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## THE VALUE OF BLOCKCHAIN FOR SUSTAINABLE DEVELOPMENT GOALS AFTER COVID-19

*After the devastating effects of the COVID-19 epidemic, countries around the world are racing to overcome these challenges and reach the Sustainable Development Goals by 2030. In many vital areas, such as finance, global supply chains, international trade, healthcare, and insurance, blockchain is predicted to create significant changes and transformations. Our paper attempts to explore how Blockchain technology could be used to curb COVID-19 challenges and how it could accelerate the achievement of SDGs from several perspectives. A qualitative approach is adopted in this study to examine the effectiveness and contribution of Blockchain projects on the social, economic, ecological and development fronts. To do so, we examine the number of Blockchain projects created by the United Nations and compare it with that created by international corporations according to several factors. The results show that UN Blockchain projects are more aligned and consistent with the SDGs. However, the Blockchain projects adopted by the sample of international corporations focus on economic and political aspects. Such results raise awareness regarding the framework and module that should be regulated on a global scale regarding any Blockchain project. As a result of this study, we conclude that blockchain technology has numerous benefits and characteristics that enhance credibility and accelerate achieving the SDGs. However, international corporation should rationalize their adoption of blockchain projects and keep pace with their application based on criteria that strike a balance between economic and economic goals. Whether it's multinational corporations or international organizations, the key to achieving the Sustainable Development Goals is coordinating and communicating, and the quickest way to achieve that is by adopting a common model for blockchain implementation.*

**Keywords.** Blockchain, Sustainable Development Goals, COVID-19, Corporate Social Responsibility.

**Introduction.** The spread of the COVID-19 pandemic to all parts of the world has created an economic, health and social crisis for international organizations and governments. As a result of the strict health measures taken, the supply chain in many sectors has been interrupted. Additionally, express money transfers and delivery services have been disrupted. Furthermore, mass media and false information regarding health statistics and numbers of injured, and the method of controlling endemic areas and vaccination procedures are added to this mix. The global economy's negative impact of the pandemic disease, called COVID-19 by the World Health Organization, is far beyond estimates. A study by WHO predicted that the global economic damage caused by the pandemic would total around 8.1 trillion dollars after the pandemic is over (WHO, 2020). The report prepared by the World Economic Forum in 2020 stated that trade and supply chain systems could collapse within weeks due to the COVID-19 global pandemic and that a technology such as Blockchain is needed for the solution (WEF, 2020). In dealing with the new learning mechanism, the shift to e-learning, one of the challenges was how to deal with it. Furthermore, the health sector was severely affected by the COVID-19 crisis, so it had to deal with numerous challenges, including constant supplies of medicine and health equipment (AKalla, Hewa, Mishra, Ylianttila, & Liyanage, 2020). Ziyong Fan, who served as the Head of Digital Commerce at the World Economic Forum, claimed that "Blockchain will enable the effective operation of the global supply chain, the importance of which is understood even more in times of crisis" (Gaur & Gaiha, 2020). He added that with the use of Blockchain in the supply chains, businesses in Western Europe could save 450 billion dollars in logistics costs. Additionally, suppliers can control their data

with the help of Blockchain and distribute them securely to other users in the Blockchain network without any delay.

The international community is collaborating with various governments to confront the COVID-19 pandemic and other pandemics and consolidate SDGs at all levels. The use of rapid technological progress, particularly at the level of Blockchain, could assist in reconciling global challenges and opportunities. Due to this, questions can be raised regarding Blockchain's efficacy in resolving economic, social, and health challenges. Further, to what extent does the United Nations and the rest of the world use Blockchain to direct efforts towards the SDGs?

There is a strong connection between blockchains and Sustainable Development Goals in literature and practice, but the Covid-19 pandemic that hit the world in late 2019 has made this connection even more substantial. Although international companies and businesses are increasingly adopting blockchain technology, however, most of the projects are driven mainly by economic and political factors. Social and ecological goals are not taken into account here.

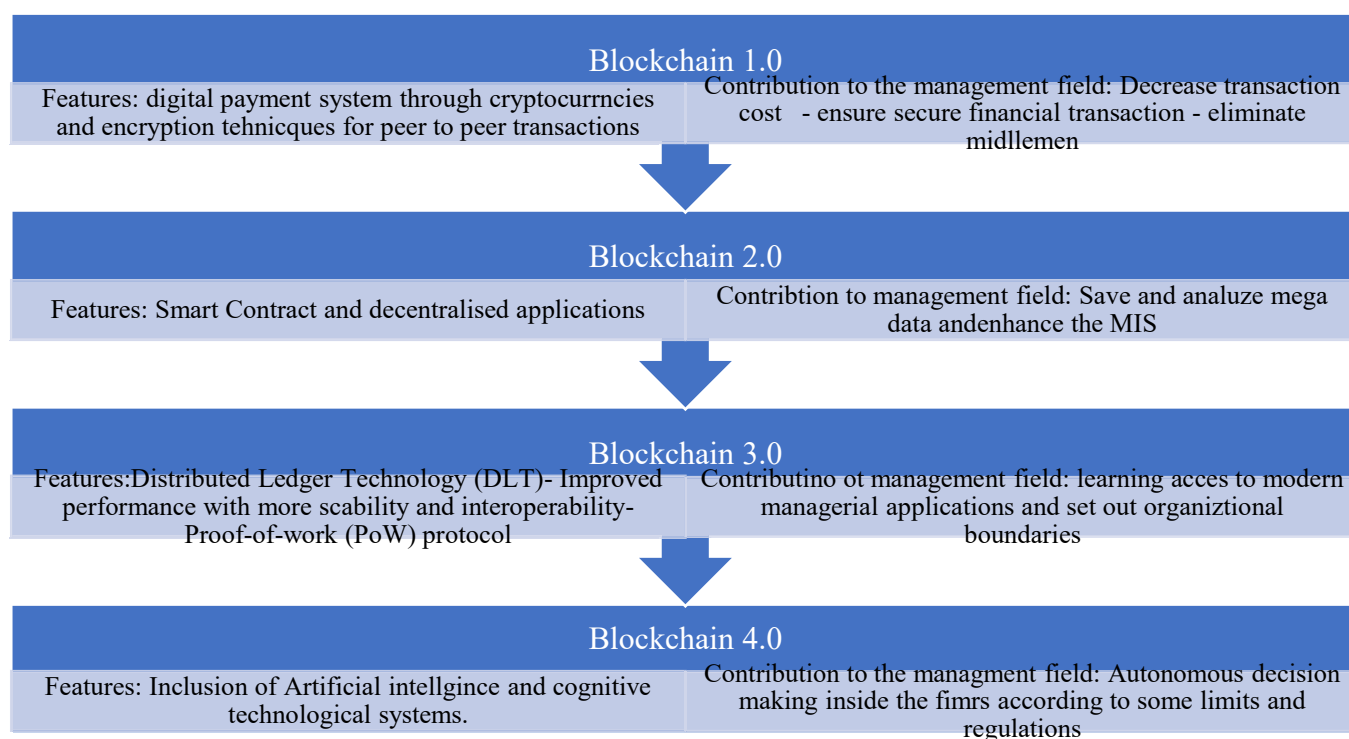
**Purpose.** The aim of this study is to align and direct international companies to adopt blockchain projects for not only economic and political goals, but also social, health and development goals, similar to the United Nations, which aims in its projects on all the goals stipulated by SDG.

**Literature Review.** Recent publications have shifted their focus away from the technical or financial aspects of Blockchain and have emphasized its role in sustainable development and supporting CSR projects. The United Nations introduced a concept for titled The Three Dimensions of Sustainable Development that involves social, economic, and environmental aspects. Today, more researchers use Blockchain to achieve Sustainable Development Goals through CSR projects. Tradition business practices are no longer sustainable; digital technologies must be employed to achieve economic, environmental, and social sustainability (Fraga-Lamas & Tiago , 2020).

It is considered by majority of scholars that blockchain has several characteristics that are relevant to the Sustainable Development Goals: (1) the ability to trace actors, roles, and participants in general, which promotes social responsibility and resource management inherently; (2) providing third parties with resilience and security prevents unilateral manipulation, ensuring accuracy in the surveillance of actions within Blockchain while employing smart contracts and corporate strategy to validate the actions that happen within the system (Jayawardhana & Colombage, 2020).

Since the beginning, strategic corporate social responsibility research struggles to synchronize with the mainstream schools of thought on corporate strategy, trying to catch the running away train. To start with, in the golden age of the strategic planning era, it was reasonable to look for ways to internalize CSR policies, programs and projects into the measurable value creation processes inside the firm (Lee & Jeanne , 1996) (Husted & David , 2009) (Mauricio , Jóhannsdóttir, & Davídsdóttir , 2019). Furthermore, it was suggested that the important potential of CSR internalization is hidden within reciprocal stakeholder responsibilities (Arora & De, 2020) (Lantos, 2001) ( Montiel & Delgado-Ceballos, 2014) and corporate culture (Hawkins, 2008) (Lantos G. , 2001). Eventually, some effort was invested into the identification and validation of the “CSR-inside” strategy development principles and dimensions (Burke & M.Logsdon, 1996) (Heslin & Ochoa, 2008) (Husted & Allen, Strategic Corporate Social Responsibility and Value Creation, 2009), as well as the exploration of the theoretical background of cost-benefit analysis and transaction costs analysis for the optimization of the firm’s level of CSR (McWilliams & Siegel, 2001) (Orlitzky, Siegel, & Waldman, 2011). Simultaneously, significant attention of the researchers was assigned to examining the link between strategic CSR and a firm’s financial performance (Belu & Manescu, 2012) (Prashar, 2021) (Saeidi, Sofian, & Saeidi, 2015) in parallel with nurturing responsible competitiveness concept (McWilliams & Siegel, 2001) (Porter & Kramer., 2006) (Zadek, 2006). These undertakings were accompanied by occasional allusions to the role of leadership (Orlitzky, Siegel, & Wal, Strategic corporate social responsibility and environmental sustainability, 2011) and organizational change (Heslin & Ochoa, 2008) in the strategic CSR implementation. Overall, these studies identified a good enough array of important managerial tools and internalized factors that should be considered in the process of sustainable corporate strategy creation. But the gap, the most of the literature reviews haven’t considered how the Blockchain features could enhance the corporate strategy and CSR approaches. Through figure 1.0, the Blockchain evolution have

contributed to the value creation inside the firm. Blockchain 1.0 optimized and increased the efficiency of the Management Information system with increasing strategy regulations in multi-domain deployments (Tandon, Kaur, Mantymaki, & Dhir, 2021) (Xu, Chen, & Kou, 2019). Regarding the second phase of the Blockchain evolution “Blockchain 2.0” it contributed to the data analyzing of reports and archives issued by the UN bodies and multinational organizations (Efanov & Roschin, 2018). As for the Blockchain 3.0, it contributed to record and track managerial changes among several financial and non-financial factors inside the firm (Akram, Malik, Singh, Anita, & Tanwar, 2020).



**Figure 1 – The Historical development of Blockchain applications and its contribution to SDG**

*Source: Done by the author, data collected from (UNCTAD, 2021).*

Blockchain 1.0 is able to reduce transaction costs since it eliminates middlemen from the supply chain. Blockchain 2.0. uses smart contracts, managers are able to take control over the rules of the game, and stakeholders without even knowing each other can trust each other.

Blockchain 3.0 provides component components that would be handled by the focal organization and must be shared. It Incorporate new parties into a network and include learning access to new capabilities and technologies. Organizational boundaries can be change, allowing for customized constellations that will generate value in a preferred manner. The innovativeness of a service or the time to market of a new product may be improved.

Blockchain 4.0 is the result of combining blockchain and Artificial Intelligence. Thus, systems are able to make decisions and take action without direct human intervention. By definition, management can either (tightly) define parameters or (loosely) dictate areas in which blockchains are allowed to operate. Although there is some management control and decision making, the focus is on defining directions rather than executions (Angelis & Silva , 2019).

As a catalyst for sustainable development, Blockchain appears to be a viable option. In theory, DLT projects designed for the public good would support the United Nations' current Sustainable Development Goals. This ambition to effect positive change could be turned into a reality through the practical application of Blockchain technology (Kewell, Parry, & Adams, 2017).

Based on the twin pillars of sustainability: responsibility and governance, Asanga Jayawardhana and Sisira Colombage have undertaken a qualitative study of Blockchain technology/cryptocurrency and sustainability (Jayawardhana & Colombage, 2020). As a result of an exploratory review using

Blockchain technology/cryptocurrency and sustainability, many actual and trial applications for corporate social responsibility have been identified.

Many of these applications have also been developed by various agencies across the globe. Corporations have used corporate social responsibility and Blockchain to address sustainability issues.

According to various studies, Sustainable Business Models "SBM" can be radically changed by Blockchain systems and leaders and managers are able to integrate Blockchain technology into their business activities to support the development of SBM (Tiscini, Ferrari, Ciaburri, & Testarmata, 2020).

Therefore, the Blockchain provides a fast and safe way to transfer money around the world. International organizations, particularly government agencies and UN associations, benefit from transferring funds around the world to support charitable donations and sustainable development projects. Furthermore, the Blockchain will allow users to gain the advantage of trust in collecting information and data and avoid unreliable information from the mass media. In turn, reliable and accurate reports can be prepared.

Third, Blockchain technologies and programs consolidate the principle of administrative decentralization. Consequently, multinational companies and United Nations agencies will be able to exchange information and coordinate between their branches in different countries.

In the financial, media, and administrative sectors, the Blockchain facilitates, speeds up, and reduces costs. It facilitates the sharing of intellectual resources as well as reducing costs. As for that, majority of academicians and scholars in the domain have investigated the features of the blockchain technology and its achievement and effectiveness on sustainability (Aysan, Bergigui, & Disli, 2021) (Angelis & Silva, 2019) (Horner & Ryan, 2019) (Porter & Kramer, 2006) (Akram, Malik, Singh, Anita, & Tanwar, 2020). Other have investigated in the theoretical justification for SBM technological innovation offered by Blockchain and SBM innovation (Efanov & Roschin, 2018) (Xu, Chen, & Kou, 2019) (Tiscini, Ferrari, Ciaburri, & Testarmata, 2020). However, there is an urgent need to investigate in which direction the multinational corporation are using Blockchain technology, and to measure and compare the implementation of Blockchain projects between multinational corporation and United Organizations. The purpose behind this comparison is to align the long-term goals of multinational corporation with the sustainable Development Goals that were issued by the United Nations.

**Research Methods.** As for the methodology part of the study, a quantitative approach has been used to account the number of Blockchain project adopted by United Nation, and classify them into social, economic or ecological goals aimed to be attempted. On the other hand, Blockchain projects adopted by the multinational organizations has been accounted, and classified simultaneously. The aim is to compare the number of projects attempted by the UN with that by the multinational organizations. In addition, the aim is to compare between the goals attempted by UN and by multinational organizations. On the account of United Nation Office for the Coordination of Humanity Affairs, data has been collected regarding the Blockchain projects implemented by the United Nations (United Nations, 2022) (OCHA, 2020). Regarding Blockchain projects implemented by multinational organizations, data has been collected from the digital-impact-governance-initiative (Tillemann & Goldstein, 2021) which is responsible for tracking Blockchain ledgers and systems worldwide and from Deloitte's 2020 Global Blockchain (Deloitte, 2021).

On account of the 2030 Agenda (United Nations, 2022) and the numerous strategic calls for innovation it has accompanied, several international organizations have taken the lead and are exploring the use of Blockchain applications, mainly for operational purposes (Jayawardhana & Colombage, 2020). Mainly, the data has been collected by reports. As part of the UN system, standards are being developed, legal implications are being explored, and Blockchain pilot programs are being conducted.

Currently, several organizations use Blockchain technology for projects and operations, individually and collaboratively. These are just some of the ongoing use cases at the field level, such as supply chain, payments, livestock tracking, and digital identity (Medaglia & Damsgaard, 2020). Some organizations are considering using Blockchain in the future, even if they do not use it today. Blockchain innovations will increase their interest (Dumitriu, 2020). A system-wide discussion on innovation involves the UN Innovation Network, investigating Blockchain technology, a technology that gives various UN agencies a platform for sharing information and advancing the discussion. Several UN

agencies have embraced Blockchain technology since its inception (United Nations, 2022). The agencies use applications of different maturity levels. Those accomplishments, challenges, and lessons learned will help establish a foundation of knowledge and guide multinational businesses and UN-affiliated organizations to use Blockchain technology (OCHA, 2020).

To compare the role of the United Nations and multinational companies in consolidating Blockchain projects to accomplish the Sustainable Development Goals, Table 1, Table 2 and Figure 2 below highlight the numbers of international projects for each Sustainable Goal and sphere. The purpose of this methodology is to examine how United Nations institutions and multinational companies utilize Blockchain technologies to meet sustainable development goals and pursue related projects.

**Table 1 – The number of projects based on Blockchain technology established by the multinational corporations during the COVID-19 pandemic. Source: edited by the authors, data collected from (Tillemann & Goldstein, 2021)**

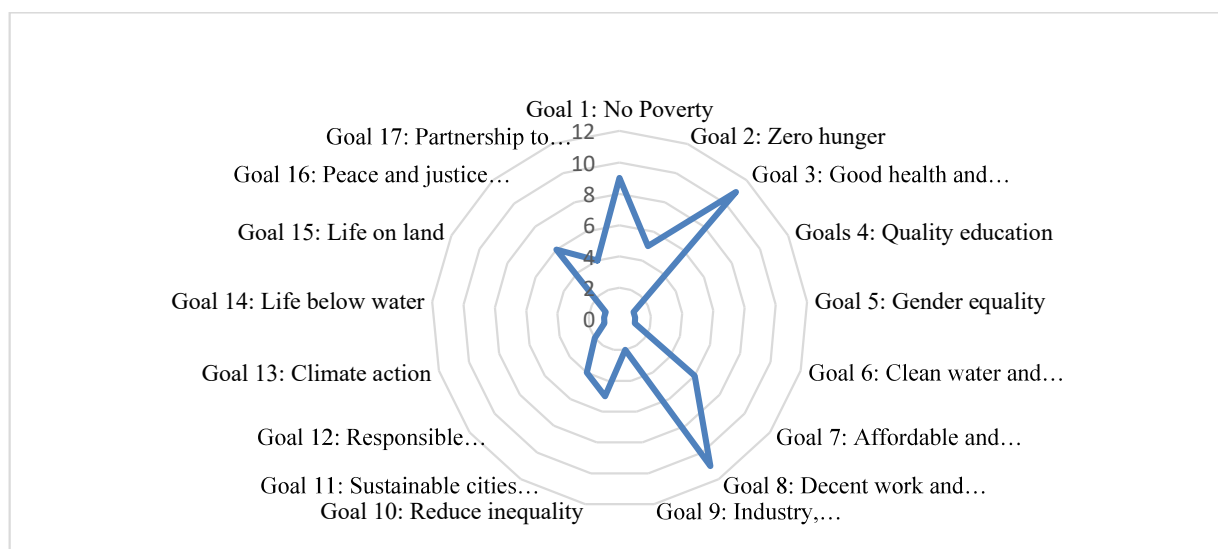
Name of the projects/ Providers Name of multinational Corporation	Number of DLT projects established by Multinational organisations	%	Sphere Targeted "Economic, Political, Social, Ecological"
Everest/Everest; Give Foundation/Give Foundation; Mojaloop/Mojaloop; Unblocked Cash/Oxfam Australia; Plastic Bank/Plastic Bank; Rohingya Project/Rohingya Project; Dubai Blockchain Platform/Smart Dubai; Sweden Lantmäteriet Land Registry/Sweden Lantmäteriet Land Registry; Bait to Plate: Sustainable Tuna Tracking on Blockchain/World Wildlife Fund	9	12.7	Social
Token Coffee/Moyee Coffee; Unblocked Cash/Oxfam Australia; Provenance/Provenance; Building Blocks/World Food Programme;	5	7.0	Social
Worker Health and Well-being Survey/Blockchain Trust Accelerator; Trustee/HIE of One; Unblocked Cash/Oxfam Australia; Prescripto/Prescripto; VaccineLedger and FoodLedger/StaTwig; BOND-I/The World Bank Group; Knorr Farm-to-Fork/Unilever	11	15.5	Social
GiveTrack/BitGive;	1	1.4	Social
BOND-I/The World Bank Group	1	1.4	Social
BOND-I/The World Bank Group	1	1.4	Ecological
Grid Singularity D3A/Grid Singularity; Brooklyn Microgrid/L03 Energy; Pylon Network Project/Pylon;swytchX/swytchX; Technical University of Moldova Project/United Nations Development Programme	6	8.5	Ecological
BitPesa/BitPesa; Circular/Circular; Trustee/HIE of One; Power Ledger/Power Ledger; PUBLIQ Blockchain Distributed Media/PUBLIQ Foundation; swytchX/swytchX; Responsible Sourcing Blockchain Network/ IBM; Mojaloop/Mojaloop; Blockcerts/Blockcerts; Trusted Lending Circles/Trusted Lending Circles; Rohingya Project/Rohingya Project; PUBLIQ Blockchain Distributed Media/PUBLIQ Foundation;	11	15.5	Economic
Ripe.io/Ripe.io	2	2.8	Economic
Grid Singularity D3A/Grid Singularity	5	7.0	Social
Grid Singularity D3A/Grid Singularity; Brooklyn Microgrid/L03 Energy; Nori/Nori; OS City/OS City; Power Ledger/Power Ledger; Title Registry and Blockchain Real Estate Transaction and Listing Platform/Propy; Dubai Blockchain Platform/Smart Dubai; swytchX/swytchX	4	5.6	Economic
Worker Health and Well-being Survey/Blockchain Trust Accelerator; Responsible Sourcing Blockchain Network/IBM; Token Coffee/Moyee Coffee; Nori/Nori; BlocRice - BlockChain For Livelihoods From Organic Cambodian Rice/Oxfam in Cambodia (Oxfam Novib); Plastic Bank/Plastic Bank;	2	2.8	Economic
Grid Singularity D3A/Grid Singularity; L03 Energy/Brooklyn Microgrid; Nori/Nori; Ripe.io/Ripe.io; swytchX/swytchX;	1	1.4	Ecological
Pacifical MSC Sustainable Tuna Blockchain/Pacifical; BOND-I/The World Bank Group; Veridium Labs/Veridium;	1	1.4	Ecological

Nori/Nori; Blockchain Land Registry Project/The National Agency of the Public Registry, Republic of Georgia; Veridium Labs/Veridium; Verified Organic/Verified Organic	1	1.4	Ecological
Sovereign/Democracy.Earth; Everest/Everest; Blockchain on the Move/Flemish Government's Programme for Innovation Procurement; Academic Certificates on the Blockchain/Academic Certificates on the Blockchain; Blockcerts/Blockcerts; Stacks Blockchain/Blockstack PBC; South Australia Election Project/Horizon State; Democracy Notary/National Democratic Institute; Blockchain-based mobile voting/Office of the Secretary of State, West Virginia; Democracy Anchored/SettleMint; Dubai Blockchain Platform/Smart Dubai	6	8.5	Political
Disperse/Disperse; Electron Tomography Database/Electron Tomography Database; Identity Provider Services/Identity Provider Services; Stacks Blockchain/ Blockchain PBC; Sovrin Protocol/Sovrin Foundation; Building Blocks/World Food Programme; Coinsence/Coinsence Services; Zug eID/Zug eID;	4	5.6	Political

**Table 2 –The number of projects based on Blockchain technology established by departments in the United Nations organization during the COVID-19 pandemic. Source: edited by the authors, data collected from (WHO, 2020) (OCHA, 2020) (Tillemann & Goldstein, 2021).**

Name of the projects/ Providers UN organisations	Number of international DLT projects	%	Sphere Targeted "Economic, Political, Social, Ecological"
Ethereum Classic/UNICEF Venture Fund Atix Labs Argentina bitcoin / UNICEF investment Co. W3 Engineers Bangladesh Ethereum / UNICEF Venture Fund;	3	7.3	Social
Public blockchain proof-of-work Consensus /Food and Agriculture Organization FAO; Hyperledger blockchain / UNDP Ecuador Office; Building Blocks / World Food Programme;	3	7.3	Social
Health information exchange / World Health Organization; UNFPA is considering the use of blockchain technology in the context of registering childbirth and health supply chain management / UNFPA; Digital health storage of patients' medical history through the eHealth system / UNRWA	3	7.3	Social
Stellar Consensus Protocol for transaction verification / UNDP Serbia office; Resource mobilisation: informing the general public about UNESCO projects and allowing donation of funds using smart contracts. / UNESCO; Educational certification: an option to open education credentials to potential employers / UNESCO	3	7.3	Social
Ethereum Blockchain-based cash transfer test in the Kakuma refugee camp in Kenya / UN-Women; Child rights: potential applications to protect children's data, manage digital identification and/or create and manage digital credentials / UNICEF IrisGuard biometric technology / UN-Women	3	7.3	Social
DLT combined with the Internet of Things sensors for water management / UNESCO World Water Assessment Programme Ethereum Mainnet / WFP	2	4.9	Ecological
CarbonX for reductions in greenhouse gas emissions into a cryptocurrency/WWF; Pilot Programme in Pakistan / WFP; Blockchain space / United Nation Environment programme;	3	7.3	Ecological
Permissioned/private Blockchain, based on Hyperledger Indy / UNICC Blockchain and machine-learning technology provide immutable records of transactions for pension recipients/UNJSPF Digital signatures and smart contracts / ILO	3	7.3	Economic

iSKY Solutions / UNICEF Kazakhstan Technology support: Blockchain Learning Group / UNDP	2	4.9	Economic
Voucher transfer / UNRWA Child rights / UNICEF	2	4.9	Social
Anchoring on a blockchain for tracking the ownership of parcels of land in Afghanistan / UN-Habitat Postal supply chain / UN Economic Commission for Africa	2	4.9	Economic
Stellar Consensus Protocol for transaction / Office of Information and Communications Technology eWallet / UPU Postal supply chain / UPU	3	7.3	Economic
Weather data exchange / UMO Ecosystem of intellectual property / WIPO Online dispute resolution for consumers / UNCTAD	3	7.3	Ecological
Blockchain space / United Nation Environment programme	1	2.4	Ecological
Blockchain space / United Nation Environment programme	1	2.4	Ecological
Cryptocurrency donations / United Nations Office on Drugs and Crime Prescripto Mexico Dash / UNICEF Venture Fund Ethereum Mainnet / UNICC data centers	3	7.3	Political
LTO Network is the service provider / UNHabitat	3	7.3	Political



**Figure 2 – Implemented DLT projects by private corporations according to the Sustainable Development Goal targeted. Source: Developed by the author, data collected from (Tillemann & Goldstein, 2020)**

Further Potential Benefits of Blockchain if Used by the UN organizations and Multinational Corporations (Table 3).

*Health Sector.* Recording patients' important and confidential medical data in a single system, diagnosis, and treatment of the patient's disease as soon as possible will be available in a faster and more accurate system. If Blockchain technology is integrated and widely used in the health sector, it will save more lives. The management of insurance processes related to patients will also eliminate delays and eliminate problems.

*Insurance.* With the use of Blockchain technology in the insurance sector, it will provide facilities such as receiving insurance claims, examining the complex and detailed processes of accidents and incidents, preventing fake documents, and storing data, as well as providing an environment for the system to be more transparent and faster.

*Foreign Trade.* There are different parties in foreign trade such as customs, ports, shipping companies, banks, and the complex trade transactions of these parties have a time-consuming process.

Transmission of documents, keeping records, delaying information creates problems. An additional registration system with Blockchain. It provides benefits such as keeping business information without delay, monitoring the process from a single source, facilitating auditing, facilitating accountability, providing transparency by accessing information faster.

**Table 4 – Potential benefits of Blockchain according to several sectors and its contribution to specific goals in the SDG**

Industry	SDG	Potential benefits of Blockchain
Health sector	Goal 1 Goal 2 Goal 3	Fast and accurate system of recording patients' important and confidential medical data
Insurance	Goal 8 Goal 9 Goal 10 Goal 17	Mega Center system which allows to benefit from insurance service on a worldwide scale and reduce corruptions and fraud
Foreign trade	Goal 8 Goal 9 Goal 10	Facilitate data and documents transformations and clarifications across borders and enable logistic recording data for governmental bodies and multinational corporations
International Transfer Transactions	Goal 8 Goal 9 Goal 10	Ensure privacy and security for financial transactions across the world, and prevent hacking and fraud since all records are archived according to a globalized standard
Supply chain management	Goal 8 Goal 9 Goal 10 Goal 12	Enhance the supply chain management by trust and security from peer to peer and eliminate third part interference.

*Source: developed by the author according to the empirical data analyzed*

*International Transfer Transactions.* With Blockchain technology in the banking sector, they will be able to make transparent and secure transfers that will carry out account management with a faster agreement, a more transparent registration system, and a better tracking system.

*Supply chain management.* Blockchain technology can create a more effective working environment with many parties, each step must be followed, and management is possible. This is the management of both national and international supply chains. From the first point of production to the last. While it is essential to monitor transparently and safely up to a point, an effective supply chain management where everyone can access the same information, be instantly informed, and take quick action is possible with Blockchain technology. Blockchain technology can solve today's supply chain problems. The age of e-commerce includes the risk of a counterfeit product chain. Thanks to Blockchain, consumers, vendors, and suppliers will verify the products they buy, thereby increasing efficiency and reliability in the supply chain (Alsaed et al., 2021).

#### **Blockchain in Mitigating the Impact of COVID-19**

*What is Blockchain doing for COVID-19 today?* Enterprise Blockchain start-up Hacera has launched MiPasa, a new Blockchain platform to assist with data collection and analytics for COVID-19. The company has partnered with IBM, Oracle, the World Health Organization, and other technology firms to make this happen. These companies will work jointly in the open data center using Blockchain technology to check the accuracy of information about the coronavirus (Peker, 2020).

Jonathan Levi, the founder of Hacera, said: "Sadly, I do not think we have a few more weeks... We are all seeing data from the World Health Organization (WHO), Johns Hopkins University, the Center for Disease Control "CDC", and others. Mikasa, on the other hand, is a center that aims to synthesize data from different sources and help them harmonise" (Deloitte, 2020). By encouraging someone infected with the Corona-19 virus to report confidentially and effectively, it may be possible to create a map by ensuring that the data in the system matches the original. Thanks to this map, it can be found who has priority for testing or where the disease is concentrated.



Many platforms embraced this contribution, and a blockchain-based donation platform called Shanzong was developed by China-based blockchain start-up Hyper chain to provide financial support to expand this project further.

The COVID-19 virus, which can survive for up to three days on banknotes, makes it necessary to digitise money and transition to a cashless life completely. Bit furry, one of the Amsterdam-based blockchain technology companies, donated its 6000 GPUs "computer power" to research led by the University of Washington to fight this disease and find the vaccine for the pandemic.

Many Dutch technology companies such as TYMLEZ, Cyberprint, Compumatika, and Traxion came together and announced that they implemented the technology against Corona and announced that they would share information with the government, healthcare professionals, and hospitals using Blockchain technology. TYMLEZ, on the other hand, will help move the supply chain of medical products to a transparent and open Blockchain platform (Beincrypto, 2021).

The blockchain-based firm, Algorand conducted a global survey on COVID-19 on March 27, 2020, and named it the "COVID Report" (the purpose of the survey was to share and constantly update global information, status) and symptoms regarding the Corona-19 outbreak. Algorand Dr Tai Robin, head of the Research Department of 's Research Department, shows that although the number of people responding is not very large, the information gathered shows that the future contributions of Blockchain are no less critical (Cacioli, 2020).

*The Future Place of the Blockchain in Our Fight Against COVID-19.* Blockchain technology can be used in many fields such as health, finance, supply chain, copyrights, political elections, insurance, law, donations, foreign trade and can help create a more transparent, healthier, more effective, more accurate, faster, and humane world.

Blockchain spending is predicted to rise to \$5.6 billion in 2025. Aiming to use Blockchain technology in the healthcare field, IBM Blockchain CEO Gari Singh said, "We started brainstorming about how to more securely collect, share and use verified information about the COVID-19 disease... Because it is needed to replicate this information." (Peker, 2020).

*The Contribution of Blockchain in the Follow-up of Pandemics.* Blockchain technology can provide total solutions in the follow-up and diagnosis of deadly pandemics such as coronavirus and can become an essential resource in monitoring the pandemic with the data set it creates. Exceptionally, it can be a very effective weapon in terms of transparency, auditability, security, decentralisation, data storage, protection, and rapid delivery to suppliers, which are the main features of Blockchain. It can be a means of separating areas where the disease has not spread from widespread ones. It can provide patient quarantine by recording the patients' symptoms, developments, and reactions to the drug moment by moment.

*Contribution to the Protection of Personal Data.* The protection of patients' data and personal information is possible with Blockchain technology, and patient safety is ensured without adversely affecting the principles of accountability and transparency. The dissemination of this technology and its activation at every stage will expand its use, and a very rapid response will be given against the pandemic.

*Contribution to Safe Daily Transactions.* It is imperative to do the daily work without coming into contact with the virus and opening the way for healthcare professionals to help patients without increasing the risk of contamination. Blockchain technology emerges as a highly effective method for both continuing the treatment process and preventing contamination in ongoing transactions from user to user or cross-border transactions.

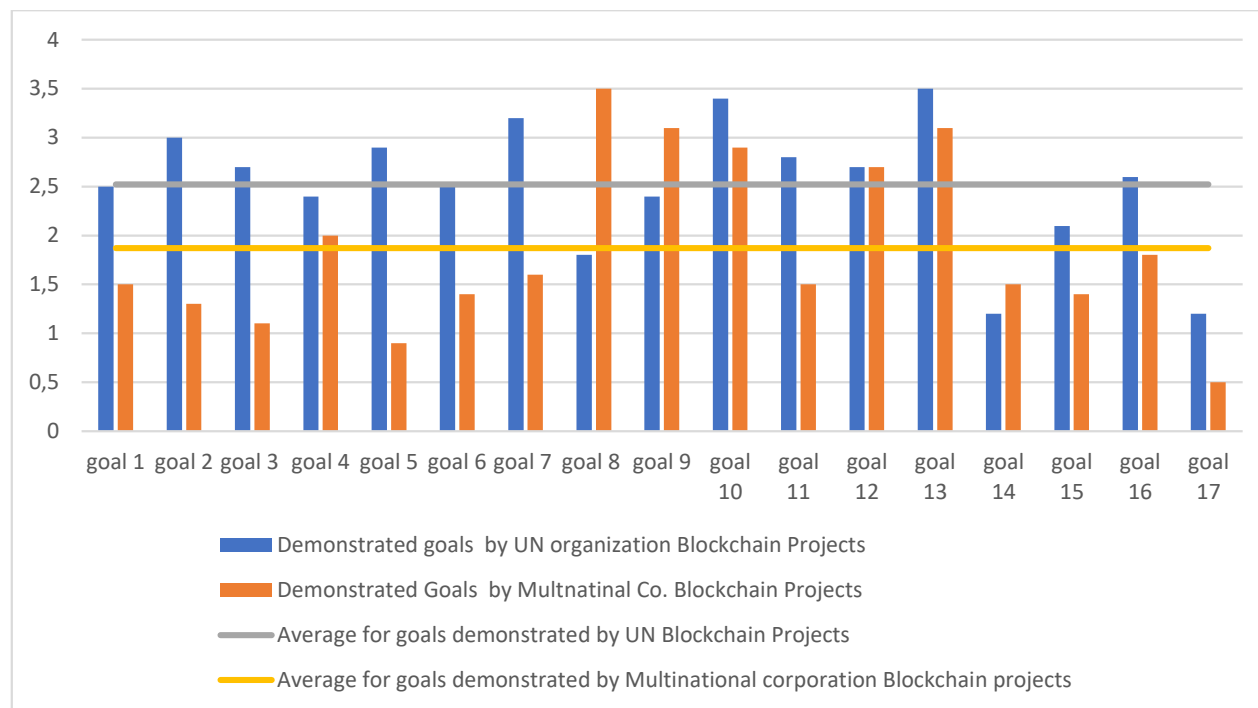
*Contribution to Ensuring Medical Supply Chain.* Blockchain technology has proven in the fight against COVID-19 that it is an instrumental technology in supplying medical drugs and equipment and reaching the necessary services. Knowing that this kind of support will continue in the future and making plans and preparations accordingly will provide an excellent convenience in the fight against the pandemic. It is a contribution that Blockchain technology can make to determine the location of the needs in the transportation process and to ensure the most successful access to the products as soon as possible.

*Contribution to Transportation of Financial Aids to the Places where the Pandemic Disease is Existing.* Blockchain technology can transfer financial aid from its source to the place or region where the pandemic spreads, without delay and in the fastest way. Efforts to find a vaccine are extraordinarily costly and resource-intensive, and delivering aid to pharmaceutical companies or those in need can be done both safely and quickly.

The control of Blockchain can be successfully tackled to provide noteworthy progress towards achieving the SDGs. It is additionally contended that there may be different limitations to what can be done, hence the need to nuance that development experts cannot solve all the issues around the SDGs with Blockchain, which implementation choices to design and implement blockchain-enabled solutions should be thoroughly justified to illustrate a substantial added-value compared to other alternative solutions which may be less costly and less technical. In this respect, for example, the SDG acceleration scorecard proposed by Aysan et al. might provide a valuable apparatus to create blockchain-based arrangements for sustainable interventions.

**Results and Discussion.** As a result, figure 3 shows the demonstration of the blockchain projects implemented by the UN organization, and the demonstration of blockchain projects implemented by the multinational organizations. The results shows that the UN organizations have implemented blockchain projects that corresponded to the 17 goals of the SDG in a balanced way, where the average is 2.5. On the other hand, the projects adopted by the multinational organizations have stressed mainly on goal number 8;9;10 and 13 which are mainly in the economic sphere. Multinational organizations are focusing on economic goals only, not on social, health and ecological goals. The average for demonstrated projects for multinational organizations is 1.9 > 2.5 for that of UN organizations.

Form here, a call should be raised to direct multinational organization to follow the trend of UN organizations. Where multinational organization has a responsibility to adopt blockchain projects that target social, ecological and health goals and not only economic goals.



**Figure 3 – Comparing the goals demonstrated by UN Blockchain projects and multinational Blockchain Projects**

*Source: done by the author, data collected from (OCHA, 2020) (Deloitte, 2021) (United Nations, 2022) (Tillemann & Goldstein, 2021).*

Comparing the spheres targeted by multinational corporations and UN organizations reveals that multinational organizations have concentrated on the economic and social goals or spheres intensely. In contrast, the UN departments have used Blockchain technology to target various "not only economic and political" spheres in a more balanced manner. The matter that sheds light on how to broadly motivate multinational organizations to target other spheres as social and ecological spheres.

International companies should pay close attention to Blockchain initiatives. This project and application support the SDGs, but at varying economic, political, environmental, and social factors.

The United Nations organizations and multinational companies are using the techniques effectively in many of the projects they are implementing. The paradox is that multinational companies place a higher priority on economic and political goals than environmental, health, and social goals. However, the United Nations focuses on all objectives. Therefore, the United Nations and other concerned organizations should set an example for multinational companies to follow.

**Conclusions.** Covid-19 has shown that international organizations and governments cannot control the epidemic on their own. The needs of multinational corporations must be addressed. Using blockchain technologies and projects, most of the challenges and problems faced by all sectors can be effectively and efficiently addressed. Blockchains simplify and speed up information exchange while maintaining confidentiality and credibility. Blockchain technology is able to activate the administrative structure of local and international companies and to eliminate third parties from delivering goods and services to the last consumer, thereby reducing production costs and ensuring direct communication between stakeholders.

In addition, blockchain technology has demonstrated high effectiveness in organizing and managing the healthcare sector by disseminating reliable information and monitoring and controlling epidemics. Block chain can play an important role in reducing the approved supply chain, as it eliminates the third party, where useless intermediaries will be hard to penetrate and manipulate.

This study concludes that blockchain is a new system that has the potential to give an organization credibility and transparency if it is adopted. Moreover, it plays an important role in achieving the SDGs. The United Nations and the international community must impose a unified and general model on multinational companies to adopt blockchain technology. Multinational companies must adopt blockchain technology in a way that addresses social, environmental, and health goals as well as economic goals. The United Nations has adopted many blockchain projects in a balanced framework with the 17th goal of sustainable development, and multinational companies should do the same.

This study sheds light on some of the most pressing challenges facing sustainable development by providing a quantitative overview of the current conditions of Covid-19 and blockchain-enabled arrangements. Further examinations are needed as Blockchain-covered portions of a rising iceberg gradually emerge over time, as technology is developed and lessons learned are shared across a broad range of economic, social, and environmental issues. It is hoped that individuals and organizations working on blockchain-based arrangements will use it for sustainable development.

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## ЗНАЧЕННЯ БЛОКЧЕЙНУ ДЛЯ ДОСЯГНЕННЯ ЦІЛЕЙ СТАЛОГО РОЗВИТКУ ПІСЛЯ ПАНДЕМІЇ COVID-19

**Проблема.** Поширення пандемії COVID-19 у всіх частинах світу спричинило економічну, медичну й соціальну кризу для міжнародних організацій та урядів. У результаті вжитих суворих заходів у сфері охорони здоров'я ланцюжок поставок у багатьох секторах був перерваний. Глобальні економічні збитки, спричинені пандемією, становитимуть приблизно 8,1 трильйон доларів після завершення пандемії. У роботі з новими механізмами цифровізації, переходом до електронного навчання одним із викликів було те, як впоратися з соціально-економічними проблемами, породженими пандемією COVID-19. Нині в розв'язанні цих проблем та досягненні цілей сталого розвитку важлива роль відводиться технологіям блокчейн (Blockchain). Фахівці стверджують, що блокчейн забезпечить ефективну роботу глобального ланцюжка поставок, важливість якого ще більше розуміється під час кризи. Завдяки використанню Blockchain у ланцюгах поставок підприємства в Західній Європі можуть заощадити 450 мільярдів доларів на витратах на логістику. Крім того, постачальники можуть контролювати свої дані за допомогою Blockchain і безпечно передавати їх іншим користувачам у мережі Blockchain без будь-яких затримок.

**Метою статті є** обґрунтування цінності та значення блокчейну для досягнення цілей сталого розвитку після пандемії COVID-19.

**Результати.** Використання швидкого технологічного прогресу, особливо на рівні блокчейну, може допомогти поєднати глобальні виклики та можливості. Авторами розкрито питання щодо ефективності Blockchain у вирішенні економічних, соціальних проблем і проблем охорони здоров'я. Показано, якою мірою Організація Об'єднаних Націй та решта світу можуть використати Blockchain для спрямування зусиль на досягнення Цілей сталого розвитку (ЦСР). У цьому дослідженні прийнято якісний підхід для вивчення ефективності та внеску проєктів Blockchain у соціальний, економічний та екологічний розвиток. Для цього ми вивчаємо кількість блокчейн-проєктів, створених ООН, і порівнюємо їх з тими, які створені міжнародними корпораціями за кількома факторами. Результати показують, що блокчейн-проєкти ООН більш узгоджені з ЦСР. Проте блокчейн-проєкти, прийняті вибіркою міжнародних корпорацій, зосереджені на економічних і політичних аспектах. Такі результати підвищують обізнаність щодо структури та модуля, які мають регулюватись у глобальному масштабі щодо будь-якого проєкту Blockchain.

**Наукова новизна.** Доведено, що на практиці існує тісний зв'язок між впровадженням блокчейну та досягненням Цілей сталого розвитку, але пандемія Covid-19, яка охопила світ наприкінці 2019 року, зробила цей зв'язок ще більш суттєвим. Визначено, більшість проєктів із застосування технології блокчейн міжнародними компаніями та бізнесом зумовлені переважно економічними та політичними факторами. Соціальні та екологічні цілі тут, як правило, не враховуються.

**Висновки.** Технологія блокчейн має численні переваги та характеристики, які підвищують довіру та прискорюють досягнення ЦСР. Однак міжнародним корпораціям слід раціоналізувати прийняття блокчейн-проєктів і йти в ногу з їх застосуванням на основі критеріїв, які забезпечують баланс між економічними та економічними цілями. Незалежно від того, чи це транснаціональні корпорації чи міжнародні організації, ключем до досягнення Цілей сталого розвитку є координація та спілкування, а найшвидший спосіб досягти цього – прийняти загальну модель впровадження блокчейну.

**Ключові слова:** блокчейн, цілі сталого розвитку, COVID-19, корпоративна соціальна відповідальність.

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