Blockchain Technology and Tokenization

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Contributor: AHMET AYSAN

Blockchain is an open-source technology that excludes the traditional third parties by relying on collective verification, thus offering a great alternative in terms of costs, traceability, security, and speed. When two financial entities such as banks receive a request to transfer money from one account to another, they have to update the balances of their respective customers. This costly and time-consuming coordination and synchronization exercise can be simplified on a blockchain by using a single ledger of transactions reflecting a single version of records instead of two different databases. Blockchain technology offers a myriad of value through a frictionless process of immutable and transparent records and through converting assets into digital tokens (i.e., tokenization) with smart contracts.

Keywords: blockchain ; tokenization ; SDGs ; Sustainability ; Finance ; Development ; Institutions ; Developmental Agencies

1. Background

As we enter the decade of action to achieve the SDGs by 2030, the international community is facing unprecedented challenges to accelerate the pace towards meeting national sustainable development targets, at a time where the very development gains won over the last decades continue to be reversed by the aftershocks of the COVID-19 crisis [1]. If new technologies are going to contribute to the necessary transformation, there have to be adequate tools, methodologies, and standards to navigate the blockchain “hype cycle” and to move from a generalized “let’s blockchain it” approach towards a rational narrative that is evidence-based.

Despite blockchain’s promising potential, the reality can be challenging, there are not enough data, blockchain-backed applications for social impact are under-studied, and claims that blockchain-backed solutions can yield superior results when compared to other alternatives are yet to be supported by evidence [2]. While we can agree that blockchain has the potential to trigger disruptive innovations, we can also agree that the technology is not yet mature and that there is still a gap in terms of approaches and tools needed to develop blockchain use cases, evaluate blockchain applications, monitor experiments, mitigate associated risks, and manage organizational changes to galvanize innovation-readiness within organizations considering adopting blockchain technology and running use case experiments [3]. It is only by filling the existing gaps that we can make a stronger case for using blockchain as an SDG accelerator.

We can argue that the comparative advantages of blockchain can be explained by its ability to address the issue of trust within the global financial system in the aftermath of the 2008 global financial crisis [4]. Looking into the current practice among the key players in both public and permissioned blockchains, there is a costly race among early adopters towards becoming the standard and prototyping blockchain applications to do things other technologies cannot. Against this background, we can look at blockchain as a package of technologies and approaches that can be used to open up new opportunities for users to manage transactions, exchange values, and maintain digital trust [5].

2. Blockchain Technology

Blockchains can be designed either as private or public; while decentralization remains a common denominator to both forms, there is a key difference in the level of access granted to participants [6]. In the case of a public blockchain, participants are typically encouraged to join the network through an incentivizing mechanism, such as in the case of Bitcoin [7]; anyone can join the network and decentralization is pushed to the fullest extent [6]. On the other hand, private or permissioned blockchains are closed networks where participants face restrictions in terms of who can write data and who can read it. Hence, while public blockchains maximize the anonymity, permissioned blockchains know the identities of their participants and determine which information they should or should not have access to [8].

While perceptions suggest that public and permissioned blockchains are competing with each other, they have different offerings and could be rather complementary in terms of the solutions they offer [8]. Public blockchains offer high security, an open environment, anonymity, and no restrictions, whereas private blockchains prioritize privacy, high efficiency, and stability. We can argue that permissionless blockchains empower the user by pushing transparency and decentralization to their full extents, while permissioned blockchains empower enterprises instead of individual employees [8][9]. The convergence of public and private blockchains is expected to pave the way for virtual ecosystems where a wide range of players can collaborate in a secure and auditable way [10].

The question remains of which blockchain is better for which applications? Indeed, public and private blockchains have distinct use cases. In general terms, public blockchains address business-to-consumer scenarios, while private blockchains are more applicable to business-to-business relationships, with some shared infrastructure between businesses [9]. The transparency and security features of public blockchains make them more suitable for developing blockchain-enabled solutions serving larger communities where trust is a key concern [6]. They are a viable option in situations where all users should be treated equally and when the protection of users' anonymity brings added value to the solution [9]. There are, however, some concerns about whether confidential data should be recorded on a public blockchain, assuming that the encryption could be hacked one day [6].

In the world of private blockchains, there are quite opposing concerns, since the players are reluctant to publicly share their business data. This is more appealing to financial institutions and corporations so they can know and predetermine who has access to what [6]. The downside though is that trust comes down to the credibility of the authorized nodes, as well as a relatively higher vulnerability to malicious attacks [6]. As blockchain technology keeps evolving, hybrid solutions could perhaps offer the best of both options by bringing together trust and security alongside efficiency and speed [6]. Given the current momentum in adopting blockchain applications across a large spectrum of industries, blockchain technology can only increase in popularity as the world enters the uncharted territories of the "new normal" in the post-COVID-19 era, where technologies are poised to play an extremely important role in redefining "business as usual".

3. Tokenization

Special importance is given to "impact tokens", which represent a group of tokens designed to unlock investments for projects with positive social and environmental impacts [11]. The deployment of these impact tokens in blockchain offers new mechanisms to improve ESG ratings, as it offers proof that a particular investment has delivered a positive impact [12]. A key advantage of tokenization is that it offers traceability across the supply chain ecosystem. In this regard, token-based incentive schemes should further broaden the accessibility of blockchain-based solutions for sustainable development, in alignment with UN SDGs. Furthermore, as suggested by Uzsoki and Guerdat [11], the UN or other international bodies could facilitate the adoption of impact tokens by setting common standards that set out both their characteristics and achievement of SDGs.

Supported by UN World Food Program, Fishcoin is a blockchain-based data-sharing platform that incentivizes catch registration and data-sharing across the seafood supply chain [13]. Data contribution to the blockchain platform is rewarded by tokens, which can be exchanged for mobile phone credit. Amply, a pilot project in South Africa that has been funded by UNICEF Innovation Fund and Innovation Edge, tracks school attendance by providing children with self-sovereign digital identities on the blockchain. When a teacher confirms attendance on a mobile application, a token is generated that the school can redeem for further subsidies. Moeda is a blockchain-based cooperative banking system that leverages on a fiat-pegged digital token. The Moeda initiative facilitates access to finance to unbanked and underbanked entrepreneurs, whereas impact investors are able to keep track of their investments.

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