

Sharonomics: A Radical Economic Theory for the Next Industrial Revolution and Beyond

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Abstract

Economics has always been the epicenter of our gender-skewed sociocultural legacy that eluded inclusiveness, equality, and sustainability for centuries. Our traditional scarcity based economic theories need serious rethinking as the exponential rise in world GDP, and billions of daily social media shares tell us that 21st century economics has transformed from one of scarcity to one of abundance, from capitalized silos to peer-shared collectives. The principal objective of this research was to identify major lacunae in our existing centralized economic systems and deploy technology to render them more democratic, equitable, inclusive and sustainable. For a proof-of-concept our methodology deployed blockchain technology to decentralize the ecosystem, harvest the economic abundance, share, and redistribute the abundance from those who "have" to those who "need" making the dynamics of today's sharing economy (Sharonomics), more equitable, inclusive and sustainable. This paper is the first demonstration of a theoretical feasibility of such Sharonomics ecosystem that monetizes the influence of abundance to achieve sustainability via hedonistic motivations for democratic wealth redistribution, seamlessly, autonomously, and altruism-agnostically. This paper provides the implications of this research and suggests future research avenues highlighting the policy recommendations for implementing Sharonomics around the world.

Keywords

Sharing Economy, Scarcity, Abundance, 5th Industrial Revolution, Financialization

1. Introduction

1.1. Background

Recently eleven European partners came together to build a consortium com-

prising 6 economists, 7 universities, 4 SMEs and an NGO to propose a radically new economic theory to the European Commission's Horizon Europe program (Sharonomics Consortium, 2022). Sharonomics is a radical new technology driven theoretical proposal that redefines economics through democratically decentralized, incentivized and equitable sharing of assets between those who "*have*" with those who "*need*", thereby mobilizing the redistribution of wealth risk-free without imposing any additional burden on the taxpayers (**Figure 1**).¹ Most importantly, Sharonomics harvests the abundance that 21st century economy offers and financializes the influence of that abundance to equitably share across the less privileged without taxing the privileged.

"To Share Is Human, To Expect Nothing In Return Is Divine." If that wasn't the case, 2.9 billion (Datareportal, 2021) of us wouldn't be sharing 4.75 billion items on Facebook, and over 4 million of the shared stuff wouldn't be rewarded with "likes" every minute (Ho, 2022). Who wouldn't want their sharing to be reciprocated? We call the new economy Sharonomics, the art and science of mobilizing global resources for democratically connecting "haves" with "needs" for achieving sustainability. Humans are perpetually attempting to maximize their utility for both monetary and non-monetary gains to find happiness in hedonism and eudaimonism (Tiberius, 2013). Regarding psychological well-being, (Konow & Earley, 2008) analyze the "Hedonistic paradox" and conclude:

"Homo economicus, or someone who seeks happiness for himself or herself, will not find it, but the person who helps others will."

Although sharing is a phenomenon as old as humankind, collaborative consumption and the "sharing economy" are phenomena born of the Internet age (Belk, 2014). Citing the business models of Airbnb, Uber, etc. Belk et al. (2019) stressed on the need for the traditional models of sales and ownership to wake up to a new reality and concluded:



Figure 1. Defining sharonomics.

¹Sharonomics is a portmanteau word of "share" & "economics" that introduces a new branch of knowledge concerned with the production, distribution and consumption of wealth based on incentivized and equitable sharing of tangible or intangible assets between peers, from those who "have" to those who "need", in an autonomous decentralized ecosystem for achieving and maintaining sustainability.

"The old wisdom that we are what we own, may need modifying to consider forms of possession and uses that do not involve ownership."

1.2. Literature Gap & Study Layout

The dynamics of global economy has dramatically changed in the 21st century. As we will see in subsequent sections of this paper today's world has accumulated unprecedented abundance of wealth. However, despite the abundance, virtually all the economic theories essentially remain scarcity based (see section 3). Applying the principals of scarcity in dealing with an ecosystem of abundance may not deliver the optimal results. It is like a square peg in a round hole. Although in peer-reviewed literature there is no dearth of information on classical or modern economic theories and on today's sharing economy, but there remains a significant gap or rather a vacuum in acclimatizing the existing economic theories to the realities of the technology dependent sharing economy. This paper presents observational research that compiles empirical data from diverse sources to build a new economic theory compatible with the realities of 21st century.

The paper is structured as follows: In section 2, this new phenomenon navigates through a historical context that drives industrial revolutions, while section 3 traces a transformation of global economy from scarcity to abundance, and the role of financialization in arriving at the abundance of the 21st century. Section 4 deals with democratic and altruism agnostic redistribution of abundance via creation of a new asset class. Section 5 presents questions, the answers to which may lead to practical use cases that carry the potential to bring on track United Nation's Sustainability Develop Goals (SDGs) and eventually get closer to realizing humanity's Utopian dreams in some tangible form. Section 6 discusses a generic technical architecture and the research necessary for real world enablement of Sharonomics. Section 7 compiles the conclusions that apparently may drive the direction of the future research.

1.3. Research Methodology

This research is conducted by adopting a narrative and integrative literature review approach as advocated by Torraco (2005) in addition to a series of realworld experiments to build a proof-of-concept. An integrative literature review is considered suitable where the subject matter is new and needs further exploration. The exponential simultaneous growth of social media and world GDP sired a technology enabled sharing economy that's thriving (Hossain, 2020), making it crucial to investigate the phenomenon further in terms of how it can make a beneficial contribution to sustainability, inclusivity, and social responsibility. To accomplish this, we need to draw linkages between different bodies of literature as diverse as modern economics, artificial intelligence and blockchain. This is achievable through an integrative study (MacInnis, 2011; Torraco, 2005). Through this review, the study aims to generate new perspectives on the implication of integration of blockchain technology and sharing economy on the ethical business agenda of the next industrial revolution, that is industry 5.0. However, there is an increased need and interest to balance this with sustainability and social responsibility imperatives embodied in the sustainable development goals (SDGs) of the United Nation, currently facing an unassailable funding gap that has now risen to \$4.2 trillion annually (UNDESA, 2020).

This research draws upon the combined literature of blockchain technology, sharing economy, financialization, sustainability, inclusivity, governance, and social responsibility to seize the influence of their interplay for building the concept of Sharonomics. Google Scholar was used as the principal search engine. Sustainability, financialization, securitization, inclusivity, governance, social responsibility are well established topics, but blockchain and sharing economy are relatively new and their implementation in different sectors is still gathering pace. The empirical data used to build the Sharonomics proof-of-concept was derived from a series of experiments conducted on a blockchain-powered social media blogging platform (details in section 4).

2. Historical Context

Economics began as a branch of moral philosophy during the 18th century (Hamilton, 2006) but has developed over time to become a discipline that emphasizes a scientific approach to understanding how economies work (Mankiw, 2020). As much as social scientists, technologists, sociologists, psychologists and political scientists, economists employ some scientific methods (Chetty, 2013) to the study of how societies allocate scarce resources to meet their needs and wants, critics still believe economics is not a science (Wang, 2013a). It falls short of the definition for several reasons, including a lack of objectivity of testable hypotheses, lack of consensus, and inherent political overtones (Stahel, 2020). Despite these arguments, economics shares a combination of qualitative and quantitative elements common to all social sciences that may use technology as a tool, but not as an enabler. As such economics is often considered as an "unfinished science" (Metu, 2017). This is because the economy is something which is continuously changing, and therefore its study needs to be revised continuously. Consequently, the economic models need to constantly evolve. With Sharonomics, we attempt to finish the unfinished science of economics and initiate a serious rethinking of the traditional "scarce resources" based economic theories laden with observer subjectivity. As a result, we design a radically new technology-enabled objective ecosystem that transforms the conjectural nature of legacy economic theories to one of empirical measures that the dynamics of 21st century economy demands. In the process we generate some support to the evolution of economics as a distinct field of science in the ongoing "Economics is Science-No Science" debate.

2.1. Modern Economic Growth Theories & the Industrial Revolutions

Historically, economic growth is closely intertwined with industrialization (Chenery et al., 1986). Piętak's review of modern theories of economic growth (Piętak, 2014) analyzes the perspectives of three leading economists of the previous century and concludes that Schumpeter's theory is based on the conviction that economic growth is unbalanced and depends on innovations, which can appear with certain probability (Schumpeter & Backhaus, 2003). (Piętak, 2014) further asserts that the economic growth models of Lewis (Lewis, 1954; Lewis, 1956) and Rostow (Rostow, 1960) predict balanced growth in long run, even if it's unbalanced in short run. Well, balanced or unbalanced, no economic growth can be sustainable if it lacks inclusivity and socioeconomic empowerment of the masses.

Globally there have been four industrial revolutions, each driven by a technological epoch (Grinin & Grinin, 2016), that significantly impacted the global economy (Rymarczyk, 2021). The first industrial revolution began with the invention of steam engine, transforming an agrarian economy to one of industry and machine manufacturing (Xu et al., 2018), dramatically increasing the productivity of human (physical) labor. The second revolution started well over a hundred years later with electricity and oil as its key drivers. Mass industrial production led to productivity gains and opened the way for individualized mass consumption. The third revolution followed with the advent of information technology and the development of personal computers in late 60s and asset financialization in mid 70s. The fourth industrial revolution (4IR) started at the turn of the century and is ongoing. 4IR was first acknowledged and introduced as Industry 4.0 during the Hannover Fair event in 2011 (Pfeiffer, 2017). Also known as the "digital revolution", it combines technological and human capacities in an unprecedented way through self-learning algorithms, self-driving cars, human-machine interconnections and big-data analytics (Schäfer, 2018). Digital ledger technology (DLT) or blockchain introduced decentralization and autonomy into the evolving digital world of the 4IR.

2.2. The Next Industrial Revolution

Economics has always been the epicenter of our sociocultural inequalities and gender-skewed industrialization of the global economy. The advent of financialization of the economy during the 3IR and its exploitation in the 4IR brought unprecedented growth and prosperity, but at the expense of further skewing the gender gap and sociocultural inequalities. Financialization refers to the increasing importance of finance, financial markets, and financial institutions to the workings of the economy. Financialization has shaped patterns of inequality, culture, and social change in the broader society. Underlying these changes is a broad shift in how capital is intermediated, from financial institutions to financial markets, through mechanisms such as securitization (turning debts into marketable securities). Securitization is a global multi-trillion market that embodies financialization. Principally driven by profit-making ambitions, such financialized capitalism has created a dynamic system of economics that has produced material wealth but at the same time pose challenges to democracy, fundamental rights, social inclusion, reversing inequalities (including gender inequality), welfare, as well as the sustainability of our ecological system and climate change. Alternative business models to counter excessive financialization based on democratic and participatory principles that prioritize their societal mission over their profits, exist. However, economic inclusiveness, equalities, gender balance, economic, social, and environmental sustainability still elude the optimum as evidenced by the 2007-2008 financial disaster (Cornand & Gimet, 2012). Excessive financialization has been blamed for the crisis, the aftermath of which produced a technology that is destined to change economics as we know. Digital Ledger Technology (DLT) or blockchain introduces autonomous decentralized governance and liberates securitization from the hazards of centralized control by few. It also establishes that financialization per se (minus centralized control) is not bad at all, as it is financialization that has indeed played a key role in turning our traditional "scarce resources" based economy to an "economy of abundance." Furthermore, it helps us identify at least three major lacunae in our current economic systems that prevent us from harvesting the influence of abundance for inclusivity, gender, socioeconomic and cultural empowerment, viz.:

1) Incumbent economic system is still based on dynamics of "scarcity" when in fact we are living in abundance,

2) Inadequate democratic accountability/governance of the legacy economic systems,

3) Lack of equitable, altruism-agnostic means to share "abundance" between those who have with those who need (distributional mechanism).

The exponential rise in world GDP, and billions of daily shares on social media tell us that 21st century economics has transformed from the old economy of scarcity to a new economy of abundance, from an economy of capitalized siloes to an economy of sharing. However, in contrast, our global economic practices still follow outdated economic norms. It is time we made economics compatible with the dynamics of today's sharing economy and monetize the influence of the abundance that the third and fourth industrial revolutions created.

We introduce Sharonomics, the blockchain-powered decentralized economic ecosystem that exploits the influence of abundance and breaks the institutional silos of capitalism (Francesca & Sylvain, 2010), and redistributes wealth equitably across diverse sectors, independent of socioeconomic, gender or cultural biases. Technology is the key driver of economic growth of countries, regions, and cities, allowing for more efficient production of goods and services. Although incumbent economic systems do use technology as a tool for implementing policies and protocols, Sharonomics is exclusively a technology enabled ecosystem that exploits the power of economic abundance to create a new asset class, Influence Capital, that can be seamlessly shared by those who have, with those who need, without risking anything of monetary value.

Achieving sustainability is a colossal challenge, funding it is even bigger. Current economic realities make it impossible to achieve the ambitious UN Sustainable Development Goals (SDGs) by 2030. Sharonomics kindles some hope.

2.3. Primary Drivers of Impending Fifth Industrial Revolution (5IR)

Necessity is the mother of innovation and prevailing circumstances are the fundamentals that drive that innovation. Discourses on those fundamentals that define what the next industrial revolution should look like, and how Covid-19 is pushing 5IR (Javaid et al., 2020), are already thriving in peer reviewed literature (Maxwell, 2014), and opinions regarding the technologies, AI (Pathak et al., 2019), AI, nanotechnology (Rai & Rai, 2017), blockchain (Mattila et al., 2022; Makori, 2020), influencing the predicted 5IR are plenty. Even preemptive evaluation of the benefits and risks of 5IR (Costa et al., 2022) and its expected overall impact (Paschek et al., 2019) particularly on AI and finance (Golic, 2019) are conjectured by many experts. EU proposed a "Responsible Research and Innovation" framework, valuing what is called "sensitive design", which represents an increasing concern about ethical issues in a technological evolution environment, promising that technological innovation will be shaped towards social goods (De Saille, 2015). The opportunities offered by the 5IR are enshrined in the idea of developing a synergistic relationship between humans and technology for common benefit, essentially to avoid the risks of unrestrained concentration of power that historically intensified inequalities across all the preceding industrial revolutions. More than ever before, the IR 5.0 calls for a careful understanding of technology as an instrument of humanity, at the service of mankind. Hence, the main issue seems to be, how to design 5.0 industrial systems respecting human values. The key prevailing circumstances that drive our radical approach to reboot the legacy economic theories are:

1) Exploiting the 21st century abundance and harvesting its influence for the benefit of humanity.

2) Redistributing the wealth via seamless sharing between those who "have" with those who "need".

3) Building new mechanisms to fund SDGs for achieving UN goals by 2030.

4) Achieving democratic governance, inclusivity, accountability, and transparency with decentralization.

During 4IR, the growth of the Internet brought citizens closer in a social fabric that introduced a new socializing paradigm, the social media. While financialization introduced during the 3IR gradually transformed our scarcity-defined economic system to an economy of abundance, the Internet added another dimension to the 4IR economy social sharing. However, despite transitioning from scarcity to abundance, the economic equality and democratic governance kept deteriorating (Lindberg, 2019) jeopardizing the goals of achieving inclusivity and sustainability. Excessive financialization is often blamed for the socioeconomic disparities (Battiston et al., 2018). Financialization also took the blame for the 2008 depression. However, we believe financialization/securitization, per se, is not the poisoned chalice. It was the lack of democratic governance that poisoned it. With the availability of digital ledger technologies to decentralize the governance of financialization, the next industrial revolution can perhaps build on the abundance, and potentially achieve the sustainability development goals by 2030 (**Figure 2**).

3. The Financialization & Economic Transition to Abundance

Although the history of economic financialization dates back to the 17th century Germany, the birth of modern financialization can be traced to 1975 when money-market funds were introduced in the United States. These money market funds invested in highly liquid money market instruments (e.g., Treasury bills, commercial papers, etc) while offering their investors deposit-like shares that could be withdrawn on demand. This led to securities becoming the primary channel of credit, making securitization a global multi-trillion phenomenon that embodied financialization (Buchanan, 2017). The European Commission adopted the Capital Markets Union (CMU), an economic policy initiative in 2012. The CMU is built around the idea of securitization (Engelen & Glasmacher, 2018). Europe is being transformed by changes that impact the livelihoods and wellbeing of its citizens and the world in total (European Commission, 2020). Such changes present important opportunities for the EU to innovate and shape forward looking inclusive societies and economies, while avoiding the mistakes of the past and promoting an inclusive recovery that strengthens economic and social resilience. However, demographic changes, digitalization, automation, environmental degradation, the transition to a low carbon economy and globalization



Figure 2. The chronology landscape of industrial revolutions from the economic growth perspective.

all pose multidimensional, interconnected, and complex social and economic challenges. Moreover, the COVID-19 pandemic has magnified the pervasive inequalities across societies, with significant differences in the way losses and costs of the COVID-19 pandemic and the crisis that followed are distributed in society. More recently the need for stable democracies has been demonstrated by the autocratic invasion into Ukraine in early 2022, and the flood of millions of refugees across Europe.

Although lacking democratic governance making it prone to centralization, financialization/securitization did indeed transform our neoclassical economy from one of "scarce resources" to one of "abundance" (Figure 3). This is clearly illustrated in phenomenal rise in world GDP over the last two millennia (Figure 4). However, imperfect democratic governance resulted in financial concentration in a handful of entities, leading to centralization of finance that was largely governed by the dictates of shareholder value maximization. This eventually led to erosion of the democratic norms, declining social inclusion, increasing inequalities, and eventually challenging sustainability of our financial and ecological systems. Excessive financialization, either in the form of the Dutch disease (Brahmbhatt et al., 2010), or through growth retardation, is one of the major reasons for the severe financial crisis of 2007-2008. This excessive financialization rendered the economy prone to risk of debt-deflation and prolonged recession (Moosa, 2017). However, securitization that played an important role in rewarding the global economy with abundance, cannot be the lone culprit to be blamed for the inequalities and other vows of the economy. It is the lack of democratic governance, concentration of power and centralization of finance that renders securitization vulnerable. Therefore, post-2008 recession, decentralizing finance became the need of the hour, leading to the birth of the digital ledger technology (DLT) or blockchain in 2009. Blockchain triggered a new financial revolution that within just over a decade became a multi-trillion behemoth (Iyer, 2022). In fact, in blockchain, we have an almost perfect example of how a "problem" becomes a "solution" if only one can wait long enough to inject mandatory democratic governance by design into securitization. Although cryptocurrencies may merely be seen as decentralized money, and perhaps the future of money, it represents the transparent democratic governance of securitization run by algorithms independent of human prejudices and risks of centralization and concentration of power.



Figure 3. Dynamics of transitioning scarcity-based economics to the abundance sharing Sharonomics.



World GDP over the last two millennia

Total output of the world economy adjusted for inflation & in international -\$ in 2011 prices

www.ourworldindata.org/economic-growth www.worldometers.info/world-population/

Figure 4. World GDP as a measure of abundance rapidly rising with the advent of the 21st century. Data Source: <u>https://ourworldindata.org/</u> & <u>https://www.worldometers.info/world-population/</u>.

"It seems that not very far in the future, money will become virtual" (Sauer, 2016). In fact, some experts raise the question: Hasn't it already? (Flint, 2014). However, since currency is the medium of exchange for goods and services, the production, distribution, and consumption of which constitutes economics, the question remains whether the virtual currency will continue to replicate the centralized monetary system of today and maintain the status quo on growing inequalities, or transition to a decentralized, securitization-inspired algorithm-governed monetary regime that eradicates all types of inequalities. Our proposal supports a transition to a decentralized governance that liberates our current inequalities-prone centralized economy to a social and gender agnostic economic regime.

Notwithstanding the 2008 recession, our present economy has traversed a long way from the economy of scarcity to the economy of abundance. However, our practice of economics remains one of an economy of scarcity, i.e., only scarce commodities have economic value. Our old school legacy makes scarcity as the mother of economics (Zaman, 2012), advocating "*the needs far outweigh haves.*" That may well have been the foundational principle of classical economics, but 21st century circumstances are completely different. The 21st century economics must go beyond Adam Smith's "laissez-faire", Keynesian "welfare capitalism" and Robbins' "scarce means". Apparently, the "scarce resources" based definition of economics was justified by the scarcity thriving across the world

during that era, basically because of the economy's inability to harvest the resources, introduce liquidity into the harvested resources, and redistribute those resources. The architects of legacy economic systems made perfectly reasonable economic trade-offs for their world. But our world is very different. The scarcity-centered economic rules of their world have failed to stop gender, socioeconomic and cultural inequalities despite the abundance that we are living in today. This is essentially because the dynamics of the economic environment has changed making the legacy economic systems too outdated to catch up with the new realities.

3.1. Scarcity, No More the Mother of Economics

Today, no matter which analysis one looks at, the world actually has a lot more capital than it needs to become sustainable and prosperous. According to one estimate \$50 trillion (Garret, 2016) liquid assets are sitting on the sidelines as investable cash (**Figure 5**) and, a lot more in other forms of tangible/intangible assets (Raheman, 2019a). The Bank for International Settlements estimated the notional value of outstanding derivative contracts at \$700 Trillion in 2014 (Carney & Reily, 2014).

An economy of abundance should be able to organize people and resources in such a way that all people and a plethora of other species on this planet would be able to thrive, not only in the present, but in the future as well. It would have to be based on incentivized and equitable sharing of resources to balance "haves" with "needs." If scarcity is not the cornerstone of the present economic system, *why does extreme poverty still exist*?

Why do people still die of hunger? Why does gender and social inequality still exist?

We believe the problem is one of distribution, or rather redistribution. As Kate Raworth's Doughnut Economics focuses on the economy needing to be designed for redistribution (Raworth, 2017), one wonders if it is a problem of missed opportunities, or one of inability to connect "needs" with "haves". In other words, the economy of abundance is still being governed by the old school economic principles of scarcity that has so far failed to reverse socio-economic and cultural inequalities or promote inclusivity and gender equality, defeating the realization of the global 2030 Agenda on the Sustainable Development Goals.

3.2. 21st Centuries Biggest Challenge to Modern Democracies

"Sustainability" is one word that encompasses all the 21st century problems from extreme poverty, hunger to climate change and gender inequality, included in the United Nations' Agenda 2030 Sustainable Development Goals (SDGs). Funding the 17 SDGs is the mother of all the 21st century socio-economic problems. The annual funding deficit that was estimated at \$2.5 trillion at the inception of the SDGs is now \$4.2 trillion (Cassimon & Mavrotas, 2021) (Figure 6) amounting to a total of \$20 trillion in the aftermath of COVID-19 (Shulla et al., 2021).







Figure 6. Post-COVID increased SDG Financing Gap. Source: OECD (2021).

With the funding gap cumulatively increasing, SDGs are looking almost impossible to be achieved by 2030. This is an egregious travesty of justice particularly when:

1) Sustainability is a \$12 trillion global impact investment opportunity estimated by UNDP (Ghosh & Rajan, 2019);

2) Our world is awash in money (Harris et al., 2022) with at least \$50 trillion worth of liquid capital sitting idle on the sidelines awaiting investment opportunities (Garret, 2016);

3) It takes only \$175 billion per annum for eradicating extreme poverty (Sachs, 2006).

3.3. The 21st Century Apartheid (Collins & Felis, 2011)

On one hand there are trillions sitting on the sideline waiting for projects, and on the other, there are UN's SDGs offering impact investment opportunities worth trillions yet facing an unassailable funding gap that has risen to \$4.2 trillion annually (UNDESA, 2020). Our inability to connect the two is making it impossible to achieve the SDGs by 2030. Wealth inequality continues to grow (Asante-Muhammad & Collins, 2017). If the trend continues, median Black & Latino household wealth in the United States is heading towards "Zero Wealth" and the United Nations goal to "end poverty" by 2030 will be a far cry. Can we do anything to stop the growth of this 21st Century Apartheid (Kelly, 2017)?

In his book, The End of Poverty, Jeffrey Sachs estimated the cost of ending extreme poverty would be about \$175 billion/year (Sachs, 2006). Looking at the big picture and the dynamics of unutilized global assets, there's no reason why extreme poverty should not be wiped out. But the tragedy is, extreme poverty not only thrives with impunity, but poses a big challenge to the UN's Agenda 2030 goal to eradicate poverty by 2030.

3.4. Legacy Economic Systems Can Never Be Fully Inclusive

Inclusivity is multidimensional. It encompasses social, political, cultural and economic dimensions and operates at various social levels (**Figure 7**). It is also dynamic and a product of unequal power distribution in social interactions, impacting people in various ways and to differing levels over time. It critically depends on and influences people's ability, opportunity and dignity, which are unequally distributed among social groups.



Figure 7. Multidimensional inclusivity democratically integrated on Sharonomics platform.

Exclusion essentially occurs because certain groups are systematically disadvantaged and/or discriminated against based on their identity: ethnicity, race, religion, sexual orientation, caste, descent, gender, age, disability, HIV status, migrant status or where they live. The principal reason why gender, social and all kinds of inequalities persist is because legacy systems are not strictly democratic or are at least quasi-democratic subjectively judging an individual's identity linked to existing social, economic, cultural and political preferences. Any principle or rule left to be interpreted or implemented by humans will always be tainted with human prejudices, preferences, or conveniences. The solution therefore lies in letting economics be governed by autonomous algorithms. That's precisely what the digital ledger technology/blockchain promises to deliver in enabling the proposed economic model of Sharonomics.

4. Sharing, Redistributing Abundance for Human Empowerment

DeFi (Decentralized Finance) is a new kid on the block that's revolutionizing financialization to a completely new level that was impossible to imagine just a few years ago. Securitization is financialization of the economy without democratic governance in a conventional centralized financial system, while blockchain driven tokenization is financialization with decentralized democratic governance. Tokenizing the abundance and redistributing it indiscriminately across the gender, socioeconomic or cultural barriers using algorithms rather than human judgment makes all the difference in achieving the sustainability goals. Contrary to the traditional centralized finance (CeFi), DeFi is endowed with the following distinctive features:

1) Transparency: DeFi transactions are public records on the blockchain, and the terms of Smart Contracts are immutable.

2) Control: DeFi allows the user to remain the custodian of its assets, i.e., no risk of misappropriation of funds or modification of terms without the users' consent. There's no third-party intermediary (e.g., bank/financial institution) and the yield from assets stake is automatic and guaranteed.

3) Accessibility: Anyone with a modest computing device, internet connection and a little know-how can create and deploy DeFi products, while the blockchain and its distributed network of miners then proceed to effectively operate the DeFi application.

4) Staking: Staking is when you invest your tokenized assets into the network under a smart contract and get a reward for doing it. Essentially you mine or multiply your assets by pledging your tokens in the network to earn passive income on your crypto holdings without losing any control over your assets.

5) Higher Yield: The financial gain in DeFi also presents a significant contrast to CeFi. In the years 2020 and 2021, DeFi offered higher annual percentage yields (APY) than CeFi: the typical yield of USD in a CeFi bank was about 0.06% (Perez, 2022), while DeFi offered consistent rates beyond 8% (Qin et al., 2021).

6) Influence Capital: The DeFi features of transparency, control, accessibility, staking and high yield without having to give away the control or surrendering the possession of your assets, means just the influence of your staked asset works as a profit generating capital. This opens the possibility of harvesting, tokenizing and sharing the influence of not only the \$50 trillion that's reported to be sitting idle but financializing the influence of Quadrillion worth of human capital (Costanza et al., 2021) to fund sustainability (Sharonomics, 2018a, 2018b, 2018c, 2018d, 2018c, 2018g) challenging the zero-sum theorists (Hornborg, 2003).

4.1. The Power of DeFi, Smart Contracts, Tokenomics & Staking

With trillions worth of global assets, \$50 trillion of them being liquidable, there is plenty of influence to be monetized and tokenized. Just imagine using that much influence to generate new wealth, and that too by not putting the monetized assets at risk? How's that possible? Let's take a deep dive into DeFi and tokenomics. Decentralized finance (DeFi) is an emerging financial technology based on secure distributed ledgers like those used by cryptocurrencies (Chohan, 2021). It is at the core of the blockchain/crypto revolution. The system removes the control that banks and institutions have on money, financial products, and financial services. As a result, the consumers avail following unprecedented advantages:

1) Elimination of the fees that banks and other financial intermediaries charge for using their services.

2) Assets are held as tokens in a secure digital wallet under user control instead of keeping it in a third-party bank.

3) Anyone with an Internet connection can use it or enforce a smart contract without needing any 3rd party approval.

4) Funds can be transferred in seconds and minutes.

5) Most importantly, the funds can still yield returns under a smart contract while remaining in an owner-controlled wallet.

Smart contracts and tokens are the building blocks of DeFi. A token is a digital unit of a cryptocurrency that is used as a specific asset or to represent a particular use on the blockchain. Tokens have multiple use cases, but the most common are security, utility, and governance tokens. Cryptocurrencies and tokens built on blockchain have pre-set, algorithmically created, issuance schedules. This means that we can predict with quite some accuracy how many coins will have been created by a certain date in time. Though it is possible for most crypto assets to have this issuance schedule altered, it will normally require the agreement of majority of peer participants and is very difficult to implement. This provides some comfort and security for token owners because they know the tokenomics, and to what degree their asset will be created in a way that is much more predictable than governments creating fiat money almost arbitrarily. Smart contracts are agreements written on blockchains that run without any outside approval or human input when conditions are met. They are "self-executing" contracts. Once they have been written and agreed to, they are immutable, the terms cannot be changed, or the agreement canceled. Any payment stipulated in the contract is locked into the contract at its creation, so there is no going back. This removes the need for a trusted intermediary to ensure that the terms of an agreement are enforced.

Staking is when users invest their tokens into the network under a smart contract and get a reward for doing it. Essentially you mine or multiply your assets by storing your tokens in the network to earn passive income on your crypto holdings. Since mining for crypto currencies has been shown to use more and more energy, more than whole countries (Aratani, 2021), we are mindful of energy needs for DeFi and will eventually build an energy efficient blockchain specially designed for Sharonomics.

4.2. Sharonomics: Beating the Conventional Wisdom with DeFi

"You Can't Give to Anyone Without Taking From Someone" is the conventional wisdom that guides every humane act of charity, philanthropy or even welfare state, in any socioeconomic polity. The world of folk economics is a zero-sum game (Rubin, 2003). In our conventional wisdom, sacrificing is an essential element in any kind of giving. The zero-sum mentality has shaped and still influences our understanding of social welfare and our choice of political institutions (Capra & Rubin, 2020). The Gift Economy as set forth by Robin Wall Kimmerer contradicts that notion (Kimmerer, 2022) and so does the Sharonomics experiments over the past few years establishing that "incentivized & equitable sharing may not need sacrifice (Sharonomics, 2018a)", and entirely driven by the eudaimonic and hedonic motives of peers (Huta et al., 2012). A Smart Contract that immutably guaranteed rewards against staked tokens made this possible. The funds at all times remain user controlled and yet yield rewards to participating peers just for staking them.

A Blockchain Social Network (BSN) is a decentralized social media platform that provides a reward mechanism for online user behavior, such as the creation, curation, and consumption of user-generated online content. Through their contributions, users gain reputation and wealth in the form of tokens. Very similar to cryptocurrencies, those tokens are exchangeable and can be converted into fiat money, such as US Dollars or Euros. In other words, BSN is implementation of a blockchain economy that allows for protecting intellectual property of participating peers, while enforcing a revenue model that equitably redistributes the rewards operating on a global scale. As such, BSN may have unprecedented effects on social networking practices that require forward-looking critical reflections (Ciriello et al., 2018).

Our experiments on incentivized sharing began sometime in January 2018 (Sharonomics, 2018b) designed to extend help to the needy across the globe using influence alone, did establish that just the influence of tokenized assets can generate funds without anyone parting with their assets. We used an existing social media blogging platform, <u>Steemit.com</u> for the experiments because the platform deployed blockchain to reward users with tokens for posting content. Such rewards were directly proportional to the digital assets locked (staked) on the platform. The peers with digital assets in the form of Steem tokens, always retained the control of their wallets holding the assets. No monetary contributions were made except staking the tokens to earn rewards. The influence of the staked assets generated enough new assets that could be shared not only with the content creators but with the curators and eventually with anyone not using the platform. Creators of Steem blockchain claim to have built it on 3 principles (Larimer et al., 2017):

1) Everyone who contributes to a venture should receive ownership, payment, or debt from the venture.

2) All forms of capital are equally valuable, so members who contribute their time and attention to the platform are as valuable as those who contribute cash.

3) A community produces products to serve its members.

Based on analysis of Steem white papers, news articles, and blog posts, following six characteristics of Steem are evident: 1) *Openness*, 2) *Irreversibility*, 3) *Decentralized Rewarding System*, 4) *Incentivized Mutual Evaluation*, 5) *Ratelimited Weighted Voting*, and 6) *Public Reputation System*.

Our experiments that sought to seek the feasibility of deploying blockchain to eradicate poverty merely using the influence of staked assets became an instant hit on the chosen BSN (Sharonomics, 2018b, 2018d, 2018g). Everyone who participated benefited monetarily and at the same time raised funds for the poor and underprivileged without their own direct monetary contribution. The capital remained safe and secure throughout the duration of the experiment. In other words, we were able to generate new funds for sharing with the impoverished without taking anything from anyone or spending any staked assets. The total average estimated ROI on the parked assets ranged between 30% - 40% (see Figure 8 adopted from https://www.zerocash.net/). The trial unequivocally established that merely sharing the influence of the tokenized asset can empower the impoverished (Sharonomics, 2018d). Such means of financing by staking the influence of the tokenized assets (yield from staked tokens), without spending any of your own money, was radically in conflict with the principles of traditional economics at the time (Sharonomics, 2018e, 2018f) and they still are. However, four years later, the phenomenon became an exponentially growing market segment of blockchain called the DeFi. In just over a year the DeFi industry grew from almost non-existent, to over \$100 billion (Figure 9) in staked assets in November 2021 (Werner et al., 2021). Although we focused on deploying the concepts of DeFi in taking crowdfunding to the next generation in financing sustainability and funding the SDGs entirely by staking tokenized influence and no cash (ZeroCash) (Raheman, 2019b), the space has expanded into diverse activities such as liquidity mining, yield farming, crypto loans, so on and so forth (Kiong, 2021). These experiments did provide the first evidence that Sharonomics indeed beats the conventional wisdom and demonstrates that "you indeed can give to anyone without taking anything from anyone using a BSN."





Figure 9. Total value locked in DeFi. Source: https://www.defipulse.com/.

4.3. How DeFi Creates Monetizable Value from Human Interactions

Every transaction between peers that requires a third-party mediator to facilitate has cost consequences, and therefore the transaction must have a value that supports that cost. That value of the transaction is the accepted norm in our society, and that transaction cost is the accepted cost of doing business, or just cost of living a normal life. When blockchain eliminates the third-party facilitator without compromising the quality, efficiency and security of the transaction, it essentially eliminates the fee that the third-party charges the transacting parties, and thus saves on the total cost of that transaction. Such saving creates a surplus value that is monetizable and can be shared as incentive with the stakeholders who support the operation of the blockchain framework. The lower the cost of operating the blockchain network, the higher the surplus value and the greater the monetizable rewards. Such reward tokens are tradable in cryptocurrency exchanges creating a market that builds on the reputation of the stakeholders, the technological advantages of the enabling blockchain, and speculation of the market makers, all fueling the Sharonomics ecosystem.

4.4. Sharonomics Creates a New Asset Class: Influence Capital

Almost anything one owns and uses for personal, or investment purposes is a capital asset (Touvila, 2020). Besides the financial capital, a business, an organization, or a country may also claim the benefit of human capital. The term human capital refers to the economic value of a worker's experience and skills. Human capital includes assets like education, training, intelligence, skills, health, and other attributes employers value such as loyalty and punctuality. Human capital is perceived to increase productivity and thus profitability. Reviewing the work of the Nobel laureates Gary Becker (Becker, 2002) and Theodore Schultz (King et al., 2012) on "human capital," it becomes clear that the concept of "to-kenized influence" that Sharonomics creates is a lot more tangible and quantifiable than all those intangible assets that constitute "human capital." It was then we set out to investigate "Influence Capital" as a potential new asset class (Sharonomics, 2018b, 2018c).

INFLUENCE within a decentralized Sharonomics ecosystem implies the authority of a participating peer quantified and tokenized by means of the quantum of stake the peer holds in his/her account on the Sharonomics platform. If one uses quantifiable tokenized influence to acquire or make new asset investments and earnings, then influence indeed should qualify as a capital asset. Having formulated and supported the hypothesis that Influence Capital indeed qualifies as a new asset class, it became incumbent upon us to further investigate and define its place in the global wealth landscape.

4.5. A World Awash in Money

In our quest to quantify the global worth of Influence Capital vis-a-vis the total global worth of all assets, we discovered that the world is indeed awash in money. Bain & Company estimated world assets at \$900 trillion in 2020 increasing from \$600 trillion in 2010 (Wang, 2013b). A research report from Bain looked at the capital trends through 2020 estimating the total worth of world assets to reach \$900 trillion in 2020 (Wang, 2013b). There are several other reports, but no matter which analysis one looks at, the estimates range between \$544 trillion at low end (Desjardins, 2020) and \$1.2 quadrillion at the higher end (Peters, 2020). The task for exact quantification of global wealth is too Herculean for anyone to take up. However, of all the reports, the most relevant is the one from Korn Ferry, which also includes the valuation of Human Capital. Actually it is the only one to our knowledge that focuses on estimating the total potential worth of global Human Capital, placing it at nearly 2.5 times more valuable to the economy than physical assets. In the Korn Ferry report (Crandell et al., 2016), Centre for Economics and Business Research (CEBR), was commissioned to create a macroeconomic model to quantify the value of human capital in relation to physical capital. These were calculated based on a lifetime earnings approach, estimating the value of all the assets in use. Korn Ferry interviewed 800 business leaders across the UK, China, United States, Brazil, France, Australia, India, and South Africa to conclude that human capital represents a potential value of \$1,215 trillion to the global economy (Figure 10). It is 2.33 times that of physical capital, which includes tangible assets like technology, real estate, and inventory. According to the Korn Ferry analysis, the total physical capital should be valued at \$521 trillion, and adding up \$1.2 quadrillion human capital takes the total worth to over \$1.7 quadrillion. Considering the current global debt of \$226 trillion (Gaspar et al., 2020), the total net worth of humanity could be estimated to reach about \$1.5 quadrillion. Further details on estimating the total potential value of the influence capital are presented in section 4.7.

4.6. Quantifying & Monetizing Influence with Blockchain

As we know, any tangible or intangible asset can be tokenized (Sazandrishvili, 2020), and such tokenized assets create value (Hargrave et al., 2019). This value bestows upon the owner of such assets, influence, which if rendered quantifiable by empirical means, can function as a new asset class. Blockchain is the technology that can harvest, quantify, monetize and disseminate equitably amongst the peers with transparency, immutability and without an intermediary (Hofmann et al., 2017). On a Sharonomics platform a peer's tokenized influence can be measured in terms of one or more of the following intrinsic or extrinsic assets on the platform:



Mapping Global Tangible & Intangible Assets For Harvesting Total Potential Influence Capital

Figure 10. Total potential worth of influence capital. Data Source: Korn Ferry. The trillion dollar difference.

- 1) cryptocurrency tokens staked;
- 2) hashing power deployed;
- 3) reputation scores achieved;
- 4) intellectual property owned;
- 5) quantum of activities conducted within the ecosystem.

4.7. Estimating the Total Potential Value of the Influence Capital

Since the entire value of influence capital disclosed in our ZeroCash crowdfunding 4.0 patent disclosure (Raheman, 2019b) came from the actions of individuals or legal entities, our initial thinking gravitated towards seeing it as an offshoot of human capital. But realizing that different types of physical assets may also create influence that can apparently be tokenized by their owners, we had to revisit our initial perception, and conclude that all kinds of assets whether tangible or intangible are inherently bestowed with some value that can manifest into influence, which can be harvested and capitalized or tokenized. A decentralized ledger technology system, such as the one we develop, test and validate as the first Sharonomics use-case in our proposed consortium can harvest such influence by tokenizing the value of such assets (Sharonomics Consortium, 2022).

Considering the estimation of the total value of Influence Capital (**Figure 10**), an extensive analysis of the value of each category of physical as well as intangible assets and their liquidability will be required. While that should be a subject of another extensive research, for now, we can attempt a quick and dirty fair estimate by adding up all the reported tangible and intangible assets globally (\$521 trillion + \$1215 trillion = \$1.736 quadrillion) and discounting the total figure by an average of 40% (although such discounting would vary depending on the liquidability of the asset, e.g., cash in hand will be least discounted, while intangibles like human capital most discounted). That brings the total potential value of Influence Capital to \$1.03 quadrillion.

4.8. Harvesting the Abundance & Redistributing It to the Masses

Using blockchain algorithms, the influence of abundance of wealth can be tokenized, and such tokenized influence can be incentivized and democratically shared amongst the peers equitably without the intervention of human prejudices. Having discussed in detail (Section 4.2) how the DeFi economy delivers yield on tokenized assets without putting the assets at risk, we can get a taste of how leading blockchain staking protocols deliver returns on staked tokens by reviewing the index of top 20 cryptocurrency tokens at <u>https://www.stakingrewards.com/</u>. Although the average value of the top 20 assets declined by 6.39% in the preceding month, the year-on-year yield on the staked assets was a whopping 360% on February 1, 2022 (**Figure 11**). Even though there isn't a blockchain that is specifically designed to serve the objectives of Sharonomics, a proof of concept can be built deploying Polygon blockchain (Vispute et al., 2021). Polygon is a layer 2 solution with very low transaction cost and high transaction speed, which are two important characteristics for generating surplus value that can be shared as rewards with the peers participating in Sharonomics. Currently the annualized reward APR for staked Polygon tokens is over 16% (Figure 12) and decent enough to validate the concept in the use case that we selected to test and validate Sharonomics on a small scale.

5. Magical Power of Sharing the Influence of Abundance Unleashed

In this age of social media, sharing content, likes, and upvotes is perceived as a very benign and benevolent part of our daily lives that gives us a pleasant sense of social belonging without any extra cost to us. Having seen and experienced the power of sharing in our experiments that delivered financial help to the impoverished across the globe without any cash contributions from anyone, we are convinced that just sharing the goodwill without any cost burden is something that citizens will be more than willing to do. Sharonomics can unfold the magic of the influence capital in many ways, four of which under investigation are briefly discussed herein.



Figure 11. Staked assets yield 360%. Source: https://www.stakingrewards.com/ (Feb 12, 2022).



Figure 12. Source: https://nexo.io/ (April 15, 2022).

5.1. Can the Influence of Abundance Help Achieve SDGs by 2030?

Section 4.2 explains in detail how influence-based crowdfunding can stimulate hedonistic motivations amongst peers to fund any proposal for a good cause. With trillions worth of unharvested influence capital sitting idle (Garret, 2016), SDGs only need Sharonomics powered framework to monetize the influence of that idling capital and of course the political will to get funded.

5.2. Can Sharonomics Fund Universal Basic Income (UBI)?

UBI has generated quite a buzz in recent years around the world amongst the advanced countries (Hoynes & Rothstein, 2019), as well as the developing world (Banerjee et al., 2019). Universal basic income (UBI) is a radical policy proposal of a monthly cash grant given to all members of a community without a means test, regardless of personal status, with no strings attached, and at a sufficiently high level to enable a life free from economic insecurity (Bidadanure, 2019). Funding UBI will cost in trillions, (Ortiz et al., 2018) much of it coming from additional taxation compelling a European report to conclude that UBI is an illusion (Mencinger, 2015). In fact, in the opinion of a think tank, UBI will actually increase poverty instead of reducing it (Greenstein, 2017). Sharonomics holds out the potential to make UBI self-funding without creating any additional tax burden. We call it Earned Minimum Income (EMI) and test and validate EMI as a Sharonomics use case, which can potentially achieve via a novel Algo-Share technology. To profit in electronic marketplaces, especially those hosting volatile financial instruments (such as cryptocurrencies), a user must be able to deploy profitable algorithms swiftly. An autonomous and dynamic approach to instantly share the most profitable algorithm (AlgoShare) (Raheman & Raheman, 2019) between peers at mutually beneficial terms via smart contract can potentially harvest daily trading profits to be distributed to the impoverished as EMI via Internet connected devices.

5.3. Gender Mainstreaming via Celebrity Influence (GMCI)

Gender mainstreaming is one of the major strategies adopted by the European Union and member states for achieving gender equality (Woodward, 2008). Despite the European Union's (EU) official commitment to include gender mainstreaming (GM) in all EU policies since the 1990s, the actual implementation of gender equality has not been executed (Vida, 2021). Governments' policy making for decades hasn't taken GM far enough to achieve its goals convincing us that policy making alone would not work. Europe and the world need more than just rule making. GM needs to be mainstreamed into our social fabric. Sharonomics can achieve that by harvesting celebrity influence that remains largely unexploited (Olya, 2021). A recent incident at a European Championship press conference involving Portuguese superstar Cristiano Ronaldo is inspirational. Ronaldo's snub of the Coca Cola soft drink cost the beverage giant \$4 billion drop in the value in a single day (Alton, 2021). The power of celebrity influence is enormous (Villegas, 2021) that can add substantially to the global value of Influence Capital that we estimated. Gender mainstreaming via Celebrity Influence (GMCI) is another use case that our consortium will be testing in the field trials to validate the Sharonomics framework (Sharonomics Consortium, 2022).

5.4. Can Sharonomics Replicate Utopia?

The idea of a perfect society intertwined with communalism can be traced back to Plato's Republic, the book of Acts in the New Testament, and Sir Thomas More's fictional Utopia. However, beyond fiction, finding another way of living in which all humans have an equitable and active stake requires a radical reimagining of society. Martin Kelly provides an account of at least five Utopiainspired movements in the United States during the 19th century (Kelly, 2020).

As Ruth Levitas argues, utopian thinking, in speculative literature, is a valid method for building the future through new creative forms of knowledge. In her book, "Utopia as Social Method", Levitas outlines that utopian thinking requires a reengagement with how the past imagined the future and makes the case that "*utopia should be understood as a method rather than a goal.*" More specifically, we understand it as a method which is currently being enacted by utopian activists across the globe, as not just acts of imagination, but acts of protest, resistance, occupation, organization and solidarity. Acts that insist on the possibility of creating another world in the near future. Without such actions, utopianism, whether as method or as goal, is rendered unthinkable, let alone realization of a better world (Levitas, 2013).

Whether it is inclusivity, gender mainstreaming (Risman et al., 2012), or eradicating extreme poverty with UBI (Van Parijs, 2013), or sustainability (McCool et al., 2013)), utopian thinking does matter. Some socioeconomic theorists see humans as inhabitants of a zero-sum world (Hornborg, 2009) shattering the utopian dream and tagging along with Huxley and Orwell's 20th century dystopian fiction defined by a pessimistic satire that warns us that once a totalitarian state comes to power, there will be no going back (Claeys, 2022). Despite the skepticism associated with the term itself, "Utopia" remains an active pursuit for some of the hardcore utopian scholars (Moylan, 2018).

There are evident links between science fiction and utopia. Many of today's technological wonders had their imaginative beginnings in science fiction (Weber, 2016). If imagination can discover technology (Alkon, 2013), there's no reason why technology cannot help building a utopian state. Achieving perfectly decentralized and transparent governance that autonomously redistributes abundance and implements universal inclusivity is a Utopian dream that Sharonomics can possibly strive to make EDAN (Equitable Decentralized Autonomous Nation) achievable in the near future.

5.5. Active Pursuits

Two of the four proposed Sharonomics use cases disclosed in the preceding section are currently being pursued by the 11-member Sharonomics consortium for developing, testing and validating the concept, and the remaining two are on the drawing board for our upcoming endeavors (Sharonomics Consortium, 2022).

6. Sharonomics Network Architecture

As Sharonomics is essentially a technology enabled economic ecosystem, that cannot be deployed without implementing DLT/blockchain, it cannot be as ambiguous and non-structured as the field of legacy economics is. Nevertheless, the real-world implementation of Sharonomics is as boundless as the field of economics itself. As there cannot be one-size-fits-all policy in economics, there cannot be a single Sharonomics framework that applies to all possible use cases and circumstances. While the specific framework that Sharonomics deploys to test and validate each specific use case is beyond the scope of this paper, a general description of the overall blockchain framework is presented herein.

6.1. Generic Blockchain Architecture for Sharonomics Applications

Blockchain technology has come a long way since Satoshi Nakamoto released the Bitcoin white paper in 2008 (Nakamoto, 2008), and it has a long we to go to become robust and sustainable. While Bitcoin was the first generation of blockchain essentially focusing on a decentralized trustless payment system, its underlying technology enables an array of applications. A blockchain consists of a virtual chain of blocks, each of which contains a unique identifier and information, such as monetary transactions, contracts, or other documents. Due to a distributed network of trusted nodes, the blockchain technology eliminates the need for a 3rd party intermediary to validate peer-to-peer transactions, thereby enabling secure and transparent transactions operating on a decentralized network (Zheng et al., 2017). Blockchains use smart contracts to execute a decentralized governance system (cf. (Beck et al., 2018)) within distributed user communities to manage and reward content creation, curation, and consumption. Smart contracts can protect individual property rights, enforce revenue streams, and may resolve network issues by a voting mechanism to resolve them without depending on trusted centralized authorities.

In the conventional ICT infrastructure, a client-server network is deployed, in which the server keeps all the required information in one place so that it is easy to update, due to the server being a centralized database controlled by a single entity. However, in the case of the distributed network of blockchain, each participant within the network maintains, approves, and updates new entries. The system is controlled not only by a single entity, but by everyone within the blockchain network. Each member ensures that all records and procedures are in order, which results in data validity and security. Thus, parties that do not necessarily trust each other are able to reach a common consensus. Essentially blockchain is a decentralized, distributed ledger of different kinds of transactions arranged into a P2P network. This network consists of many computers (nodes), but in a way that the data cannot be altered without the consensus of the whole network (each individual node). The structure of blockchain is represented by a list of blocks with transactions in a particular order therefore the term "blockchain." These lists can be stored as a flat file (txt. format) or in the form of a simple database. A high-level architecture of a typical blockchain framework can be visualized as layers of components that constitute the complete decentralized infrastructure (Figure 13). For a specific blockchain most layers may remain constant except the application layer, which varies widely depending on a user interface that a specific use-case demands. In designing the Sharonomics generic architecture we introduce one more variation in the classical blockchain framework at the data layer. This is essentially because blockchain's data layer can hold only very limited data. Since some of the Sharonomics applications may have higher data requirements, we integrate a more cost effective and network efficient privacy preserving and GDPR compliant approach discussed elsewhere.

6.2. Optimizing Blockchain for Sharonomics

Most blockchain research focusses on scalability and speed of transactions, which we believe are already within reach. The dynamics of Sharonomics go beyond scalability and speed and hinge around creating a surplus value from each transaction recorded on the blockchain, and done so in perfectly democratic manner, leaving no scope for human manipulation. While the former depends on the economics of each transaction and is a showstopper of sorts, the latter involves perfecting the blockchain's consensus mechanism, which are currently prone to pooling, syndication or some such centralization scheme. A less than perfect consensus mechanism cannot perfectly decentralize the blockchain to prevent 51% attacks.

6.2.1. Achieving the Surplus Value Ratio of >3

Our initial hypothesis building experiments were conducted on a popular blockchain social media (BSN) platform, Steemit.com, that deploys Steem blockchain. Steem blockchain transaction costs were extremely low and the transactions it recorded on blockchain had an intrinsic value far higher than the transaction costs, leaving some surplus value that was redistributed among the participating peers. In designing a blockchain that enables Sharonomics following metrics are essential:

1) The transaction that the blockchain records should have significant intrinsic or perceived value to justify the cost of recording the transaction on the blockchain.

2) The cryptocurrency tokens that the blockchain generates to reward peer participation should have adequate liquidity in crypto exchanges.



Figure 13. Blockchain's generic layered architecture for Sharonomics applications.

3) The ROI or yield on a staked cryptocurrency token should be higher than the highest interest rate available in any legacy bank.

4) The cost of recording a transaction on the blockchain should be as close as possible to the cost of a traditional database and should leave a surplus value after covering all costs including staking investors' profits. Such surplus value can be shared among the non-staking peers.

5) The Surplus Value Ratio of >3: The ratio of the total blockchain reward value/the total transaction cost should always exceed 3.

The above metrics are essential to implementing Sharonomics, which are currently difficult to achieve by most blockchains out there, but like the Steem blockchain, certainly possible. In other words, the results we got would not have been possible using most other blockchains. The reason is best explained by a transaction cost comparison study (Rimba et al., 2017) reporting a two orders of magnitude cost difference between a standard Amazon database service and Ethereum blockchain. To be precise the actual cost of transaction was estimated at \$0.36 for blockchain vs \$0.001 for Amazon database, i.e., blockchain cost was 360 times higher than the conventional cost. Rimba et al., (Rimba et al., 2017) further estimated that Amazon servers must store the data for 197 years to reach a break-even point to justify the blockchain transaction (Rimba et al., 2017). Moreover, those estimates were made when the Ethereum price was in 2 digits. Now, with the Ethereum price being in 4 digits, the cost will be astronomically prohibitive. While sustainable blockchain researchers mostly focus on blockchain' electricity consumption and its carbon footprint (Schinckus, 2020) and propose sustainability use cases (Yahaya et al., 2020), the humongous transaction cost, which makes it economically impossible even if the energy footprint hurdle is overcome, is hardly on anyone's radar screen.

6.2.2. Centralization Resistant Consensus Protocol

No matter how much decentralization is inherent in blockchain, human inter-

vention will always work to centralize the power by one or the other means. Consensus algorithm is at the heart of such a power play. Since Satoshi Nakamoto's first disclosure of the Proof-of-Work (PoW) consensus algorithm in his bitcoin blockchain white paper in 2008, several consensus protocols have been developed and deployed. But none can claim to be completely immune to a 51% attack. This is because, although blockchain, in theory, decentralizes power, it cannot completely stop human greed and craving for power from gaming the system. Pooling, syndication, cartelization are the names of the game (Algo-Share, 2019).

A 51% attack on a blockchain network is when a single entity or organization or syndicate can control most of the hash rate, potentially causing a network disruption. In such a scenario, the attacker would have enough mining power to intentionally exclude or modify the ordering of transactions. They can send a transaction and then reverse it, making it appear as though they still had the coin they just spent. This vulnerability, known as double-spending, is the digital equivalent of a perfect counterfeit and the basic cryptographic hurdle the blockchain was built to overcome. A network that was vulnerable to double spending would quickly suffer a loss of confidence. They can also prevent other miners from completing blocks, theoretically allowing them to monopolize the mining of new blocks and earn all the rewards. All cryptocurrencies that use distributed ledger technology are potentially vulnerable to 51% attacks (Bambrough, 2021), with bitcoin itself suffering one in 2014 (Hern, 2014). While the debate on the most robust decentralized consensus algorithm goes on, the consensus protocol that sanitizes a blockchain from 51% attack alludes. There seems to be no consensus on a perfect consensus protocol.

6.2.3. The Way Forward

The ideal blockchain that can enable Sharonomics in real world scenarios may apparently be a show-stopping obstacle that first needs to be tackled. Given the pace at which the blockchain economy is evolving, and that the Steem blockchain has already demonstrated the feasibility of Sharonomics, the possibility is not too far-fetched. Taming the market volatility of the associated tokenized assets that represent the influence capital is another goal that needs to be achieved to make Sharonomics a viable ecosystem. These goals aren't technologically unsurmountable but need concentrated efforts from the blockchain researchers. This paper offers rich insight into the complex interrelationships between blockchain, social networking tools and their effects on the underlying economic practices. These mechanisms can be exploited to introduce a new economy that harvests the abundance and redistributes the abundance to galvanize the subdued sustainability movement of United Nations. We believe, as an enabler of sustainability, Sharonomics has the potential to become one of the main pillars of the next industrial revolution. In that process the Sharonomics thesis raises more questions than the hypothesis it supports. We believe this comprehensive review will spur scholars into exploring the phenomenon as a promising new research field.

7. Conclusion

The architects of scarcity-driven legacy economic systems made perfectly reasonable economic trade-offs for their world, but our world is very different. The legacy economic systems are too outdated to catch up with the new reality. If we don't harvest the abundance of 21st century, achieving the United Nation's goal of sustainability by 2030 will become impossible.

Sharonomics is a radically novel concept that needs to be extensively researched to explore its possible implementation in real world settings. However, an economic regime that does not conflict with the principles of sustainability and adapts to the economic realities of 21st century appears to be no less than a utopian dream. We build a theoretical possibility of a path to that dream. Traversing that path will be a challenge that all the stakeholders have to collectively overcome. The recent technological advancements indicate that the next industrial revolution is imminent and has already been predicted by several researchers. Undoubtedly technology will be at the heart of it. While it is hard to precisely predict how technology shapes the future, a prudent and judicious analysis of the preceding 4IR tells us that sustainability should be the epicenter of 5IR, not only because of its altruistic urgency but because of its technological and economic feasibility that Sharonomics makes possible.

The emerging economy promises much, though many of the details still need to be determined. As the results of the potential enabling effects of Sharonomics illustrate, the biggest caveat in practical implementation of the theory of Sharonomics is building a sustainable blockchain that meets the Sharonomics metrics to reach a Surplus Value Ratio that exceeds >3. Another area that blockchain needs to improve is the consensus protocol that remains vulnerable to human manipulation. There is also a great potential in studying the ethics underpinning Sharonomics. For instance, the algorithmic decentralization of economics will reflect the subscribed Sharonomics tenets of fairer distribution of value (whatever "fair" means in this context), or will it recreate the already existing divisive capitalist economy where whales take advantage of minnows. And, what can we learn about the governance of blockchain ecosystems from studying Sharonomics? How could Sharonomics governance reflect societal ethics while also protecting freedom of speech? How should the economic mechanisms underlying Sharonomics be designed to provide sustainable growth while also decentralizing wealth? And how can Sharonomics enable a political discourse while also allowing to express critical views? No one can claim to have all the answers, and this research can only provide in part preliminary answers. But, it is hoped that this research inspires the researchers to critically reflect on what is observed in this research and try to figure out an answer for themselves.

Policy Recommendations

The definition of Sharonomics coined in this study is relevant for the academicians studying the sustainability impacts of the new sharing economy, decentralized, and democratized by deploying blockchain to promote comparability and compatibility in research. Furthermore, the definition is useful for economists, policymakers, entrepreneurs, managers and consumers that have the new economy on the agenda in order to promote social enterprise and support inclusivity, equality and sustainable consumption. The resulting recommendations are addressed to five distinct audiences: 1) Providers; 2) Consumers; 3) Potential Sharonomics platforms; 4) Educators; 5) Policy makers.

1) Recommendations for providers:

- Ensure 24/7 online availability: Stable Internet access is crucial to ensure that all sharing peers are always reachable.
- Employ reputation mechanism: Many consumers are insecure about interacting with strangers. A rating system with strong online presence is therefore helpful.
- Skills/influence monetization: Skills/assets of peers carry influence that can be monetized for sharing. Better the peer skills/assets, higher the value of shared influence.
- Regulatory compliance: Make sure a sharing service is legal in locally relevant jurisdictions.
- Ensure privacy, security, and interoperability: GDPR compliance for privacy and cybersecurity is of paramount importance, while interoperability is also desirable.

2) Recommendations for consumers:

- Connectivity: Good connectivity is key to implementing Sharonomics. Blind spots should be diligently identified.
- Internet skills: Practice makes consumers perfect, so adequate training helps.
- Trust: Average consumer may be apprehensive of unknown peers, so a robust trust mechanism should be ensured.
- Reputation verification: Reputation scores on platforms can be artificially inflated, hence consumers should consult text reviews to get a better understanding of a provider and their offers.
- Monetize assets: Sharonomics is much beyond the traditional sharing economy wherein consumer skills/assets can be monetized to earn benefits for all the participants in the system.

3) Recommendations for platforms:

- Create awareness: Sharonomics builds a new economic fabric for monetizing intangible assets and redistributing for the benefit of all, going beyond the notion of conventional sharing economy that is currently identified as room-share, car-share, bike-share, etc. It therefore needs to create awareness.
- Invest and build social capital: Facilitating sharing may make it easier for non-users to gain access to Sharonomics and build social capital.

- Lower entry barriers for inclusivity: Providing convenient processes allows for a wider, more diverse user base.
- Take responsibility: Promote financial benefits for all the peers in the ecosystem.

4) Recommendations for educators

- Support digital literacy: Supporting the development of Internet skills improves the benefit of Sharonomics. Peers with higher skills benefit more.
- Gender, ethnicity, age prejudices: The best way to ensure inclusive and open access of all is spreading awareness of the existing societal prejudices.
- Reach out to the fringe: Educating the marginalized universalizes Sharonomics.

5) Recommendations for policy makers.

- Foster Internet skills: Internet expertise is related with a more enjoyable experience and with higher economic and social outcomes.
- Seize opportunity for rural development: Lack of public services in rural areas may benefit most from Sharonomics.
- Fund and achieve SDGs: The influence capital that Sharonomics generates can be utilized to fund the sustainability develop goals (SDGs) of the United Nation's Agenda 2030.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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