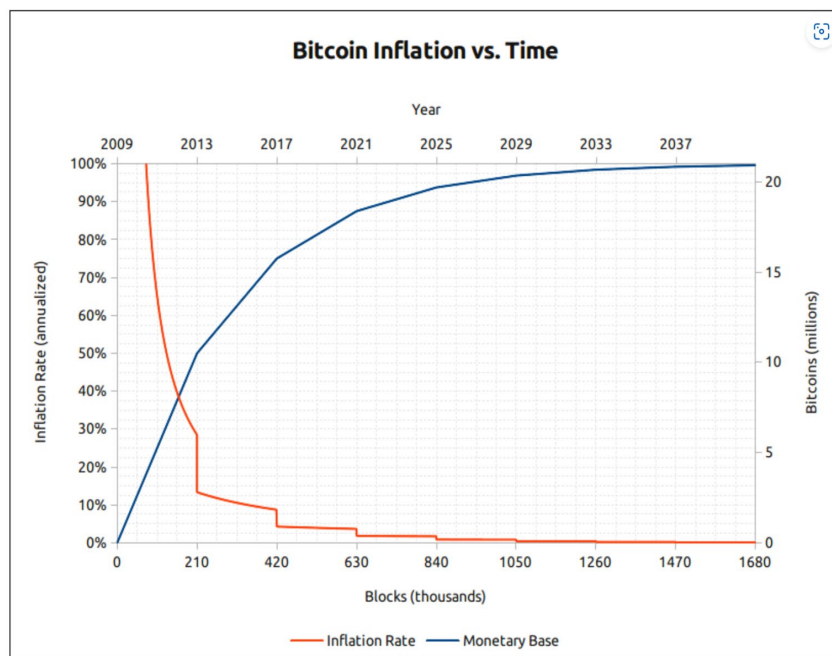


Figura 13: Gráfico que muestra la tasa de inflación y la base monetaria de Bitcoin a lo largo del tiempo, medidas en número de bloques. Fuente: "Bitcoin Block Reward Halving Countdown" [Link](#).

Esta limitación en la oferta hace que Bitcoin no responda a los cambios de demanda, por lo que su precio es muy volátil. Para la mayoría de los productos, fluctuaciones de demanda provocan un aumento de la producción, lo que atenúa las subidas de precios y aumenta la rentabilidad (y viceversa). La

¹²² La complejidad de este acertijo aumenta con el tiempo para compensar la mayor velocidad de las actualizaciones de software.

¹²³ El primer evento de reducción a la mitad se produjo el 28 de noviembre de 2012 a una altura de bloque de 210.000, el segundo el 9 de julio de 2016 a una altura de bloque de 420.000 y el tercero el 11 de mayo de 2020 a una altura de bloque de 630.000. Al momento de escritura, la recompensa es de 3,125 bitcoins por bloque tras la reducción a la mitad de abril de 2024. "Bitcoin Block Reward Halving Countdown", consultado el 24 de Mayo, 2024, [Link](#).

volatilidad de bitcoin (su fluctuación puede alcanzar el 5% con respecto al dólar estadounidense en un solo día) ha llevado a los gobiernos a argumentar que no es adecuado como unidad de valor, asemejándolo más a productos de inversión especulativa como las acciones.¹²⁴ Puede resultar contradictorio que el dinero actúe a la vez como inversión y como medio de cambio que la mayoría de la gente utiliza para sus necesidades cotidianas.¹²⁵

Un fiel adepto como Saifedean Ammous, por otro lado, cree que bitcoin puede considerarse una inversión sólo porque constituye menos del 1% de la oferta monetaria mundial. Si la cuota de Bitcoin se convirtiera en mayoritaria, su demanda y previsibilidad serían cada vez más estables.¹²⁶

Hipotéticamente, si fuera la única moneda utilizada a nivel mundial, dada su oferta fija, un cambio en la demanda sería marginal en comparación con las cantidades que poseen los grandes bancos e instituciones (véase figura 13).

La contratación de Ammous como asesor económico por parte de Bukele sugiere que sus agendas están alineadas.¹²⁷ El interés del presidente de El Salvador en que Bitcoin se adopte globalmente se basa en la posibilidad de que adquiera estabilidad y suba de precio. Los primeros en adoptarlo, como El Salvador, se beneficiarían significativamente de ello, ya que a los bancos centrales posteriores les resultaría progresivamente más caro comprarlo. En palabras (informales) del propio Bukele:

Bitcoin is going to change the world. It has already changed, but it's going to change even more. A lot of people don't know about the history of money. I won't tell the history of money, don't worry. But, you know, this is normal evolution. So it's not just a good or cool, or a nice idea. It's the evolution of humankind. We're going there. You can't stop evolution. No, we just can't. It just happens. So it doesn't matter if we build Bitcoin City or not for the evolution of bitcoin. If we issue some bonds, or if we do this event: it will evolve regardless because that's the way it is. But it's nicer if we are part of it. So it's nicer if we push it a little. It's nicer if we make it legal tender. It's nicer if we build a city or 10 cities or 20 cities like the Alexandrias. So, you know, it's nicer. It doesn't have to be that way, but I think it's going to be better if it is that way. So, in the end, it's for us. **It would be nice to be the financial center of the world.** Yeah, it sounds cool to us. So it doesn't matter probably for bitcoin, but yes it matters for us. And I think we can make it even better and we can push the future even forward.

La neutralidad de Bitcoin en el ecosistema internacional (ningún país tiene el exorbitante privilegio de emitirlo) es comprensiblemente interesante para El Salvador, teniendo en cuenta su grave situación

¹²⁴ Nouriel Roubini, "Exploring the Cryptocurrency and Blockchain Ecosystem", (U.S. Government Publishing Office, 2018). [Link](#).

¹²⁵ Dávila, *Blockchain Radicals*, 67.

¹²⁶ Ammous, *The Bitcoin Standard*, 4831.

¹²⁷ "Saifedean Ammous Joins El Salvador's Bitcoin Office as Economic Advisor," *Bitcoin Magazine* [@BtcCasey], 23 de Mayo de 2023. Consultado el 22 de mayo de 2024. [Link](#).

económica. Aunque la complejidad económica, social y política de El Salvador excede el alcance de esta investigación, es importante señalar que, desde enero de 2001, la moneda tradicional de la nación, el "Colón", fue reemplazada por el dólar estadounidense por el partido opuesto al de Bukele. Con exportaciones poco diversificadas, deficiencia en la supervisión del sistema financiero y escasa inversión extranjera, la economía depende en gran medida de las remesas.¹²⁸ La dolarización se hizo a costa de una mayor exposición a adversidades externas, como un terremoto, o una disminución de estas remesas. En un contexto dolarizado, acontecimientos de ese tipo obligarían al país a aumentar su dependencia de la deuda externa, afectando a su soberanía en términos de toma de decisiones y autonomía política.¹²⁹

La apuesta de Bukele podría ser que Bitcoin cumplirá algún día las tres funciones del dinero, convirtiéndose en la principal moneda del mundo. En ese contexto, adoptar Bitcoin en una fase temprana constituiría una oportunidad para impulsar la economía de El Salvador, así como su soberanía política. La creación de una nueva ciudad daría visibilidad estratégica y materialidad a esa iniciativa, asemejándose a la manera en que las Alejandrías de la antigüedad se convirtieron en emblemas de la visión imperial de Alejandro Magno. O, al menos, así lo ve Bukele.

II.c Adaptando ciudades

The creation of a community, now both a local and global urgency, is perhaps the highest calling of an architect, as it requires the architecture to be neither under – nor overdetermined.

Reiser+Umemoto, Los proyectos y sus consecuencias (2019)¹³⁰.

Bitcoin City es una ciudad circular organizada radialmente, con múltiples centros de actividad repartidos por el territorio. El diseño de Fernando Romero Enterprise surgió como adaptación de un concepto urbano desarrollado en 2012 (véase Figura 14).¹³¹

¹²⁸ Carlos J. Glower, "La dolarización en El Salvador: Lecciones y advertencias para la región." *Nueva Sociedad*, 172, (Marzo-Abril 2001): 150-163.

¹²⁹ El Fondo Monetario Internacional (FMI) ha advertido a El Salvador contra la adopción de la criptomoneda, siendo su principal preocupación la alta volatilidad del precio y sus implicaciones en la estabilidad macroeconómica.

¹³⁰ Reiser+Umemoto, *Projects and Their Consequences*, 38.

¹³¹ "Semana del Diseño de Milán con Fernando Romero | MINDED Podcast". YouTube video. Postado por @createurs_design_association 24 de abril de 2023. [Link](#).



Figura 14: A la izquierda, el primer render publicado de Bitcoin City. A la derecha, un render de Fr-ee City. Ambos proyectos son de Fernando Romero Enterprise. Fuente: "Bitcoin City in El Salvador", Arquitectura Viva (2023); "Fr-Ee City". 2012, [Link](#).

El prototipo de 2012 constaba de 100.000.000 m² para construir nuevas ciudades en economías emergentes. La propuesta, titulada Fr-ee City, fusionaba tres tipologías: una estructura radial, conexiones hexagonales y una retícula urbana. Esta organización buscaba crear una estrategia de zonificación jerárquica al tiempo que optimizaba la proximidad entre zonas. Todos los residentes viven a menos de 8 minutos a pie de una estación de tranvía. Con una eficiente red de transporte público, el modelo urbano se mantiene libre de automóviles. Fr-ee City se presenta como una oportunidad para "disfrutar de las libertades de la vida urbana en una economía holística" (aunque siguen sin estar claras las formas concretas en que pretende conseguirlo). El resumen oficial de FR-EE City reza así:

Imagínese un lugar en el que los residentes tengan garantizada la seguridad, la asistencia sanitaria y la educación, una ciudad en la que el acceso a la información no tenga restricciones y las tecnologías innovadoras estén plenamente integradas en la vida cotidiana. ¿Qué pasaría si la elaboración de políticas estuviera determinada por datos objetivos y no por disputas políticas? Las ciudades deben aprovechar este tipo de oportunidades y contribuir a redefinir la forma en que vivimos hoy en día.¹³²

Su ideología casi explícitamente libertaria es quizá la principal razón por la que Bukele se dirigió a FR-EE para adaptar el concepto a su visión de Bitcoin City: las palabras clave son libertad, seguridad, información sin restricciones, tecnología innovadora y una visión (¿distópica?) de un mundo sin disputas políticas. Dicho de otro modo, si la promoción de Bitcoin City sirve como estrategia narrativa para fomentar la adopción de la moneda, se deduce que las ideologías libertarias deben estar en armonía con

¹³² "FR-EE City," FR-EE, 2012, Consultado 24 de mayo, 2024, [Link](#).

ella. Desde un punto de vista más pragmático, la decisión de Bukele de encargar el proyecto a Fernando Romero también puede atribuirse a la trayectoria de la oficina en el diseño de proyectos a gran escala. Con oficinas en Nueva York, Ciudad de México, Madrid y Shenzhen, y una cartera que abarca desde aeropuertos hasta museos y hoteles, Romero es considerado capaz de realizar edificios icónicos y proyectos urbanos. La empresa tiene experiencia en colaborar con estudios de arquitectura internacionales, como Foster and Partners, como hicieron en su interrumpido diseño del nuevo aeropuerto de Ciudad de México.

Entender Bitcoin City como una adaptación de FR-EE City es clave para comprender su carácter. Mientras que Bitcoin se describe como un giro disruptivo hacia valores libertarios, FR-EE City destaca que estos valores no se derivan únicamente de la propia tecnología. En otras palabras, sugiere una relación no lineal entre tecnología y forma urbana. Esto no resta importancia al papel de la innovación, sino que sugiere que puede entenderse como una acumulación de pequeñas mutaciones añadidas a las tendencias existentes. ¿Cuáles son esas tendencias y cómo mutan?



Figura 15: Vista aérea de Bitcoin City. Se hace hincapié en la conexión de la ciudad con el mundo a través del puerto. Fuente: Ravenscroft, Tom. 2022. "El presidente de El Salvador revela el diseño de la ciudad volcánica de Bitcoin". Dezeen. 12 de mayo de 2022. [Link](#).

Martinotti propone –como se menciona en el capítulo I– que la ambición de una ciudad por adquirir relevancia mundial puede ir en detrimento de la vida de los residentes permanentes. Los expatriados y los turistas, por el contrario, son agentes bienvenidos, que aportan talento y capital, al tiempo que impulsan la circulación de los iconos de la ciudad (aeropuertos, hoteles de lujo, museos) a través de las redes sociales. Para dirigirse a *influencers*, jóvenes profesionales y nómadas digitales, Bukele optó por difundir Bitcoin City utilizando el inglés y una cuenta de Twitter. El 10 de mayo de 2022 subió diecisiete imágenes, entre ellas fotos suyas y de Romero mirando dos maquetas físicas -una de toda la ciudad, en

dorado, y otra del aeropuerto, en plateado-, renders del proyecto desde lejos y una vista en planta renderizada.

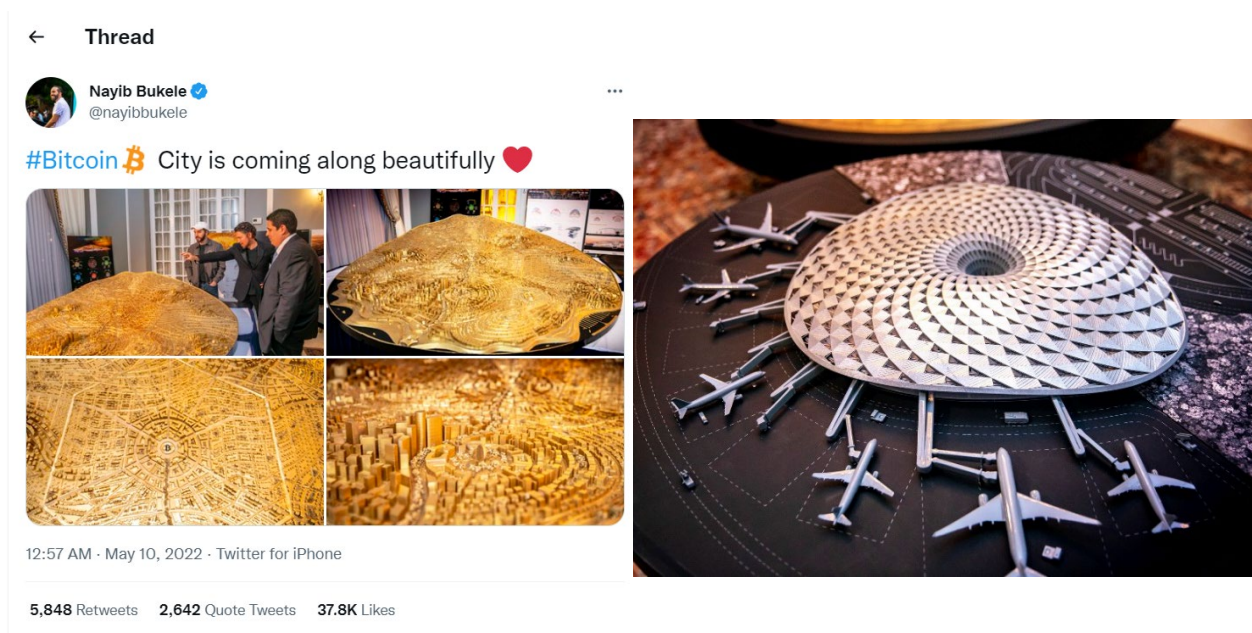


Figura 16: A la izquierda, fotografía de Fernando Romero y Nayib Bukele con la maqueta de Bitcoin City. A la derecha, fotografía de la maqueta del aeropuerto. Fuente: Nayib Bukele [@nayibbukele], "Bitcoin City is coming along beautifully <3," Twitter, 10 de Mayo, 2021, [Link](#).

Si el proyecto sigue la tendencia de destacar los aeropuertos como puertas de entrada y símbolos emblemáticos de la conectividad, la elección del dorado como color del modelo físico puede leerse como una evolución más de dicha tendencia. La identidad no es sólo glamurosa; está hecha a la medida de la particular exuberancia de la comunidad Bitcoin. Otra forma de crear una identidad distintiva, explica Romero, fue mediante el diseño de la Plaza Central.¹³³ Esto sigue la tradición del urbanismo colonial español: primero se trazó la plaza, seguida de la iglesia como principal autoridad.¹³⁴ Sin embargo, si la iglesia se convirtió en el corazón de la ciudad, proporcionando cohesión, estabilidad económica y unidad ideológica, este ancla ha sido sustituida en Bitcoin City por un museo que muestra la historia del dinero.

¹³³ "Milan Design Week with Fernando Romero | MINDED Podcast". YouTube video. Postado por @createurs_design_association. 24 de abril de 2023. [Link](#).

¹³⁴ El acto fundacional se realizaba siempre en compañía de un jerarca de la Iglesia y un representante de la ley. La primera zona que se delimitaba era la plaza mayor, en la que se asignaba, en primer lugar, un espacio para la iglesia, que generalmente tenía una cúpula como símbolo para demostrar su grandeza y la autoridad que allí tendría la iglesia católica. Igualmente, en la Plaza Mayor tenían asiento las construcciones del poder ejecutivo, como el palacio para la Alcaldía o el cabildo y de los representantes del orden jurídico. Jacinto Chozza Marta C. Betancur, Gustavo Muñoz, *Narrativas Fundacionales De América Latina* (Sevilla: Thémata, 2010).



Figura 17: A la izquierda, el toro de Wall Street: una escultura de bronce que representa el distrito financiero y el mercado capitalista de la bolsa. A la derecha, su reinterpretación para la *Bitcoin Week* celebrada en Miami en 2022. Las identidades se crean explotando símbolos ya establecidos. Fuente: Eva Marie Uzcategui "Bitcoin Extravaganza is 'All About Eye-Catching' Post Pandemic" *Bloomberg News* (2022).

También se menciona en la introducción la (tendencia hacia) la dependencia de fuentes de energía renovables. Bitcoin City lleva esto en una dirección sin precedentes: en lugar de proponer paneles solares o molinos de viento, la principal fuente de energía es un volcán. En la siguiente sección se desarrolla un análisis holístico de estas tendencias (no sólo considerando el cambio climático, sino también las dimensiones social y económica).

II.d Mirando al Sur: Perspectivas desde Brasilia

Si la ciudad es realmente el lugar estratégico donde se materializan importantes tendencias macrosociales, toda nueva ciudad se enfrenta al reto de tener que crear su propia cultura.¹³⁵ Aunque a veces existe la narrativa (o la ilusión) de partir de cero, siempre hay al menos cierto grado de contexto, ya sea una historia local o una tendencia global actual.¹³⁶

Aunque Romero es consciente de este desafío y de las razones por las que las nuevas ciudades han sido criticadas en el pasado, es interesante que, en lugar de pretender partir de una hoja en blanco, reconozca otras nuevas ciudades como parte de su contexto:

When you analyze the history of cities designed by architects, like [Brasilia, Masdar City], there's always two different views. Number one is: "it failed, because it didn't achieve this or that humanitarian quality". On the other hand, "it was super successful, because they managed to develop this neo-political center, for example, the case of Brasilia." **I think that requests a presidential leader** that has a vision to develop a new place in the country. El Salvador is quite singular for many reasons: one is the dimension of the country: it's quite small. Also, when you see the map, it's helpful that the country is not

¹³⁵ Sassen, "The city: Its return as a lens for social theory", 1.

¹³⁶ Este es el caso de City of Telosa, donde el proyecto se presenta como planeado sobre un lienzo en blanco. Consideraciones similares se aplican a la mentalidad startup, a menudo fundada en la idea de que se está creando algo de la nada. "City of Telosa – Introduction". YouTube video. Posteador por @cityoftelosa7330. 12 de julio de 2022. [Link](#).

developed. (...) It's really an extraordinary vision to try to really boost the economy of the country, boost employment, boost the destination, boost tourism. They have beautiful beaches in that area so it's also going to develop the country by bringing more remittances or bringing more resources, more investments.¹³⁷

El interés de Romero por Brasilia puede entenderse desde tres perspectivas. En primer lugar, la tarea de establecer la identidad en el proceso de creación de una nueva ciudad. Aquí radica el enigma establecido de la representación arquitectónica del Estado, la doble presión de simbolizar el progreso y exaltar los mitos nacionales. La monumentalidad mexicana surgida en la década de 1950 estaba vinculada a la centralización de las instituciones y a la consolidación de una visión integral de la cultura nacional enraizada en el extenso patrimonio precolombino. Sin embargo, Brasil carecía de una monumentalidad precolombina equivalente, de modo que cuando Lucio Costa diseñó el plano de Brasilia y Oscar Niemeyer proyectó los principales edificios institucionales, crearon un lenguaje de monumentalidad utilizando principalmente una retórica tecnocrática y un lenguaje moderno.¹³⁸ En segundo lugar, Brasilia es culturalmente próxima, en el contexto de una nación latinoamericana en desarrollo. Mirar más al sur que al norte, resuena con la intención de Bukele de convertir El Salvador en el centro financiero del mundo, desplazando la tradicional relevancia de los países del norte. Brasilia pretendía simbolizar el compromiso de la nación con el desarrollo industrial.¹³⁹ Romantizaba el automóvil y la autopista, en un momento en que Brasil invertía en la industria automovilística.¹⁴⁰ Por último, Brasilia encarna la transición de la visión utópica a la ciudad tangible, ya que las 'supermanzanas' que componen el plan maestro se basaron en los proyectos no realizados de Le Corbusier para ciudades europeas.¹⁴¹

¹³⁷ "Milan Design Week with Fernando Romero | MINDED Podcast." YouTube video. Postado por @createurs_design_association. 24 de abril, 2023. [Link](#).

¹³⁸ William J. R. Curtis, *La Arquitectura moderna desde 1900* (Londres: Phaidon, 2012), 499.

¹³⁹ Visto desde arriba, su forma se asemeja a la de un avión.

¹⁴⁰ Curtis, *La Arquitectura moderna desde 1900*, 499.

¹⁴¹ "The conceptual schism that had already occurred at Chandigarh in 1951, between the isolated monumentality of the government center as designed by Le Corbusier and the rest of the city; was to be repeated at Brasilia where the overall plan was somewhat less systematic in its basic conception". Frampton, *Modern Architecture*, 256.

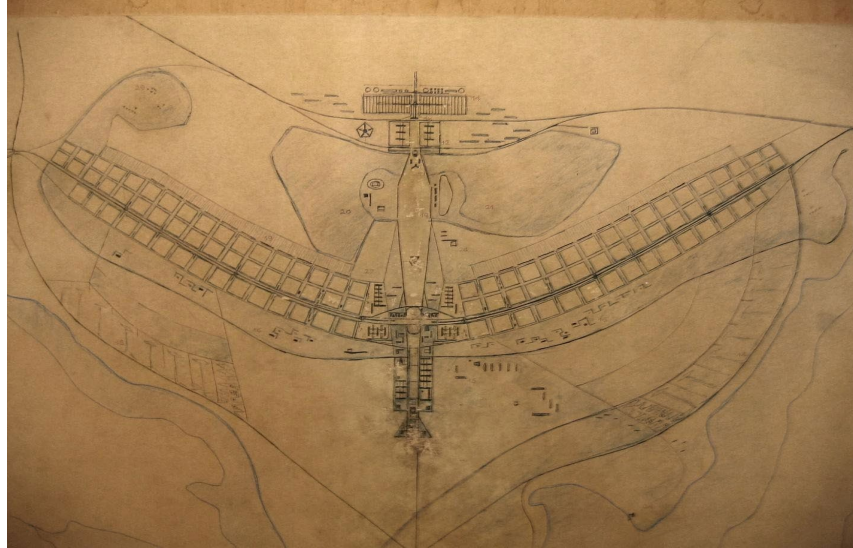


Figura 18: Lucio Costa. Plano Piloto para Brasília. 1956.

Una figura clave en dicha transición fue el presidente Juscelino Kubitschek de Oliveira, un modelo que obligó a Romero a promover a Bukele como líder visionario y esperanza para la materialización de Bitcoin City:

He's the most popular president in the Americas, so really the only way in which you can do a new city is to have a present that says "let's develop a new city!". You need to bring all the structures, and in many countries you cannot do this. There are, of course, some exceptions in the world –Saudi Arabia is another one–, where the prince has the capacity to serve all the structures of the government can be aligned to develop a new city right.¹⁴²

Romero tiene razón al reconocer la popularidad de Bukele.¹⁴³ *Nuevas Ideas*, su partido, logró una mayoría cualificada en la Asamblea Legislativa (controlaba 56 de los 84 escaños), lo que le permitió aprobar leyes sin necesidad de obtener el apoyo de la oposición. Esto le valió duras críticas de la prensa extranjera, que denuncia su administración por abusos de los derechos humanos, y el camino general de El Salvador hacia la dictadura.¹⁴⁴ De hecho, las recientes acciones de Bukele ponen en duda su discurso de eliminar el poder de la autoridad centralizada mediante la introducción del Bitcoin.

Según William Curtis, Brasília fue una adaptación inadecuada de la utopía europea, ya que no tuvo en cuenta la extrema desigualdad de la sociedad en la que se iba a desarrollar. Al priorizar su

¹⁴² "Milan Design Week with Fernando Romero | MINDED Podcast." YouTube video. Posteadó por @createurs_design_association. 24 de abril, 2023. [Link](#).

¹⁴³ Jennifer Vilcarino Chase Harrison, "Chart: How Popular Are Latin America's Presidents in 2024?", AS/COA (2024), [Link](#).

¹⁴⁴ BBC News, "Nayib Bukele, el presidente "del cambio" al que acusan de dar un "golpe" a la Corte Suprema de El Salvador," *BBC Mundo* (2021); Jacobo Garcia, "Nayib Bukele y el poder absoluto," *El País* (2021); "El Salvador accused of 'massive' human rights violations with 2% of adults in prison," *The Guardian* (2022); Jonathan Blitzer, "The Rise of Nayib Bukele, El Salvador's Authoritarian President," *The New Yorker* (2022).

representación formalista -el plano urbanístico se asemejaba a un avión o a una cruz- sobre la accesibilidad, la élite vivía en el entorno urbano y podía ir y venir en avión, pero los pobres caían en el vacío de su concepto diagramático.¹⁴⁵ Bitcoin City también atrae a nivel emocional a la comunidad a la que se dirige, ya que encarna la forma de un círculo perfecto, como el de una moneda (véase Figura 19).

Evidentemente, Romero vive en el presente y es consciente de las críticas dirigidas a Brasilia. Su falta de calidad humana remite a las visiones de los años 30, que idealizaban el uso del automóvil y promovían funciones muy separadas y edificios articulados por supermanzanas. Bitcoin City, en cambio, propone la ciudad de 15 minutos. Este modelo fue acuñado por un equipo dirigido por Carlos Moreno, profesor de la Escuela de Negocios de la Sorbona de París.¹⁴⁶ El concepto promueve una vida basada en la proximidad para aumentar la accesibilidad a los lugares de trabajo, las escuelas, la sanidad y las actividades recreativas. Sus principios urbanos fundamentales son fomentar una densidad óptima, acomodar la diversidad entre barrios, integrar las tecnologías digitales para agilizar las operaciones urbanas, dar prioridad al transporte no motorizado, garantizar un acceso equitativo a los servicios y comodidades de la ciudad para reducir la desigualdad y la segregación urbanas, y promover la identidad cultural respetando el patrimonio histórico y las tradiciones locales al tiempo que se acomodan las necesidades urbanas contemporáneas. El concepto ha sido adoptado por ciudades como París, sugiriendo un enfoque transformador del desarrollo urbano que se alinea con la sostenibilidad, la resiliencia y la mejora de la cohesión de la comunidad.



Figura 19: Vista aérea de Bitcoin City. Fuente: Ravenscroft, Tom. 2022. "El presidente de El Salvador revela el diseño de la ciudad volcánica de Bitcoin". Dezeen. 12 de mayo de 2022. [Link](#).

¹⁴⁵ Curtis, *La Arquitectura moderna desde 1900*, 501.

¹⁴⁶ Allam, Moreno, Chabaud, Gall and Pratlong, "Introducing the '15-Minute City'", 93-111.

II.e El poder de la energía geotérmica

Según anunció Bukele, El Salvador está desplegando los recursos de la nación para aprovechar la energía geotérmica de un volcán tanto para alimentar la ciudad como para la minería de bitcoins. Esta iniciativa comenzó con la perforación de un nuevo pozo que supuestamente proporcionará unos 95 megavatios de energía limpia y sin emisiones (véase Figura 20). El Salvador planea ampliar su capacidad de energía geotérmica con una propuesta para desarrollar una planta renovable de 241 megavatios.



Figura 20: Captura de pantalla del tweet de Bukele anunciando la excavación de un pozo para extraer energía geotérmica. Fuente: Nayib Bukele [@nayibbukele]. "Our engineers just informed me that they dug a new well, that will provide approximately 95MW of 100% clean, 0 emissions geothermal energy from our volcanos", Twitter. 9 de Junio, 2021, [Link](#).

Este proyecto también se promociona como instrumento financiero innovador: el llamado "bono volcán".¹⁴⁷ Con el objetivo de recaudar mil millones de dólares estadounidenses, los fondos se

¹⁴⁷ Para hacer realidad los bonos, Samson Mow, CEO de Blockstream (invitado por Bukele al escenario durante la presentación de Bitcoin City) explicó que primero hay que tomar varias medidas. Una de ellas es la Ley de *Digital Securities* (valores digitales), que permitiría a la plataforma Bitfinex a operar con licencia como bolsa de valores en El Salvador. Aunque omitió las razones por las que esta ley es crucial, sí insinuó que Bitfinex sería un patrocinador "ballena" del proyecto. Esto es relevante porque Bitfinex no está descentralizada, actúa como un banco de criptomonedas, custodiando las claves de los usuarios. A medida que los proyectos comienzan a ser patrocinados por ballenas, estas instituciones tienen un poder financiero significativo, lo que puede conducir a los mismos problemas que bitcoin pretende solucionar: manipulación del mercado, dependencia, reducción de la competencia, problemas de gobernanza, etc.

destinarán a partes iguales a la compra de Bitcoin en el mercado y a la construcción de infraestructuras para seguir mejorando el sector energético y la industria minera.¹⁴⁸ Este uso estratégico de la energía geotérmica no sólo pretende proporcionar una solución energética sostenible, sino que también posiciona supuestamente a El Salvador como Estado-nación pionero dentro del ecosistema bitcoin mundial.

La energía geotérmica presenta algunas ventajas en comparación con otras energías renovables como los paneles solares y las turbinas eólicas: no está sujeta a las intermitencias meteorológicas, tiene poco impacto en el paisaje, crea más puestos de trabajo que cualquier otra energía verde, requiere menos mantenimiento y produce sonidos insignificantes cuando funciona a pleno rendimiento.¹⁴⁹ Sin embargo, el especialista en energías renovables Lorenzo Vallechi sugiere que quizá no sea la más adecuada para El Salvador.¹⁵⁰ Los yacimientos de energía geotérmica están disponibles sólo en regiones con límites de placas tectónicas, lo cual podría obstaculizar la ampliación de las operaciones, ya que se destinan menos recursos globales a su avance tecnológico. En segundo lugar, los costes iniciales de instalación e infraestructura son más elevados que los de otras fuentes renovables, como los paneles solares o los molinos de viento.¹⁵¹ En tercer lugar, el enfoque más rentable para El Salvador sería minar su propio bitcoin utilizando energía renovable, generada localmente, en lugar de comprarlo en el mercado. Aunque esto debería hacerse lo antes posible para maximizar los beneficios, extraer energía del volcán podría llevar otros dos o tres años antes de que comience la generación de electricidad.

El debate sobre si la geotermia es la mejor solución en términos de sostenibilidad queda fuera del alcance de esta investigación. Sin embargo, si la sostenibilidad se considera más allá de lo meramente técnico, surge la pregunta de cómo podría el volcán informar las decisiones de diseño de la ciudad. En otras palabras, ¿cómo contribuye al capital cultural y social de la Nueva Alejandría?

A primera vista, el plano de la ciudad presenta similitudes con la Ciudad Jardín de Ebenezer Howard, un

¹⁴⁸ Se espera que este bono de mil millones de dólares, también conocido como "EBB1" o "bono volcán", sea sólo el primero de una serie. Tras un periodo inicial de bloqueo de cinco años de los Bitcoins adquiridos, y suponiendo que el precio haya subido desde entonces, El Salvador comenzará a vender parcialmente estos BTC como cupón adicional a los tenedores del bono. Tras un periodo de diez años, asumiendo lo que ellos llaman una predicción "conservadora" de un incremento del 35% del valor del BTC, calculan una porcentaje de rendimiento anual (APY por sus siglas en inglés) del 146%.

¹⁴⁹ Yuqing Wang, Yingxin Liu, Jinyue Dou, Mingzhu Li, Ming Zeng. "Geothermal energy in China: Status, challenges, and policy recommendation" *Utilities Policy* 64, (Junio 2020): 1.

¹⁵⁰ Lorenzo Vallechi, "Is Volcano Energy Really The Best Fit For El Salvador's Bitcoin City?", *Bitcoin Magazine*, 5 de Febrero, 2022. [Link](#).

¹⁵¹ La base de datos de IRENA muestra que, en 2020, el coste total medio instalado de los proyectos de energía solar fotovoltaica (FV) fue de 883 dólares por kW. Esto es significativamente más barato que la energía geotérmica, que cuesta cinco veces más por kW según IRENA, y diez veces más según el estudio del Congreso Geotérmico Mundial. La energía eólica marina también es más cara, con un coste total medio instalado de 1.355 dólares por kW en 2020. Incluso teniendo en cuenta la temporada de lluvias de mayo a octubre, Vallechi sostiene que el mapa de alta irradiación de El Salvador podría potencialmente suministrar energía más barata y frecuente a la red, siempre que se disponga de un sistema de almacenamiento con baterías de iones de litio.

modelo concéntrico que pretende maridar la dualidad moderna entre el campo -la naturaleza- y la ciudad contaminada y congestionada (véase Figura 21).¹⁵² Si se examinan más de cerca, las propuestas difieren en aspectos cruciales: La propuesta de Howard, por ejemplo, fue criticada por centrarse desproporcionadamente en la vivienda, por ser excesivamente determinista, dejar muy poco margen para los ajustes, y por sugerir que las casas debían darle la espalda a la calle que era mala, para mirar hacia dentro, hacia jardines protegidos.¹⁵³ La adopción del modelo de ciudad de 15 minutos por FR-ee muestra que se han superado muchas de estas discusiones, ya que fomenta la diversidad, la transitabilidad, la flexibilidad, etc.

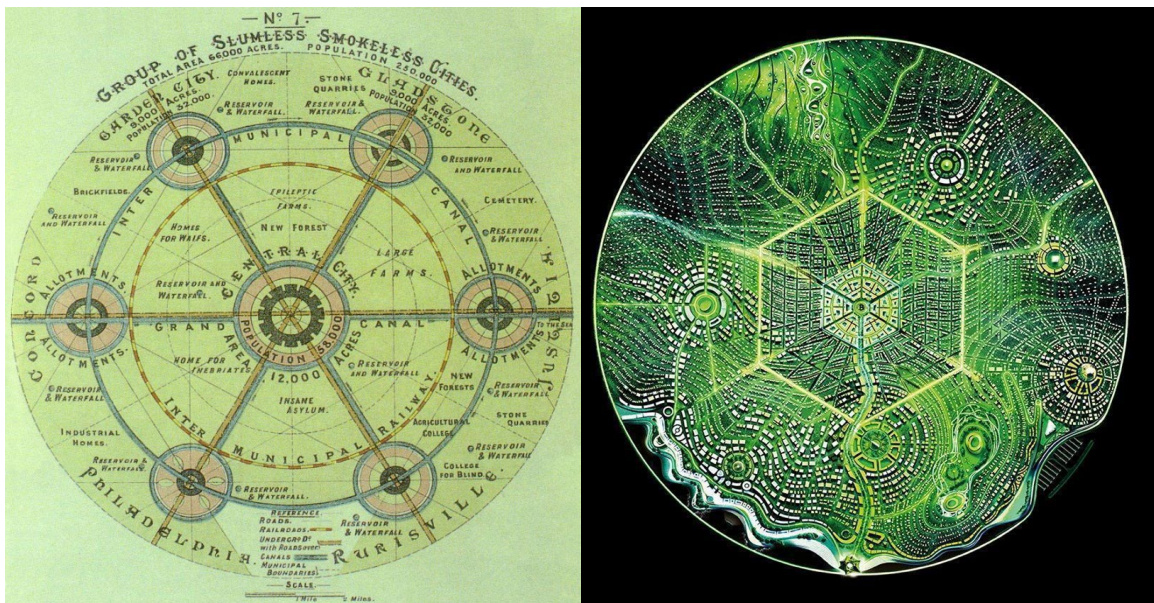


Figura 21: A la izquierda, la Ciudad Jardín de Ebenezer Howard. A la derecha, Bitcoin City de Fr-EE. Fuentes: Ebenezer Howard en "Garden Cities of tomorrow"; Ravenscroft, Tom. 2022. "El presidente de El Salvador revela el diseño de la ciudad volcánica de Bitcoin". Dezeen. 12 de mayo de 2022. [Link](#).

Además, la ciudad de Howard y su organización concéntrica se inspiraban en la sociedad alternativa que él planeaba, que no era ni capitalista ni burocrático-socialista: mancomunidades autogobernadas que se basaban en la cooperación de sus habitantes.¹⁵⁴ En la propuesta de Howard, la Ciudad Jardín es la única propietaria de la tierra.¹⁵⁵ Se supone que ha comprado la tierra mediante un préstamo bancario con un tipo de interés no superior al cuatro por ciento. La propiedad se otorga a cuatro personas solventes, de indudable honorabilidad, que tienen el título de propiedad como garantía ante el préstamo hipotecario.

¹⁵² Françoise Choay, *El Urbanismo Utopías y Realidades*, trad. Luis del Castillo (Barcelona: Editorial Lumen, 1965), 339.

¹⁵³ Jacobs, *The Death and Life of Great American Cities*, 17.

¹⁵⁴ Hall, *Cities of Tomorrow*, 2.

¹⁵⁵ Choay, *El Urbanismo Utopías y Realidades*, 340.

Las infraestructuras (calles, colegios públicos, parques, etc.) y su debido mantenimiento deben ser pagados por los administradores de los terrenos con el dinero de los alquileres, una vez cubiertos los intereses y las hipotecas. Se respeta la iniciativa individual; cada empresario es libre de establecer libremente los precios de los bienes, siempre que se cubra la renta. Se permite la competencia entre ciudadanos: la propuesta no es restringirlos, sino ampliarlos: aunque el modelo permite la agricultura, es una economía libre en la que se permite cualquier negocio. Su organización espacial responde a la necesidad de acomodar ambas.

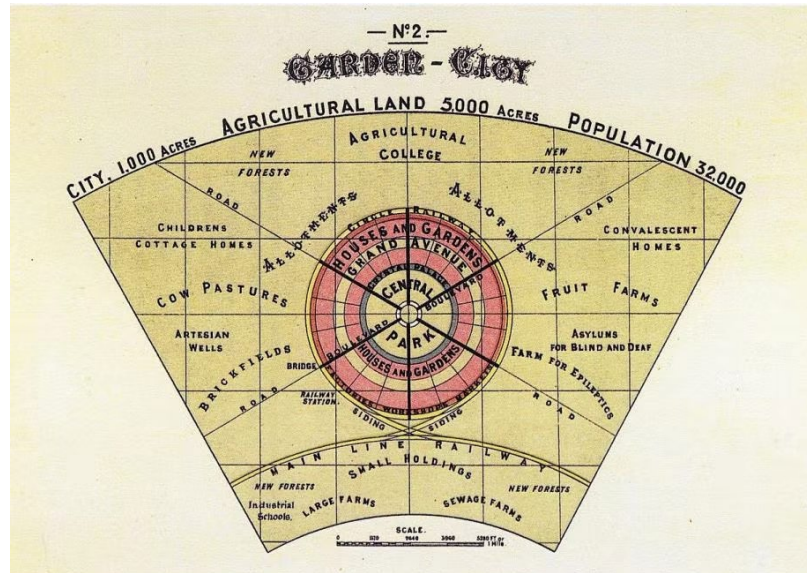


Figura 22: Ciudad Jardín de Ebenezer Howard. Fuente: Ebenezer Howard en "Garden Cities of tomorrow".

Aunque el ideal utópico de fusionar la agricultura con el entorno urbano hace tiempo que desapareció, es como si la propuesta de Howard se convirtiera en un legado simbólico para la planificación urbana. Las Ciudades Jardín imaginadas, como mancomunidades autogobernadas, fomentaban (a nivel teórico) la cooperación colaborativa entre sus habitantes. Del mismo modo, la integración del volcán en el diseño de Bitcoin City podría conformar su visión cultural y social, simbolizando la innovación y la sostenibilidad, y fomentando un sentimiento colectivo de orgullo entre sus residentes. Además, el modelo de Howard subraya la importancia de la iniciativa individual y la libertad económica, principios que podrían reflejarse en el planteamiento de Bitcoin City para integrar fuentes de energía renovables como la geotérmica. En última instancia, independientemente del rendimiento técnico del volcán a la hora de abordar el cambio climático, su integración en Bitcoin City es su ADN inherente como símbolo de pertenencia a la comunidad, como los soldados pertenecían a las Alejandrías. Arraigada en la identidad única del lugar, la economía dependiente del volcán de Bitcoin City representa una propuesta definitivamente menos escalable y generalizable en comparación con el modelo de Howard.



Capítulo III. Criptocolectivismo: CityDAO y la ciudadanía distribuida

Perhaps the most ethically dubious excess associated with programmatic projects is when a political problem is addressed through architectural symbolism. It thus becomes a question whether architecture is the best tool for addressing the problem at all. In certain architecture schools, the border problem is a favorite: Palestine/Israel, United States/Mexico, North/South Korea, and, once upon a time, the Berlin Wall. The paradox here is thinking that designing more architecture, or more stuff, addresses a problem truly solvable only with policy.

Reiser+Umemoto, *Projects and Their Consequences* (2019).¹⁵⁶

III.a Introducción al capítulo III

He definido una criptociudad como un proyecto urbano, que se origina dentro de *la cultura startup* - siendo el crecimiento su principal motor, la innovación su búsqueda, y la toma de riesgos su modus operandi-, y se basa en la tecnología blockchain para restringir la intromisión de las autoridades, potenciar la formación de comunidades, y reducir la actual brecha de desigualdad del capitalismo. El capítulo II analizó Bitcoin City en el marco de los esfuerzos de El Salvador por atraer inversión extranjera y promocionarse como pionero del progreso. Con esta audaz apuesta, el proyecto de Bukele se presenta como la insignia de una nación que busca reposicionarse en el escenario global.

Este capítulo analizará CityDAO, una iniciativa enmarcada por sus fundadores en el marco discursivo de la democratización de la propiedad y la gobernanza de la tierra. Primero, se esboza el problema identificado por sus promotores y cómo su proyecto pretende abordarlo. Broadacre City de Frank Lloyd Wright se pone en primer plano como precedente en la larga tradición de búsqueda de alternativas al monopolio de la tierra, la desigualdad de derechos y la centralización del poder. A continuación, me ocupo de las condiciones en las que se originó CityDAO, principalmente, la oportunidad de experimentar con panoramas normativos inciertos, proclives a la implantación de modelos de gobernanza distribuida. El objetivo es entender cómo los desarrolladores de CityDAO intentan explotar las capacidades de blockchain para permitir la propiedad colectiva de la tierra y abordar la desigualdad social. La cuestión que se plantea en este capítulo es cómo CityDAO da forma a un modelo de ciudadanía que supera las fronteras nacionales establecidas geográficamente.

¹⁵⁶ Reiser+Umemoto, *Projects and Their Consequences*, 40.

III.b La nueva búsqueda de Usonia

The way to get startup ideas is not to try to think of startup ideas. It's to look for problems, preferably problems you have yourself. The very best startup ideas tend to have three things in common: they're something the founders themselves want, that they themselves can build, and that few others realize are worth doing. Microsoft, Apple, Yahoo, Google, and Facebook all began this way.

Paul Graham, "Ideas para startups"¹⁵⁷

Si la forma de obtener una idea para una startup es buscar un problema común a mucha gente, ¿cuál es el problema que intenta resolver el fundador de CityDAO, Scott Fitsimones? Así lo expone en una charla TED de 2022:

CityDAO grew out of my frustrations dealing with city bureaucracy and red tape while building a startup that helps cities better utilize their empty parking lots. It took us over three months to get a permit just to sell parking in San Francisco. And it was an archaic, bureaucratic nightmare. Things like putting a parking lot to higher and better use, which my urbanist self really wants to do, like, you know, build a food truck park, logistics hub, maybe even new housing, a farmer's market. These things are also really tedious, can take months, years, or even just be illegal due to zoning laws.¹⁵⁸

Scott Fitsimones es cofundador y director técnico de *AirGarage*, una startup que replantea el uso y la gestión de estacionamientos.¹⁵⁹ Con formación en informática, Fitsimones recibió la beca Thiel en 2020, como premio a emprendedores que abandonan la universidad con U\$D 100.000 para perseguir ideas de negocio. Para él, esa idea era AirGarage.¹⁶⁰

Previsiblemente, el fundador de CityDAO es un emprendedor que defiende los tres principios básicos *del startupismo*: el crecimiento como motor, el riesgo como oportunidad y la innovación como valor. Crecimiento como motor no significa dinero rápido; Fitsimones ve el proyecto como un experimento más que como una inversión,¹⁶¹ desde donde elegirá medir el crecimiento a través de parámetros como el número de ciudadanos implicados.

¹⁵⁷ Paul Graham, "How to Get Startup Ideas". *Paul Graham*. Noviembre de 2012. Consultado 26 de mayo, 2024, [Link](#).

¹⁵⁸ Scott Fitsimones, 2022. "Could a DAO Build the Next Great City?", *TED2022: A New Era*, Vancouver, BC, [Link](#).

¹⁵⁹ La plataforma busca eliminar gastos operativos innecesarios y proporcionar a los propietarios datos en tiempo real para mejorar la eficiencia operativa y aumentar la ocupación e ingresos. La empresa se fundó en 2016, tiene 49 empleados y el importe de la última operación fue de 26,9 millones de dólares.

¹⁶⁰ "Thiel Foundation Announces 2020 Thiel Fellows", *Bloomberg* (2020). [Link](#).

¹⁶¹ Eric Gilbert Williams, Podcast Audio. "CityDAO Ideator; From First Tweet to Successful Launch" en *CityDAO Podcast A Crypto City of the Future*, episodio 02, *Spotify*. Febrero 2022.

Inicialmente, se había dirigido a la tediosa burocracia necesaria para comprar y vender terrenos. Según él, una de las dificultades del sistema actual es la necesidad de contar con un agente (intermediario) para realizar las transacciones. Esto requiere coordinación, papeleo y logística. Además, el problema de las autoridades centralizadas que regulan el suelo también conduce a la ineficacia: las leyes de zonificación prohíben a veces estrategias de uso dinámico de las plazas de aparcamiento. Fitsimones desarrolla esta idea en un blogpost en el que aboga por hacer inconstitucional la zonificación: ahora las propuestas sustituyen a la mera queja.¹⁶²

Expensive housing. Zoning is mainly used to limit the height and density of buildings. This means it's illegal to build new housing and lower income residents are forced out.

Urban sprawl and more vehicle emissions. Most cities use zoning codes to specify rules that mandate building large parking lots and ban dense housing near transit. Most cities you probably enjoy visiting (Paris, NYC, SF) were built before zoning.

Segregated neighborhoods. Many wealthy suburbs like Beverly Hills intentionally ban apartments and cheap housing, creating an exclusionary, wealthy, white suburb.

Corrupt cities. Zoning gives the city a monopoly on permitting. By making the zoning code complex and onerous, developers always have to request permission to build, delaying housing and giving city commissions opportunities to extract concessions and bribes.

Zoning law is (probably) an infringement on property rights.

Estos argumentos contra la zonificación pueden sostenerse como una llamada a la mejora de los marcos normativos excesivamente estrictos. Sin embargo, despreciar la regulación del uso del suelo urbano como una mera "infracción de los derechos de propiedad" pasa por alto una larga historia de debates sobre la zonificación que se remontan a la Carta de Atenas y a sus críticas en los años sesenta, que provocaron su complejización.¹⁶³ El análisis de Fitsimones ignora justificaciones cruciales de la zonificación, como la protección del medio ambiente y del patrimonio, la planificación de la densidad, etcétera. Aunque algunas leyes de zonificación promueven efectivamente la desigualdad, otras fomentan la equidad. Por ejemplo, las que obligan a los promotores a incluir viviendas accesibles o las que asignan espacio para equipamientos comunitarios en las nuevas urbanizaciones. La afirmación de que las "ciudades populares" como París y Nueva York se construyeron antes de la aplicación de las normativas de zonificación delata una comprensión limitada de las ciudades como objetos estáticos, en lugar de como procesos en curso, que evolucionan bajo sistemas de normativas cambiantes. Esto evidencia que las operaciones inmobiliarias requieren conocimientos especializados (profesionalidad), lo que saca a la

¹⁶² Scott Fitsimones, "San Francisco's Most Absurd Zoning Policies", *Scott*, 2021. Aunque todas las entradas han sido eliminadas de la pagina de Fitsimones (<https://www.scott.xyz/index.html>), he descargado una copia que está disponible bajo petición.

¹⁶³ "The need for primary mixed uses" en Jacobs, *The Death and Life of Great American Cities*, 152.

luz un reto que hay que abordar. Si se suprime la autoridad central para la aprobación de proyectos, ¿cómo evitará una determinada estructura de gobierno las consecuencias del amateurismo?



Figura 23: Fotografía que muestra la homogeneidad de las alturas de los edificios y del lenguaje arquitectónico de París, que habría sido extremadamente difícil de lograr sin regulación. Fuente: Jessica Nora, "Guía para visitar las Galerías Lafayette de París" (2024) [Link](#).

A pesar de su visión reduccionista de la zonificación, Fitsimones destaca problemas reales de los actuales procesos de compra y gestión del suelo, como su ineficiencia, costes, y su dependencia de la autoridad central (lo que plantea dificultades a las estrategias de uso, ceden ganancias, y abre las puertas al soborno). Estos obstáculos tienden a hacer que la tierra sea menos accesible para los residentes con bajos ingresos, contribuyendo a ampliar la brecha de la desigualdad. Otros desafíos a abordar incluyen: el desplazamiento de las comunidades locales, leyes obsoletas que no tienen en cuenta las necesidades modernas, el fomento de entornos que dan prioridad a los automóviles sobre las personas y la necesidad contradictoria de mayor flexibilidad y previsibilidad.¹⁶⁴ En resumen, eliminar las autoridades centralizadas como pretende CityDAO no impide que los civiles operen en un paisaje que requiere un alto grado de profesionalidad, y a la vez supone que los no urbanistas pueden aportar puntos de vista innovadores en los campos del diseño y la gestión urbana.

La búsqueda de la equidad a través de la distribución de la tierra en Estados Unidos no es una aspiración novedosa. En 1928, Wright acuñó el nombre de "Usonia" para denotar una cultura igualitaria que surgiría en EE.UU.¹⁶⁵ Consistía en unidades de vivienda dispuestas para que todos los ciudadanos tuvieran acceso a tierras productivas en un radio de 16 a 20 millas desde su hogar, garantizada mediante

¹⁶⁴ Emily Talen, *City Rules: How Regulations Affect Urban Form*. (Washington D.C.: Island Press. 2012), 127.

¹⁶⁵ Frampton, "Frank Lloyd Wright and the Disappearing City 1929-63" en *Modern Architecture: A Critical History*, 187. Como ha señalado Peter Hall, esta búsqueda también puede remontarse a Garden City, de Ebenezer Howard. Véase: Hall, *Cities of Tomorrow*, 8.

el uso masivo del automóvil y la generalización de los sistemas de transporte público. Frente a la centralización de las grandes aglomeraciones urbanas como Nueva York, donde florecía la metáfora de la ciudad como cáncer, la propuesta de Wright consistía en un mínimo de un acre por habitante configurando una red distribuida de unidades agrarias.



Figura 241: FLW, Broadacre, maqueta, 1936. Fuente: Frank Lloyd Wright Foundation (MOMA / AA&FALCU)].

La concepción de Wright tiene varias afinidades con CityDAO. Ambos rechazan el latifundismo¹⁶⁶ y los grandes gobiernos;¹⁶⁷ ambos confían en el impacto emancipador de la tecnología. Sin embargo, hay que señalar dos diferencias clave: CityDAO no rechaza la idea de la gran ciudad, fomenta la cooperación; mientras que Wright afirmaba la libertad de hombres y mujeres, promoviendo el individualismo. De hecho, Wright defendía la descentralización: se oponía a la idea de que el dinero y la *autoridad* debían gobernar el mundo, y creía que las ideas y *el trabajo* debían ocupar su lugar. "Centralization," escribió, "the social force that made the king an appropriate necessity, is now the economic force that has overbuilt the pseudo-monarchic towns and cities of today."¹⁶⁸

Las propuestas de Wright para Broadacre City se consideran hoy ingenuas por promover un determinismo arquitectónico simplista, la suburbanización, su ineficiente utilización de recursos, su falta

¹⁶⁶ Wright hace referencia al impuesto único de Henry George como una vía hacia la democracia, al tiempo que reconoce que esta política nunca pretendió tomarse como una solución completa al problema de la tierra. Frank Lloyd Wright, *The Living City* (Nueva York: New American Library, 1970), 90.

¹⁶⁷ Hall, *Cities of Tomorrow*, 342.

¹⁶⁸ Frank Lloyd Wright, *When Democracy Builds* (Chicago: Universidad de Chicago, 1951), 9.

de urbanidad y una consideración insuficiente del colectivismo.¹⁶⁹ La economía agraria individualista no habría podido garantizar a la sociedad industrializada los beneficios de la producción en masa, ya que ésta exigía, indefectiblemente y a pesar de la automatización, al menos cierto grado de concentración de mano de obra y recursos. Desde un punto de vista progresista, Wright no abordó la lucha de clases al prever la disolución de la gran ciudad. A pesar de "alguna referencia pasajera al impuesto único",¹⁷⁰ se evita la preocupación por la clase y el poder, y se ignoran en gran medida las condiciones económicas que determinan la libertad y una vida digna.

Aunque pudiera parecer lo contrario, la oposición a la autoridad central y la disposición de acceso a la tierra en CityDAO y Broadacre City no están ligadas a tecnologías específicas. Incluso si blockchain fuera decisivo para cumplir esas promesas, las fuerzas que originaron ambos proyectos deberían buscarse en los niveles cultural y social, más que en el técnico.

El análisis de Broadacre City revela que la concepción de Wright de Usonia puede leerse como una infraestructura de los valores de la sociedad: el fomento de un individualismo que sigue arraigado en la sociedad estadounidense actual. A la luz de estos precedentes, ¿qué tipo de ciudadanía está configurando CityDAO? Responderé a esta pregunta analizando paso a paso su funcionamiento.

III.c Legal en Wyoming



Figura 25: Tuit fundacional de Scott Fitsimones. Fuente: Scott Fitsimones [@Scottfits], "Starting a DAO to buy and tokenize land in Wyoming, who wants in?". *Twitter*, 1 de Julio, 2021.

El 1 de julio de 2021, Scott Fitsimones publicó en Twitter que iba a crear una DAO para tokenizar tierras

¹⁶⁹ Hall, *Cities of Tomorrow*, 345.

¹⁷⁰ Meyer Schapiro, citado en Frampton, *Modern Architecture*, 191.

en Wyoming. ¿A qué se refería y por qué era Wyoming el lugar de la aventura? El concepto de tokenización es clave para entenderlo; además, primero hay que entender el contexto legal de este experimento, dejando para más adelante la explicación de qué es una DAO. Por ahora, digamos que una DAO es una organización.

Un *token* es una representación digital o unidad de valor que puede crearse, almacenarse y transferirse electrónicamente. Aunque en el ecosistema de las criptomonedas "token" suele utilizarse indistintamente con la palabra "moneda", no son lo mismo. Todas las monedas son tokens, pero no todos los tokens son monedas. Los tokens representan cualquier unidad de valor, incluyendo tierras, propiedades, derechos, documentos, certificados. En resumen, un token es un activo digital. Dado que un token es una *representación* de otra cosa, sólo tiene valor en un contexto específico. Por ejemplo, un token en arcade, una ficha, es útil para jugar y su valor está fijado por un tipo de cambio establecido, pero, fuera de ese contexto, no tiene valor intrínseco.¹⁷¹

La tokenización de terrenos es la expresión utilizada cuando la propiedad inmobiliaria se representa en una blockchain como un token. Cuando se adquiere un token de terreno, la propiedad se representa en la billetera virtual del comprador como un archivo digital.¹⁷² Es conceptualmente la misma tecnología que Bitcoin, salvo que las transacciones no representan intercambios de divisas, sino un archivo que otorga la propiedad a una parcela específica de terreno. De este modo, la propiedad de la tierra puede dividirse en porciones más pequeñas y negociables, de modo que cada poseedor de estos tokens tiene acciones de propiedad o inversión en la tierra. La tokenización de terrenos permite a múltiples inversores adquirir una parcela mediante la compra de estas unidades más pequeñas. Las participaciones en la propiedad se registran digitalmente, lo que facilita la compra, venta y gestión de las inversiones, reduciendo la ya mencionada necesidad de agentes.

Los tokens, sin embargo, sólo tienen valor dentro de un contexto determinado. Mientras que la tierra física tiene valor intrínseco porque se puede construir en ella, alquilarla, cultivarla, etc., una representación digital de la propiedad es inútil a menos que todo el mundo –no solo los usuarios de criptotecnología– lo acepten como prueba válida de esa propiedad.

El 1 de julio de 2021, el mismo día del tuit de Fitsimones, entró en vigor la Ley 38 del Senado de Wyoming, titulada *Decentralized Autonomous Organizations Supplement*, convirtiendo a Wyoming en el primer Estado de EEUU en reconocer a las DAOs como entidades legales.¹⁷³ Esta ley permitía a las organizaciones gobernadas bajo contratos blockchain registrarse como Sociedad de Responsabilidad

¹⁷¹ Dávila, *Blockchain Radicals*, 85.

¹⁷² Ver 'billetera virtual' en "Léxicos".

¹⁷³ Otros estados siguieron a Wyoming. En la actualidad, sólo otros dos estados -Vermont y Tennessee- reconocen a las DAO como entidades jurídicas.

Limitada (SRL), siendo reconocidas por la ley estatal. Dado que a las SRLs se les permite poseer tierras, esto podría permitir que las representaciones y transacciones digitales de tierras bajo esta organización sean legalmente viables. Según Fitsimones, el verdadero avance es que Wyoming reconoce sus contratos rectores (codificados por programadores y ejecutados automáticamente cuando se cumplen ciertos criterios) como el sistema de gobierno legal de la SRL registrada.¹⁷⁴ Sin embargo, la normativa actual es imprecisa y aún en desarrollo, lo que plantea problemas técnicos y jurídicos.

El principal desafío jurídico es que la tierra, aunque no proporcione un rendimiento, se considera activo financiero según la normativa estadounidense.¹⁷⁵ Un activo es un instrumento financiero que posee algún tipo de valor monetario y puede negociarse, como las acciones, los bonos y los contratos de inversión. Los activos están muy regulados¹⁷⁶ para la prevención de la manipulación del mercado, el uso de información privilegiada y otras prácticas fraudulentas, contribuyendo a la estabilidad y la confianza. Esto plantea un desafío porque, al momento de escritura, ser miembro de CityDAO no otorga ningún derecho legal ni reivindicación sobre el terreno físico. Para mitigar estos riesgos regulatorios, los tokens sólo disponen poder de voto y agencia en el proceso de toma de decisiones. Como no se concede la propiedad del terreno, los ciudadanos no pueden construir sobre él. Por ahora, están experimentando con estas limitaciones.

III.d Contratos de ejecución automática como instrumentos rectores

¿Cómo funciona una DAO? Una DAO (u Organización Autónoma Descentralizada) puede entenderse como una organización que utiliza contratos programados, ejecutados automáticamente, para su gobierno. En CityDAO, estos contratos gobiernan la organización para formar una comunidad *online* con una cuenta bancaria conjunta. Los participantes en una DAO se comunican y coordinan sus acciones a través de chats y plataformas de votación. Las decisiones dentro de la DAO se toman de forma colectiva basándose en el consenso y la mayoría. El objetivo es gestionar recursos, asignar fondos y ejecutar tareas en un entorno transparente y de confianza. Se requieren múltiples firmas para la liberación de fondos para diferentes propuestas de proyectos a ejecutar. El primer y principal proyecto de CityDAO fue reunir capital para comprar tierra en grupo.

¹⁷⁴ @PODOFJAKE, Podcast Audio. "Scott Fitsimones", en *Pod of Jake*, episodio 78, *Apple*. 14 de septiembre de 2021, [Link](#). Transcripción descargada, disponible bajo petición.

¹⁷⁵ Eric Gilbert Williams, Podcast Audio. "Introducción a CityDAO & The CityDAO Podcast" en *CityDAO Podcast A Crypto City of the Future*, podcast, episodio 1, *Spotify*. Febrero 1, 2022. [Link](#).

¹⁷⁶ La ley que regula esto en Estados Unidos es la Ley del Mercado de Valores de 1934.

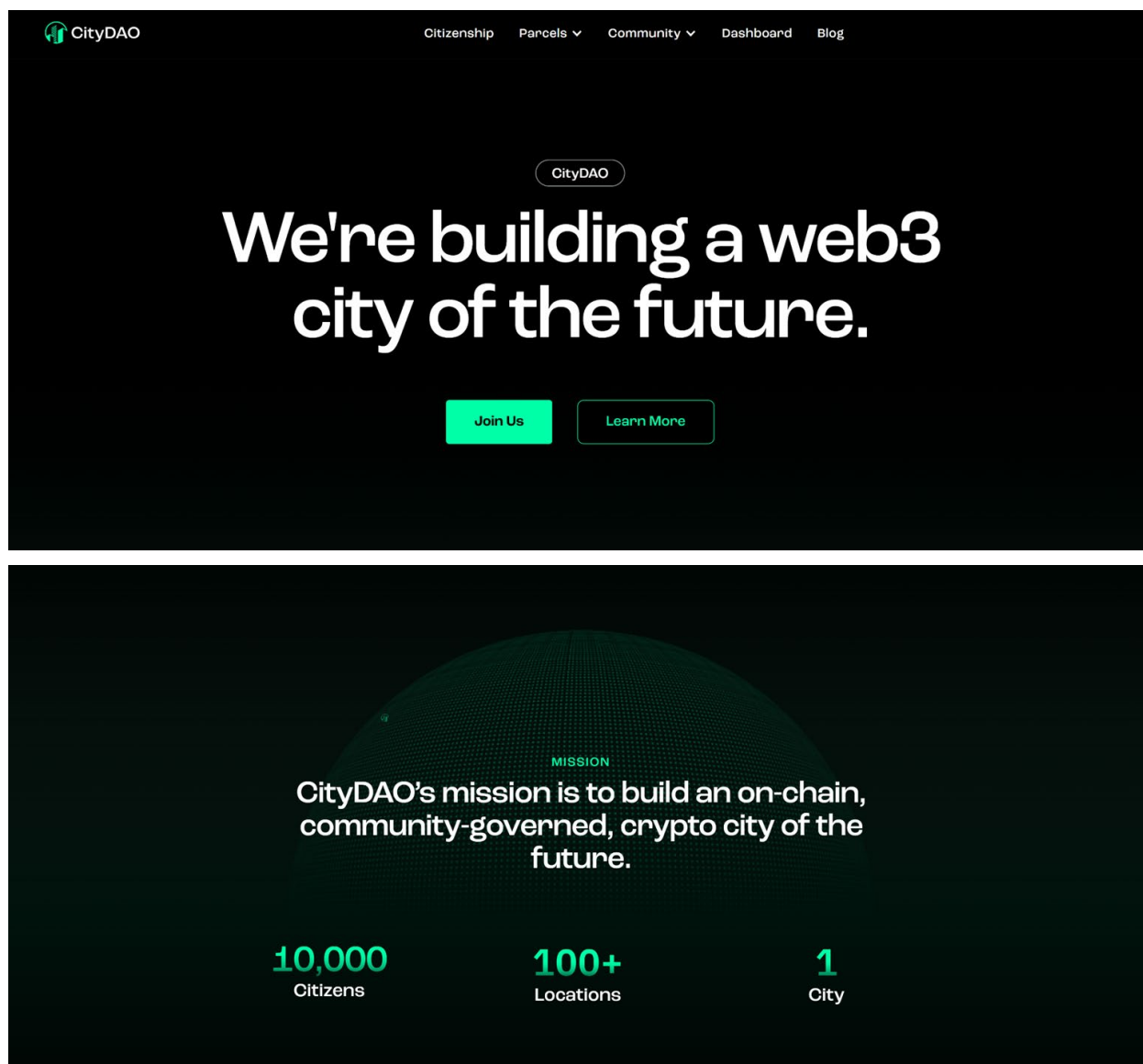


Figura 262: Capturas de pantalla del sitio web de CityDAO. Fuente: CityDAO [Link](#).

La primera afirmación que establece el sitio web es que se está *construyendo* una ciudad web3. ¿Qué significa esto y en qué se diferencia de otras ciudades anteriores?

Web3 es un concepto muy utilizado en la comunidad cripto, haciendo referencia a una tercera iteración de Internet, que incorpora tecnologías como blockchain e inteligencia artificial, permitiendo a los usuarios mantener un control más estricto sobre sus datos.¹⁷⁷ En esta narrativa, la Web1 se describe como en

¹⁷⁷ El término fue acuñado por el cofundador de Ethereum, Gavin Wood. Gilad Edelman, "The Father of Web3 Wants You to Trust Less", *WIRED*, 29 Noviembre, 2021. Consultado 26 de Mayo 2024.

gran medida estática porque los usuarios sólo podían visitar y leer contenidos; la Web2, que utilizamos hoy en día, permite a los usuarios interactuar entre sí a través de la mensajería y la creación de contenidos en plataformas como Meta, X, Google, etc. Mientras que en la Web2 los datos creados por los usuarios pertenecen a las autoridades centrales, es decir, a las distintas plataformas y entidades corporativas que la gestionan, la Web3 promete deshacerse de intermediarios, los datos pertenecen exclusivamente a los usuarios. Aunque se promociona como una iteración de la web, este concepto no excluiría versiones anteriores; su uso es útil para comercializarlo como una evolución, desviando el uso de otras palabras como "cripto" y "blockchain" que han crecido para tener malas connotaciones o resistencia.¹⁷⁸

La segunda declaración del sitio web refuerza la idea de que la ciudad del futuro está gobernada por la comunidad. Esta idea se basa en contratos inteligentes. Cinco años después de la creación de Bitcoin, Vitalik Buterin, un canadiense de diecinueve años, publicó un *whitepaper* en el que describía un proyecto de blockchain llamado Ethereum,¹⁷⁹ que podría facilitar lo que él llamaba "contratos inteligentes". La palabra *contrato* es engañosa, ya que tiene poco que ver con lo legal.¹⁸⁰ Es esencialmente un programa, un código, que reside en una dirección específica de la blockchain de Ethereum.¹⁸¹ La red Ethereum combina la naturaleza descentralizada de blockchain –con su resistencia y transparencia– con la capacidad de ejecutar cualquier tipo de programa informático.¹⁸² Un contrato inteligente es, por tanto, una serie de pasos a ejecutar, una secuencia de sentencias 'si-entonces' definidas por el programador. Cuando se cumplen ciertas condiciones (si), se ejecuta el siguiente paso del proceso (entonces).¹⁸³

Algunos ejemplos de cómo podría utilizarse un contrato inteligente:

1. **SI** el arquitecto presenta el anteproyecto finalizado, **ENTONCES** se libera automáticamente el

¹⁷⁸ Dávila, *Blockchain Radicals*, 307.

¹⁷⁹ Ethereum es de código abierto, está impulsado por la comunidad y ha evolucionado desde su concepción inicial. El libro de Camila Russo *The Infinite Machine* explora su fascinante historia, profundizando en sus orígenes y desarrollo.

¹⁸⁰ En su concepción original, el término *Smart Contracts*, acuñado por Nick Szabo en 1996, se acercaba teóricamente más al jurídico, realizando la mediación entre dos partes. Véase: Devcon Conference. @howtocreateresilience7009, 2015. "Nick Szabo - History of the Blockchain" YouTube. 14 de noviembre de 2015. [Link](#). Sobre este tema, Buterin publicó: "Para ser claros, en este momento me arrepiento bastante de haber adoptado el término "Smart contracts". Debería haberlos llamado algo más aburrido y técnico, quizás algo como "códigos persistentes"." @VitalikButerin en Twitter. 13 de octubre de 2018. [Link](#).

¹⁸¹ Vitalik Buterin, "Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform", *Ethereum* (2014), <https://ethereum.org/en/whitepaper/>.

¹⁸² Como dice Camila Russo, la analogía de Internet es muy ilustrativa para entender el impacto tecnológico: el correo electrónico era para Internet lo que Bitcoin, la criptomoneda, era para la tecnología blockchain. Bitcoin era tanto la criptomoneda como la blockchain subyacente; Ethereum no era como el correo electrónico. No era una aplicación. Su objetivo era ser un protocolo base para muchos proyectos, como Internet. Camila Russo, *The Infinite Machine: How an Army of Crypto-Hackers Is Building the Next Internet with Ethereum* (Nueva York: HarperCollins, 2020), 126.

¹⁸³ Fue un gran avance porque combinaba la naturaleza descentralizada de blockchain con la completitud de Turing de la programación. "Turing completo" es un término utilizado para describir un sistema computacional o lenguaje con la capacidad de resolver cualquier problema que pueda abordarse mediante algoritmos.

pago de la cuenta de garantía bloqueada del cliente al arquitecto.

2. **SI** los materiales de construcción se entregan a tiempo, **ENTONCES** libera fondos del presupuesto del proyecto para el proveedor.
3. **SI** el consumo energético del edificio se mantiene por debajo de un umbral especificado durante un periodo consecutivo, **ENTONCES** se concede automáticamente un descuento al inquilino o propietario como incentivo a la eficiencia energética.

El programa necesita buscar una entrada específica para determinar si se cumple la sentencia (SI), que debe estar registrada en la misma blockchain en la que está programado el contrato inteligente. Si el arquitecto envía el proyecto finalizado por correo electrónico, el pago no se hará efectivo. Para evitar esto, los desarrolladores utilizan lo que se denomina un 'oráculo' que recupera datos de otro sitio, fuera de la blockchain.

Adentrarse en estos detalles técnicos es esencial para entender el sistema de gobernanza de las DAO, ya que permiten una perspectiva crítica para formular preguntas que matizan las afirmaciones exageradas que se derivan de ellos. Por ejemplo, para una afirmación "si" basada en hechos –¿presentó el arquitecto el anteproyecto?– la respuesta es (teóricamente) sencilla, puede ser sí o no. Esto podría llevar a la conclusión de que los contratos autoejecutables hacen que los procesos sean más eficientes y transparentes. Sin embargo, en el ejemplo anterior, el sitio desde el que se recuperan los datos no utiliza necesariamente la tecnología blockchain y, por tanto, puede ser manipulado. Si parte del proceso no está en la blockchain, los riesgos a los que se enfrentan estos contratos hoy en día pueden ser significantes.

Más allá de estos desafíos técnicos, las DAO pretenden ofrecer mayor transparencia que los marcos democráticos no digitalizados (políticos, corporativos, sin ánimo de lucro). Cuando el funcionamiento de una organización está delineado por un código *opensource*, la gobernanza se hace evidente y auditable. Se aplican automáticamente, sin necesidad de una jurisdicción legal –un gobierno o un Estado– para su puesta en práctica. Esto deriva en que sus promotores afirmen por doquier que "el código es ley," como si un código informático pudiera sustituir a los contratos legales y regular indefectiblemente el comportamiento humano.¹⁸⁴ Como escribe Dávila, esta afirmación ignora que los contratos legales se utilizan para gestionar relaciones entre humanos, que requieren ambigüedad e incertidumbre futura. Es muy poco probable que todo el mundo llegue a un acuerdo en todos los asuntos, independientemente de lo complejo que llegue a ser el código. Aunque, es cierto, los contratos inteligentes comparten algunas

¹⁸⁴Aunque blockchain podría potencialmente permitir contratos autoejecutables, la filosofía precedió a su implementación. Lawrence Lessig escribió sobre ello en su libro de 1999. Véase: Lawrence Lessig, *Code and Other Laws of Cyberspace* (Nueva York: Basic Books, 1999).

similitudes con los contratos jurídicos, en el sentido de que actúan como instrumento de mediación social, difícilmente puedan pretender su sustitución.¹⁸⁵ La siguiente sección profundiza en algunos de estos desafíos.

III.e Conviértase en ciudadano: Guía paso a paso

Simplificar ciertos conceptos técnicos de la criptoesfera es inevitable en el contexto de una tesis que aborda los aspectos urbanos y culturales de las iniciativas de criptociudades. Sin embargo, para evitar la posible lectura errónea de una simplificación excesiva, ofrezco a continuación una simulación del proceso de convertirse en ciudadano de CityDAO, ilustrada con capturas de pantalla de su sitio web, explicaciones de cierta terminología y un comentario en el que se esbozan riesgos y oportunidades cuando pertinente.

1. **Conoce sobre CitizenNFTs:** Los CitizenNFT son activos digitales representados como *tokens* no fungibles (NFT) que sirven como forma de afiliación.



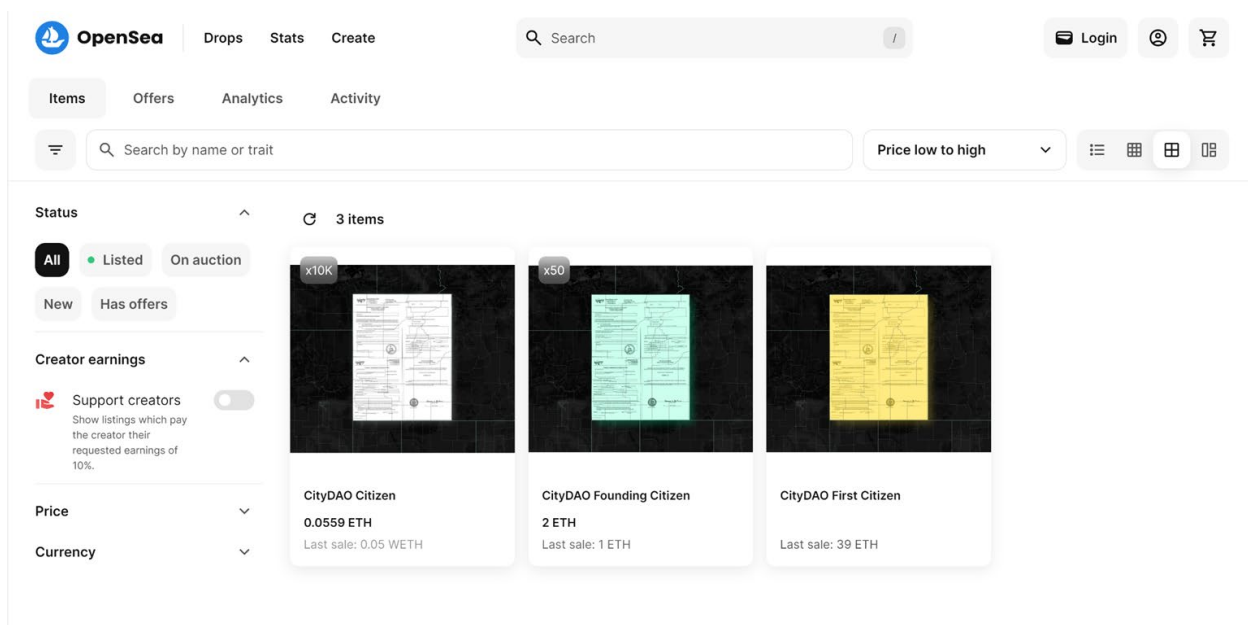
Un *token* es un activo digital que representa la propiedad o la prueba de autenticidad de un artículo o contenido único, como obras de arte, música, vídeos, objetos de colección o bienes inmuebles virtuales, en una blockchain. El término "no fungible" significa que estos tokens son únicos e indivisibles. Las divisas son fungibles porque pueden intercambiarse de igual a igual: un billete de cinco dólares puede cambiarse por cinco billetes de un dólar de igual a igual. Las criptomonedas como Bitcoin y Ethereum

¹⁸⁵ Dávila, *Blockchain Radicals*, 93

copian este aspecto del dinero fiduciario porque también son divisibles y cualquier bitcoin vale lo mismo que cualquier otro bitcoin. Los tokens no fungibles, en cambio, son como una obra de arte: cada token tiene propiedades distintas.

Los *CitizenNFT* son representaciones ciudadanas de CityDAO. Se crean y almacenan en la blockchain de Ethereum mediante contratos inteligentes (es decir, autoejecutables). Estos contratos codifican la propiedad y los metadatos del activo digital, proporcionando un registro descentralizado de su autenticidad e historial de transacciones. La tecnología de contabilidad distribuida de la blockchain garantiza la procedencia, escasez e inmutabilidad del token, convirtiéndolo en una forma de propiedad fiable y verificable.

2. **Ir al mercado (OpenSea):**¹⁸⁶ Visita la plataforma donde se venden los tokens CitizenNFT, en este caso se llama OpenSea.



CityDAO ofrece tres niveles de ciudadanía: Primer ciudadano, Ciudadano fundador y Ciudadano. Hay solo un certificado de Primer Ciudadano y cualquiera puede hacer una oferta para su compra.¹⁸⁷ Su propietario tiene derecho a dar nombre a una parcela de terreno y acceso privilegiado a los terrenos cuando salen a la venta. Un certificado de Ciudadano Fundador otorga acceso anticipado a las subastas de terrenos; cuando hay terrenos disponibles, estos ciudadanos tienen prioridad. Sólo hay 50 de estos certificados. Un certificado de Ciudadano normal tiene derechos de voto básicos y acceso a la compra de

¹⁸⁶ OpenSea es uno de mercados más conocidos de NFT. Al publicar aquí, en lugar de la pagina web de CityDAO, alcanzan a un público más amplio.

¹⁸⁷ Se subastó y vendió por 6,52 ETH el 8 de agosto de 2021, (el precio del ETH rondaba los 3.000 dólares).

tierras sólo después de que los Ciudadanos Fundadores hayan ofertado.¹⁸⁸

3. **Compra un CitizenNFT:** Examine los CitizenNFT disponibles para CityDAO. Cada token representa una membresía o ciudadanía única. Seleccione el token que desea comprar y siga las instrucciones para completar la transacción. Esto implica conectar su billetera digital y pagar la cantidad requerida de criptomonedas (ETH).

The screenshot shows the OpenSea interface for the 'CityDAO Citizen' NFT. The main listing shows a current price of 0.0559 ETH (\$193.96) listed by ESECAB. Below this is a price history chart showing volume and average price from January 2022 to January 2024. A table of listings is also visible, showing two listings: one for 0.0559 ETH by ESECAB and another for 0.056 ETH by dunhuang.eth.

Unit Price	USD Unit Price	Quantity	Expiration	From
0.0559 ETH	\$193.96	1	in 11 hours	ESECAB
0.056 ETH	\$194.15	1	in 22 days	dunhuang.eth

Item Activity

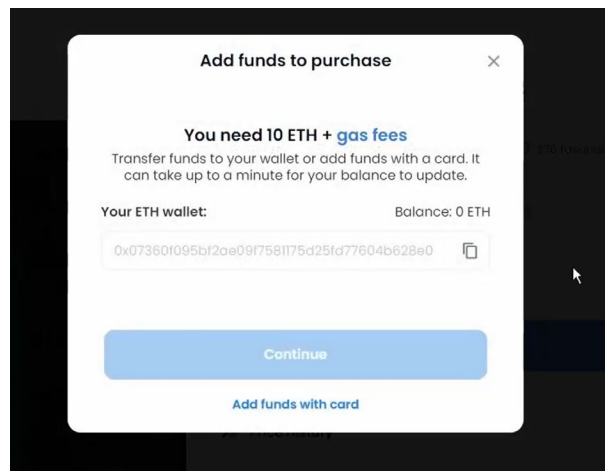
Filter

Sales x Transfers x Clear All

Event	Unit Price	Quantity	From	To	Date
Sale	0.0518 WETH	1	CardenCCCCC	FAA1EB	5d ago
Transfer		1	cjack60	E5ECAB	8d ago
Sale	0.052 WETH	1	cjack60	E5ECAB	8d ago
Transfer		1	1B242B	916C3D	8d ago
Sale	0.050 ETH	1	1B242B	916C3D	8d ago

¹⁸⁸ Esta jerarquía fue criticada por los usuarios por ir intuitivamente en contra de la igualdad social que el proyecto dice buscar. El sitio fue retirado por el anfitrión. Copia descargada disponible bajo solicitud. [Autor desconocido]. "CityDao - Why is Nobody Talking about this Blockchain on Land?." *Liquid*. Consultado el 4 de marzo de 2023.

Como se muestra en la imagen, cuando se visualiza cada NFT, se hace visible el historial de precios y los propietarios anteriores. Al comprar un NFT es importante saber que se extraerán ETH (la moneda de Ethereum) adicionales para cubrir la tasa de transacción. Esta tasa, denominada "gas",¹⁸⁹ depende de la congestión y la demanda de la red en el momento en que se realiza una transacción.

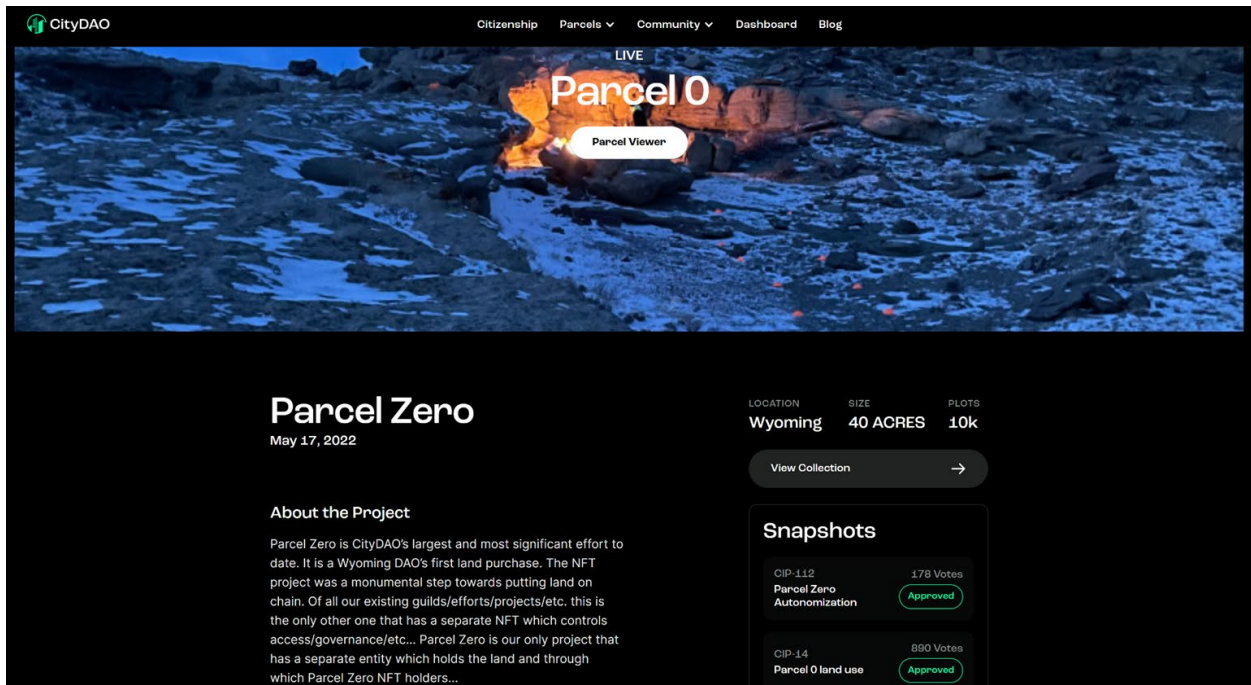


Cuando la red Ethereum está congestionada, es decir que hay muchas transacciones compitiendo por un espacio limitado en los bloques, las tasas de gas tienden a subir porque los usuarios están dispuestos a pagar tasas más altas para que sus transacciones se procesen más rápidamente. Las tasas de gas son necesarias para los contratos inteligentes en Ethereum porque actúan como un mecanismo de recompensa para incentivar a los validadores a crear nuevos bloques en la cadena.¹⁹⁰ Además, estas tasas evitan la congestión y los contratos maliciosos, e incentivan a los desarrolladores a escribir códigos eficientes.

Los "CitizenNFT" no son el único tipo de token disponible: los usuarios también pueden adquirir un token "Parcel Zero". Esto significa que un ciudadano de CityDAO podría tener acceso a votar sobre temas de gobernanza relacionados con la ciudad, (por ejemplo, asignar fondos para una determinada investigación) pero no necesariamente sobre temas específicos de ese terreno (como una propuesta para su subdivisión). Esto da autonomía a los diferentes proyectos.

¹⁸⁹ Ver 'gas' en la sección de léxicos.

¹⁹⁰ Ethereum difiere de Bitcoin en la forma en que se crean los bloques. Mientras que Bitcoin requiere abundante potencia de cálculo para validar las transacciones, Ethereum utiliza un mecanismo de colaterales. Cierta cantidad de ETH se bloquean como garantía de honestidad. Si tuvieran un comportamiento malintencionado, se arriesgan a sufrir sanciones y a perder una parte de los fondos depositados. Esto se considera más eficiente desde el punto de vista energético y, al mismo tiempo, incentiva a las partes interesadas a actuar en el mejor interés de la red.



CityDAO

Citizenship Parcels Community Dashboard Blog

LIVE
Parcel 0
Parcel Viewer

Parcel Zero
May 17, 2022

LOCATION: Wyoming SIZE: 40 ACRES PLOTS: 10k

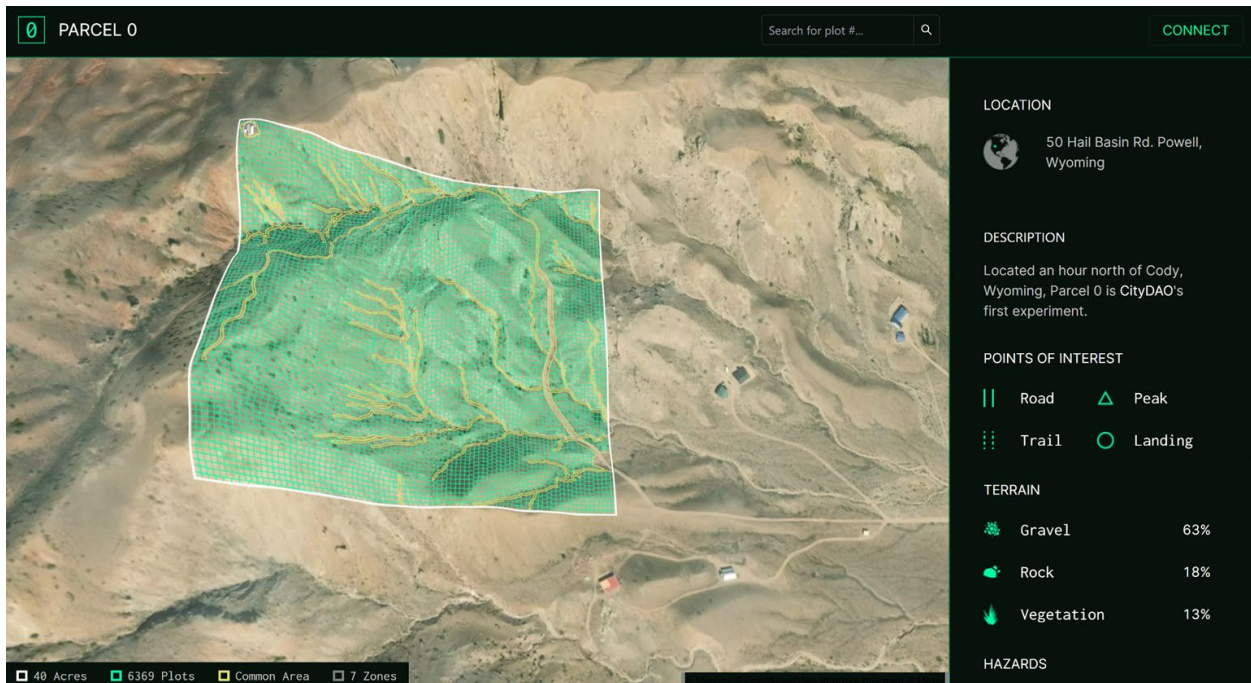
View Collection →

About the Project

Parcel Zero is CityDAO's largest and most significant effort to date. It is a Wyoming DAO's first land purchase. The NFT project was a monumental step towards putting land on chain. Of all our existing guilds/efforts/projects/etc. this is the only other one that has a separate NFT which controls access/governance/etc... Parcel Zero is our only project that has a separate entity which holds the land and through which Parcel Zero NFT holders...

Snapshots

- CIP-112: Parcel Zero Autonomization (178 Votes, Approved)
- CIP-14: Parcel 0 land use (890 Votes, Approved)



PARCEL 0

Search for plot #... Q

CONNECT

LOCATION
50 Hail Basin Rd. Powell, Wyoming

DESCRIPTION
Located an hour north of Cody, Wyoming, Parcel 0 is CityDAO's first experiment.

POINTS OF INTEREST

- Road
- Peak
- Trail
- Landing

TERRAIN

- Gravel: 63%
- Rock: 18%
- Vegetation: 13%

HAZARDS

40 Acres 6369 Plots Common Area 7 Zones

Para seleccionar el terreno *Parcel Zero*, los ciudadanos investigaron el valor de mercado, teniendo en cuenta parámetros como las estructuras existentes, la proximidad a aeropuertos, el suministro de

electricidad, alcantarillado y agua, y el valor de las parcelas adyacentes.¹⁹¹ Fitsimones lo cuenta en el podcast CityDAO: contrataron a un agente, hicieron una lista de necesidades y preferencias y eligieron la que consideraron más adecuada. En este proceso, dejaron fuera una parcela situada en un entorno más caro, con el objetivo de maximizar las posibilidades de subdivisión más adelante.¹⁹² Curiosamente, se dieron cuenta de que numerar las Parcelas 0, 1, 2 crea un sentido de competencia por ser la "Parcela 1". Su intención es cambiar la convención de nomenclatura por nombres de proyectos como Parcela Agartha, para pasar de la rivalidad a la abundancia.¹⁹³ Esto se alinea con la misión general de crear una comunidad que trabaje unida hacia un objetivo común, en lugar de competir entre sí.

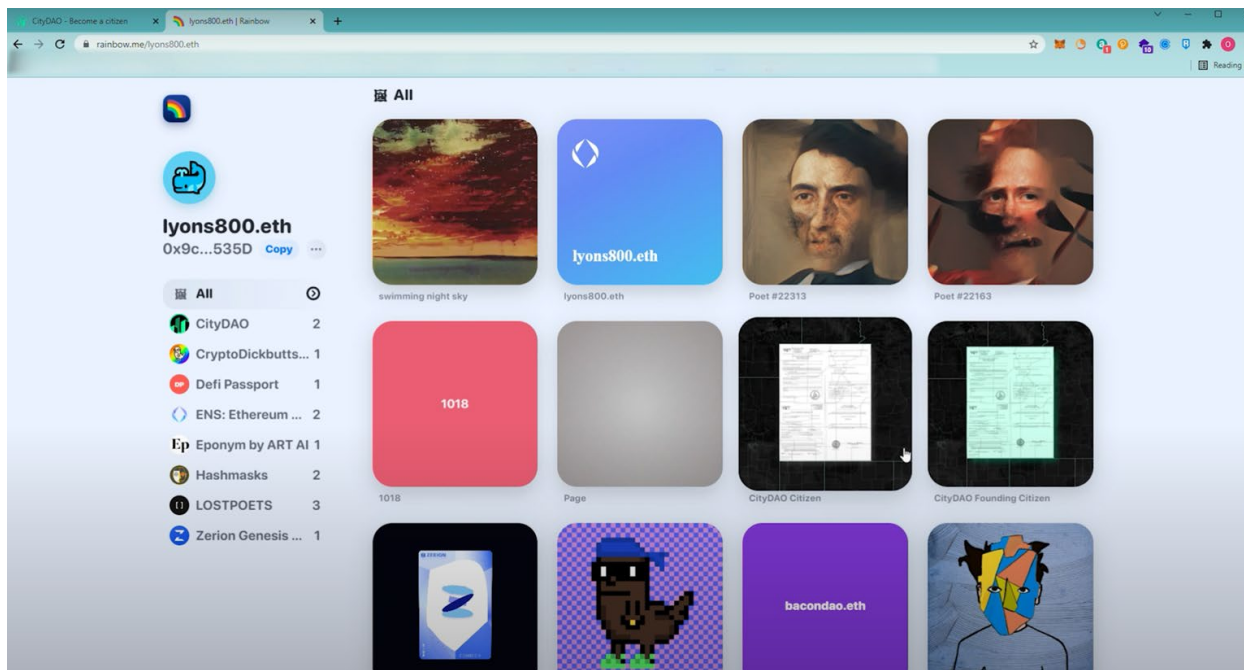
The screenshot shows the OpenSea marketplace interface for CityDAO Parcel-0. At the top, there are navigation links for 'OpenSea', 'Drops', 'Stats', and 'Create'. A search bar is present. Below the navigation, there's a header for 'CityDAO Parcel-0' with a green '0' icon. Key statistics are displayed: 99 ETH Total volume, 0.0398 ETH Floor price, 0.0114 WETH Best offer, 0.4% Listed, and 2,903 (53%) Owners (Unique). A description states: 'Located an hour north of Cody, Wyoming, Parcel 0 is CityDAO's first ... See more'. Below this, there are tabs for 'Items', 'Offers', 'Analytics', and 'Activity'. A search bar shows '5,453 results'. On the left, there are filters for 'Status' (All, Listed), 'On auction' (New), 'Has offers', and 'Creator earnings' (Support creators). The main area displays five listings for CityDAO Parcel-0 with their respective prices and last sale information. A 'Buy now' button is visible for the third listing. At the bottom right, there is a 'Make collection offer' button.

- Propiedad:** Tras la compra del token Citizen NFT, la propiedad se reflejará en la billetera digital del usuario y se registrará en la blockchain.

¹⁹¹ Eric Gilbert Williams, Podcast Audio. "CityDAO Ideator; From First Tweet to Successful Launch," en *Citydao Podcast a Crypto City of the Future*, episodio 02, *Spotify*, febrero 2022, [Link](#).

¹⁹² *Op. cit.*

¹⁹³ "CityDAO's Mission and Key Metric", *CityDAO*, 16 de junio de 2022. Consultado el 25 de mayo de 2024, [Link](#).



En este caso, la billetera digital que se utiliza para almacenar el token es RainbowMe, pero existen otros. Las billeteras de este tipo se denominan *self-custodial*, porque son los usuarios los dueños de la clave, sin un tercero mediador.¹⁹⁴ Los usuarios gestionan sus tokens utilizando dos tipos de claves, una pública y otra privada (son combinaciones aleatorias de caracteres). La clave pública es una especie de número de cuenta: los usuarios la comparten con otros para intercambiar tokens. La clave privada es la que permite a los usuarios acceder a billetera.¹⁹⁵

5. **Revisión de propuestas:** Las propuestas presentadas por ciudadanos, organizaciones o partes interesadas pretenden mejorar distintos aspectos del proyecto. En la actualidad tratan sobre gobernanza y desarrollo comunitario, pero también podrían incluir la gestión de infraestructuras, servicios y medio ambiente. Es posible revisar las propuestas entrando al foro vía este [Link](#).

¹⁹⁴ Las billeteras *custodial*, en cambio, operan de manera más parecida a un banco tradicional: un tercero tiene acceso a los activos. Aunque estas ofrecen comodidad, asistencia al usuario, mayor compatibilidad entre divisas y mayor cumplimiento de la normativa, los usuarios confían en un tercero para asegurar sus fondos, bajo el riesgo que sean manipulados.

¹⁹⁵ Ser el único propietario de las claves es crucial para garantizar una propiedad y una gestión totalmente autónomas de los activos. Sin embargo, con las billeteras *self-custodial*, si el usuario pierde la clave (la olvida o la regala), no hay forma de recuperar la cuenta ni su contenido. Esto supone un riesgo para las personas poco familiarizadas con la ciberseguridad, ya que pueden no estar equipados con los conocimientos necesarios para protegerse contra estas amenazas.

Topic	Replies	Views	Activity
CIP - 209D - Representation via Annual Meeting Proposals (CIPs)	1	53	2h
CIP 207: CityDAO Compute - Build a GPU Cluster in Wyoming Proposals (CIPs)	49	1.1k	3h
CIP 208 - Sponsorship for Legal Qualification of DAOs Book Proposals (CIPs)	4	135	3h
CIP-206: Reimburse Discord Scam Victims Proposals (CIPs)	34	1.2k	14h
CIP 208 INVEST COSMOS [Atom]	6	274	7d
[CIP 206] Treasury reform package Proposals (CIPs)	17	997	7d
The Formation of an Unincorporated Community Request for Proposals project-proposal, dev-team, operations	9	351	7d
CIP 208 : CLOSE LLC for CIP 207 Proposals (CIPs)	10	426	20d
CIP- X: Sunset CityDAO and return a pro-Ratia share of assets to Citizens Proposals (CIPs) project-proposal, operations	8	589	21d
Discord Compromised - Updates and New Chat	4	279	Feb 6
Discord compromised?	1	104	Jan 28
Djiscord compromised do not click or authorized Proposals (CIPs)	5	265	Jan 26

Claim CityDAO Citizenship

Connect your wallet, buy the NFT, and join us in shaping the future of land

4152 minted / 10000

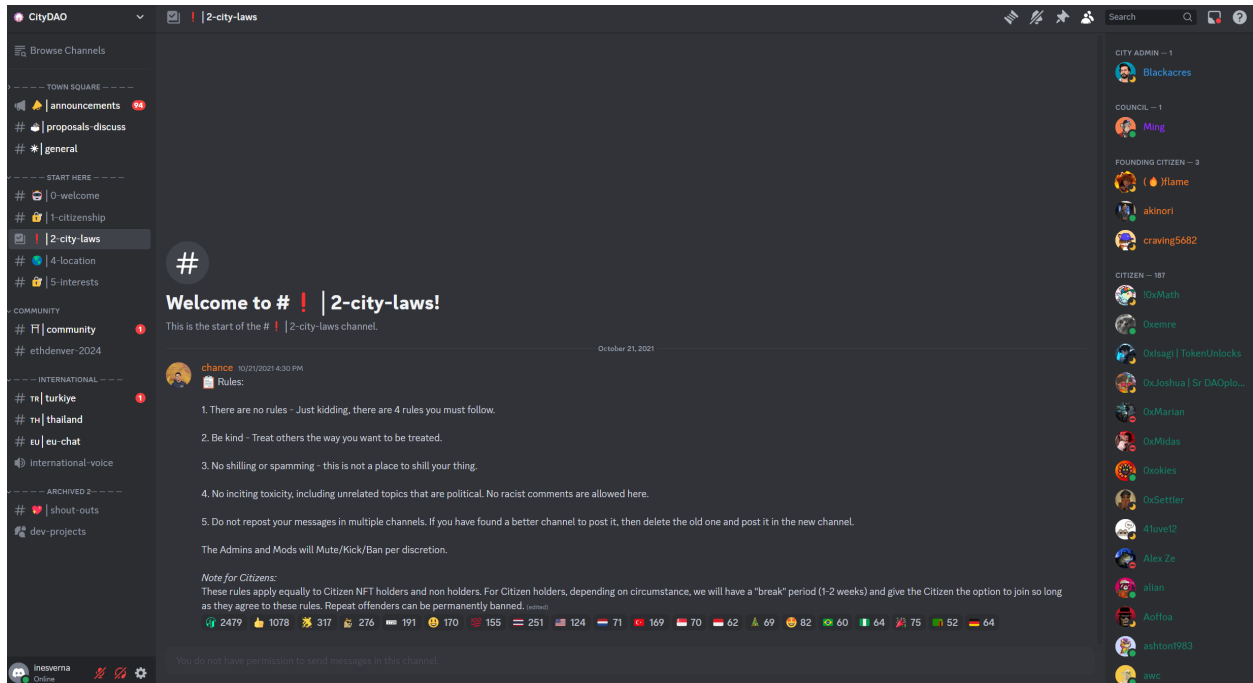
Citizen NFT
 Price: 0.25 ETH
 Supply: 10,000+
 Special privileges: Access to land drops after the First & Founding Citizens, access to Citizens Discord channels, voting power

MINT NFT

Contract Discord

Las propuestas en el foro necesitan el apoyo de los ciudadanos (en forma de "me gusta") antes de que puedan someterse a votación. Los debates tienen lugar en canales exclusivos de Discord (una plataforma de chat gratuita que admite varios tipos de medios), cada uno de ellos dedicado a temas

específicos. Algunos ejemplos de canales en CityDAO son: información general, anuncios, memes, propuestas, comunidad, leyes de la ciudad. Los canales se agrupan en servidores, que tienen administradores que establecen normas de comportamiento y contenido (normalmente sobre protocolos, spam, acoso, incitación al odio, relevancia, etc.). Para hacer cumplir las normas, los administradores pueden borrar mensajes, silenciar usuarios, advertirles, suspenderlos temporalmente o excluirlos por completo.



Aunque blockchain es un sistema fiable y resistente a la censura, la comunidad utiliza servicios que no son igual de robustos (Discord, Zoom, Meetup, Youtube, etc.). Esto añade cierta centralización al proceso, ya que los usuarios con derechos de administrador pueden efectivamente censurar a quienes no sigan las normas. También añade vulnerabilidad a la seguridad. CityDAO fue víctima de un hackeo a través de Discord en 2022: el atacante comprometió la cuenta de un administrador para emitir un enlace falso a terrenos.¹⁹⁶

6. **Emita su voto:** Revisa los detalles de cada propuesta, incluidos sus objetivos, presupuesto, calendario e impacto potencial en la ciudad. Los votos se emiten conectando la billetera del usuario a la plataforma Snapshot. Los votos se registran en la blockchain y contribuyen al proceso colectivo de toma de decisiones de la DAO.

¹⁹⁶ Jamie Crawley, "Blockchain City: CityDAO Falls Victim to \$95K Hack via Discord ", *CoinDesk*, 14 de enero de 2022, consultado el 25 de mayo de 2024. [Link](#).

Un miembro de la organización puede tener muchas billeteras y tokens de ciudadanía. Esto significa que el proceso de toma de decisiones no es unipersonal. Si un único usuario crea una cantidad desproporcional de cuentas para influir en la votación, puede haber centralización de poder y poner en peligro la legitimidad de la gobernanza de la DAO. Esto se conoce como "plutocracia", una situación en la que la riqueza se traduce directamente en poder político, configurando los procesos de toma de decisiones, a expensas de una representación equitativa. Para contrarrestar estas posibilidades, el ecosistema de las criptomonedas está desarrollando mecanismos como la verificación de la identidad,¹⁹⁷ y el bloqueo de los tokens del votante durante un determinado periodo de tiempo, con el riesgo de perderlos si actúa de forma deshonesto. Otra alternativa es la "votación por convicción", en la que los miembros de la comunidad expresan continuamente su preferencia por las propuestas a lo largo del tiempo, en lugar de en un único evento: cuanto más tiempo se mantenga la misma preferencia por cada propuesta, más peso tiene el voto, otorgando así más poder a los usuarios que participan de forma constante.¹⁹⁸

7. **Seguimiento de los resultados:** Tras la votación de las propuestas, los resultados pueden supervisarse en tiempo real en Snapshot. Una vez finalizada la votación, si se alcanza el quórum mínimo y la mayoría vota a favor de la propuesta, la financiación se libera automáticamente para su aplicación.

¹⁹⁷ *Proof of Humanity*, por ejemplo, es un token que utiliza tecnología blockchain que vincula las direcciones de las billeteras a personas reales, evitando cuentas duplicadas o falsas.

¹⁹⁸ Dávila, *Blockchain Radicals*, 224.

snapshot Connect wallet

CIP-112: Parcel Zero Automization

CityDAO by 0xF469...62DE Core Share

Parcel Zero is CityDAO's largest and most significant effort to date. It is a Wyoming DAO's first land purchase. The NFT project was a monumental step towards putting land on chain. Of all our existing guilds/efforts/projects/etc. this is the only other one that has a separate NFT which controls access/governance/etc... Parcel Zero is our only project that has a separate entity which holds the land and through which Parcel Zero NFT holders interact, and "Parcel Zero, LLC" merits an arms length relationship.

The possibilities for Parcel Zero have not been fully realized. While there are significant limitations for what can be done with the land, there remains a great deal of potential within the related Parcel Zero effort. Which direction we go needs to be determined by Parcel Zero NFT holders through the governance granted to them. However, very little is possible with no funding available. Additionally, we have known expenses which will exist, and past expenses which have yet to be paid.

Taking all of this into consideration, it is important that we recognize the Parcel Zero effort for the significance that it holds, and grant Parcel Zero NFT holders enough autonomy and funding to govern meaningfully. Without this a not insignificant amount of energy will be consumed making small asks along the way, and it will be that much more difficult to fully realize the value of holding a Parcel Zero NFT. This proposal provides a baseline foundation intended to prevent the project from languishing and maintain the current momentum.

Information

Strategie(s) 👤👤

IPFS #bafkrei

Voting system Single choice voting

Start date Jul 29, 2022, 11:43 PM

End date Aug 5, 2022, 11:43 PM

Snapshot 15,239,873

Results

Approve 171 CITIZE... 76.68%

Reject 52 CITIZE... 23.32%

Quorum ✔ 223 / 100

En el ejemplo anterior, 171 ciudadanos votaron a favor de la propuesta, mientras que 52 la rechazaron.

- Redactar propuestas:** Cualquier ciudadano titular de un NFT puede escribir una propuesta y publicarla en el foro. Cada propuesta debe seguir una plantilla creada por el *Gremio de Planificación*. Para que la propuesta pase del foro a Snapshot, donde se votará para su aprobación, debe antes recibir al menos veinte "me gusta" en un plazo de tres semanas.

Proposals How-to Guide

Proposal Process

- Writing:** Any Citizen NFT holder may write a proposal and [post it on the forum](#).
- Discussion:** For a proposal to move from forum to snapshot, it must receive 20 likes within 3 weeks.
- Voting:** A proposal is posted on [Snapshot](#) for a vote.

After it passes, the multisig allocates funds to the project!

To be considered a valid proposal, the Planning Guild asks Citizens to use the following format.

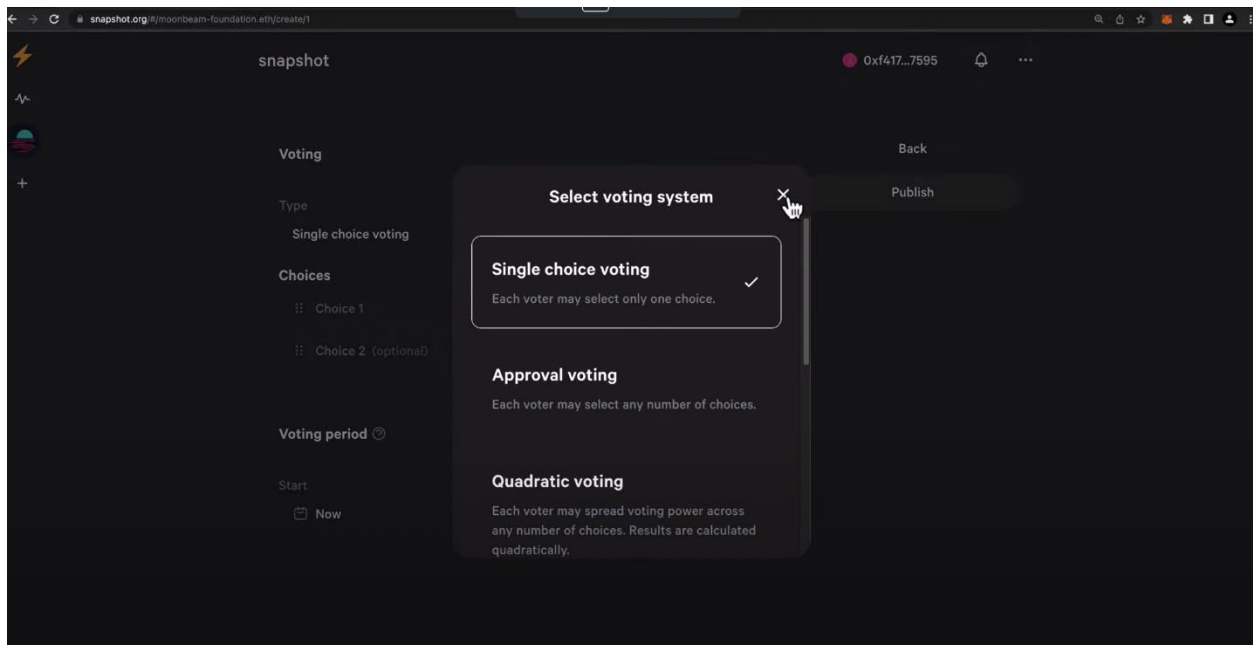
CIP Format

- 1. Proposal TLDR**
Describe your proposal, how much money it allocates and to whom, and the expected outcome.
- 2. Project Team**
Please describe team members and their qualifications.
- 3. Proposal Budget**
Please include how much money will be allocated to the project and what types of assets (for example, ETH, USDC, Citizen NFTs).
Describe the justification for how these funds will be spent.
Describe comp for team members and how that comp is distributed (for example hourly, upon completion, etc)
- 4. Timeline and Deliverables**
How long until the project is complete? What are some milestones the DAO can look forward to?
- 5. Risks**
What might go wrong?
- 6. Regulatory**
Will the project require creating new legal entities, new tax burdens for the DAO, or issuing new tokens?

Al publicar una propuesta, el autor debe elegir entre tres posibles sistemas de votación: votación de

opción única (en la que cada votante puede seleccionar una opción); votación de aprobación (en la que cada votante puede seleccionar cualquier número de opciones); y votación cuadrática (en la que el coste de emitir votos adicionales aumenta cuadráticamente con el número de votos emitidos). Con el voto cuadrático, los participantes pueden distribuir sus tokens entre distintas opciones o asignar varios a una sola, en función de sus preferencias. Este sistema está diseñado para restringir el poder de los usuarios que poseen múltiples tokens, ya que cada voto adicional es exponencialmente más caro. Representa una forma más equitativa para que los individuos expresen sus preferencias, incentivando el establecimiento de prioridades, la asignación estratégica de votos y una toma de decisiones más matizada.

Uno de los retos de votar para toda propuesta es que se necesita un quórum mínimo para tomar decisiones, pero no todos los ciudadanos tienen el mismo nivel de interés o experiencia en todos los asuntos. Si esto se traduce en bajos niveles de compromiso, el grupo podría encontrar dificultades para evolucionar de forma eficiente.



En resumen, esta sección revela cómo los participantes compran tokens de ciudadanía para tener acceso a los debates y derecho a voto en las decisiones de gobernanza. La escasez de tokens crea un caso de negocio que promueve la inversión, a riesgo de elitismo o exclusión de quienes no pueden adquirirlas. Proporcionan estatus y legitimidad a los miembros de la comunidad, destacando su papel en la configuración del futuro de CityDAO. Los fondos recaudados con la venta de estos tokens se destinan a una tesorería común, que luego se libera parcialmente para financiar diferentes propuestas de

proyectos, si son aprobadas por los ciudadanos. Mediante la creación de reglas, debates moderados y la cuantificación del logro de objetivos, la comunidad intenta crecer y evolucionar.

Este proceso de presentación y selección de propuestas puede considerarse menos eficiente que si un único agente (un presidente, un primer ministro, un director general) decidiera dónde asignar los fondos de una organización, sin necesidad de consenso. Sin embargo, como cada integrante tiene participación, hay una sensación compartida en el éxito de la ciudad. Como los tokens de terreno son escasos, su valor es sensible a la demanda. Esto incentiva a los participantes de la DAO a reconocer cómo sus acciones y decisiones repercuten en el colectivo, lo que conduce a un compromiso compartido para alcanzar objetivos comunes. En otras palabras, la eficiencia se intercambia por la transparencia y la gobernanza participativa.

Hasta aquí he esbozado varias oportunidades y riesgos propios del proyecto de CityDAO. He aquí un resumen:

Oportunidades:

Eficiencia: Los mecanismos descentralizados de toma de decisiones pueden agilizar potencialmente los procesos burocráticos, reduciendo el tiempo y los costes asociados a las estructuras tradicionales, como el rol de agentes en el sector inmobiliario, pero el proceso de decisión para llegar a tales contratos puede llevar más tiempo de gestión.

Mayor igualdad: A través de la tokenización y el crowdfunding, se puede facilitar el acceso al capital a personas con acceso a internet, y conocimiento de las oportunidades disponibles en la economía digital.

Participación: CityDAO puede fomentar mayor participación de la comunidad en la toma de decisiones relacionados al desarrollo urbano.

Transparencia: Al utilizar código abierto como marco de gobernanza, cualquiera (con los conocimientos técnicos) puede auditarlo, lo que aumenta la confianza y la responsabilidad.

Innovación: CityDAO puede fomentar la innovación en la planificación urbana proporcionando una plataforma para la experimentación y la colaboración entre las partes interesadas.

Descentralización: Mitigación de la concentración de poder en las estructuras tradicionales de gobierno.

Riesgos:

Amateurismo no deseado: La estructura de gobernanza propuesta hoy por CityDAO no impide que personas sin licencia o no profesionales actúen en el paisaje urbano.

Incertidumbre normativa: La ciudadanía no otorga ningún derecho legal o reclamación sobre el activo físico de la tierra y, dependiendo de la regulación, puede que nunca lo haga.

Desigualdad: CityDAO podría exacerbar las desigualdades socioeconómicas existentes al favorecer a los miembros de la comunidad acomodados o con conocimientos tecnológicos en detrimento de los grupos marginados con acceso limitado a la tecnología o los recursos.

Vulnerabilidades de seguridad: Los contratos inteligentes y las tecnologías blockchain son susceptibles de sufrir errores y otras vulnerabilidades de seguridad, lo que puede provocar pérdidas financieras o interrupciones en los procesos de gobernanza.

Retos de gobernanza: La descentralización de la toma de decisiones puede traer problemas de coordinación, conflictos de intereses y parálisis en la toma de decisiones, sobre todo en entornos urbanos diversos y complejos.

Falta de responsabilidad: Aunque la transparencia es un beneficio potencial, también suscita preocupación la falta de responsabilidad si las decisiones se toman de forma anónima o sin mecanismos claros de recurso o supervisión.

Brecha digital: Las iniciativas como CityDAO pueden excluir a segmentos de la población que carecen de acceso a las tecnologías digitales o no están familiarizados con ellas, ampliando la brecha digital.

III.f Criptocolectivismo: Una identidad dinámica y participativa

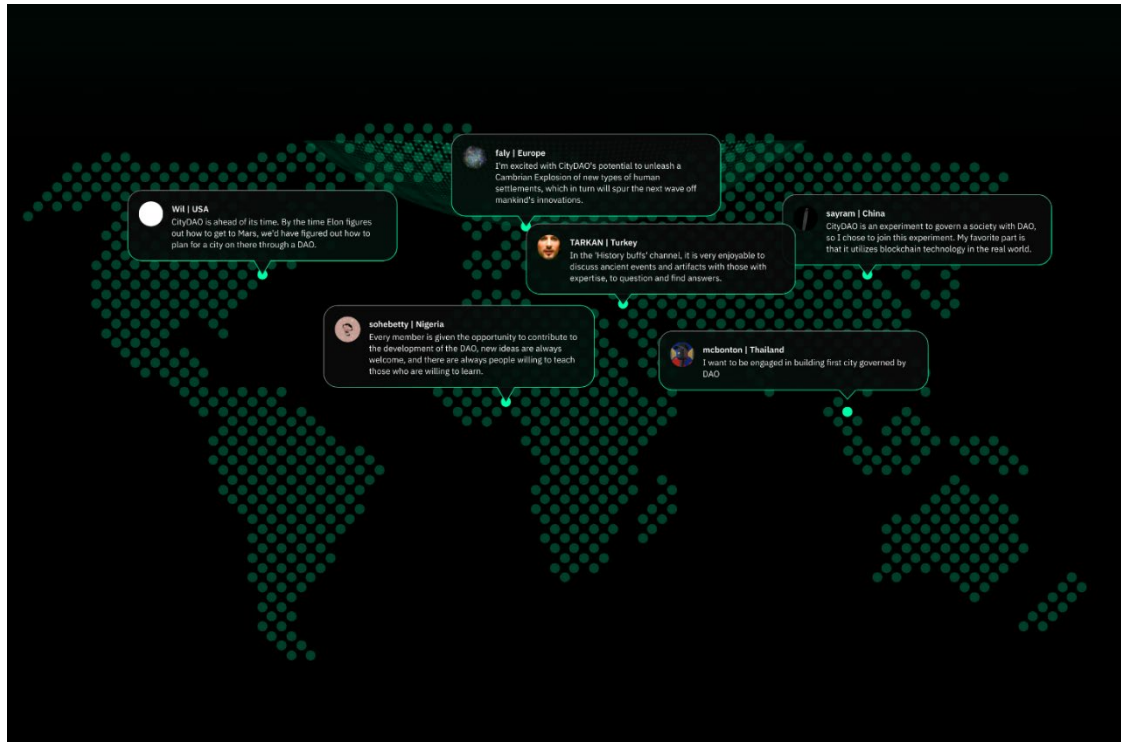


Figura 27: Captura de pantalla del sitio web de CityDAO. Fuente: CityDAO [Link](#).

Como se menciona en el capítulo I, el ritmo acelerado de la globalización ha generado nuevas identidades sociales y políticas que trascienden las fronteras nacionales. Los conceptos tradicionales de ciudadanía arraigados en el Estado-nación se ven cuestionados por la inmigración y el desplazamiento. La circulación de capitales y personas, tanto profesionales acomodados como trabajadores desfavorecidos, sirve para redefinir las subculturas locales, dando lugar a nuevas reivindicaciones de espacio, derechos y ciudadanía. Esta tendencia sigue siendo moldeada por blockchain a través de lo que Balaji Srinivasan ha definido como el *network-state*: el concepto de una red que utiliza la tecnología para financiación colectiva de territorio y crear identidad, independientemente de sus fronteras nacionales. En palabras de Srinivasan "Found a startup society. This is simply an online community with aspirations of something greater. Anyone can found one, just like anyone can found a company or cryptocurrency".¹⁹⁹

Srinivasan, antiguo director técnico (CTO) de Coinbase y socio general de una empresa de capital de riesgo, ha sido criticado por sus ideas libertarias. Se le ha acusado de no tener en cuenta la historia del colonialismo en la evolución del Estado-nación: un sistema de gobierno completamente orientado al mercado como el que él sugiere podría suponer el fin de muchos derechos civiles que hoy damos por

¹⁹⁹ Balaji Srinivasan, *The Network State: How to Start a New Country*, Autopublicado, (2022), 11.

sentados.²⁰⁰ Dávila, que considera que las empresas son esencialmente dictaduras económicas controladas por capitalistas de riesgo, advierte del peligro que supone un *ledger* distribuido, resistente e inmutable que codifique valores políticos. Atribuye la aspiración de Srinivasan, que las nuevas naciones digitales sean extensiones de la cultura de las startups, a su deseo de una tecnocracia antidemocrática, señalando que esta cultura está controlada por capitalistas como él. La crítica de Dávila pretende mostrar lo improbable que es llegar a una norma universal de derechos humanos y subraya que el contenido embebido en el código de los contratos inteligentes está influido por el contexto social del que proceden.

En este capítulo se ha analizado CityDAO como un primer intento, dentro del modelo de Estado posnacional, de operar mediante la toma de decisiones descentralizada, para financiar, mediante *crowdfunding*, bienes inmuebles físicos. Dicho de otro modo, CityDAO señaló una posible vía de materialización de un Estado posnacional: es un ejemplo de cómo las DAO permiten a individuos de diversos orígenes participar en los procesos de toma de decisiones, con el objetivo de crear una ciudad sin fronteras físicas. Prueba de ello es la imagen de Fitsimones plantando una bandera en el terreno adquirido, símbolo de su sentido de pertenencia más allá de los estados nacionales.

Aunque su fundador procede de la cultura de las startups, esto no refleja necesariamente la perspectiva distópica sugerida por Dávila. Aunque priorizar el crecimiento, buscar la innovación y asumir riesgos puede no ser la solución a la desigualdad social, tampoco son necesariamente incompatibles. Como se ha mostrado en la sección anterior, los contratos que rigen la DAO incorporan los valores sociales por los que lucha la comunidad. Que sean distópicos o no depende de los individuos que los redactan y votan, más que de su modelo de negocio. OpenAI es un ejemplo que comenzó como una organización sin ánimo de lucro para "garantizar que la inteligencia artificial beneficie a toda la humanidad"²⁰¹, centrándose en el bien público por encima del beneficio. Debido a los importantes recursos financieros necesarios para la investigación de la IA, más tarde introdujo una estructura híbrida que incorporaba una filial con ánimo de lucro. Esto les permitió atraer capital y talento competitivo, muy necesario para su misión inalterada.²⁰² Aunque las organizaciones sin ánimo de lucro puedan parecer más nobles, no son inmunes a los incentivos financieros.²⁰³ En resumen, se requieren consideraciones éticas y cautela para ambos modelos empresariales. Iniciativas como CityDAO instan a cuestionarse las consecuencias si tales valores, que podrían o no ser ilegítimos, se incrustan en un código informático ejecutable

²⁰⁰ Dávila, *Blockchain Radicals*, 240.

²⁰¹ "About OpenAI", *OpenAI*, consultado el 25 de mayo de 2024, [Link](#).

²⁰² James Broughel, "OpenAI Is Now Unambiguously Profit-Driven-and That's a Good Thing", *Forbes*, 9 de Diciembre de 2023.

²⁰³ La sensibilidad al esfuerzo es mayor en el sector lucrativo, posiblemente porque las empresas sin ánimo de lucro tienen menos probabilidades de aplicar primas por rendimiento, remuneración por méritos o ascensos. Véase: Joseph Lanfranchi y Mathieu Narcy, "Effort and Monetary Incentives in Nonprofit and For-Profit Organizations", *TEPP*, nº 2013-1 (enero de 2012), 17.

automáticamente.

A través de estructuras de gobierno descentralizadas, intereses compartidos y transacciones sin fronteras, las comunidades DAO se forman en torno a objetivos comunes más que en torno a afiliaciones nacionales. Aunque ya surgen inevitables errores al navegar por este novedoso medio tecnológico, el potencial reside en sus fundamentos democráticos, un experimento sin precedentes posible gracias a la tecnología blockchain. Los desafíos técnicos y legales impiden a sus participantes poseer y construir sobre la tierra en estos momentos. Aun así, como ilusión, ofrece a los ciudadanos una plataforma participativa para explorar la configuración de una comunidad autogobernada. Aunque no se superen estos retos, es interesante considerar la noción de ciudadanía que se está configurando en este proyecto. Al no estar ligada a fronteras geográficas, adquiere una dimensión dinámica: la ciudadanía es un compromiso colectivo de co-crear y administrar recursos comunales para el bien común. Las definiciones más específicas pueden evolucionar con el tiempo a través de propuestas de mejora, siempre que la comunidad vote a su favor. En este ethos -o modelo- encarnado de sociedad posnacional, la ciudadanía se definiría por la participación, el respeto mutuo y el empoderamiento colectivo. Su viabilidad jurídica y financiera está aún a prueba.



World Octopus#7f0b

Crawls0r#b2c7

Kat

PiZzArte#a92d



Capítulo IV. Suburbios en línea de Decentraland

IV.a Introducción al capítulo IV

El capítulo anterior toma como caso de estudio CityDAO, un modelo de Organización Autónoma Descentralizada (DAO), explorando las oportunidades y desafíos de la propiedad y gestión colectiva de la tierra. A continuación, un resumen de lo mencionado hasta ahora en relación a las DAO:

- La red de Ethereum combina la naturaleza descentralizada de la tecnología blockchain –su resistencia y transparencia– con la capacidad de ejecutar cualquier tipo de programa informático.
- Los programas informáticos de blockchain pueden ejecutar operaciones si-entonces, lo que permite que los contratos se ejecuten automáticamente cuando se cumplen los parámetros codificados en la declaración 'si'. Por ejemplo, "si" el usuario es titular de tokens de ciudadanía, "entonces" se le permite votar.
- Estos tipos de contratos permiten un sistema más transparente, ya que son de código abierto y auditable por la comunidad, aunque no eliminan por completo los problemas de gobernanza.
- Estos contratos se utilizan para codificar la propiedad y los metadatos de los activos digitales, que son únicos e indivisibles, conocidos como tokens no fungibles.
- Estos tokens permiten a los miembros de la comunidad adquirir derechos sobre el proceso de toma de decisiones mediante mecanismos de votación.
- Los valores sociales están inherentemente integrados en el código de estos contratos, que hoy operan en ámbitos regulatorios grises.

La propiedad colectiva, sin embargo, es sólo una entre las múltiples posibilidades que abre la exploración con la tecnología blockchain. En este capítulo se analiza Decentraland, una DAO que prescinde por completo del territorio físico. Propone en su reemplazo un universo digital, en el que cada usuario es propietario de su patrimonio virtual, desde la tierra hasta la ropa o los accesorios. La propiedad privada convive aquí con cierto sentido de comunidad compartida: lo llamo titularidad del capital de multijugadores.

Como en CityDAO, los contratos autoejecutables permiten a la comunidad verificar la propiedad, intercambiar activos, sugerir propuestas de mejora y participar en votaciones, sin que medie una agencia centralizadora. Si el capítulo anterior concluía que los valores sociales están intrínsecamente codificados en estos contratos, éste examina las normas y reglas cultivadas por los múltiples actores. Profundizando en la filosofía promovida por sus fundadores, su proceso de toma de decisiones, los desafíos afrontados, sus prioridades y su estética, la pregunta que se plantea este capítulo es en qué se diferencia esta ciudad de otras ciudades digitales y qué papel desempeña la tecnología blockchain.

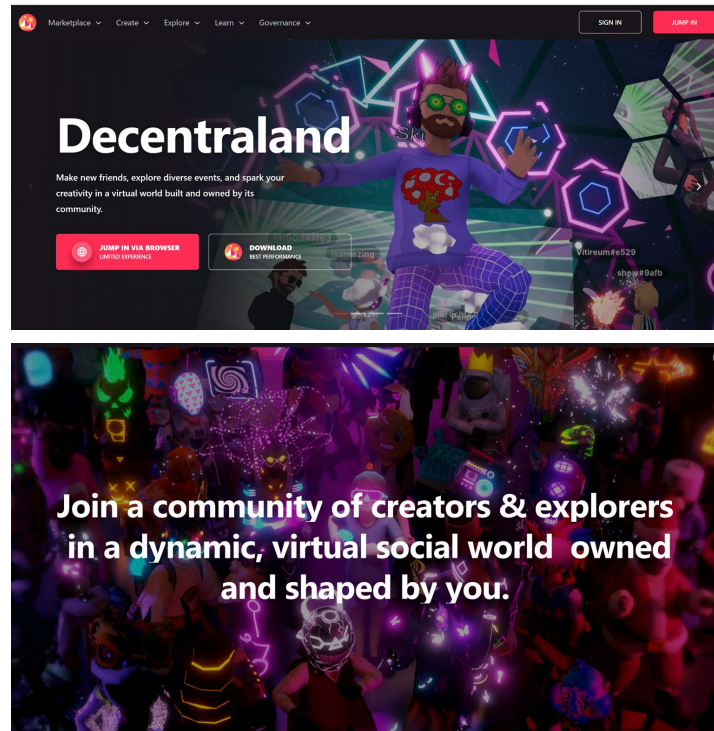


Figura 28: Capturas de pantalla de la web de Decentraland. Fuente: Decentraland [Link](#).

Como indica Varoufakis (véase el capítulo I), *quién* posee el capital es clave en la comprensión del sistema económico. La mutación del capital en capital-nube derribó los dos pilares del capitalismo: los mercados y las ganancias.²⁰⁴ En la era de las redes sociales, este nuevo tipo de capital es producido por una gran parte de la humanidad y, sin embargo, sólo es rentable para unos pocos. Tal concentración de riqueza lleva a la contradicción de los ideales del capitalismo (un mercado competitivo, una regulación mínima por parte de gobiernos y bancos centrales, libertad de elección por parte del usuario final).²⁰⁵ Un mercado es un espacio que facilita el comercio, permitiendo a compradores y vendedores interactuar entre sí para intercambiar bienes y servicios. Las plataformas, en cambio, ejercen un control sustancial sobre la experiencia del usuario. Para exactamente la misma búsqueda, los usuarios verán contenidos personalizados, adaptados a su historial y preferencias.²⁰⁶ Los compradores no pueden comunicarse con

²⁰⁴ Varoufakis, *Technofeudalism*, 125.

²⁰⁵ Op. Cit., 130.

²⁰⁶ "Markets have been replaced by platforms: so amazon.com is not a market. It looks like a market but it's more like a digital fief, a cloud fief, belonging to one man, whose accumulation of wealth is based not on profit but on a form of rent. Every time you buy something from Amazon 30 40% of the price goes to Mr Bezos, not to the maker." Ver: "Capitalism as we know it is over, so what comes next? | My Wildest Prediction with Varoufakis" Youtube Video. Posted by @euronews 20 de diciembre, 2023. [Link](#).

el vendedor, salvo cuando lo permita el propietario de la plataforma, quien definirá condiciones precisas para ello. La propiedad sobre el contenido, los datos y los recursos permite a las plataformas manipular a los usuarios y facilita la acumulación de riqueza (poder) por parte de éstas.

A medida que los mercados son sustituidos por plataformas, el problema de la propiedad de los datos no es que los usuarios sean meramente "vigilados",²⁰⁷ sino que se busca alterar su comportamiento.

The question is who owns what. Some people are very worried about surveillance (...) but I'm far more worried by *what they own*. They own this Capital, which is a capacity to separate us, to fragment us, as markets, as communities, as societies. To influence us in ways we don't understand, in ways that the people who wrote the algorithms do not understand.²⁰⁸

Este poder sobre la conducta se ejerce no sólo mediante la hiper personalización de la publicidad, sino a través de un algoritmo persuasivo que dice a los usuarios dónde ir, qué ver, leer, comprar, con quién encontrarse, qué escuchar, qué cocinar, dónde invertir. El capital-nube es, por tanto, un medio producido de modificación del comportamiento, más que un medio producido de producción.

La cuestión no es si blockchain puede revertir esto. La pregunta es, más bien, si Decentraland se considera como la simulación de un modelo alternativo al propuesto por Varoufakis -donde la propiedad del capital pasa de unos pocos individuos a los múltiples jugadores-, ¿qué dinámicas sociales emergen de esto, y cómo afecta esta redistribución del capital a la organización de espacios dentro del ámbito digital?

Saskia Sassen argumenta (véase el Capítulo I) que la necesidad de funciones centrales, coordinación de fábricas, servicios financieros –muy necesarios para la máquina capitalista–, derivó en una mayor concentración de infraestructuras que hacen atractiva la ciudad como centro global. De este modo, se entiende que, a pesar de las crecientes tendencias que buscan aprovechar las oportunidades de trabajo a distancia (los llamados nómades digitales), sin locación fija, este nuevo estilo de vida no elige el suburbio tradicional como destino, sino que buscan recorrer el mundo, visitando (y por ende concentrándose) en distintas grades ciudades.²⁰⁹

Las siguientes secciones exploran la dinámica centro-periferia planteada por Decentraland, un modelo de ciudad digital que es a la vez autónoma y dependiente de la ciudad material: sus usuarios siguen viviendo en el mundo físico y sólo entran momentáneamente en el digital. Como un nuevo destino para nómadas digitales, pero más breve, Decentraland se presenta como un espacio soberano, con su propia

²⁰⁷ Así, Varoufakis argumenta que no se puede hablar de "capitalismo de vigilancia", como plantea Shoshana Zuboff.

²⁰⁸ "Capitalism as we know it is over, so what comes next? | My Wildest Prediction with Varoufakis" Youtube Video. Posteador por @euronews 20 de diciembre, 2023. [Link](#).

²⁰⁹ Giana M. Eckhardt, Aleksandrina Atanasova, "The New Reality of Digital Nomads" *Harvard Business Review*, 5 de febrero, 2024. [Link](#).

economía, dinámica social y lugares de aprendizaje, entretenimiento y oportunidades para ganar dinero.

IV.b Ciudades digitales

Las “ciudades digitales,” entendidas tanto como simulación de ciudades reales como mundos virtuales autónomos, se han instalado en los últimos años en el centro de los debates arquitectónicos, impulsadas por la expansión (si no la ambición) del reino virtual más allá de la industria del entretenimiento. Esta exploración transforma ahora el entorno digital en un ámbito para “vivir”, es decir, trabajar, aprender, investigar y albergar eventos culturales, artísticos y políticos.

En el ámbito de los mundos virtuales, Second Life²¹⁰ surgió en 2003 como una plataforma de interacción en tiempo real, que ofrecía a los usuarios, mediante *avatars*, una amplia paleta de experiencias artísticas, personales y políticas.²¹¹ Concebida como un espacio que se llenaría con contenidos generados por los usuarios, desde su debut ha sido escenario de educación y aprendizaje, pero también de polémicas relacionadas con el fraude, el mal comportamiento, la congestión,²¹² y el comercio de actividad sexual involuntaria con avatares infantiles mediante el robo de identidad.²¹³

Recientemente, especialmente en el contexto de la pandemia de Covid-19, el concepto de metaverso ha emergido como una versión más sofisticada de aquellos mundos virtuales, prometiendo generar experiencias inmersivas mediante nuevos dispositivos de hardware, a los ya existentes medios para la interacción virtual. Facebook anunció bombásticamente su apuesta por el futuro de los entornos digitales inmersivos. La transformación de Facebook en *Meta* fue una de las inversiones iniciales en el sector audiovisual que incluyó el desarrollo de la inteligencia artificial. Esto catalizó un renovado interés por el urbanismo digital y la arquitectura virtual en figuras como Patrick Schumacher, quien declaró que estos mundos virtuales representarían un fértil nuevo campo para el involucramiento de las prácticas del diseño. Algunas preguntas relevantes en ese debate son: ¿Qué nuevas oportunidades emergen y qué ofrecen los arquitectos en el espacio especulativo del metaverso que no puedan ofrecer los artistas, diseñadores de juegos y programadores? ¿Hasta qué punto los entornos virtuales deben ser miméticos del mundo material? ¿Deben estos espacios ser estables (siguiendo las reglas de la gravedad, las fuerzas, el movimiento, el peso, los presupuestos) o deben liberarse de estas dinámicas?

Schumacher está experimentando con una ciudad digital, Liberland (Figura 29), como ciudad gemela de

²¹⁰ Second Life ha sido considerado precursor de Decentraland por figuras como Santiago Siri. Siri menciona que Second Life fue demasiado avanzado para su época. Véase Hernán Zin. "La Prodigiosa Historia de Decentraland " *¿Por Qué No Te Habré Hecho Caso?* Podcast audio. Abril de 2022. [Link](#).

²¹¹ Andrea Moneta, "Arquitectura, patrimonio y metaverso: New Approaches and Methods for the Digital Built Environment" *Traditional Dwellings and Settlements Review*, Vol. 32, n° 1 (Otoño 2020): 40.

²¹² Tom Boellstroff, *Coming of Age in Second Life: An Anthropologist Explores the Virtually Human*, (Nueva Jersey: Princeton University Press, 2008),

²¹³ "Second Life 'child abuse' claim" *BBC News*, Última modificación: 9 de mayo de 2007. [Link](#).

una (potencialmente) futura ciudad material. Concibe la ciudad gemela virtual como un simulador para evaluar distintos parámetros (como la especulación del mercado, la congestión, la volatilidad de los precios o la normativa) antes de su implantación material. En este contexto, sostiene que el diseño arquitectónico consiste en enmarcar las interacciones sociales, incluidas las virtuales, y, en este sentido, *quién* diseñe el metaverso implicará necesariamente una diferencia de propósito y criterios de éxito.²¹⁴ Sin duda, atribuye al diseñador la principal responsabilidad y competencia, independientemente de que sea virtual o no, ya que los arquitectos han sido formados para garantizar que la riqueza y complejidad de los mundos interactivos tridimensionales inmersivos en capas sigan siendo perceptualmente manejables y fáciles de navegar. Desvaloriza la importancia de los juegos en este contexto, argumentando que sólo representan un pequeño nicho en comparación con el marco general que abarca el metaverso, incluyendo la interacción humana, el intercambio de conocimientos, la colaboración profesional, la comunicación cultural, el arte, la educación, el compromiso político, etc.



Figura 29. Zaha Hadid Architects, Liberland. 2022. Fuente: "Zaha Hadid Architects Designs Liberland, a "Cyber-Urban" Metaverse City" *ArchDaily*, 15 de marzo de 2022. [Link](#).

En función del linaje tecnológico en que se inserta, Decentraland debería leerse, no como un videojuego con fines de entretenimiento exclusivamente, sino como una instanciación de estas ciudades digitales: una que no está diseñada por un maestro-arquitecto, sino por su propia comunidad. Esto desplaza las

²¹⁴ Sara Kolata "The Metaverse as Opportunity for Architects: An Interview with Patrik Schumacher" *ArchDaily*, 14 de abril de 2022. [Link](#).

preguntas de *cómo debería ser el espacio urbano del metaverso a qué dinámicas urbanas interesantes se están configurando en el metaverso de las que podrían aprender los arquitectos.*

IV.c La huida de la familia

Decentraland comenzó a gestarse alrededor de mayo de 2015 por los desarrolladores de software argentinos Esteban Ordano y Ariel Meilich.²¹⁵ Ordano y su amigo Manuel Araoz intuyeron el potencial creciente de la tecnología de realidad virtual (VR) para mejorar y ser cada vez más inmersiva; preveían un mercado de crecimiento significativo en unos pocos años o una década. Creyendo que surgiría un mundo visual social compartido, discutieron la necesidad de que tal experiencia no fuera monopolizada por una sola corporación como Meta -entonces Facebook-. Esta idea es también dominante en la redacción de su Whitepaper, cuya publicación tuvo sensación de urgencia: el boom de la realidad virtual parecía estar teniendo lugar frente a sus ojos.²¹⁶ Se preveía que los ingresos mundiales de la Realidad Aumentada (AR) y la Realidad Virtual (VR) alcanzarían los 162.000 millones de dólares en 2020, frente a los apenas 5.200 millones de 2016.²¹⁷

Ordano es licenciado por el Instituto Tecnológico de Buenos Aires (ITBA), trabajó en Google y en el procesador de pagos de Bitcoin BitPay. Meilich estudió neurociencia y economía en la Universidad de Nueva York y en ese entonces utilizó Bitcoin para eludir las leyes monetarias argentinas y dirigir una empresa de subcontratación.²¹⁸ La inestable economía argentina, pasó de un tipo de cambio de 1:3.8 del peso respecto al dólar estadounidense en 2010 a 1:8 en 2015.²¹⁹ Para evitar la fuga de capitales y el agotamiento de las reservas de dólares estadounidenses del banco central (y una mayor devaluación del peso), el gobierno prohibió casi por completo el libre comercio de dólares estadounidenses (excepto para pequeñas cantidades y operaciones de comercio internacional).²²⁰

Según un perfil publicado por el blog CoinTelegraph, fue la libertad intrínseca en la tecnología blockchain lo que inspiró a Meilich a unirse a una "casa de hackers" en Buenos Aires llamada Voltaire, donde conoció a Ordano.²²¹ La Casa Voltaire estaba formada por 15 personas, en su mayoría hombres, que se

²¹⁵ "Interview with Esteban Ordano, Cto @ Decentraland - Ethfinex* [Old]." Youtube video. Publicado por @Rhinofi. 13 de junio de 2018. [Link](#).

²¹⁶ El proyecto Decentraland está en continua evolución y algunos de los planteamientos expuestos en el libro blanco han quedado obsoletos. Sin embargo, sigue siendo válido para comprender las motivaciones que dieron origen a Decentraland. Véase: Ariel Meilich Esteban Ordano, Yemel Jardi, Manuel Araoz, "Libro blanco de Decentraland" (2017), [Link](#).

²¹⁷ Ariel Meilich, "Introducing the Decentraland White Paper", *Medium*, 12 de julio de 2017. [Link](#).

²¹⁸ The Coin Telegraph Top 100. "Esteban Ordano #6: Co-founder of Decentraland". Consultado el 01/06/2024. [Link](#). El hecho de que los fundadores sean argentinos no es menor: a pesar de la volatilidad intrínseca a las criptomonedas, su demanda tiende a ser mayor en regiones económicamente volátiles y políticamente inestables. Ver: "Charting the course of Bitcoin, 11 years and counting", *Coinbase*, 31 de octubre de 2019. [Link](#).

²¹⁹ "Dólar oficial histórico" *Ámbito*, consultado el 06/06/2024. [Link](#)

²²⁰ "Argentina: Evolución económica; 29 de abril de 2015" *Biblioteca electrónica del FMI*, 29 de febrero de 2016. [Link](#).

²²¹ The Coin Telegraph Top 100. "Esteban Ordano #6". Sobre la historia de Voltaire, véase: Leo Schwartz & Lucia Cholokian Herrera, "Rise and fall of the house of Bitcoin," *Rest of world* 1 de febrero, 2021. [Link](#).

conocían del ITBA. Organizaron almuerzos y debates durante tres años con el objetivo de fomentar una economía descentralizada y transparente.

El whitepaper de Decentraland también fue escrito por otros dos miembros del equipo central, igualmente ingenieros informáticos, graduados del ITBA y ex empleados de Bitpay, Yemel Jardí y Manuel Araoz. Araoz fue el fundador de la Casa Voltaire en 2014, con el objetivo de construir el equipo de desarrollo de BitPay en Argentina. En ese momento, todos los miembros hicieron contribuciones significativas para la construcción de la tecnología blockchain: Araoz y Ordano crearon a principios de 2013 una implementación blockchain de Proof of Existence; Araoz, junto con otro miembro de la casa, creó OpenZeppelin;²²² Yemel elaboró herramientas de código abierto como la biblioteca Bitcore y trabajó en ChangeTip, una infraestructura de micropagos para la web que fue adquirida por Airbnb en 2016.²²³

En resumen: mientras buscaban formas de esquivar las restricciones económicas de Argentina, los desarrolladores de Decentraland vieron una oportunidad para evitar la posible monopolización de las plataformas de VR por parte de grandes corporaciones como Meta. Así comenzó un experimento de propiedad inmobiliaria basado en blockchain, que hace especial hincapié en la tenencia de contenidos manejada por el usuario.

La idea de construir una comunidad nueva, pseudo-autónoma, lejos de los males de la ciudad vieja (para Decentraland eso podría ser corrupción, centralización del poder, restricciones comerciales) tiene profundas raíces históricas. El modelo de Ciudad Jardín de Ebenezer Howard implantó un ideal consistente en un nuevo tipo de familia moderna. Esta viviría en estabilidad comunitaria, liberada de la congestión, la contaminación, la pobreza, en un estado restaurado de armonía con la naturaleza. Estos son los precedentes de la materialización de los suburbios que el historiador urbano Robert Fishman ha descrito como *bourgeois utopia* [utopía burguesa]. No se trata de una creación de urbanistas y arquitectos, como genios individuales que trabajan en aislamiento, sino que comenzó con la élite londinense a finales del siglo XVIII.²²⁴ Este movimiento se caracterizó por unos valores emergentes que dieron forma a un nuevo tipo de familia: una dirigida hacia el interior, con fuertes y exclusivos lazos personales, que buscaba escapar de las intrusiones del lugar de trabajo.²²⁵ El concepto inicial de suburbio, concebido por la planificación utópica como una alternativa inmaculada a la vida urbana, evolucionó de forma gradual y anónima, por prueba y error, a lo largo de doscientos años de historia

²²² La prueba de existencia utiliza la tecnología blockchain para verificar la existencia de un documento. Véase: Proof of Existence, [Link](#).

OpenZeppelin crea herramientas para desarrolladores y realiza auditorías de seguridad para sistemas distribuidos. Véase: OpenZeppelin, [Link](#).

²²³ Franco Zeoli, "Chatting With Blockchain Veteran Yemel Jardí", *Medium*, 6 de agosto de 2017. [Link](#).

²²⁴ El análisis de Fishman se basa en el conflicto inherente entre "burgués" y "utopía", ya que el primero implica materialismo y rechazo del idealismo. Esta paradoja es clave en la comprensión de este nuevo tipo de suburbio, que prioriza la propiedad privada y las familias individuales, a diferencia de otras utopías colectivistas.

²²⁵ Fishman, *Bourgeois Utopia*, 9.

moldeado por el colectivo de la clase media angloamericana. La vida doméstica era para el intenso centro cívico lo que la arquitectura pública era para la ciudad antigua.²²⁶

Ese modelo se convertiría entonces en el ideal a perseguir, con un apego emocional a la casa como materialización de nuevos valores culturales (ocio, vecindad, prosperidad) y de la idea de vida familiar.²²⁷ Los primeros modelos de este proceso fueron Londres y Manchester, y más tarde se adoptaron ampliamente en Estados Unidos y América Latina. La tecnología de la expansión urbana, la especulación del suelo y el amargo conflicto de clases favorecieron su desarrollo.²²⁸ Fishman sostiene que la caída de los suburbios comienza en 1945, cuando las tecnologías avanzadas permiten una red de superautopistas que fomentan su emancipación: deja de ser *suburbanización* para convertirse en una nueva ciudad de carácter autónomo. Los lazos con los núcleos urbanos más antiguos se debilitan.

Según esta definición, Decentraland podría considerarse una nueva instancia de los suburbios, que lucha por una comunidad armoniosa, distanciada una vez más del contaminado núcleo urbano, aunque dependiente de él. Una diferencia clave entre ambos es que, mientras que en la década de 1920 se requería una inversión importante para entrar en los suburbios (había que comprar un terreno y poseer un automóvil), el dinamismo del reino virtual baja la barrera de entrada: cualquiera puede pasear por el mundo independientemente de si posee o no un terreno o un auto. Si la familia moderna del siglo pasado invirtió los significados de núcleo y periferia, experimentó una domesticidad cerrada, se separó de las intrusiones del lugar de trabajo y creó un nuevo sueño colectivo de la casa ideal, la pregunta es ¿qué visión de la "armonía" persiguen los multijugadores?

IV.d Desafíos de priorizar las interacciones de tiempo real

Aunque la red Ethereum ya existía cuando los fundadores de Decentraland empezaron a experimentar con la idea original en 2015, el concepto estaba aún en una fase incipiente. Decentraland se prototipó entonces como una variación del código de Bitcoin.²²⁹ En esencia, los desarrolladores replicaron el código publicado por Nakamoto pero modificaron el formato de los datos de transacción. En lugar de transferir una moneda digital, en Decentraland los usuarios podían transferir tokens que simbolizaban píxeles en una cuadrícula 2D infinita. Estos tokens incluían metadatos que especificaban el propietario y los atributos de color de las coordenadas *x* e *y* de cada píxel. A finales de 2016, el equipo incorporó capacidades 3D a la cuadrícula y dio a los propietarios de las parcelas la oportunidad de asociarla a un

²²⁶ Op. cit., 3.

²²⁷ Op. cit., 10.

²²⁸ Op. cit. 14. El automóvil es la tecnología más evidente que fomentó la expansión urbana, pero muchas otras contribuyeron: las tecnologías de la comunicación (teléfono, televisión), los frigoríficos, los ferrocarriles interurbanos, aflojaron los lazos con el núcleo urbano. Véase: Fishman, *Bourgeois Utopia*, 186.

²²⁹ Hernán Zin. "La Prodigiosa Historia de Decentraland "¿Por Qué No Te Habré Hecho Caso? Podcast audio. Abril de 2022. [Link](#).

archivo de referencia que definía los modelos y texturas que se mostrarían en esa ubicación. Estos archivos seguían utilizando una versión modificada de la blockchain de Bitcoin.²³⁰ En 2017 Decentraland había migrado a la blockchain de Ethereum, que era cada vez más *mainstream* y permitía el uso de contratos inteligentes. Cuando Decentraland se lanzó por primera vez, no había DAO: es decir, la propiedad de los activos estaba descentralizada, pero las decisiones de gobierno las tomaban los fundadores y su equipo, en lugar de un mecanismo de votación.

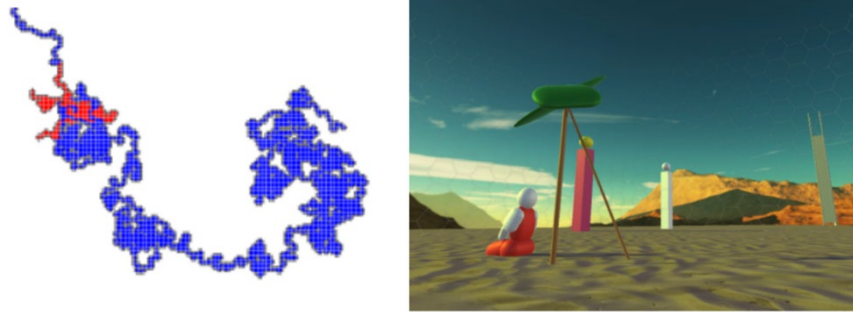


Figura 30: A la izquierda, el primer mapa de Decentraland, que muestra el estado de la ciudad. Los usuarios podían crear píxeles, transferir su propiedad y cambiar su color. A la derecha, una iteración posterior. Ahora los usuarios podían crear modelos 3D y aplicar texturas. Fuente: Esteban Ordano *et. al.*, "Decentraland Whitepaper". (2017).

[Link.](#)

Actualmente los jugadores pueden comprar una parcela o alquilarla para construir un escenario. Las parcelas pueden adquirirse en el mercado, conectando una billetera con la criptomoneda del juego llamada MANA. Cada escena ocupa un espacio finito. Se muestran una junto a otra para que los jugadores las recorran. Cada escena se compone de modelos tridimensionales. Los creadores de escenas pueden elegir los elementos que las compondrán de una biblioteca ya establecida o crearlos desde cero con Blender (una aplicación gratuita de modelado y animación). Algunos de estos elementos vienen con un comportamiento incorporado, que puede personalizarse para que las escenas sean interactivas. Por otra parte, los usuarios pueden crear, vender y comprar *wearables* personalizados (ropa, pelo, sombreros, gafas o cualquier tipo de dispositivo que se lleve en el cuerpo). La comunidad también organiza eventos diarios, desde conciertos a inauguraciones de galerías de arte, pasando por reuniones y lanzamientos de juegos.

²³⁰ Esteban Ordano, *et. al.*, "Decentraland Whitepaper". (2017). [Link.](#)

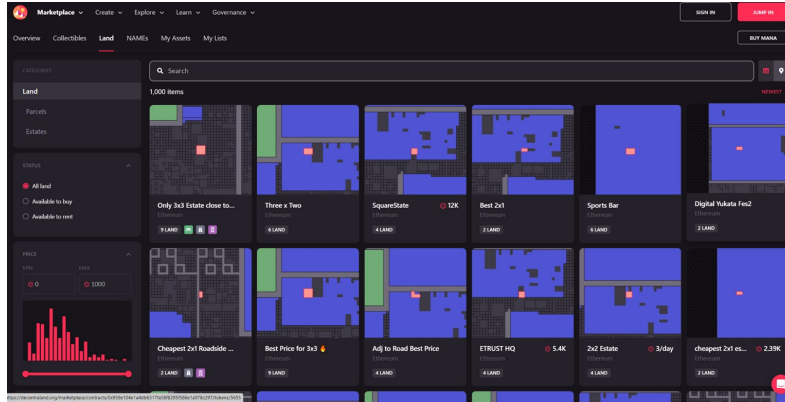


Figura 31: Captura de pantalla de la página web de Decentraland. Dispone de un mercado para que los usuarios compren y vendan sus activos. Fuente: "Marketplace", *Decentraland*, consultado el 06/06/2024. [Link](#).

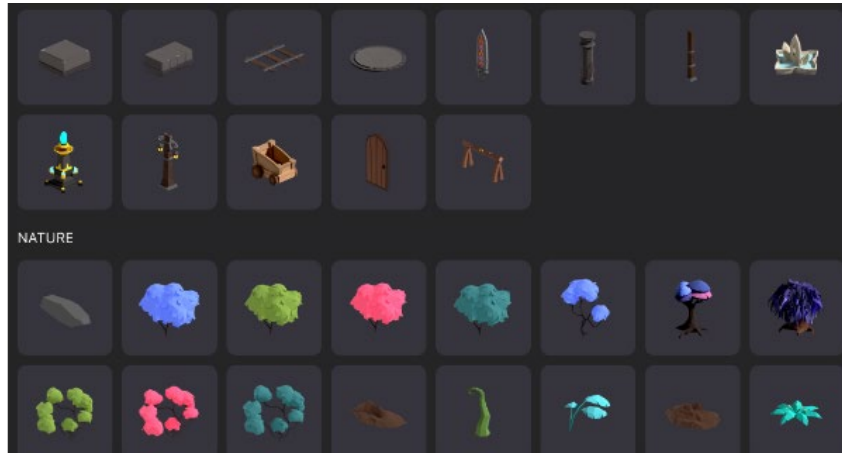


Figura 32: Capturas de pantalla del sitio web de Decentraland. Biblioteca de diferentes objetos ya construidos para que los creadores de contenidos los incorporen a sus escenas. Fuente: "Creador de contenidos". *Decentraland*. Consultado el 04/05/2024. [Link](#).

Los fundadores de Decentraland pasaron a nuevos proyectos, cediendo el control a integrantes de la comunidad a través de la DAO.²³¹ Los miembros de la DAO son usuarios que poseen tokens, pero cualquier persona con acceso a Internet puede pasear por la ciudad e interactuar con otros jugadores, aunque no tenga una billetera digital vinculada a su perfil. La decisión de fomentar la participación de los no poseedores de tokens se corresponde con la misión inicial de descentralizar el monopolio de la industria de VR. Esta filosofía se mantiene inalterada al transferirse la propiedad de los fundadores a la

²³¹ Ordano fundó Big Time Studios en abril de 2020.

DAO.

Al igual que CityDAO, la comunidad online de Decentraland utiliza el foro para publicar propuestas de mejora, la plataforma Discord para debatir temas específicos, las billeteras para verificar la propiedad de sus activos y Snapshot para votar las diferentes propuestas de asignación de fondos. Sin embargo, en lugar de implementar el voto cuadrático, en Decentraland el poder de voto se calcula a partir del saldo total de tokens asignados.²³² Esto permite que los usuarios con mayor inversión (ya sea financiera - tokens comprados con dinero fiduciario- o de tiempo -tokens ganados en apuestas o realizando servicios-) tengan más poder de voto en el proceso de toma de decisiones.

En 2021, en medio de la pandemia de Covid19 y del anuncio de Facebook de su visión del Metaverso²³³, un lote de 116 parcelas de terreno virtual en Decentraland se vendió por la cifra récord de 2,49 millones de euros en criptodivisas.²³⁴ Este hito marcó un aumento en la creencia (en retrospectiva, exagerada) de la relevancia que tendría el metaverso en los meses siguientes. En noviembre de 2021, una empresa inmobiliaria virtual compró un terreno en Decentraland por 2,43 millones de dólares.

En marzo de 2022, Decentraland organizó su propia semana de la moda y logró una asistencia total de 108.000 usuarios únicos durante cuatro días. El cartel incluía a diseñadores de renombre como Dolce & Gabbana, Tommy Hilfiger, COACH, Vogue Singapore, DUNDAS, Monnier Paris y Adidas. Esteé Lauder repartió 10.000 NFT. El evento también contó con la actuación de la artista musical Grimes. Empresas importantes como Samsung, Coca-Cola y Sotheby's también han entrado en Decentraland de diferentes maneras. Samsung abrió su tienda digital durante un periodo limitado para mostrar los últimos anuncios. Coca-Cola organizó un evento virtual en Decentraland con motivo del día del amigo, en el que presentó su primera colección NFT. La casa de subastas Sotheby's abrió una galería virtual en Decentraland y expuso a artistas famosos de NFT, para después organizar una subasta digital en junio de 2021.²³⁵

Sin embargo, la popularidad del juego disminuyó tras la caída del mercado de criptomonedas, lo que provocó críticas por falta de compromiso e informes que mostraban un tráfico de usuarios muy bajo.²³⁶ Los youtubers grabaron con humor su deambular por la solitaria ciudad. Otros usuarios con los que

²³² Un MANA equivale a un Poder de Voto (VP). Un NAME equivale a cien VP. Una parcela de terreno equivale a dos mil VP [Link](#)

²³³ Kari Paul, "Facebook announces name change to Meta in rebranding effort", *The Guardian* (2021). Consultado el 06/06/2024.

²³⁴ Los youtubers que hacen reseñas de mundos virtuales suelen incluir a Decentraland en su top ranking. Véase, por ejemplo: "TOP 5 BEST BLOCKCHAIN GAMES 2021 - 2022 [VR WORLDS] PLAY TO EARN" Youtube Video. Publicado por @ TheDigitalGoldToken. 27 de abril de 2021. [Link](#); "Los MEJORES METAVERSOS en 2023 | Descubre los mejores mundos virtuales en 2024 Qué es un Metaverso" Youtube Video. Publicado por @DaniCorrecaminos. 12 de febrero de 2023. [Link](#).

²³⁵ Carlos de Lanuza "10 Popular Brands Stepping Into the Metaverse", *DappRadar*, 11 de enero de 2024. [Link](#).

²³⁶ Sam Hamilton, director creativo de Decentraland, rebatió la forma en que se realiza el seguimiento de los "usuarios activos", ya que sólo se cuenta a las personas que interactúan con contratos inteligentes. Sostuvo que la plataforma tenía 8.000 usuarios de media al día. Cam Thompson, "It's Lonely in the Metaverse: DappRadar Data Suggests Decentraland Has 38 'Daily Active' Users in \$1.3B Ecosystem", *CoinDesk*, 7 de octubre de 2022. [Link](#).

intentaron interactuar estaban tratando de vender algo o completamente inactivos. Según un informe publicado en la revista de tecnología WIRED, de las 300 parcelas que figuran en el mercado, sólo 40 están ocupadas.²³⁷

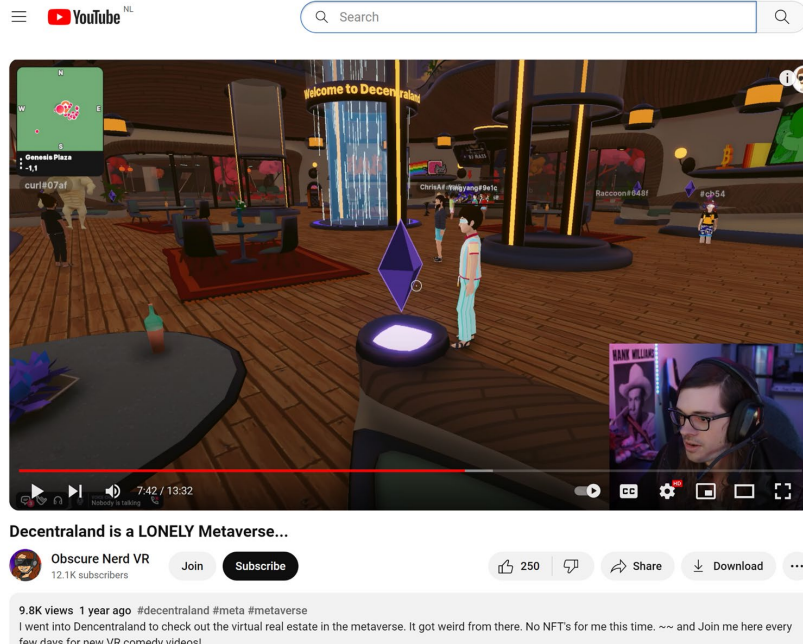


Figura 33: Captura de pantalla de youtuber navegando por Decentraland tratando de interactuar con otros usuarios. Fuente: "Decentraland is a LONELY Metaverse..." Video de Youtube. Publicado por @ObscureNerdVR. 4 de noviembre de 2022. [Link](#).

La disminución en la participación de Decentraland puede atribuirse a la migración de la comunidad de criptojugadores hacia otros mundos virtuales como Sandbox.²³⁸ Mientras que Decentraland se centra en la creación de arte y *wearables* –dirigidos a la comunidad de artistas–, Sandbox se diseñó inicialmente con fines de entretenimiento y, por tanto, ofrece una experiencia más relevante.²³⁹

La comunidad de jugadores suele caracterizarse por su interés en procesadores de alto rendimiento, tarjetas gráficas y abundante memoria RAM que permiten que los juegos más exigentes se ejecuten sin problemas y ofrezcan una experiencia inmersiva. Al intentar encontrar una alternativa al monopolio de la realidad virtual, Decentraland, sin embargo, dio prioridad a la ejecución dentro de un explorador de Internet. Esto significa que puede funcionar en cualquier computadora con acceso a Internet,

²³⁷ Eric Ravenscraft, "The Metaverse Land Rush Is an Illusion", *WIRED*, 26 de diciembre de 2021. [Link](#).

²³⁸ Sandbox se lanzó en 2021. Otros competidores son Roblox (no funciona con blockchain, pero también permite a los usuarios crear contenidos), W3rlds (diseñado específicamente para empresas), MatrixWorld (la preventa de Land comenzó en octubre de 2021), Vault Hill (lanzado en octubre de 2023).

²³⁹ Prakriti Chanda, "¿Cómo gana dinero Tether? USDT Ecosystem Explained", *AMB Crypto*, 22 de agosto de 2023. [Link](#).

independientemente del hardware. Además, su ambición era sincronizarse en tiempo real para facilitar las interacciones multijugador.²⁴⁰ Su estética de baja resolución demuestra que esto es una prioridad clara, ya que garantiza la compatibilidad con hardware que no sea de juego, a costa de la experiencia del usuario. Esta sincronización supuso grandes desafíos. Las experiencias multijugador basadas en exploradores suelen tener que garantizar que el estado del mundo virtual sea coherente para todos los jugadores, y lidiar con la latencia de la red (retrasos entre el momento en que un jugador realiza una acción y el momento en que esta acción se refleja en el mundo para los demás jugadores), la escalabilidad (garantizar una experiencia fluida, incluso con un gran número de jugadores uniéndose al mundo al mismo tiempo) y la interacción multijugador, entre otras cuestiones.²⁴¹

Además, Decentraland se enfrentaba a una limitación importante: los usuarios tenían que manejar herramientas básicas de código para la creación de contenidos, lo que la volvía inadecuada para su público objetivo, formado principalmente por no-desarrolladores.²⁴² La estética de baja resolución carece de atractivo para los diseñadores, que no priorizan las oportunidades que plantea blockchain. La figura 34 muestra la imagen del proyecto de la firma danesa BIG para un centro tecnológico en Taipei tras ser simplificado para adaptarse a las limitaciones del software. El diseño de Decentraland, supuestamente para alojar la sede virtual de Vice Media Group, es decepcionante según las críticas.²⁴³

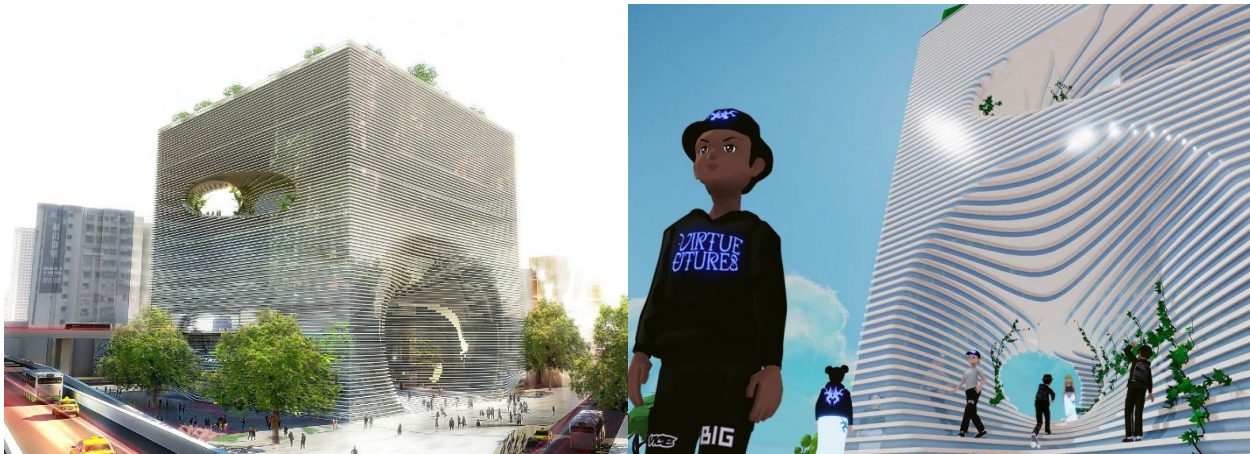


Figura 34: A la izquierda, un render de la sede de TEK. A la derecha, su adaptación para Decentraland. Las restricciones de materialidad del software hacen que el edificio pierda la transparencia del diseño original. Fuente: Catherine Warman "TEK by BIG", *Dezeen*, 4 de febrero de 2011, [Link](#).

²⁴⁰ Hernán Zin. "La Prodigiosa Historia de Decentraland " *¿Por Qué No Te Habré Hecho Caso?* Podcast audio. Abril de 2022. [Link](#).

²⁴¹ Otros incluyen la elección del protocolo de red correcto y el diseño de la arquitectura, pero estos conceptos son demasiado técnicos y escapan al alcance de esta investigación. Para más información al respecto Véase: Srushtika Neelakantam, "Building a realtime multiplayer browser game in less than a day - Part 2/4", *Medium*, 12 de junio de 2020. [Link](#).

²⁴² Ver: "How to Build for DCL | Wearables". Youtube Video. Publicado por @lowpolymodelsw. 2 de abril de 2021, [Link](#).

²⁴³ " Bjarke Ingels Group Disappoints with VICEVERSE decentraland architecture review" Youtube video. Publicado por @extraoffice7981. 18 de marzo de 2022, [Link](#).

En un intento por expandirse, Decentraland se dirigió a incluir a los no iniciados y no expertos en criptografía.²⁴⁴ La DAO reestructuró proactivamente el sitio web proporcionando definiciones exhaustivas de la terminología de blockchain y explicaciones para permitir la comprensión básica de los conceptos subyacentes. El flujo de trabajo de scripting, muy técnico, se sustituyó por funciones de arrastrar y soltar intuitivas y fáciles de usar, simplificando el proceso y haciéndolo más accesible. Se integraron tutoriales completos, reconociendo que la facilidad de acceso a los datos fomenta el compromiso con la plataforma. La DAO también aumentó su transparencia publicando informes y los códigos utilizados para generarlos.²⁴⁵ Se añadió una página de transparencia en la que puede consultarse el balance en tiempo real, junto con los nombres de los miembros de los distintos comités.

IV.e Cómo alinearse en el diseño de un mundo *ciberpunk*

Si Bitcoin City y CityDAO conforman una identidad dentro de su comunidad objetivo a través de los símbolos utilizados en sus imágenes (hitos arquitectónicos en el caso de El Salvador, la bandera en el caso de CityDAO), ¿qué factores informan las decisiones de diseño en Decentraland?

El mundo de Decentraland comprende 90.601 parcelas cuadradas, cada una de dieciséis por dieciséis metros, organizadas en una cuadrícula en forma de árbol cuaternario. Tiene una plaza central y ocho plazas adicionales que irradian desde ella a 45 grados. Dos ejes principales conectan las plazas de norte a sur y de este a oeste. Las cuatro plazas restantes están conectadas por cuatro calles en forma de cuadrado. Cada cuadrilátero formado por la intersección del cuadrado y los ejes principales tiene una organización ortogonal laberíntica. Su ambiente y atmósfera pueden describirse como una mezcla entre una estética low-poly –que recuerda a los videojuegos retro– y un mundo virtual futurista –con llamativas luces de neón–. Esta elección de diseño podría atribuirse a la intención de crear un sentimiento de pertenencia entre los usuarios. Al mismo tiempo, el uso de tonos llamativos crea un entorno visualmente estimulante que fomenta el compromiso de los usuarios y les incita a navegar por el espacio.

²⁴⁴ "Recap of Decentraland 2022", *Decentraland*, 2022. Consultado el 04/05/2024. [Link](#).

²⁴⁵ Yemel, "Decentraland DAO | Transparency", *Decentraland*. Consultado el 04/05/2024. [Link](#).



Figura 35: Mapa de Decentraland. Fuente: "Génesis City" *Decentraland*. Consultado el 04/05/2024. [Link](#).

Trevor Waldorf, miembro de la Fundación Decentraland, reveló los debates que tuvieron lugar durante el diseño del mapa de Decentraland.²⁴⁶ La cuestión principal era el rol que desempeñarían las calles en el entorno virtual. Mientras que en la vida material los caminos comunican de un punto a otro y caminar puede ser una experiencia agradable, el metaverso tiene otras reglas: los usuarios pueden saltarse puntos para acortar el tiempo de viaje, lo que hace que la navegación sea mucho más fragmentada. Esta navegación fragmentada espeja la experiencia de los suburbios del norte de Buenos Aires (y de otras ciudades latinoamericanas). En respuesta a la marcada polarización entre ricos y pobres, han surgido la expansión de los *barrios cerrados*, que ahora dejan de ser zonas meramente residenciales para abarcar enclaves cada vez más complejos con centros comerciales, escuelas, hospitales y hoteles. Siguiendo la dinámica del mercado, y aprovechando la falta de intervención estatal, se establecen como islas segregadas, con muros que las delimitan, en medio del mar de pobreza que las rodea.²⁴⁷

²⁴⁶ "Designing Genesis City: Roads & Urban Planning", Decentraland, 2018. Consultado el 06/06/2024 [Link](#).

²⁴⁷ Ver: Michael Janoschka, "El nuevo modelo de la ciudad latinoamericana: fragmentación y privatización" *Revista eure*, Vol. XXVIII, Nº 85, Santiago de Chile, diciembre de 2002, 26.

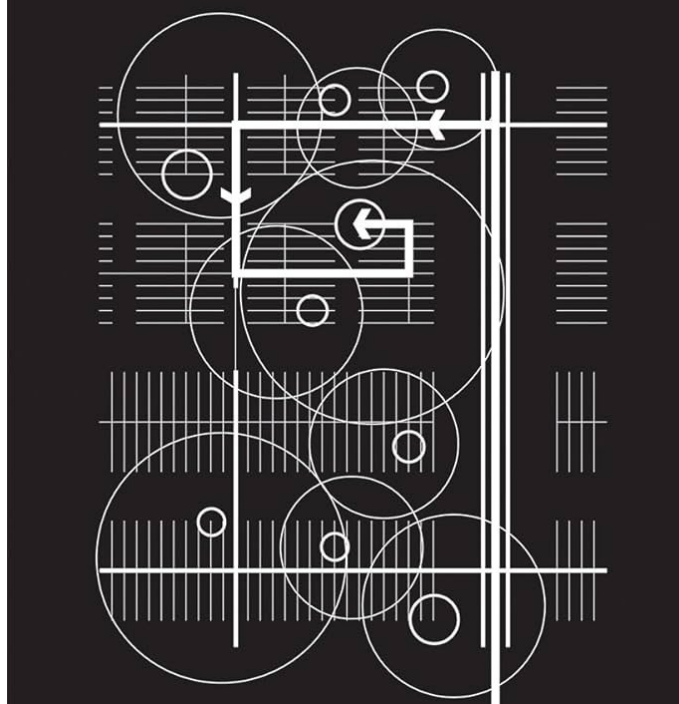


Figura 36: En su influyente libro de 1996 *Ladders*, Albert Pope exploró el complejo dialecto de la forma urbana compuesta por el crecimiento expansivo y las islas exclusivas, discontinuas y sin salida. Véase: Albert Pope. *Ladders*. (Nueva York: Princeton Architectural Press, 2015), 188.

Independientemente de esta fragmentación, las calles de Decentraland, al igual que en el mundo material, permiten descubrir contenidos –muy valorados por los desarrolladores–. Por tanto, los diseñadores partieron de la hipótesis de que la adyacencia a las calles aumentaría el valor del terreno. Del mismo modo, el centro era intrínsecamente más valioso que el resto, ya que todos los usuarios acceden al mundo por esta ubicación. En consecuencia, el trazado de calles fue una estrategia utilizada por los desarrolladores para contrarrestar este desequilibrio.²⁴⁸ La figura 37 muestra el mapa de calor del precio del suelo tras la subasta, que confirma esta teoría.

²⁴⁸ Además de distribuir las calles lejos del centro, otro punto que tuvieron en cuenta fueron las intersecciones viarias. Las intersecciones agregan variedad a la ciudad y mejoran la experiencia del usuario por dos motivos. Por un lado, aumentan la exposición de las caras de las parcelas y, por otro, restringen el número de parcelas que pueden verse en un momento dado. Waldorf escribe: "[T]o make the best use of roads we included as many intersections as possible, hence the crazy patterned roads in the quad and heavy use of intersections in the south". Véase: Trevor Waldorf, "Designing Genesis City: Roads & Urban Planning". *Decentraland*. 26 de febrero de 2018. [Link](#).



Figura 37: Mapa de precios de Decentraland. Fuente: Trevor Waldorf, "Designing Genesis City: Roads & Urban Planning". *Decentraland*, 26 de febrero de 2018. [Link](#).

Según el *whitepaper*, las parcelas deben ser contiguas a otras ya existentes y tener un número fijo de colindancias.²⁴⁹ El contenido de las parcelas contiguas es visible a distancia. Este principio establece un tráfico dirigido de usuarios, que, por su parte, se benefician al encontrar contenidos relevantes a través de su navegación. Los barrios (llamados distritos) permiten descubrir experiencias temáticas. Cada distrito varía en tamaño y suele tener un equipo directivo que coordina la comunidad. Treinta y nueve de ellos fueron aprobados, diecisiete de ellos se disolvieron en 2019, principalmente debido a la inactividad. Algunos de los distritos son: Aetheria (ciberpunk), Vegas City (casinos), Dragon City (barrio chino), Fashion Street (compras), University (educación).²⁵⁰

Cada barrio tiene su propia comunidad. Ciudad Aetheria es la más popular, con unas ocho mil parcelas. Pretende ser la mayor aglomeración ciberpunk.²⁵¹ Promueven la adopción de un escenario al estilo de 'Ready Player One', en referencia a la película de Steven Spielberg de 2018. Ambientada en 2045, la película describe un mundo en el que las personas escapan de sus duras realidades sumergiéndose en un vasto universo de realidad virtual. Este mundo ofrece un refugio convincente de sus vidas distópicas,

²⁴⁹ Ordano *et. al.* "Decentraland Whitepaper", 6.

²⁵⁰ Vea la lista completa aquí: ""Decentraland District Update", Decentraland, 2019. Consultado el 04/05/2024, [Link](#).

²⁵¹ El término *ciberpunk* alude a una visión distópica de la tecnología. En el mundo criptográfico, se está readaptando con el término "cyberpunk", que fusiona "cypher", como en código o cifrado, con "punk", que alude a la subcultura antisistema y del "hágalo usted mismo". Este movimiento aboga por el uso extensivo de la criptografía y las tecnologías que mejoran la privacidad para proteger los derechos individuales hacia una sociedad más abierta y descentralizada. Véase: Guneet Kaur, "¿Qué es el Cyberpunk?" *CoinTelegraph*, modificado por última vez el 5 de marzo de 2024. [Link](#).

mezclando tecnología avanzada con interacción social y videojuegos.



Figura 38: Imágenes de Ready Player One. A la izquierda, la ciudad de 2045; a la derecha, el universo de entretenimiento llamado OASIS (Ontologically Anthropocentric Sensory Immersive Simulation). Fuente: *Ready Player One*, dirigida por Steven Spielberg (Roma: Warner home video, 2018).

Inicialmente, todos los distritos tenían que seleccionar a sus líderes, que debían presentar un Plan Inicial de Distrito antes del 22 de junio de 2018.²⁵² Estos planes de puesta en marcha debían ser aprobados por el comité de Decentraland mediante votación. Los planes tenían que incluir cómo se iba a gobernar el distrito, cómo se iban a ejecutar las decisiones y qué miembros figurarían como titulares de la billetera del distrito que contenía los fondos. Tras la publicación de la campaña, se requería un mínimo de dos semanas y el voto mayoritario (51%) con su aprobación.²⁵³ También se presentaron planes iniciales de desarrollo y se convocaron concursos para alcanzar sus objetivos. Por ejemplo, en febrero de 2021 un concurso animaba a los jugadores a presentar una propuesta para un "escenario ciberpunk cool", descrito con humor como "un mundo distópico donde reina la tecnología, la vigilancia lo invade todo, un virus asesino arrasa la Tierra y la gente protesta en las calles a diario contra gobiernos de extrema derecha dirigidos por personajes mediáticos".²⁵⁴ Aunque este tipo de humor negro puede ser una poderosa herramienta para el compromiso comunitario y la expresión artística, también conlleva riesgos de malas interpretaciones o de refuerzo de estereotipos.

En su plan de desarrollo inicial,²⁵⁵ Aetherian City afirmaba que la ciudad se construiría en una sola planta, con gran énfasis en un edificio principal llamado el club Fractus, un edificio piramidal destinado a ser un enorme centro de entretenimiento y comercio. Algunos de los proyectos de ciencia ficción a los que hacen referencia para su estética general son: Kowloon Walled City, un asentamiento densamente poblado de Hong Kong, demolido en 1994; Neo-Tokio de Akira; Coruscant de Star Wars, el paisaje

²⁵² "Decentraland Blockchain Districts," *NFT Plazas*. Consultado el 04/05/2024. [Link](#).

²⁵³ "District Update: Leadership and Governance," *Decentraland*, 2018. Consultado el 04/05/2024, [Link](#).

²⁵⁴ "New Builder Contest: Cyberpunk 2021," *Decentraland*, 2021. A Consultado el 04/05/2024, [Link](#).

²⁵⁵ "Aetheria Initial Development Plan v3," *Decentraland*, consultado el 06/06/2024. [Link](#).

urbano digital futurista de Tron Legacy y la ciudad flotante de Columbia (véase la figura 39).



Figura 39: Arriba a la izquierda, Kowloon City; a la derecha, Neo Tokio; abajo, Coruscant de Star War; abajo, Tron Legacy. Fuente: "Diseño e implementación de Aetheria" *Decentraland*. Consultado el 06/06/2024. [Link](#).

Los propietarios privados pueden construir en sus parcelas, pero antes sus propuestas deben ser aprobadas por el distrito. Aunque "construye lo que quieras" es una filosofía general adoptada por los

comités de distrito, las propuestas pueden ser rechazadas. Blockchain se promociona como una vía hacia la ausencia de censura, pero que iniciativas como Decentraland la utilicen no garantiza una libertad absoluta. Las parcelas públicas, por su parte, son donaciones de inversores privados que contribuyen a proyectos públicos. Estas contribuciones les dan acceso a beneficios y recompensas (membresía que da acceso a salones exclusivos, acceso a fiestas y eventos privados, descuentos en productos digitales propiedad de Aetheria City).²⁵⁶ Esta dinámica añade una capa de complejidad al concepto de propiedad, ya que es a la vez individual (los jugadores poseen sus propios bienes) y compartida. Como ocurre en muchas ciudades contemporáneas, cuanto mayor es la popularidad de un distrito, mayor es el valor del terreno dentro de ese distrito. Sin embargo, no es habitual que los propietarios de terrenos en el mundo real contribuyan a iniciativas destinadas a aumentar la popularidad del barrio. En Decentraland, las ganancias pueden generarse rápidamente, lo que permite disfrutar con mayor rapidez el rendimiento potencial de la inversión.

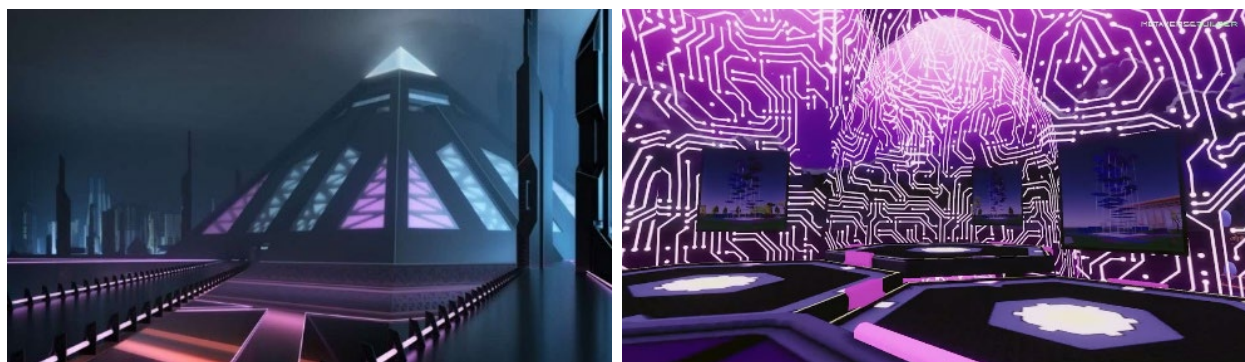


Figura 40: Distrito de Aetheria. Decentraland. Fuente: "Aetheria Design and Implementation" *Decentraland*. Consultado el 06/06/2024. [Link](#).

IV.f Los *influencers* como mercenarios de capital-multijugador

En resumen, Decentraland muestra que los contenidos creados y subidos al mercado sí pueden ser censurados, ya que pasan por un proceso de curación. El comité de gestión es sin duda más fácilmente accesible y auditable, pero no elimina por completo las posibles restricciones. Se permite la especulación con la tierra, lo que fomenta el individualismo, y los mecanismos de votación benefician a los jugadores con mayores apuestas. No obstante, se fomenta el fortalecimiento de la comunidad con medidas como el fomento de las donaciones a las parcelas públicas, el impulso a la implicación de los participantes mediante propuestas de mejora y la creación de normas para el bienestar de todos que el usuario debe cumplir. Este capital multijugador se ve reforzado por la elección de Decentraland de dar prioridad a ser

²⁵⁶ "Aetheria Design and Implementation," *Decentraland*. Consultado el 06/06/2024. [Link](#). Véase el Anexo d.

una experiencia basada en el navegador, a costa de la resolución y quizá de la participación: la accesibilidad masiva se prioriza frente a una experiencia inmersiva. Una mayor resolución quizá la haría más autónoma de la ciudad material. Al igual que la casa familiar de los suburbios de los años veinte, Decentraland sigue dependiendo de los núcleos urbanos: sus tokens tienen valor únicamente por su capacidad de ser intercambiados por moneda fiduciaria. Aunque el capital pueda poseerse de forma descentralizada, para que los usuarios puedan vender el contenido que crean, los artículos deben seguir promocionándose en los medios sociales tradicionales -Discord, Youtube, Instagram, Twitter-.

Este modelo de capital multijugador anuncia la aparición de un nuevo paradigma de mercado: un ámbito comisariado en el que se restablece la competencia. Si el ámbito familiar suburbano era exclusivo de la élite burguesa y luego se convirtió en el ideal de la clase media, debemos preguntarnos si el capital multijugador conlleva el peligro de glorificar a los mercenarios de hoy: los *influencers* que tienen más visitas y likes en las redes sociales. Esta cuestión queda abierta a futuras investigaciones, que invitan a profundizar en las implicaciones socioeconómicas y los cambios culturales impulsados por esta nueva forma de distribución del capital.

Lanzamiento

Esta tesis presenta un análisis del concepto emergente de criptociudades, explorando sus diversas definiciones, oportunidades, desafíos y riesgos. Inicialmente, el concepto se definió como una iniciativa de desarrollo que integra la tecnología blockchain en la gobernanza, la economía y/o las operaciones urbanas. Estas ciudades pretenden aprovechar las características de descentralización, transparencia y seguridad de blockchain para mejorar el compromiso cívico, agilizar los procesos de gestión y fomentar el crecimiento económico. La definición inicial se revisó y concretó posteriormente en función de tres casos de estudio –Bitcoin City, CityDAO y Decentraland–, cada uno de ellos con aplicaciones y promesas diferentes en cuanto al potencial transformador de blockchain en la sociedad, la economía y el medio ambiente. La narrativa excesivamente optimista que sostienen estas iniciativas tuvo que ser desplazada para revelar cuestiones históricas, teóricas y prácticas subyacentes dignas de mayor consideración.

Aprovechando las tecnologías para el crecimiento económico y la sostenibilidad, Bitcoin City pretende adoptar Bitcoin como moneda y emite bonos para su financiación. La denominación de estos "bonos volcán" revela la otra innovación tecnológica que supuestamente hará que esta ciudad esté libre de impuestos para sus residentes: se alimentará por energía geotérmica procedente de un volcán próximo y, por tanto, con cero emisiones. Esta estrategia de marketing enfatiza la imagen del país como pionero en la adopción de nuevas tecnologías –tanto Bitcoin como la extracción de energía geotérmica–. Aunque, bajo una mirada más detallada, estas tecnologías podrían no cumplir la ambiciosa promesa salvadoreña de crecimiento (es decir, ser el próximo líder financiero mundial) y de sostenibilidad (estar completamente libre de emisiones), el proyecto aún puede tener un impacto positivo. Bitcoin City adapta símbolos existentes para la creación de una nueva identidad para el país. En la búsqueda de esa nueva identidad, la ciudad podría promover el crecimiento como nuevo polo turístico, y poner a prueba las premisas de proximidad adaptadas del modelo de ciudad de 15 minutos, como instrumento para generar cualidades de resiliencia, inclusión y diversidad.

El concepto de tokenización de la tierra se exploró en el análisis del proyecto de CityDAO. La red Ethereum permite la creación de contratos autoejecutables que gestionan el gobierno de la tierra. Con la intención de eliminar a los agentes inmobiliarios como intermediarios, restringir el poder de decisión gubernamental de los permisos de construcción y la política, y reducir la corrupción, CityDAO experimenta con el aumento de la transparencia, la eficiencia y la accesibilidad a la compra de terrenos. Como se ha demostrado, la tecnología por sí misma no puede resolver estos problemas; el proyecto se enfrenta a desafíos técnicos y legales, que impiden a sus ciudadanos ser propietarios de los terrenos que posee la DAO. No obstante, aunque no se superen estos obstáculos, el proyecto genera una nueva forma de entender la ciudadanía, sin fronteras geográficas convencionales. Al ofrecer a los participantes la oportunidad de co-crear y administrar recursos comunales para el beneficio compartido, se fomenta un interesante experimento de acción colectiva y gobernanza; podrían desatarse nuevos potenciales si los

marcos legales evolucionaran en una dirección favorable.

Decentraland, analizado en el capítulo IV, explora la tokenización de la tierra de forma similar a CityDAO. Sin embargo, al ser totalmente virtual, se evitan los problemas legales a los que hace frente CityDAO, lo que permite una simulación más ágil de lo que podría ser una economía descentralizada. Por otro lado, el compromiso de los usuarios de Decentraland ha disminuido. Independientemente de que estos desafíos se superen, el modelo ilustra que la narrativa de las criptomonedas (resistencia a la censura, confianza, transparencia, inclusión, etc.) no debe defenderse ciegamente. Decentraland no es completamente autónoma, sino que depende de plataformas y divisas existentes no basadas en blockchain, por lo que sigue siendo susceptible (aunque quizás de forma restringida) a los mismos tipos de manipulación que se producen en las organizaciones centralizadas. Entre ellas se incluyen la corrupción, el engaño, el adoctrinamiento, la malversación y la cartelización. Una pregunta para investigación futura es qué mecanismos podrían ayudar a restringir la tecnología blockchain para evitar la transferencia exclusiva de poder a una élite tecnocrática capaz de operar sus dispositivos y funcionamientos.

Esta investigación ofrece una exposición metódica de la dinámica polifacética de las ciudades a través del comentario de las imágenes y la narrativa proporcionadas por las fuentes disponibles en línea. Este recorrido ha tratado de despojar la exaltación a menudo exagerada en torno a la criptocultura, buscando sus debilidades y promesas. Más allá de sus promesas exacerbadas y a veces idealistas, se detectan innovaciones significativas. Más que como ciudades del futuro, las criptoiniciativas urbanas se consideran ciudades de hoy, desplazando el foco de atención de *¿es esto deseable?* a *¿qué estamos deseando?*

Un desafío notable de la investigación es la inevitable proximidad del objeto de estudio, cuya definición cultural y espacial evoluciona rápidamente. Esta situación dinámica plantea el riesgo de que algunas observaciones realizadas aquí puedan resultar erróneas o incluso irrelevantes en un futuro próximo. Por ejemplo, en noviembre de 2022 comenzó un “invierno” de las criptomonedas, con los precios casi estancado hasta finales de 2023. Como consecuencia, muchos de los proyectos –tanto urbanos como de desarrollo de la tecnología– quedaron en suspenso o se ralentizaron durante el proceso de redacción de esta tesis. La dirección que tomarán estos proyectos o su validez a largo plazo siguen siendo inciertas. Además, mantener la precisión, objetividad y sentido crítico en los análisis técnicos resultó desafiante, dada mi limitada experiencia en el campo. La mayor parte de la información procedía de fuentes muy sesgadas (defensores o detractores), que fue necesario despolarizar, para discernir los hechos de las exageraciones y los riesgos reales del puro pesimismo tecnológico.

La tesis recurrió principalmente al estudio de la imagería visual y el lenguaje utilizados en la presentación de diversos proyectos de criptociudades, en un contexto en el que prácticamente no existe

un debate académico establecido sobre el tema. La investigación construye su tapiz a través de las aplicaciones prácticas que se promueven, los debates sobre la tecnología, así como un marco más amplio que abarca modelos urbanísticos tanto pasados como recientes. Al evaluar las oportunidades, los desafíos y los riesgos, la tesis promueve un diálogo informado sobre la intersección contemporánea entre las ideas urbanas recibidas y los avances de vanguardia en las tecnologías de contabilidad distribuida.

Como descubrimiento inicial, los tres modelos encontraron una intersección central en el uso de la ciudad como lugar para crear identidad y sentido de pertenencia para los posthumanos. Los posthumanos son múltiples y variados y se presentan en forma de chat, renderizadores de imágenes o contratos autoejecutables. Pueden incorporar valores sociales y culturales de larga tradición y pretender crear otros nuevos. Pueden reforzar las fronteras nacionales existentes, y también intentar escapar de ellas y rechazarlas por completo. Pueden rejuvenecer en espacios luminosos inundados de luz diurna y ejercicio, pero también pueden encontrar revitalización en clubes y entornos poco iluminados. Pueden alinearse con ideales de sostenibilidad, adherirse a tendencias veganas, meditación y bienestar, y también pueden desear viajar, frecuente y extensamente. Puede que quieran crear startups y luchar por la igualdad. Y lo que es más importante, el posthumano quiere todo lo anterior, inequívocamente, sin reservas y en simultáneo. Su urbanismo seguirá abarcando estas contradicciones inherentes, que se extienden más allá de la escala colectiva para manifestarse a escala individual. A partir de aquí, la investigación sugiere un debate matizado de cara al futuro, que valide la naturaleza polifacética y evolutiva de las experiencias urbanas posthumanas.

Léxico

Organización Autónoma Descentralizada (DAO): una organización que utiliza contratos programados, ejecutados automáticamente, para su gobierno. La DAO también puede definirse como una comunidad en línea con una cuenta bancaria conjunta, donde se requieren múltiples firmas para la liberación de fondos para diferentes propuestas de proyectos a ejecutar.

Gas: "Gas" es un término utilizado para describir el coste de alimentar una transacción o contrato en Ethereum. Se compone de dos partes: gas precio y gas límite. El precio del gas es lo que ofreces pagar a los validadores (en una pequeña medida de éter llamada "gwei") por cada operación para ejecutar el contrato inteligente. El gas límite es el número de operaciones que les dejas hacer antes de que se queden sin gas y abandonen la transacción.

1 gwei = 1/1.000.000.000 de un Éter.

Cuanto más alto sea el precio del gas, más rápido se procesará la transacción. Así que, para las transacciones más importantes, los usuarios suelen tender a aumentar el precio del gas ofrecido. El gas es como un sello que se necesita para enviar una carta o, como su nombre indica, como la gasolina que se necesita para arrancar un auto. Este nombre tiene el propósito de promocionarlo como una mercancía, en lugar de una inversión, para evitar problemas legales de tokens que se consideran activos por la Ley de Valores de 1933.

Minería (en Bitcoin): El nombre hace una analogía con el proceso de extracción de metales preciosos. Es el proceso por el que se extraen nuevas monedas del protocolo y se añaden al mercado. Redes de computadoras con un hardware muy específico compiten entre sí para adivinar un número complejo. Resolver este número requiere grandes cantidades de energía (el software tiene que probar muchas combinaciones), pero una vez que un nodo ha encontrado la respuesta es muy fácil para el resto de la red validarla como correcta. El ganador de esta carrera consigue añadir un nuevo bloque a la blockchain. A cambio de esto, los mineros obtienen Bitcoins recién acuñados, que actúan como incentivo económico para que corran.

Token no fungible (NFT): Un NFT es un tipo de activo digital que representa la propiedad o la prueba de autenticidad de un artículo o contenido único (como obras de arte, música, vídeos, objetos de colección o bienes inmuebles virtuales) en una blockchain. A diferencia de las criptomonedas como Bitcoin o Ethereum, que son fungibles y pueden intercambiarse una por una, las NFT son únicas e indivisibles, lo que significa que cada token tiene propiedades distintas y no puede intercambiarse de igual a igual. Las NFT suelen crearse y almacenarse en plataformas de blockchain como Ethereum, mediante contratos inteligentes (es decir, autoejecutables). Estos contratos codifican la propiedad y los metadatos del activo digital, proporcionando un registro descentralizado y transparente de su

autenticidad e historial de transacciones. El libro de contabilidad distribuido garantiza la procedencia, escasez e inmutabilidad del NFT, convirtiéndolo en una forma de propiedad fiable y verificable.

Peer-to-peer network (p2p): Infraestructura en la que varias computadoras están conectadas y comparten recursos. Los *peers* (pares) se comunican entre sí en igualdad de condiciones, lo que permite la computación distribuida, el intercambio de archivos, la mensajería y otras actividades de colaboración. Esta estructura descentralizada ofrece varias ventajas, como una mayor resistencia a los fallos, escalabilidad y menor dependencia de una infraestructura centralizada. Una red p2p puede concebirse como una cena grupal en la que todos los vecinos traen un plato para compartir. Una red centralizada tradicional es como ir a un restaurante donde hay un chef encargado de preparar toda la comida. Uno hace un pedido al chef y éste sirve el plato. En este escenario, si el chef está ocupado o no está disponible, no se puede servir la comida. En la versión grupal, a la inversa, cada persona del vecindario decide cocinar algo en casa y lo lleva a la reunión. Todo el mundo contribuye y consume. Si una persona no puede hacerlo o tiene algún problema con su plato, sigue habiendo una gran variedad de platos de distintos vecinos. Así, cada persona (*peer*) del vecindario (red) comparte y recibe comida (datos) directamente con los demás, sin chef (autoridad central).

Contrato inteligente: Un contrato inteligente es un programa, una colección de código, que reside en una dirección específica de la blockchain. Como cualquier otro programa informático, un contrato inteligente es una sentencia *si-entonces* definida por el programador. Cuando se cumplen determinadas condiciones (si), se ejecuta el siguiente paso del proceso (*entonces*). Uno de los principales usos de estos contratos es crear aplicaciones descentralizadas, pero también es una forma de establecer acuerdos ejecutables automáticamente entre las partes.

Token y tokenización de tierra: Un token es una representación digital o unidad de valor que puede crearse, almacenarse y transferirse electrónicamente. Aunque "token" suele utilizarse indistintamente con la palabra "moneda" en el ecosistema de las criptodivisas, no son lo mismo. Todas las monedas son tokens, pero no todos los tokens son monedas. Los tokens representan cualquier unidad de valor, incluidos terrenos, propiedades, derechos, documentos, certificados. En resumen, un token es un activo digital. La tokenización de la tierra consiste en dividir la propiedad de la tierra en porciones más pequeñas y negociables. Así, cada poseedor de estos tokens, estos activos digitales, tiene la propiedad o acciones de inversión en la tierra. A diferencia de los métodos tradicionales de compra directa de terrenos, en los que una persona o entidad adquiere toda la propiedad, la tokenización de terrenos permite a múltiples inversores adquirir una misma parcela en conjunto. Dado que las acciones de propiedad se registran digitalmente, se facilita la compra, venta y gestión de inversiones en bienes inmuebles.

Billetera: Una billetera virtual puede considerarse como un inventario de todos los criptoactivos. No es sólo donde se puede almacenar dinero, sino también cualquier tipo de token. Existen dos tipos de

billeteras: la primera, llamada *custodial*, es como entrar en una cuenta bancaria, donde los activos están asegurados bajo una contraseña, y el banco actúa como una autoridad centralizada para custodiarlos. Si el usuario olvida su contraseña, el banco verifica su identidad y le permite restablecerla. El segundo tipo, llamada billetera *self-custodial*, es fundamentalmente diferente porque no tiene una autoridad central que custodie los activos. Este tipo, en cambio, es más parecido a una caja fuerte. El usuario –o cualquiera que tenga la clave– tiene plena propiedad de lo que hay dentro, y las contraseñas no pueden recuperarse ni cambiarse.

En otras palabras, las billeteras *self-custodial* permiten a los usuarios gestionar sus propias claves, sin necesidad de terceros. Los usuarios tienen dos tipos de claves, una pública y otra privada, que son esencialmente una combinación aleatoria de números y letras. La clave pública es la que los usuarios comparten con otros para recibir e intercambiar tokens. No hay forma de averiguar, sólo con la clave pública, cuál es la clave privada. La clave privada es la que permite a los usuarios acceder a su billetera.

Web 3: Web3 es un concepto ampliamente adoptado entre la comunidad criptográfica con fines de marketing. Se refiere a una supuesta tercera iteración de Internet que incorpora tecnologías como blockchain e inteligencia artificial, permitiendo a los usuarios mantener un mayor control sobre sus datos. En esta narrativa, esta nueva versión mejorada difiere de la Web1, percibida en gran medida como estática porque los usuarios sólo podían visitar y leer contenidos, y de la Web2, la web que utilizamos mayoritariamente hoy en día, que permite a los usuarios interactuar entre sí a través de la mensajería y la creación de contenidos en plataformas como Meta, X, Google, etc. Aunque se comercializa como una evolución de la web, este concepto es ahistórico ya que todas las iteraciones coexisten y es posible encontrar tanto contenidos estáticos como interactivos en distintas plataformas.

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Anexo

A. Tablas – Ciudades Nuevas

Model	Cultural, Social, Economic Needs	Urban Strategies	Technological Components	Examples	
<p>15-min inute-city: Building safer, more resilient, sustainable and inclusive cities through an urban set up that ensures access to all basic essentials (living, working, commerce, healthcare, education and entertainment) at distances of maximum 15 min by foot or by bike</p>	<p>Source: Carlos Moreno</p> <p>Ecological sustainability: Promotes reduced use of energy-consuming automobiles</p>	<p>Optimal proximity: 15-min radii for residents to access basic services</p> <p>Optimal density: allows for the creation of locally based solutions e.g. energy generation, food supply and multiple use of available spaces</p>	<p>Adoption of mixed energy and technologies that facilitate optimal consumption of resources</p> <p>Real-time delivery of services encouraged through digital platforms</p>	Paris, France	
	<p>Social sustainability: Promotes social interactions and citizen participation</p>	<p>Creation of parks, squares and public places within neighborhoods</p> <p>Diversity in culture and people within the 15-min radii by ensuring sufficient housing for all urban residents</p>			
	<p>Improve quality of life in cities</p>	<p>Saving time wasted in traffic, thus more opportunities to exercise and gain social interactions</p> <p>Promotes healthier mobility strategies like walking and biking</p> <p>Less pollution</p>	<p>Novel digital innovations such as bike-sharing technologies, sensors to ensure safety and security of cyclists</p> <p>Wearables (including those gathering biodata) that allow people to keep tab of their health</p>		
	<p>Economic boost</p>	<p>Embracing diversity of opportunities within neighbourhoods promotes livability status and maintains property value</p> <p>Cultural diversity promotes wide variety of products, which would render an attractive urban landscape for visitors, promoting tourism and other related businesses.</p> <p>Increased employment opportunities due to diversity</p> <p>Reduced costs on fuel, road maintenance, health, etc</p>	<p>With technologies such as smart contracts through blockchain technology would help to ease security concerns, especially in regard to virtual payments</p> <p>Digitalization has made possible for people to work from home and communicate virtually</p>		
	<p>Bridge social inequalities</p>	<p>by improving accessibility to facilities</p>			
<p>Libertecture: Ideological frameworks like libertarian thinking (which convey ideas of personal liberty and unfettered market activity) can be made manifest in, and amplified by, specific spaces and architectural forms</p>	<p>Source: Rowland Atkinson, Liam O'Farrell</p>				
	<p>Deepening privatisation, financialisation and power-elite expansion in corporate and national settings</p>	<p>private cities: Founded on constitutional arrangements in which the development and subsequent governance of the urban territory are undertaken by a corporate, rather than public, entity.</p>	<p>voting or controlling shares by owner-residents and enabling individual residents to exit if standards or management is not deemed good enough</p>	<p>Neom, in Saudi Arabia</p> <p>Masdar City in the United Arab Emirates</p> <p>Telosa in the US</p> <p>Eko Atlantic City in Nigeria</p>	
	<p>Libertarianism advances the absolute primacy of personal freedoms and the desirability of reductions in, or total dissolution of, social bonds</p>	<p>residential exit spaces (such as gated communities or urban compounds); These developments deliver better services and urban districts by combining the spending power of residents to pay for private services that rival or exceed the quality of those services provided by public cities.</p>	<p>Creation of defensible bunker spaces that help preserve the material and social privileges while defensively isolating owners from the environmental and social consequences of the process by which wealth is accrued</p>		One Hyde Park in London
	<p>Withdrawal or negation of the state as either a legitimate or necessary institution, the prizing of individual liberty, and a celebration of voluntary association over what are seen as power relations founded on coercion.</p>	<p>portal-spaces (private airports or marinas);</p>			<p>London's five private airport</p> <p>Van Nuys airport in Los Angeles</p> <p>Prolific heliports in Rio or Mexico City</p>
	<p>Idealization of tax, work and regulation regimes that are compliant with the needs of capital, finance and the wealthy</p>	<p>fiscal lockers: spaces where tangible assets are held securely to withdraw from tax obligations and serve as a fiscal store of wealth that can guard against inflation and other risks</p>			<p>Freeport in Geneva</p> <p>Freeport in Luxembourg</p>
	<p>Libertarian utopian belief in the power of new digital technologies to disrupt markets, states and human societies and to create new opportunities</p>	<p>apeirotopias or infinity spaces (digital architectures, such as offshore bank accounts or elements of the metaverse);</p>	<p>Virtually reproduced iteration as a digital city for events and networking of professionals and investors</p> <p>Cryptocurrencies such as bitcoin enable flows and markets to exist ostensibly all without borders, limits, state controls or interference.</p>		Liberland, between Croatia and Serbia
	<p>escape and social exit</p>	<p>pioneer exclaves (such as seasteads or space colonies); 'citizenship' is conferred through the price of entering these spaces, and the high cost of which can be used to exclude undesirables such as the poor and troublemakers, who can be ejected back to land as a result of the application of residency conditions.</p>	<p>Libertarian ideas have been applied to exclaves of pioneers beyond the planet, in colonies on Mars, the Moon or in outer space.</p>		

Verna - Crypto-Cities

Model	Cultural, Social, Economic Needs	Urban Strategies	Technological Components	Examples
Eco - City: to achieve the best environmentally friendly performance	Source: Rachel Keeton			
	to achieve the best environmentally friendly performance	Reduction of car use and increased use of public transport	Renewable energy sources (wind turbines, solar panels, or bio-gas created from sewage)	Tianjin Eco-city, China
		Use of raw and local materials		Masdar City, UAE
		Dynamic economic cycle		Zira Island, Azerbaijan
		Reduction of waste, increased recycling		
	Marketing: Convey a political commitment to sustainable practices	Green everywhere		
	Water as an aesthetic urban component			
Political City: Construction of new capitals	Source: Rachel Keeton			
	To represent (national or local) government	Public buildings as representations of the ambitions: modern, dignified, and efficient.		Astana, Kazakhstan
	To present itself as modern, dignified and efficient	Clean slate: rejection of the existing, often crowded and chaotic historical city.		Naypyidaw, Myanmar
Enclave City: cities that target groups who want to be spared the difficulties of the existing cities	Source: Rachel Keeton			
	to offer retreat from the existing city to expats, party political elites, or simply the richest citizens.	Clean, safe facilities		The Blue City, Oman
	to cater a solution to the fear of the urban unpredictability	Built on virgin territory, far away from the compromised city		Saadiyat Island, UAE
				Songdo, Korea
				CamKo City, Cambodia
Shelter City: A city that provides housing or urban district for the masses	Source: Rachel Keeton			
	to host the masses who flood the cities from the countryside or other regions	Artificial environments have been created following the rules of the Experience Economy to enrich the residential environment, which consists of endless rows of standard flats, and to give it an identity.		Songjiang, China
	Provide better opportunities for work, fortune, freedom, safety	enormous concentrations of densely clustered apartment blocks, often developed by the state, often far from the city center, often lacking in facilities or employment, and often with an extremely bad reputation.		Bumi Serpong Damai, Indonesia
				Tin Shui Wai, Hong Kong
Charter City - City that operates under special jurisdiction (laws, policies, regulations) that are different from the national law	Sources: Paul Romer, Mathew McCartney			
	Provide an opportunity to developing countries to jump-start economic growth and development	Attract investors, businesses, residents by offering reliable infrastructure and an efficient regulatory environment		Honduras Zones for Employment and Economic Development
				Madagascar
				Panama Canal
Hackable City	Source: Martijn de Waal, Michiel de Lange and Matthijs Bouw			
	Democratic participation, transparency and accountability, resilience, inclusivity, enhanced quality of urban life, innovation and economic opportunity		Explores how digital platforms can be used to democratize the process of citymaking. These include platforms for collaboration, open data initiatives, prototyping and experimentation, among others	Buiksloterham, Amsterdam
				Bangalore, India
				Shenzhen, China
Powerpoint City - Cities that only exist in virtual presentations but never become tangible	Source: Moser Roy			

B. Bitcoin City

Bitcoin City Announced by Bukele

<https://www.youtube.com/watch?v=tqoJkVvKmy0>

Consultado 16 sept 2023



Bitcoin City & Bitcoins Bonds announcement by El Salvador's President Nayib Bukele



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Pour clôturer la BitcoinWeek, le 20 Novembre 2021 au El Salvador, le Président Nayib Bukele annonce l'émission d'obligations d'état qui serviront à 50% à l'achat de Bitcoin (pour 500 millions de Dollars) et à 50% au financement de la BitcoinCity avec des avantages fiscaux pour favoriser ...more

Auto generated transcript

wow
[Applause]
so
[Music]
[Music]
so [Music]
so
[Music]
[Music]
[Music] [Applause] [Music]

[Applause] right
well let me say some hellos i have to say this that's in protocol
so here's the vice president over there hello vice president over there yeah
he's the vice president of the country in the party the president of the assembly is also here where is he
ernesto
over there [Applause] yeah we have
some deputies over there ministers secretaries
here we have the participants and speakers of la bitcon where are you guys
great event how about the participants organizers and speakers of adopting bitcoin where are you
[Applause] our friends at bitcoin beach
[Applause]
where everything is started [Applause] and every bitcoiners
[Applause]
[Applause] germans
yeah okay i'm joking okay so let's see let's see

you remember on june 6 I sent a video to bitcoin conference in miami and we announced that El Salvador was making Bitcoin legal tender? That was June 6.

Then, on June 9th, the deputy's over here approved the bitcoin law in the assembly. A lot of us, 22 000 of us, will listen to it in Bitcoin spaces. We listened to the boat live and, you know, after that we had some attacks from the opposition. Believe it or not we have an opposition.

[Music] It's very small, but we do have one. They started complaining about bitcoin and they started this with the misinformation to the people telling Bitcoin was bad and, you know, you shouldn't use that currency because it's invisible: you cannot see it.

Yeah, exactly, they all follow. But, you know, still they're allowed to be full of it, so they started rallying some people. One percent of population is 70 000 people so it's a lot of people. They couldn't rally one percent but they can still rally like you know 0.1 percent. We had some protests. You see, they even burned an ATM full of usd, so... fine. The bitcoin was saved [Applause]

They just burned 30 000 US dollars. They couldn't burn the Bitcoin because it was invisible, right?

So they burn the ATM and everything but, do you see something? how many events that we had this week, like 40 events, right?

Did you see one protester? they can't rally anybody anymore.

I don't know because I don't know the exact number but I would think around 5 million salvadorans have the orange pills. How do I know that number? I don't know the exact number but I know 3.8 people use our wallet. I know bitcoin beach has a lot of users. I know the guys from strike have a lot of users too. There was number one app in El Salvador for like three months and a lot of people use other wallets Coinbase and, you know, a lot of wallets and yeah Moon wallet
yeah yours bite refill bit refill sorry bit refill yeah

So, uh, I don't know the exact number but if you add up thirty thousand Salvador's the wood bitcoiners before the law, the number could be way over 4 million. I don't know if it's 5 million, but you could say 5 million percent of the population. So it's very hard for them to find protesters. But, you know, so they couldn't do one in the whole bitcoin week that's good, right? yeah, but they're free to do it. That's good. Also, free country: they can protest. They can, you know, burn ATMs, fine. They have insurance. You can burn all of them, don't worry. So it took us like, June, July, August, September, it took us like four months to orange build everybody.

so that's fast, right? that's really fast. Yeah, exactly, the savior.
no beautiful salvador

Yep, so, um, you know, we demonstrated that Bitcoin could do a lot of good things. You know, in this conference in the Bitcoin the bitcoin that the american Bitcoin conference they sold some surfboards yeah and they sold them eleven thousand, seven thousand dollars, and all that money was going to the children's hospital.

yeah you know there were some other guys from Liberia. They donated one Bitcoin, right? They donated one full bitcoin for the children's hospital too. Yeah, that's right. And we're getting a lot of donations. We're building 20 Bitcoin schools which will be full of, you know, technology and everything. But also few economical education of the future –how did money evolve– but also the use of the pet hospital we're building. Yeah, so, we're building a pet hospital with, you know, our trust fund. Its made up of Bitcoin and Dollars so since the Bitcoin part is not worth more so the US dollar part. You can spend some of it and build that, and we announced it like in first days of October. We started building it in the last days of October and now we're doing the third floor. I asked, “when are you finishing that thing?” They said, “60 days, Mr. President”. I said, “yeah, that's fast.” El Salvador is fast.

Which country in the world will announce one thing one day, start construction four weeks later, and finish it 60 days later? El Salvador. That's right. So, you know, I was thinking, we're having this great event, with all these great people, and I was thinking we should do a great announcement. Right? But we already have Bitcoin as legal tender. So what could it be? It has to be something as good as that. At least so I was thinking: What do we do? Do we bring satoshi here? What do we do? Right? It's a little hard.

So I thought, you know, when Alexander the Great was conquering the world, they established this Alexandria and the whole point of the Alexandria. They were very small pieces of land. If you would think cities at that time, but they established 20 alexandria all over the empire and the idea was this alexander's not to cover the territory –which was immense–. The alexanders were actually very small, but the idea behind it was to these Alexanders be the beacons of hope for the rest of the world. That all of the world could be like that. Of course Alexander the Great died and the emperor divided. You know the rest of the story. But that was the idea. So I thought, you know, if you want Bitcoin to spread all over the world, we should build some Alexandrias, right?
[Applause]

So I thought, “well, we should build the first Alexandria here in El Salvador.” So we were thinking of building... no, not that, take that off, that's Chivo pets, so we were thinking of building... Bitcoin City
[Applause]

Over there, there you have El Salvador. You have the geothermal plant. Some people saw that you have that in Berlin and, right next to, well, close to there, you have the power plant. Close to there you have the Gulf of Fonseca, the second gulf. So why don't we build the city over there, in the second gulf, so, actually, what I was going to present to you is the building of nah filthy media Bitcoin City.

It's not just an idea, but it would actually be a legal, with municipality and everything. Probably run for mayor of Bitcoin City in the future.
[Music]

So what is Bitcoin City gonna include? Well it's going to be right there, in the front second gulf and it's got included everything: residential areas, commercial areas, services, museums, entertainment bars, restaurants, airport, port, rail.... Everything devoted to Bitcoin.
Can you put up the presentation of the Bitcoin City, please? yeah, not the logo guys [Applause]
[Music] [Applause]

So, there you go. Go back, don't show them guys, go to the beginning. A principio
yeah what's that that's oh it's yours
yeah it's from argentina oh it's wine thank you beautiful
[Applause] okay so that's the city

So that's Bitcoin City. It will be a circle that will encode a new volcano. It's not a new volcano, but a new volcano is not the same volcano there's power in the mine, it's another one. So, at the beginning we will power the city with the old volcano and the old uh power plant but then we will build a new one, right next to the city. The volcano will power the whole city and will also power the mining [Music]

So we will have a real volcano here, and the full city is going to be totally circled, except for the place of the volcano. In the middle you would have a huge plaza, which from the air you will look at as a bitcoin sign [Applause]

So you have everything: regulations, new economic policies, digital zones, the strategic location. That second gulf is shared by Honduras, Nicaragua and El Salvador.

Now the second gulf it's three countries, so this will be in an international area and the government will provide the land and the infrastructure. The public infrastructure, the economic areas, will attract investors that will contribute to the construction of the city. Of course, Bitcoin City is committed to free and equal access to everything. We'll have digital education and the social polycentric urban configuration, which has a small dent for the volcano. Nice feature. In the city we have digital and physical arts and culture, equality, infrastructure to the digital system, geothermal energy: they will power the entire city and bitcoin mining. Of course, it will facilitate business and technology investment, sustainable and efficient public transportation. I will not bore you with those things, but you have social amenities, residential, green areas. I mean it will be hugely technological but also huge to stay in the bowling green. That's nice, isn't it?

We're going to have industrial office space and also everything is going to be a digital environment. Everything has been taken into consideration: recreation, electricity, water treatment, waste management, etc. The airport will be 10 miles away and the port will be five kilometers away. It's just like three miles. The volcano, you know how it works: it powers the hot water steam that powers the turbine that powers the energy generator and then we have electricity. Crypto mining, warehousing, tourism, entertainment and culture and sports, everything clean, and coming from the volcano, of course!

That sounds nice and everything, but that would be the city... with time and private entrepreneurship and investment.. of course what if I had a company, a digital company, why wouldn't I want to be there, right? it's like logical for me and everybody that you have to be there, in the alexandria, right? Everybody wants an office space over there, so office space builders build something because you will have a lot of clients looking for office space and apartment builders build apartments because you have a lot of people looking for an apartment. Everyone in an apartment over there and that plastic was beautiful. Made up of a colored stone so you have orange and gray stone, you have that beautiful thing made up of stone so it will last for thousands of years. Not the buildings but the plaza itself would last for thousands of years. We're all gone, they will see that the plaza is still there, probably using it. Yes, that's from the air a little sepia here. That's bitcoin city!

But I'm not done. Bitcoin people say: "well, it looks fine, still, I'm fine in New York, Houston or, whatever, Miami and nice cities" No: you're not really. You want to live, exactly. You're moving here, look at the weather! I mean, we're in winter! yeah, that's winter! it's winter for you! Well, not winter but, you know, almost...

And Bitcoin City is in El Salvador, so bitcoin is legal tender. That's nice. We'll have zero income tax! [Applause]

Zero capital gains tax! That's all! See, invest here, make all the money you want. We're fine. Trade whatever you want. Zero property tax. I mean, if you're making a huge building you don't want to pay property tax for that, so you don't pay anything. It's your payroll tax, we want you to hire people, not to pay taxes for hiring people. Zero municipal taxes. Now you say, "okay, so who's gonna pick up the trash?" I'm gonna go into that... And zero co2 emissions because this is a fully ecological city. That's work and it's energized by a volcano. That is just right in the side of the city. So that's Bitcoin City everybody! [Applause]

So, you will say, "well, that sounds nice, but who's gonna pick up the trash?"

The only tax that you're gonna have in Bitcoin City is the value-added tax, normal value-added tax 10%, which you will pay for if you buy a coke. That value added tax will be used half of it to pay the bonds that we're gonna issue to build up the city, –so it's gonna pay for itself–, and the other half will be transferred

to municipalities so they clean up the trash, they keep the parks nice and they keep the city all neat and clean. So that would be the only tax, the value-added tax 10% value added tax
[Applause]

And that tax will be used to pay for the city and its interest, its public infrastructure, and to pay for the maintenance of the city. So the mayor will have that income so he keeps the city clean and tight and tidy. We'll start funding in 20, 60 days, after funding. No, no, we'll start funding in 2022, so the bonds will be available in 2022.

So, I'm thinking the public infrastructure will be around 10. No, sorry, around five. 300,000 bitcoins. Yeah, that would be the public infrastructure. And the private investment, that's unlimited. Now, we were talking about these bonds fully in the Bitcoin ecosystem and not the normal bond that we would issue in the New York Stock Exchange. So, we talked with my friend Samson. Where is he? Samson from Blockstream. Yeah, come on, yeah. Samson's right here
[Applause]

So, we were talking about building a park before, but that idea is gone. We're not building the park. I thought we are building the park. No, no, we're not. Sorry, maybe. So, we're gonna start with a small issuance to test the waters. So, I'm gonna give two minutes to my friend's house right here so he can explain what we're gonna do right now before issuing the city bonds. So, please, where is it? Yeah, presentation. It's okay, I can just start. Yeah, you start. So, this is a very historic moment. We're going to be issuing Bitcoin bonds. Do you guys like Bitcoin bonds? [Applause] And these bonds are amazing. The first one is going to be a billion-dollar bond, and what makes it a Bitcoin bond is because it's backed by Bitcoin. So, half of the billion dollars will go into buying Bitcoin. So, the president is going to mark it by 500 million dollars of Bitcoin. [Music]

That's awesome, yeah. We're gonna buy 500 million dollars in Bitcoin. We'll see. The other half will go towards infrastructure, specifically building energy infrastructure and Bitcoin mining. So, this is why it's going to be called the volcano bond, and this is going to be a series. So, this first bond is called the ebb-1 or El Salvador Bitcoin bond one, but there will be more.

The coupon is 4.5, but there's also a special Bitcoin dividend. So, of that 500 million that the president buys after a five-year lockup, they will start selling some of that Bitcoin to give an additional coupon, an additional coupon to all the investors in the bond. Now, if you think Bitcoin is going to go up, and we've modeled it out, so this is something we've been working on for months actually, conservatively, this is a guy that's important. 35 year-over-year is conservative, but at the end of the 10 years or in the 10th year of the bond, your APY will be 146 percent. So, the coupon is 6.5 for the first five years, and then it starts getting a Bitcoin boost. And I think this product is going to be incredibly attractive not only to Bitcoin hodlers, investors, people that have stable coins, but just normal people as well, like even from the traditional financial industry or bankers, because there's no instrument like this on the market. This bond will be issued on the Liquid Network, a Bitcoin side chain.
[Music]

And to make that happen, there needs to be a few things that are done. So, first of all, the government is working on a securities law, so law for digital securities, modern digital securities laws, and they will be issuing the first license to operate a securities exchange here in El Salvador to Bitfinex, to Paolo and his excellent team.
[Applause]

So, this is going to make El Salvador the financial center of the world, it's the Singapore of Latin America, and if the U.S. continues declining, all of North and South America. But this is a big first step, and you know with Bitfinex, they have a lot of whales, so I don't see a problem filling a billion-dollar bond. Um, there's a five-year lock-up on the bond, so that's half a billion dollars of Bitcoin taken off the market for five years. Now, if you do nine more bonds, that's ten bonds, that's five billion in Bitcoin taken off the market for ten years. And if you get ten more countries to do these bonds, that's half of Bitcoin's market cap right there. So, the game theory on these Bitcoin bonds is just insane. The first country to do it, which will be El Salvador, will have a massive advantage if Bitcoin at the five-year mark reaches one million dollars, which

I think it will.

They will sell Bitcoin in two quarters and recoup that 500 million dollars in three and a half quarters. They can get enough money to pay back the entire bond. I think that's pretty good. So, definition, the first countries that do this will have a massive advantage. This is the beginning of uh nation-state Bitcoin FOMO. Do you guys like that? [Applause] So if you guys want to invest in El Salvador, this is the easiest way to do it. It would be tied to citizenship too, so if you're investing in these bonds it's anything else: permanent residence, fast-tracking to citizenship. So, you might have thought when the Bitcoin law came out, how can I do it? How do I start? This makes it super easy: buy the bond and the rest takes care of itself. So, I'm running short on time, so I'll just repeat Jack Mallors: "We are here to change the world. We're here in El Salvador to change the world, and we are ready to die on this hill. All of us are ready to die on this hill." [Applause] Bitcoin is going to save the world, and it starts here in El Salvador. [Applause] No bras. So good. Oh, sorry, yeah, the wind. I went there now, yeah. Thank you. Thank you. [Applause] From Colombia. [Applause] Do you want to show the shirt? [Music] Free advertising here now. Send me some sets now, you know.

Like Samson said, Bitcoin is going to change the world. It has already changed, but it's going to change even more. And what a lot of people didn't know about the history of money. I won't tell the history of money, don't worry. But this is normal evolution. So it's not just a good or cool, or a nice idea. It's the evolution of humankind. So we're going there. You can't stop evolution. Now we just can't. It just happens. So it doesn't matter if we build Bitcoin City or not for the evolution of Bitcoin, or we issue some bonds, or if we do this event: it will evolve regardless because that's the way it is. But it's nicer if we are part of it. So it's nicer if we push it a little. It's nicer if we make it legal tender. It's nicer if we build a city or 10 cities or 20 cities like the Alexandrias. So, you know, it's nicer. It doesn't have to be that way, but I think it's going to be better if it is that way. So, at the end, it's for us. It would be nice to be the financial center of the world. Yeah, it sounds cool for us. So it doesn't matter probably for Bitcoin but yes, it matters for us. And I think we can make it even better and we can push the future even forward.

So for some reason, if you believe in God, if you don't believe in God, nature, the universe, for some reason we're all here right now, in Misata Beach, in El Salvador having fun, watching these projects, looking into the future. It's nice to be part of it, isn't it? So, you know, let's all be part of it and let's all push the future even forward. Thank you guys! Have fun! We love you everybody! For the surfers out there. [Music]

C. CityDAO – Ley 38 del Senado de Wyoming

17-31-106. Articles of organization.

(a) The articles of organization of a decentralized autonomous organization shall include a statement that the organization is a decentralized autonomous organization, pursuant to W.S. 17-31-104, and shall set forth the matters required by W.S. 17-29-201.

(b) In addition to the requirements of subsection (a) of this section the articles of organization shall include a publicly available identifier of any smart contract directly used to manage, facilitate or operate the decentralized autonomous organization.

(c) Except as otherwise provided in this chapter, the articles of organization and the smart contracts for a decentralized autonomous organization shall govern all of the following:

(i) Relations among the members and between the members and the decentralized autonomous organization;

(ii) Rights and duties under this chapter of a person in their capacity as a member;

(iii) Activities of the decentralized autonomous organization and the conduct of those activities;

(iv) Means and conditions for amending the operating agreement;

(v) Rights and voting rights of members;

(vi) Transferability of membership interests;

(vii) Withdrawal of membership;

(viii) Distributions to members prior to dissolution;

(ix) Amendment of the articles of organization;

(x) Procedures for amending, updating, editing or changing applicable smart contracts;

(xi) All other aspects of the decentralized autonomous organization.

17-31-109. Management.

Management of a decentralized autonomous organization shall be vested in its members, if member managed, or the smart contract, if algorithmically managed, unless otherwise provided in the articles of organization or operating agreement.

Figura 3: Captura de pantalla de la Ley 38 del Senado de Wyoming. Fuente: "SF0038 - Organizaciones autónomas descentralizadas". (2021) [Link](#)

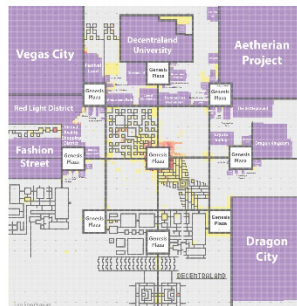
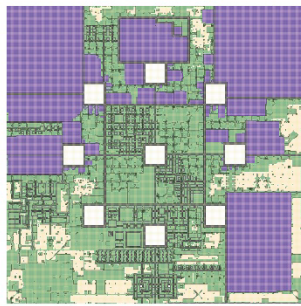
D. Decentraland – Aetheria Development Plan



Map of the District

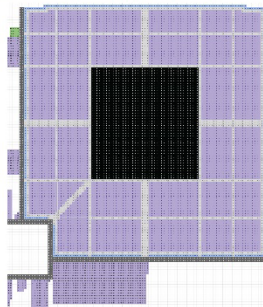
This map is not finalized. It has gone through several revisions, with some input from the original district proposal's leadership team. More changes will occur before and after the allocation process.

Aetheria currently has 10,005 LAND parcels which will be placed in an area roughly 100x100 square. The final layout of roads, walls and the central pyramid will be adjusted based on Aetheria stakeholder feedback.

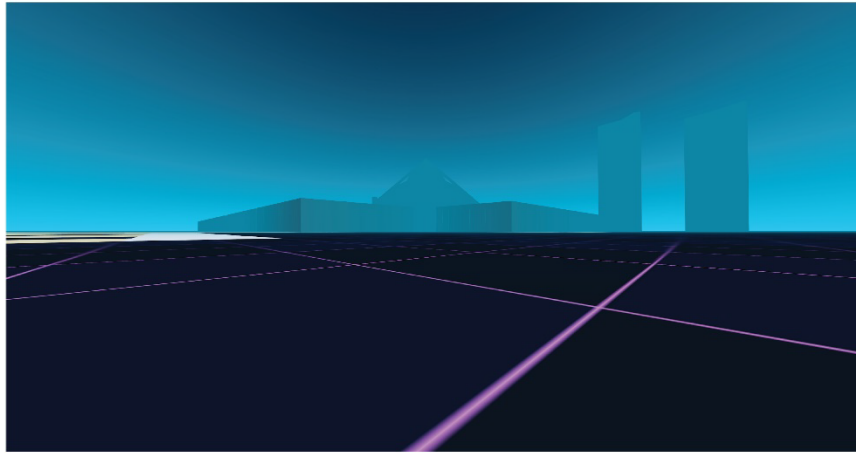


[Position of Aetheria in Decentraland](#)

[Districts and auctioned LAND](#)



[Proposed District Map](#)



[Visualization of Proposed Map \(View in VR\)](#)

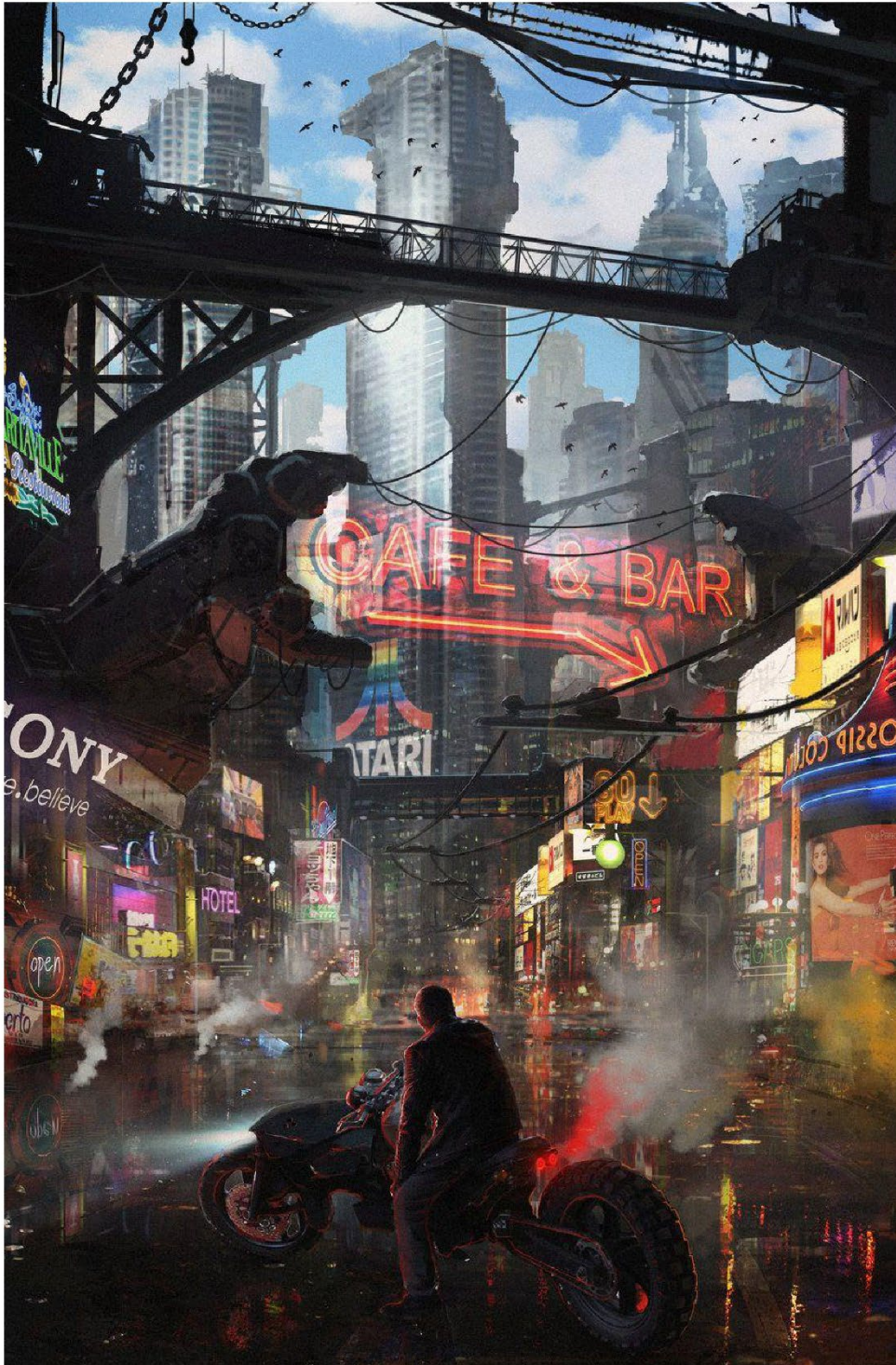
District Composition

Initially, Aetheria will be built on a single ground level, focused largely on the Fractus club, roads and public lands, plus commercial development.

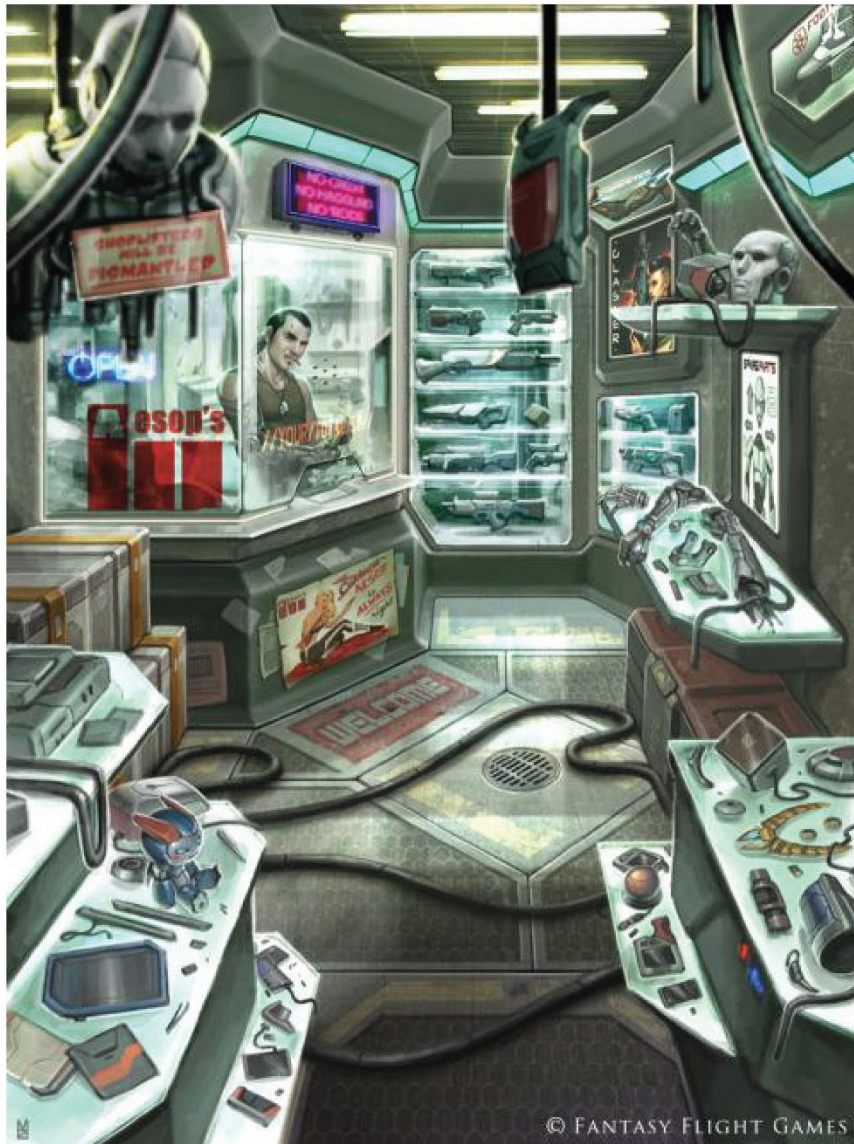
The general aesthetic would be modelled after a futuristic version of [Kowloon Walled City](#), a large densely populated settlement in Hong Kong which was demolished in 1994. It will be combined with inspiration from other megacities in the cyberpunk, sci-fi and fantasy genres such as Akira's [Neo-Tokyo](#), Star Wars' [Coruscant](#), the futuristic digital cityscape in [Tron Legacy](#) and the floating city of [Columbia](#).

Initial Ground Level - Commerce

This is the main ground level which exists at ground level or perhaps 20 metres above the Undercity. The main entrance to Aetheria might be elevated by ramps so visitors can easily access commercial shops, bars and restaurants and the Fractus Club. Overhead may be seen monorails, platforms and roads connecting various parts of future upper levels.







Possible Additional Future Levels

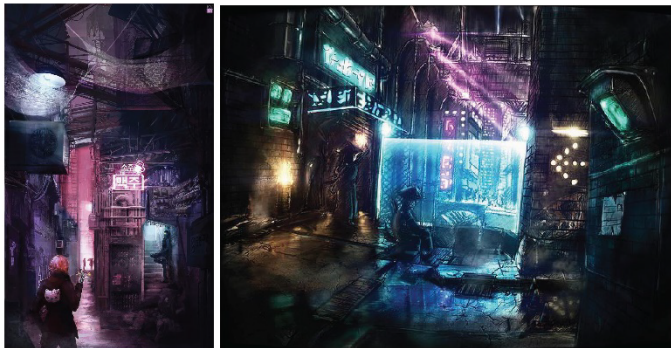
In the future, if and when Decentraland's land use technology and the limits allow, The DAO may choose to build the district into multiple levels stacked on top of each other. This would require builds on parcels to follow more specific aesthetic guidelines.



Basement Level - The Crypt

The dirty, seedy underbelly of Aetheria. All shady dealings in our cyberpunk world go on here. Characters and shops exist in holes in the inner wall, canals and alleyways at the bottom of the city. This is the oldest part of the city, and contains the original foundations and marketplaces that Aetheria was built on.

Underneath the pyramid of the Fractus Club is an exclusive basement level for members only. Access to the undercity must be obtained by elevators, pathways and stairways.



Level 1 & 2 - Upper Levels

Private apartments, exclusive bars and the upper levels of the Fractus Club exist here, 40 - 60 metres above the Crypt Level. A network of platforms connect various apartment stacks, and flying taxis to various parts of the city can be arranged here. The outer wall of Aetheria extends to this height.



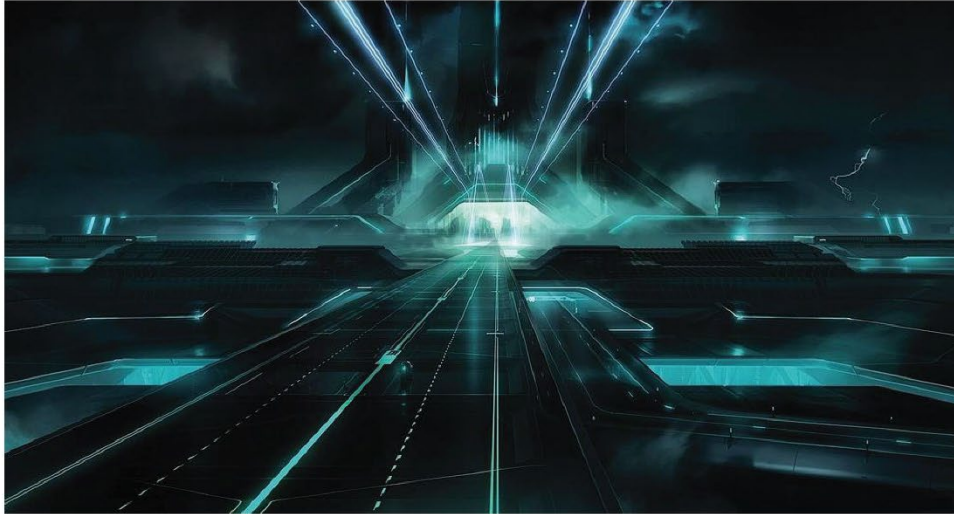
Level 3 & 4 - Flying City

A grand, futuristic flying city exists at this elevation, 80 - 100 metres above the Crypt Level.



Level 5 - Floating Platforms

A series of floating 8x8m platforms, covering the tops of the district. Holographic forcefields connect the platforms and act as walkways between them.



Land Structure and Allocation

A total of 10,005 LAND parcels were contributed to Aetheria.

The district will be comprised of LAND parcels allocated for private use, as well as public LAND for public works such as walls, roads and the Fractus Club.

All LAND tokens will be frozen by Decentraland to district Primary District Wallets for a time of at least one year. As elaborated in the Startup Plan, it is the intention of Aetheria that the district LAND will be held permanently in Aetheria's Primary District Wallet, with public and private land use allocations based on Decentraland and Aetheria smart contracts. The future DAO once formed will elaborate land use policy. More governance details are provided in the Aetheria Startup Plan.

LAND Leases, Rentals, and Build Delegation

- Although the long-term ownership of the land is held by the district, Decentraland may provide smart contract functionality for leases and for delegation of build/upload rights. If so, then Aetheria will employ these, together with additional smart contracts as may be needed for management by the DAO, to allow short or long term leases and rentals of land to private parties. The initial allocation to private parties will be determined in the Allocation Event.
- The Aetheria DAO may choose to create fungible or non fungible tokens to assist in the management and transfer of leases and of build rights, but financial transactions in the district will be based on the tokens supported by Decentraland – Mana and possibly Ethers.
- For tax purposes, any reporting of financial gains or losses from private use or transfer of plot rights will be the responsibility of the holder in their country and/or state of jurisdiction.
- In the future, any LAND plot not contributed for public works may be rented out using the [Decentraland LAND Manager](#). This grants a paying tenant access to publish to LAND plot in exchange for recurring payments of MANA.



District Composition

Note: all references here to numbers of parcels are visionary. The actual allocation will be determined by the allocation event.

We anticipate building the Crypt Level early in the development of Aetheria. We envision a possible breakdown of LAND parcels somewhat like the following:

Public

- Public pathways: 1445
- Fractus Club: 2025
- Walls: 383
- **Total: 3853 max**

Private

- Private plots - **Total: 6152**

LAND Plots

Plots of LAND will be 10x10m, with the following height ranges for various vertical parts of the city according to specific aesthetics:

- Crypt - 20m high level
- Ground - 20m high level, positioned directly above the Crypt Level
- Upper Levels - 2x 20m high levels for the Aetheria Rising Age
- Flying City Basement
- Flying City Upper Levels
- Floating Platforms - 30m above the Flying City Upper levels

Exact height limits are to be confirmed as the Decentraland team have not given full confirmation if height limits will be enforced.

Walls & Roads

Specific public LAND parcels will be allocated for roading and walls, as per the currently [proposed district map](#). If and when we can support upper levels in the district, some of these roads might be adapted into ramps to allow access to those levels.

Fractus Club

This pyramid shaped building will be the central "jewel" of the district and will be a massive hub of entertainment and commerce. Space will be provided for this public project by members contributing their LAND to its construction, with additional benefits such as exclusive apartments in the Club and [Stakeholder](#) membership tier in the district as described later in this

document. Exact implementation of these rewards will be investigated after the initial MVP build of the district. It is intended that this club to be a driving force of visitor traffic to the district. For owners of private LAND, they will receive bonus incentives such as exclusive club access and discounts for making a 1m buffer zone for walkways around their groups of LAND plots so visitors can easily move through the district. The exact nature of these incentives are still to be decided.

LAND Allocation Model & Registration Form

- There will be an online Registration Form distributed to those who contributed LAND to Aetheria to register their preference for LAND plot adjacency and whether or not they would like their LAND to be used for public works during the initial construction of the district. The form will be run off-chain for performance and cost control.

Benefits for Donating Public LAND

Contributors putting LAND towards public projects will get access benefits and rewards along the following lines, with the final details subject to the technology, buildout roadmap, and DAO policy. Public LAND contributions are considered donations and are non-refundable:

- Members-only lounges and areas
- Viewing Parties for Events (MLG streams, Soccer streams, etc).
- 50% extra bonus from minigames within Fractus Club (when scripting is available in the future)
- 50% discount on digital goods and automated services owned by Aetheria that require MANA, where Aetheria is developing the smart contracts for these. Privately owned goods and services will not be discounted.
- Exclusive access to the future stakeholder-only lounge with great views above the nightclub floor. When it becomes technically possible, this lounge will be on its own private chat instance for stakeholder meetings which will be held here.
- An exclusive owned apartment of a size and placement within the district in relation to the number of LAND parcels contributed. The exact size and placement will be determined at a later date.

Distribution Event Timeline

Exact times and dates for this timeline will be released in the future.

Phase One - LAND Registration

1. This Phase begins after the Startup Plan has been ratified and the technology needed for the registration has been created and well tested.
2. A countdown begins two weeks before the registration event and is visible on the Aetheria homepage at aetheria.io. Announcements will go out on



[#aetherian_announcements](#) and [#District_Aetherian_project](#) Rocket.Chat channels, as well as [Twitter](#).

3. During the countdown, contributors having specific projects they would like to build on their plots should prepare project proposals describing how they will arrange and develop them.
4. The registration event begins, and runs for two weeks, in which LAND contributors to the Aetheria district may register to put their LAND into public or private plot types, according to the maximum public LAND cap listed earlier in this document. Contributors may set the split of their LAND plots when they fill out the **Registration Form** during the event. This form will collect basic contact information such as email address, and all contributors will be asked if they support Aetheria's Initial Development Plan. For private plots contributors will be asked to provide a short description of what they plan to build with their LAND and an optional link to a full project proposal, as well as the desired parcel arrangement and size for their project(s). Suggested common plot arrangements will be listed, allowing contributors a greater opportunity to swap with others during **#5 of Phase Two**. No actual placement on the map will occur just yet - this event is so Aetheria's District Leadership team can receive an indication of how much public space it will have to work with. **The order of form submissions during this time does not affect your future priority for placement within the district.** Contributors will have up to 2 weeks to fill this form out and can do so at any time during this period to accommodate everyone's schedules. LAND pledged for Public plots is considered a donation to the district and will not be reallocated in the future. Note that allocation to private use does NOT mean transfer of the ownership of the Land tokens, rather it means using the Decentraland smart contracts to allow the private party to control and use the land. If a LAND contributor does not fill out the form the district will assume that they wish their LAND to be allocated for public works and LAND tokens will not be allocated for their private use.
5. After two weeks the registration event ends.
6. The Leadership Team will adjust the district map layout to accommodate the number of pledged public LAND plots. If we do not reach enough contributions towards public plots, we will adjust the layout of the district to work with what has been provided, with priorities being placed on pathways and roading. The size of the Fractus Club pyramid will also be adjusted to compensate. The adjustments to the map will reflect the spirit of the original layout proposed in this Aetheria Initial Development Plan document.
7. A revised district map will be presented to the community for feedback for one week.
8. After one week feedback closes for the revised map.

Phase Two - placement

1. Aetheria's Leadership team and core contributors will be invited to a planning meeting to receive early placement on the map. This will be done over a real time conference call, taking into account for any larger projects that people have planned.
2. Projects with the most well thought out project plans will be invited, too - these will need a full project proposal to be eligible for consideration. Our goal is to provide assistance to the projects with the best utility and benefit to the district as it grows. This will in turn likely raise the foot traffic, patronage and value of nearby LAND plots and the district as a whole. These projects will be added to the placement map ahead of time, with links to their respective proposals.
3. An initial layout of the remaining contributors plot arrangements will be finalized by the District Leadership team using a combination of random and manual placements to ensure that everyone can be placed and that no holes are present. In the event that not all plot arrangements fit, we will contact specific contributors about their placement and ask if they are happy to adjust their arrangement layout, in exchange for priority placement ahead of time into the district.
4. The development of the LAND placement form and the establishment of a means to use the Aetheria Primary Wallet will be finalized before the final placement event can begin.
5. A countdown begins two weeks before the placement event and is visible on the Aetheria homepage at aetheria.io. Announcements will go out on [#aetherian_announcements](https://twitter.com/aetherian_announcements) and [#District_Aetherian_project](https://twitter.com/District_Aetherian_project) Rocket.Chat channels, as well as [Twitter](https://twitter.com/aetheria).
6. The placement event begins, allowing the remaining contributors of privately-allocated LAND to select their placement on the district map, based on previously indicated parcel sizes. This will be viewed as a 2D map, similar to the one that was available during Decentraland's Terraform Event. Initially, contributors will be offered a specific placement in the district as described in #3. If a contributor does not like their placement, they can register their plot arrangement(s) to be added to a swap pool, from which they may select another plot arrangement and start an automated swap with another contributor placed elsewhere in the district. Each plot arrangement can only be swapped for plot arrangements of the same size and layout and each plot arrangement may only be swapped up to 2 times.
7. After 4 weeks, the placement event ends. All swaps are final.



8. Aetheria's Leadership team will release the final map data showing placements, and will begin allocating LAND.
9. Private LAND allocations will be made by a combination of smart contracts and/or tokens.

Aetheria Initial Build - Minimum Viable Product (MVP)

- This is the initial MVP build of Aetheria and the Fractus Club. We will work together to create a compelling district with a focus on buildings and environments to explore, according to Aetheria's aesthetic guidelines.
- We will commission several prefab building configurations that can be placed on LAND plots for users who do not wish to build on their allocated LAND from scratch.

Governance

- See the Aetheria Startup Plan for details.
- Aetheria's Leadership team and later its Board of Directors Leadership will retain full authority over the development of all public LAND, guided by policy from the future DAO when it is created.

Community Curation

- We will investigate mechanisms to aid users in reporting offending content within the district and will work with the Decentraland Team to ensure that various parties rights are respected and laws are abided by.
- Mechanisms for removal of offending content may be implemented in the future by the Decentraland Team.

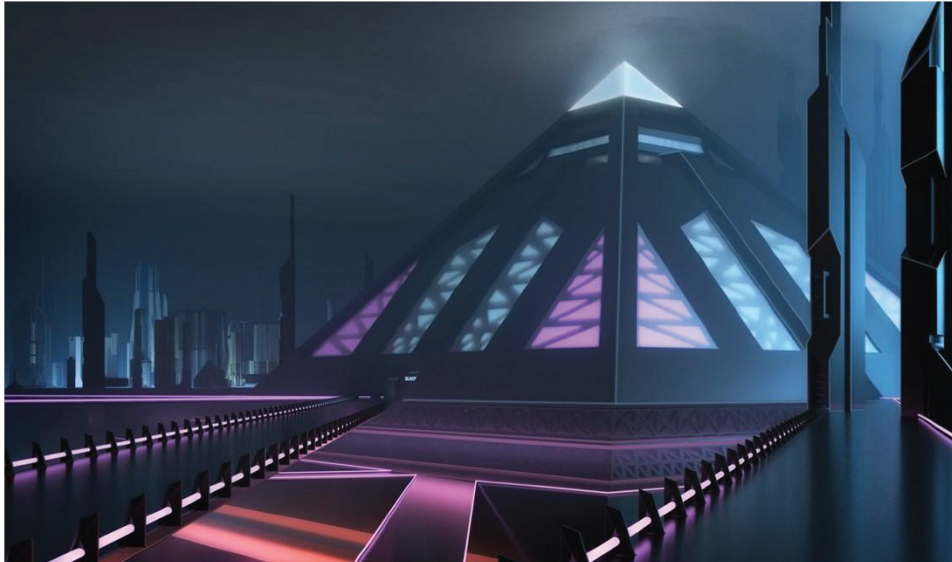
Public Facilities and Content

Facilities and Venues

Aetheria has a variety of facilities and venues that members and visitors can utilize. We expect to fund the development of these through some combination of an initial contribution of funding from Decentraland, contributed work and content from the community, and possible future fundraising efforts.

Fractus Club

A central building, referred to in the original district proposal as a massive black pyramid, based on The Black Sun from Snow Crash. View the [Fractus Club Pinterest board](#) for some ideas for art direction. We will also be approaching artists from the Aetheria community to see how they might envision the club and its interior.



Fractus Club Proposed Membership Structure

Membership in the Fractus Club will have multiple tiers enabling access to different areas. The following is not a final and exhaustive detail of what membership entails and may be subject to change at any time before the final membership structure is agreed on by Aetherian leadership in consultation with contributors who stake LAND for public projects during the Aetherian Foundation Age. Future membership policy will be guided by the DAO. The exact organisational structure of the club will be subject to future consultation of legal professionals to determine the best approach for this. All perks listed below are subject to change, pending legal confirmation.

Vouchee

A vouchee is the membership given to all Decentraland users. This membership comes with rights to enter Fractus Club but they will not be able to participate in almost any of the functionality of the interior of Fractus. This level of membership is primarily used as a means to



tour the facility and give them an opportunity to see what it has to offer before paying for a membership. Functionality of the nightclub that would be disabled under this membership is to be decided.

Member

This level of membership is a paid membership. A user of Decentraland can pay a predetermined amount of MANA to be able to join Fractus as a member. This would give them access to all base level content (all of which will be chosen at a later time) which would consist of things such as:

- Members only lounges and areas
- Viewing Parties for Events (MLG streams, Soccer streams, etc).

For the higher forms of membership, areas of exclusivity and perks are still to be finalized.

Contributor

Contributor membership will be given to the individuals who are helping develop Fractus and as well as other parts of Aetheria. This may also include contractors. Perks are:

- 50% extra bonus from minigames within Fractus (when scripting is available in the future)
- 50% discount on digital goods and automated services owned by Aetheria that require MANA, where Aetheria is developing the smart contracts for these. Privately owned goods and services will not be discounted.

Patron

This membership will be roughly the same as contributor but will be given to individuals who have donated LAND to public projects including Fractus during Aetherian Foundation Age. Perks are:

- Exclusive access to the future stakeholder-only lounge with great views above the nightclub floor. When it becomes technically possible, this lounge will be on its own private chat instance for stakeholder meetings which will be held here.
- An exclusive owned apartment of a size and placement in relation to the number of LAND parcels contributed. The exact size and placement will be determined at a later date.
- All previous perks

Crypto-cities

History and future of urban models in the era of distributed ledger technologies (ca.2020)

Universidad Torcuato Di Tella

Escuela de Arquitectura y Estudios Urbanos

Maestría en Historia y Cultura de la Arquitectura y la Ciudad

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distributed ledger technologies (ca.2020)

Inés Verna

Director: Julián Varas

July 2024

Universidad Torcuato Di Tella

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Director: Javier Agustín Rojas

Abstract

The thesis dives into the study of crypto-cities by exploring three ongoing projects: Bitcoin City, CityDAO and Decentraland. Their narratives, spatial structures and organization are examined to establish a diagram that encompasses thematic, geographic and chronological aspects. With the aim of organizing and commenting the available material, the analysis is based on the images and discursive propositions generated by each project's authors. Inscribing these initiatives within a long-range urban lineage, the central question driving the research is: What is new about the projects for crypto-cities and what continuities can be traced with urban models of the past? The hypothesis is that, given the intense polarization around blockchain technology and its ideological weight, revisiting the historical framework and establishing interconnections will contribute to an insightful perspective, stripped of the euphoria displayed by both its promoters and critics.

Acknowledgements

This thesis was born during the pandemic lockdown as my guilty pleasure: trapped in the network of hyperlinks, it unscrupulously enabled the absolute loss of the sense of time, when time seemed to be the only thing there was. It became my shield, armor, in my hectic voyage, facilitating (but also hindering) the heartbreaking self-discovery that every trip endures. In that journey it was my backpack, my heavy companion; my bridge to Buenos Aires; my development log; my north-lacking compass; portal to the transdisciplinary. It was the liquid structure of a cultural and linguistic map. It was a shelter in the mourning of a love that was not; a hindrance in one that begins.

In this destabilizing path, I would like to thank, above all, Julian, for his rigor, accuracy, openness to a foreign subject, which he diligently made his own. For his guidance and encouragement in the formation of my critical thinking. Thank you for your time, patience, flexibility, insistence, effort, professionalism and commitment.

To UNStudio (Gerard, Crystal, Harlen): for prompting me to complete the research, and for providing me with the resources for the final wording. To Pietro Scarpa and Harlen Miller: for their generosity in my professional growth, for being my confidants, mentors, whose conversations –about blockchain, technology, architecture– were deeply inspiring.

To the professors of the master's program, in particular, Pablo Elinbaum and Guillermo Jajamovich, for their reading of an incipient draft, whose feedback were decisive in refining the approach. To Adriana Amante, for stimulating me with the indicated literature and writing exercises, even when the topic seemed to be cryptic. I came to realize in her workshops that the way I live in English, academic, cold, almost robotic, is very different from the way I live in Spanish, noticeably more frantic. First written in English and then translated, this thesis is the first step in the exploration of a dual voice: Adriana validated that search even before I did.

To my parents and sister, who cheered me, understood me, nurtured me, hosted me with love, always propelling me to finish. To my network all over the map, especially Gabriela Trattenberg, Sol Batistti, my friends from Lincoln (including Sarita), my cousins, my colleagues from UTDT who, each in their own way, helped me gain perspective to decipher my e-motions in the writing process. To Sonia Boustani, Ignacio Dostal, Candela Galarza, Luciana Capozzoli, Jose Miguel Polanco, Jennifer Namm, Liva Sadovska, Rahul Girish, and Julia Durand, who made of this city my home. To Federico, who empathized with my prioritization of this thesis with humor and affection. During these last very intense months his light energized me for the final sprint.

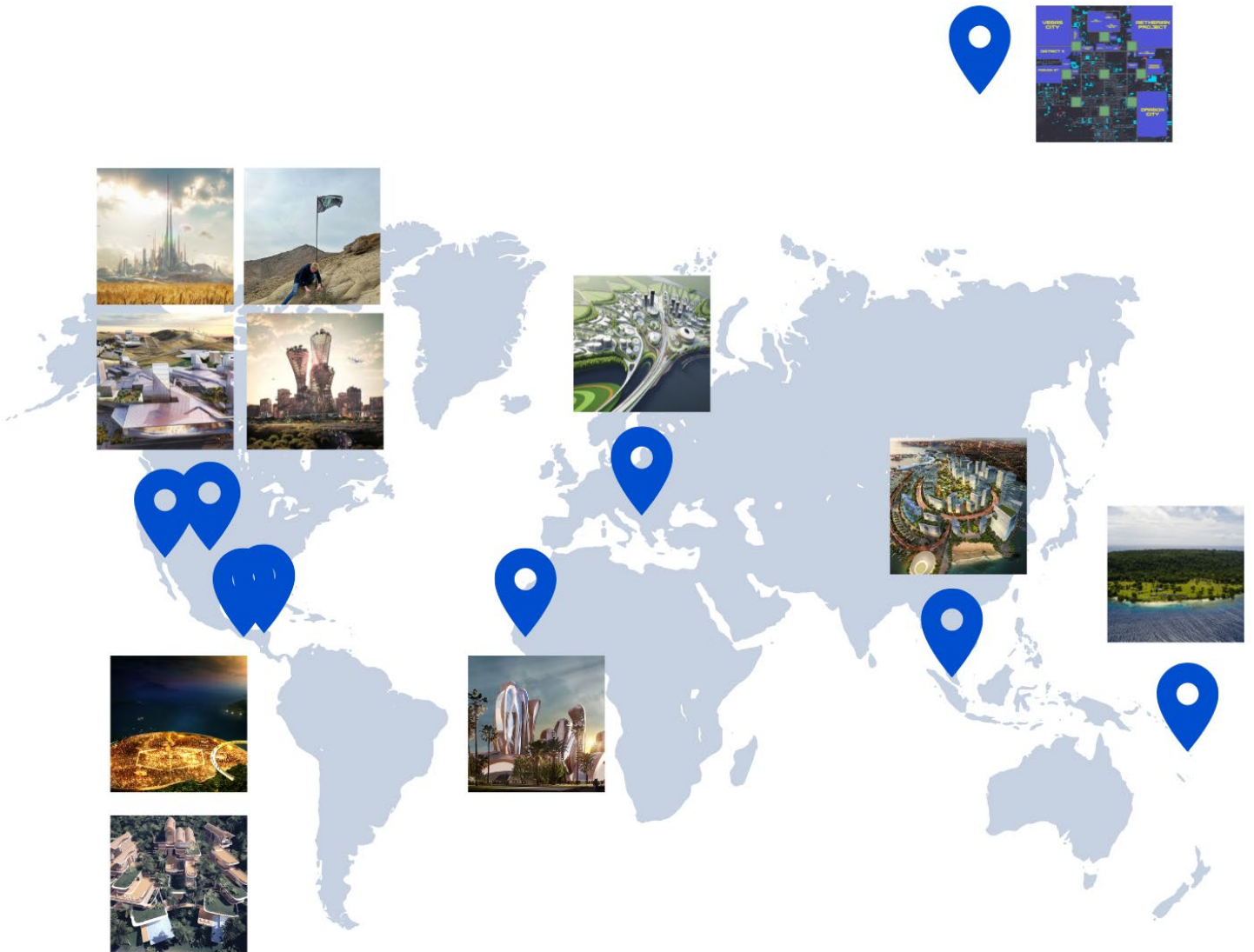
Abbreviations

AI	Artificial Intelligence
BTC	Bitcoin
DAO	Decentralized Autonomous Organization
DLT	Distributed Ledger Technology
ETH	Ethereum
IoT	Internet of Things
NFT	Non-Fungible Token
P2P	Peer-to-Peer

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Opening

Cryptomania

Discussions on crypto have become increasingly central to the daily feeds of global news and public debates, shifting what had emerged as an underground culture to a mainstream agenda and source of concern for governments, corporations, and individuals. Amidst a frenzy of unpredictable developments, both bear markets (in decline) and bull markets (rising), have put the fluctuations of crypto currencies on the headlines of major news outlets with an alarming sense of relevance and urgency. As price goes up, new investors want in and early adopters boast. When it is wintertime, skeptics double down on their critiques. However, if price volatility is intrinsic to mainstream cryptocurrencies, that dynamic represents only a very small part of the overall picture played by crypto within the evolutionary landscape of contemporary digital technologies.

On a 2008 cryptography discussion mailing list, an anonymous participant or group using the pseudonym Satoshi Nakamoto published Bitcoin's whitepaper announcing: "I have been working on a new electronic cash system that is entirely peer-to-peer, without a trusted third-party validator"¹. Thus emerged Bitcoin as a criticism of the traditional monetary system² and its known associations with the ideology of techno-libertarianism,³ which promotes it as a way towards individual freedom and autonomy.

Having been designed specifically to withstand attacks seeking to destabilize it, Bitcoin has evolved in less than two decades into a broad array of applications, from contraband to social justice, as various ideological groups scrambled to appropriate its potential. For instance, in 2011 an online marketplace named Silk Road was launched to facilitate the sale of illegal goods and services (drugs, fake IDs, hacking tools); later it was used for raising money for the Ukrainian resistance in the Russia-Ukraine war, circumventing financial blockades by states. Likewise, the cases WikiLeaks⁴ and Sci-Hub⁵ illustrate politically legitimate (though polemical) uses for the technology.

¹ "The Next Big Thing. Or is It?" *The Economist*, May 7, 2015. [Link](#)

² Joshua Davis "The Crypto-Currency. Bitcoin and its mysterious inventor" *The New Yorker*, October 10, 2011.

³ Techno-libertarianism is a political and philosophical ideology that combines elements of libertarianism with a strong belief in the importance of technology, particularly digital technologies and the internet, as a means to promote individual freedom, privacy, and autonomy. It has its roots in the libertarian and cyberpunk movements of the late 20th century. It emerged as a response to the rapid growth of digital technologies and the internet, along with concerns about government regulation and corporate power.

⁴ WikiLeaks has published more than ten million censored documents involving war crimes, spying, violation of international treaties and corruption. Joshua Dávila, *Blockchain Radicals: How Capitalism Ruined Crypto And How To Fix It* (London: Repeater Books, 2023), 40.

⁵ Sci-Hub is a website that provides free access to millions of scientific research papers and academic articles. Its purpose is to provide access to those who cannot afford expensive subscriptions. Harvard's Faculty disclosed that the university allocated \$3.75 million annually towards academic journal subscriptions, with the authors of the purchased articles not benefiting financially from the sales of their publications. Dávila, *Blockchain Radicals*, 47.

Importantly, with the creation of the first digital coin in 2008, what in fact emerged was the combination of several technologies, today commonly denominated under *blockchain*, of which Bitcoin is only a special application. Blockchain is a system that guarantees the reliability of digital transactions by means of time-stamping the data. Its theory was first developed in 1991 by Haber and Stornetta⁶, and was proposed for a first attempt of a digital currency BitGold⁷, considered to be Bitcoin's predecessor.

The applications of blockchain go beyond the limited scope of techno-libertarianism and its stakeholders.⁸ Experiments on the blockchain also include supply chain management, healthcare, and voting. Within the current governance system, regulatory bodies around the world are exploring its use for various purposes, such as improving public services, enhancing transparency, and reducing fraud.

This investigation invites the reader to suspend the preconception that the crypto space is being shaped by and tailored primarily for the right. While discussions often revolve around the likelihood of crypto becoming mainstream, the following chapters intend to show that blockchain technology has the potential to upset cultural and social conventions, and so question contemporary ideas of what a city can be.

But what is blockchain technology? Literature on the subject is usually technical in nature and hard to follow for the non-initiated. I have therefore attempted to minimize the use of esoteric terms, or to offer explanations when they are unavoidable. A glossary can be found at the end for further reference.

Here is an initial definition of a blockchain: it is a digital ledger, i.e., a digital "book" that holds records sequentially using encryption. Moreover, this ledger is distributed, which means that there exist numerous copies of it, rather than it being kept in a lock controlled by a central administration or authority.

⁶ Haber, S.; Stornetta, W.S. "How to Time-Stamp a Digital Document" *Journal of Cryptology* 3,9-111 (1991).

⁷ BitGold is an attempt at a digital currency, developed by Nick Szabo in 1998. It was only a theoretical postulation that was never implemented. It mentioned the idea of a data chain, but lacked the economic incentive for the various nodes of the network to function. See: Nick Szabo, "Bit Gold," *Unenumerated* (blog), December 27, 2008, <https://unenumerated.blogspot.com/2005/12/bit-gold.html>.

⁸ Not all distributed ledgers are, like Bitcoin, public and accessible. They can also be designed as privately permissioned, which means that additions and modifications of data require permissions from a centralized administrator. Estonia is one of the most cited examples of blockchain governmental applications. For further information on this topic see David Rozas Silvia Semenzin, Samer Hassan, "Blockchain-based application at a governmental level: disruption or illusion? The case of Estonia," *Oxford University Press* (April 2022), 1-16.

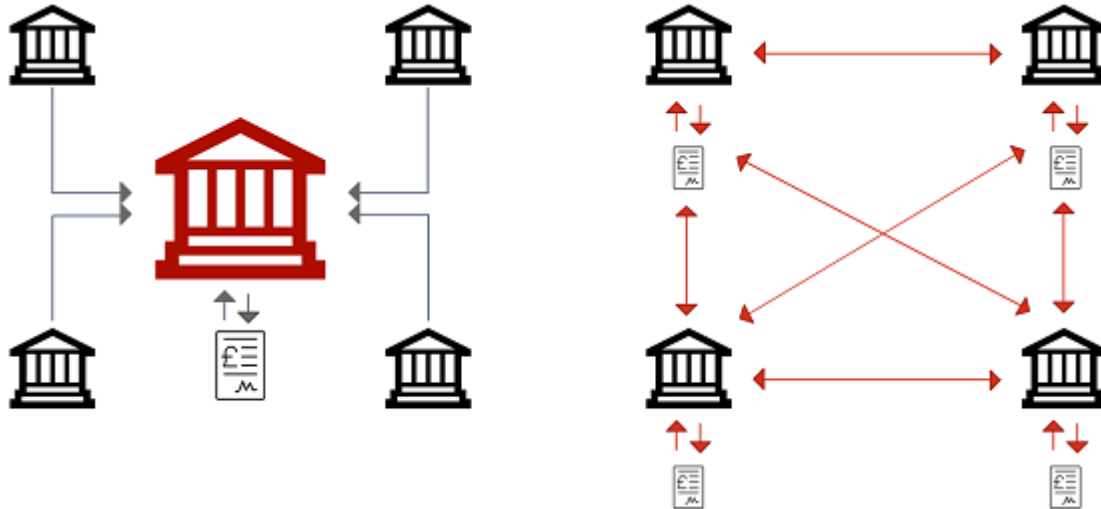


Figure 1: On the left, a traditional database approach to banking, where a centralized and trusted third party acts as intermediary between people on the network. On the right, a decentralized approach, where each participant of the network has a copy of the database, ensuring immutability.

Blockchain technology is said to be in its infancy and so is probably the debate on how it should be used. Part of that debate is strictly technical, for example, questions regarding how transactions of digital currency should be endorsed, or how many should be validated in a certain period of time, etc. As Bitcoin's code is fixed, those who disagree with Nakamoto's decisions create alternative coins or platforms. Positions regarding those questions have nonetheless ample implications: social (energy efficiency, identity protection, data privacy), economical (inflation, inequality, stability), and political (modes of governance, sovereignty, and regulation). The thesis' specific focus, however, is on the ongoing speculations taking place in architecture and urbanism on the possibilities opened by crypto. As of 2024, every continent has been the site of at least one crypto city project, and renowned architectural firms like BIG and ZHA have become involved in high-profile versions of such initiatives. Blockchain has already become a subject of academic programs at architecture schools such as South California Institute of Architecture⁹ and the Massachusetts Institute of Technology¹⁰.

In that context, it becomes necessary to attempt a deeper enquiry on the status of crypto urbanism today. Which are the relevant projects? Where lies their potential? What is the cultural baggage carried by the

⁹ SCI-Arc's Master of Science in Architectural Technologies is actively engaged in new models of entrepreneurship by developing research and applications in AI, blockchain and interactive media. One of the program's professors, Tom Wiscombe, has a blockchain city project in Nevada. See: Nathaniel Popper, "A Cryptocurrency Millionaire Wants to Build a Utopia in Nevada" *The New York Times*, November 1, 2018; "MS Architectural Technologies" SCI-ARC, Accessed May 26, 2024 [Link](#)

¹⁰ MIT CityScope researchers are developing several platforms dedicated to urban planning using blockchain. Some of the projects include mobility, taxation, equity building without zoning, among others. "Looking Beyond Smart Cities" *MIT Media Lab*, Accessed May 26, 2024. [Link](#)

(seemingly) radical crypto cities being currently developed? What historical models are involved in their conceptual, operational, organizational matrices? What could be relevant means to investigate such dynamic phenomena as crypto cities, which so far barely exist outside the volatile realm of digital media?

Groundwork

Crypto urbanism is still a nascent academic territory. Scholarly work on the subject is recent and limited in scope -as discussed below. Its emergent condition, interdisciplinary nature and rapid evolutionary pace straddle the boundaries of traditional fields. Additionally, the complexity of blockchain technology, with its ideological baggage and ubiquitous jargon still deters researchers coming from the humanities, presenting challenges in the formulation of a standardized approach to the subject. Consequently, the decision here has been to work from the bottom up, on the basis of analyzing three relevant case studies: Bitcoin City, CityDAO and Decentraland.

This selection by no means exhausts the universe of crypto city projects: new ones are born regularly in the ever-shifting ground where architecture meets business, politics, and technology. In fact, an earlier draft of this research included the study of three additional projects: Telosa, Liberland and Akon City. The selection was ultimately reduced to allow a lengthier treatment of the technology itself, the remaining sample being heterogeneous enough to present distinct applications of the technology (as money, as an application), focus on distinct social trends (which will be presented in Chapter I) as well as exploring its applicability within distinct economic and social conditions (emerging country, developed country, virtual space).

The literature utilized for the thesis encompasses three types of materials. The first group consists in writings from the history architecture and urbanism, which provide a backbone for the formulation of a conceptual frame. These include authors from Leonardo Benevolo to Kenneth Frampton, but also more recent academic work that delves into the subject obliquely by looking at (non-crypto) urban experiences being shaped over the last decades. The second group consists of literature related to contemporary developments in technology and economy, focusing primarily on blockchain but dealing also with startup culture and other associated phenomena. The selection of this literature posed a methodological challenge for several reasons, mainly my lack of expertise on the subject blurred at times the line separating facts from hype, and its fast-paced evolution rendered concepts obsolete very quick. To address this, I read authors from diverse ideological backgrounds and fields of expertise, helped by Gary Gensler's MIT course on blockchain¹¹. I surveyed authors whose names were frequently mentioned in

¹¹ All classes are available on YouTube. Gensler is former Goldman Sachs investment banker and currently serving as the chair of the U.S. Securities


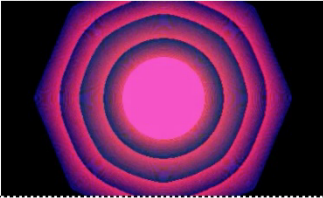


podcasts, blogs, and social media within the crypto ecosphere, like for example Balaji Sirinivasan, James Dale Davidson and William Rees-Mogg, understanding them not as definitive sources of truth but rather as indicators of prevailing sentiments within the field. The last group of the materials is composed by sources that are specific to the analysis of each case study. The amount and seriousness of information available is not equivalent for all cities discussed. Some have had a much greater deal of media hype than others. In some cases, the release of images is paired to a political agenda, like in the case of Bitcoin City –as the main promoter of the project is the president of El Salvador–. Other projects like CityDAO and Decentraland are first released as a test version and progressively built on top as their promoters have the resources to do so. With an extended “crypto winter” on the cryptocurrency landscape in 2022, many of these projects lacked funding or political power to continue their development. To deal with such disparate, unstable fields of information, I have included in the body of the investigation the evidence from which the analysis stems. These comprise screenshots from websites, social media posts, excerpts from interview transcripts on YouTube, podcasts, and images published by the media. In recognition of the challenges this might bring to build my case, I have saved a local copy of the online materials as currently offered and included it partially as an annex.

Roadmap


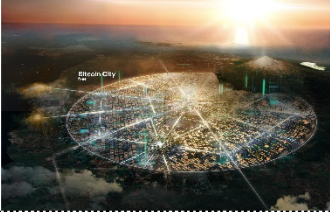


This investigation comprises four chapters. The first one sets out the question of crypto cities, explains how blockchain technology works. The following three analyze specific case studies, delving into their various components. The definition drafted in Chapter I is based on the examination of a handful of examples, extracting common themes. It explores the evolution of entrepreneurial culture and its impact on urban governance, recognizing that many figures within this ecosystem originate from the startup realm. A trend which began to surface in the 1970s and 1980s, as per David Harvey. This definition also encompasses a technical explanation of how blockchain works, as its comprehension later translates as leitmotifs that are transversal to all case studies. Chapter I also situates this investigation within a broader conceptual framework, addressing notions of models, utopias, and new cities. The aim is to specify these concepts and illustrate their significance in comprehending the subsequent case studies to be presented. Ultimately, an examination of the evolution of urban theory and the identification of prevailing trends in contemporary new cities sheds light on the redefinition of social values taking place, both independently and in proximity to blockchain technology. These act as a ubiquitous matrix, reappearing intermittently in the following chapters. Chapter II focuses on the analysis of El Salvador’s Bitcoin City, presented as innovative by its proponents for two reasons: the adoption of the cryptocurrency that after which it is named as a means to fund the project, and the groundbreaking initiative in harnessing geothermal

energy. Its analysis discerns the role that these ventures play in the formulation of a narrative in a bid to reshape the country's global image. Chapter III examines CityDAO as a model wherein land ownership is shared among the community members after a change in the regulation of the State of Wyoming. Delving into the specificities of how the technology enables this, along with its opportunities, challenges and risks, the analysis seeks to unravel how a participative sense of belonging encodes social values that redefines the concept of citizenship. The final chapter delves into Decentraland's virtual realm, examining it as an opportunistic alternative to monopolization of big technological companies in the VR industry like Meta.

Time Line of Crypto Cities

Date	Event	Source
1/1/1991	The idea of a cryptographically secured chain of blocks was proposed by Stuart Haber and W. Scott Stornetta	Haber, S; Stornetta, S. "How to Time-Stamp a Digital Document" <i>Journal of Cryptology</i>
1989	David Chaum creates DigiCash, a form of electronic payment that used public and private key cryptography to become untraceable by a third party. It went bankrupt as it entered the market before e-commerce was fully integrated within the Internet	Chaum, D. "Blind Signatures for Untraceable Payments" <i>Springer-Verlag</i> (1989).
1996	Nick Szabo coins the term "smart contract" and writes extensively on the topic	Szabo, N. "Smart Contracts: Building Blocks for Digital Markets" (1996).
1998	Nick Szabo publishes the theory of a decentralized digital coin "BitGold"	Szabo, N. "BitGold" <i>Unenumerated</i> . (2008)
10/31/2008	Satoshi Nakamoto publishes Bitcoin's WhitePaper "Bitcoin: A Peer-to-Peer Electronic Cash System"	Nakamoto, Satoshi. "Bitcoin: A Peer-to-Peer Electronic Cash System" (2008).
1/3/2009	Bitcoin's first block, called <i>Genesis Block</i> is created by Nakamoto, giving birth to Bitcoin's blockchain	
5/22/2010		First Bitcoin transaction to purchase a good on the market. A Florida man paid 10,000 BTC for two pizzas.
2014	Vitalik Buterin published Ethereum's Whitepaper, which introduced a platform of decentralized self-executable computer programs (known as smart contracts), enabling decentralized applications (DApps) on its blockchain	Kamau, R. "What Is Bitcoin Pizza Day, And Why Does The Community Celebrate On May 22?" Buterin, V. "Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform"
6/10/2014		First world's NFT called "Quantum" is minted by Kevin McCoy and sold via Sotheby's for \$1.47 million
2015	Esteban Ordano and Ariel Meilich start working on Decentraland, a virtual world on the blockchain	McCoy, K. "Quantum" <i>Sotheby's</i> (2014). Zin, Hernan. ¿Por Qué No Te Habré Hecho Caso? Podcast audio. <i>La Prodigiosa Historia de Decentraland</i> 2022
2015		Liberland announces competition for its Masterplan
2016		Rosenfield, K. "Design Liberland: Competition Seeks to Masterplan New European Micronation" <i>ArchDaily</i> (2015). RAW-NYC Architects wins first prize in the competition for Liberland

Date	Event	Source
2017		Decentraland's Whitepaper is published Esteban Ordano, Ariel Meilich, Yemel Jardi, Manuel Araoz. "Decentraland Whitepaper." (2017).
11/1/2018		Tom Wiscombe publishes a Blockchain City for Nevada and gets featured in The New York Times Henry, J. "A Cryptocurrency Millionaire Wants to Build a Utopia in Nevada" <i>The New York Times</i> (2018).
2/1/2020		Decentraland Launches
7/1/2020		Akon publishes Akoin's Whitepaper and announces Akon City. Media publishes images from other projects Akoin Inc., "Akoin. One Africa. One Koin". (2020)
12/1/2020		Akon City publishes new images by BAD Consult BAD Consult. "Akon City"
3/1/2021		Beeple sold the most famous NFT called <i>Everydays: The First 5000 Days</i> for \$69.3 million. The event created a snowball effect throughout mainstream media, setting the stage for an NFT boom. "Beeple's Opus" <i>Christie's</i>
7/1/2021	Wyoming Law accepts DAOs, and Fitsimones starts CityDAO	"SF0038 - Decentralized autonomous organizations" <i>State of Wyoming 67th Legislature</i> (2021).
9/1/2021		Bjarke Ingels and Marc Lore announce City of Telosa Ravenscroft, T. "Bjarke Ingels designing "new city in America" for five million people" <i>Dezeen</i> (2021).

Date	Event	Source
10/31/2021		<p>Vitalik Buterin publishes a blog post on CryptoCities around the same date that CityDAO plants its flag</p> <p>Buterin, V. "Crypto Cities"</p>
11/20/2021		<p>Bukele announces Bitcoin City</p> <p>"Bitcoin City & Bitcoins Bonds announcement by El Salvador's President Nayib Bukele"</p>
01/03/2022		<p>Zaha Hadid Architects publishes new project for Liberland</p> <p>Finney, A. "Zaha Hadid Architects designs virtual Liberland Metaverse city" <i>Dezeen</i> (2022).</p>
5/10/2022		<p>Bukele publishes through Twitter new images of Bitcoin City</p> <p>Bukele, N. "Bitcoin City is Comming Along Beautifully"</p>

Chapter I. What are Crypto Cities?

Blockchain's short history in the realm of architecture and urbanism may explain the absence of an established definition for what a crypto city is. Much of the literature¹² available on blockchain and architecture explores how adopting blockchain technology might enable a participatory economy to amend the downsides of smart cities¹³. However, this investigation differs in the recognition that smart

¹² See Jianjun Sun; Jiaqi Yan; Kem Z. K. Zhang, "Blockchain-based sharing services: What blockchain technology can contribute to smart cities," *Financial Innovation* 2,26 (2016).

¹³ Smart cities have been criticized by authors like Anthony Townsend and Richard Sennett for several reasons. Some of these include: the abolishment of spontaneity and serendipity, which make the cities a place where no one wants to live; the worrying role of private investments from big corporations, which, after the 2008 crash, could again fall; the role played by another category of stakeholders, software developers, working independently, who use massive quantities of data to promote collaborative urban practices; among others. See Anthony M. Townsend, *Smart Cities: Big data, civic hackers, and the quest for a new utopia* (United States: W. W. Norton & Company, 2013).

cities and crypto cities have different goals. Smart cities aim to internalize mechanisms for learning and reasoning through the collection of data.¹⁴ Whereas this does not necessarily exclude crypto cities, it is not constitutive of them. A definition is then approached by examining a handful of study cases (Bitcoin City, CityDAO, Decentraland, Liberland and City of Telosa) and building up common ground. The aim is to explain the technical aspects intrinsic to blockchain and how they translate as leitmotifs in each proposals' narrative. Before going into the specifics, however, I first revisit the entrepreneurial culture that gave birth to it.

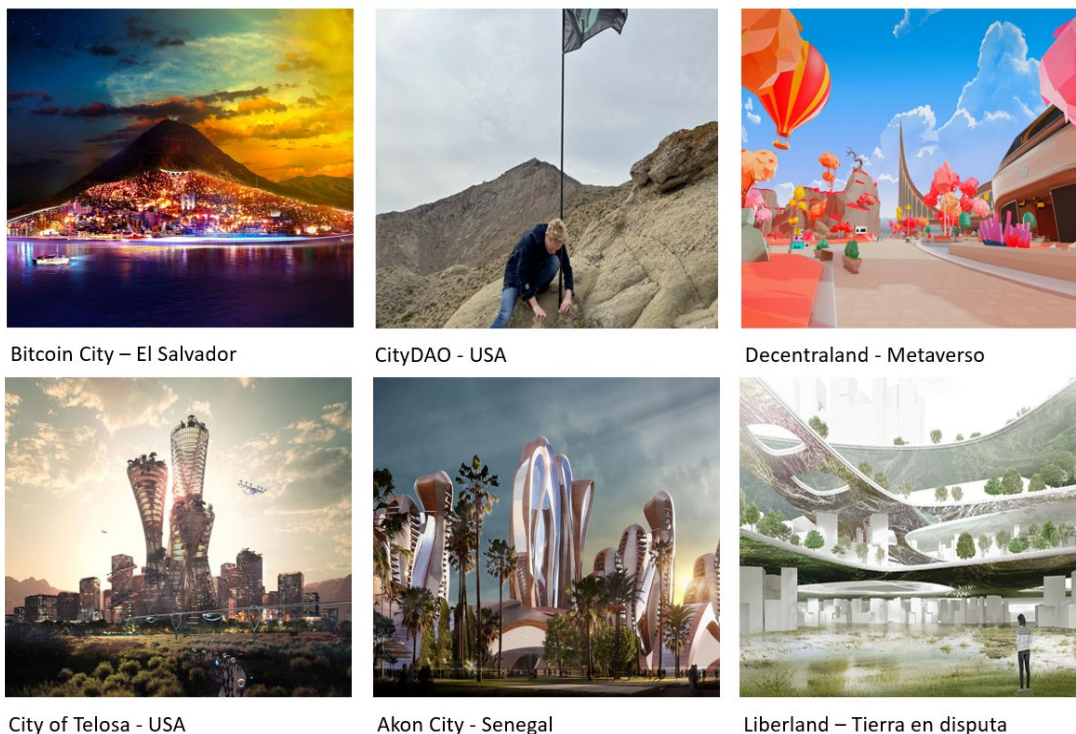


Figure 2: From left to right, top to bottom: Akon City by Bakri & Associates Development Consultants, Bitcoin City by Fernando Romero Enterprise, City of Telosa by Bjarke Ingels Group, Liberland by Raya Ani.

I.a From Harvey's Entrepreneurialism to Graham's Startup-ism

The main individuals behind crypto-city initiatives usually come from the startup world.¹⁵ It could be

¹⁴ Antoine Picon, *Smart Cities: A Spatialised Intelligence* (Italy: Wiley, 2015), 29.

¹⁵ City of Telosa's billionaire founder Marc Lore for example, has started and sold four companies, most recently Jet.com, which he sold to Walmart for \$3.3 billion. CityDAO's founder Scott Fitsimones was also awarded with the Thiel Fellowship for founding AirGarage, an app that manages parking properties. Decentraland's founders previously worked at BitPay.

inferred from this that the culture that gave birth to (and is being fostered by) crypto-cities can be identified with the concept of entrepreneurship. As I will show, they share certain objectives, mindset, and values. This trend is not completely novel, for, according to David Harvey, urban governance gradually transitioned from a prevalent “managerial style” in the 1960s into a more innovative and entrepreneurial mode of action during the 1970s and 1980s.¹⁶ To understand this culture it is necessary to revisit the transition from managerial to entrepreneurial urban governance, and to untangle how the concept of entrepreneurship has evolved and become intrinsic to crypto-city dynamics.

Urban entrepreneurialism of the 1970s and 1980s initially relied on a collaborative effort, a public-private partnership, emphasizing investment and economic *growth*.¹⁷ Its immediate objective was centered in creating the necessary preconditions to attract and promote private enterprise. In other words, local governmental powers were used to attract external sources of investments and employment to fund a speculative cycle. The urban focus shifted from projects designed to improve the living and working conditions of the region (like housing and education), to the construction of culture, entertainment, retail, new parks and civic centers that would upgrade the image of the city¹⁸.

Certain strategies identified with urban growth in the entrepreneurial framework of the 1970s and 1980s¹⁹, continue to be relevant to crypto-cities. These include:

- (1) Stimulating competition within (a) the international realm –by fostering private investments for social infrastructure that strengthen the economic base of the region as an exporter of goods and services (e.g. the oil that allowed Texas to bloom in the 1970s)– and (b) within the distribution of consumption patterns (i.e. the city must appear innovative, safe, exciting);
- (2) Creating the impression that the city of the future will be primarily characterized by command and control functions, gathering and processing information, transforming it into a post-industrial hub, where the export of services becomes the economic foundation for urban sustainability; and,
- (3) Exploiting, through central government, redistributive opportunity (e.g. Long-Beach-San Diego’s urban prosperity was related to its military and defense contracts).

Their new manifestation involves stimulating competition -also within the local and international realm- by settling in regions that foster crypto development, relying on the expectation of a more conducive environment for future innovation. This aims to attract developers who want to experiment with different

¹⁶David Harvey, "From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism," *Geografiska Annaler. Series B, Human Geography* 71, no. 1 (1989), 3.

¹⁷*Op. Cit.*, 4.

¹⁸ *Op. Cit.*, 7.

¹⁹ *Op. Cit.*, 8.

implementations of the technology but cannot do so under the current regulatory systems. CityDAO, for example, was founded the day after the State of Wyoming announced the legal recognition of blockchain based companies –a decision read by the founder of the project as a demonstration of Wyoming intending to be “the most crypto innovation friendly state”²⁰. Another fresh configuration of the same idea is to promote the city as economically self-sufficient, i.e., a haven that will attract all kinds of new residents in pursuit of a way to alleviate existing tax burdens. Such is the case of Bitcoin City, as announced by the president of El Salvador, Nayib Bukele:

“Zero income tax. Zero capital gains tax. That’s all. Invest here. Make all the money you want. We’re fine. Trade whatever you want. Zero property tax. I mean, if you’re making a huge building you don’t want to pay property tax for that, so you don’t pay anything. It’s your payroll tax. We want you to hire people, not to pay taxes for hiring people.”²¹

Likewise, crypto cities also seek to position themselves as future assets through innovative technologies oriented towards gathering and processing information. City of Telosa, for example, presents a mobility system of autonomous electric vehicles, a smart waste management system buried underground, along with an intelligent electricity grid.

But who will be first to invest in these initiatives? Several projects have recruited crypto developers, gamers, and digital art collectors as their ideal initial customer. The new urbanity begins with a marketing strategy: a plot to convey an overall gameplan that can turn potential investors into customers of their products and services. Liberland’s NFT Plaza (see Figure 3) is a case in point: a region of the map dedicated exclusively to plazas and exhibition centers of digital art. Architect of ZHA Patrick Schumacher noted in recent conference that Liberland’s strategy has been appropriated from Decentraland’s “cryptovalley”.²² A similar strategy was adopted by Bitcoin City: a museum dedicated to the show the history of money was defined by the architect as its DNA²³.

²⁰ @PODOFJAKE, Podcast Audio. “Scott Fitsimones,” Pod of Jake, episode 78, September 14, 2021, [Link](#). Downloaded transcript, available upon request.

²¹ “Bitcoin City & Bitcoins Bonds Announcement by El Salvador’s President Nayib Bukele.” YouTube video. Posted by @surfinbitcoin. November 21, 2021. [Link](#).

²² “LIBERLAND METAVERSE ArchAgendaDebate: Cyber-urban Incubators in the Blockchain Metaverse,” YouTube video. Posted by @patrikschumacher2844. January 17, 2022, [Link](#).

²³ “Milan Design Week with Fernando Romero | MINDED Podcast,” YouTube video. Posted by @createurs_design_association. April 24, 2023. [Link](#).

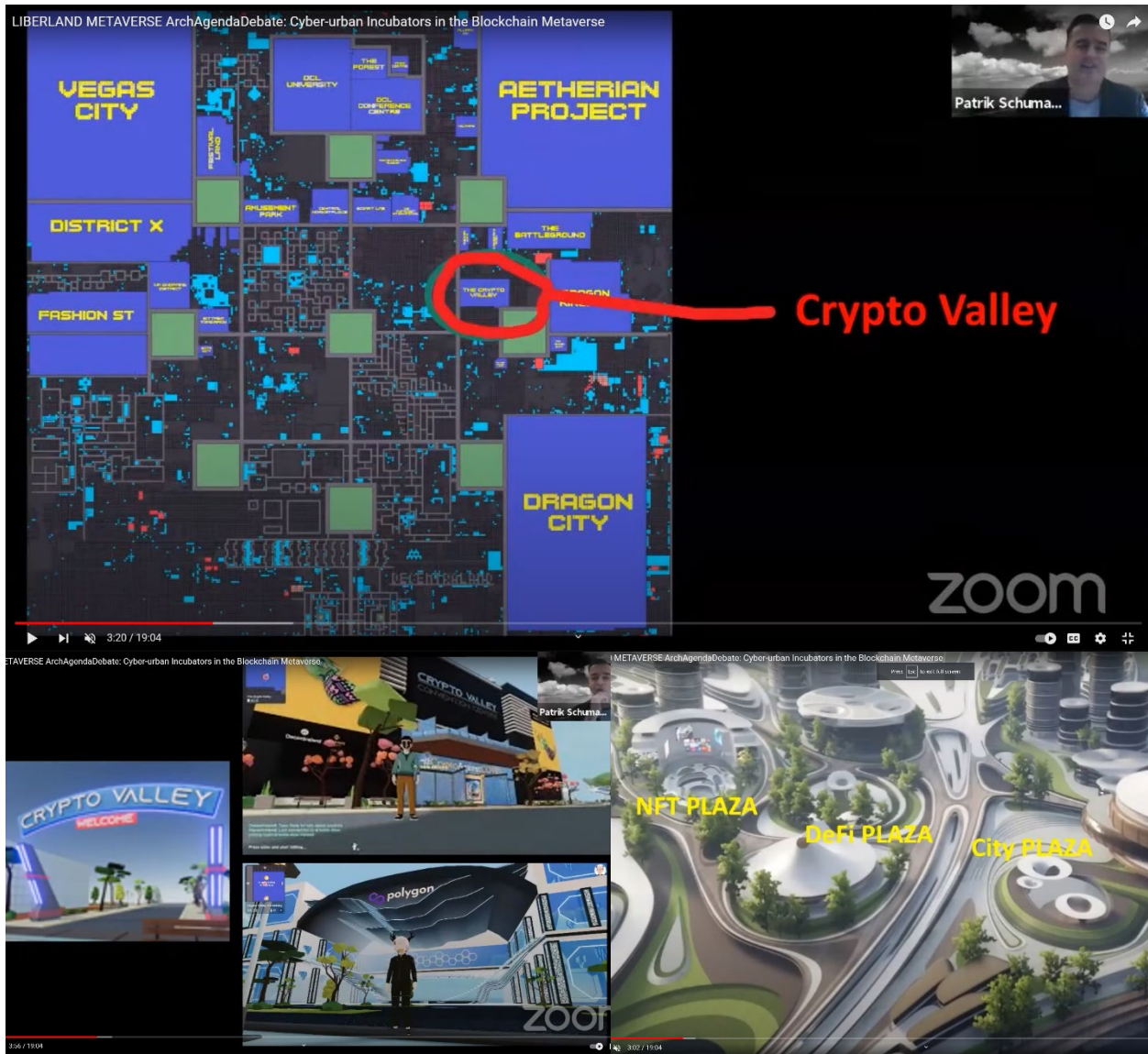


Figure 3: Screenshots from Patrick Schumacher's lecture. Decentraland was a reference in the design of Liberland, particularly in targeting the crypto community and creating an identity that is catered to them. Source: Schumacher, "LIBERLAND METAVERSE ArchAgendaDebate: Cyber-urban Incubators in the Blockchain Metaverse." [Link](#)

Tab. 1 Summary of Urban Entrepreneurialism. Public-private partnership strategies to foster economic growth

Strategies	1970s and 1980s (Traditional businesses)	Stimulating competition (exports, consumption patterns, fostering private investments for social infrastructure)	Towards gathering and processing information	Redistributed opportunity
	2020s (Startups)	Stimulating competition (promise of deregularization of crypto, tax haven)	Sustainable waste management system, Self driving cars	Crypto art galleries to attract a certain target group, banking on the expectation they will bring urban prosperity; the land appreciation will fund economic growth for all stakeholders; the appreciation of Bitcoin will fund social services
Examples	1970s and 1980s (Traditional businesses)	the oil that allowed Texas to bloom		Long-Beach-San Diego's urban prosperity was related to its military and defense contracts
	2020s (Startups)	Bitcoin City		
		"Zero income tax. Zero capital gains tax. That's all. Invest here. Make all the money you want. We're fine. Trade whatever you want. Zero property tax."	"We have digital and physical arts and culture, equality, infrastructure to the digital system, geothermal energy. They will power the entire city and the bitcoin mining and, of course, will facilitate business and technology investment and sustainable and efficient public transportation."	"the first country to do [Bitcoin bonds], which will be El Salvador, will have a massive advantage. If bitcoin at the five-year mark reaches one million dollars they will sell bitcoin in two quarters and recoup that 500 million dollars. In three and a half quarters they can get enough money to pay back the entire bond"
		Telosa		
		"With Equitism, Telosa aims to create a much higher level of social services offered to residents, without additional burdens on taxpayers"	Garbage will be buried underground; "Autonomous cars create safe, flexible streetscapes to create a collective and active transportation system that is more enjoyable, greener and universally accessible"	"The project also envisions transparent governance and a new model for society: Equitism, a new economic model based on the premise that citizens should have a stake in the land and as the city does better, the residents do better."
		Liberland		
		"Now I'm starting to call it Liberland cyber urban incubator and basically it connects up with the idea of anticipating the creation of a place like Liberland, a big real estate project, a free trade zone, maybe some kind of incubator startup cluster of the kinds."	"A prior digital city and community building game (...) could also be layered and involve not only developers playing a competitive and synergetic "monopoly" with each other but could already involve end users. The idea here is that all those who consider joining Liberland would evolve an emergent order together prior to purchase and construction."	"In a way, I think that we are going to focus with the Liberland method was addressing and at least initially that crypto ecosystem community and focus on that, so as a kind of crypto valley is interesting (...) this focus on the crypto ecosystem on networking and collaboration rather than on the entertainment as city functions "
CityDAO				
"Wyoming is trying to be the most crypto innovation friendly state. For context, Wyoming was the first state to legalize or to create the LLC, the limited liability company that is now a mainstream staple of business. And other states basically copied it, started adopting it."	"A lot of the ideas come from a book called <i>Radical Markets</i> by Glenn Wilde. They talk about things like quadratic voting, quadratic funding mechanisms to allow people to vote and govern decentralized communities and ideally make our democracy stronger by giving people more input."	"Most DAOs raised initial funding by selling a governance token that gives holder voting rights over DAO activities. You can either buy these tokens on the market or you can earn them by contributing to the DAO. For example, things like designing a logo, researching or writing some code."		

In recent decades, the concept of entrepreneurship has evolved in the wake of globalization, the internet, remote work and flexibility, among other factors.²⁴ However, if in the 1980s entrepreneurship was associated with traditional business modes, often local or national in scope, less attractive to capital, and rarely focused on innovative technologies, its core remains consistent: growth as the main driver. Today's startups are shaped by practitioners and business leaders (rather than economists or scholars) who share their values and success formulas. They are usually linked to newly established or early-stage technology companies, although as Paul Graham notes, not every newly founded company is a startup, nor is it necessary for a startup to work on technology.²⁵ Instead, the definition he suggests is "a company designed to grow fast".²⁶ Growth is the only essential thing, the compass that should drive every decision.

"For a company to grow really big, it must (a) make something lots of people want, and (b) reach and serve all those people. Barber shops are doing fine in the (a) department. Almost everyone needs their hair cut. The problem for a barbershop, as for any retail establishment, is (b). A barbershop serves customers in person, and few will travel far for a haircut. And even if they did, the barbershop couldn't accommodate them.(...) Most businesses are tightly constrained in (a) or (b). The distinctive feature of successful startups is that they're not."

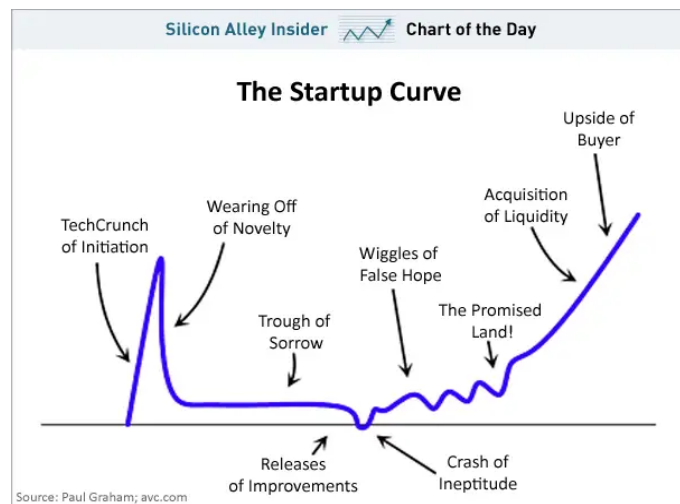


Figure 4: Chart showing how startups should expect their growth to be. An initial high excitement, leaded by a crisis realizing the idea is not as great as initially hypothesized, and finalizing with exponential growth once it takes off.

²⁴ R. Daniel Wadhvani Geoffrey Jones, "Entrepreneurship and Business History: Renewing the Research Agenda " *Harvard Business School* 07-007, (January 2006).

²⁵ Paul Graham is a programmer, writer, investor and co-founder of the Y Combinator: the first startup incubator that has funded over three thousand startups, including Airbnb and Dropbox. "Startup = Growth," 2012, <https://www.paulgraham.com/growth.html>.

²⁶ The word "designed" has a double meaning. In the first place it means intended, recognizing that most startups fail, because there is a high risk to them. Secondly, it notes that each startup is unique by nature.

Source: "The Startup Curve," 2012, [Link](#).

Growth is also usually the reason why startups are associated with new technologies, as it is the best source of rapid change. Because the field of innovation is unknown, the entrepreneurial mindset is usually flexible, willing to experiment different methods and taking risks, yet with a strong vision of an idea to achieve such high growth.

How can entrepreneurialism, which has evolved from traditional businesses to innovation-driven and cutting-edge technologies, shape the experiments of blockchain-based cities?

One hypothesis is that the pursuit of innovation, fostered by the growth-hunting culture, could be the main incentive for blockchain city experiments to navigate through high risk, uncertain regulatory landscapes and adoption rates. They typically focus on regulatory gray areas, exploiting existing loopholes in current systems, as was the case with CityDAO, which was launched without a clear understanding of its operative details, or how the new regulations would reshape opportunities in the future. As will be discussed in chapter III, the downsides such uncertainties might bring are compensated by the startup culture's drive for rapid growth and innovation because, although appallingly risky, there looms a promise of extremely high returns.

A second hypothesis is that crypto-cities, considered as startup entities, not only employ state-of-the-art technologies, such as cryptocurrencies, but also actively seek to pioneer novel technologies themselves. In other words, they aim to (a) create a product or service in high demand among a large audience, and (b) serve that audience. Decentraland was among the first to create the necessity to buy and sell assets and created a new type of marketplace. This idea will be further developed in chapter III.

The previous hypotheses are related to the objectives (growth), mindset (risk-taking, flexible) and values (innovation) of startups. The third one has to do with the precariousness of their vision. Because startups seek to install themselves as purveyors of services geared to fulfilling *actually existing* necessities, they must develop resilience against criticisms that attempt to discredit their relevance. Moreover, startup culture recognizes that few ventures emerge equipped with all the elements for their success. It is far more typical for the refinement of a flawed concept to catalyze its transformation into a successful one than for a successful idea to emerge from scratch: most startups end up nothing like their initial idea.²⁷ Some of these crypto-cities, too, are being shaped on the go.

I.b The Peer-to-Peer Urban Model

Bitcoin's main breakthrough lies in the combination of different technologies to solve the long-standing

²⁷ Paul Graham, "How to Get Startup Ideas." Paul Graham. November 2012. Accessed May 24, 2024. [Link](#)

double-spending problem in digital currency, ensuring that each coin can only be spent once. When an email is sent from person A to person B, the email is duplicated and both person A and B have a *copy* of the same email. Banks digitally solve this by having a centralized ledger, ensuring its integrity, and validating only the second coin. Bitcoin, instead, solves this using what is called a peer-to-peer (p2p) network: a p2p network can be thought of as a neighborhood potluck dinner where everyone brings a dish to share. A centralized network is like going to a restaurant where there is a chef in charge of preparing all the food. One places an order with the chef to enjoy a dish, but if the chef is busy food cannot be served. In the potluck version, inversely, each person brings something to the gathering. Everyone is both a contributor and a consumer. If someone fails to contribute, the event can still happen: other dishes will still be available. Thus, every person (peer) of the neighborhood (network) both shares and receives food (data) directly with others, with no chef (central authority).

Ensuring the integrity of a network against potentially deceitful participants is referred to as solving the *Byzantine General's Problem*. A group of soldiers is planning a surprise invasion to a castle, but some could be unreliable²⁸. For the invasion to work, all soldiers must agree on the date and location without directly communicating with each other. They can only send messages through a messenger, and they know that some of these messengers might be dishonest, spreading false information, or trying to sabotage the operation. Bitcoin's solution is to give each soldier a special, unforgeable stamp, which is included with the messages. Instead of trusting any single messenger, they rely on the probability that most messengers will not send a deceiving message. Hence, if the majority of the messages match and have the same stamp, they trust that information. If a few messengers spread conflicting or false details, they disregard those and focus on consistent information with the right stamp. In other words, the stamp minimizes the number of messages these disloyal soldiers have access to.

²⁸ Leslie Lamport, Robert Shostak, and Marshall Pease, "The Byzantine Generals Problem," *ACM Transactions on Programming Languages and Systems* 4, no. 3 (July 1982): 389.

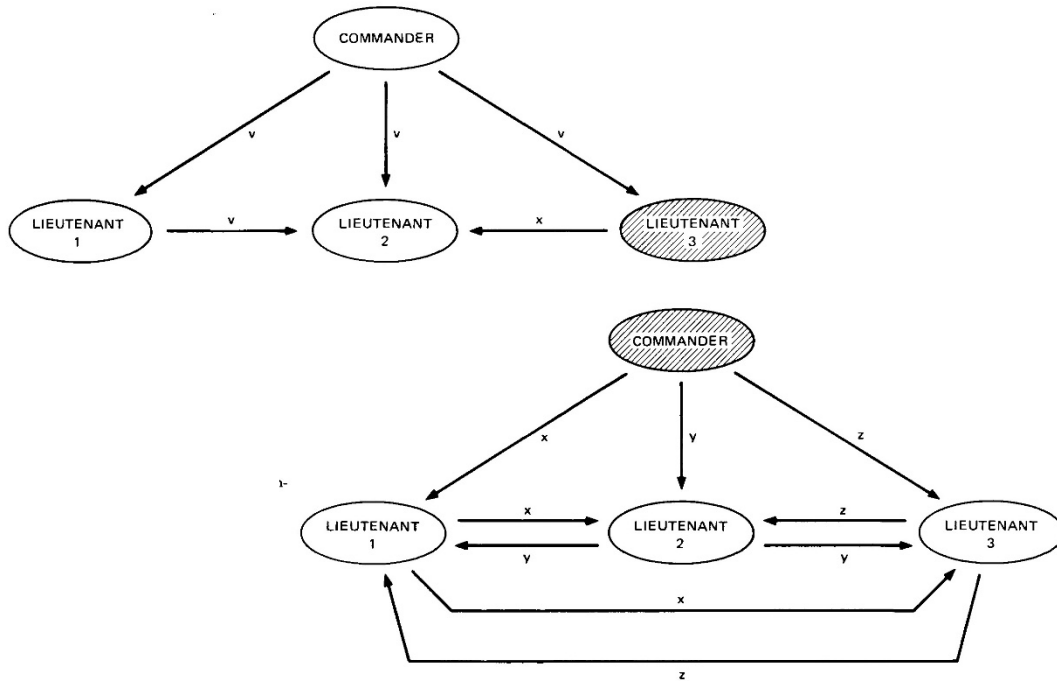


Figure 5: Diagram illustrating the Byzantine General's Problem coordination. Even if Lieutenant 3 is a traitor, Lieutenant 2 receives a majority of faithful messages. In the second scenario, the commander is the traitor and no coordination is possible. To create resilience, it is necessary for every node to communicate with each other and not rely on a single commander. Source: Robert Shostak Leslie Lamport, Marshall Pease, "The Byzantine Generals Problem," ACM, Vol. 4, No.3. (1981), 389.

The technical name for this stamp is *hash*. It is a unique fingerprint generated by an algorithm capable of compressing data (words, figures, images, etc.) to a fixed-size output number. Even the smallest change, like an extra comma, will generate a completely new *hash*²⁹. This algorithm is one-directional, meaning there is no way to know the input when provided just the output. This is an important technique to hide messages. The table below shows that the output is always a 64-character combination of letters and numbers, regardless of how long the input is, and that the slightest change in the input, a parenthesis missing or a change of capitalization in one letter will generate an entirely different output.

²⁹ While it is possible that two different inputs create the same exact output, the probabilities of this happening is astronomically low and it would require a significant amount of energy to find one purposefully. When quantum computers become prevalent, many hashing algorithms will likely become obsolete, but there are already many that have been created to be quantum-resistant. Dávila, *Blockchain Radicals*, 302.

Input	Output
Crypto cities: History and future of urban models in the era of distributed ledger technologies (ca.2020)	0bf8b7e35e9f41d4435465e10bca4362b4df3046a2f32f3052146aa6a1405c87
Crypto cities: History and future of urban models in the era of distributed ledger technologies (ca.2020	fac700bcd7cc789af7694221d1898da560f3148c59a75ac2200170c6dd588977
Crypto Cities	1ee511589a65c7345d6e3b5787b3555df5e9af2d4750b406600b2bda293d12a9
Crypto cities	70ade6f65c7da17db731ef1eab56689dac9263822f22f80af65bc12558ba08d4

Tab. 2: Illustration of hash algorithms. The slightest difference –a parenthesis or a capital letter– changes completely the output. Source: Own elaboration with "Sha-256 Cryptographic Hash Algorithm." 2005, [Link](#).

Hashes are important because they provide an unbreakable link between different segments of the blockchain. Every block contains two hashes: the one generated with the transactions as input, and the one from the previous block (see Figure 6). Because any change in the input will affect the hash, this means that it is impossible to alter the transactions data of a block that has already been added to the chain without breaking the link. Since all nodes on the network store a copy of the entire chain, blocks with broken links will be rejected by the majority (unless a very unlikely conspiracy takes place). As a result, the system as a whole can be trusted, even if some of its users are unreliable.

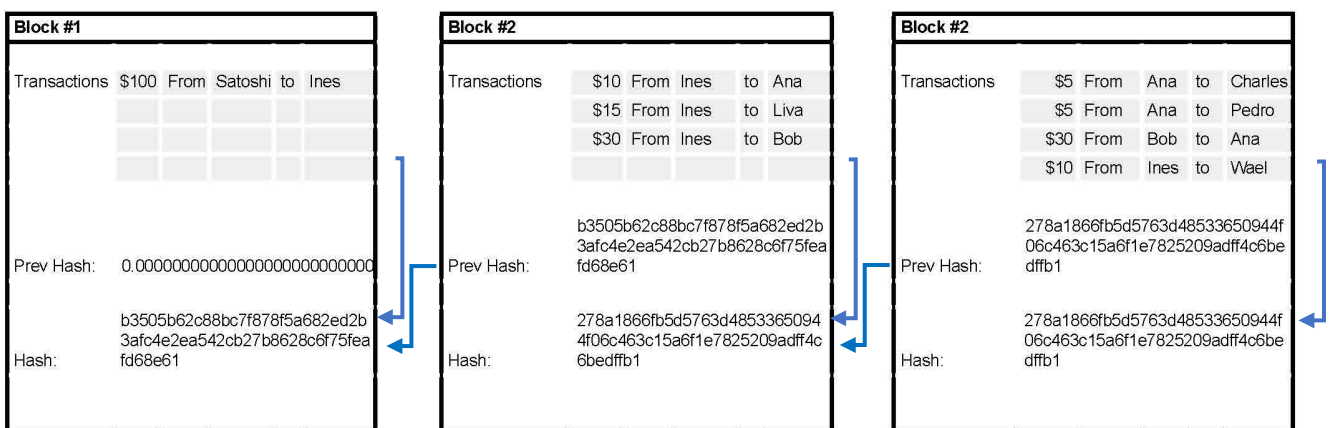


Figure 6: Diagram of a blockchain. The transactions are the input to create a hash, which is included in the current block, but also in the following one, creating a chain. The hash is created with an algorithm. The minimal change in the input will create a completely different hash, breaking the chain. Source: own elaboration.

Among blockchain enthusiasts, several debates emerged regarding Satoshi Nakamoto's approach to open-source code. Concerns were raised about the fixed supply (no inflation) economy, the amount of transactions that can be approved per block, or the method used to approve each block, but the main question is whether or not cryptocurrencies can be considered as money.

Arguing that Bitcoin is the way to solve the problem of governments printing money at the cost of inflation, its advocates tend to overlook the roles government play in providing a framework for stable and coherent social organization³⁰. Additionally, the narrative of blockchain being tamper-proof frequently omits mentioning how cryptocurrencies can and have been subjected to censorship. The US imposed penalties to countries using cryptocurrencies to evade their sanctions.³¹ China banned Bitcoin mining, which it was able to detect through changes in energy grid consumption patterns.³² Recent scandals around crypto have also demonstrated the technology is not as transparent and safe as their advocates claim and the lack of regulation is not always favorable.³³ Bitcoin skeptics, on the other hand, can also tend to disregard it as a scam, overlooking the functions of money Bitcoin does indeed serve. It might be useful therefore to ask not "*Is Bitcoin money?*", but "*What functions of money does Bitcoin perform?*"

Functions of money:³⁴

- Medium of exchange: Money serves as a medium through which goods and services can be exchanged.
- Store of value: Money serves to store wealth over time, allowing individuals to save purchasing power for future use.
- Unit of account: Money provides a common measure of value for goods and services, allowing the standardization of prices across goods and services.

The intrinsic price fluctuation of Bitcoin has led skeptics like economist and winner of the Nobel Memorial Prize in Economic Sciences Paul Krugman³⁵ to argue that it is more akin to a speculative investment product (like stocks) than money as a unit of account or store of value. Bitcoin maximalist Saifedean Ammous³⁶, on the other hand, argues in his book *The Bitcoin Standard* the future price will stabilize.

³⁰ Dávila, *Blockchain Radicals*, 61.

³¹ Virgil Griffith was sentenced to five years in prison for assisting the North Korean state on how to use cryptocurrencies to evade sanctions imposed by the US. "U.S. Citizen Who Conspired to Assist North Korea in Evading Sanctions Sentenced to Over Five Years and Fined \$100,000," *Office of Public Affairs*, April 12, 2022. [Link](#).

³² Roger Huang, "After China's Bitcoin Mining Ban, Bitcoin Is Stronger Than Ever," *Forbes*, October 31, 2023.

³³ In particular, the ones revealing major exchange platforms like FTX were a scam.

³⁴ Both Bitcoin's proponents (Ammous) and its detractors (Krugman) agree that these are the functions of money.

³⁵ Paul Krugman "How Crypto Became the New Subprime" *The New York Times*, January 27, 2022.

³⁶ Saifedean Ammous is an economist at the Lebanese American University.

However, as of today, Bitcoin's worth still relies on its conversion to the US Dollar price, thus not fully meeting the function of the unit of value. Yet even if it never achieves this stability, or is fully accepted, the examples of WikiLeaks, Sci-Hub, Ukraine and others are proof of Bitcoin's potential as a medium of exchange.

A further aspect of the crypto philosophy is that blockchain can be a way toward financial inclusion by providing access to services for underbanked populations, as *Blockchain Revolution* argues:

“According to UNICEF, ‘the births of around one fourth of children under the age of five worldwide have never been recorded.’ Not getting a birth certificate can have life-shattering consequences: these children may have trouble receiving an education or health care. Worse, they may be married off, indentured into labor, or conscripted into the military before they reach the legal age (...) As adults, they may not be able to inherit property, vote in elections, or get jobs or passports, let alone bank accounts. The World Bank estimates that 1.5 billion people on the planet lack a legal identifier.”³⁷

The statistics used are outdated, as they are from 2017, yet the underlying message remains pertinent. In 2022, credit card ownership in Southeast Asia is negligible, yet around 75% of the population owns a mobile phone. Only half the population has a bank account.³⁸

To summarize, Bitcoin's main breakthrough consists in solving the double-spend problem without the need of a centralized authority. The idea of decentralization, a p2p network with no intermediary, means that there is no “chef” guiding or controlling what each individual is preparing. The “recipe” is public (open source) and everyone has the freedom to cook (script) something different. An illustrative case of a decentralized application would be a blockchain version of Spotify³⁹. Opposed to the current, centralized server, artists would upload their music onto a tamper-proof network. Instead of listeners paying a large corporation (who keeps most of the revenue and decides which artists are promoted), payments could go directly to the artists, the algorithm responsible for choosing featured content remaining public. New monetization models, such as micro-payments for individual song plays or direct support for favorite artists could be applied, centralized information gathering avoided.

The conceptual umbrella of decentralized networks under which crypto cities have emerged is loaded with strongly idealistic narratives of inclusivity and reduction of inequality⁴⁰. Bitcoin City promotes financial

³⁷ Don Tapscott and Alex Tapscott, *Blockchain Revolution: How the Technology behind Bitcoin and Other Cryptocurrencies Is Changing the World* (New York, NY: Portfolio/Penguin, 2019), Loc. 805. Kindle.

³⁸ Kell Jay Lim “How to close Southeast Asia's financial inclusion gap” *World Economic Forum*, February 7, 2022. [Link](#)

³⁹ Don Tapscott and Alex Tapscott, *Blockchain Revolution*, 2253.

⁴⁰ Telosa, a crypto city initiative in the United States, is branded on the pillars of openness, fairness and inclusivity, and purports to create “equitism”, a system based on capitalism but with no inequality. The idea is based on Henry George's 1897 thesis in *Progress and Poverty*, which affirms that economic progress entailed a growing scarcity of land, generating greater gains for the inactive landowner at the expense of the productive factors of

freedom by using cryptocurrencies as primary means of exchange and as a general discourse to attract residents in the context of El Salvador. In CityDAO and Decentraland, the censorship-resistant philosophy focuses not on the economy or financial situation of individuals but rather on the discourse of community empowerment and resilient governance.

A crypto city could be framed as a city project designed to exploit the technology of distributed ledgers to restrict centralized authorities in some of their processes, including, but not restricted to, currency, land ownership and government. Such a cutback of centralization purports to empower the adopters (i.e. individuals and communities) by fostering growth, freedom, and equality.

I.c Lexical Specifications

I.c.i Urban Models

In the discussion of crypto cities, the notion of the model is important as both method and framework. A brief discussion of its meaning is thus warranted, particularly vis-à-vis a closely related term such as *type*.

Quatremère de Quincy canonical statement (in his *Dictionnaire historique d'architecture*) that “everything is accurate and given in the model, everything is more or less vague in the type”⁴¹ opposed the model as singular and evoking a prime example against the type as an image unworthy of imitation. *Type* was understood as an abstract and logic way of selectively classifying a series of distinct works, based on history⁴². Under this definition, the centralized basilica represents a type (vague, without an image, synthesis) while Bramante’s Basilica of San Pietro in Montorio constitutes a model (maximum specificity, worthy of imitation, original).

In the early 19th century, Jean Nicholas Louis Durand proposed a compositional system as a design method, which later became the tool to accommodate the wide variety of new programs required by modern development. He described a variety of buildings and classified them according to their function (hospitals, jails, palaces, theaters, universities, etc.), and analyzed well-known case studies to highlight which composition was more adequate for each. Although he did not use the word *type*, this set the base for an attitude that extended through the century: knowledge was based on the available material

labor and capital. According to George (and now Telosa founder Marc Lore too), the solution to poverty lies in capturing rent from natural resources and land titles. In Telosa, the land is owned by the community as a whole instead of individuals.

⁴¹ Original quote: Le modèle, entendu dans l'exécution pratique de l'art, est un objet qu'on doit répéter tel qu'il est; le *type* est, au contraire, un objet d'après lequel chacun peut concevoir des ouvrages qui ne se ressembleroient pas entre eux. Tout est précis et donné dans le modèle; tout est plus ou moins vague dans le *type*. Quatremère de Quincy, *Dictionnaire Historique d'Architecture: Les Notions Historiques, Descriptives, Archéologiques, Biographiques, Théoriques, Didactiques et Pratiques de cet Art*, vol. 2 (Paris: Librairie d'Adrien le Clere et Cie, 1832), 629.

⁴² Ludovico Quaroni, *Proyectar un edificio: ocho lecciones de arquitectura* (Madrid: Xarait, 1987), 87.

(history), understanding the already built cases as the principles that shaped tradition. According to Carlos L. Marcos, revivalism and colonial eclecticism of the 19th century exhausted the discipline with repetition strategies, leading to a crisis. "Modernity could not fit into the typological corset."⁴³

The notion of type had a comeback in the 1960-70s, but lost currency again as a production tool due to its historical baggage with the advent of digital tools that enabled architects, as Alejandro Zaera Polo says, to "imagine alternatives to trigger emerging sectors of the market."⁴⁴ Digitalization played a crucial role in the shift to the idea of the scientific model, as it facilitated the creation of complex organizations that could be tested under specific conditions. Through simulation, designers were able to reproduce and observe myriad scenarios and conditions, leading to a deeper understanding of how designs would perform in real-world contexts. It became possible to accumulate knowledge beyond what was at hand from historic urban and architectural systems. Quatremère de Quincy's definition –singular, original, worthy of imitation– was thus replaced by a more abstract and diagrammatic concept: digital models prioritize the relationship between components rather than simulating every aspect of reality. They become adaptable, generative, and potentially normative. The idea of models in architecture and urbanism drifted away from the artistic process, the idea of copying, drawing a closer relationship to a scientific understanding. Models in science act as mediators between theories and the world, allowing scientists to explore their implications and to test their compatibility with empirical data.⁴⁵ They provide a means to articulate hypotheses and predictions, and make it possible to visualize and manipulate aspects of the world that are not directly accessible, such as atomic structures or cosmological events, or unbuilt structures in the case of architecture. Through these roles, models contribute profoundly to the formulation, testing, and refinement of theories, making them a cornerstone of science but also to architecture and urban practice.

Based on this definition, the following chapters distill specificities of each case study to illustrate the practical implementation and significance of theories from the crypto ecosystem as they are applied onto the urban condition. Acting as mediators between the theories and the world, these testbeds establish the parameters of the framework within which they could be conceptualized.

I suggest, moreover, that urban models are not rendered as *representations*, but rather as *rhizomatic diagrams* of a world that is being reshaped. Gilles Deleuze and Félix Guattari's concept of the "rhizomatic map" illustrates a network of interconnected nodes without a fixed center or predefined pathways. It emphasizes connectivity, heterogeneity and multiplicity, meaning that any node can be connected to any

⁴³ Marcos, "Typologies or Topologies? On the Typologically Based Form in Architecture," *EGA Revista de Expression Grafica Arquitectonica*, March 2012, 106.

⁴⁴ Alejandro Zaera-Polo, "Generative Processes and New Material Agencies," in *The Sniper's Log: Architectural Chronicles of Generation-X* (Actar, 2012), 167.

⁴⁵ Roman Frigg; Stephan Hartmann, "Models In Science," in *Stanford Encyclopedia of Philosophy* (Stanford University, 2020). [Link](#).

point of the network. This rhizomatic thinking is crucial in forging maps of the crypto territory⁴⁶, which, despite its short history, is already very much charged with static and binary categorization.

I.c.ii Utopia's Episodes

*If the story of utopia throws any light upon the story of mankind it is this: our utopias have been pitifully weak and inadequate; and if they have not exercised enough practical influence upon the course of affairs, it is because, as Viola Paget says in *Gospels of Anarchy*, they were simply not good enough. We travel through utopia only in order to get beyond utopia: if we leave the domains of history when we enter the gates of Plato's Republic, we do so in order to re-enter more effectively the dusty midday traffic of the contemporary world.*

—Lewis Mumford, *The Story of Utopias* (1922).⁴⁷

The notion of utopia is undoubtedly relevant to understand the historical provenance of contemporary crypto city models. However, this assertion compels an excavation of its history and multiple meanings. In common parlance, the idea of the utopian is frequently employed to criticize or dismiss a concept as impractical and unattainable. On the other hand, utopia can also be used in a propositional sense to denote a desirable condition, a blueprint for a harmonious (co)existence.⁴⁸ As Leonardo Benevolo, and others after him have argued, utopias have played a major role in the development of modern urbanism.⁴⁹ This influence can be seen in the frameworks that scholars have used to categorize different types of utopian visions. Benevolo distinguished between the pre-urban and the urban model;⁵⁰ Francois Choay, the progressive and the cultural model;⁵¹ and Lewis Mumford, the utopias of escape and the ones of reconstruction.⁵² For our purposes, a survey of the most influential utopian projects on the genealogy

⁴⁶ Dávila, *Blockchain Radicals*, 8.

⁴⁷ Lewis Mumford, *The Story of Utopias* (New York: Barnes & Noble, 2011), 34.7. Published originally in 1922.

⁴⁸ Patrick Geddes labels Thomas More's Utopia as a mock up name for both Eutopia –good place– and Outopia –no place–. Mumford later picks up this distinction in his book *The Story of Utopias*.

⁴⁹ Benevolo's thesis in *Le origini dell'urbanistica moderna* (1963) is that urbanism, although born in the 20th century, has its origins in the utopias shaped the previous century. He argues that the descriptions sketched by Owen, Fourier and Cabet had elements that continued to be picked up generations after, including the dwelling unit with fixed number of people, the centralization of installations, concentration of buildings, circulation on the ground floor, the organization of urban landscape on the base of social and economic relationships. The number of ideal citizens that Owen (1200) and Fourier (1620) imagined has a resemblance with Le Corbusier's Unite d'habitation (1600).

⁵⁰ Two main differences between the two are: pre-urbanism is broad, shaped by historians, economists, and politicians whereas urbanism, both in practice and theory, is shaped by specialists, mainly architects. Secondly, urbanism ceases to insert itself within a global vision of society. Whereas pre-urbanism is linked to a series of political ideologies, urbanism emerges depoliticized

⁵¹ The main difference between these two is that the progressive model (represented by Owen, Fourier, Cabet) rejects all artistic legacy of the past, and is applicable to any human group in any place and time. Its proposals seek to make *the individual* progress, independently from contingencies. The culturalist model, on the other hand (Ruskin, Morris, Howard), is founded on history's testimony, its departure point is not the individual, but rather society as a group.

⁵² The first leaves the external world unchanged, while the second endeavors to alter it to engage with it on one's own terms

of crypto-cities has been ordered chronologically (see diagram on page 27).

The term "utopia" was coined by Sir Thomas More in 1516, as the title for his book describing an imaginary, ideal society. More's "Utopia" marked the beginning of a more systematic exploration of ideal societies, which would influence other Renaissance utopian thinkers like Campanella and Bacon. However, it was only at the turn of the 19th century with figures like Owen, Saint-Simon and Fourier, that these social projects began to develop an image, or a reflection in the form a physical organization.

During the 19th century industrial revolution, several transformations destabilized the dynamic between the city and the countryside. These changes include the increase of density -mainly due to a decline in child mortality rate-; the change in the distribution of the population -as a result of the settlement of job opportunities in central urban areas-; technical progress that enabled an unlimited increase in the industrial production and the creation of public transport networks. In turn, these transformations carried the well-known externalities that characterized mid 19 century industrial metropolises: overcrowding, insufficient ventilation and daylight, uneven streets, lack of drainage, excess of smoke and industrial pollution, stench, humidity, dirt. Although such descriptions refer to extreme scenarios, public opinion considered these conditions unacceptable regardless of their statistical diffusion. Thus, they were the engine of literary denunciations and reform actions.⁵³

⁵³ Antoine Picon, "Notes on Utopia, the City, and Architecture," Grey Room 68, (Summer 2017): 104.

..... 1825 1885 1905 1925 1945 1965 1985 2005 2025

New Harmony
1825 - 1,200 Residents

Broadacre City - Wright
1935 - 5,000 Residents

Plan Piloto - Costa
1957 - 500,000 Residents

A Walking City - Archigram
1964 - 2,000,000 Residents

Comprehensive City - Mitchell & Boutwell
1969 - 1,000,000 Residents

Telosa-BIG
2021 - 5,000,000 Residents

Bitcoin City - Fr-EE
2021 -

AMERICA

Linear City - Soria y Mata
1882 - 45,000 Residents

Familistery - Godin
1886 - 400 Families

Carden City - Howard
1890 - 32,000 Residents

Phalanstery - Fourier
1902 - 100 Families

Industrial City - Carnier
1904 - 35,000 Residents

City of the Future - Hénard
1910 -

Plan Voisin - Le Corbusier
1925 - 78,000 Residents

Ville Radieuse - Le Corbusier
1935 - 3,000,000 Residents

EUROPE

Liberland - ZHA
2022 - 700,000 Residents

Ville Spatiale - Friedman
1958-1963

Marine City - Kikutake
1958-1963

Floating City - Tange
1960

Agricultural City - Kurokawa
1960

ASIA

The utopian initiatives aimed at rectifying the shortcomings of the industrial city often advocated for a complete overhaul –as if a blank slate was possible– rather than incremental changes. They existed as a contrast from the existing city, with forms of cohabitation that were dictated by purely theoretical models. Urban planning and architecture were not the main objective of such projects, but rather crucial mediations, made *a posteriori*, that facilitated the amplification of the utopian message.⁵⁴ “If we return to Fourier’s phalanstery”, in Picon’s words, “what definitely matters is not the details of its spatial configuration and its material construction –apartments, glazed arcades, and winter garden– but the hope it embodies and the circuits that allow for this hope to circulate.”⁵⁵



Figure 7: On the left, Charles Fourier’s Phalanstery. On the right, Chateau de Versailles. Sources: Choay, F. *El Urbanismo Utopias y Realidades*, (1965); [Unknown] Cetadi Prod “Drone château de Versailles” [Link](#)

As initial attempts at establishing a new organized social structure were underway, the market simultaneously engaged in mitigating the most severe slum conditions by engaging in extensive suburbanization. The canonical response to the Victorian city, developed between 1880 and 1898, emerged through Ebenezer Howard’s garden-city concept.⁵⁶ The idea focused on addressing, or at the very least alleviating, the challenges of the Victorian city by relocating a substantial portion of its population and job opportunities to self-contained clusters of new towns. These towns were to be constructed in open countryside, far removed from the slums, pollution, and particularly the inflated land values associated with the sprawling metropolis. Its central organization, which sought to shorten the journey to work, was widely more adopted than the linear model sponsored by Soria y Mata.⁵⁷

Towards the end of the 1920s, with the uprising economic crisis and the widespread ownership and

⁵⁴ Op. Cit. 95.

⁵⁵ Op. Cit. 104.

⁵⁶ Peter Hall, *Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880*, IV ed. (Chichester: Wiley Blackwell, 2014), 7.

⁵⁷ Kenneth Frampton, *Modern Architecture: A Critical History*, Third Edition ed. (London: Thames and Hudson, 1996), 28.

usage of automobiles, another tradition emerged, entwined with both the garden city and monumental city concepts. There was a pressing need to distinguish between the construction of singular monuments (formal determination) and the potential benefits of employing standardized, large-scale, production methods for the widespread provision of housing. Such contradiction between the monumental one-off and the need for mass production seems to have been the motivation for Le Corbusier to abandon his perimeter block, also known as the *Immuable-Villa*, which was predicated as an autonomous unit, with a qualitative garden and double height living room. This shift towards an apartment designed to be modular, efficient, with minimal space standards, normative equipment populated his vision for *Ville Radieuse* in 1935. This plan, his vision of the machine-age city, marked a significant departure from Howard's centralized model to give way to a theoretically limitless growth. principle of this linear model relied on the zoning of different functions into parallel bands⁵⁸. The car played a pivotal road in the formulation of Le Corbusier's 'superblock', and the redistribution of the concentration found in the cities of the 19th century.

The narrative of utopias paused during the years of World War II, particularly in Europe, and the subsequent period of reconstruction to reemerge at the end of 1950s in the form of megastructures. Megastructures, in essence, as Banham⁵⁹ has defined them, were extensive buildings of a distinctive nature, though precisely defining what sort of nature proves challenging. Interestingly, Banham has defined their overarching precursor to be Le Corbusier's *Fort l'Empereur* project from his Algiers plan of 1931. Among the continuities between them, Banham highlights a massive, colossal, substructure of reinforced concrete, which enables inhabitants to construct their space according to their individual preferences. The structure, depicted in his drawings on a curving and accelerating perspective, runs over an elevated super-highway. The following proliferation of megastructures kept this distinction between the formerly determined parts of urban high-density construction –massive, monumental frame– and, at a smaller scale, habitable containers which embed urban spontaneity, beyond the architect's control.

Clients were usually found in universities, expositions, municipalities, and central governments. Yet few megastructure projects were actually materialized and sometimes construction had to be abruptly interrupted (some examples of completed buildings are Montreal's Expo 67 and Cumbernauld Town Centre). However, even finished structures faced a predominantly negative reception and unfavorable media coverage. The extended construction period, owing to their immense scale, meant that the intellectual trend that had originated them had faded by the time they were finished. Notably, proposals for megastructures were more common in socialist regimes in Eastern Europe, and even in Cuba, where conventional market pressures were not at play, and property fortunes were not the driving force. When those who experienced that era are willing to speak candidly, many acknowledge that the self-assurance, bordering on arrogance, to suggest such monumental projects primarily emanated from within the

⁵⁸ *Op. Cit.*, 182.

⁵⁹ Reyner Banham, *Megastructure: Urban Futures of the recent past* (London: Thames and Hudson, 1976).

architectural profession itself⁶⁰.



Figure 8: From top to bottom : Le Corbusier's Plan Obus for Algiers. Perspective. 1932 ; Comprehensive City by Mike Mitchell and Dave Boutwell. 1969; The City in Need of Humanity by Amancio Williams. 1974-89. Sources: Le Corbusier Foundation, Paris. FLC 14345; Reyner Banham, *Megastructure*, 197; Amancio Williams Archive, [Link](#).

⁶⁰ *Op. Cit.*, 10

The final decadence of the megastructure movement arrived in the 1970s. Banham attributes this to an intrinsic contradiction that became apparent around 1968: that a city, or a substantial portion thereof, conceived by a single individual or a sufficiently unified group for a coherent design, would result in an exceedingly lacking, meager, and culturally impoverished environment, both visually and in broader, less defined cultural dimensions. This debate had initiated years earlier, led by figures like Jane Jacobs⁶¹. In other words, there was a conflict between the commitment to a vast, uniform, monumental, fully designed shared space and the allure of its potential fragmentation.

The story of utopia continues with conceptions of going “beyond” it. In other words, once urbanism accepted that it could no longer provide a unitary answer to solve all of the city’s problems it declared its death⁶². The task of urbanism, then, after utopia, was to create and defend plurality within each region. Such has been the thesis of Robert Fishman, who explored the idea that suburban development was not merely a response to urban problems but rather a distinct and intentional social and spatial experiment, shaped by specific cultural ideologies. He suggests that the suburbs were envisioned as utopian landscapes, embodying a particular vision of the good life, characterized by order, stability, and a strong sense of community. This vision can be clearly traced back to the same utopias which vehemently opposed suburbia: those of Howard, Wright and Le Corbusier⁶³.

In synthesis, a common thread joining the mentioned utopian projects, has been their intention to respond to perceived societal ills –whether as a way to escape from them or with the intention to amend them–. In exploring the space of solutions, their propositions range from central to linear and grid-based organizations. Oscillating between a nostalgia for an urbanism that never was, and an overly optimistic narrative around technology,⁶⁴ utopias consistently state that a city that was once imagined is now possible.

This is the genealogy of crypto cities. As the following chapters will demonstrate, at times the narrative they present can also be thought of as a revival of the overly optimistic (utopian) vision that today's technology could solve our problems.

⁶¹ Jacobs's book *Death and Life of Great American Cities*, published in 1961, was a groundbreaking work in the enunciation and critique of urban planning policies that had prevailed in the mid-20th century. In it, she advocates for a more community-focused approach to city planning. She criticized zoning as the prevailing strategy for 20th century urbanism, as well as the ambition of the master architect to design-it-all.

⁶² Robert Fishman, "Beyond utopia: urbanism after the end of cities," *Ciutat real, ciutat ideal. Significat i funció a l'espai urbà modern*, [Real City, Ideal City. Signification and Function in Modern Space], "Urbanitats" no. 7, (Barcelona: Centre of Contemporary Culture of Barcelona, 1998).

⁶³ Robert Fishman, *Bourgeois Utopias: The Rise and Fall of Suburbia* (New York: Basic Books, 1987).

⁶⁴ Novel agricultural methods in the Howard's Garden City, mass production construction methods in Le Corbusier's Ville Radieuse, the car in Wright's Broadacre City, computer aided technology in the 1960's 'plug-in' and 'clip-on' projects.

I.c.iii New Cities

Most sustained projects are poly-authored anyway because their trajectory, even for new projects, comes from a legacy of those previous –even if in reaction against that legacy, always from others.

Reiser+Umemoto, *Projects and Their Consequences* (2019)⁶⁵.

Since the end of the 20th century, over 150 new master-planned city projects, supposedly “from scratch”, have proliferated as a worldwide strategy of economic growth.⁶⁶ This phenomenon has given rise to a burgeoning subfield within urban studies dedicated to their exploration and analysis.⁶⁷ The terminology used to define such urban experiments also diversified, including evocative monikers such as “smart city,”⁶⁸ “15-minute city,”⁶⁹ “eco-city,”⁷⁰ “libertecture,”⁷¹ “charter city,”⁷² “powerpoint city,”⁷³ “hackable city,”⁷⁴ “shelter city”⁷⁵ (see tab. 4 & 5 in the appendix).

A closer look at this literature shows that if those terms emphasize a particular category of the urban object, the corresponding models do not necessarily exclude one other (a single project can fit both within the frame of a smart city and a 15-minute city). While using these names is useful to highlight specific aspects, the term “crypto-city” (an expression used by Ethereum founder Vitalik Buterin⁷⁶) shares some of its ambitions with other models mentioned. Why is it, though, that the focus is on *cities*, rather than regions, states, nations, kingdoms, colonies, republics? Buterin’s foundational post on crypto-cities gives out the clues:

⁶⁵ Jesse Reiser, Nanako Umemoto, *Projects and Their Consequences* (New York: Princeton Architectural Press, 2019), 25.

⁶⁶ Sarah Moser and Laurence Côté-Roy explore the challenges and opportunities of conducting research on new master-planned city projects in the Global South. The authors reflect on the lack of explicit examination of the methodological challenges in researching new cities, despite the growing literature on the subject. Drawing on their fieldwork experiences across different geographic contexts, the paper focuses on four key themes: the international dimensions of new cities, challenges in gaining access to information in corporate-driven projects, safety and positionality in authoritarian contexts, and the logistical complexities of fieldwork in these spaces of exception. Sarah Moser & Laurence Côté-Roy, “Reflections on researching new cities underway in the Global South,” *Journal of Urban Affairs*, (December 2022): 1.

⁶⁷ See for example, Avery & Moser, 2022; Caprotti & Gong, 2017; Chitti & Moser, 2019; Datta & Shaban, 2017; Keeton, 2011; Keeton & Provoost, 2019; Moser, 2019; Moser & Côté-Roy, 2021; Rizzo, 2020; Van Noorloos & Kloosterboer, 2018.

⁶⁸ Picon, *Smart Cities: A Spatialised Intelligence*.

⁶⁹ Zaheer Allam Carlos Moreno, Didier Chabaud, Catherine Gall and Florent Pratlong, “Introducing the “15-Minute City”: Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities,” *Smart Cities* 4, no. 1 (2021): 93-111.

⁷⁰ Rachel Keeton, *Rising in the East: Contemporary New Towns in Asia* (Amsterdam: SUN, 2011).

⁷¹ Liam O’Farrell Rowland Atkinson, “Libertecture: A catalogue of libertarian spaces,” *Urban Studies* 0, (2023).

⁷² Matthew McCartney, “Paul Romer, charter cities and lessons from historical big infrastructure?,” *Elsevier* 131, (December 2022).

⁷³ Côté-Roy, “Reflections on researching new cities underway in the Global South.”

⁷⁴ Michiel de Lange, “The Hackable City: Digital Media and Collaborative City-Making in the Network Society,” ed. Martijn de Waal (e-Book: Springer, 2019).

⁷⁵ Keeton, *Rising in the East: Contemporary New Towns in Asia*.

⁷⁶ Vitalik Buterin, “Crypto Cities,” *Vitalik*, 31.10.2021, 2021, [Link](#).

Cities and states, as we've seen from the examples at the start of this post, are at least in theory capable of genuine **dynamism**. There are large and very real differences of culture between cities, so it's easier to find a single city where there is public interest in adopting any particular radical idea than it is to convince an entire country to accept it. There are very real challenges and opportunities in local public goods, urban planning, transportation and many other sectors in the governance of cities that could be addressed. **Cities have tightly cohesive internal economies where things like widespread cryptocurrency adoption could realistically independently happen.** Furthermore, it's less likely that experiments within cities will lead to terrible outcomes both because cities are regulated by higher-level governments and because cities have an easier escape valve: people who are unhappy with what's going on can more easily exit.⁷⁷

Buterin's arguments converge with those of Saskia Sassen: The key is the scale, but not in terms of number of residents or area. A city is sufficiently large to be able to embrace complexity, yet sufficiently small to be autonomous and embrace change. It has a multi-scalar character: their political infrastructure can override national law when urgency demands for it.⁷⁸ It has an impact on social, political and environmental challenges at global and national level. This is in part because management at a national or international level is too detached from processes they intend to transform, resulting in policies that are unable to attend to the realities faced by cities.⁷⁹ As a study object, cities could be thought of as the smallest unit one that can perform as testbeds for the adoption of innovative technologies such as blockchain. They are not enclosed units, but rather circuits, processes, systems, which instantiate different policy frameworks –supranational, national, subnational–.⁸⁰ The city scale has specific advantages: it is manageable, resilient, amenable to change due to resource efficiency –money, personnel, time–, allows for the simulation of rapid iteration cycles, facilitates data gathering and analysis, enables evaluation of regulatory frameworks and policies. In short, it provides a semi-controlled environment enabling informed decision-making before the implementation in larger urban areas, with global impact, and provide a quick response to the ongoing restructuring of a dynamic society.

⁷⁷ Buterin, "Crypto Cities." Emphasis added.

⁷⁸ Saskia Sassen, "Cities are at the center of our environmental future," *Revista de Ingeniería* n. 31, (May 2010): 73.

⁷⁹ *Op. Cit.*, 73.

⁸⁰ *Op. Cit.*, 82.

I.d Narratives of the city: Sassen, Castells and posthumanist urbanity

Panofsky on Gothic cathedrals, Tafuri on American skyscrapers, Venturi on the surprisingly kitsch American city, Lynch on city images, Harvey on postmodernism as the expression of time/space compression by capitalism, are some of the best illustrations of an intellectual tradition that has used the forms of the built environment as one of the most signifying codes to read the basic structures of society's dominant values.

Castells, *The Rise of the Network Society*, (1996)⁸¹

The city, with its metropolitan region, has historically stand out as strategic site where significant macro-social trends materialize, making them pivotal subjects for scholarly examination.⁸² By the late 1960s, critical scrutiny emerged, led by the Catalan sociologist Castells, who asserted urban questions were fundamentally societal. In the 1970s and 1980s, urban studies, influenced by Marxist critical theory and the works of theorists like Castells, Lefebvre, and Harvey, emphasized the city as a theater of class struggle, wealth redistribution, and political activism tied to citizenship rights and urban resources. The 1980s additionally brought feminist and race-focused perspectives and a growing interest in the global urban system and urban politics. Postcolonial critiques emerged in the 2000s, questioning the global North-centric nature of urban theory. Research then shifted to consider additional dimensions, including globalization's impact on city structures, and investigations into urban policy, governance, and the internal dynamics of cities.

What are the macro-social trends that materialize in new cities and how can blockchain technology contribute, enhance or shift, their development? Their brief history poses a challenge in defining these trends: most likely these will be more precisely defined in hindsight, a few years from now. However, Saskia Sassen⁸³ presents an interesting starting point, which I have regrouped into four major categories: The city can be understood as a key site⁸⁴ of 1) globalization, and new forms of citizenship; 2) the growing effect new information technologies have on socio-cultural diversity; 3) the environmental impact;⁸⁵ 4) the deepening of transnational dynamics and the shifting of power. These complex and multi-

⁸¹ Manuel Castells, *The Rise of the Network Society*, Second Edition ed. (Chichester: Wiley Blackwell, 2010), 448. Originally published in 1996.

⁸² Saskia Sassen, "The city: Its return as a lens for social theory," *Elsevier* 1, (2010): 1.

⁸³ Sassen, "The city: Its return as a lens for social theory.", 2.

⁸⁴ Sassen's work showcases how the urban environment is not only affected by these dynamics, but also contributes in actively shaping them

⁸⁵ Sassen, "Cities are at the center of our environmental future.", 1.

layered trajectories should be understood as mere patterns, incipiently identified, rather than fully established, in which the urban represents just a singular moment.

By presenting these trends with the prefix “post” the intention is to imply that today's naturalized concepts (the national, the human, the sustainable, capitalism) will inevitably tend to evolve. These developments are possibly latent in the current system. The aim is to understand the ideological changes that are taking place and to assess their potential impact on the urban landscape.

1. Post-nationhood: From Martinotti's Glamour Nodes to Crypto's Extravaganza

Social media's saturation has also enormously amplified and increased the complexity of what was once termed 'site and context' in the same measure that it has shrunk the half life of images to almost nothing.

Reiser+Umemoto, *Projects and Their Consequences* (2019).⁸⁶

What was once considered to be national (firms, capital, culture), can now be located outside of the national territory, like a foreign country or digital platforms⁸⁷. A city becomes a global city when its economic, cultural, social and political influence can be considered a hub, a key node, within the network of transnational corporations, financial institutions, and information exchange. Globalization is specific and partial, rather than all-encompassing: it connects cities through the intensity of flows (capital, people, institutions) instead of connecting them by proximity. This reconfiguration of centrality re-signifies emerging spaces like the digital one and challenges traditional notions of citizenship tied to the nation-state. One of the constitutive processes of globalization is immigration⁸⁸. As foreign communities interact, new forms of political and social identities are shaped, transcending national boundaries. The transmigration of people, –both rich and poor–, re-territorialize local subcultures, leading to new claims of the space, new entitlements and new forms of citizenship⁸⁹.

How this shift on the idea of nationhood, with its social, economic, political and cultural migrations, engenders a transformation of the urban physical landscape? Martinotti⁹⁰ suggest that the global city in its new urban form, will still contain towns and metropolitan areas that present continuity with pre-existing social orders. However, rather than their main focus being their inhabitants, they increasingly become the

⁸⁶ Reiser+Umemoto, *Projects and Their Consequences*, 22.

⁸⁷ Sassen, "The city: Its return as a lens for social theory," 4.

⁸⁸ *Op. Cit.*, 5.

⁸⁹ *Op. Cit.*, 7.

⁹⁰ Guido Martinotti, "Social Morphology and Governance in the New Metropolis," in *Cities of Europe: Changing Contexts, Local Arrangements, and the Challenge to Urban Cohesion*, ed. Yuri Kazepov (Malden: Blackwell, 2005), 91.

site for guests and visitors who showcase them through social media. In their ambition to become global, cities foster the spaces that are attractive to the social group which constitutes the network (i.e. *instagrammable*): airports, luxury hotels, offices, meeting places, Michelin restaurants and shopping centers proliferate to cater this transnational population of urban travelers. This is what Sassen⁹¹ has named the Urban Glamour Zone, characterized by the indifference and greed of elites.

Post-nationhood is also embedded in the discourse of the crypto world. If it were true that it could serve as money, digital currencies could destabilize the symbolic power and social hierarchies centralized institutions of today hold (central banks and governments). As their ability to influence interest rates, control money supply and regulate monetary policies diminishes, it could become harder for them to consolidate power. The idea of a currency that is not centrally governed, and is censorship resistant, therefore, challenges the monopoly of central banks and intends to reshape the global financial landscape. This thesis, widely cited and debated within the crypto ecosystem, has been formulated before the rise of blockchain technology, as early as 1997. James Dale Davidson and Lord William Rees-Mogg in their book *The Sovereign Individual*⁹² explore how the cyber economy could shift the power away from traditional nation-states to empowered individuals in the control of their own finances. An ideological successor to this idea is found in Balaji Srinivasan's book *The Network State*, which also had a major impact in blockchain discussions.⁹³ Srinivasan diverges from Davidson and Rees-Mogg's theory in the search for a broader political narrative for the blockchain community: rather than aiming to *replace* other types of government, network states are small communities organized around a shared vision on how to run their own society which grow large enough to seek political autonomy and diplomatic recognition.

This is a major theme stirring the narrative of some of the selected crypto city projects, albeit with variations in its interpretation and focus, which will be explored in the following chapters.

⁹¹ Sassen, "The city: Its return as a lens for social theory," 8.

⁹² This book has had major influence in the crypto discourse, being cited by figures like, among others, Ethereum founder Vitalik Buterin, economist Saifedean Ammous, author and entrepreneur Balaji Srinivasan. SeeL James Dale Davidson, Lord William Rees-Mogg, *The Sovereign Individual: Mastering The Transition To The Information Age* (New York: Touchstone, 2020).

⁹³ It was cited by Vitalik Buterin on Twitter, who has been a key figure leading the discussions around crypto.

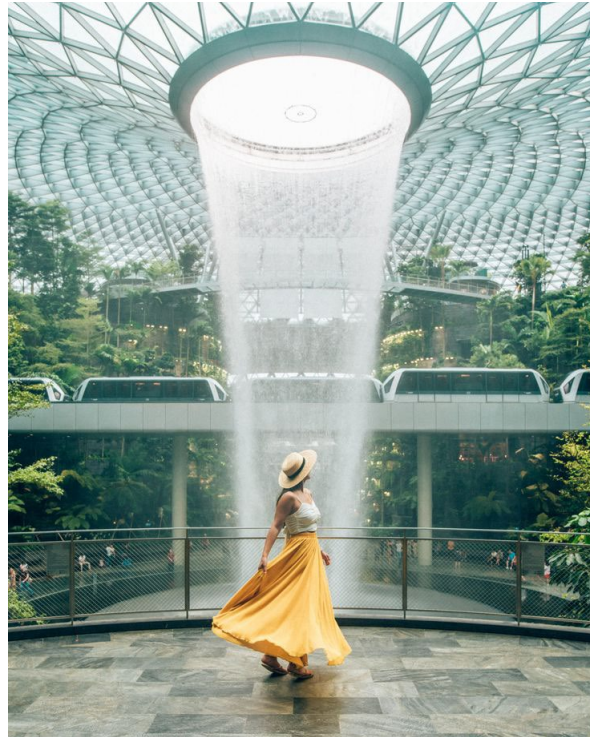


Figure 9: Influencer @jasminealley at Singapore's Airport Changi Jewel Vortex. Source: Jasminalley "Changi Jewel Vortex - My favorite Singapore Instagram Spot!" [Link](#).

2. Post-Human: From standardized décor to galactic memes

Thinkers like Bruno Latour have questioned, in the wake of new technologies, the traditional boundaries between apparently binary categories –human and machine, nature and culture, mind and body–. He suggests humans and nonhumans are intricately articulated, challenging the notion that technology is considered as a distinct category from humans. Our social values and subjectivity have been embedded into technology's design⁹⁴. By the same token, humans are no longer by themselves: Yuval Noah Harari in his book *Homo Deus*⁹⁵ suggests that the same technology used to amend illnesses can be applied to enhance human's physical and cognitive attributes. Importantly, he warns the shift from human to super-

⁹⁴ In his essay *Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts* sociologist and philosopher Bruno Latour introduces the door as a nonhuman: he destabilizes the notion of (what most people would consider) a technical artifact, a mundane object, to demonstrate it is actually a highly social actor. His exhaustive description of the hinges showcases the way in which human selective attitudes, such as holding the door for someone else who is behind, is taken over by the engineered nonhuman. Bruno Latour, "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts," in *Shaping Technology/Building Society: Studies in Sociotechnical Change*, ed. Wiebe E. Bijker; John Law (Cambridge: MIT Press, 1992).

⁹⁵ Harari defines an algorithm as "a methodical set of steps that can be used to make calculations, resolve problems and reach decisions. An algorithm isn't a particular calculation, but the method followed when making the calculation." By this definition, he argues an organism can also be understood as such. Yuval N. Harari, *Homo Deus: A Brief History of Tomorrow* (HarperCollins, 2017), 293.

human, or post-human, is not merely biological, it brings with it social shifts.

A question this brings is how does the post-human subject transform components of the city? What are the incipient trends in the characterization of the spaces occupied by them? i.e. how do post-humans express themselves spatially? According to Sassen, under the Fordist contract of mass manufacturing and mass consumption, the factory, in the outskirts of the city, emerges as a key site for political work. This led to the loss of significance of the city as a strategic scale for politics and creative institutional innovations.

The historicity of this process rests in the fact that under Keynesian policies, particularly the Fordist contract, and the dominance of mass manufacturing as the organizing economic dynamic, cities had lost strategic functions and were not the site for creative institutional innovations. The strategic sites were the large factory at the heart of the larger process of mass manufacturing and mass consumption, and the national government where regulatory frameworks were developed and the Fordist contract instituted. The factory and the government were the strategic sites where the crucial dynamics producing the major institutional innovations of the epoch were located. With globalization and digitization – and all the specific elements they entail – global cities emerge as such strategic sites. While the strategic transformations are sharply concentrated in global cities, many are also enacted (besides being diffused) in cities at lower orders of national urban hierarchies.⁹⁶

Although possibly this trend will be further deepened with digitalization, due to the upsurge in remote work, online shopping, virtual chatting, etc., according to Castells, both concentration and dispersal are taking place at the same time.

For instance, telebanking is spreading fast, mainly under the impulse of banks interested in eliminating branch offices and replacing them by on-line customer services and automated-teller machines. However, the consolidated bank branches continue as service centers, to sell financial products to their customers through a personalized relationship.⁹⁷

What are these spaces like? Although defining it as a single urban format proves challenging, due to the many expressions of the posthuman, it is possible to identify a tendency to create a globally unified spatial design *within specific brands*.⁹⁸ Examples include international hotels with standardized decor for a familiar inner world, VIP lounges at airports, and the branding of shops, particularly of tech products, which establish a specific aesthetic trying to position themselves as a pioneering reference of the future. The Apple shop, for example, is globally recognizable for its use of large glass walls, emphasis on natural daylight, minimalist interior, mainly white surfaces and wooden tables with integrated technology. Such imagery has then been associated with innovative technologies, but it does not exclude other formal

⁹⁶ Sassen, "The city: Its return as a lens for social theory," 9.

⁹⁷ Castells, *The Rise of the Network Society*, 427.

⁹⁸ *Op. Cit.*, 448.

expressions (like sci-fi looking spaces which replace daylight with neon lights) from similar associations.

Repeating design elements for social identity beyond the locality also resonates with the blockchain space. Trends in digital art, graphics for logos and websites proliferate at much higher pace, setting the base of vibrant colors and stunning compositions. Gold and green (associated with profit making) and blue (reminiscent of safety) are predominant. The designs are often reminiscent of images from science fiction and video games, incorporating purple and galactic themes, typical of the ethereal nature of cryptocurrencies. With multiple interactive screens, or virtual and augmented reality experiences, spaces often display memes that appeal to the humor characteristic of the community.



Figure 10: On the left, Apple Store in New York, by Foster+Partners, 2019. On the right, an NFT gallery designed by ZHA. Sources: Pintos, P. "Apple Store Fifth Avenue / Foster + Partners" ArchDaily; Stouhi, D. "Zaha Hadid Architects Presents Virtual Gallery Exploring Architecture, NFT's, and the Metaverse" ArchDaily.



Figure 11: On the left, images of videogames, (PUBG Battlegrounds on the top, Fortnite on the bottom). On the right, images of crypto-cities with a similar dreamy, science fiction look-and-feel (Telosa on the top, Bitcoin City on the Bottom).

3. Post-Sustainability

Amid the global environmental urgency, cities have increasingly been at the center of the debate,⁹⁹ focusing on their resources to make a positive climate impact. The term “sustainable” has proliferated, referring to the ability to maintain or sustain practices (like urbanization) over the long term. These practices include generating renewable energy, waste recycling, selecting eco-friendly materials, integrating green spaces, developing pedestrian oriented communities, incentivizing the repurpose of existing buildings, and implementing water-saving technologies.

However, current levels of consumption and growth are at odds with any notion of sustainability. Jane Jacobs was mocking the simplified modernist images of urban greenery as early as 1961: “The first necessity in understanding how cities and their parks influence each other,” she writes, “is to jettison confusion between real uses and mythical uses –for example, the science-fiction nonsense that parks are ‘the lungs of the city.’ It takes about three acres of woods to absorb as much carbon dioxide as four

⁹⁹ Sassen, “Cities are at the center of our environmental future,” 1.

people exude in breathing, cooking and heating.”¹⁰⁰ Despite this, the idea of sustainable practices has increasingly been incorporated into the architecture and city design agenda. Environmental certifications, as Reinier de Graaf shows, are increasingly systematically and widely applied, based on a weighting system of dubious credibility, but whose economic benefits have been recognized by developers who admit that it means higher rents and lower vacancy. This higher profit derives in the pursuit of scores through apparently absurd resources such as the use of low-emission paints and the installation of video game rooms for employees.¹⁰¹

Mohsen Mostafavi¹⁰² urges for a broader and more complex approach to sustainability, beyond mere technical performance. He promotes instead an ecological concept: the interaction of subjects with one another and with their environment, which is no longer merely natural, or organic, but social. This perspective acknowledges the multifaceted essence of urban systems, which incorporate social, political, economic, and cultural dimensions into urban planning. It underscores the importance of understanding interactions between agents human, non-human (and now also post-human) together with processes like biodiversity, resilience, and adaptation.¹⁰³ This transition sees design operations evolving beyond mere functionality to also circumscribe the user experience: a water fountain transforms from a mere urban necessity into a source of pleasure.

Blockchain technology’s impact on sustainability has also been questioned: the process of validating transactions on the Bitcoin network requires a great deal of computing power and consumes exorbitant amounts of energy, leading to its consumption being compared to that of entire countries.¹⁰⁴

The sustainability regarding Bitcoin has been, in many occasions, clouded by misinformation.¹⁰⁵ Its calculation is complex: often done by estimating the revenue and working backwards, assuming a fixed portion is spent on expenses like electricity and hardware. This methodology is questionable due to the high fluctuation of Bitcoin price. Recognized leading expert in understanding the environmental impact of information technology Jonathan Koomey¹⁰⁶, estimated Bitcoin consumes about 0.2% of global electricity

¹⁰⁰ Jane Jacobs, *The Death and Life of Great American Cities* (New York: Vintage Books Edition, 1992), 91.

¹⁰¹ Reinier de Graaf, *Architect, verb: The New Language of Building* (London: Verso, 2023), 67.

¹⁰² Gareth Doherty, Mohsen Mostafavi, *Ecological Urbanism* (Zürich: Lars Müller Publishers, 2016), 5.

¹⁰³ This concept of ecology as a dynamic and intricate system of relations is taken from Felix Guattari, who rejected the dualistic separation between humanity and nature.

¹⁰⁴ See Dávila, J. *Blockchain Radicals*, 196. Ethereum, for instance, uses a mechanism for validation of collaterals, where anyone with a sufficient number of coins in their wallet can run the nodes on a traditional computer.

¹⁰⁵ Davila, J. *Blockchain Radicals*, 191.

¹⁰⁶ Chris Calwell Jonathan G. Koomey, Skip Laitner, Jane Thornton, Richard E. Brown, Joseph H. Eto, Carrie Webber, and Cathy Cullicott, "Sorry, Wrong Number: The Use and Misuse of Numerical Facts in Analysis and Media Reporting of Energy Issues," *Annual Review Of Environment And Resources*, 27, (2002).

use, which is almost half what has been generally claimed.¹⁰⁷

As the environmental discussion raised in the 1990s, consolidating its place on the global political agenda, the economy became the means to tackle the problems.¹⁰⁸ Instead of evaluating transnational corporations's impact, they installed the parameters to which the environmental concerns should be discussed.

Sustainable design (or its narrative) has been present in crypto cities, with initiatives for the use of renewable energy sources: a volcano in the case of Bitcoin City, solar panels and windmills in the case of Telosa. These well-intended practices entail argumentative distortions, since they omit that the changes depend on the power of institutions that, driven by economic interests, have been delaying the abandonment of fossil fuels for half a century.¹⁰⁹

The upcoming chapters aim to uncover how these endeavors contribute towards decentralization, shifting focus away from their technical details or carbon footprints, and instead elucidating their role in fostering collective action against the centralization which allowed the exploitation of the Earth's finite resources.

4. Post-Capitalism: An alternative to Varoufaki's Techno-Feudalism

Feudalism had died and gradually but fast was replaced by something called capitalism. The magnificent shift of power from the owners of land to the owners of machinery (...). My view is that we are already experiencing a similar transformation(...) to something like feudalism but a very technologically advanced version of it. Markets have been replaced by platforms.

—Yanis Varoufakis, "Capitalism as we know it is over" (2023).¹¹⁰

Allow me to give you the economic definition [of capital]: it's not money. Capital used to be something really simple before capitalism. It used to be a produced means of production. (...) A plow steel, a fishing rod, these are produced means of production. That's what capital used to be. Now what capitalism did was (because capital predates capitalism by millennia) [to] transfer social power from those who had

¹⁰⁷ Jonathan Koomey, "Estimating Bitcoin Electricity Use: A Beginner's Guide," *Coin Center*, 1, (May 2019).

¹⁰⁸ Graaf, *Architect, verb*, 76.

¹⁰⁹ Davila, J. *Blockchain Radicals*, 201.

¹¹⁰ "Capitalism as we know it is over, so what comes next? | My Wildest Prediction with Varoufakis" Youtube Video. Posteadó por @euronews. 20 de diciembre, 2023. [Link](#).

land to those who owned capital. Up until the end of the late feudal era, power emanated from land ownership with the creation of the working class. The erection of the first factories were machine-based. You had a shift of power from the owners of land to the owners of capital.

–Yanis Varoufakis, “Technofeudalism and Cloud Capital” (2022).¹¹¹

The contemporary economic landscape is marked by significant deviations from what classical capitalism envisioned, giving birth to what Yanis Varoufakis called post-capitalism.¹¹² The following paragraphs further develop this idea, showcasing the emergence of a new type of capital –cloud-capital–. A question that arises is, if, as Sassen argues, cities have historically functioned as arenas where power is spatially manifested,¹¹³ then what impact does this relocation of capital ownership have on the built environment? What characterizes the spatial elements of the existing economic system, dominated by digital capital? It is necessary, before addressing these questions, to review capitalism’s evolution and the reasons why Varoufakis argues for its end.

The Keynesian model of economic growth,¹¹⁴ which delivered exceptional economic prosperity and societal stability for nearly thirty years following the conclusion of World War II, encountered its inherent constraints during the early 1970s. The Bretton Woods System, which had fixed exchange rates to the U.S dollar, pegged to gold, had governed international monetary relations since the end of WWII.¹¹⁵ However, for the dollar to be the globe’s currency at fixed rates, the US had to sell more goods and services than what it consumed. Yet by the 1960s, the US became a chronically deficit economy,¹¹⁶ which

¹¹¹ Varoufakis' theories are largely influenced by the Marxist view that capital is not just accumulation of wealth, but a social relation, leading to the exploitation of labor by capital. See: Varoufakis, *Technofeudalism*, 182; “Technofeudalism and Cloud Capital: A Conversation with Yanis Varoufakis” Youtube video. Posted by @stanfordingovernmentsig5480. July 11, 2022. [Link](#).

¹¹² Economist and former finance minister in Greece.

¹¹³ Sassen, “The city: Its return as a lens for social theory,” 6.

¹¹⁴ British economist John Maynard Keynes led a significant shift in economic thought by challenging the then prevailing notion that free markets alone could ensure full employment. He introduced the concept that aggregate demand, encompassing spending by households, businesses, and government, drives economic activity. He argued that free markets lack inherent mechanisms for achieving full employment and justifies government intervention to promote employment and price stability. Ahmed Saber Mahmud Sarwat Jahan, and Chris Papageorgiou, “What Is Keynesian Economics?,” *Finance & Development* 51, no. 3 (2014).

¹¹⁵ Aside from the Bretton Woods system, other factors contributing to the constant demand for the US currency included the increased globalization of trade, finance and investment, the growth of the information technology industry, and the agreements between the United States and major oil-exporting countries which established the dollar as the currency for oil export. These elements positioned the dominance and stability of the country (symbol of capitalism) as a major world power. Since then, the United States has absorbed much of the surplus industrial output from the rest of the world, which would return to Wall Street as direct investment to U.S. corporations, creating a global circular flow of goods and capital.

¹¹⁶ Three developments that immensely contributed to this deficit were: the substantial military spending in the Vietnam War; other countries’ factories – like Japan and Germany– surpassing American quality and efficiency (partly due to support these countries received from US governments); and the implementation of ambitious social programs under President Lyndon B. Johnsons.

gave way to rampant inflation and the collapse of Bretton Woods.

A new type of capitalism emerged, mainly characterized by the shift in economic policies, limiting fixed exchange rates and relying more heavily on market-oriented regulations. Privatization became a central tenet of economic policy. In this context, the United States managed to keep its role as the leading global economy, despite the fact that it consumed more than it produced. This was done by running trade deficits, primarily with Europe and Asia, that sucked in the surpluses of other countries: as the US increasingly spent on foreign products, in dollars, foreign countries have excess savings, which they then reinvest back in the US. Thus, the country developed a heavy reliance on capital inflows from abroad to finance their deficit, in the form of stocks, bonds, real estate, or foreign central banks purchasing U.S. Treasury securities. This dynamic, inherently imbalanced, relied on ever-growing debt and consumption in the United States. Varoufakis argues that this capitalism, created after 1971, broke down with the Lehman Brothers collapse in 2008.

To avoid a second Great Depression, the central bank intended to save capitalism by printing money and throwing it back at the same bankers “whose quasi-criminal activities brought misery to the majority,” to put it in Varoufakis’ words¹¹⁷. This flow of new cash never came back as investments generating good-quality jobs, mainly because interest rates tanked causing capitalists to panic and refrain from such investments. Instead, shareholders directed their money into purchasing art, land, warehouses, clubs, superyachts, decoupling hard work from rising living standards.

As central bank money flowed with little resistance, and every share, bond or asset raised, talented entrepreneurs like Jeff Bezos and Elon Musk were able to build up their ultra-powerful companies without needing to sell large portions of their business, generate large profits to pay for new capital stock, or borrow money from the bank (the three things traditional capitalists had to do to expand). With the central bank trapped into printing more money, and the pandemic boosting the system, shares in companies skyrocketed, regardless if they turned profit or not. This was the opportunity to establish total market dominance. Using their shares as collateral, they paid for artificial intelligence research, trained software developers and engineers, bought promising startups, not in the search for profit, as capitalists would, but in the search of a new type of capital (cloud-capital).

This radically shifts the power structure because it is a means of production that is not created through waged labor, but by likes on Instagram, searches on Google, purchases on Amazon, posts on Twitter. It is produced by a great portion of humanity, through content, but only a very few individuals are getting paid for it. Such concentration of wealth and power in the hands of a few contradicts the ideal competitive marketplace, the hallmark of capitalism. Thus the name techno-feudalism: because of its marked

¹¹⁷ Yanis Varoufakis, *Technofeudalism: What Killed Capitalism* (London: The Bodley Head, 2023), 99.

resemblance to a system in which the accumulation of wealth is controlled by a minority.

Techno-feudalism is founded on two pillars. (1) the heavy involvement of governments and banks in economic affairs, which goes against the principles of capitalism because, as money is printed, everyone's salary loses purchasing power, replacing capitalist's profits (2) the replacement of marketplaces by platforms, with hyper-customized algorithms for each consumer, capable of persuading individuals to consume certain products.

A question that arises from this is, does blockchain technology pose an alternative to this tendency of concentration of power? The question is not whether or not blockchain is the *solution*, as its many downsides have prevented it to become economically significant. Its inability to surpass the challenges might even mean it will never become mainstream. Nonetheless, because it operates without a single decision-making authority, relegating power ownership across the network nodes, it is worth asking how this could enable a shift of property rights over, among others, information, the network, land, vehicles, art and energy i.e. capital. Even if crypto is indeed a false promise, the experiments with blockchain might help elucidate what social trends are being shaped as an alternative to techno-feudalism.

What are the spatial implications of the existing economic system, characterized by a notable consolidation of capital ownership? Sassen suggests that cities increasingly become the preferred site of central functions, including the need for central coordination of factories and service outlets, finance and corporate services, which heavily rely on social networking, and proximity to infrastructure and support services like universities and research institutions that make the city attractive as a global hub. It is hard to predict if a shift in the ownership of capital, from private businesses to the network, would radically impact such need for physical concentration because the dynamics of technological innovation, regulatory frameworks, and socio-economic factors would all play crucial roles. Moreover, digital models quickly test some of these ownership transfers. CityDAO, for example, explores the decentralization of ownership of land; Decentraland simulates the decentralization of money, land, art and clothes. The next chapters intend to untangle these alternatives to techno-feudalism.



Chapter II. Volcanic Story: Shaping Bitcoin City's Identity

II.a Intro to Chapter II

As mentioned in the introduction, the goal of this thesis is to understand both the current status of crypto city initiatives and their insertion into a longer genealogy urban model development—either enabled or fostered by new technologies like blockchain—. This pursuit amounts to determining if and how crypto cities have followed, adjusted to, or introduced novelties in, the prevailing trends of urban production globally.

Chapter II analyzes Bitcoin City, a project propelled by Nayib Bukele, president of El Salvador, and designed by the Mexican-based architectural studio Fernando Romero Enterprise (FR-EE). This project is touted as innovative due to its supposed ability to operate with, and mine, Bitcoin using geothermal energy from a nearby volcano. While much of the debate around it jumps to the question *is it desirable?* I suggest asking: *why do its promoters find it desirable?* In other words, what agenda is being pursued, and how is digital technology intended to deliver it? The vision behind the proposal is expressed in the narrative delivered by the president Bukele and architect Romero. To understand the origins and purpose of Bitcoin City, I will also look at the context of El Salvador, its economy, and politics, as well as the legacy of urban models that serve as a substrate for its development.

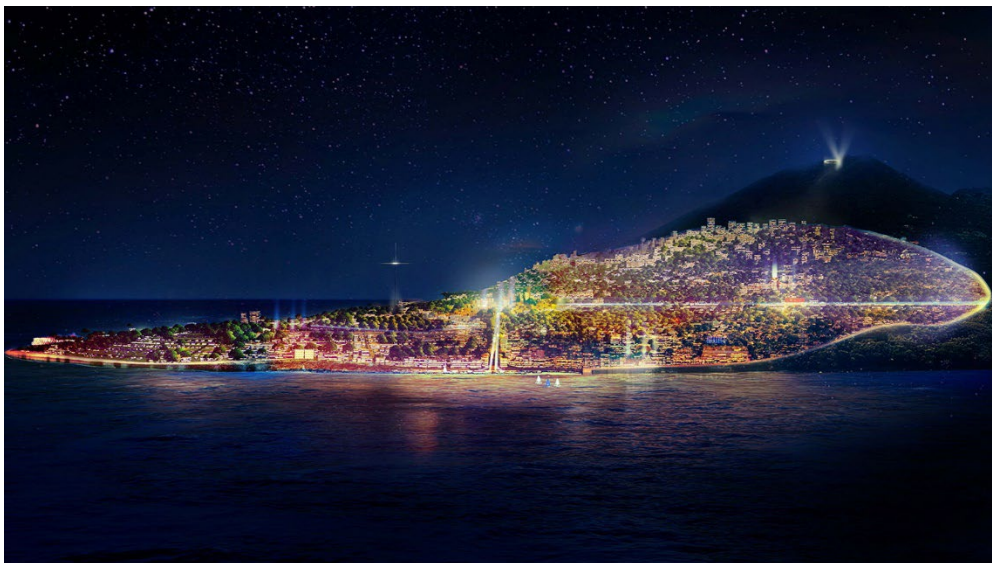


Figure 12: Render of Bitcoin City at night. The image shows vibrant, almost unrealistic colors, emphasizing the volcano in the background and the port in the foreground. Source: Ravenscroft, Tom. 2022. "El Salvador's President Reveals Design for Volcanic Bitcoin City." Dezeen. May 12, 2022. [Link](#).

II.b New Alexandria's Bid for Financial Hegemony

Bitcoin City was announced by president Bukele on November 20, 2021 at the closure of *Bitcoin Week*, a conference held in San Salvador almost six months after the country had sanctioned cryptocurrency as legal tender. Set to be built on the Gulf of Fonseca on the southern coast of the city, Bukele presented it to a cheering crowd confidently speaking in English. Stoked by extensive fireworks, led graphics, and an AC/DC song playing loudly in the background, he recalled that,

When Alexander the Great was conquering the world, they established these Alexandrias and the whole point of the Alexandrias [is that they] were very small pieces of land. If you would think about cities at that time, they established 20 Alexandrias all over the empire. The idea of these Alexandrias was not to cover the territory –which was immense–. The Alexandrias were actually very small, but the idea behind it was to make these Alexandrias be the **beacons of hope** for the rest of the world. That all of the world could be like that. Of course, Alexander the Great died and the empire divided. You know the rest of the story. But that was the idea. So, I thought, if you want **Bitcoin to spread all over the world**, we should build some Alexandrias, right?¹¹⁸

By creating *his* "Alexandria" of the modern era, he would spread the adoption of the cryptocurrency worldwide, much like the intended influence of the ancient Alexandrias. Speaking at a Bitcoin conference, however, Bukele took concepts and opinions for granted. What were his presumptions? Why did he consider Bitcoin “a beacon of hope” and expect it to spread the world over? What other agendas upheld his project? Let us recap some technical concepts underpinning Bitcoin.

¹¹⁸ @surfinbitcoin. 2021. "Bitcoin City & Bitcoins Bonds Announcement by El Salvador's President Nayib Bukele." YouTube. November 21, 2021. [Link](#).

- Bitcoin's creator, an unknown figure or group under the pseudonym Satoshi Nakamoto, intended to create a digital cash system in 2008.
- The main breakthrough was the combination of already existing technologies to solve the double-spend problem, guaranteeing a coin is not duplicated but legitimately transferred once when used.
- Bitcoin can validate and record transactions without centralized authorities, i.e. it automates through software the functions of modern central banks.
- Because everyone can access and audit the ledger, the code is almost impossible to alter.
- Transactions are recorded in a series of blocks, linked to each other through digital fingerprints (hashes), to ensure the history (ledger) is immutable even in the presence of unreliable actors.
- The three functions of money, which Bitcoin intends to fulfill, are:
 - To serve as medium of exchange
 - To serve as store of value
 - To serve as unit of account
- Bitcoin is touted as a way towards financial inclusion because a smartphone and an internet connection are all that is necessary to use it, thus (theoretically) avoiding restrictions imposed by the banking system.

Most Bitcoin advocates emphasize their distrust of governments. For currencies to be a reliable store of value, they argue, they have to beat the “easy money” trap: the currency must increase in value when people seek it for storing wealth, while its supply must be limited to prevent its price from dropping. Beating this trap is essential.¹¹⁹ Although Bitcoin is designed to overcome this hurdle, its defenders overlook the importance of the role governments play -through monetary policy and taxation- in ensuring the stability of the money market.¹²⁰

Throughout modern history, gold has consistently maintained its dominance in the monetary arena. This is due, on one hand, to its unparalleled chemical stability, and on the other, to its scarcity and slow rate of growth. Over the past seventy years, gold's growth rate has hovered around 1.5%, never surpassing the 2% threshold. This has rendered it practically infeasible for gold miners to extract quantities substantial enough to exert significant downward pressure on its price.¹²¹ Similarly, Bitcoin has a set production schedule. Its supply is capped by design at 21 million, the offer decreasing gradually (also by design) until drying up estimated to be in the year 2140. While physical coins are minted, new bitcoins are created through a process called mining. Nodes running special hardware compete against each other at number crunching, consuming vast amounts of electrical power (the software has to try out many combinations). Once a node cracks the encryption, the rest of the nodes can validate it as correct.¹²² The winners of this

¹¹⁹ Saifedean Ammous, *The Bitcoin Standard: Sound Money in a Digital age* (Newark: John Wiley & Sons, Incorporated, 2018), 899. Kindle.

¹²⁰ Dávila, *Blockchain Radicals*, 61.

¹²¹ Ammous, *The Bitcoin Standard*, 904.

¹²² The complexity of this puzzle increases over time to compensate for higher speed software updates.

race get to add a new block to the blockchain, and are rewarded with new Bitcoins. The value of the reward for adding the new block to the chain halves every 210,000 blocks.¹²³ As blocks are created every approximately 10 minutes, halving events take place around every four years. The rate of bitcoin creation thus decreases over time until the maximum supply is reached.

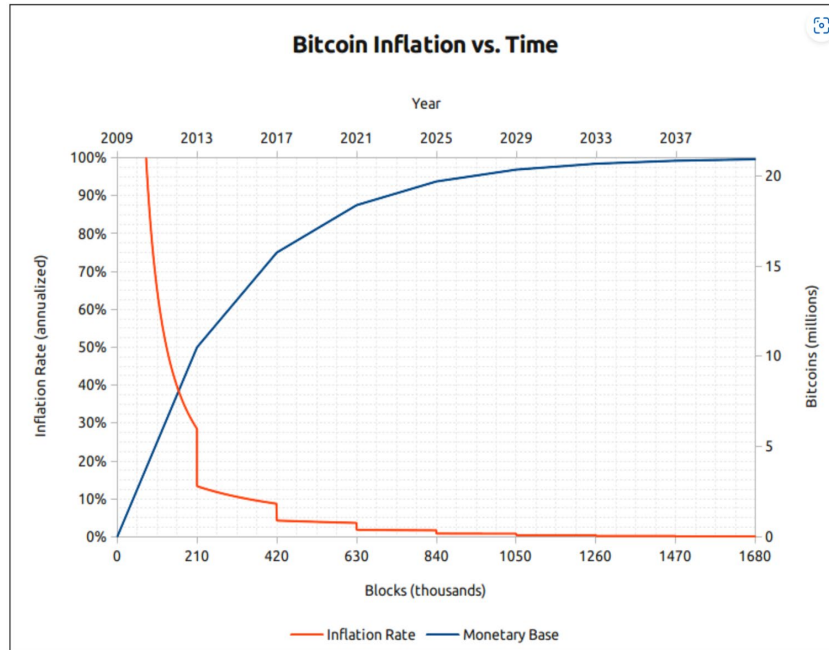


Figure 13: Graph showing Bitcoin’s inflation rate and monetary base over time, measured in number of blocks. Source: “Bitcoin Block Reward Halving Countdown” [Link](#).

This limitation in supply renders Bitcoin unresponsive to demand changes, making its price highly volatile. For most products, fluctuations in demand prompt an increase in production, which tempers price increases and boosts profitability. On the contrary, a drop in demand, will lead to supply reduction, minimizing losses for producers. Bitcoin’s volatility (fluctuation can reach 5% relative to the US dollar in a single day) has led governments to argue that it is unsuitable as a unit of value, making it more akin to speculative investment products like stocks.¹²⁴ It might be a contradiction for money to act both as an investment, and as the means of exchange most people use for their daily needs.¹²⁵

A devotee like Saifedean Ammous, on the other hand, believes Bitcoin can be regarded as an investment only because it constitutes less than 1% of the global money supply. If Bitcoin’s share of the global

¹²³ The first halving event occurred on November 28, 2012 at block height 210,000, the second on July 9, 2016 at block height 420,000, the third on May 11, 2020 at block height 630,000. As of the time of writing, the block reward is 3.125 coins per block, after the halving of April 2024. “Bitcoin Block Reward Halving Countdown,” accessed May 24, 2024, [Link](#).

¹²⁴ Nouriel Roubini, “Exploring the Cryptocurrency and Blockchain Ecosystem,” (U.S. Government Publishing Office, 2018). [Link](#).

¹²⁵ Dávila, *Blockchain Radicals*, 67.

money supply became a majority, its demand and predictability would become increasingly stable.¹²⁶ Hypothetically, should it be the only currency used globally, given its fixed supply, a change in demand will be marginal compared to the quantities held by big banks and institutions (see Figure 13).

Bukele's hiring of Ammous as economic advisor suggests their agendas are aligned.¹²⁷ The president of El Salvador's interest in Bitcoin becoming adopted globally is founded on the possibility of it acquiring stability and rising in price. Early adopters such as El Salvador would benefit significantly from this as it will become progressively more expensive for later central banks to buy it. In Bukele's own (informal) words:

Bitcoin is going to change the world. It has already changed, but it's going to change even more. A lot of people don't know about the history of money. I won't tell the history of money, don't worry. But, you know, this is normal evolution. So it's not just a good or cool, or a nice idea. It's the evolution of humankind. We're going there. You can't stop evolution. No, we just can't. It just happens. So it doesn't matter if we build Bitcoin City or not for the evolution of bitcoin. If we issue some bonds, or if we do this event: it will evolve regardless because that's the way it is. But it's nicer if we are part of it. So it's nicer if we push it a little. It's nicer if we make it legal tender. It's nicer if we build a city or 10 cities or 20 cities like the Alexandrias. So, you know, it's nicer. It doesn't have to be that way, but I think it's going to be better if it is that way. So, in the end, it's for us. **It would be nice to be the financial center of the world.** Yeah, it sounds cool to us. So it doesn't matter probably for bitcoin, but yes it matters for us. And I think we can make it even better and we can push the future even forward.

Bitcoin's neutrality in the international ecosystem (no single country has the exorbitant privilege of issuing it) is understandably interesting for El Salvador, considering its dire economic situation. While the economic, social and political complexity of El Salvador exceed the scope of this investigation, it is important to note that, since January 2001, the nation's traditional currency "Colón" was dropped for the United States Dollar by the political party opposite to Bukele's. With poorly diversified exports, deficiency in the supervision of the financial system and little foreign investment, the economy is highly dependent on remittances.¹²⁸ Dollarization came at the expense of greater exposure to external adversities, such as an earthquake, or a decrease in such remittances. In a dollarized context, events of that sort would force the country to increase its reliance on external debt, affecting its sovereignty in terms of decision-making and policy autonomy.¹²⁹

¹²⁶ Ammous, *The Bitcoin Standard*, 4831.

¹²⁷ Bitcoin Magazine [@BtcCasey], "The Bitcoin Standard Author Saidedean Ammous Joins El Salvador's National Bitcoin Office as Economic Advisor," *Bitcoin Magazine*, May 23, 2023. Accessed May 22, 2024. [Link](#).

¹²⁸ Carlos J. Glower, "La dolarización en El Salvador: Lecciones y advertencias para la región." *Nueva Sociedad*, 172, (Marzo-Abril 2001): 150-163.

¹²⁹ The International Monetary Fund (IMF) has warned El Salvador against the adoption of the cryptocurrency, with its main concern being the high volatility of the price and its implications on macroeconomic stability.

Bukele's wager might be that Bitcoin will one day fulfill all three functions of money, becoming the world's main currency. In that context, early adoption of Bitcoin would constitute an opportunity to boost El Salvador's economy as well as its political sovereignty. The creation of a new city would give strategic visibility and materiality to that initiative, resembling the manner in which the Alexandrias of antiquity became emblematic of Alexander the Great's imperial vision. Or, at least, that is how Bukele sees it.

II.c Adapting Cities

The creation of a community, now both a local and global urgency, is perhaps the highest calling of an architect, as it requires the architecture to be neither under – nor overdetermined.

Reiser+Umemoto, *Projects and Their Consequences* (2019)¹³⁰.

Bitcoin City is a circular city organized radially, with multiple centers of activity spread across the territory. The design by Fernando Romero Enterprise emerged as an adaptation of an urban concept developed in 2012 (see Figure 14).¹³¹



Figure 14: On the left, the first render published of Bitcoin City. On the right, a render of Fr-ee City. Both projects are from Fernando Romero Enterprise. Sources: "Bitcoin City in El Salvador," *Arquitectura Viva* (2023).; "Fr-Ee City." 2012, [Link](#).

The 2012 prototype had consisted of 100,000,000 m² for building new cities in emerging economies. The

¹³⁰ Reiser+Umemoto, *Projects and Their Consequences*, 38.

¹³¹ "Milan Design Week with Fernando Romero | MINDED Podcast." YouTube video. Posted by @createurs_design_association. April 24, 2023. [Link](#).

proposal, titled Fr-ee City, merged three typologies: a radial structure, hexagonal connections and an urban grid. This organization sought to create a hierarchical zoning strategy while optimizing proximity between zones. All residents live within 8 minutes walking distance to a tram station. With an efficient public transit network, the urban model remains free of cars. Fr-ee City is presented as an opportunity to “enjoy the liberties of urban life in a holistic economy” (although the precise ways in which it aims to achieve this remain unclear). The official abstract of FR-EE City reads:

Envision a place where residents are guaranteed security, healthcare and education, a city where access to information is unrestricted and innovative technologies are fully integrated into everyday life. What if policy-making was determined by factual data and not political disputes? Cities must embrace these types of opportunities and help redefine the way we live today.¹³²

Its almost explicitly libertarian ideology is perhaps the main reason why Bukele approached FR-EE to adapt the concept for his vision of Bitcoin City: the key words being liberty, security, unrestricted information, innovative technology and a (dystopian?) vision of a world lacking political disputes. Put differently, if the promotion of Bitcoin City serves as a narrative strategy to encourage currency adoption, it follows that libertarian ideologies must be in harmony with it. More pragmatically perhaps, Bukele’s decision to commission the project to Fernando Romero can also be attributed to the office’s trajectory in designing large-scale projects. With offices in New York, Mexico City, Madrid, and Shenzhen, and a portfolio that ranges from airports to museums and hotels, Romero is seen as capable of delivering iconic buildings and urban projects. The firm has experience collaborating with international architecture firms, such as Foster and Partners, as they did in their aborted design for Mexico's City new airport.

Understanding Bitcoin City as an adaptation of FR-EE City is key to grasping its character. While Bitcoin is depicted as a disruptive turn towards libertarian values, FR-EE City highlights that these values do not solely stem from the technology itself. In other words, it suggests a non-linear relationship between technology and urban form. This does not diminish the role of innovation, but suggests that it can be understood as a buildup of small mutations added to existing trends. What are these trends and how do they mutate?

¹³² "FR-EE City," FR-EE, 2012, Accessed May 24, 2024, [Link](#).



Figure 15: Bird-eye view of Bitcoin City. Emphasis is made on the city's connection with the world through the port. Source: Ravenscroft, Tom. 2022. "El Salvador's President Reveals Design for Volcanic Bitcoin City." Dezeen. May 12, 2022. [Link](#).

Martinotti proposes –as referenced in Chapter I- that a city's ambition to become relevant globally can be detrimental to the life of permanent residents. Expats and tourists, on the contrary, are welcome agents as they bring in talent and capital, while pushing the circulation of the city's icons (airports, luxury hotels, museums) through social media. In order to target influencers, young professionals, and digital nomads, Bukele chose to broadcast Bitcoin City using English and a Twitter account. On 10th of May 2022 he uploaded seventeen images, including photos of himself and Romero looking at two physical models – one of the entire city, in gold, and one of the airport in silver–, renders of the project from afar, and a rendered plan view.



Figure 16: On the left, photograph of Fernando Romero and Nayib Bukele with Bitcoin City's city model. On the right, photograph of the model of Bitcoin City's airport. Source: Nayib Bukele, "Bitcoin City is coming along beautifully <3," Twitter. May 10, 2022, [Link](#).

If the project follows the trend of highlighting airports as gateways and emblematic symbols of connectivity, the choice of gold as the color of the physical model can be read as a further evolution of such trend. The identity is not just glamorous; it is tailored to suit the particular exuberance of the Bitcoin community. Another way of creating a distinctive identity, Romero explains, was through the design of the Central Plaza.¹³³ This follows the tradition of Spanish colonial urbanism: the plaza was traced first, followed by to the church as the main authority.¹³⁴ However, if the church became the heart of the city, providing cohesion, economic stability and ideological unity, this anchor has been replaced in Bitcoin City with a museum showcasing the (hi)story of money.¹³⁵

¹³³ "Milan Design Week with Fernando Romero | MINDED Podcast." YouTube video. Posted by @createurs_design_association. April 24, 2023. [Link](#).

¹³⁴ The foundational act was carried out in the company of a hierarch of the Church and a representative of the law. The former fulfilled the function of sealing the foundation and legitimizing the baptism. Generally, it culminated with a mass. The legal representative of the institutionality gave the legal framework. All this was sentenced through a written document, which served as a faithful testimony. The first area to be delimited was the main square, where, first of all, a space was assigned for the church, one of the first and most outstanding constructions, which generally had a dome as a symbol to demonstrate its greatness and the authority that the Catholic Church would have there. Likewise, the Plaza Mayor was the seat of the executive branch of government, such as the palace for the Mayor's office or the town council, and of the representatives of the legal system. See: Jacinto Chozas Marta C. Betancur, Gustavo Muñoz, *Narrativas Fundacionales De America Latina* (Sevilla: Thémata, 2010).

¹³⁵ Parenthesis added.



Figure 17: On the left, the bull of Wall Street: a bronze sculpture representing the financial district and the capitalist marketplace of the stock exchange. On the right, its re-interpretation for the Bitcoin Conference held in Miami in 2022. Identities are created by exploiting already established symbols. Source: Eva Marie Uzcategui “Bitcoin Extravaganza is ‘All About Eye-Catching’ Post Pandemic” Bloomberg News (2022).

Also mentioned in the introduction is the (trend toward) reliance on renewable energy sources. Bitcoin City pushes this in an unprecedented direction: instead of proposing solar panels or windmills, the main energy source is a volcano. A holistic analysis of these trends (not only considering climate change but also the social and economic dimensions) is developed in the next section.

II.d Looking South: Insights from Brasilia

If the city is indeed the strategic site where significant macro-social trends materialize, every new city faces the challenge of having to create their own culture.¹³⁶ Although sometimes there is a narrative (or illusion) of starting from scratch, a blank slate, there is always at least some degree of context –either a local history or a current global trend.¹³⁷

While Romero is aware of this challenge and the reasons why new cities have been criticized in the past, it is interesting that rather than pretending to start from a blank slate, he acknowledges other new cities as part of his context:

When you analyze the history of cities designed by architects, like [Brasilia, Masdar City], there's always two different views. Number one is: “it failed, because it didn't achieve this or that humanitarian quality”. On the other hand, “it was super successful, because they managed to develop this neo-political center, for example, the case of Brasilia.” **I think that requests a presidential leader** that has a vision to develop a new place in the country. El Salvador is quite singular for many reasons: one is the dimension of the country: it's quite small. Also, when you see the map, it's helpful that the country is not developed. (...) It's really an extraordinary vision to try to really boost the economy of the

¹³⁶ Sassen, “The city: Its return as a lens for social theory,” 1.

¹³⁷ This is the case of the City of Telosa, where the project is presented as planned on a white canvas. Similar considerations apply to the startup mentality, often founded on the idea that something is being created out of nothing. @cityoftelosa7330. 2022. “City of Telosa – Introduction.” YouTube. July 12, 2022. [Link](#).

country, boost employment, boost the destination, boost tourism. They have beautiful beaches in that area so it's also going to develop the country by bringing more remittances or bringing more resources, more investments.¹³⁸

Romero's interest in Brasilia can be understood from three perspectives. Firstly, the task of establishing identity in the process of creating a new city. Here lies the established conundrum of the architectural representation of the state, the dual pressure to symbolize progress and exalt national myths. The Mexican monumentality that emerged during the 1950s was linked to the centralization of institutions and the consolidation of a comprehensive vision of national culture rooted in the extensive pre-Columbian heritage. However, Brazil lacked an equivalent pre-Columbian monumentality, so when Lucio Costa designed the plan for Brasilia and Oscar Niemeyer projected the main institutional buildings, they created a language of monumentality using primarily technocratic rhetoric and modern language.¹³⁹ Secondly, Brasilia is culturally proximate, in the context of a developing Latin American nation. Looking south rather than north, resonates with Bukele's intention of making El Salvador the financial center of the world, displacing the traditional relevance of northern countries. Brasilia aimed to symbolize the nation's commitment to industrial development.¹⁴⁰ It romanticized the car and the highway, at a time when Brazil was investing in the car industry.¹⁴¹ Lastly, Brasilia embodies the transition from utopian vision to tangible city, as the superblocks that make the masterplan were based on Le Corbusier's unrealized projects for European cities.¹⁴²

¹³⁸ "Milan Design Week with Fernando Romero | MINDED Podcast." YouTube video. Posted by @createurs_design_association. April 24, 2023. [Link](#).

¹³⁹ William J. R. Curtis, *La Arquitectura moderna desde 1900* (London: Phaidon, 2012), 499.

¹⁴⁰ Looked from above, it's shape can be seen like a plane.

¹⁴¹ Curtis, *La Arquitectura moderna desde 1900*, 499.

¹⁴² "The conceptual schism that had already occurred at Chandigarh in 1951, between the isolated monumentality of the government center as designed by Le Corbusier and the rest of the city; was to be repeated at Brasilia where the overall plan was somewhat less systematic in its basic conception". Frampton, *Modern Architecture: A Critical History*, 256.

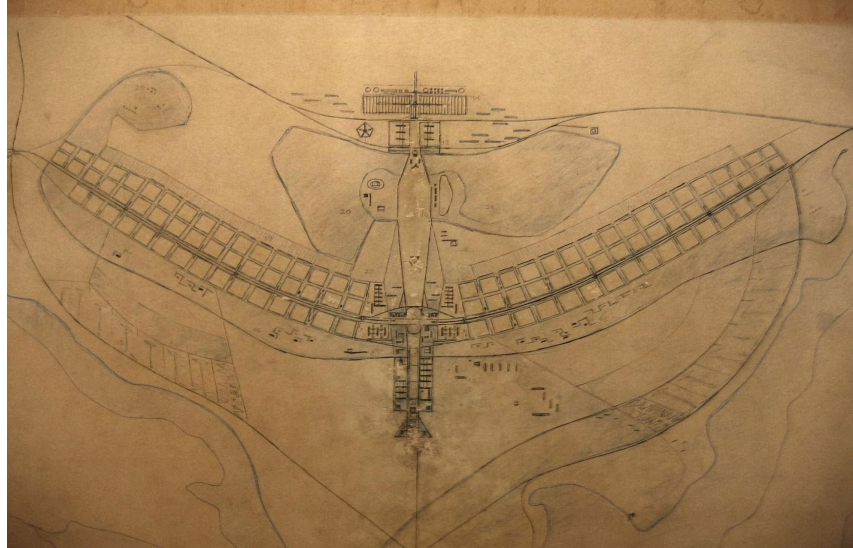


Figure 18: Lucio Costa. Plano Piloto for Brasilia. 1956.

A key figure in such transition was president Juscelino Kubitschek de Oliveira, a model that compelled Romero to promote Bukele as a visionary leader and hope for the materialization of Bitcoin City:

He's the most popular president in the Americas, so really the only way in which you can do a new city is to have a present that says "let's develop a new city!". You need to bring all the structures, and in many countries you cannot do this. There are, of course, some exceptions in the world –Saudi Arabia is another one–, where the prince has the capacity to serve all the structures of the government can be aligned to develop a new city right.¹⁴³

Romero is correct in acknowledging Bukele's popularity.¹⁴⁴ *Nuevas Ideas*, his party, achieved a qualified majority in the Legislative Assembly (controlling 56 out of the 84 seats), enabling him to pass legislation without the need to obtain opposition support. This earned him harsh critiques from the foreign press, who denounce his administration for human rights abuses, and the overall path of El Salvador toward dictatorship.¹⁴⁵ Indeed, Bukele's recent actions cast doubt on his discourse of eliminating centralized authority's power through the introduction of Bitcoin.

According to William Curtis, Brasilia was an unsuitable adaptation of the European utopia, as it did not account for the extreme inequality of the society in which it was to unfold. As it prioritized its formalistic representation –the urbanistic plan resembled an airplane or a cross– over accessibility, the elite lived in

¹⁴³ "Milan Design Week with Fernando Romero | MINDED Podcast." YouTube video. Posted by @createurs_design_association. April 24, 2023. [Link](#).

¹⁴⁴ Jennifer Vilcarino Chase Harrison, "Chart: How Popular Are Latin America's Presidents in 2024?," *AS/COA* (2024), [Link](#)

¹⁴⁵ BBC News, "Nayib Bukele, el presidente "del cambio" al que acusan de dar un "golpe" a la Corte Suprema de El Salvador," *BBC Mundo* (2021); Jacobo Garcia, "Nayib Bukele y el poder absoluto," *El Pais* (2021); "El Salvador accused of 'massive' human rights violations with 2% of adults in prison," *The Guardian* (2022); Jonathan Blitzer, "The Rise of Nayib Bukele, El Salvador's Authoritarian President," *The New Yorker* (2022).

the urban settings, and were able to fly back and forth in aircrafts, yet the poor fell into the void of its diagrammatic concept.¹⁴⁶ Bitcoin City too appeals at an emotional level to the community it targets as it embodies the shape of a perfect circle, like that of a coin (see Figure 19).

Romero evidently lives in the present and is aware of the criticism levelled at Brasilia. Its lack of human quality harkens back to the visions of the 1930s, idealizing car use and promoting vastly separated functions and buildings articulated by superblocks. Bitcoin City, instead, proposes the 15-minute-city. This model was coined by a team lead by Carlos Moreno, a professor from the Paris Sorbonne Business School.¹⁴⁷ The concept promotes proximity-based living to increase accessibility to workplaces, schools, healthcare, and recreational activities. Its core urban principles involve encouraging an optimal density, accommodating diversity among neighborhoods, integrating digital technologies to streamline urban operations, prioritizing non-motorized transport options, ensuring equitable access to city services and amenities to diminish urban inequality and segregation, and promoting cultural identity by respecting historical heritage and local traditions while accommodating contemporary urban needs. The concept has been famously taken up by cities like Paris, suggesting a transformative approach to urban development that aligns with sustainability, resilience, and enhancing community cohesion.



Figure 19: Bird-eye view of Bitcoin City. Source: Ravenscroft, T. "El Salvador's president reveals design for volcanic Bitcoin City" Dezeen, May 12, 2022. [Link](#).

II.e Geothermal Power Play

As Bukele announced, El Salvador is deploying the nation's resources to harness geothermal energy from a volcano for both powering the city as well as for bitcoin mining. This endeavor began with the

¹⁴⁶ Curtis, *La Arquitectura moderna desde 1900*, 501.

¹⁴⁷ Allam, Moreno, Chabaud, Gall and Pratlong, "Introducing the '15-Minute City'", 93-111.

drilling of a new geothermal well claiming to provide about 95 megawatts of clean, zero-emissions energy (see Figure 20). El Salvador plans to expand its geothermal energy capacity with a proposal to develop a 241-megawatt renewable plant.



Figure 20: Screenshot of Bukele’s tweet announcing the digging of a well to extract geothermal power. Source: Nayib Bukele on Twitter.com @nayibbukele. "Our engineers just informed me that they dug a new well, that will provide approximately 95MW of 100% clean, 0 emissions geothermal energy from our volcanos," 2021, [Link](#).

This project is also branded as an innovative financial instrument: the so called ‘volcano bond’.¹⁴⁸ Aiming to raise one billion US dollars, the funds will be directed in equal parts at buying Bitcoin from the market and building infrastructure for further enhancements in the energy sector and mining industry.¹⁴⁹ This strategic use of geothermal energy not only aims to provide a sustainable power solution but also

¹⁴⁸ To make the bonds happen, Samson Mow, Blockstream’s CEO (invited by Bukele to the stage during the presentation of Bitcoin City) explained there are several things to be done first. One of them is the Law for Digital Securities, which would enable to issue the first license to operate a securities exchange in El Salvador to the token trading platform Bitfinex. Although Mow left out of the presentation the reasons why this law is crucial, he did hint Bitfinex would be a ‘Whale’ sponsor of the project. This is relevant because Bitfinex is not decentralized, as it acts like a bank for cryptocurrency guarding the user’s keys, meaning it is managed by a specific company. As projects start having exchanges as whale sponsors, these institutions start holding significant financial power, which can lead to the same problems bitcoin claims to escape in the first place: market manipulation, dependency, reduced competition, governance issues, etc.

¹⁴⁹ This one-billion-dollar Bitcoin bond, also known as “EBB1” or “volcano bond”, is expected to be only the first of a series of bonds backed by Bitcoin. After an initial five-year lock up period of the Bitcoins purchased, and assuming the price has risen since, El Salvador will begin partially selling these BTC as an additional coupon to holders of the bond. For the first five years this coupon will be of 6.5% and will then get a bitcoin boost, generated by the staggered liquidation. After a ten-year period, assuming what they call “conservative” prediction of 35% increase of BTC value, they calculate an Annual Percentage Yield (APY) of 146%.

supposedly positions El Salvador as a pioneering nation-state within the global bitcoin ecosystem.

Geothermal power holds some advantages when compared to other renewable energies such as solar panels and wind turbines: it is not subject to weather intermittencies, has little impact on the landscape, creates more jobs than any other green energy, requires less maintenance, and produces negligible sounds when working at full capacity.¹⁵⁰ However, renewable energy specialist Lorenzo Vallechi suggests this might not be the best fit for El Salvador.¹⁵¹ He argues that geothermal energy sites are geographically limited, available only in regions with tectonic plate boundaries. This could hinder scaling up operations, as less global resources are deployed in making the technology more efficient. Secondly, the initial setup and infrastructure costs for geothermal power are higher when compared to other renewable resources like solar panels or windmills.¹⁵² Thirdly, the most profitable approach for El Salvador would be to mine its own bitcoin using locally generated renewable energy instead of purchasing it from the market. While this should be done as soon as possible to maximize the benefits, extracting power from the volcano could take another two to three years before electricity generation begins.

The debate of whether geothermal is the best solution in terms of sustainability is beyond the scope of this investigation. However, if sustainability is considered beyond the merely technical, the question arises as to how might the volcano inform the design decisions of the city? In other words, how does it contribute to the cultural and social capital of the New Alexandria?

At first glance, the plan of the city presents similarities with Ebenezer Howard's Garden City, a concentric model aiming to marry the modern duality between countryside –nature– and the polluted, congested, city (see Figure 21).¹⁵³ On closer inspection, the proposals differ in crucial respects: Howard's proposal, for example, was criticized for its disproportionate focus on housing, for being over-deterministic, allowing very small room for adjustments, and for suggesting that the street was bad and that the houses had to turn its back to it, face inwards, towards sheltered gardens.¹⁵⁴ Fr-ee's adoption of the 15-minute-city model shows that much of these discussions have been overcome, as it fosters diversity, walkability, flexibility, etc.

¹⁵⁰ Yuqing Wang, Yingxin Liu, Jinyue Dou, Mingzhu Li, Ming Zeng. "Geothermal energy in China: Status, challenges, and policy recommendation" *Utilities Policy* 64, (June 2020): 1.

¹⁵¹ Lorenzo Vallechi, "Is Volcano Energy Really The Best Fit For El Salvador's Bitcoin City?", *Bitcoin Magazine*, February 5, 2022. [Link](#).

¹⁵² The IRENA database shows that in 2020, the average total installed cost of solar photovoltaic (PV) projects was \$883 per kW. This is significantly cheaper than geothermal power, which costs five times more per kW according to IRENA, and ten times more according to the World Geothermal Congress study. Offshore wind power is also more expensive, with an average total installed cost of \$1,355 per kW in 2020. Even taking into account the rainy season from May to October, Vallechi argues El Salvador's high irradiation map could potentially supply cheaper, frequent, energy to the grid, provided a lithium-ion battery storage system.

¹⁵³ Françoise Choay, *El Urbanismo Utopias y Realidades*, trans. Luis del Castillo (Barcelona: Editorial Lumen, 1965), 339.

¹⁵⁴ Jacobs, *The Death and Life of Great American Cities*, 17.

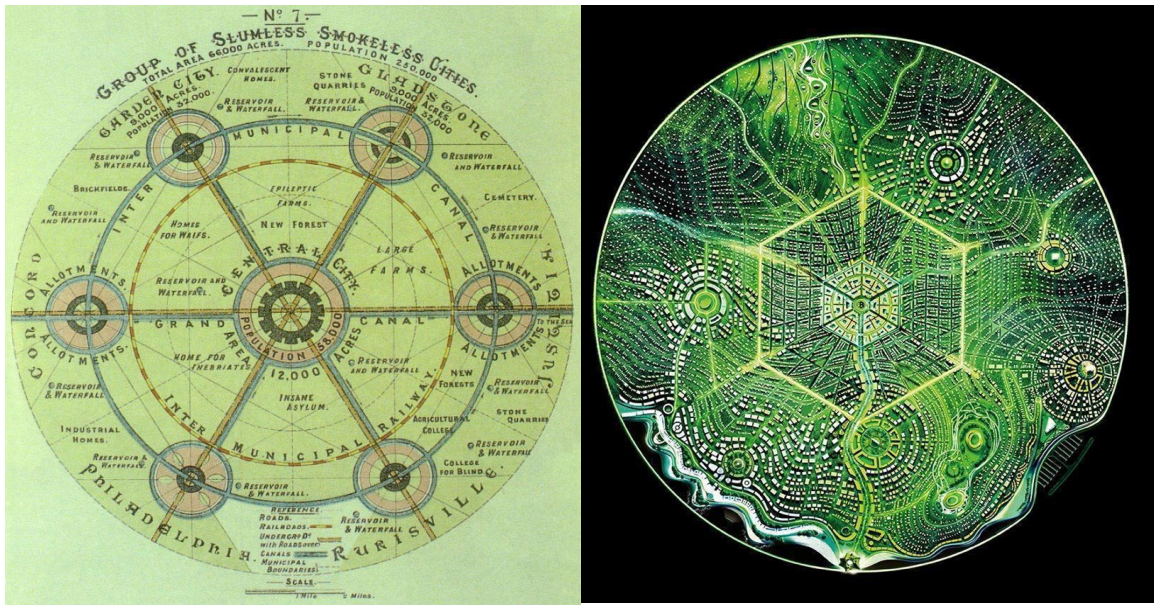


Figure 21: On the left, Ebenezer Howard's Garden City. On the right, Fr-EE's Bitcoin City. Sources: Ebenezer Howard in "Garden Cities of tomorrow"; Ravenscroft, Tom. 2022. "El Salvador's President Reveals Design for Volcanic Bitcoin City." Dezeen. May 12, 2022. [Link](#).

Moreover, Howard's city and its concentric organization was informed by the alternative society he planned for, which was neither capitalistic nor bureaucratic-socialistic: self-governing commonwealths that were based on collaborative cooperation of its inhabitants.¹⁵⁵ In Howard's proposal, The Garden City is the only landowner.¹⁵⁶ It is assumed it has purchased the land through a bank loan with no higher interest rate than four percent. Ownership is given to four solvent people, of undoubted honor, who have the title of the property as collateral before the mortgage loan. Infrastructure (streets, public schools, parks, etc.) and their due maintenance are to be paid for by the administrators of the land through the money of rents, after interest rates and mortgages have been covered. Individual initiative is respected; each businessperson is free to establish the prices for goods freely, as long as the rent is covered. Competition among citizens is allowed. The proposal is not to restrict them, but to expand them: although the model enables agriculture, it is a free economy where any business is allowed. Its spatial organization responds to the need to accommodate the two.

¹⁵⁵ Hall, *Cities of Tomorrow*, 2.

¹⁵⁶ Choay, *El Urbanismo Utopias y Realidades*, 340.

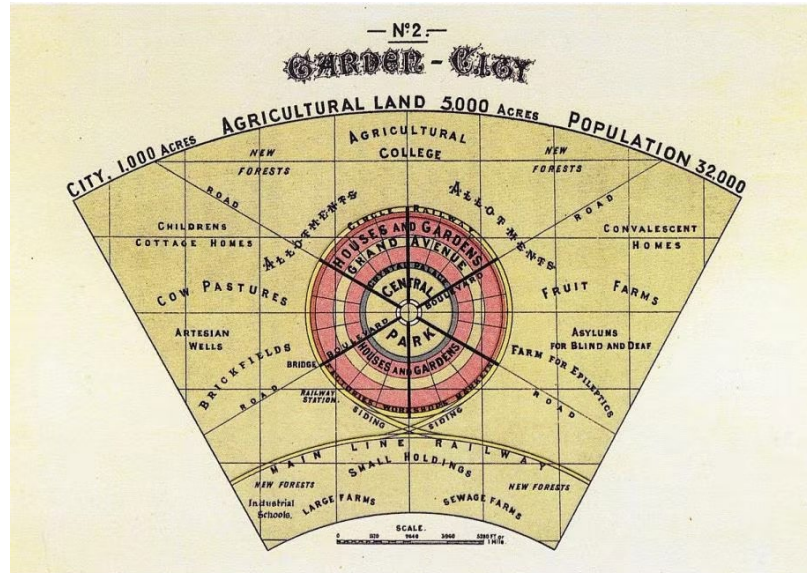


Figure 22: Ebenezer Howard's Garden City. Source: Ebenezer Howard in "Garden Cities of tomorrow".

Although the utopian ideal of merging agriculture with the urban setting has been long gone, it is as if Howard's proposal became a symbolic legacy for urban planning. The envisioned Garden Cities, as self-governing commonwealths, fostered (on a theoretical level) collaborative cooperation among inhabitants. Similarly, the integration of the volcano into Bitcoin City's design could shape its cultural and social vision, symbolizing innovation and sustainability, and fostering a collective sense of pride among its residents. Additionally, Howard's model underscores the importance of individual initiative and economic freedom, principles that could be mirrored in Bitcoin City's approach to integrating renewable energy sources like geothermal power. Ultimately, regardless of the technical performance of the volcano in addressing climate change, its integration into Bitcoin City is its inherent DNA as a symbol of community belonging, like the soldiers belonged in the Alexandrias. Rooted in the unique identity of the site, the Bitcoin City's volcano dependent economy represents a definitively less scalable and generalizable proposition when compared with Howard's model.



Chapter III. Crypto-collectivism: CityDAO and Distributed Citizenship

Perhaps the most ethically dubious excess associated with programmatic projects is when a political problem is addressed through architectural symbolism. It thus becomes a question whether architecture is the best tool for addressing the problem at all. In certain architecture schools, the border problem is a favorite: Palestine/Israel, United States/Mexico, North/South Korea, and, once upon a time, the Berlin Wall. The paradox here is thinking that designing more architecture, or more stuff, addresses a problem truly solvable only with policy.

Reiser+Umemoto, *Projects and Their Consequences* (2019) ¹⁵⁷

III.a Intro to chapter III

I have defined a crypto city as an urban project, which originates from within *startup culture* –growth being its main driver, innovation its pursuit, and risk-taking its modus operandi–, and relies on blockchain technology to restrict meddling by authorities, empower community-formation, and reduce capitalism's current inequality gap. Chapter II analyzed Bitcoin City within the framework of El Salvador's efforts to attract foreign investment and promote itself as a pioneer of progress. With this audacious wager, Bukele's project is presented as the flagship project of a nation seeking to reposition itself in the global stage.

This chapter will analyze CityDAO, an initiative set by its founders in the discursive framework of democratization of land ownership and governance. I first outline the problem identified by its promoters, and how their project purports to address it. Frank Lloyd Wright's project for Broadacre City is brought to the fore as precedent in the long tradition of seeking alternatives to land monopoly, inequality of rights, and power centralization. I then deal with the conditions under which CityDAO originated, namely, the opportunity to experiment with uncertain regulatory landscapes, prone to the implementation of distributed governance models. The aim is to understand how the developers of City DAO seek to exploit the capabilities of blockchain to enable collective land ownership, and to addresses social inequality. The question broached by this chapter is how CityDAO shapes a model of citizenship that surpasses geographically established national boundaries.

¹⁵⁷ Reiser+Umemoto, *Projects and Their Consequences*, 40.

III.b A Renewed Quest for Usonia

The way to get startup ideas is not to try to think of startup ideas. It's to look for problems, preferably problems you have yourself. The very best startup ideas tend to have three things in common: they're something the founders themselves want, that they themselves can build, and that few others realize are worth doing. Microsoft, Apple, Yahoo, Google, and Facebook all began this way.

Paul Graham, "Ideas for Startups"¹⁵⁸

If the way to get an idea for a startup is to look for a problem many people have, what is the problem that CityDAO's founder, Scott Fitsimones, is trying to solve? This is how he states it in a TED Talk given in 2022:

CityDAO grew out of my frustrations dealing with city bureaucracy and red tape while building a startup that helps cities better utilize their empty parking lots. It took us over three months to get a permit just to sell parking in San Francisco. And it was an archaic, bureaucratic nightmare. Things like putting a parking lot to higher and better use, which my urbanist self really wants to do, like, you know, build a food truck park, logistics hub, maybe even new housing, a farmer's market. These things are also really tedious, can take months, years, or even just be illegal due to zoning laws.¹⁵⁹

Scott Fitsimones is co-founder and Chief Technical Officer of *AirGarage*, a start-up rethinking the use and management of parking lots.¹⁶⁰ He has a background in computer science and in 2020 he received the Thiel Fellowship, which rewards entrepreneurs who drop out of college with USD 100,000 to pursue business ideas. For him, that idea was AirGarage.¹⁶¹

Unsurprisingly, the founder of CityDAO is an entrepreneur who holds dear the three basic tenets of *startupism*: growth as driver, risk as opportunity, and innovation as value. Growth as driver does not mean fast money; Fitsimones views the project as an experiment more so than an investment,¹⁶² from whence he will choose to measure growth through such parameters as the number of citizens involved.

Initially, he had targeted the highly tedious bureaucracy needed for buying and selling land. Part of the

¹⁵⁸ Paul Graham, "How to Get Startup Ideas." Paul Graham. November 2012. Accessed May 26, 2024, [Link](#).

¹⁵⁹ Scott Fitsimones, 2022. "Could a DAO Build the Next Great City?" *TED2022: A New Era*, Vancouver, BC, [Link](#).

¹⁶⁰ The platform seeks to remove unnecessary operating expenses and provide property owners with real-time data to improve operational efficiency and increase occupancy and revenue. The company was founded in 2016, has 49 employees and the latest deal amount was of USD 26.9 million. "AirGarage Overview," accessed 04/05/2024, <https://pitchbook.com/profiles/company/267107-59#overview>.

¹⁶¹ "Thiel Foundation Announces 2020 Thiel Fellows," *Bloomberg* (2020). [Link](#)

¹⁶² Eric Gilbert Williams, Podcast Audio. "CityDAO Ideator: From First Tweet to Successful Launch" in *CityDAO Podcast A Crypto City of the Future*, episode 02, *Spotify*. February 2022.

hassle created by the current system, as he describes it, is the need for an agent (an intermediary) to carry out transactions. This requires coordination, paperwork, and logistics. Additionally, the problem of centralized authorities regulating land also leads to inefficiency: zoning laws sometimes prohibit dynamic usage strategies for parking spaces. Fitsimones develops this idea on a blogpost where he advocates making zoning unconstitutional: now proposals replace mere complaining.¹⁶³

Expensive housing. Zoning is mainly used to limit the height and density of buildings. This means it's illegal to build new housing and lower income residents are forced out.

Urban sprawl and more vehicle emissions. Most cities use zoning codes to specify rules that mandate building large parking lots and ban dense housing near transit. Most cities you probably enjoy visiting (Paris, NYC, SF) were built before zoning.

Segregated neighborhoods. Many wealthy suburbs like Beverly Hills intentionally ban apartments and cheap housing, creating an exclusionary, wealthy, white suburb.

Corrupt cities. Zoning gives the city a monopoly on permitting. By making the zoning code complex and onerous, developers always have to request permission to build, delaying housing and giving city commissions opportunities to extract concessions and bribes.

Zoning law is (probably) an infringement on property rights.

These arguments against zoning can be tenable as a call for the improvement of overly strict regulatory frameworks. However, disregarding the regulation of urban land use as a mere “infringement on property rights” overlooks a long history of discussions on zoning going back to the Athens Charter and its critiques in the 1960s, which brought about their complexification.¹⁶⁴ Fitsimones’ analysis ignores crucial justifications of zoning such as environmental and heritage protection, density planning, and so forth. Although some zoning laws indeed promote inequality, other foster equity. For example, those that require developers to include affordable housing units or allocating space for community facilities in new developments. The statement that “popular cities” like Paris and New York were built prior to the implementation of zoning regulations betrays a limited understanding of cities as static objects, rather than as ongoing processes, evolving under shifting systems of regulations. This is evidence that real estate ventures require specialized knowledge (professionalism), bringing to light a challenge to be addressed. If central authority is to be removed for the approval of projects, how will a given governance structure prevent the consequences of amateurism?

¹⁶³ Scott Fitsimones, “San Francisco’s Most Absurd Zoning Policies,” *Scott*, 2021. Although all blogposts have been taken down from Fitsimones’ site <https://www.scott.xyz/index.html>, I downloaded a copy which is available upon request.

¹⁶⁴ “The need for primary mixed uses” in Jacobs, *The Death and Life of Great American Cities*, 152.



Figure 232: Photograph showcasing Paris's homogeneity in building heights and architectural language, which would have been extremely difficult to accomplish without regulation. Source: Jessica Nora, "Guide to Visiting Galleries Lafayette in Paris" (2024) [Link](#).

Despite his reductionist views on zoning, Fitsimones highlights actual issues of current land purchasing and management processes, namely, its inefficiency and costs, and its reliance on central authority (posing difficulties to complex use strategies that yield efficiency gains, and opening doors to bribery). These hurdles tend to make land less accessible to low-income residents, thus contributing to widening the inequality gap. Other challenges include the displacement of local communities, outdated laws that do not account for modern urban needs, the fostering of environments that prioritize automobiles over people, and the conflicting need for both greater flexibility and predictability.¹⁶⁵ In short, eliminating centralized authorities as CityDAO intends cannot prevent laypeople from operating in a landscape that requires a high degree of professionalism, yet assumes that non-urbanists can bring innovative views into the fields of urban design and management.

The search for equity through the distribution of land in the United States is not a new aspiration. In 1928, Wright coined the name "Usonia" to denote an egalitarian culture that would emerge in the U.S.¹⁶⁶ His vision consisted of housing units arranged such that within a 10 to 20 mile radius from their home, all citizens would have access to productive land. Such access would be guaranteed by means of mass ownership of the private automobile and widespread public transportation systems. Opposed to the centralization of large conurbations like New York, where the metaphor of the city as cancer flourished, Wright's proposal consisted of a minimum of one acre per inhabitant configuring a distributed network of

¹⁶⁵ Emily Talen, *City Rules: How Regulations Affect Urban Form*. (Washington D.C.: Island Press. 2012), 127

¹⁶⁶ Frampton, "Frank Lloyd Wright and the Disappearing City 1929-63" in *Modern Architecture: A Critical History*, 187. As Peter Hall has noted, this search can also be traced back to Ebenezer Howard's Garden City. See: Peter Hall, *Cities of Tomorrow*, 8.

agrarian units.



Figure 24: FLW, Broadacre, model, 1936. Source: courtesy of FLLWFA (MOMA / AA&FALCU).

Wright's conception has several affinities with CityDAO. They both reject landlordism¹⁶⁷ and big government¹⁶⁸; both of them trust the emancipating impact of technology. Yet two key differences must be noted: CityDAO does not reject the idea of the big city; and it encourages cooperation, whereas Wright asserted the freedom of men and women, fostering individualism. Indeed, Wright stood for decentralization: he argued against the idea that money plus *authority* should rule the world, embracing instead the belief that ideas plus *work* should take its place. "Centralization," he wrote, "the social force that made the king an appropriate necessity, is now the economic force that has overbuilt the pseudo-monarchic towns and cities of today."¹⁶⁹

Wright's proposals for Broadacre City are regarded today as naïve for promoting a simplistic architectural determinism, suburbanization, inefficient resource utilization, lack of urbanity, and insufficient consideration for collectivism.¹⁷⁰ The individualistic agrarian economy could not have guaranteed the industrialized society the benefits of mass production, as mass production demanded, unfailingly and despite automation, at least some degree of concentration of labor and resources. From a progressive point of view, Wright failed to address class struggles in foreseeing the dissolution of the big city. Despite

¹⁶⁷ Wright references Henry George's single tax as a way towards democracy while acknowledging this policy never intended to be taken as a complete solution to the land problem. Frank Lloyd Wright, *The Living City* (New York: New American Library, 1970), 90.

¹⁶⁸ Hall, *Cities of Tomorrow*, 342.

¹⁶⁹ Frank Lloyd Wright, *When Democracy Builds* (Chicago: University of Chicago, 1951), 9.

¹⁷⁰ Hall, *Cities of Tomorrow*, 345.

“some passing reference to the single tax”,¹⁷¹ the concern of class and power is avoided, the economic conditions that determine freedom and decent living for Broadacre largely ignored.

Although it could seem otherwise, the opposition to central authority and the readiness of access to land in CityDAO and Broadacre City are not tied to specific technologies. Even if blockchain were instrumental in delivering those promises, the forces originating both projects should be looked for at the cultural and social, rather than technical levels.

The analysis of Broadacre City reveals that Wright’s conception of Usonia can be read as an infrastructure of society’s values: the fostering of an individualism that is still embedded in American society today. In light of those precedents, what kind of citizenship is being shaped by CityDAO? I will answer this through analyzing step-by-step how it works.

III.c Legal in Wyoming



Figure 25: Scott Fitsimones foundational tweet. Source: @Scottfits in Twitter “Starting a DAO to buy and tokenize land in Wyoming, who wants in?” (2021).

On July 1 2021, Scott Fitsimones posted on Twitter that he was going to start a DAO to tokenize land in Wyoming. What did he mean, and why was Wyoming the locus of the venture? The concept of tokenization is key to understanding this; furthermore, the legal context of this experiment must be dealt with first, leaving the explanation of what a DAO is for later. For now, let us say a DAO is an organization.

A token is a digital representation or unit of value that can be created, stored, and transferred

¹⁷¹ Meyer Schapiro, quoted in Frampton, *Modern Architecture*, 191.

electronically. Although “token” is usually used interchangeably with the word “coin”, in the cryptocurrency ecosystem, they are not the same thing. All coins are tokens, but not all tokens are coins. Tokens represent any unit of value, including land, properties, rights, documents, certificates. In short, a token is a digital asset. Because a token is a *representation* of something else, it only has value in a specific context. For example, an arcade token is very useful to play an arcade game and its value is fixed by a set exchange rate, but, outside of that context, it has no intrinsic value¹⁷².

Land tokenization is the expression used when real estate property is represented on a blockchain as a token. When a land token is purchased, ownership is represented in the buyer’s virtual wallet as a digital file.¹⁷³ It is the same technology as Bitcoin, except that the transactions do not represent currency exchanges, but a file that gives ownership to a specific parcel of land. Land ownership can thus be broken into smaller, tradable portions, so that each holder of these tokens has ownership or investment shares in the land. Land tokenization allows multiple investors to buy into a parcel by purchasing these smaller units. Ownership shares are recorded digitally, making it easy to buy, sell, and manage investments, reducing the aforementioned need for agents.

Tokens, however, only have value within a given context. While physical land has intrinsic value because one can build on it, rent it, cultivate it, etc., a digital representation of ownership is useless unless everyone –not just users of crypto technology– accepts the token as a valid proof of that ownership.

On July 1 2021, the very same day of Fitsimone’s tweet, the Wyoming Senate Bill 38, titled *Decentralized Autonomous Organizations Supplement* became effective, turning Wyoming into the first US State to recognize DAOs as legal entities.¹⁷⁴ This law allowed organizations governed under blockchain contracts to register as a Limited Liability Company (LLC), being recognized by state law. Because LLCs are allowed to own land, this could enable digital representations and transactions of land under this organization to become legally feasible. According to Fitsimones, the real breakthrough is that Wyoming recognizes their governing contracts (which are coded by programmers and executed automatically when certain criteria are met) as the legal governance system of the registered LLC.¹⁷⁵ However, current regulations are vague and still in the shaping, causing technical and legal challenges.

The main legal challenge is that land is considered a security under the US regulation, even if it does not provide a return.¹⁷⁶ A security is a financial instrument that holds some form of monetary value and can

¹⁷² Dávila, *Blockchain Radicals*, 85.

¹⁷³ An explanation of virtual wallet can be found under ‘Lexicons’.

¹⁷⁴ Other states followed Wyoming. Currently, only two other states –Vermont and Tennessee– recognize DAOs as legal entities.

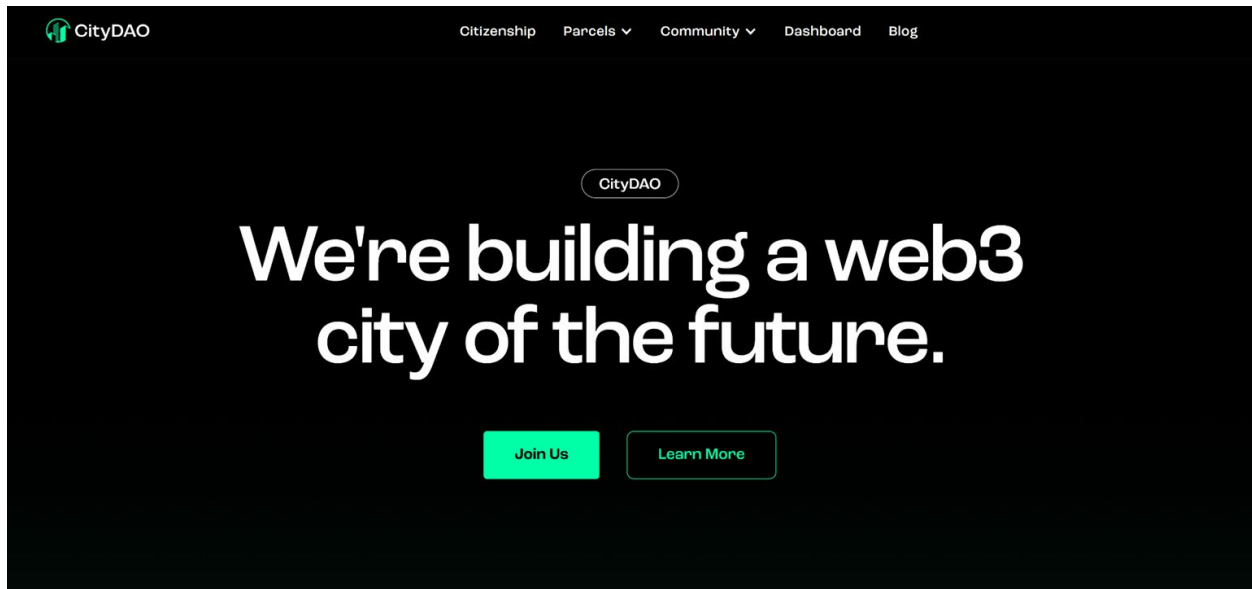
¹⁷⁵ @PODOFJAKE, Podcast Audio. “Scott Fitsimones,” Pod of Jake, episode 78, September 14, 2021, [Link](#). Downloaded transcript, available upon request.

¹⁷⁶ Eric Gilbert Williams, Podcast Audio. “Introducción a CityDAO & The CityDAO Podcast” in *CityDAO Podcast A Crypto City of the Future*, podcast, episode 1, *Spotify*. February 1, 2022. [Link](#).

be traded. Examples include stocks, bonds, and investment contracts. Securities are very heavily regulated¹⁷⁷ to protect investors and ensure market integrity. By establishing rules and standards for trading securities, preventing market manipulation, insider trading and other fraudulent practices, these regulations aim at contributing to stability and trust. This poses a challenge because, as of the time of writing, being a member of CityDAO's LLC, does not grant any legal rights or claims to the physical land. Tokens only grant voting power and agency in the decision-making process to mitigate the regulatory risks shares of land may hold. Because ownership of the land is not granted, citizens cannot build on top of it. For now, they are experimenting within these constraints.

III.d Automatically-Executed Contracts as Governing Tools

How does it work? A DAO (or, Decentralized Autonomous Organization) can be understood as an organization that uses programmed, automatically executed, contracts for its governance. In CityDAO, these contracts govern the organization to form an online community with a joint bank account. Participants in a DAO communicate and coordinate their actions through chats and voting platforms. Decisions within the DAO are made collectively based on consensus and majority. The objective is to manage resources, allocate funds, and execute tasks in a transparent and trustworthy environment. Multiple signatures are required for the release of funds for different project proposals to be implemented. The first and main project in CityDAO was to raise capital to purchase land as a group.



¹⁷⁷ The law that regulates them is the Securities Exchange Act of 1934.

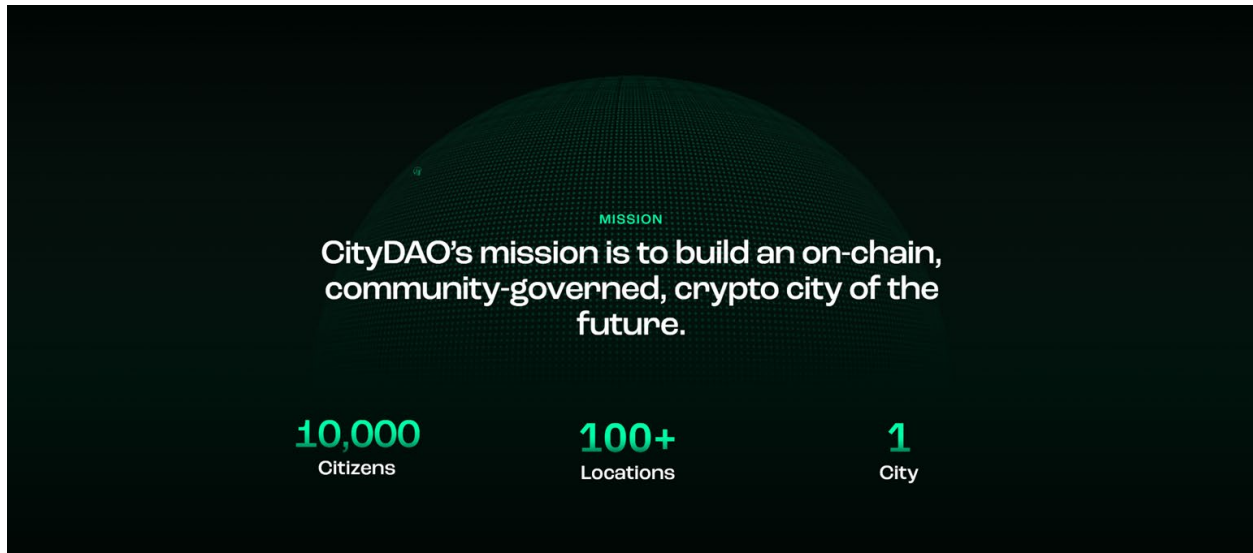


Figure 36: Screenshots from CityDAO's website. Source: CityDAO [Link](#).

The first claim made by CityDAO's website is that a web3 city is being *built*. What does this mean and how is it any different from other previous cities?

Web3 is a widely used concept in the crypto community referring to a third iteration of the internet. This iteration incorporates technologies like blockchain and artificial intelligence which enable users to maintain tighter control over their data.¹⁷⁸ In Web3 narrative, Web1 is described as largely static because users could only visit and read content; Web2, which we use nowadays, allows users to interact with each other through messaging and content creation on platforms like Meta, X, Google, etc. Whereas in Web2 the data created by users belongs to central authorities, i.e. the various platforms and corporate entities that run it, Web3 promises to get rid of intermediaries, data belonging exclusively to the users. Although marketed as an evolution of the web, this concept would not exclude previous iterations. The use of the concept of web3 is useful to brand this as an evolution that deviates from the use of other words like "crypto" and "blockchain" which have grown to have bad connotations or resistance.¹⁷⁹

CityDAO's website second claim reinforces the idea that the city of the future is community-governed. This notion relies on smart contracts. Five years after the creation of Bitcoin, Vitalik Buterin, a nineteen-year-old Canadian published a white paper describing a blockchain project named Ethereum,¹⁸⁰ that could facilitate what he called "smart contracts". The word *contract* is deceiving, as it has little to do with law.¹⁸¹ It is essentially a program, a piece of code that resides at a specific address on the Ethereum

¹⁷⁸ The term was coined by Ethereum co-founder Gavin Wood. Gilad Edelman, "The Father of Web3 Wants You to Trust Less," *WIRED* (2021).

¹⁷⁹ Dávila, *Blockchain Radicals*, 307.

¹⁸⁰ Ethereum is open-source, community-driven and has evolved since its initial conception. Camila Russo's book *The Infinite Machine* explores Ethereum's fascinating story, delving into its origins and development.

¹⁸¹ In its original conception, coined by Nick Szabo in 1996, the term *smart contracts* was theoretically closer to the legal one, performing the mediation

blockchain.¹⁸² The Ethereum network effectively combines the decentralized nature of blockchain –with its resilience and transparency– with the ability to run any type of computer program.¹⁸³ A smart contract is therefore a series of steps to be executed, a sequence of if-then statements defined by the programmer. When certain conditions are met (if), the next step of the process is executed (then).¹⁸⁴

Some examples of how a smart contract could be used:

1. **IF** the architect submits the finalized blueprint, **THEN** automatically release payment from the client's escrow account to the architect.
2. **IF** the construction materials are delivered on time, **THEN** release funds from the project budget to the supplier.
3. **IF** the energy consumption of the building remains below a specified threshold for a consecutive period, **THEN** automatically issue a rebate to the tenant or owner as an incentive for energy efficiency.

The program needs to look for a specific input to determine whether the (IF) statement is met. This input has to be recorded directly on the same blockchain that the smart contract is programmed in. If the architect submits the finalized blueprint via email, the payment will not be released. To work around this, developers use what is called an oracle that retrieves data from another site that is not on the blockchain.

Grasping these technical details is essential to understand the governance system of DAOs because they enable a critical perspective to formulate questions that nuance overly-hyped statements that derive from them. For example, for an “if” statement based on facts –did the architect submit the blueprint? – the answer is (theoretically) straightforward, it can be either yes or no. This could lead to the conclusion that self-executable contracts make processes more efficient and transparent. However, in the example above, the site from which the data is being retrieved does not necessarily use blockchain technology and can thus be manipulated. If part of the process is not on the blockchain, the risks these contracts face

between two parties. See: Devcon Conference. @howtocreateresilience7009, 2015. “Nick Szabo - History of the Blockchain” YouTube. November 14, 2015. [Link](#). On this topic Buterin posted: “To be clear, at this point I quite regret adopting the term “smart contracts”. I should have called them something more boring and technical, perhaps something like “persistent scripts”.” @VitalikButerin on Twitter. October 13, 2018. [Link](#).

¹⁸² Vitalik Buterin, “Ethereum: A Next-Generation Smart Contract and Decentralized Application Platform,” *Ethereum* (2014), <https://ethereum.org/en/whitepaper/>.

¹⁸³ As Camila Russo’s frames it, the internet analogy is enlightening to understand the technologic impact: email was to the internet what Bitcoin, the cryptocurrency, was to blockchain technology. Bitcoin was both the cryptocurrency and the underlying blockchain; Ethereum was not like email. It was not an application. Instead, it was intended to be a base protocol for many projects, like the internet. Camila Russo, *The Infinite Machine: How an Army of Crypto-Hackers Is Building the Next Internet with Ethereum* (New York: HarperCollins, 2020), 126.

¹⁸⁴ This was a great breakthrough because it combined the decentralized nature of blockchains with the Turing completeness of programming. “Turing complete” is a term used to describe a computational system or programming language that has the ability to simulate any Turing machine. In essence, if a system or language is Turing complete, it means that it has the computational power to solve any problem that can be solved algorithmically.

today can be significant.

Beyond those technical challenges, the DAOs purport to offer enhanced transparency over non-digitalized democratic frameworks (political, corporate, nonprofit). When an organization's operation is delineated by open-source code, governance becomes evident and auditable. They are enforced automatically, with no need for a legal jurisdiction –a government or state– for their implementation. This derived in their promoters stating everywhere that “code is law”, as if a computer code could replace legal contracts and regulate unfailingly human behavior.¹⁸⁵ As Davila writes, this statement ignores that legal contracts are used to manage relationships between humans, which require ambiguity and future uncertainty. It is very unlikely to be the case everyone will agree on all matters, regardless of how complex code becomes. Although there is some truth to the statement that smart contracts share similarities to legal contracts, in that they act as instrument of social mediation, it is very unlikely to expect their replacement.¹⁸⁶ The next section delves into some of these challenges.

III.e Become a Citizen: Your step-by-step guide

Simplifying certain technical concepts of the crypto-sphere is inevitable in the context of a thesis dealing with the urban and cultural aspects of crypto-city initiatives. To avoid the potential misreading of excessive simplification, however, I offer below a simulation of the process of becoming a citizen of CityDAO, illustrated with screenshots from their website, explanations of some terminology, and a commentary outlining risks and opportunities when relevant.

1. **Learn about Citizen Tokens:** Citizen NFT tokens are digital assets represented as Non-Fungible Tokens (NFTs) that serve as a form of membership.

¹⁸⁵Although blockchain could potentially enable self-executing contracts, the philosophy preceded their implementation. Lawrence Lessig wrote about it in his 1999 book. See: Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999).

¹⁸⁶ Dávila, *Blockchain Radicals*, 93



An NFT is a token, that is, a type of digital asset that represents ownership or proof of authenticity of a unique item or piece of content, such as artwork, music, videos, collectibles, or virtual real estate, on a blockchain. The term “non-fungible” means these tokens are unique and indivisible. Currencies are fungible because they can be exchanged on a one-to-one basis: a five-dollar-bill can be exchanged for five one-dollar-bills on a like-for-like basis. Cryptocurrencies like Bitcoin and Ethereum copy this aspect of fiat money because they are also divisible and any bitcoin is worth the same as any other bitcoin. Non-Fungible Tokens, on the other hand, are like an art piece: each token has distinct properties.

Citizen NFTs for CityDAO are created and stored on the Ethereum blockchain using smart (i.e. self-executable) contracts. These contracts encode the ownership and metadata of the digital asset, providing a decentralized record of its authenticity and transaction history. The blockchain's distributed ledger ensures the provenance, scarcity, and immutability of the NFT, making it a trusted and verifiable form of ownership.

2. **Go to the OpenSea marketplace:** Visit the platform where the Citizen NFT tokens are being sold, in this case it is called OpenSea. ¹⁸⁷

¹⁸⁷ OpenSea is one of the largest and most well-known NFT marketplaces. By listing the tokens here, rather than on CityDAO's website, they can reach a much broader audience.

The screenshot shows the OpenSea marketplace interface. At the top, there is a search bar and navigation links for 'Drops', 'Stats', and 'Create'. Below the search bar, there are tabs for 'Items', 'Offers', 'Analytics', and 'Activity'. A search filter is set to 'Price low to high'. On the left side, there are filters for 'Status' (All, Listed, On auction), 'New', 'Has offers', 'Creator earnings' (Support creators), 'Price', and 'Currency'. The main display shows three NFT items:

Item Name	Price	Last Sale
CityDAO Citizen	0.0559 ETH	0.05 WETH
CityDAO Founding Citizen	2 ETH	1 ETH
CityDAO First Citizen	39 ETH	39 ETH

CityDAO offers three levels of citizenship: First Citizen, Founding Citizen and Citizen. There is only one First Citizen certificate, and anyone can bid for it.¹⁸⁸ The buyer has the right to name a parcel of land and has privileged access to land releases. A Founding Citizen certificate grants early access to land auctions; when land is available, these citizens can make a bid for it before others. There are only 50 such certificates. A regular Citizen certificate has basic voting rights and access to land purchasing only after the Founding Citizens have bid.¹⁸⁹

- Purchase Citizen NFT Tokens:** Browse the available Citizen NFT tokens for CityDAO at OpenSea. Each token represents a unique membership or citizenship within the DAO. Select the token you want to purchase and follow the instructions to complete the transaction. This involves connecting your digital wallet and paying the required amount of cryptocurrency.

¹⁸⁸ It was auctioned and sold for 6.52 ETH on August 8th, 2021, when the price of ETH was around US\$ 3,000.

¹⁸⁹ This hierarchy was criticized by users as intuitively against the social equality the project claims to seek. The site was removed by the host. Downloaded copy of the blog upon request. [Unknown Author]. "CityDao - Why is Nobody Talking about this Blockchain on Land?." *Liquid*. Accessed March 4 2023.

The screenshot shows the OpenSea interface for an NFT listing titled "CityDAO Citizen". The listing is currently priced at 0.0559 ETH, which is equivalent to \$193.96. It is listed by the user "ESECAB". The interface includes a "Buy 1 now" button and a "Make offer" button. Below the listing, there is a "Price History" chart showing volume and average price from January 2022 to January 2024. The chart shows a peak in volume in early 2022 followed by a decline. A "Listings" table below the chart shows two active listings: one for 0.0559 ETH by ESECAB (expiring in 11 hours) and another for 0.056 ETH by dunhuang.eth (expiring in 22 days).

Item Activity

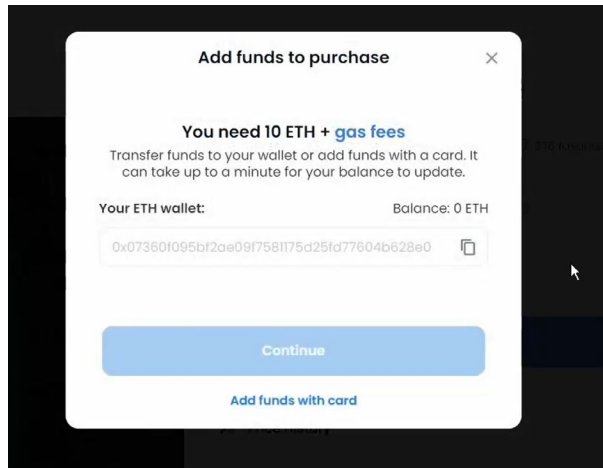
Filter

Sales × Transfers × Clear All

Event	Unit Price	Quantity	From	To	Date
🛒 Sale	0.0518 WETH	1	CardenCCCCC	FAA1EB	5d ago 🔗
↔️ Transfer		1	cjack60	E5ECAB	8d ago 🔗
🛒 Sale	0.052 WETH	1	cjack60	E5ECAB	8d ago 🔗
↔️ Transfer		1	1B242B	916C3D	8d ago 🔗
🛒 Sale	0.050 ETH	1	1B242B	916C3D	8d ago 🔗

As shown above, when each NFT is displayed, the price history and previous owners of the token become visible. When purchasing an NFT it is important to know that additional ETH (Ethereum’s coin) will be extracted from the wallet to cover for the transaction fee. The transaction fee, called “gas”¹⁹⁰, depends on the congestion and demand of the network at the time a transaction is performed.

¹⁹⁰ See ‘gas’ under lexicons.



When the Ethereum network is congested, meaning there are many transactions competing for limited space in blocks, the gas fees tend to rise because users are willing to pay higher fees to have their transactions processed more quickly. Conversely, when the network is less congested, gas fees may be lower as there is less competition for block space. Gas fees are necessary for smart contracts on Ethereum because they act as a reward mechanism to incentivize validators to create new blocks on the chain.¹⁹¹ Additionally, these fees prevent congestion, malicious contracts, and incentivize developers to write efficient codes.

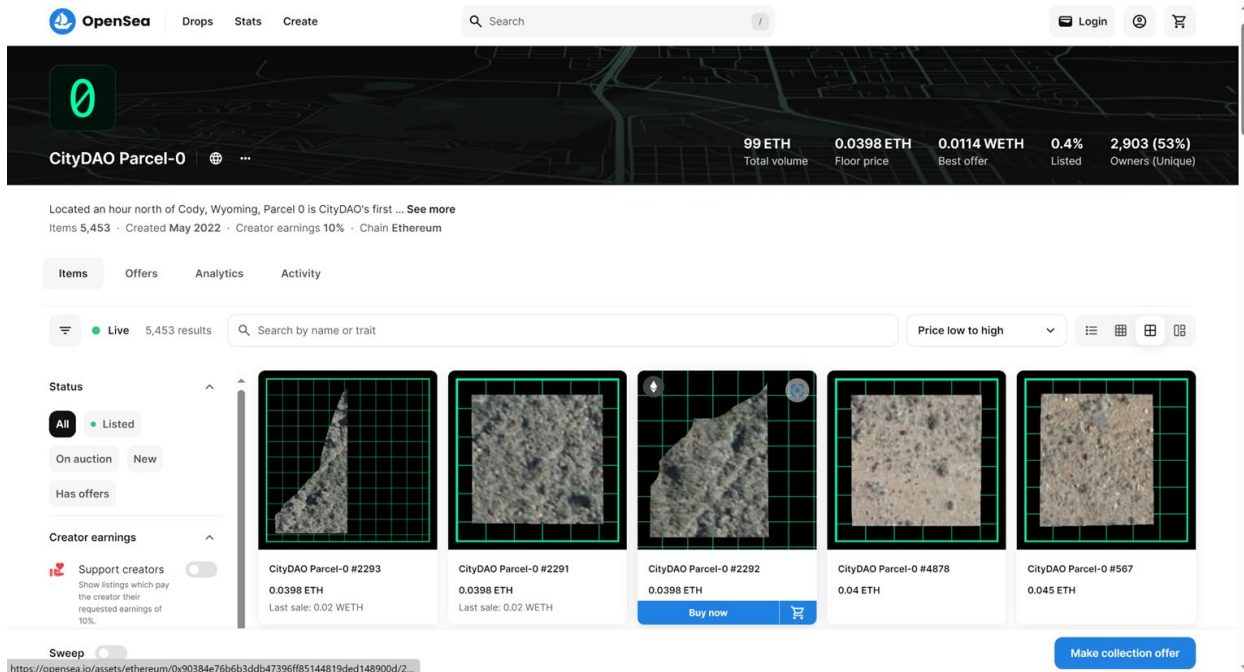
CitizenNFTs are not the only type of tokens available: users can also purchase a Parcel Zero token. This means that a citizen of CityDAO could have access to vote on governance topics related to the city, (for instance, allocate funds for a certain research) but not necessarily on topics specific to that piece of land (like a proposal for its subdivision). This gives a higher degree of autonomy to the different projects.

¹⁹¹ Ethereum differs from Bitcoin in how blocks are created. While Bitcoin requires abundant computational power to validate transactions, Ethereum uses a mechanism of collateral. Validators in the network are required to lock up a certain amount of cryptocurrency as a stake to ensure honesty. If they were to engage in malicious behavior, they risk facing penalties and losing a portion of the cryptocurrency staked. This is considered more energy-efficient while simultaneously incentivizing stakeholders to act in the best interest of the network.

To acquire Parcel Zero citizens looked into land with low market value, taking into account parameters such as existing structures, proximity to airports, provision of electricity, sewage and water, and the value of adjacent parcels.¹⁹² Fitsimones tells the story on the CityDAO podcast: they hired a broker, listed the

¹⁹² Eric Gilbert Williams, Podcast Audio. "CityDAO Ideator; From First Tweet to Successful Launch," in *Citydao Podcast a Crypto City of the Future*,

must-haves and nice-to-haves, narrowed down the possibilities, and picked what they considered the most suitable one. In this process, they left out a parcel located in a more expensive setting, aiming to maximize the chances to subdivide the parcel later.¹⁹³ Interestingly, they realized numbering Parcels 0, 1, 2 creates a zero-sum mindset, or competition to be “Parcel 1.” They intend to shift the naming convention to project names like Parcel Agarthia so that the mindset is shifted from rivalry to abundance.¹⁹⁴ This aligns with the overall mission to create a community that works together towards a common goal, rather than competes against each other.

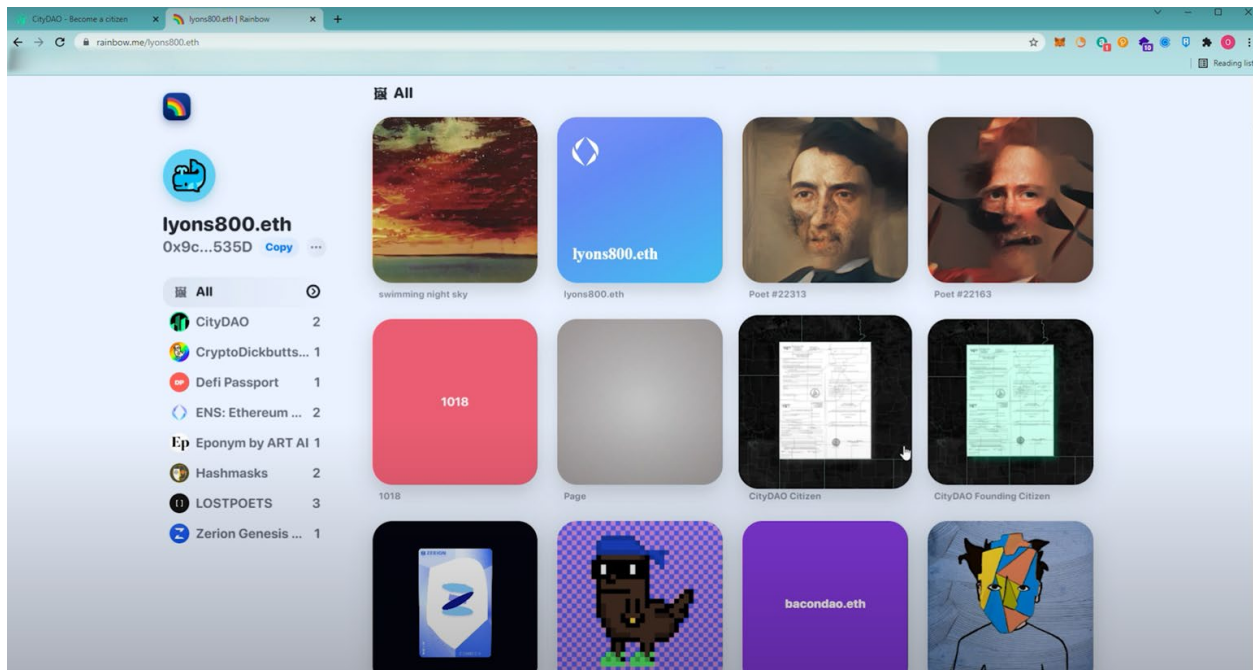


4. Ownership: After purchasing the Citizen NFT token, ownership will be reflected in the user’s digital wallet and recorded on the blockchain.

episode 02, February 2022, [Link](#).

¹⁹³ *Op. Cit.*

¹⁹⁴ "CityDAO's Mission and Key Metric," CityDAO, June 16, 2022. Accessed May 25, 2024, [Link](#).



In this case, the digital wallet being used to store the token is RainbowMe, but many others exist. Wallets of this kind are called self-custodial, because users manage them without a mediating third party.¹⁹⁵

Users manage their tokens using two types of keys, one public and one private (they are random combinations of characters). The public key is a sort of account number: users share them with others to receive and exchange tokens. The private key is what gives users access to their wallet allowing them to make transactions.¹⁹⁶

5. **Review Proposals:** Proposals submitted by community members, organizations, or stakeholders aim at improving different aspects of the city. These are currently about governance and community development, but could also include the management of infrastructure, services and environment. Reviewing proposals is possible by entering the CityDAO forum at this [Link](#).

¹⁹⁵ Custodial wallets, instead, operate in a more similar way to traditional banks: a third party holds access to the assets. While these offer convenience, user support, greater compatibility among currencies, and greater regulatory compliance, users rely on a third party to secure their funds, at the risk of manipulation.

¹⁹⁶ Being the sole owner of the keys is crucial to guarantee fully autonomous ownership and management of the assets. With self-custodial wallets, however, if the user loses the key (either forgets it or gives it away), there is no way of recovering the account, nor its content. This presents a risk for individuals who may have limited familiarity with cybersecurity, as they might not be fully aware of how their keys might be hacked, or they may not be equipped with the knowledge to safeguard against these threats.

Topic	Replies	Views	Activity
CIP - 209D - Representation via Annual Meeting Proposals (CIPs)	1	53	2h
CIP 207: CityDAO Compute - Build a GPU Cluster in Wyoming Proposals (CIPs)	49	1.1k	3h
CIP 208 - Sponsorship for Legal Qualification of DAOs Book Proposals (CIPs)	4	135	3h
CIP-206: Reimburse Discord Scam Victims Proposals (CIPs)	34	1.2k	14h
CIP 208 INVEST COSMOS [Atom]	6	274	7d
[CIP 206] Treasury reform package Proposals (CIPs)	17	997	7d
The Formation of an Unincorporated Community Request for Proposals project-proposal, dev-team, operations	9	351	7d
CIP 208 : CLOSE LLC for CIP 207 Proposals (CIPs)	10	426	20d
CIP- X: Sunset CityDAO and return a pro-Ratia share of assets to Citizens Proposals (CIPs) project-proposal, operations	8	589	21d
Discord Compromised - Updates and New Chat	4	279	Feb 6
Discord compromised?	1	104	Jan 28
Djiscord comprimised do not click or authorized Proposals (CIPs)	5	265	Jan 26

Claim CityDAO Citizenship

Connect your wallet, buy the NFT, and join us in shaping the future of land

4152 minted / 10000

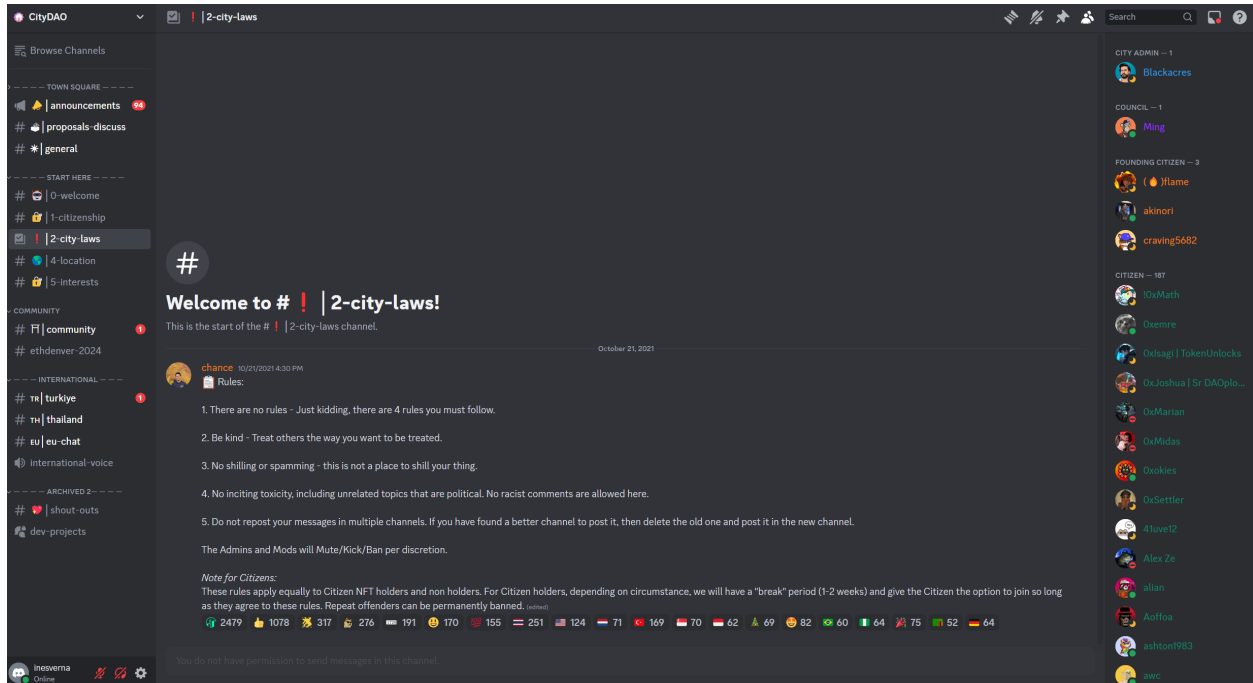
Citizen NFT
 Price: 0.25 ETH
 Supply: 10,000
 Special privileges: Access to land drops after the First & Founding Citizens, access to Citizens Discord channels, voting power

MINT NFT

Contract Discord

Proposals on the forum need to be supported by citizens (in the form of “likes”) before they can be posted for vote. Discussions take place on exclusive channels on Discord (a free chatting platform that supports various media types), each channel being devoted to specific issues. Examples of channels in CityDAO

include: general information, announcements, memes, proposals, community, city laws. Channels are grouped in servers, which have administrators who establish rules for behavior and content (usually dealing with etiquette, spamming, harassment, hate speech, relevance, etc.). To enforce the rules, administrators are allowed to delete messages, mute users, warn them, suspend them temporarily or completely exclude them.



Although blockchain is a reliable, censorship resistant, system, the community uses services that are not equally robust (Discord, Zoom, Meetup, Youtube, etc.). This adds some centralization to the process, as users with administrator rights can indeed censor those who do not follow the rules. It also adds security vulnerability. CityDAO was victim of a hack via Discord in 2022: the attacker issued a fake link for users to purchase land via an administrator's compromised account.¹⁹⁷

- 6. Cast your vote:** Review the details of each proposal, including its objectives, budget, timeline, and potential impact on the city. Votes are cast by connecting the user's wallet to the Snapshot platform. Votes are recorded on the blockchain, and contribute to the collective decision-making process of the DAO.

A member of the organization can have many wallets and citizen tokens. This means that the decision-making process is not one-person to one-vote. Centralization of power takes place if multiple accounts are created by a single user to influence voting, potentially jeopardizing the legitimacy of the DAO's

¹⁹⁷ Jamie Crawley, "Blockchain City: CityDAO Falls Victim to \$95K Hack via Discord," CoinDesk, January 14, 2022, Accessed 25 May 2024. [Link](#).

governance. This is known as “plutocracy”, a situation where wealth or economic power translates directly into political power or influence, shaping policies and decision-making processes, at the expense of equal representation. To counter these possibilities, the crypto ecosystem is developing mechanisms such as identity verification,¹⁹⁸ and locking up the voter’s tokens for a certain period of time, with the risk of losing them if they act dishonestly. Other alternatives to the one-person one-vote mechanism being explored in the blockchain space are “quadratic voting”, and “conviction voting”, where community members are continuously expressing their preference for proposals over time, rather than on a single event. The longer the member keeps the same preference for each proposal, the stronger the preference becomes. This gives more power to the users participating consistently.¹⁹⁹

- 7. **Monitor Results:** After voting on proposals, results can be monitored in real-time on Snapshot. Once the voting ends, if the minimum quorum is attained and the majority voted in favor of the proposal, funding is automatically released for implementation.

The screenshot shows a Snapshot proposal interface. The main content area displays the proposal title "CIP-112: Parcel Zero Automization" by CityDAO. The text describes the project as a Wyoming DAO's first land purchase and discusses the challenges of land ownership and governance. A sidebar on the right provides technical details: "Strategie(s)" (IPFS), "Voting system" (Single choice voting), "Start date" (Jul 29, 2022, 11:43 PM), "End date" (Aug 5, 2022, 11:43 PM), and "Snapshot" (15,239,873). Below the sidebar, the "Results" section shows a progress bar for "Approve" at 76.68% (171 votes) and "Reject" at 23.32% (52 votes). The "Quorum" is indicated as 223 / 100.

In the example above, 171 citizens voted in favor of the proposal while 52 citizens rejected it.

- 8. **Write Proposals:** Any Citizen NFT holder may write a proposal and post it on the forum. Every proposal should follow a template created by the *Planning Guild*. For the proposal to move from the forum to Snapshot, where it will be voted upon for approval, it must receive at least twenty likes within three

¹⁹⁸ Proof of humanity, for instance, is a token using blockchain technology that links wallet addresses to real humans, avoiding duplicate or fake accounts.

¹⁹⁹ Dávila, *Blockchain Radicals*, 224.

weeks.

Proposals How-to Guide
Proposals (CIPs)

Proposal Process

- 1. Writing:** Any Citizen NFT holder may write a proposal and [post it on the forum](#).
- 2. Discussion:** For a proposal to move from forum to snapshot, it must receive 20 likes within 3 weeks.
- 3. Voting:** A proposal is posted on [Snapshot](#) for a vote.

After it passes, the multisig allocates funds to the project!

To be considered a valid proposal, the Planning Guild asks Citizens to use the following format:

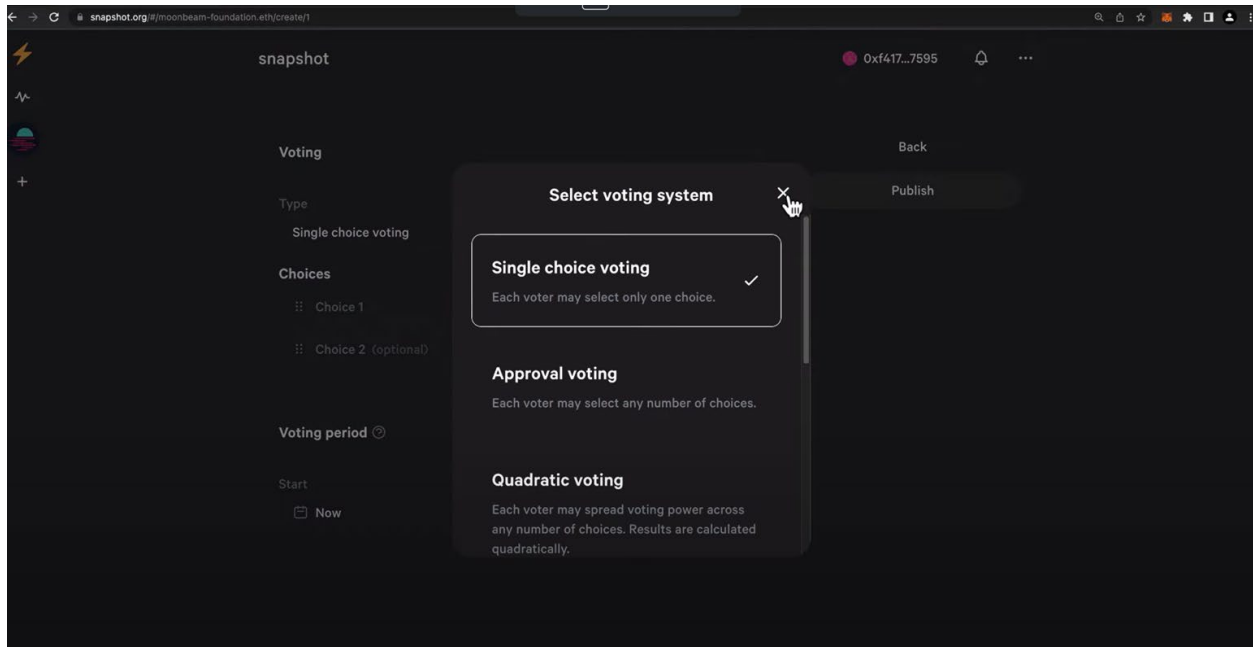
CIP Format

- 1. Proposal TLDR**
Describe your proposal, how much money it allocates and to whom, and the expected outcome.
- 2. Project Team**
Please describe team members and their qualifications.
- 3. Proposal Budget**
Please include how much money will be allocated to the project and what types of assets (for example, ETH, USDC, Citizen NFTs).
Describe the justification for how those funds will be spent.
Describe comp for team members and how that comp is distributed (for example hourly, upon completion, etc)
- 4. Timeline and Deliverables**
How long until the project is complete? What are some milestones the DAO can look forward to?
- 5. Risks**
What might go wrong?
- 6. Regulatory**
Will the project require creating new legal entities, new tax burdens for the DAO, or issuing new tokens?

Aug 2022
1/3 Aug
Aug 2022

When posting a proposal, the author must select from three possible voting systems: single choice voting (where each voter can select one choice); approval voting (where each voter may select any number of choices); and quadratic voting (where the cost of casting additional votes increases quadratically with the number of votes cast). With quadratic voting, participants can distribute their tokens across different options or allocate multiple tokens to a single one, depending on their preferences. This system is designed to restrict the power of users holding multiple tokens, since each additional vote is exponentially more expensive. It represents a more equitable way for individuals to express their preferences, incentivizing priority setting, strategic vote allocation, and more nuanced decision-making.

A challenge of voting for every proposal is that a minimum level of quorum is needed to make decisions, yet not all citizens have the same level of interest or expertise in all matters. If this results in low levels of engagement the group could lack power to efficiently evolve.



Summarizing, this section reveals how participants purchase citizenship tokens to have access to discussions and rights to vote on governance decisions. The scarcity of tokens creates a business case that promotes investment, even risking elitism or exclusion of those unable to acquire them. They provide status and legitimacy to community members, emphasizing their role in shaping the future of CityDAO. The coins collected through the sale of these tokens are allocated to a common treasury, which is then partially released to fund different project proposals, if approved by the citizens. Through the creation of rules, moderated discussions, and goal achievement quantification, the community attempts to grow and evolve.

This process of floating and selecting proposals can be considered less efficient than if a single agent (a president, a prime minister, a CEO) decided where to allocate the funds of an organization. However, because each participant holds a stake in the organization, this generates a sense of investment in the city's success. Because land tokens are scarce, their value is sensitive to demand. This incentivizes participants of the DAO to recognize how their actions and decisions impact the collective, leading to a shared commitment to achieving common goals. In other words, efficiency is traded off for transparency and participative governance.

Up until this point, I have outlined several opportunities and risks proper to the project of CityDAO. Here is a recap:

Opportunities:

Efficiency: Decentralized decision-making mechanisms can potentially streamline bureaucratic processes, reducing time and cost associated with traditional governance structures, like the role of agents in real estate. However, the decision process to arrive to such contracts can be more inefficient since they require a lot of coordination from the community.

Increased equality: Through tokenization and crowdfunding, access to capital can be facilitated to anyone with access to the internet, and knowledge of available opportunities in the digital economy.

Community Engagement: CityDAO can foster increased community involvement in decision-making processes related to urban development.

Transparency: By using open-source code as their governance landscape, it is auditable by anyone, enhancing trust and accountability.

Innovation: CityDAO may encourage innovation in urban planning, transportation, sustainability, and other areas by providing a platform for experimentation and collaboration among stakeholders.

Decentralization: Mitigation of the concentration of power in traditional government structures

Risks:

Unwanted amateurism: The governance structure does not prevent unlicensed or non-professionals from acting in the urban landscape, which could lead to suboptimal outcomes for communities.

Regulatory Uncertainty: DAOs today operate in a gray zone. Citizenship does not grant any legal rights or claims to the physical land asset and depending on regulation it may never will.

Inequality: Without proper safeguards, CityDAO could exacerbate existing socioeconomic inequalities by favoring affluent or technologically savvy community members over marginalized groups

Security Vulnerabilities: Smart contracts and blockchain technologies are susceptible to hacking, bugs, and other security vulnerabilities, potentially leading to financial losses or disruptions in governance processes.

Governance Challenges: Decentralized decision-making can lead to governance challenges such as coordination problems, conflicts of interest, and decision paralysis, particularly in diverse and complex urban environments.

Lack of Accountability: While transparency is a potential benefit, it also raises concerns about the lack of accountability if decisions are made anonymously or without clear mechanisms for recourse or oversight.

Digital Divide: CityDAO initiatives may exclude segments of the population who lack access to digital technologies or are not familiar with blockchain and cryptocurrency platforms, widening the digital divide.

III.f Crypto-Collectivism: A Dynamic, Participative Identity

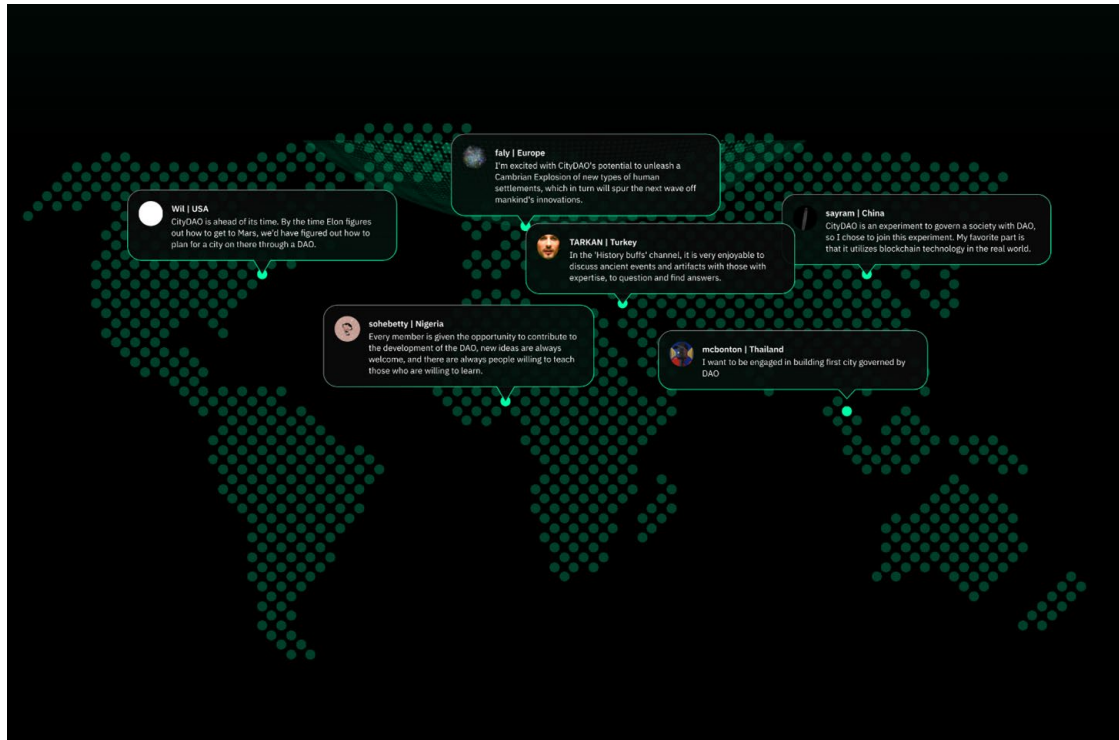


Figure 47: Screenshots from CityDAO's website. Source: CityDAO [Link](#).

As mentioned in Chapter I, the accelerating pace of globalization has bred new social and political identities that transcend national boundaries. Traditional concepts of citizenship rooted in the nation-state are challenged through immigration and displacement. The movement of capital and people, encompassing both affluent professionals and underprivileged workers, serves to redefine local subcultures, giving rise to fresh assertions of space, entitlements, and citizenship. This trend continues to be shaped by blockchain through what Balaji Srinivasan has defined as the network state: the concept of a network that uses the technology to crowdfund territory and create identity, regardless of its national borders. In Srinivasan's words: "Found a startup society. This is simply an online community with aspirations of something greater. Anyone can found one, just like anyone can found a company or cryptocurrency."²⁰⁰

A former CTO of Coinbase and former general partner of a venture capital firm, Srinivasan has been criticized for his libertarian underpinnings. He has been accused of disregarding the history of colonialism in the evolution of the nation state: a completely market-driven system of governance like he suggests

²⁰⁰ Balaji Srinivasan, *The Network State: How to Start a New Country*, Self-published (2022), 11.

could spell out the end of many civil rights we take for granted today.²⁰¹ Dávila, who considers companies to be essentially economic dictatorships controlled by venture capitalists, warns against the danger posed by a resilient, immutable ledger that encodes political values. He attributes Srinivasan's aspiration for new digital nations as extensions of the startup culture, to his desire for an anti-democratic technocracy, pointing out that this culture is controlled by venture capitalists like himself. Dávila's criticism aims to show how unlikely it is to arrive at a universal standard for human rights and emphasizes that the content embedded into the code of smart contracts is influenced by the social context from which they originate.

This chapter analyzed CityDAO as the first attempt within the post-nation state model to operate on decentralized decision-making platforms to crowdfund physical real estate. Framed differently, CityDAO signaled a possible route of materialization of a post-national state: it is an example of how DAOs enable individuals from diverse backgrounds to participate in decision-making processes, with the aim of creating a city without physical borders. A proof of this is the image of Fitsimones planting a flag in the land purchased, symbol of its sense of belonging beyond national states.

Although its founder comes from startup culture, this might not necessarily reflect the dystopian prospect suggested by Dávila. Although prioritizing growth, seeking innovation, and assuming risks may not be the solution to social inequality, they are not necessarily incompatible either. As the previous section showed, contracts that govern the DAO embed the social values the community strives for. Whether they are dystopic or not depends on the individuals writing the proposals and voting, more so than its business model. OpenAI is an example which started as a non-profit to "ensure artificial intelligence benefits all of humanity,"²⁰² focusing on public good over profit. Due to significant financial resources required for AI research, it later introduced a hybrid structure incorporating a for-profit subsidiary. This enabled them to attract capital and competitive talent, much needed for their unchanged mission.²⁰³ While non-profits may sound more noble, they are not immune to financial incentives.²⁰⁴ In short, ethical considerations and caution is called for both business models. Initiatives like CityDAO urge the questioning of the consequences if such values, which could or could not be illegitimate, are embedded into automatically executable computer code.

Through decentralized governance structures, shared interests, and borderless transactions, DAO communities form around common goals rather than national affiliations. While inevitable missteps already arise in navigating this novel technological medium, the potential lies in its democratic

²⁰¹ Dávila, *Blockchain Radicals*, 240.

²⁰² About OpenAI, "OpenAI," Accessed May 25, 2024, [Link](#).

²⁰³ James Broughel, "OpenAI Is Now Unambiguously Profit-Driven—and That's a Good Thing," *Forbes*, December 9, 2023.

²⁰⁴ Higher sensitivity of effort is found in the for-profit sector, possibly because nonprofit firms are less likely to implement performance premium, merit pay or promotion. See: Joseph Lanfranchi and Mathieu Narcy, "Effort and Monetary Incentives in Nonprofit and For-Profit Organizations," *TEPP*, no. 2013-1 (January 2012), 17.

underpinnings—an unprecedented experiment made possible through blockchain technology. Technical and legal challenges prevent their participants from owning and building on the land right now. Still, as an illusion, it offers citizens a participatory platform to explore shaping a self-governing community. Even if these challenges are not overcome, it is interesting to consider the notion of citizenship being shaped in this project. Not bound by geographical borders, it takes on a dynamic dimension: citizenship is a collective commitment to co-create and steward communal resources for the common good. Definitions that are more specific are allowed to evolve over time through proposals for improvement, as long as the community votes in their favor. In this embodied ethos—or model—of a post-national society, citizenship would be defined by participation, mutual respect, and collective empowerment. Its legal and financial viability are still to be tested.



Woi Octopus#7f0b

Crawls0r#b2c7

Kat

PiZzArte#a92d

Fra

Chapter IV. Decentraland's Online Suburbia

IV.a Intro to Chapter IV

The previous chapter studies CityDAO, a model of a Decentralized Autonomous Organization (DAO), exploring the opportunities and challenges of collective land ownership. Here is a recap of what we've mentioned so far regarding DAOs:

- The Ethereum blockchain network combines the decentralized nature of blockchain technology –its resilience and transparency– with the ability to run any type of computer program.
- Computer programs on the blockchain can run if-then operations, allowing contracts to automatically execute when the parameters encoded in the 'if' statement are met. For example, 'if' the user is a holder of citizen tokens, 'then' allow them to vote.
- These types of contracts allow for a more transparent governance system, as they are open source and auditable by the community, although they do not eliminate governance challenges.
- These contracts are being used to encode ownership and metadata of digital assets, which are unique and indivisible, known as Non-Fungible Tokens.
- These tokens enable members of the community to gain rights over the decision-making process through voting mechanisms.
- Social values are inherently embedded in the code of these contracts, which today operate in gray regulation landscapes.

Collective ownership is just one among the many possibilities opened up by the exploration with blockchain technology. This chapter analyzes Decentraland, a DAO that completely dispenses with physical land. Instead, it proposes a digital universe, in which each user is the owner of his or her virtual heritage, from land to clothes or accessories. Private property coexists here with a certain sense of shared community: I call it multiplayer equity ownership.

As in CityDAO, self-executable contracts allow the community to verify ownership, exchange assets, suggest improvement proposals and participate in voting, without a mediating third party. If the previous chapter concluded that social values are intrinsically encoded in these contracts, this one examines the norms and rules cultivated by multiple actors, understanding them only as another possible instantiation. Delving into the philosophy promoted by its founders, its decision-making process, the challenges faced, its priorities and aesthetics, the question this chapter probes is how does this virtual city differ from other cities, and what role does blockchain technology play?

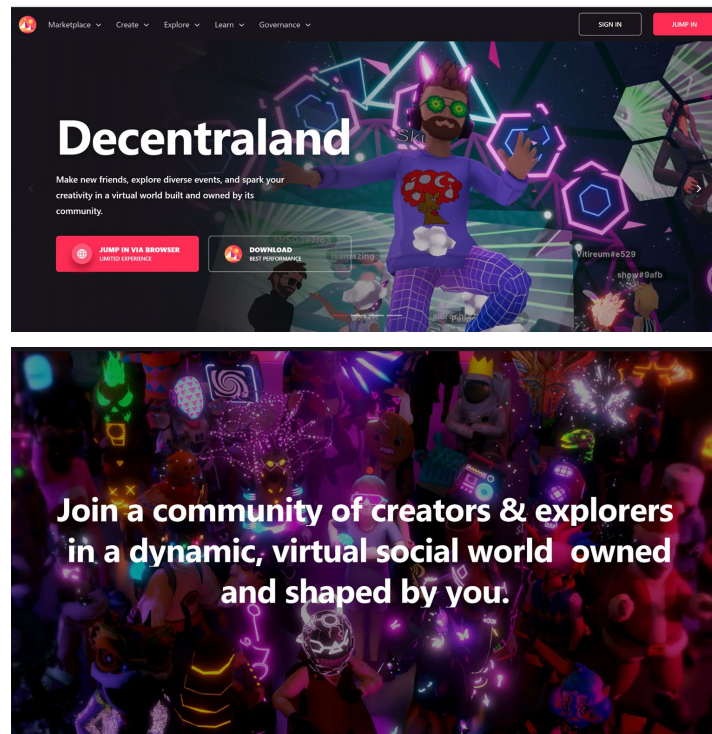


Figure 28: Screenshots of Decentraland’s website. Source: Decentraland [Link](#).

As indicated by Varoufakis (see chapter I), *who* owns the capital is key in the understanding of the economic system. Capital’s mutation to cloud capital demolished capitalism’s two pillars: markets and profits.²⁰⁵ In the age of social media, this new type of capital is produced by a great portion of humanity yet only profitable for a very few. Such concentration of wealth leads to the contradiction of capitalism’s ideals (a competitive marketplace, minimum regulation from governments and central banks, freedom of choice by the end user).²⁰⁶ A market is a setting that facilitates trade, enabling buyers and sellers to interact with each other to exchange goods and services. Prices are determined (mainly) by demand and supply, sometimes subject to regulations. Platforms, on the other end, exert substantial control over the user experience. For the exact same search, users will see customized content –tailored to their history and preferences.²⁰⁷ Buyers are unable to communicate with the seller, except when and how the landlord of the platform allows it. Ownership over the content, data, and resources, allows platforms to manipulate

²⁰⁵ Varoufakis, *Technofeudalism*, 125.

²⁰⁶ *Op. Cit.*, 130.

²⁰⁷ “Markets have been replaced by platforms: so amazon.com is not a market. It looks like a market but it’s more like a digital fief, a cloud fief, belonging to one man, whose accumulation of wealth is based not on profit but on a form of rent. Every time you buy something from Amazon 30 40% of the price goes to Mr Bezos, not to the maker.” See: “Capitalism as we know it is over, so what comes next? | My Wildest Prediction with Varoufakis” Youtube Video. Posted by @euronews, December 20, 2023. [Link](#).

users, facilitating the ever-increasing accumulation of wealth (power) by platform owners.

As markets are replaced by platforms, the problem of data ownership is not that users are merely “surveilled,”²⁰⁸ but that their behavior is being altered.

The question is who owns what. Some people are very worried about surveillance (...) but I'm far more worried by *what they own*. They own this Capital, which is a capacity to separate us, to fragment us, as markets, as communities, as societies. To influence us in ways we don't understand, in ways that the people who wrote the algorithms do not understand.²⁰⁹

The power over users' behavior is exercised, not only by the hyper-taylorization of advertisement, but through a persuasive algorithm that tells them where to go, what to watch, read, buy, whom to meet, what to listen to, what to cook, where to invest. Cloud capital is, thus, a produced means of behavior modification, rather than a produced means of production.

The question is not if blockchain can revert this. Crypto might well be a false promise. The question is rather, if Decentraland is viewed as a simulation of an alternative model to the one proposed by Varoufakis—where capital ownership shifts from a few individuals to many—what social dynamics emerge from this, and how does this redistribution of capital affect the organization of spaces within the digital realm?

As per Saskia Sassen (see Chapter I), the need for central functions, coordination of factories, financial services –much needed for the capitalist machine–, derived in a greater concentration of infrastructures that make the city attractive as a global hub. Thus, it follows, that despite the growing trends that seek to take advantage of remote work opportunities, the so-called digital nomads, the protagonists of this new lifestyle choose world traveling over settling in the traditional suburb. Without a fixed location, they dynamically concentrate in different large cities.²¹⁰

The following sections explore the center-periphery dynamic posed by Decentraland, a model of a digital city that is both autonomous and dependent on the material city: its users still live in the physical world, only entering the digital one momentarily. Like a new destination for digital nomads, only briefer, Decentraland presents itself as a sovereign space, with its own economy, social dynamics, and places for learning, entertainment, and opportunities to earn money.

²⁰⁸ Thus, Varoufakis argues, it cannot be stated as “surveillance capitalism”, as posed by Shoshana Zuboff

²⁰⁹ “Capitalism as we know it is over, so what comes next? | My Wildest Prediction with Varoufakis” Youtube Video. Posted by @euronews, December 20, 2023. [Link](#).

²¹⁰ Giana M. Eckhardt, Aleksandrina Atanasova, “The New Reality of Digital Nomads” *Harvard Business Review*, February 5, 2024. [Link](#).

IV.b Digital Cities

“Digital cities,” understood as both simulations of real cities and autonomous virtual worlds, have gained center stage of architectural debates in recent years. Driven by the expansion (if not ambition) of the virtual realm beyond the entertainment industry. This exploration now transforms the digital environment into a realm for “living,” i.e., working, learning, researching, and hosting cultural, artistic, and political events.

In the realm of virtual worlds, Second Life²¹¹ emerged in 2003 as a real-time interaction platform that offered users, through avatars, a wide range of artistic, personal and political experiences.²¹² Conceived as a space to be filled with user-generated content, since its debut it has been the scene of education and learning, but also of controversies related to fraud, misbehavior, congestion,²¹³ and the trade of involuntary sexual activity with child avatars through identity theft.²¹⁴

Recently, especially in the context of the Covid-19 pandemic, the metaverse concept has emerged as a more sophisticated version of those virtual worlds, promising to generate immersive experiences through new hardware devices in addition to the already existing means of virtual interaction. Facebook bombastically announced its commitment to the future of immersive digital environments. Facebook's transformation of Meta was one of the initial investments in the audiovisual sector that included the development of artificial intelligence. This catalyzed a renewed interest in digital urbanism and virtual architecture in figures like Patrick Schumacher, who declared that these virtual worlds would represent a fertile new field for the engagement of design practices. Some relevant questions in that debate are: What new opportunities emerge and what do architects offer in the speculative space of the metaverse that artists, game designers and programmers cannot offer? To what extent should virtual environments be mimetic of the material world? Should these spaces be stable (following the rules of gravity, forces, movement, weight, budgets) or should they be free of these dynamics?

Schumacher is experimenting with a digital city, Liberland (Figure 29), as a twin city of a (potentially) future material city. He conceives the virtual twin city as a simulator to evaluate different parameters (such as market speculation, congestion, price volatility or regulations) prior to its material implementation. In this context, he argues that architectural design is about framing social interactions, including virtual ones, and, in this sense, *who* designs the metaverse will necessarily imply a difference of purpose and criteria

²¹¹ Second Life has been considered Decentraland's precursor by figures like Santiago Siri. Siri mentions Second Life was too early for its time. See Hernan Zin. "La Prodigiosa Historia de Decentraland" *¿Por Qué No Te Habré Hecho Caso?* Podcast audio. April 2022. [Link](#).

²¹² Andrea Moneta, "Architecture, Heritage, and the Metaverse: New Approaches and Methods for the Digital Built Environment" *Traditional Dwellings and Settlements Review*, FALL 2020, Vol. 32, No. 1 (FALL 2020): 40.

²¹³ Tom Boellstroff, *Coming of Age in Second Life: An Anthropologist Explores the Virtually Human*, (New Jersey: Princeton University Press, 2008),

²¹⁴ "Second Life 'child abuse' claim" *BBC News*, Last modified May 9, 2007. [Link](#).

for success.²¹⁵ It certainly places the primary responsibility and competence on the designer, regardless of whether it is virtual or not, as architects are trained to ensure that the richness and complexity of layered immersive three-dimensional interactive worlds remain perceptually manageable and easy to navigate. He downplays the importance of games in this context, arguing that they represent only a small niche compared to the overall framework that encompasses the metaverse, including human interaction, knowledge sharing, professional collaboration, cultural communication, art, education, political engagement, etc.



Figure: 29. Zaha Hadid Architects, Liberland. 2022. Source: "Zaha Hadid Architects Designs Liberland, a "Cyber-Urban" Metaverse City" *ArchDaily*, March 15, 2022. [Link](#).

Based on the technological lineage in which it is embedded, Decentraland should be read, not as a video game for entertainment purposes alone, but as an instantiation of these digital cities: one that is not designed by a master-architect, but by its own community. This shifts questions from *what the urban space of the metaverse should look like* to *what interesting urban dynamics are taking shape in the metaverse that architects could learn from*.

²¹⁵ Sara Kolata "The Metaverse as Opportunity for Architects: An Interview with Patrik Schumacher" *ArchDaily*, April 14, 2022. [Link](#).

IV.c The Family's Getaway

Decentraland began to take shape around May 2015²¹⁶ by Argentine software developers Esteban Ordano and Ariel Meilich. Ordano and his friend Manuel Araoz sensed a growing potential for virtual reality (VR) technology to improve and become increasingly immersive over time; they anticipated a significant rising market within a few years or a decade. Believing that a shared social visual world would emerge, they discussed the need of such an experience not being monopolized by a single corporation like Meta (then Facebook). This idea is also dominant in the writing of their Whitepaper.²¹⁷ In its publication had a sense of urgency: the VR boom was happening then (or at least they believed so).²¹⁸ The global revenue for Augmented Reality (AR) and Virtual Reality (VR) was projected to hit \$162 billion in 2020, up from just \$5.2 billion in 2016.

Ordano is an Instituto Tecnológico de Buenos Aires (ITBA) graduate who has worked at Google and leading Bitcoin payment processor BitPay. Meilich studied neuroscience and economics at New York University and back then used Bitcoin to bypass Argentina's currency laws to run an outsourcing business.²¹⁹ The unstable Argentine economy went from an exchange rate of 1:3.8 of the peso to the U.S. dollar in 2010 to 1:8 in 2015.²²⁰ To prevent capital flight and the depletion of the central bank's reserve of US Dollars (and further devaluation of the peso) the free trade of US Dollars was almost entirely forbidden by the government (except for small amounts and international commerce operations).²²¹

According to a profile published by the blog CoinTelegraph, it was the freedom intrinsic in the blockchain technology that inspired Meilich to join a 'hacker house' in Buenos Aires called Voltaire, where he met Ordano.²²² The Voltaire House was composed of 15 people, mostly men, who knew each other from ITBA. They hosted lunches and discussions over a three-year period with the aim of fostering a decentralized and transparent economy.

The Decentraland whitepaper was also written by two other core team members, also software engineers, ITBA graduates and ex-Bitpay employees, Yemel Jardí and Manuel Araoz. Araoz was the

²¹⁶ "Interview with Esteban Ordano, Cto @ Decentraland - Ethfinex* [Old]." Youtube video. Posted by @Rhinofi. June 13, 2018. [Link](#).

²¹⁷ The Decentraland project is continually evolving and some of the approaches outlined in the white paper are outdated. However, it is still valid to understand the motivations that gave birth to Decentraland. See: Ariel Meilich Esteban Ordano, Yemel Jardí, Manuel Araoz, "Decentraland Whitepaper" (2017), [Link](#).

²¹⁸ Ariel Meilich, "Introducing the Decentraland White Paper," *Medium*, July 12, 2017. [Link](#).

²¹⁹ The Coin Telegraph Top 100. "Esteban Ordano #6: Co-founder of Decentraland." Accessed 01/06/2024. [Link](#). The fact that the founders are Argentine is not minor: despite the volatility that is intrinsic to cryptocurrencies, their demand tends to be higher in economically volatile and politically unstable regions. See: "Charting the course of Bitcoin, 11 years and counting," *Coinbase*, October 31, 2019. [Link](#).

²²⁰ "Dólar oficial histórico" *Ambito*, Accessed 06/06/2024. [Link](#)

²²¹ "Argentina: Economic Developments; April 29, 2015" *IMF eLibrary*, February 29, 2016. [Link](#).

²²² The Coin Telegraph Top 100. "Esteban Ordano #6". On the history of Voltaire, see: Leo Schwartz & Lucia Cholakian Herrera, "Rise and fall of the house of Bitcoin," *Rest of world*, February 1, 2021. [Link](#).

founder of the Voltaire House in 2014, with the aim to build out BitPay's development team in Argentina. At the time, all members made significant contributions for the buildout of blockchain technology: Araoz and Ordano created in early 2013 a blockchain implementation of Proof of Existence; Araoz, along with another member of the house created OpenZeppelin;²²³ Yemel crafted open-source tools such as the Bitcore library and worked on ChangeTip, a micropayment infrastructure for the web which was acquired by Airbnb in 2016.²²⁴

To summarize: while searching for ways to dodge the economic regulations of Argentina the developers of Decentraland saw an opportunity to prevent the potential monopolization of VR platforms by large corporations like Meta. Thus started an experiment of blockchain based real estate ownership, which places particular emphasis on user-directed content tenure.

The idea of building a new, pseudo-autonomous community, far away from the old city's ills (for Decentraland that could be corruption, centralization of power, trading restrictions) has deep historical roots. Howard's Garden City model planted a consistent ideal of a new type of modern family. One that lived in community stability, freed from congestion, pollution, poverty, in a restored state of harmony with nature. These are the precedents for the materialization of suburbia that urban historian Robert Fishman has described as a *bourgeois utopia*. It is not the creation of urban planners and architects, as individual genius who work in isolation, but rather one that started with London's elite in the late 18th century.²²⁵ This movement was characterized by emerging values that shaped a new type of family: one that was inner-directed, with strong and exclusive personal ties, seeking to escape from the intrusions of the workplace.²²⁶ The initial concept of suburbia, envisioned by utopian planning as a pristine alternative to urban life, evolved gradually and anonymously, by trial-and-error, over two hundred years of history, shaped by a collective anglo-american middle class. Domestic life was to the intense civic center what public architecture was to the ancient city.²²⁷

Such model would then become the ideal to pursue, with an emotional attachment to the house as the materialization of new cultural values (leisure, neighborliness, prosperity) and the idea of family life.²²⁸ The first models of this process were London and Manchester and were later widely adopted in the United States and Latin America. The technology of urban sprawl, land speculation, and the bitter class

²²³ Proof of Existence leverages blockchain technology to verify the existence of a document. See: Proof of Existence, [Link](#). OpenZeppelin builds developer tools and performs security audits for distributed systems. See: OpenZeppelin, [Link](#).

²²⁴ Franco Zeoli, "Chatting With Blockchain Veteran Yemel Jardi," *Medium*, August 6, 2017. [Link](#).

²²⁵ Fishman's analysis is rooted on the inherently conflict between "bourgeois" and "utopia", as the former implies materialism and a rejection of idealism. This paradox is key in the understanding of this new type of suburbia, which prioritizes private property and individual families, unlike other collectivist utopias.

²²⁶ Fishman, *Bourgeois Utopia*, 9.

²²⁷ Op. Cit., 3.

²²⁸ Op. Cit., 10.

conflict fostered its development.²²⁹ Fishman argues the fall of suburbia starts in 1945 as advanced technologies enable a web of superhighways that foster its emancipation: it ceases to be *sub*-urbanization to become a new city of autonomous character. The ties with older urban cores are weakened.

Under such definition, Decentraland could be seen as a new instantiation of suburbia; one striving for a harmonious community, once more distanced from the tainted urban core, yet still reliant upon it. A key difference between the two is that while a significant investment was required to enter suburbia in the 1920s (one had to buy land and own a car), the dynamism of the virtual realm lowers the entry barrier: anyone can walk through the world regardless of whether they own land. If the modern family of the past century reversed the meanings of core and periphery, experienced an enclosed domesticity, separating themselves from intrusions of the workplace and created a new collective dream of the ideal house, the question is what vision of 'harmony' are the multi-players striving for?

IV.d Challenges of Prioritizing Real-Time Browser-Based Interactions

Although the Ethereum network already existed when Decentraland's founders started experimenting with the original idea in 2015, the concept was still in an early stage. Decentraland was initially prototyped as a variation of the Bitcoin code.²³⁰ In essence, the developers replicated Nakamoto's published code but modified the transaction data format. Rather than transferring a digital coin, in Decentraland users could transfer tokens symbolizing pixels on an expansive 2D grid. These tokens encompassed metadata specifying ownership and color attributes for each pixel's x and y coordinates. In late 2016 the team incorporated 3D capabilities to the grid and gave owners of the parcels the opportunity to associate it with a reference file which defined the models and textures to be displayed at that location. These files were still using a modified version of the Bitcoin blockchain.²³¹ By 2017 Decentraland had migrated to the Ethereum blockchain, as it was increasingly mainstream and enabled the use of smart contracts. When Decentraland was first launched, there was no DAO: meaning, ownership of the assets was decentralized, but governance decisions were taken by the founders and their team, rather than by a voting mechanism.

²²⁹ Op. Cit. 14. The automobile is the most evident technology that fostered urban sprawl, but many others contributed: communication technologies (telephone, television), fridges, interurban railways, loosened the ties with the urban core. See: Fishman, *Bourgeois Utopia*, 186.

²³⁰ Hernan Zin. "La Prodigiosa Historia de Decentraland" ¿Por Qué No Te Habré Hecho Caso? Podcast audio. April 2022. [Link](#).

²³¹ Esteban Ordano, et. al., "Decentraland Whitepaper." (2017). [Link](#).

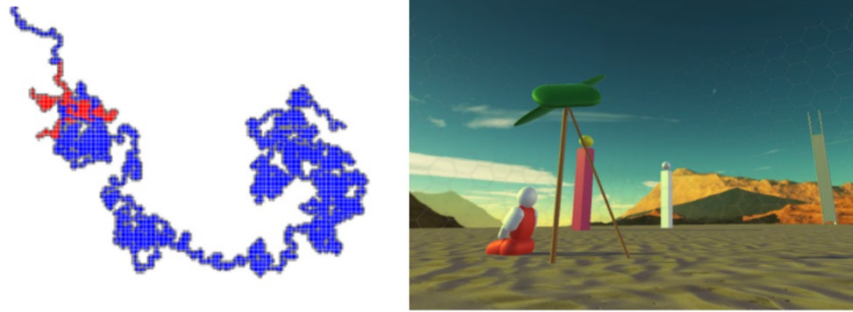


Figure 30: On the left, Decentraland's first map, showing the state of the city. Users could create pixels, transfer their ownership, and change their color. On the right, a later iteration. Users could now create 3d models and apply textures. Source: Esteban Ordano *et. al.*, "Decentraland Whitepaper." (2017). [Link](#).

Today, players can purchase a plot or rent it out in order to build a scene. Plots can be acquired from the marketplace, connecting a wallet with the game's cryptocurrency called MANA. Each scene occupies a finite amount of space. They are displayed one next to the other for players to walk through them. Each scene is composed of 3D models. Scene creators can choose the items that will make up the scene from an already established library, or create them from scratch using Blender (a freeware modeling and animation application). Some of these items come with an inbuilt behavior, which can be customized to make the scenes interactive. Alternatively, users can create, sell and buy customized wearables (clothing, hair, hats, glasses, or any type of device worn on the body). Daily events are also organized by the community, ranging from concerts to art gallery openings and hangouts to game releases.

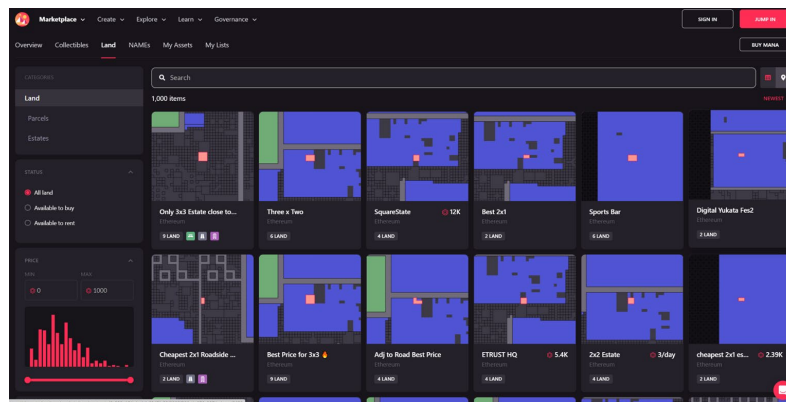


Figure 51: Screenshot of Decentraland's website. It has a marketplace for users to buy and sell their assets. Source: "Marketplace," *Decentraland*, Accessed 06/06/2024. [Link](#).

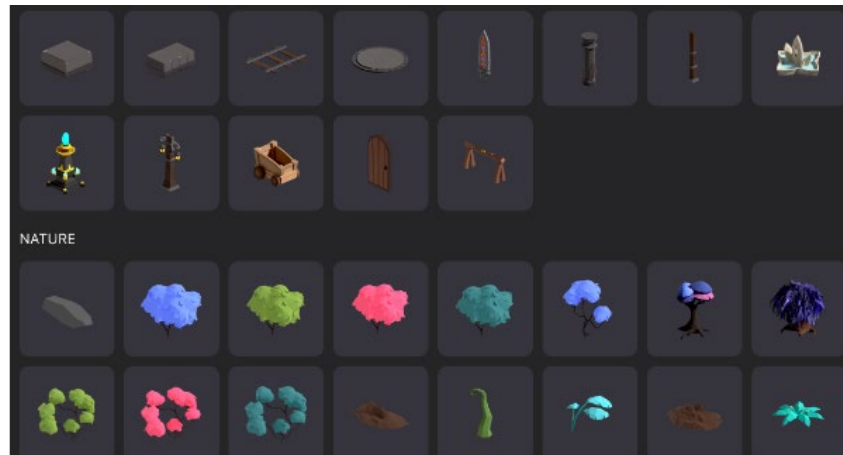


Figure 32: Screenshots of Decentraland’s website. Library of different already built objects for content creators to incorporate on their scenes. Source: “Content Creator.” *Decentraland*. Accessed 04/05/2024. [Link](#).

The founders of Decentraland moved on to new projects,²³² handing control over to people of the community through the DAO. Members of the DAO are users that hold tokens, but anyone with access to the internet can wander around the city and interact with other players, even if they do not have a digital wallet linked to their profile. The decision to encourage the participation of non-token holders corresponds to the initial mission to decentralize the monopoly of the VR industry. This philosophy remains unchanged as ownership was transferred from the founders to the community.

Just like CityDAO, the online community of Decentraland uses the forum to post proposals for improvement, Discord platform to discuss specific topics, wallets to prove ownership of their assets, and Snapshot to vote on the different proposals for fund allocation. However, rather than implementing quadratic voting, in Decentraland voting power is calculated from the total balance of tokens allocated in the user’s wallet.²³³ This allows users with greater involvement (be it financial –tokens purchased with fiat money– or of time spent –tokens earned in gambling or performing services–) have more voting power in the decision-making process.

In 2021, amid the Covid19 pandemic and Facebook announcing their vision for the Metaverse,²³⁴ a 116-parcel plot of virtual land in Decentraland was sold for a record of 2.49 million euros worth of cryptocurrency.²³⁵ This milestone marked a rise in the (in hindsight, overhyped) belief of the relevance the

²³² Ordano founded Big Time Studios in April 2020.

²³³ One MANA contributes one Voting Power (VP). One NAME contributes one hundred VP. One LAND parcel contributes two thousand VP

²³⁴ Kari Paul, "Facebook announces name change to Meta in rebranding effort," *The Guardian* (2021). Accessed 06/06/2024.

²³⁵ Youtubers reviewing virtual worlds often include Decentraland in their top ranking. See for example: "TOP 5 BEST BLOCKCHAIN GAMES 2021 - 2022 [VR WORLDS] PLAY TO EARN" Youtube Video. Posted by @ TheDigitalGoldToken. April 27, 2021. [Link](#); "Los MEJORES METAVERSOS en 2023 | Descubre los mejores mundos virtuales en 2024 Qué es un Metaverso" Youtube Video. Posted by @DaniCorrecaminos. February 12, 2023. [Link](#).

metaverse would have in the following months. In November 2021 a virtual real-estate company purchased a plot of land in Decentraland for \$2.43 million.

In March 2022 Decentraland hosted its own fashion week and achieved a total attendance of 108,000 unique users over four days. The line-up included mainstream designers like Dolce & Gabbana, Tommy Hilfiger, COACH, Vogue Singapore, DUNDAS, Monnier Paris, and Adidas. Estée Lauder gave out 10,000 NFTs. The event also included the performance of musical artist Grimes. Mainstream companies like Samsung, Coca-Cola, Sotheby's, have also stepped into Decentraland in different ways. Samsung opened their digital shop for a limited period to display the latest announcements. Coca-Cola hosted a virtual event in Decentraland for Friendship Day, where they launched their first NFT collection. Sotheby's auction house opened a virtual gallery in Decentraland and displayed famous NFT artists and then hosted a digital auction in June 2021.²³⁶

However, popularity of the game decreased after the slump in the crypto market, leading to criticism of lacking engagement and reports showing a very low user traffic.²³⁷ Youtubers humorously recorded their wandering around the lonely city. Other users with whom they tried to interact with were either trying to sell something or completely inactive. According to a report published in the technology magazine WIRED, from the 300 plots that are listed on the marketplace, only 40 are occupied.²³⁸

²³⁶ Carlos de Lanuza "10 Popular Brands Stepping Into the Metaverse," *DappRadar*, January 11, 2024. [Link](#).

²³⁷ Sam Hamilton, Creative Director at Decentraland, disputed the way in which "active users" are tracked, only counting people interacting with smart contracts. He argued the platform had 8,000 users on average per day. Cam Thompson, "It's Lonely in the Metaverse: DappRadar Data Suggests Decentraland Has 38 'Daily Active' Users in \$1.3B Ecosystem," *CoinDesk*, October 7, 2022. [Link](#).

²³⁸ Eric Ravenscraft, "The Metaverse Land Rush Is an Illusion," *WIRED*, December 26, 2021. [Link](#).

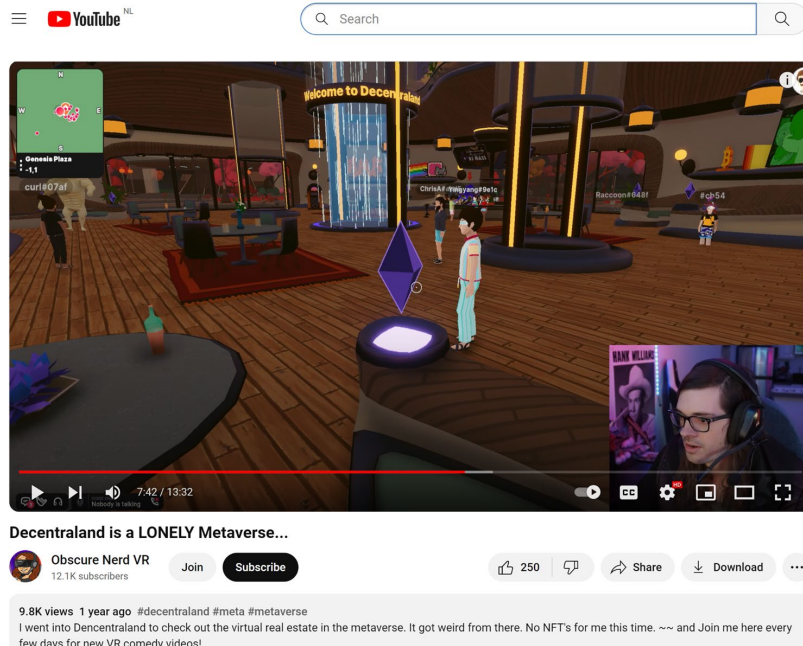


Figure 33: Screenshot of youtuber navigating Decentraland trying to interact with other users. Source: “Decentraland is a LONELY Metaverse...” Youtube video. Posted by @ObscureNerdVR. November 4, 2022. [Link](#).

Decentraland’s decreasing engagement can be attributed to the migration of the crypto-gamer community towards other virtual worlds like Sandbox.²³⁹ Whereas Decentraland focuses on creating art and wearables -targeting the artist community-, Sandbox was initially designed for gaming and thus offers a more relevant experience.²⁴⁰

The gaming community is often characterized by their interest on high-performance processors, graphics cards, and abundant RAM, as they enable demanding games to run smoothly and provide an immersive experience. In trying to find an alternative to the monopoly of virtual reality, Decentraland, however, prioritized running inside an internet browser. This means that it can run on any computer with access to the internet, regardless of hardware. Furthermore, its ambition was to synchronize in real time to facilitate multiplayer interactions.²⁴¹ Its low-resolution aesthetics demonstrates this as a clear priority as it ensures compatibility across non-gaming hardware, at the cost of the user’s experience. This synchronization was a major challenge. Multiplayer browser-based experiences usually have to ensure the virtual world state is consistent for all players, and deal with network latency (delays between the moment a player takes action and the moment in which this action is reflected in the world for other players), scalability

²³⁹ Sandbox was released in 2021. Other competitors include Roblox (it does not operate on blockchain, but also allows users to create content), W3rlds (designed specifically for businesses), MatrixWorld (Land pre-sale started on October 2021), Vault Hill (launched October 2023).

²⁴⁰ Prakriti Chanda, "How Does Tether Make Money? USDT Ecosystem Explained," *AMB Crypto*, August 22, 2023. [Link](#).

²⁴¹ Hernan Zin. "La Prodigiosa Historia de Decentraland" *¿Por Qué No Te Habré Hecho Caso?* Podcast audio. April 2022. [Link](#).

(guaranteeing a smooth experience, even with a large number of players joining the world at the same time), and multiplayer interaction, among other issues.²⁴²

Additionally, Decentraland faced a significant limitation: users had to grasp basic scripting for content creation, making it unfit for its targeted audience, shaped mainly by non-developers.²⁴³ The low-resolution aesthetics lacks is unappealing to designers, who do not prioritize the opportunities posed by blockchain. Figure 34 shows the image of Danish firm BIG's project for a technology center in Taipei after being simplified to adapt to software limitations. The design on Decentraland, supposed to host the virtual headquarters of Vice Media Group, is disappointing according to reviews.²⁴⁴

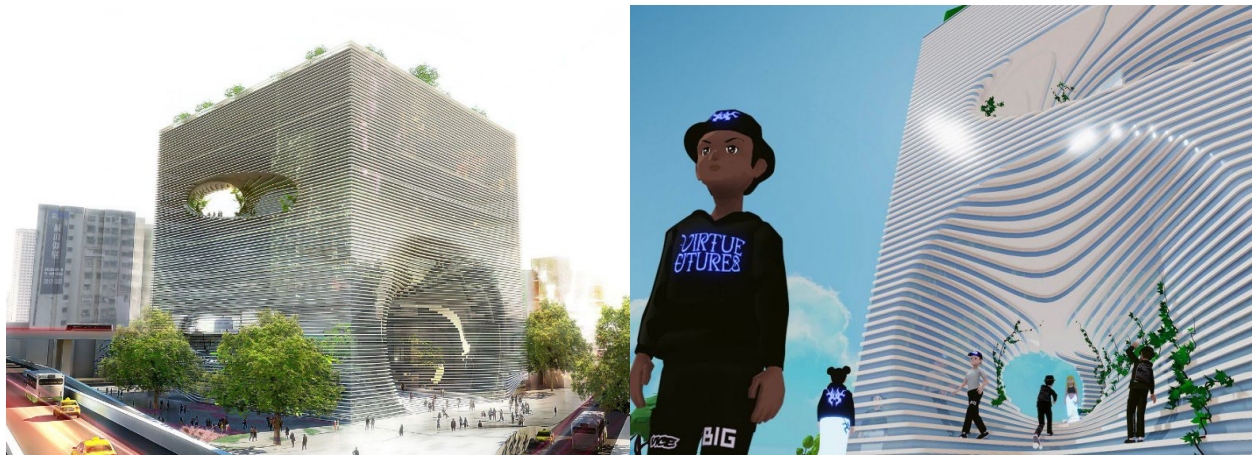


Figure 64: On the left, a render of TEK Headquarters. On the right, its adaptation for Decentraland. The materiality constraints in the software make the building lose the transparency of the original design. Source: Catherine Warman "TEK by BIG," *Dezeen*, February 4, 2011, [Link](#).

In an attempt to expand, Decentraland targeted newcomers and non-crypto experts.²⁴⁵ The DAO proactively restructured the website providing thorough definitions of the blockchain terminology and explanations to enable basic comprehension of the underlying concepts. The highly technical scripting workflow was replaced with intuitive and user-friendly drag-and-drop functions, simplifying the process and making it more accessible to lay users. They integrated comprehensive tutorials, recognizing that ease of access to data fosters engagement with the platform. The DAO also increased its transparency by publishing reports and the codes used to generate those reports.²⁴⁶ A transparency page was added

²⁴² Others include choosing the correct networking protocol and architecture design, but these concepts are too technical and escape the scope of this investigation. For more information on this. See: Srushtika Neelakantam, "Building a realtime multiplayer browser game in less than a day — Part 2/4," *Medium*, June 12, 2020. [Link](#).

²⁴³ See: "How to Build for DCL | Wearables." Youtube Video. Posted by @lowpolymodelsw. April 2, 2021, [Link](#).

²⁴⁴ "Bjarke Ingels Group Disappoints with VICEVERSE decentraland architecture review." Youtube video. Posted by @extraoffice7981. March 18, 2022, [Link](#).

²⁴⁵ "Decentraland 2022 Recap," *Decentraland*, 2022. Accessed 04/05/2024, [Link](#).

²⁴⁶ Yemel, "Decentraland DAO | Transparency," *Decentraland*. Accessed 04/05/2024. [Link](#).

where a real-time balance can be found, along with names of members in the different committees.

IV.e How to Align in Designing a Cyberpunk World

If Bitcoin City and CityDAO shape an identity within their target community through symbols used in their images (architectural landmarks in the case of El Salvador, the flag in the case of CityDAO, what factors inform design decisions in Decentraland?

The Decentraland world comprises 90,601 squared parcels, each measuring sixteen-by-sixteen meters, organized in a quad-tree like grid. There is a central plaza at the center, and eight additional plazas that radiate from it at 45 degrees. Two main axes roads connect the plazas from north to south and from east to west. The remaining four plazas are connected by four roads in the shape of a square. Each quad formed by the intersection of the square and the main axes has a labyrinth-like orthogonal organization. Its mood and atmosphere can be described as a blend between a low-poly aesthetic –reminiscent of retro video games– and a futuristic, – with eye-catching neon lights–virtual world. This choice of design could be attributed to the intention to create a sense of belonging among users. Simultaneously, the use of bold hues creates a visually stimulating environment that fosters the engagement of users and prompts them to navigate the space.



Figure 75: Decentraland Map. Source: "Genesis City" *Decentraland*. Accessed 04/05/2024. [Link](#).

Trevor Waldorf, a member of Decentraland Foundation, revealed discussions taking place during the

design of Decentraland's map.²⁴⁷ The main question was the role roads would play in the virtual environment. Whereas in material life, roads communicate from one point to another and walking can be a pleasant experience, in the metaverse users are able to bypass points to shorten travel time, making navigation much more fragmented. This fragmented navigation mirrors the experience of the suburbs of northern Buenos Aires (and other Latin American cities). In response to the stark polarization between the rich and the poor, *gated communities* have expanded beyond mere residential areas. They now encompass increasingly complex enclaves with shopping malls, schools, hospitals, and hotels. Following market dynamics, and taking advantage of the lack of state intervention, they stand as segregated islands with walls defining its boundaries, amidst the surrounding sea of poverty.²⁴⁸

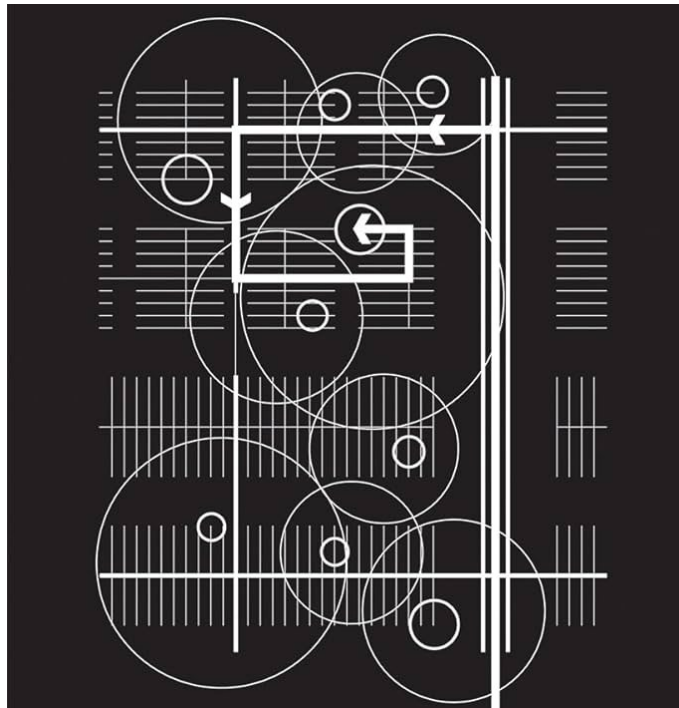


Figure 36: In his seminal 1996 book *Ladders* Albert Pope explored the complex dialect of urban form made up expansive growth and exclusive, discontinuous, cul-de-sac islands. See: Albert Pope. *Ladders*. (New York: Princeton Architectural Press, 2015), 188.

Regardless of the fragmentation, roads in Decentraland, like in the material realm, enable content discovery –highly valued by developers–. The designers therefore hypothesized adjacency to roads would increase land value. By the same token, the center was inherently more valuable than the rest, as all users enter the world on this location. As a result, the road layout was a strategy used by the

²⁴⁷ "Designing Genesis City: Roads & Urban Planning," Decentraland, 2018, Accessed 06/06/2024 [Link](#).

²⁴⁸ See: Michael Janoschka, "El nuevo modelo de la ciudad latinoamericana: fragmentación y privatización" *Revista eure*, Vol. XXVIII, N° 85, Santiago de Chile, December 2002, 26.

developers to counteract this unbalance.²⁴⁹ Figure 37 shows the land price heat-map after the land auction which confirms this theory.

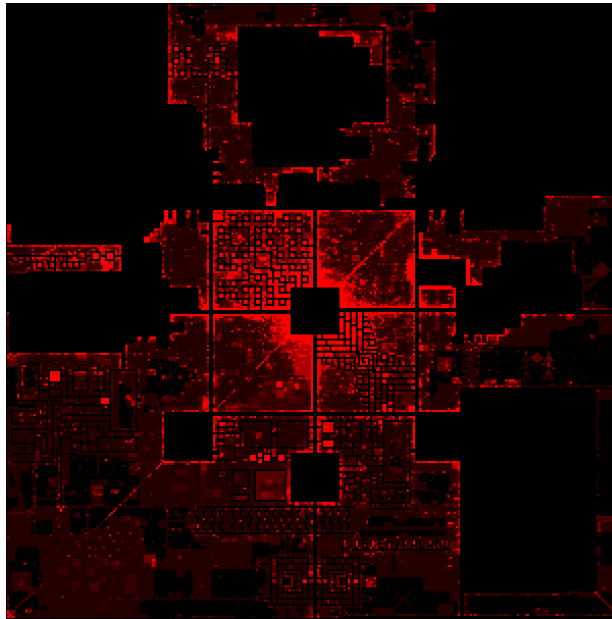


Figure 87: Decentraland's price heat map. Source: Trevor Waldorf, "Designing Genesis City: Roads & Urban Planning." *Decentraland*, February 26, 2018. [Link](#).

According to the whitepaper, land parcels must be contiguous to existing ones and have a fixed number of adjacencies.²⁵⁰ The content of adjoining parcels is visible from a distance. This principle establishes a targeted traffic of users, who, on their end, benefit by finding relevant content through their navigation. Neighborhoods (called districts) provide for a discovery of themed experiences. Each district varies in size and usually has a leadership team who coordinate the community. Thirty-nine of them were approved, seventeen of them dissolved in 2019, mainly due to inactivity. Some of the districts are: Aetheria (cyberpunk), Vegas City (gambling), Dragon City (Chinese), Fashion Street (shopping), University (education).²⁵¹

Each neighborhood has its own community. Aetherian City is the most popular one, with around eight

²⁴⁹ In addition to distributing the roads away from the center, another point they considered was road intersection. Intersections add variety to the city and improve user experience for two reasons. On the one hand, they increase exposure to parcel faces and, on the other, they restrict the number of parcels that can be seen at any given time. "[T]o make the best use of roads," Waldorf writes, "we included as many intersections as possible, hence the crazy patterned roads in the quad and heavy use of intersections in the south." See: Trevor Waldorf, "Designing Genesis City: Roads & Urban Planning." *Decentraland*. February 26, 2018. [Link](#).

²⁵⁰ Esteban Ordano, "Decentraland Whitepaper," 6.

²⁵¹ See full list here: "Decentraland District Update," Decentraland, 2019. Accessed 04/05/2024, [Link](#).

thousand plots. It intends to be the largest cyberpunk-agglomeration.²⁵² They promote the adoption of a 'Ready Player One'-style setting, referencing Steven Spielberg's 2018 film. Set in 2045, the movie depicts a world where people escape from their harsh realities by immersing themselves in a vast virtual reality universe. This world offers a compelling refuge from their dystopian lives, blending advanced technology with social interaction and gaming.



Figure 38: Images from Ready Player One. On the left, the city of 2045; on the right, the entertainment universe called the OASIS (Ontologically Anthropocentric Sensory Immersive Simulation). Source: *Ready Player One*, Directed by Steven Spielberg (Rome: Warner home video, 2018).

Initially, all districts had to select their leaders, who had to come up with a District Startup Plan by June 22, 2018.²⁵³ These Startup Plans then had to be approved by the Decentraland committee with a vote. The plans had to include how the district was to be governed, how decisions were going to be executed, and which members would be listed as the individuals holding the district's wallet containing the funds. After the poll was published, a minimum of two weeks and a majority vote (51%) was required for approval.²⁵⁴ They also presented initial development plans and held competitions towards this goal. For example, in February 2021 a competition encouraged players to submit a proposal for a "cool cyberpunk scene", humorously described as "a dystopian world where technology reigns, surveillance is all-pervasive, a killer virus ravages the Earth and people protest in the streets daily against far-right governments led by media personalities."²⁵⁵ While this type of dark humor can be a powerful tool for community engagement and artistic expression, it also carries risks of misinterpretations or reinforcing stereotypes.

²⁵² The term *cyberpunk* alludes to a dystopic vision of technology. In the crypto world, it is being re-adapted with the term "cypherpunk", which merges "cypher," as in code or encryption, with "punk," which alludes to the anti-establishment and do-it-yourself subculture. This movement advocates for the extensive use of cryptography and privacy-enhancing technologies to protect individual rights towards a more open and decentralized society. See: Guneet Kaur, "What is Cypherpunk?" *CoinTelegraph*, last modified March 5, 2024. [Link](#).

²⁵³ "Decentraland Blockchain Districts." *NFT Plazas*. Accessed 04/05/2024. [Link](#).

²⁵⁴ "District Update: Leadership and Governance," *Decentraland*, 2018. Accessed 04/05/2024, [Link](#).

²⁵⁵ "New Builder Contest: Cyberpunk 2021," *Decentraland*, 2021. Accessed 04/05/2024, [Link](#).

In their initial development plan,²⁵⁶ Aetherian City stated that the city would be built on a single ground level, with great emphasis on a main building called the Fractus club –a pyramidal building meant to be a massive hub for entertainment and commerce. Some of the sci-fi projects they reference to for their aimed general aesthetic are: Kowloon Walled City, a densely populated settlement in Hong Kong, demolished in 1994; Akira's Neo-Tokyo; Star Wars' Coruscant, the futuristic digital cityscape in Tron Legacy and the floating city of Columbia (see Figure 39).



Figure 39: On the top left, Kowloon City; to the right, Neo Tokyo; below, Star War's Coruscant; on the bottom, Tron Legacy. Source: "Aetheria Design and Implementation" *Decentraland*. Accessed 06/06/2024. [Link](#).

²⁵⁶ "Aetheria Initial Development Plan v3" *Decentraland*, Accessed 06/06/2024. [Link](#).

Private owners of land can build on their plots, but first their proposals have to be approved by the district. Although “build whatever you want” is a general philosophy adopted by district committees, proposals can be rejected. Blockchain is touted as a way towards lack of censorship, but just because initiatives like Decentraland use it does not guarantee absolute freedom. Public plots, on the other hand, are donations of private investors who contribute towards public projects. These contributions give them access benefits and rewards (membership that grants access to exclusive lounges, access to private parties and events, discounts on digital goods owned by Aetheria City).²⁵⁷ This dynamic adds a layer of complexity to the concept of ownership, as it is both individual (players own their own assets) and shared. As in many contemporary cities, the greater the popularity of a district, the higher the land value within that district. However, it is uncommon for real-world landowners to contribute to initiatives aimed at boosting neighborhood popularity. In Decentraland, revenue can be rapidly simulated, allowing for quicker assessments of potential returns on investment.

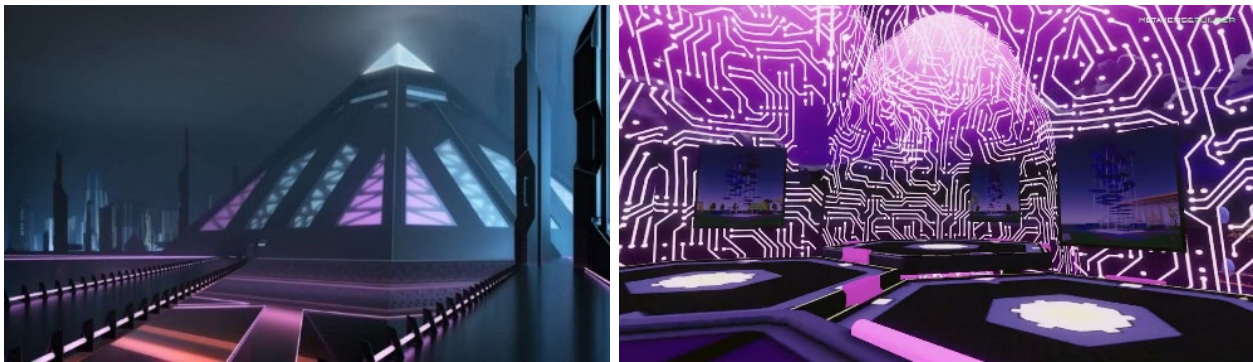


Figure 40: Aetheria District. Decentraland. Source: “Aetheria Design and Implementation” *Decentraland*. Accessed 06/06/2024. [Link](#).

IV.f Influencers as Merchants of Multiplayer-Capital

In summary, Decentraland shows the content created and uploaded to the marketplace can indeed be censored, as it goes through a curation process. The management committee is surely more easily accessible and auditable, yet it does not completely eliminate potential restrictions. Speculation on land is enabled, fostering individualism, and voting mechanisms benefit players with higher stakes. Nevertheless, community strengthening is fostered by measures like encouraging donations to public plots, encouraging participants to get involved through improvement proposals, and creating rules for everyone’s well-being that the user has to oblige to. This multi-player capital is enhanced by Decentraland’s choice to prioritize

²⁵⁷ “Aetheria Design and Implementation” *Decentraland*. Accessed 06/06/2024. [Link](#). See Annex d.

being browser-based experience, at the cost of resolution and perhaps engagement: mass accessibility is regarded as a priority over an immersive experience. A higher resolution would perhaps make it more autonomous from the material city. Like the family house of the suburbia of the 1920s, Decentraland still relies on urban cores: their tokens hold value solely through their ability to be exchanged for fiat currency. Although capital may be owned in a decentralized manner, for users to sell the content they create, items must still be promoted on traditional social media –Discord, Youtube, Instagram, Twitter.

This model of multi-player capital heralds the emergence of a novel marketplace paradigm: a curated arena where competition is restored. If the suburban family domain was exclusive for the bourgeois elite, and then became the ideal of the middle class, then we must question whether multiplayer capital carries the peril of glorifying the merchants of today: the influencers who have more views and likes on social media. This is a question that remains open to future research, inviting a deeper exploration into the socio-economic implications and cultural shifts driven by this new form of capital distribution.

Launch

This dissertation presents an analysis of the emerging concept of crypto-cities, exploring its various definitions, opportunities, challenges and risks. Initially, the concept was defined as a development initiative that integrates blockchain technology into urban governance, economy, and/or operations. These cities claim to leverage the decentralization, transparency, and security features of blockchain to enhance civic engagement, streamline management processes, and foster economic growth. The initial definition was subsequently reviewed and specified according to three study cases –Bitcoin City, CityDAO and Decentraland–, each of them displaying different applications and promises regarding the transformative potential of blockchain on society, economy, and the environment. The overly optimistic narrative upholding these initiatives had to be displaced to reveal underlying historical, theoretical, and practical issues worthy of further consideration.

Leveraging technologies for economic growth and sustainability, Bitcoin City adopts Bitcoin as its currency and issues bonds for its financing. The naming of these “volcano bonds” reveal the other technological innovation that will allegedly make this city free from taxation for its residents: it is branded as powered by geothermal energy from a nearby volcano and therefore zero emissions. This marketing strategy emphasizes the image of the country as a pioneer in the adoption of new technologies –both Bitcoin and geothermal energy extraction–. Although on closer inspection these technologies might not deliver El Salvador’s ambitious promise of growth (i.e., being the next financial world leader) and sustainability (being completely emission free), the project may still have a positive impact. Bitcoin City adapts existing symbols for the creation of a new identity for the country. In the search for that new identity, Bitcoin City could promote growth as a new hub for tourists, and test the premises of proximity adapted from the 15-minute city model, as an instrument to generate qualities of resilience, inclusion and diversity.

The concept of land tokenization was explored in the analysis of the project of CityDAO. The Ethereum network allows for the scripting of self-executable contracts that manage the governance of land. With an intent to remove real estate agents as middlemen, restrict governmental decision power of construction permits and policy, and reduce corruption, CityDAO experiments with increasing transparency, efficiency and accessibility to land purchasing. As demonstrated, the technology itself cannot solve these problems; the project faces technical and legal challenges, which prevent its citizens from being owners of the land that the DAO holds. Notwithstanding, even if these hurdles are not superseded, the project engenders a novel understanding of citizenship, unbound from conventional geographical borders. By offering participants the opportunity to co-create and steward communal resources for the common good, an interesting experiment in collective action and governance is fostered; further potentials could be unleashed if the legal frameworks were to develop in a favorable direction.

Decentraland, discussed in chapter IV, explores land tokenization in a similar way as CityDAO. However, because it is entirely virtual, the legal issues CityDAO encounters are bypassed, allowing for a much faster simulation of what a decentralized economy could look like. On the other hand, Decentraland user engagement has waned. Irrespective of whether these challenges are superseded, the model illustrates that the cryptocurrency narrative (censorship resistance, trustless-ness, transparency, inclusion, etc.), should not be blindly championed. Decentraland is not completely autonomous, but depends upon existing, non-blockchain based platforms and currencies, so it is still susceptible (although perhaps restricted) to the same kinds of tampering that happen in centralized organizations. These include corruption, deception, indoctrination, embezzlement, cartelization. A question for future research is what mechanisms could help restrain blockchain technology to avoid the exclusive transfer of power to a technocratic elite capable of operating its devices and behaviors.

This investigation provides a methodical exposition of the cities' multifaceted dynamic through the commentary of the images and narrative provided by sources available online. This journey has attempted to strip the often-exaggerated hype around crypto-culture, looking for its weakness and promises. Beyond their exacerbated and sometimes idealistic claims, significant innovations are detected. Rather than as cities of the future, urban crypto initiatives are regarded as cities of today, shifting the focus from *is this desirable?* to *what are we desiring?*

A notable challenge of the investigation is the inevitable proximity of the object of study, whose cultural and spatial definition is rapidly evolving. This dynamic situation poses the risk that some observations made here may be proven wrong or even irrelevant in the near future. As an example of this, a crypto "winter" began in November 2022, with prices of cryptocurrencies only picking up towards the end of 2023. As consequence, many of the projects –both urban and developments of the technology– were either put on hold or slowed down during the process of writing. The direction these projects will take, or their long-term validity remains uncertain. Moreover, maintaining precision, objectivity, and criticality in technical analyses proved challenging given my limited expertise in the field. Most information was obtained from strongly biased sources (advocates or detractors), needing de-polarizing. Discerning facts from hype, and real risks from sheer technological pessimism was constantly necessary.

The thesis resorted primarily to the study the visual imagery and language utilized in the presentation of diverse crypto-city projects, in a context where there is virtually no established academic debate on the topic. The research builds up its tapestry through the practical applications being promoted, the discussions on the technology as well as a broader framework encompassing urbanistic models both past and recent. By assessing opportunities, challenges, and risks, the dissertation promotes an informed dialogue regarding the contemporary intersection between received urban idea(l)s and cutting-edge developments in distributed ledger technologies.

As an initial discovery, all three models found a core intersection at using the city as a site for creating

identity and sense of belonging for the post-human. The post-humans are multiple and varied and come in the form of chat boxes, image renderers, and self-executable contracts. They embed social and cultural values of long tradition and intend to create new ones. They enforce existing national borders, but they also try to escape from them, and reject them altogether. They rejuvenate in brightly lit spaces flooded with daylight and exercise, and they also find revitalization in clubs and dimly lit environments. They align with ideals of sustainability, adhere to vegan trends, meditation and well-being, but they also desire to travel, frequent and extensively. They want to build up startups and strive for equality. Most importantly, the post-human wants all the above mentioned, unequivocally, simultaneously and without reservation. Their urbanism will continue to encompass these inherent contradictions, which extend beyond the collective scale to manifest on an individual level. From this, the investigation suggests a nuanced debate looking forward, one that validates the multifaceted and evolving nature of post-human urban experiences.

Lexicon

Decentralized Autonomous Organization (DAO): an organization that uses programmed, automatically executed, contracts for its governance. DAOs can also be defined as an online community with a joint bank account, where multiple signatures are required for the release of funds for different project proposals to be implemented.

Gas: 'Gas' is a shorthand term used to describe the cost of powering a transaction or contract in Ethereum. It is composed of two parts: Gas Price and Gas Limit. Gas Price is what you offer to pay the miners (in a tiny measurement of ether called 'gwei') for each operation to execute the smart contract. Gas Limit is how many operations you let them do before they run out of gas and drop the transaction.

1 gwei = 1/1,000,000,000th of an Ether.

The higher the gas price you set, the faster your transaction will get processed. So, for more important transactions users usually tend to increase the offered gas price. Gas is like a stamp you need to send a letter, or, like its name suggests, like gasoline needed to fuel a car. This naming has the purpose to brand it as a commodity, rather than an investment, to avoid legal issues of tokens being considered securities.

Mining (in Bitcoin): The name draws an analogy to the process of mining for precious metals. It is the process by which new coins are extracted from the protocol and added to the market. Nodes of very specific hardware compete with each other to guess a complex number. Solving this number requires high amounts of energy power (the software has to try out many combinations), but once a node has found the answer it is very easy for the rest of the nodes to validate it as correct. The winner of this race gets to add a new block to the blockchain. In exchange for this, miners get freshly minted Bitcoins, which act as the economic incentive for them to run.

Non-fungible Token (NFT): An NFT is a type of digital asset that represents ownership or proof of authenticity of a unique item or piece of content, such as artwork, music, videos, collectibles, or virtual real estate, on a blockchain. Unlike cryptocurrencies like Bitcoin or Ethereum, which are fungible and can be exchanged on a one-to-one basis, NFTs are unique and indivisible, meaning each token has distinct properties and cannot be exchanged on a like-for-like basis. NFTs are typically created and stored on blockchain platforms, such as Ethereum, using smart (i.e. self-executable) contracts. These smart contracts encode the ownership and metadata of the digital asset, providing a decentralized and transparent record of its authenticity and transaction history. The blockchain's distributed ledger ensures the provenance, scarcity, and immutability of the NFT, making it a trusted and verifiable form of ownership

Peer-to-peer Network (p2p): An infrastructure in which multiple computers are connected, sharing resources. peers communicate with each other on an equal footing, enabling distributed computing, file

sharing, messaging, and other collaborative activities. This decentralized structure offers several advantages, including increased resilience to failure, scalability, and reduced dependency on central infrastructure. A p2p network can be thought of as a neighborhood potluck dinner where everyone brings a dish to share. A traditional, centralized network is like going to a restaurant where there is a chef in charge of preparing all the food. One places an order with the chef, and they serve the dish. In this scenario, if the chef is busy or unavailable, food cannot be served. In the potluck version, inversely, each person in the neighborhood decides to cook something at home and brings it to the gathering. Everyone is both a contributor and a consumer. If one person cannot make it or has a problem with their dish, it does not stop the whole event: a variety of dishes from different neighbors are still available. Thus, every person (peer) of the neighborhood (network) both shares and receives food (data) directly with others, with no chef (central authority).

Smart Contract: A smart contract is a program, a collection of code, that resides at a specific address on the blockchain. Like any other computer program or script, a smart contract is an if-then statement defined by the programmer. When certain conditions are met (if), the next step of the process is executed (then). A major use of these contracts is to create decentralized applications but also as a way to enter into automatically executable agreements between parties.

Token & Land Tokenization: A token is a digital representation or unit of value that can be created, stored, and transferred electronically. Although “token” is usually used interchangeably with the word “coin” in the cryptocurrency ecosystem, they are not the same thing. All coins are tokens, but not all tokens are coins. Tokens represent any unit of value, including land, properties, rights, documents, certificates. In short, a token is a digital asset. Land tokenization involves breaking down land ownership into smaller, tradable portions. So, each holder of these tokens, these digital assets, has ownership or investment shares in the land. Unlike traditional methods of buying land outright, where an individual or entity purchases the entire property, land tokenization allows multiple investors to buy into a parcel by ²⁵⁸purchasing these smaller units. Because ownership shares are recorded digitally, it is easy to buy, sell, and manage investments in real estate.

Wallet: A virtual wallet can be thought of as an inventory for all crypto assets. It is not just where you can store money, but also any kind of token. Two type of wallets exist: the first one, is like entering a bank account, where these assets are secured under a password, and the bank acts like a centralized authority to guard the user's assets. If the user forgets their password, the bank verifies their identity and allows them to reset it. The second type, called a non-custodial wallet, is fundamentally different because it has

no central authority safekeeping the assets. A crypto wallet, on the other hand, is more like a safe box. The user –or anyone with the key– has full ownership of what is inside, and passwords cannot be recovered or changed.

In other words, non-custodial wallets allow users to manage their own keys, without the need of a third party. Users have two types of keys, one public and one private, which are essentially a random combination of numbers and letters. The public key is what users share with others to receive and exchange tokens. There is no way of figuring out, with the public key alone, what the private key is. The private key is what gives users access to their wallet.

Web 3: Web3 is a widely adopted concept among the crypto community for branding purposes. It refers to a supposedly third iteration of the internet which incorporates technologies like blockchain and artificial intelligence, allowing users to maintain more control over their data. In this narrative, this new upgraded version differs from Web1, perceived to be largely static because users could only visit and read content, and Web2, the web we mostly use nowadays, which allows users to interact with each other through messaging and content creation on platforms like Meta, X, Google, etc. Although marketed as an evolution of the web, this concept is ahistorical as all iterations coexist and it is possible to find both static and interactive content in different platforms.

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Annex

a. Tables – New Cities

Model	Cultural, Social, Economic Needs	Urban Strategies	Technological Components	Examples	
<p>15-min inute-city: Building safer, more resilient, sustainable and inclusive cities through an urban set up that ensures access to all basic essentials (living, working, commerce, healthcare, education and entertainment)at distances of maximum 15 min by foot or by bike</p>	<p>Source: Carlos Moreno</p> <p>Ecological sustainability: Promotes reduced use of energy-consuming automobiles</p>	<p>Optimal proximity: 15-min radii for residents to access basic services</p> <p>Optimal density: allows for the creation of locally based solutions e.g. energy generation, food supply and multiple use of available spaces</p>	<p>Adoption of mixed energy and technologies that facilitate optimal consumption of resources</p> <p>Real-time delivery of services encouraged through digital platforms</p>	Paris, France	
	<p>Social sustainability: Promotes social interactions and citizen participation</p>	<p>Creation of parks, squares and public places within neighborhoods</p> <p>Diversity in culture and people within the 15-min radii by ensuring sufficient housing for all urban residents</p>			
	<p>Improve quality of life in cities</p>	<p>Saving time wasted in traffic, thus more opportunities to exercise and gain social interactions</p> <p>Promotes healthier mobility strategies like walking and biking</p> <p>Less pollution</p>	<p>Novel digital innovations such as bike-sharing technologies, sensors to ensure safety and security of cyclists</p> <p>Wearables (including those gathering biodata) that allow people to keep tab of their health</p>		
	<p>Economic boost</p>	<p>Embracing diversity of opportunities within neighbourhoods promotes livability status and maintains property value</p> <p>Cultural diversity promotes wide variety of products, which would render an attractive urban landscape for visitors, promoting tourism and other related businesses.</p> <p>Increased employment opportunities due to diversity</p> <p>Reduced costs on fuel, road maintenance, health, etc</p>	<p>With technologies such as smart contracts through blockchain technology would help to ease security concerns, especially in regard to virtual payments</p> <p>Digitalization has made possible for people to work from home and communicate virtually</p>		
	<p>Bridge social inequalities</p>	<p>by improving accessibility to facilities</p>			
		<p>Source: Rowland Atkinson, Liam O'Farrell</p>			
	<p>Libertecture: Ideological frameworks like libertarian thinking (which convey ideas of personal liberty and unfettered market activity) can be made manifest in, and amplified by, specific spaces and architectural forms</p>	<p>Deepening privatisation, financialisation and power-elite expansion in corporate and national settings</p>	<p>private cities: Founded on constitutional arrangements in which the development and subsequent governance of the urban territory are undertaken by a corporate, rather than public, entity.</p>	<p>voting or controlling shares by owner-residents and enabling individual residents to exit if standards or management is not deemed good enough</p>	<p>Neom, in Saudi Arabia</p> <p>Masdar City in the United Arab Emirates</p> <p>Telosa in the US</p> <p>Eko Atlantic City in Nigeria</p>
<p>Libertarianism advances the absolute primacy of personal freedoms and the desirability of reductions in, or total dissolution of, social bonds</p>		<p>residential exit spaces (such as gated communities or urban compounds); These developments deliver better services and urban districts by combining the spending power of residents to pay for private services that rival or exceed the quality of those services provided by public cities.</p>	<p>Creation of defensible bunker spaces that help preserve the material and social privileges while defensively isolating owners from the environmental and social consequences of the process by which wealth is accrued</p>	One Hyde Park in London	
<p>Withdrawal or negation of the state as either a legitimate or necessary institution, the prizing of individual liberty, and a celebration of voluntary association over what are seen as power relations founded on coercion.</p>		<p>portal-spaces (private airports or marinas);</p>		<p>London's five private airport</p> <p>Van Nuys airport in Los Angeles</p> <p>Prolific heliports in Rio or Mexico City</p>	
<p>Idealization of tax, work and regulation regimes that are compliant with the needs of capital, finance and the wealthy</p>		<p>fiscal lockers: spaces where tangible assets are held securely to withdraw from tax obligations and serve as a fiscal store of wealth that can guard against inflation and other risks</p>		<p>Freeport in Geneva</p> <p>Freeport in Luxembourg</p>	
<p>Libertarian utopian belief in the power of new digital technologies to disrupt markets, states and human societies and to create new opportunities</p>		<p>apeirotopias or infinity spaces (digital architectures, such as offshore bank accounts or elements of the metaverse);</p>	<p>Virtually reproduced iteration as a digital city for events and networking of professionals and investors</p> <p>Cryptocurrencies such as bitcoin enable flows and markets to exist ostensibly all without borders, limits, state controls or interference.</p>	<p>Liberland, between Croatia and Serbia</p>	
<p>escape and social exit</p>		<p>pioneer exclaves (such as seasteads or space colonies); 'citizenship' is conferred through the price of entering these spaces, and the high cost of which can be used to exclude undesirables such as the poor and troublemakers, who can be ejected back to land as a result of the application of residency conditions.</p>	<p>Libertarian ideas have been applied to exclaves of pioneers beyond the planet, in colonies on Mars, the Moon or in outer space.</p>		

Model	Cultural, Social, Economic Needs	Urban Strategies	Technological Components	Examples
Eco - City: to achieve the best environmentally friendly performance	Source: Rachel Keeton			
	to achieve the best environmentally friendly performance	Reduction of car use and increased use of public transport	Renewable energy sources (wind turbines, solar panels, or bio-gas created from sewage)	Tianjin Eco-city, China
		Use of raw and local materials		Masdar City, UAE
		Dynamic economic cycle		Zira Island, Azerbaijan
		Reduction of waste, increased recycling		
	Marketing: Convey a political commitment to sustainable practices	Green everywhere		
	Water as an aesthetic urban component			
Political City: Construction of new capitals	Source: Rachel Keeton			
	To represent (national or local) government	Public buildings as representations of the ambitions: modern, dignified, and efficient.		Astana, Kazakhstan
	To present itself as modern, dignified and efficient	Clean slate: rejection of the existing, often crowded and chaotic historical city.		Naypyidaw, Myanmar
Enclave City: cities that target groups who want to be spared the difficulties of the existing cities	Source: Rachel Keeton			
	to offer retreat from the existing city to expats, party political elites, or simply the richest citizens.	Clean, safe facilities		The Blue City, Oman
	to cater a solution to the fear of the urban unpredictability	Built on virgin territory, far away from the compromised city		Saadiyat Island, UAE
				Songdo, Korea
			CamKo City, Cambodia	
Shelter City: A city that provides housing or urban district for the masses	Source: Rachel Keeton			
	to host the masses who flood the cities from the countryside or other regions	Artificial environments have been created following the rules of the Experience Economy to enrich the residential environment, which consists of endless rows of standard flats, and to give it an identity.		Songjiang, China
	Provide better opportunities for work, fortune, freedom, safety	enormous concentrations of densely clustered apartment blocks, often developed by the state, often far from the city center, often lacking in facilities or employment, and often with an extremely bad reputation.		Bumi Serpong Damai, Indonesia
				Tin Shui Wai, Hong Kong
Charter City - City that operates under special jurisdiction (laws, policies, regulations) that are different from the national law	Sources: Paul Romer, Mathew McCartney			
	Provide an opportunity to developing countries to jump-start economic growth and development	Attract investors, businesses, residents by offering reliable infrastructure and an efficient regulatory environment		Honduras Zones for Employment and Economic Development
				Madagascar
			Panama Canal	
Hackable City	Source: Martijn de Waal, Michiel de Lange and Matthijs Bouw			
	Democratic participation, transparency and accountability, resilience, inclusivity, enhanced quality of urban life, innovation and economic opportunity		Explores how digital platforms can be used to democratize the process of citymaking. These include platforms for collaboration, open data initiatives, prototyping and experimentation, among others	Buiksloterham, Amsterdam
				Bangalore, India
			Shenzhen, China	
Powerpoint City - Cities that only exist in virtual presentations but never become tangible	Source: Moser Roy			

Model	Cultural, Social, Economic Needs	Urban Strategies	Technological Components	Examples	History	
<p>15-min inute-city: Building safer, more resilient, sustainable and inclusive cities through an urban set up that ensures access to all basic essentials (living, working, commerce, healthcare, education and entertainment)at distances of maximum 15 min by foot or by bike</p>	Source: Carlos Moreno					
	Ecological sustainability: Promotes reduced use of energy-consuming automobiles	<p>Optimal proximity: 15-min radii for residents to access basic services</p> <p>Optimal density: allows for the creation of locally based solutions e.g. energy generation, food supply and multiple use of available spaces</p>	<p>Adoption of mixed energy and technologies that facilitate optimal consumption of resources</p> <p>Real-time delivery of services encouraged through digital platforms</p>	Paris, France	<p>First introduced in 2016 by Carlos Moreno</p> <p>Re-emergence and modifications of the concept amid COVID-19 pandemic</p>	
	Social sustainability: Promotes social interactions and citizen participation	<p>Creation of parks, squares and public places within neighborhoods</p> <p>Diversity in culture and people within the 15-min radii by ensuring sufficient housing for all urban residents</p>			It traces continuities with the vision of urbanists such as Whyte City: <i>Rediscovering the Center</i> ; Alexander, C. <i>The Nature of Order: The Process of Creating Life</i> , Salingeros, N.A., "Compact city replaces sprawl". In <i>Crossover: Architecture, Urbanism, Technology and Labs</i> . I. The	
	Improve quality of life in cities	<p>Saving time wasted in traffic, thus more opportunities to exercise and gain social interactions</p> <p>Promotes healthier mobility strategies like walking and biking</p> <p>Less pollution</p>	<p>Novel digital innovations such as bike-sharing technologies, sensors to ensure safety and security of cyclists</p> <p>Wearables (including those gathering biodata) that allow people to keep tab of their health</p>		<p>In <i>Crossover: Architecture, Urbanism, Technology and Labs</i>. I. The</p> <p>It traces continuities in the use of digital technologies with the concept of smart cities</p>	
	Economic boost	<p>Embracing diversity of opportunities within neighbourhoods promotes livability status and maintains property value</p> <p>Cultural diversity promotes wide variety of products, which would render an attractive urban landscape for visitors, promoting tourism and other related businesses.</p> <p>Increased employment opportunities due to diversity</p> <p>Reduced costs on fuel, road maintenance, health, etc</p>	<p>With technologies such as smart contracts through blockchain technology would help to ease security concerns, especially in regard to virtual payments</p> <p>Digitalization has made possible for people to work from home and communicate virtually</p>			
	Bridge social inequalities	by improving accessibility to facilities				
<p>Libertecture: Ideological frameworks like libertarian thinking (which convey ideas of personal liberty and unfettered market activity) can be made manifest in, and amplified by, specific spaces and architectural forms</p>	Source: Rowland Atkinson, Liam O'Farrell					
	Deepening privatisation, financialisation and power-elite expansion in corporate and national settings	private cities: Founded on constitutional arrangements in which the development and subsequent governance of the urban territory are undertaken by a corporate, rather than public, entity.	voting or controlling shares by owner-residents and enabling individual residents to exit if standards or management is not deemed good enough	<p>Neom, in Saudi Arabia</p> <p>Masdar City in the United Arab Emirates</p> <p>Telosa in the US</p> <p>Eko Atlantic City in Nigeria</p>	Historical connection to ideas in which the design of buildings, cities and patterns of urban life itself are seen to express or relay ideological currents.	
	Libertarianism advances the absolute primacy of personal freedoms and the desirability of reductions in, or total dissolution of, social bonds	residential exit spaces (such as gated communities or urban compounds); These developments deliver better services and urban districts by combining the spending power of residents to pay for private services that rival or exceed the quality of those services provided by public cities.	Creation of defendable bunker spaces that help preserve the material and social privileges while defensively isolating owners from the environmental and social consequences of the process by which wealth is accrued	One Hyde Park in London	These connections can be seen in the work of writers like Lefebvre (2003), Castells (1972) and Althusser (1971)	
	Withdrawal or negation of the state as either a legitimate or necessary institution, the prizing of individual liberty, and a celebration of voluntary association over what are seen as power relations founded on coercion.	portal-spaces (private airports or mannas);		<p>London's five private airport</p> <p>Van Nuys airport in Los Angeles</p> <p>Prolific heliports in Rio or Mexico City</p>	Relationship between ideology and the built environment	
	Idealization of tax, work and regulation regimes that are compliant with the needs of capital, finance and the wealthy	fiscal lockers: spaces where tangible assets are held securely to withdraw from tax obligations and serve as a fiscal store of wealth that can guard against inflation and other risks		<p>Freeport in Geneva</p> <p>Freeport in Luxembourg</p>	symbolic content: scale (using physical presence to impose ideas or status positions on	
	Libertarian utopian belief in the power of new digital technologies to disrupt markets, states and human societies and to create new opportunities	apeirotopias or infinity spaces (digital architectures, such as offshore bank accounts or elements of the metaverse);	<p>Virtually reproduced iteration as a digital city for events and networking of professionals and investors</p> <p>Cryptocurrencies such as bitcoin enable flows and markets to exist ostensibly all without borders, limits, state controls or interference.</p>	Liberland, between Croatia and Serbia	symbolism (the use of inscribed signs that denote rank, privilege or authority, such as statues or memorials)	
	escape and social exit	pioneer exclaves (such as seasteads or space colonies); 'citizenship' is conferred through the price of entering these spaces, and the high cost of which can be used to exclude undesirables such as the poor and troublemakers, who can be ejected back to land as a result of the application of residency conditions.	Libertarian ideas have been applied to exclaves of pioneers beyond the planet, in colonies on Mars, the Moon or in outer space.		architectural form (common use of classical columns and elevated facades to connote ideas of democracy and heritage stemming from antiquity). (Kostof, 1998).	
	Global investment capital in the housing market and sovereign individualism	necrotectures (socially dead but 'investment full' dwellings).	Policy innovations	<p>Super-thin apartment blocks in Manhattan</p> <p>Dark apartment blocks in London</p> <p>Housing estate in Spain's coastal urban areas</p>		

b. Bitcoin City

Bitcoin City Announced by Bukele

<https://www.youtube.com/watch?v=tqoJkVvKmy0>

Accessed 16 sept 2023



Bitcoin City & Bitcoins Bonds announcement by El Salvador's President Nayib Bukele



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Pour clôturer la BitcoinWeek, le 20 Novembre 2021 au El Salvador, le Président Nayib Bukele annonce l'émission d'obligations d'état qui serviront à 50% à l'achat de Bitcoin (pour 500 millions de Dollars) et à 50% au financement de la BitcoinCity avec des avantages fiscaux pour favoriser ...more

Auto generated transcript

wow
[Music] [Applause] [Music]

well let me say some hellos i have to say this that's in protocol
so here's the vice president over there hello vice president over there yeah
he's the vice president of the country in the party the president of the assembly is also here where is he
ernesto
over there [Applause] yeah we have
some deputies over there ministers secretaries
here we have the participants and speakers of la bitcon where are you guys

great event how about the participants organizers and speakers of adopting bitcoin where are you
[Applause] our friends at bitcoin beach
[Applause]
where everything is started [Applause] and every bitcoiners
[Applause]
[Applause] germans
yeah okay i'm joking okay so let's see let's see

you remember on june 6 I sent a video to bitcoin conference in miami and we announced that El Salvador was making Bitcoin legal tender? That was June 6.

Then, on June 9th, the deputy's over here approved the bitcoin law in the assembly. A lot of us, 22 000 of us, will listen to it in Bitcoin spaces. We listened to the boat live and, you know, after that we had some attacks from the opposition. Believe it or not we have an opposition.

[Music] It's very small, but we do have one. They started complaining about bitcoin and they started this with the misinformation to the people telling Bitcoin was bad and, you know, you shouldn't use that currency because it's invisible: you cannot see it.

Yeah, exactly, they all follow. But, you know, still they're allowed to be full of it, so they started rallying some people. One percent of population is 70 000 people so it's a lot of people. They couldn't rally one percent but they can still rally like you know 0.1 percent. We had some protests. You see, they even burned an ATM full of usd, so... fine. The bitcoin was saved [Applause]

They just burned 30 000 US dollars. They couldn't burn the Bitcoin because it was invisible, right?

So they burn the ATM and everything but, do you see something? how many events that we had this week, like 40 events, right?

Did you see one protester? they can't rally anybody anymore.

I don't know because I don't know the exact number but I would think around 5 million salvadorans have the orange pills. How do I know that number? I don't know the exact number but I know 3.8 people use our wallet. I know bitcoin beach has a lot of users. I know the guys from strike have a lot of users too.

There was number one app in El Salvador for like three months and a lot of people use other wallets Coinbase and, you know, a lot of wallets and yeah Moon wallet

yeah yours bite refill bit refill sorry bit refill yeah

So, uh, I don't know the exact number but if you add up thirty thousand Salvador's the wood bitcoiners before the law, the number could be way over 4 million. I don't know if it's 5 million, but you could say 5 million percent of the population. So it's very hard for them to find protesters. But, you know, so they couldn't do one in the whole bitcoin week that's good, right? yeah, but they're free to do it. That's good. Also, free country: they can protest. They can, you know, burn ATMs, fine. They have insurance. You can burn all of them, don't worry. So it took us like, June, July, August, September, it took us like four months to orange build everybody.

so that's fast, right? that's really fast. Yeah, exactly, the savior.

no beautiful salvador

Yep, so, um, you know, we demonstrated that Bitcoin could do a lot of good things. You know, in this conference in the Bitcoin the bitcoin that the american Bitcoin conference they sold some surfboards yeah and they sold them eleven thousand, seven thousand dollars, and all that money was going to the children's hospital.

yeah you know there were some other guys from Liberland. They donated one Bitcoin, right? They donated one full bitcoin for the children's hospital too. Yeah, that's right. And we're getting a lot of donations. We're building 20 Bitcoin schools which will be full of, you know, technology and everything. But also few economical education of the future –how did money evolve– but also the use of the pet hospital we're building. Yeah, so, we're building a pet hospital with, you know, our trust fund. Its made up of Bitcoin and Dollars so since the Bitcoin part is not worth more so the US dollar part. You can spend some of it and build that, and we announced it like in first days of October. We started building it in the last days of October and now we're doing the third floor. I asked, "when are you finishing that thing?"

They said, “60 days, Mr. President”. I said, “yeah, that's fast.” El Salvador is fast.

Which country in the world will announce one thing one day, start construction four weeks later, and finish it 60 days later? El Salvador. That's right. So, you know, I was thinking, we're having this great event, with all these great people, and I was thinking we should do a great announcement. Right? But we already have Bitcoin as legal tender. So what could it be? It has to be something as good as that. At least so I was thinking: What do we do? Do we bring satoshi here? What do we do? Right? It's a little hard.

So I thought, you know, when Alexander the Great was conquering the world, they established this Alexandria and the whole point of the Alexandria. They were very small pieces of land. If you would think cities at that time, but they established 20 Alexandria all over the empire and the idea was this Alexander's not to cover the territory –which was immense–. The Alexanders were actually very small, but the idea behind it was to these Alexanders be the beacons of hope for the rest of the world. That all of the world could be like that. Of course Alexander the Great died and the emperor divided. You know the rest of the story. But that was the idea. So I thought, you know, if you want Bitcoin to spread all over the world, we should build some Alexandrias, right?

[Applause]

So I thought, “well, we should build the first Alexandria here in El Salvador.” So we were thinking of building... no, not that, take that off, that's Chivo pets, so we were thinking of building... Bitcoin City

[Applause]

Over there, there you have El Salvador. You have the geothermal plant. Some people saw that you have that in Berlin and, right next to, well, close to there, you have the power plant. Close to there you have the Gulf of Fonseca, the second gulf. So why don't we build the city over there, in the second gulf, so, actually, what I was going to present to you is the building of nah filthy media Bitcoin City.

It's not just an idea, but it would actually be a legal, with municipality and everything. Probably run for mayor of Bitcoin City in the future.

[Music]

So what is Bitcoin City gonna include? Well it's going to be right there, in the front second gulf and it's got included everything: residential areas, commercial areas, services, museums, entertainment bars, restaurants, airport, port, rail.... Everything devoted to Bitcoin.

Can you put up the presentation of the Bitcoin City, please? yeah, not the logo guys [Applause]

[Music] [Applause]

So, there you go. Go back, don't show them guys, go to the beginning. A principio

yeah what's that that's oh it's yours

yeah it's from argentina oh it's wine thank you beautiful

[Applause] okay so that's the city

So that's Bitcoin City. It will be a circle that will encode a new volcano. It's not a new volcano, but a new volcano is not the same volcano there's power in the mine, it's another one. So, at the beginning we will power the city with the old volcano and the old uh power plant but then we will build a new one, right next to the city. The volcano will power the whole city and will also power the mining [Music]

So we will have a real volcano here, and the full city is going to be totally circled, except for the place of the volcano. In the middle you would have a huge plaza, which from the air you will look at as a bitcoin sign [Applause]

So you have everything: regulations, new economic policies, digital zones, the strategic location. That second gulf is shared by Honduras, Nicaragua and El Salvador.

Now the second gulf it's three countries, so this will be in an international area and the government will provide the land and the infrastructure. The public infrastructure, the economic areas, will attract investors that will contribute to the construction of the city. Of course, Bitcoin City is committed to free and equal access to everything. We'll have digital education and the social polycentric urban configuration, which has a small dent for the volcano. Nice feature. In the city we have digital and physical arts and culture, equality, infrastructure to the digital system, geothermal energy: they will power the entire city and bitcoin mining. Of course, it will facilitate business and technology investment, sustainable and efficient public transportation. I will not bore you with those things, but you have social amenities, residential, green areas. I mean it will be hugely technological but also huge to stay in the bowling green. That's nice, isn't it?

We're going to have industrial office space and also everything is going to be a digital environment. Everything has been taken into consideration: recreation, electricity, water treatment, waste management, etc. The airport will be 10 miles away and the port will be five kilometers away. It's just like three miles. The volcano, you know how it works: it powers the hot water steam that powers the turbine that powers the energy generator and then we have electricity. Crypto mining, warehousing, tourism, entertainment and culture and sports, everything clean, and coming from the volcano, of course!

That sounds nice and everything, but that would be the city... with time and private entrepreneurship and investment.. of course what if I had a company, a digital company, why wouldn't I want to be there, right? it's like logical for me and everybody that you have to be there, in the alexandria, right? Everybody wants an office space over there, so office space builders build something because you will have a lot of clients looking for office space and apartment builders build apartments because you have a lot of people looking for an apartment. Everyone in an apartment over there and that plastic was beautiful. Made up of a colored stone so you have orange and gray stone, you have that beautiful thing made up of stone so it will last for thousands of years. Not the buildings but the plaza itself would last for thousands of years. We're all gone, they will see that the plaza is still there, probably using it. Yes, that's from the air a little sepia here. That's bitcoin city!

But I'm not done. Bitcoin people say: "well, it looks fine, still, I'm fine in New York, Houston or, whatever, Miami and nice cities" No: you're not really. You want to live, exactly. You're moving here, look at the weather! I mean, we're in winter! yeah, that's winter! it's winter for you! Well, not winter but, you know, almost...

And Bitcoin City is in El Salvador, so bitcoin is legal tender. That's nice. We'll have zero income tax! [Applause] Zero capital gains tax! That's all! See, invest here, make all the money you want. We're fine. Trade whatever you want. Zero property tax. I mean, if you're making a huge building you don't want to pay property tax for that, so you don't pay anything. It's your payroll tax, we want you to hire people, not to pay taxes for hiring people. Zero municipal taxes. Now you say, "okay, so who's gonna pick up the trash?" I'm gonna go into that... And zero co2 emissions because this is a fully ecological city. That's work and it's energized by a volcano. That is just right in the side of the city. So that's Bitcoin City everybody! [Applause]

So, you will say, "well, that sounds nice, but who's gonna pick up the trash?" The only tax that you're gonna have in Bitcoin City is the value-added tax, normal value-added tax 10%, which you will pay for if you buy a coke. That value added tax will be used half of it to pay the bonds that we're gonna issue to build up the city, –so it's gonna pay for itself–, and the other half will be transferred to municipalities so they clean up the trash, they keep the parks nice and they keep the city all neat and clean. So that would be the only tax, the value-added tax 10% value added tax [Applause]

And that tax will be used to pay for the city and its interest, its public infrastructure, and to pay for the maintenance of the city. So the mayor will have that income so he keeps the city clean and tight and tidy. We'll start funding in 20, 60 days, after funding. No, no, we'll start funding in 2022, so the bonds will be available in 2022.

So, I'm thinking the public infrastructure will be around 10. No, sorry, around five. 300,000 bitcoins. Yeah, that would be the public infrastructure. And the private investment, that's unlimited. Now, we were talking about these bonds fully in the Bitcoin ecosystem and not the normal bond that we would issue in the New York Stock Exchange. So, we talked with my friend Samson. Where is he? Samson from Blockstream. Yeah, come on, yeah. Samson's right here
[Applause]

So, we were talking about building a park before, but that idea is gone. We're not building the park. I thought we are building the park. No, no, we're not. Sorry, maybe. So, we're gonna start with a small issuance to test the waters. So, I'm gonna give two minutes to my friend's house right here so he can explain what we're gonna do right now before issuing the city bonds. So, please, where is it? Yeah, presentation. It's okay, I can just start. Yeah, you start. So, this is a very historic moment. We're going to be issuing Bitcoin bonds. Do you guys like Bitcoin bonds? [Applause] And these bonds are amazing. The first one is going to be a billion-dollar bond, and what makes it a Bitcoin bond is because it's backed by Bitcoin. So, half of the billion dollars will go into buying Bitcoin. So, the president is going to mark it by 500 million dollars of Bitcoin. [Music]

That's awesome, yeah. We're gonna buy 500 million dollars in Bitcoin. We'll see. The other half will go towards infrastructure, specifically building energy infrastructure and Bitcoin mining. So, this is why it's going to be called the volcano bond, and this is going to be a series. So, this first bond is called the ebb-1 or El Salvador Bitcoin bond one, but there will be more.

The coupon is 4.5, but there's also a special Bitcoin dividend. So, of that 500 million that the president buys after a five-year lockup, they will start selling some of that Bitcoin to give an additional coupon, an additional coupon to all the investors in the bond. Now, if you think Bitcoin is going to go up, and we've modeled it out, so this is something we've been working on for months actually, conservatively, this is a guy that's important. 35 year-over-year is conservative, but at the end of the 10 years or in the 10th year of the bond, your APY will be 146 percent. So, the coupon is 6.5 for the first five years, and then it starts getting a Bitcoin boost. And I think this product is going to be incredibly attractive not only to Bitcoin hodlers, investors, people that have stable coins, but just normal people as well, like even from the traditional financial industry or bankers, because there's no instrument like this on the market. This bond will be issued on the Liquid Network, a Bitcoin side chain.
[Music]

And to make that happen, there needs to be a few things that are done. So, first of all, the government is working on a securities law, so law for digital securities, modern digital securities laws, and they will be issuing the first license to operate a securities exchange here in El Salvador to Bitfinex, to Paolo and his excellent team.
[Applause]

So, this is going to make El Salvador the financial center of the world, it's the Singapore of Latin America, and if the U.S. continues declining, all of North and South America. But this is a big first step, and you know with Bitfinex, they have a lot of whales, so I don't see a problem filling a billion-dollar bond. Um, there's a five-year lock-up on the bond, so that's half a billion dollars of Bitcoin taken off the market for five years. Now, if you do nine more bonds, that's ten bonds, that's five billion in Bitcoin taken off the market for ten years. And if you get ten more countries to do these bonds, that's half of Bitcoin's market cap right there. So, the game theory on these Bitcoin bonds is just insane. The first country to do it, which will be El Salvador, will have a massive advantage if Bitcoin at the five-year mark reaches one million dollars, which I think it will.

They will sell Bitcoin in two quarters and recoup that 500 million dollars in three and a half quarters. They can get enough money to pay back the entire bond. I think that's pretty good. So, definition, the first countries that do this will have a massive advantage. This is the beginning of uh nation-state Bitcoin FOMO. Do you guys like that? [Applause] So if you guys want to invest in El Salvador, this is the easiest way to do it. It would be tied to citizenship too, so if you're investing in these bonds it's anything else: permanent residence, fast-tracking to citizenship. So, you might have thought when the Bitcoin law came

out, how can I do it? How do I start? This makes it super easy: buy the bond and the rest takes care of itself. So, I'm running short on time, so I'll just repeat Jack Mallors: "We are here to change the world. We're here in El Salvador to change the world, and we are ready to die on this hill. All of us are ready to die on this hill." [Applause] Bitcoin is going to save the world, and it starts here in El Salvador. [Applause] No bras. So good. Oh, sorry, yeah, the wind. I went there now, yeah. Thank you. Thank you. [Applause] From Colombia. [Applause] Do you want to show the shirt? [Music] Free advertising here now. Send me some sets now, you know.

Like Samson said, Bitcoin is going to change the world. It has already changed, but it's going to change even more. And what a lot of people didn't know about the history of money. I won't tell the history of money, don't worry. But this is normal evolution. So it's not just a good or cool, or a nice idea. It's the evolution of humankind. So we're going there. You can't stop evolution. Now we just can't. It just happens. So it doesn't matter if we build Bitcoin City or not for the evolution of Bitcoin, or we issue some bonds, or if we do this event: it will evolve regardless because that's the way it is. But it's nicer if we are part of it. So it's nicer if we push it a little. It's nicer if we make it legal tender. It's nicer if we build a city or 10 cities or 20 cities like the Alexandrias. So, you know, it's nicer. It doesn't have to be that way, but I think it's going to be better if it is that way. So, at the end, it's for us. It would be nice to be the financial center of the world. Yeah, it sounds cool for us. So it doesn't matter probably for Bitcoin but yes, it matters for us. And I think we can make it even better and we can push the future even forward.

So for some reason, if you believe in God, if you don't believe in God, nature, the universe, for some reason we're all here right now, in Misata Beach, in El Salvador having fun, watching these projects, looking into the future. It's nice to be part of it, isn't it? So, you know, let's all be part of it and let's all push the future even forward. Thank you guys! Have fun! We love you everybody! For the surfers out there. [Music]

c. CityDAO – Wyoming’s Senate Bill 38

17-31-106. Articles of organization.

(a) The articles of organization of a decentralized autonomous organization shall include a statement that the organization is a decentralized autonomous organization, pursuant to W.S. 17-31-104, and shall set forth the matters required by W.S. 17-29-201.

(b) In addition to the requirements of subsection (a) of this section the articles of organization shall include a publicly available identifier of any smart contract directly used to manage, facilitate or operate the decentralized autonomous organization.

(c) Except as otherwise provided in this chapter, the articles of organization and the smart contracts for a decentralized autonomous organization shall govern all of the following:

(i) Relations among the members and between the members and the decentralized autonomous organization;

(ii) Rights and duties under this chapter of a person in their capacity as a member;

(iii) Activities of the decentralized autonomous organization and the conduct of those activities;

(iv) Means and conditions for amending the operating agreement;

(v) Rights and voting rights of members;

(vi) Transferability of membership interests;

(vii) Withdrawal of membership;

(viii) Distributions to members prior to dissolution;

(ix) Amendment of the articles of organization;

(x) Procedures for amending, updating, editing or changing applicable smart contracts;

(xi) All other aspects of the decentralized autonomous organization.

17-31-109. Management.

Management of a decentralized autonomous organization shall be vested in its members, if member managed, or the smart contract, if algorithmically managed, unless otherwise provided in the articles of organization or operating agreement.

Screenshot of Wyoming’s Senate Bill 38. Source: “SF0038 - Decentralized autonomous organizations.” (2021)

[Link](#)

d. Decentraland – Aetheria Development Plan



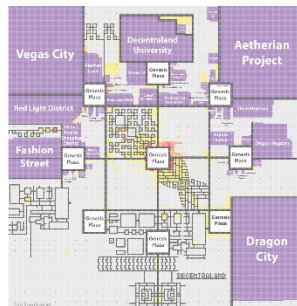
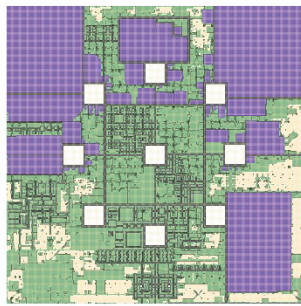
Initial Development Plan v3.01

www.aetheria.io

Map of the District

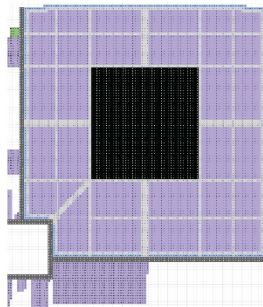
This map is not finalized. It has gone through several revisions, with some input from the original district proposal's leadership team. More changes will occur before and after the allocation process.

Aetheria currently has 10,005 LAND parcels which will be placed in an area roughly 100x100 square. The final layout of roads, walls and the central pyramid will be adjusted based on Aetheria stakeholder feedback.

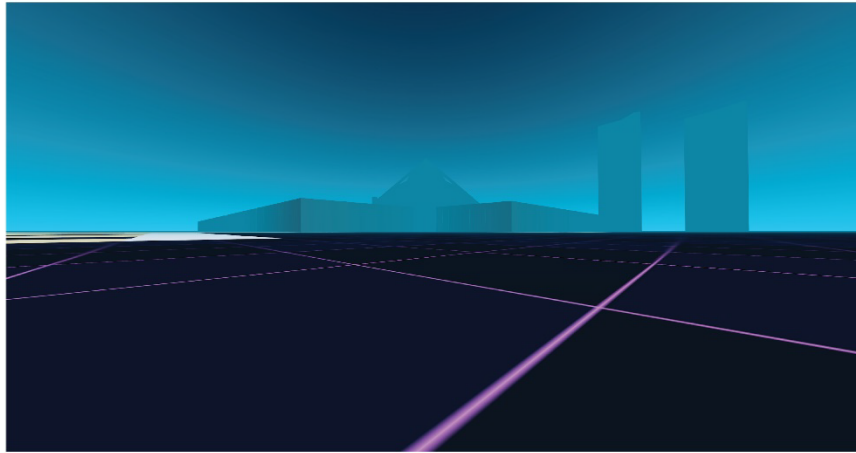


[Position of Aetheria in Decentraland](#)

[Districts and auctioned LAND](#)



[Proposed District Map](#)



[Visualization of Proposed Map \(View in VR\)](#)

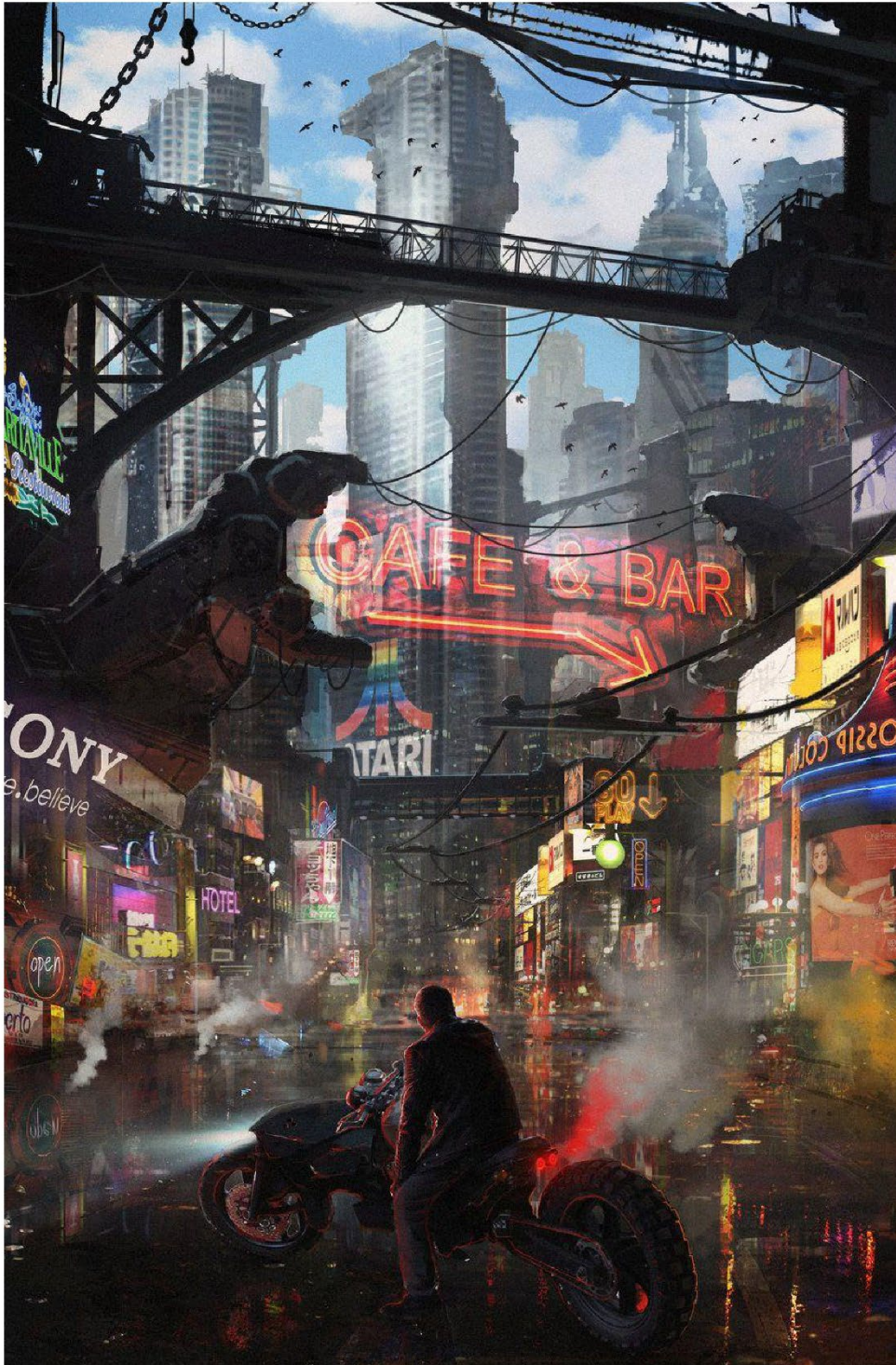
District Composition

Initially, Aetheria will be built on a single ground level, focused largely on the Fractus club, roads and public lands, plus commercial development.

The general aesthetic would be modelled after a futuristic version of [Kowloon Walled City](#), a large densely populated settlement in Hong Kong which was demolished in 1994. It will be combined with inspiration from other megacities in the cyberpunk, sci-fi and fantasy genres such as Akira's [Neo-Tokyo](#), Star Wars' [Coruscant](#), the futuristic digital cityscape in [Tron Legacy](#) and the floating city of [Columbia](#).

Initial Ground Level - Commerce

This is the main ground level which exists at ground level or perhaps 20 metres above the Undercity. The main entrance to Aetheria might be elevated by ramps so visitors can easily access commercial shops, bars and restaurants and the Fractus Club. Overhead may be seen monorails, platforms and roads connecting various parts of future upper levels.







Possible Additional Future Levels

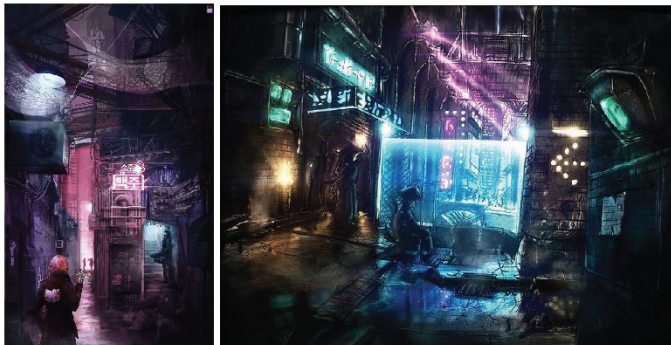
In the future, if and when Decentraland's land use technology and the limits allow, The DAO may choose to build the district into multiple levels stacked on top of each other. This would require builds on parcels to follow more specific aesthetic guidelines.



Basement Level - The Crypt

The dirty, seedy underbelly of Aetheria. All shady dealings in our cyberpunk world go on here. Characters and shops exist in holes in the inner wall, canals and alleyways at the bottom of the city. This is the oldest part of the city, and contains the original foundations and marketplaces that Aetheria was built on.

Underneath the pyramid of the Fractus Club is an exclusive basement level for members only. Access to the undercity must be obtained by elevators, pathways and stairways.



Level 1 & 2 - Upper Levels

Private apartments, exclusive bars and the upper levels of the Fractus Club exist here, 40 - 60 metres above the Crypt Level. A network of platforms connect various apartment stacks, and flying taxis to various parts of the city can be arranged here. The outer wall of Aetheria extends to this height.



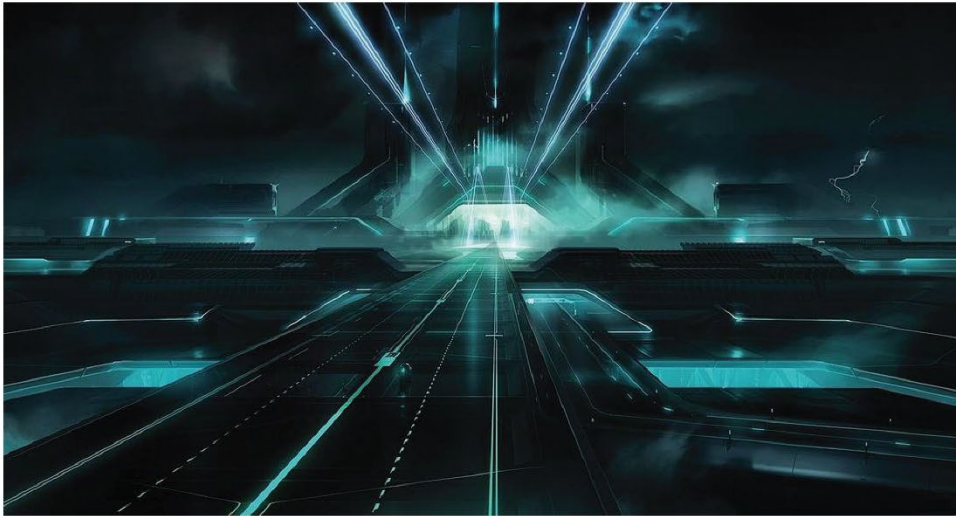
Level 3 & 4 - Flying City

A grand, futuristic flying city exists at this elevation, 80 - 100 metres above the Crypt Level.



Level 5 - Floating Platforms

A series of floating 8x8m platforms, covering the tops of the district. Holographic forcefields connect the platforms and act as walkways between them.





Land Structure and Allocation

A total of 10,005 LAND parcels were contributed to Aetheria.

The district will be comprised of LAND parcels allocated for private use, as well as public LAND for public works such as walls, roads and the Fractus Club.

All LAND tokens will be frozen by Decentraland to district Primary District Wallets for a time of at least one year. As elaborated in the Startup Plan, it is the intention of Aetheria that the district LAND will be held permanently in Aetheria's Primary District Wallet, with public and private land use allocations based on Decentraland and Aetheria smart contracts. The future DAO once formed will elaborate land use policy. More governance details are provided in the Aetheria Startup Plan.

LAND Leases, Rentals, and Build Delegation

- Although the long-term ownership of the land is held by the district, Decentraland may provide smart contract functionality for leases and for delegation of build/upload rights. If so, then Aetheria will employ these, together with additional smart contracts as may be needed for management by the DAO, to allow short or long term leases and rentals of land to private parties. The initial allocation to private parties will be determined in the Allocation Event.
- The Aetheria DAO may choose to create fungible or non fungible tokens to assist in the management and transfer of leases and of build rights, but financial transactions in the district will be based on the tokens supported by Decentraland – Mana and possibly Ethers.
- For tax purposes, any reporting of financial gains or losses from private use or transfer of plot rights will be the responsibility of the holder in their country and/or state of jurisdiction.
- In the future, any LAND plot not contributed for public works may be rented out using the [Decentraland LAND Manager](#). This grants a paying tenant access to publish to LAND plot in exchange for recurring payments of MANA.

District Composition

Note: all references here to numbers of parcels are visionary. The actual allocation will be determined by the allocation event.

We anticipate building the Crypt Level early in the development of Aetheria. We envision a possible breakdown of LAND parcels somewhat like the following:

Public

- Public pathways: 1445
- Fractus Club: 2025
- Walls: 383
- **Total: 3853 max**

Private

- Private plots - **Total: 6152**

LAND Plots

Plots of LAND will be 10x10m, with the following height ranges for various vertical parts of the city according to specific aesthetics:

- Crypt - 20m high level
- Ground - 20m high level, positioned directly above the Crypt Level
- Upper Levels - 2x 20m high levels for the Aetheria Rising Age
- Flying City Basement
- Flying City Upper Levels
- Floating Platforms - 30m above the Flying City Upper levels

Exact height limits are to be confirmed as the Decentraland team have not given full confirmation if height limits will be enforced.

Walls & Roads

Specific public LAND parcels will be allocated for roading and walls, as per the currently [proposed district map](#). If and when we can support upper levels in the district, some of these roads might be adapted into ramps to allow access to those levels.

Fractus Club

This pyramid shaped building will be the central "jewel" of the district and will be a massive hub of entertainment and commerce. Space will be provided for this public project by members contributing their LAND to its construction, with additional benefits such as exclusive apartments in the Club and [Stakeholder](#) membership tier in the district as described later in this



document. Exact implementation of these rewards will be investigated after the initial MVP build of the district. It is intended that this club to be a driving force of visitor traffic to the district. For owners of private LAND, they will receive bonus incentives such as exclusive club access and discounts for making a 1m buffer zone for walkways around their groups of LAND plots so visitors can easily move through the district. The exact nature of these incentives are still to be decided.

LAND Allocation Model & Registration Form

- There will be an online Registration Form distributed to those who contributed LAND to Aetheria to register their preference for LAND plot adjacency and whether or not they would like their LAND to be used for public works during the initial construction of the district. The form will be run off-chain for performance and cost control.

Benefits for Donating Public LAND

Contributors putting LAND towards public projects will get access benefits and rewards along the following lines, with the final details subject to the technology, buildout roadmap, and DAO policy. Public LAND contributions are considered donations and are non-refundable:

- Members-only lounges and areas
- Viewing Parties for Events (MLG streams, Soccer streams, etc).
- 50% extra bonus from minigames within Fractus Club (when scripting is available in the future)
- 50% discount on digital goods and automated services owned by Aetheria that require MANA, where Aetheria is developing the smart contracts for these. Privately owned goods and services will not be discounted.
- Exclusive access to the future stakeholder-only lounge with great views above the nightclub floor. When it becomes technically possible, this lounge will be on its own private chat instance for stakeholder meetings which will be held here.
- An exclusive owned apartment of a size and placement within the district in relation to the number of LAND parcels contributed. The exact size and placement will be determined at a later date.

Distribution Event Timeline

Exact times and dates for this timeline will be released in the future.

Phase One - LAND Registration

1. This Phase begins after the Startup Plan has been ratified and the technology needed for the registration has been created and well tested.
2. A countdown begins two weeks before the registration event and is visible on the Aetheria homepage at aetheria.io. Announcements will go out on

[#aetherian_announcements](#) and [#District_Aetherian_project](#) Rocket.Chat channels, as well as [Twitter](#).

3. During the countdown, contributors having specific projects they would like to build on their plots should prepare project proposals describing how they will arrange and develop them.
4. The registration event begins, and runs for two weeks, in which LAND contributors to the Aetheria district may register to put their LAND into public or private plot types, according to the maximum public LAND cap listed earlier in this document. Contributors may set the split of their LAND plots when they fill out the **Registration Form** during the event. This form will collect basic contact information such as email address, and all contributors will be asked if they support Aetheria's Initial Development Plan. For private plots contributors will be asked to provide a short description of what they plan to build with their LAND and an optional link to a full project proposal, as well as the desired parcel arrangement and size for their project(s). Suggested common plot arrangements will be listed, allowing contributors a greater opportunity to swap with others during **#5 of Phase Two**. No actual placement on the map will occur just yet - this event is so Aetheria's District Leadership team can receive an indication of how much public space it will have to work with. **The order of form submissions during this time does not affect your future priority for placement within the district.** Contributors will have up to 2 weeks to fill this form out and can do so at any time during this period to accommodate everyone's schedules. LAND pledged for Public plots is considered a donation to the district and will not be reallocated in the future. Note that allocation to private use does NOT mean transfer of the ownership of the Land tokens, rather it means using the Decentraland smart contracts to allow the private party to control and use the land. If a LAND contributor does not fill out the form the district will assume that they wish their LAND to be allocated for public works and LAND tokens will not be allocated for their private use.
5. After two weeks the registration event ends.
6. The Leadership Team will adjust the district map layout to accommodate the number of pledged public LAND plots. If we do not reach enough contributions towards public plots, we will adjust the layout of the district to work with what has been provided, with priorities being placed on pathways and roading. The size of the Fractus Club pyramid will also be adjusted to compensate. The adjustments to the map will reflect the spirit of the original layout proposed in this Aetheria Initial Development Plan document.
7. A revised district map will be presented to the community for feedback for one week.
8. After one week feedback closes for the revised map.

Phase Two - placement

1. Aetheria's Leadership team and core contributors will be invited to a planning meeting to receive early placement on the map. This will be done over a real time conference call, taking into account for any larger projects that people have planned.
2. Projects with the most well thought out project plans will be invited, too - these will need a full project proposal to be eligible for consideration. Our goal is to provide assistance to the projects with the best utility and benefit to the district as it grows. This will in turn likely raise the foot traffic, patronage and value of nearby LAND plots and the district as a whole. These projects will be added to the placement map ahead of time, with links to their respective proposals.
3. An initial layout of the remaining contributors plot arrangements will be finalized by the District Leadership team using a combination of random and manual placements to ensure that everyone can be placed and that no holes are present. In the event that not all plot arrangements fit, we will contact specific contributors about their placement and ask if they are happy to adjust their arrangement layout, in exchange for priority placement ahead of time into the district.
4. The development of the LAND placement form and the establishment of a means to use the Aetheria Primary Wallet will be finalized before the final placement event can begin.
5. A countdown begins two weeks before the placement event and is visible on the Aetheria homepage at aetheria.io. Announcements will go out on [#aetherian_announcements](#) and [#District_Aetherian_project](#) Rocket.Chat channels, as well as [Twitter](#).
6. The placement event begins, allowing the remaining contributors of privately-allocated LAND to select their placement on the district map, based on previously indicated parcel sizes. This will be viewed as a 2D map, similar to the one that was available during Decentraland's Terraform Event. Initially, contributors will be offered a specific placement in the district as described in #3. If a contributor does not like their placement, they can register their plot arrangement(s) to be added to a swap pool, from which they may select another plot arrangement and start an automated swap with another contributor placed elsewhere in the district. Each plot arrangement can only be swapped for plot arrangements of the same size and layout and each plot arrangement may only be swapped up to 2 times.
7. After 4 weeks, the placement event ends. All swaps are final.



8. Aetheria's Leadership team will release the final map data showing placements, and will begin allocating LAND.
9. Private LAND allocations will be made by a combination of smart contracts and/or tokens.

Aetheria Initial Build - Minimum Viable Product (MVP)

- This is the initial MVP build of Aetheria and the Fractus Club. We will work together to create a compelling district with a focus on buildings and environments to explore, according to Aetheria's aesthetic guidelines.
- We will commission several prefab building configurations that can be placed on LAND plots for users who do not wish to build on their allocated LAND from scratch.

Governance

- See the Aetheria Startup Plan for details.
- Aetheria's Leadership team and later its Board of Directors Leadership will retain full authority over the development of all public LAND, guided by policy from the future DAO when it is created.

Community Curation

- We will investigate mechanisms to aid users in reporting offending content within the district and will work with the Decentraland Team to ensure that various parties rights are respected and laws are abided by.
- Mechanisms for removal of offending content may be implemented in the future by the Decentraland Team.

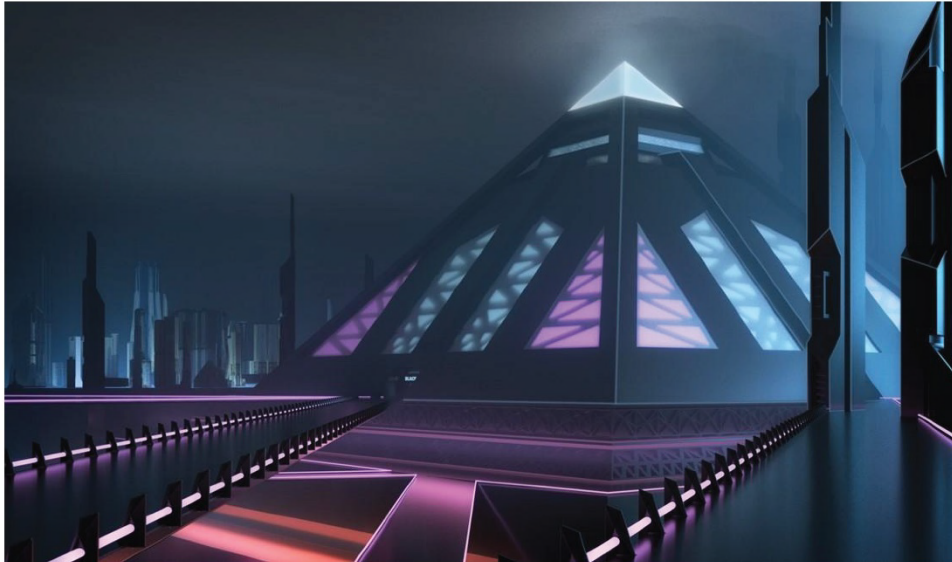
Public Facilities and Content

Facilities and Venues

Aetheria has a variety of facilities and venues that members and visitors can utilize. We expect to fund the development of these through some combination of an initial contribution of funding from Decentraland, contributed work and content from the community, and possible future fundraising efforts.

Fractus Club

A central building, referred to in the original district proposal as a massive black pyramid, based on The Black Sun from Snow Crash. View the [Fractus Club Pinterest board](#) for some ideas for art direction. We will also be approaching artists from the Aetheria community to see how they might envision the club and its interior.



Fractus Club Proposed Membership Structure

Membership in the Fractus Club will have multiple tiers enabling access to different areas. The following is not a final and exhaustive detail of what membership entails and may be subject to change at any time before the final membership structure is agreed on by Aetherian leadership in consultation with contributors who stake LAND for public projects during the Aetherian Foundation Age. Future membership policy will be guided by the DAO. The exact organisational structure of the club will be subject to future consultation of legal professionals to determine the best approach for this. All perks listed below are subject to change, pending legal confirmation.

Vouchee

A vouchee is the membership given to all Decentraland users. This membership comes with rights to enter Fractus Club but they will not be able to participate in almost any of the functionality of the interior of Fractus. This level of membership is primarily used as a means to

tour the facility and give them an opportunity to see what it has to offer before paying for a membership. Functionality of the nightclub that would be disabled under this membership is to be decided.

Member

This level of membership is a paid membership. A user of Decentraland can pay a predetermined amount of MANA to be able to join Fractus as a member. This would give them access to all base level content (all of which will be chosen at a later time) which would consist of things such as:

- Members only lounges and areas
- Viewing Parties for Events (MLG streams, Soccer streams, etc).

For the higher forms of membership, areas of exclusivity and perks are still to be finalized.

Contributor

Contributor membership will be given to the individuals who are helping develop Fractus and as well as other parts of Aetheria. This may also include contractors. Perks are:

- 50% extra bonus from minigames within Fractus (when scripting is available in the future)
- 50% discount on digital goods and automated services owned by Aetheria that require MANA, where Aetheria is developing the smart contracts for these. Privately owned goods and services will not be discounted.

Patron

This membership will be roughly the same as contributor but will be given to individuals who have donated LAND to public projects including Fractus during Aetherian Foundation Age. Perks are:

- Exclusive access to the future stakeholder-only lounge with great views above the nightclub floor. When it becomes technically possible, this lounge will be on its own private chat instance for stakeholder meetings which will be held here.
- An exclusive owned apartment of a size and placement in relation to the number of LAND parcels contributed. The exact size and placement will be determined at a later date.
- All previous perks