Blockchain Technology as a tool for reaching the Sustainable Development Goals: SDG 9

José David Araya Navarro [1]

Abstract

The world is at the verge of extinction, humans keep destroying the only world they have although some of the experts say they should stop polluting and over exploding the natural resources to make a change and save it. Still, this has not become a popular behavior, however there are some advantages at that stubborn attitude, the technological development. Due to the imminent necessity of creating something new every day, the world is at its prime when referring to technological advances. Everything is becoming digital, but is it possible that these new trends help to solve the other crises? No one knows yet, however, these new technologies have shown a great potential at helping reach a balance in today's society. More specifically complying with the Sustainable Development Goals (SDGs) also known as 2030 Agenda, with the help of new trending technology like Blockchain. The paper looks to answer the following question, how this technology is being used to comply with the SDGs? For this purpose, a literature review was conducted to gather the information about this issue. Having as a result finding about modern processes involving the blockchain technology that will help reach this Agenda in the future especially regarding Goal number 9, about industry, innovation, and infrastructure.

Key words:

Blockchain; SDGs; Cooperation; Innovation; Technology

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As time goes by the world is entering into a more digital reality. Every decade, or even every year, comes with new technological advances that awe every person on the planet.

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1 Jose David Araya Navarro, Bilingual Bachelor's Degree in International Relations, ORCID: 0000-0002-5007-6690, Email: joda.130@gmail.com

A few decades ago, it was with the creation of the internet, then other devices appeared like cellphones, laptops, video game consoles, and similar. After that, the next steps taken were how to find a way to connect everyone no matter where they were, so they combined all the previous inventions and created a more globalized world. Now, this desire of humans to create new things has ended in the appearance of different instruments or tools by pure coincidence. Some examples are microwave ovens, penicillin, and even something as common as Coca-Cola.

Also, there are other cases that due to different circumstances, people have found out that some inventions can be useful for other tasks rather than their original purpose. As it was stated at the beginning, the world is turning every day more digitized, this has led to the creation of high tech that excels from the rest. A good representation of these two situations is "Blockchain Technology", most of the people relates it to financial transactions and cryptocurrencies. However, in the last few years, Blockchain has demonstrated an unimaginable potential at improving the quality of other tasks in areas that people won't think about. The essay would go through a simple definition of the technology, then its development regarding how it can be useful for complying with the Sustainable Development Goals. After that, it would look over the main challenges nowadays and final thoughts on the topic.

What is Blockchain?

Due to the high complexity of this technology, it may be difficult to explain it to someone out of the tech industry. Due to this knowledge barrier, IBM took the initiative and released a book "Blockchain for dummies" in which they explained the topic in a more comprehensible way. According to it, "Blockchain is a shared immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved." (Gupta, 2020, p.3). In regard to how it works, it could be compared to a Google Doc in Drive. In this document, you give access to other people, and they can see every modification that has happened in the paper as well as make real-time changes to it. Helping with the accountability of a system, since it has an accurate history that can't be changed.

Also, as Gupta (2020) explains, all Blockchain systems have four core characteristics that differentiate them from traditional transaction systems which almost only let the user see the current transaction in process. These are consensus, provenance, immutability, and finality. In the following table, each concept would be defined in a clearer way.

Table 1: Core characteristics of Blockchain Systems

Characteristic	Definition
Consensus	For a transaction to be valid, all participants must agree in its validity
Provenance	Participants know where the asset came from and holist ownership has changed over time
Inmutability	No participant can temper with a transaction after it has been recorder in the ledger
Finality	A single shared ledger provides one place to go to determine the ownership of an asset

Adapted from: Blockchain for dummies, by Manav Gupta. 2020.

Moving to examples of current uses of Blockchain systems, it is possible to find information from important tech enterprises like IBM. Its Blockchain system operates in different areas and different countries all around the world. They are involved in financial services through aspects like trade finance in which they created a platform called We.Trade facilitating trade between small and medium companies in Europe.

Also, through improving the digital identity security they made the SecureKey system that is used in Canada. IBM Blockchain is also involved in areas like Supply Chain Management, Healthcare, and Media and entertainment. In regard to Healthcare, they are impulsing a program for better accountability and control of the COVID Vaccines distribution and application as IBM (2021) explains. For media and entertainment, they have improved the advertisement system so that the media reaches the right people and then the market wins from that effectiveness.

Blockchain and SDGs

After learning the basics of what Blockchain is, it is important to present how this system could be used for reaching the Sustainable Development Goals established by the United Nations. In 2016 the United Nations Conference on Trade and Development (UNCTAD) released a report called Trading into Sustainable Development: trade, market access, and the sustainable development goals. In this document, they describe a series of situations that need to be addressed in order to comply with the SDGs in the international trading area. It highlights issues like how to connect trading and SDGs and refers to trading barriers specifically relating to tariffs and trade costs.

As it was explained earlier Blockchain is the finest system at tracking assets and transactions, it doesn't mean that the assets need to be digital to be registered. As Gupta (2020) explains, when trading there are different parts involved, and most of the time each actor has their ledger making it difficult and inefficient to synchronize all the information from each party, the same happens in supply chains. With a Blockchain system, each party would have access to all the information allowing them to trace everything at every moment making it easier for transactions to be completed.

Using more effective systems in terms of inventory, client registration, and financial transactions would be translated into fewer costs. But not only financial costs, it would also mean a reduction in time and resources for a transaction to be completed, in both virtual and physical sense. As the WTO (2018) explains the transactions in global trade involves costs like transportation, logistics, information and transaction costs and trade policy barriers costs. With Blockchain acting in these areas, the systems would be improved. Some examples are by eliminating duplicated processes or making verifications and payments quicker to complete. Additionally, as the WTO (2018) mentions, these cost reductions would boost the international trade system, since the participation of micro, small and medium-sized enterprises (MSMEs) will increase. Reaching a higher compliance with SDGs related to decent work and economic growth (G.8) and industry, innovation, and infrastructure (G.9)

Referring to the second main obstacle that the UNCTAD report presents a link between tariffs and SDGs. "The 2030 Agenda for Sustainable Development (hereafter referred to as the 2030 Agenda) stipulates that the reviewing and monitoring of the progress made towards the SDGs at the global level will benefit from global indicators."(UNCTAD, 2016, p.21). The quote mentions global indicators. Tariffs, in this context, can be used as a global indicator for access to trade for example. These barriers limits the capacity for countries to promote the SDGs in their territories, causing a delay in the whole world.

So, the Blockchain systems allow permanent traceability of transactions or data, this information would never disappear, and no one can make changes to it. This means that a system for this purpose would allow the UN authorities to look at inconsistencies in the progress of the different countries in regard to the SDGs. As Glahn (2017) say, part of the major limitation of the International System programs is that states comply just when their interests are aligned with those rules. However, with better control, UN authorities could insist on the different countries to impulse the SDGs by showing them data of how they could progress quicker in this project.

For the last issue presented, regarding the relation with trade costs. As it was explained before, using the Blockchain system would reduce costs. The first examples given were general to support the argument about economic growth. Now referring to a specific application, "The cost of trade documentation is estimated to reach one-fifth of the actual physical transportation costs because different supply chain participants rely on vastly different systems to process transactions, often slowing or completely stopping

the movement of goods."(Gupta, 2020). Definitely, no one can argue with numbers and tangible evidence. Integrating all the information in the same place, but at the same time assuring security and privacy is almost the perfect solution for this issue.

Another interesting element that could develop a more efficient trading is the "Smart Contracts". This tool lets you create a set of rules that will apply to the transaction between the parties you choose. It is stored in the Blockchain and would be activated automatically for your transactions, reducing, and facilitating all the negotiations between the actors involved.

Creating Trust in Blockchain

As people say you should trust actions not words because companies that use or promote the Blockchain systems say that they are extremely secure. But as it is known, new technologies always tend to cause mistrust in the people, in this context it's even more worrying due to the decentralization of the system. Some people could think that it makes the system more vulnerable, however, if you look at a real application of the system, then the evidence is undeniable.

Taking the most known case, Bitcoin, it is possible to see how the interest in Blockchain grew at the same rate this cryptocurrency gained a place in mainstream society. Just for a little bit of context according to official data, in this case from the respected platform Statista (2021) there are over 18.8 million Bitcoins in the market. Each coin is valued in a little bit over 41 thousand dollars, meaning that the market cap when writing this essay was nearly 850 billion dollars, data valid for the middle of September. Still is quite rare for robberies through hackings to happen. Also, there are reports for Bitcoins to be lost forever, this due to the reason of people losing their access to their "accounts". Meaning that no one can access it, and what was stored inside would be there forever, but no one would be able to manipulate it. This validates the affirmation that the Blockchain systems are extremely secure.

Also, it's important to highlight how its strengths could become into the worst nightmares for the people using the system, as it happens when private keys are lost. Showing how the people must be aware of what they are getting into.

Furthermore, the UNCTAD Secretariat (2020) also published a document called Harnessing blockchain for sustainable development: prospects and challenges. In this report, they address all the possible impacts of adding Blockchain technology to the chase of the SDGs. What's more interesting is that they give examples of projects that are being used or in final phases for each of the seventeen goals, all of them based on blockchain systems. Some of them are the creation of digital identity in India for people that do not have birth certificates or official identifications. The idea is that they with this system could access government services and subsidies.

Also, the project aiming for Goal #7 ensures transparency of the system of interactions and data exchange between electricity companies, as well as consumers. What all these tell is that the authorities are willing to work with any technology if it represents an improvement in the current reality that humans are living. There is enough evidence to trust the system and to promote its development for the next few years.

Challenges for Blockchain

To produce a change and to help in the race of complying with the 2030 Agenda, this technology must overcome certain difficulties and improve in other areas. As it was exposed before, some important institutions and countries support and are using this system for their activities. Adding to this, promising projects that have as their main goal helping people in need are based on this technology. Still, it's necessary to insist that if people want to take all the possible benefits from this technology they have to develop it as much as possible. Based on all that, some of the challenges are:

Culture:

humans have demonstrated that change is something difficult, there are always people that believe that moving to new technologies is not necessary. Making it longer and more complicated to establish the best policies to reach this type of transition. Especially when they must trust a decentralized network rather than an established institution as Swanson (n.d) says. Also, history has shown that the technological developments play an important role in human evolution, one example is transportation like airplanes. They got to reduce travel times considerably, nowadays, all the digitalization with professional and academic purposes can be an example. How a global pandemic didn't stop the people from attending to classes or meetings.

Talent:

every technology needs to be developed and taken care of by experts. Due to how relatively new this Blockchain technology is, there are not enough engineers or people in general trained in the topic to move everything into this system. Universities and other institutions must start establishing the best possible academic programs so that in a few years it could be easier to reach a transition. Also, it would help to create new and better applications for the technology. Along with this, tech companies could find a market gap at preparing freelancers or students in the area so that they work for them at finding all the potential of this technology.

International Cooperation:

for the system to be effective in aspects like global trading or studies based on international data, big powers must take the initiative and start debating on how to create the best projects for the benefit of the whole system. It is known that International Programs normally have issues, especially in the sense of funding and budget. However, if there's good planning and solid strategies, developing this technology could even work as expense relief for these big powers, while helping the developing nations. In the future it could even work as a transparency seeker, like generating a global information center about each country. Making it easier to interact with each other.

Common knowledge:

when people start studying something they familiarize with it and get use to their usage or constant presence. That's one of the biggest detractors of such a different technology like Blockchain, just a small group have the right and enough knowledge to understand it properly. This generates misconceptions in terms of security or reliability, meaning that the system, as a whole, would not reach its development potential. The solution comes from the problem, literacy in the topic is what the world needs, Tech universities are the first options at spreading this knowledge.

Diversification:

when companies reach a considerable size and influence in their market, they start looking for new products or services in which they can make a difference and grow more. This is commonly known as diversification, and its main goal is to increase the exposure or importance of the company's name. This can be applied to a technology like Blockchain, currently its more known usage it's in cryptocurrency. As it was discussed earlier, this whole digital concept is complicated and not accepted by everyone. For this reason, looking to develop the technology in more popular areas would cause a positive impact and create more approval by the masses.

Promotion:

as any product or service, Blockchain technology needs to be promoted and advertised, it happens now but, the advertising aims only for the people that have certain relation with the technology. That's one of the reasons of highlighting these specific challenges, because they are related with each other. If more people know about it, it will start becoming a part of the daily life which would impulse its development. Meaning that more people would be needed to work in it and try to explode its potential by diversifying its impact areas.

There are more challenges for this technology to be an everyday tool in the mission of complying with the SDGs. However, for the sake of this essay the ones mentioned are believed to be the most important to reach a future relevant development in this process of sustainability.

Conclusions

As it was mentioned before, this paper has the intention of presenting a relatively new technology as a tool for reaching the sustainable development. Considering the characteristics of it, the most accurate goal for it to be related with is Goal 9, about industry, innovation, and infrastructure. In this sense the paper explains what the technology is and how it can be related to that SDG. Also, it is mentioned how it can indirectly help increase the compliance with other Goals. It's important to highlight how the paper look at the status of the technology, establishing certain challenges for it to be fully useful to the cause.

International cooperation between countries and International Organizations is essential for progressing in this common objective. It would also help in the creation of different policies, systems, and technologies that could have a positive impact on the whole situation. Thanks to this, is why a technology like Blockchain could have an important role in the next years. Its core characteristics place it as a promising tool for improving different areas like international trading and resources distribution that would help reach sustainable development.

Some of the challenges have to do with the fact that it is based on a decentralized network, an aspect that makes some people doubt its security. Also, another aspect that could stop big industries to accept this technology is the fact that it assures transparency in every transaction realized. This means that there is no way to hide or manipulate any data that enters the network. As it is known, corruption is still a major issue in today's society, so Blockchain may find some detractors under this unfortunate aspect.

It is important to highlight that the purpose of this essay is to present Blockchain technology as a tool for improving administrative processes that already exist, which would also develop higher compliance with the SDGs as it was explained before. This by giving examples of current companies like IBM that already use the technology and is causing a positive impact in terms of efficiency. Also, if you look at history, new technologies have always looked for making life easier, or they have helped to solve different issues that humans have confronted. Understanding that, there's evident optimism in the essay about the possible impact of the technology in next year. It is also intended to encourage people to research about new technologies no matter if they are not in that professional area. It is always important to be informed about the current trends and what could be part of your daily life tomorrow.

Recommendations

Following the same line of thought of the last paragraph, it's important to contribute with more than just a simple "go and search about it" when there's people that have no idea where to begin. That's why, some suggestions would be given in order to help the new learners get the topic in an easier way.

One of the best techniques to understand new information is looking at it through something familiar and how an innovative technology can help improve this market or area. For this reason, the following suggestion would be related to two general topics. The first one being about the Sustainable Development Goals. Even though it's a trending topic, some people may not be completely aware of them or what they are. That's why it's important to do some research about them. The best way is by visiting the official site of the United Nations. There you can find all the information of the 17 goals and their proposals.

Following that first step would make it easier to comprehend or find how Blockchain could help reach the different goals. After that first insight into the topic, it's necessary to go into Blockchain technology. The first case would revolve around music, specifically the music streaming services. According to Statista (2021), for the first quarter of 2020 existed over 400 million subscribers to stream apps.

Sadly, these apps don't help the artists at giving them just a few thousand dollars for every million reproductions of a song. That's why different companies have developed streaming services using Blockchain Technology to reduce expenses and have a more efficient data control so that the artists profit more from their music. In the end, this gives the opportunity to grow and produce even more music. Here it's possible to identify a current appliance of one of the concepts described in the paper. It refers to how reducing cost can develop more profit for the parties involved, as well as a better distribution of the resources.

Another potential area of improvement and growth due to Blockchain is online gaming. As Hollerith (2021) explains, the Blockchain-based gaming is increasing exponentially. Currently the most popular games have certain relation with cryptocurrency, since they are using an NFT system which means non-fungible token.

The Ethereum's website (2021) says that "NFTs are tokens that we can use to represent ownership of unique items. They let us "tokenise" things like art, collectibles, and even real estate. They can only have one official owner at a time no one can modify the record of ownership or copy/paste a new NFT into existence."

These properties have caused games where you buy a certain digitalized object, get trending. Also, other people use it for selling art, pictures, and whatever they feel may have accepted through the masses. For some people all this may sound crazy, but it works as anything that it's available on the market, if many people want it, its price will go up. The only difference is that it's a digital object.

Looking at these examples, it's possible to notice two aspects. The first one is, how most of the objects that were traded physically in the past, people have made them digital and know they trade them through the internet. What people must understand is that the value is given by the acceptance of the masses, as what happens with the cash everyone uses. It's necessary to go deeper and realize how these innovative ideas can also be applied to reach the SDGs, maybe in other contexts like education or for financing welfare programs.

Second, it's imperative to highlight how Blockchain can be used in any market. In the end, it's important to remember that everyone and everything is connected. Some people may think that all these examples, or even all this context isn't related to the SDGs and the world's welfare. But the truth is that if some technology can make a market more efficient, then all the people in that market would benefit from it.

Also, there are more than financial benefits, it could be through knowledge, time, justice or even joy, the core idea is that by accepting that everything is somehow connected, then if a system that helps people is improved, the outcome would be that more people would take advantage of it. That's why, every area in which Blockchain is developed it's important. Not forgetting that the main intention is to use this technology as a tool to reach the Sustainable Development Goals.

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