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Blockchain Technology for Social Good

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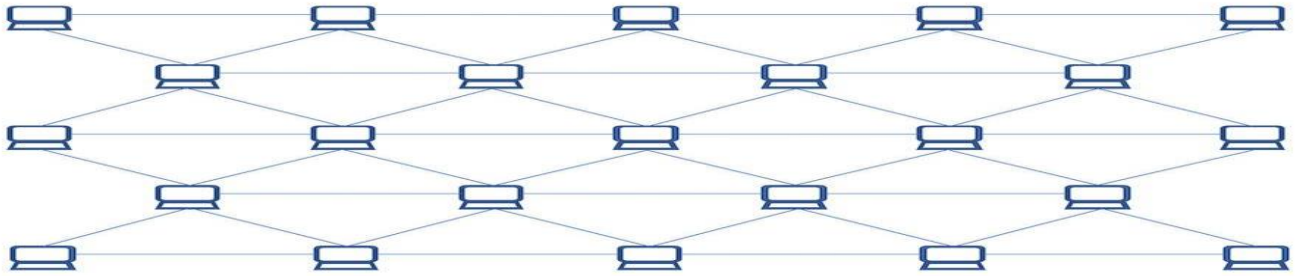
ABSTRACT

What does our subconscious mind think of when we hear the word "Technology"? Well, something futuristic, exciting or entertaining on the bright side or something destructive for nature and the world on the negative side, but what if there is an emerging technology which can change this prevailing perception and change the world in a better way. Well, this is nothing unknown but what we all have heard of at least once in our lives- blockchain. Yes, you heard that right. It is not just related to cryptocurrency or decentralization, but to something which can change our world forever. Blockchain can act as a digital weapon towards many social uneasiness presents around us today, like plastic accumulation in landfills, misuse of donations, centralized money system and much more.

Keywords: *Blockchain Technology, Supply Chains, Waste Management, Transparency, Accenture*

1. INTRODUCTION

Since its inception in 2008 witnessing the publication of the white paper by the mysterious Satoshi Nakamoto taking it upon himself to introduce Bitcoin as the world's first cryptocurrency, blockchain technology has been a catalyst for transformative innovation [1]. Ethereum being introduced in 2015 further expanded the horizon and possibilities of blockchain technology by introducing smart contracts, making possible the development of decentralized applications (dApps) with automated agreements, that self execute themselves coded into the blockchain. This breakthrough opened the gateways to myriad of applications beyond monetary transactions including supply chain management, verification of identity and decentralized finance (DeFi). With increase in growth and maturity of blockchain technology, its potential for social good became increasingly recognised. Organizations and initiatives worldwide began exploring and experimenting with how blockchain could address societal challenges and empower marginalized and oppressed communities. In summary, blockchain technology has evolved and developed enormously from its humble beginnings as the foundation of cryptocurrencies to become a commanding force for fostering positive social change. Its decentralized and crystal clear nature offers solutions to enhance and protect the extremely retrievable and traceable data shared across the business network. Blockchains are a network surviving on the nature of increased trust and faith, between people engaged in business. The convenience this network showcases with its automated transactions, benefits to numerous multi-billion dollar industries, quick traceability and commendable transparency, justify its wide and extensive usage in the global market.



2. METHODOLOGY

[2] Several sectors make use of the blockchain technology to harness positive social impact and foster significant change in the society. The efficiency and cost saving, accountability and prevention of misuse/misallocation of resources, and empowerment of individuals are some of the diverse reasons, why this system is adopted by companies.To elucidate the claims made above, detailed research was done to study and find industries who leverage blockchain technology for innumerable applications.

2.1 Aim of the study

To present how new startups and prevailing giants are using blockchain technology for social good, and how it can be used in future to help us combat huge global issues.

2.2 Research Design

Explanatory,[17] Explanatory research is defined as a way to connect ideas to understand cause and effect.

2.3 Scales used/tools used/instruments used

- Google and google scholar for data collection.
- Reference management software (MyBib): To keep track of the sources and create citations.

2.7 Data Collection Procedure

The data collection method used is a secondary data collection method.[18] Existing datasets that have already been collected are used, from sources such as official websites of companies and research organizations.

Blockchain startups promoting public welfare:

1.[3] **Civic**- Secure Identity Ecosystem

A blockchain project known as Civic is giving individuals and businesses the opportunity to protect and control identities. Extremely crucial and personal information such as passport information, birth certificates and banking information can be safely stored on the civics blockchain. Taking advantage of the blockchain network, storage, management and identification of the technology become efficient and secure.

2.[4] **Digits-** The Future of Crypto Payments:

The Digits project (launched on 26 march 2019) is a revolutionary breakthrough in the field of cryptocurrency payments ecosystem. In an inaugural move, this project has given consumers the privilege of using their debits/credit cards for payments made in crypto rather than using fiat money. This provides the public a medium to incorporate crypto in their life, in a way that is accessible to all. This organization is exhibiting great potential to bank the unbanked and make the world a better place through the power of blockchain technology.

3.[5] **Giveth**- Building the Future of Giving;
This is an extremely powerful and influential project for it gives people the chance to give and invest in causes they believe in, a clear and straightforward format using blockchain technology. All donations made are stored in the Ethereum blockchain, so that people can follow, perceive and track who is receiving the donations and why. Projects like these have the ability to change the way charitable organizations operate forever.
Apart from startups, many well established and wealthy companies are incorporating blockchain
technology in their functioning to promote social welfare initiatives. These companies acknowledge the potential of blockchain to incorporate in their philanthropic endeavors. Furthermore, they typically have the infrastructure required to use this technology on an enormous scale, therefore magnifying social impact. Some of these organizations are:

1. Tech Mahindra

[6] Tech Mahindra (24 October 1986) is a company consisting of more than 152000 professionals across 20 countries seeking to provide assistance to companies all over the world to foster growth and development in the global market. The company leverages advanced technology, including blockchain,5G, etc. The company's perspective and take towards blockchain aims to simplify a business's journey towards a digital transformation.

2. Accenture (launched 1st January 2001)
Accenture truly visualizes the potential of blockchain technology to address social issues and create a positive impact across various industries. They have tried their best to discover solutions to global challenging problems. They mention a few of their organizations around the world that are building multiparty systems that leverage blockchain technology to change the lives of millions for the better. Some of them including:

(i) Akshaya Patra Million Meals Program -
[7] This program provides midday meals in millions of schools in India, combining artificial intelligence and the Internet of Things. Based in Bengaluru, this is the world's largest NGO-run Mid-Day Meal Program (1800907 children on a daily basis). Their "Million Meals" uses blockchain to revolutionize the supply chain and operations, resulting in expanded reach and improved food quality, with a vision to eliminate child hunger. This project addresses the challenge of mass meal production and delivery using disruptive technology. Their goal is to continue to optimize and streamline the program.

(ii) DHL Serialization for Pharmaceutical Safety -
[8] This uses blockchain to eliminate counterfeit drugs from the pharmaceutical supply chain. In Germany with the help of Accenture DHL, a leading global technology consultant, blockchain technology's potential is to transform the logistics industry. DHL and Accenture collectively are working on a prototype, which tracks pharmaceuticals from the point of origin to the consumer, preventing tampering and errors. "We see especially exciting potential for blockchain in pharmaceuticals, which is why we focused our proof of concept with Accenture on the life sciences and healthcare industry," says Keith Turner, CIO Chief Development Office, DHL Supply Chain. "By utilizing the inherent irrefutability within blockchain technologies, we can make great strides in highlighting tampering, reducing the risk of counterfeits, and actually saving lives."
About one million lives are lost every year due to counterfeit medicines, according to Interpol, it is estimated that up to 30% of pharmaceutical products sold are counterfeit. DHL with Accenture created a blockchain-based serialization prototype with nodes in 6 geographics to track pharmaceuticals across the supply chain.

(iii) BetterPlace SafeDrive App -
They built rideshare passenger trust using a blockchain-based digital identity to match drivers to
vehicles.

(iv) KfW TruBudget donor tracking -
[9] This is a pioneering blockchain solution that aids developing countries to regain trust with a tamper-evident digital trail that tracks the impact of donor funds. On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), KfW is testing the use of blockchain technology in the management of public finances in Burkina Faso. The potential of this technology for development cooperation in Africa will be explored during a six-month pilot phase.

KfW developed TruBudget software to trace all work and approval steps. This incorporates, for example, making contracts or tendering and disbursement processes in the implementation of a project, for example in the field of water supply. Using this platform, users can view all processes and changes in real-time. Complex manual processes used to ensure that funds are used correctly can thus be eliminated.

(v) Sustainable garment Supply Chain with GIZ -

[10]They are trying to enhance the social, environmental, and economic performance of garment supply chains in an award-winning study with GIZ in Germany.

(vi) Blockchain for Supply Chain -

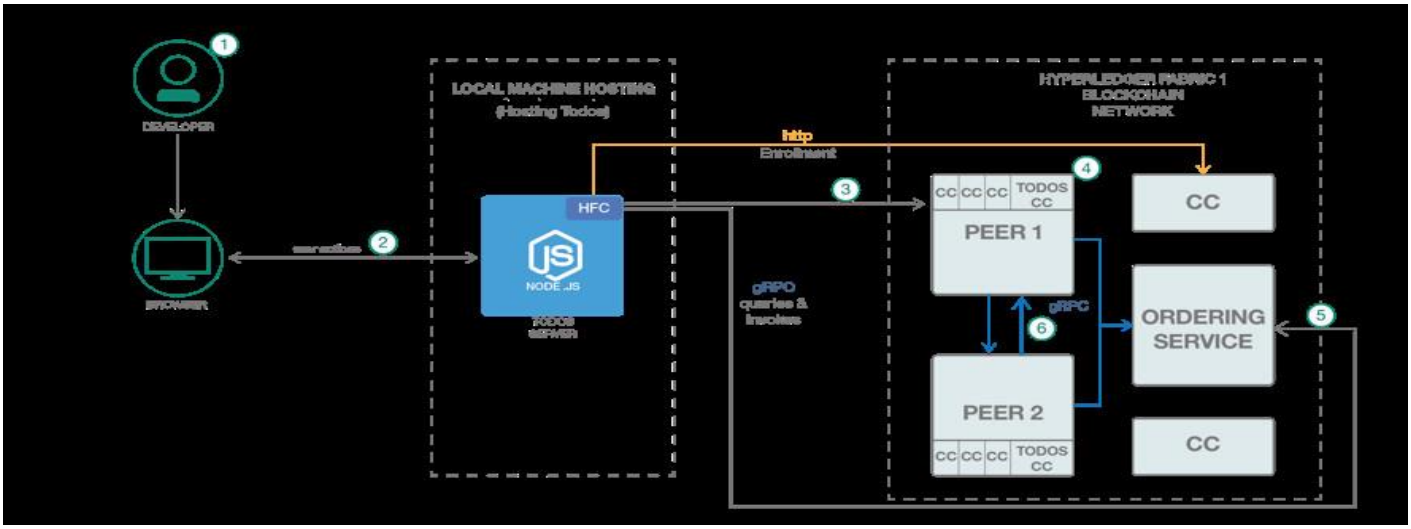
[11] It addresses the challenges of provenance, authenticity, traceability, and how to provide small producers with an equitable seat at the fair-trade table. Their circular supply chain capability leverages cutting-edge technologies and collaboration with Mastercard, Amazon Web Services, Everledger, and Mercy Corps to promote financial inclusion, empower consumers, and incentivize sustainable practices.

3. IBM

[12] The infrastructure of the IBM Science for Social Good program is built on the forefront of assuming that applied science and technology can solve critical problems faced by the world by accelerating the speed and exposure to find solutions through scientific methods. Being birthed in 2016, this program has given the opportunity to gather several renowned scientists, engineers, respected academics, and experts from a diverse range of nonprofit organizations. The result to date stands at:28 innovation-based projects, 19 partnerships,9 patents pending and several more.

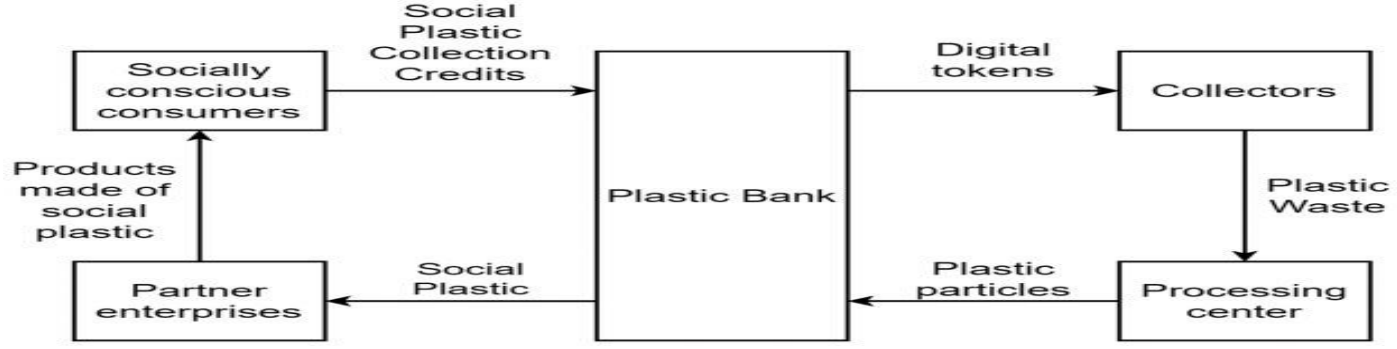
(i) Food Centres-

[13] IBM food centers facilitate farmers to accelerate their growth by constantly being in touch with each other and building trustworthy relationships. An accurate example of this can be tracing the coffee beans the moment they're picked. The traceability of the coffee increases the convenience on every front for everyone involved and this can very possibly be the Future of coffee beans. Traceability will help ensure that the coffee is being navigated in a sustainable and responsible way.



(ii) Plastic Banks-

[14] Plastic Bank's impact spreads over one billion individuals drowning in poverty and fighting to survive against the ever-growing plastic pollution. This transformative mindset leverages the power of the IBM Blockchain platform, helping communities not only gather but also exchange plastic waste for essential goods. Through this, Plastic Bank is not only acknowledging environmental concerns but also fostering an inclusive environment.



(iii) Cobalt Mining-

[15] IBM at its helm, is pioneering creative solutions to address the concerns circulating cobalt mining. By using blockchain technology to their advantage, they are aiming towards creating a system that is transparent and traceable in its approach. It monitors the cobalt's path from the minute it is extracted by smelters from the sites to the manufacturers. This not only minimizes pollution and health-related problems but also ensures proper handling throughout the supply chain.

IBM is applying blockchain technology to achieve the United Nations sustainable development goals with initiatives including Plastic Bank, which is turning plastic waste into a valuable currency, and Twiga Foods, which is increasing accessibility to microfinance for small farmers.

Although blockchain can't reduce waste production, it can definitely be used to connect recycling companies with other processing alternatives rather than landfills and can create a lack of transparency and accountability in waste management.

The problem of waste-

Americans alone contribute 728,000 tonnes of garbage to landfills every day, whereas, before 2018, China contributed at least half of the world's exports of plastic, paper, and metals. All these end up in landfills; many are thought to be recycled but are never and are left there for thousands and millions of years to decompose.

Fortunately, blockchain can help. This technology can help connect recycling companies with other processing alternatives than landfills, so when one company is burdened with a stockpile of recyclable materials, they can reach out through the blockchain's network to locate another company's or organization, which could help with it's processing.

How does blockchain solve this problem, and what are its benefits?

Blockchain does not have the capability to reduce the waste generated by the average American, but a system that uses radio frequency identification and QR codes on the trash bags or pieces of recycling sent to landfills could help ease and make the process much more transparent. This kind of technology can be used to build a connection between recycling companies and other processing alternatives like landfills.

Waste management is in a critical state.

Improved Transparency-

[16] Waste can be tracked using blockchain through the supply chain, from generation of waste to its disposal. This ensures responsible handling of waste and not filling up landfills. In application, when one company has a hefty immeasurable amount of waste that is recyclable in nature, they could reach out to the blockchain network to locate other members who process the remaining materials rather than disposing of them and generating waste. By creating a more efficient means of communication, blockchain could connect recycling companies to balance the burden of materials.

Accountability-

The current system unfortunately lacks a sense of accountability leading to frustration with recycling efforts. There is no digital transaction system to hold companies or individuals accountable for the waste created. Blockchain could integrate producers, consumers, and waste management operators into a network providing a view that is accessible and logical. Orthodox beliefs hold that the responsibility to reduce materials into landfills should be placed on producers of consumer packaged goods. Blockchain would distribute responsibility equally amongst everyone engaged in the cycle. Moreover Blockchain is a tamper-proof and foolproof making it a perfect fit to measure and accommodate waste reduction.

A consortium blockchain would give waste management and recycling observations to share data openly with w tamper proof ledger of destinations and recycling amounts.

This indisputable record would ensure accountability across the entire chain leading to a more prominent recycling process for early blockchain adopters for a clean future with all the challenges that come with tackling the waste epidemic, blockchain lays down the groundwork for scalable blockchain applications to reduce waste burden globally.

Agora Tech Lab-

Leverages policy ideas with blockchain technology working with the principality in Rotterdam in the Netherlands to register waste management-related transactions and integrating IoT systems to create a well-defined and monitored blockchain-based waste management system. Their digital tokens that reward recycling privileges can be redeemed for public and community services.

Swachh Coin-

It combines big data and IoT devices with blockchain-based networks to sort and segregate waste by playing the role of the technical developer to make the system seem as capable as possible to tackle the waste crisis.

Arep-

A subsidiary of SCNF located in France has utilized blockchain technology to track each station-based bin, updating continuously on the status of waste collection, its kind, and how it's circulated. This enables the managers to optimize sorting for different streams.

The Dutch Ministry for Infrastructure -

This organization acts as a role model for government agencies aiming to better their waste management procedures. It uses blockchain to improve transparency in waste in transit for the waste management industry, producing a solution to track waste from producers to landfills.

3. CONCLUSION/ DISCUSSION

Blockchain, as an emerging technology, has the potential to solve complex problems prevailing in society for years with increased transparency and efficiency. For instance, as discussed earlier, the management of public finances can be done with the help of blockchain, which also tracks the impact of donor funds. Whether it be sustainability, pollution, finance, the supply chain, voting, or whatnot, this technology holds the power to revolutionize all of this. Many organizations have started incorporating it in the initial stages to change the world for the better. The existing giants are also volunteering to use it for social causes, hence setting an example for other players in the market and initializing the use of this futuristic-seeming technology. This technology still seems too far-fetched to people, but it is actually the right time to start incorporating it into our lives. Everything has disadvantages, even though there are problems like how much it can grow and the rules around it. Plus, the big groups using blockchain ensure it can do incredible things in the world. We need to make sure we use this technology for good things and not bad, as we keep on going. Let's not let technology always be talked about as a stain on nature but rather as a companion to save nature.

4. LIMITATIONS

- Lack of proper conclusions
- [19]Coincidences can be mistaken for causal relationships, and it can sometimes be challenging to ascertain which is the causal variable and which is the effect.

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