

»» Blockchain technology: how it works and what potential it offers for development

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Some experts predict that the blockchain technology will have such a profound and lasting impact on the world as only the internet has had so far.

What is a blockchain and how does it work?

Basically, the blockchain technology is just a way of creating tamper-proof databases. The system is rendered tamper-proof through a combination of the following three elements:

- The database no longer has a central owner; it is stored and updated on several decentralised servers at the same time.
- Every time a new entry is made in the database, an alphanumeric code (block) is generated, based on the code of the last entry - in this way a "blockchain" is created in which all previous transactions are recorded.
- Before new entries are stored, all the servers involved must confirm that the blockchain is intact, i.e. that the database has not been manipulated.

To manipulate this kind of database, you would thus have to "reverse" every previously created code through all the entries that have been made since then, and recode them step-by-step with the manipulated entry, on all the servers simultaneously - that would be very difficult with just two servers and is practically impossible with a large server network.

Practical applications: Smart Contracts and transparency

For practical purposes, the added value of the blockchain technology is that information and processes can now be seamlessly tracked and verified, even without a neutral player to confirm the transactions. This means that many processes which are still very complex could be greatly simplified and streamlined and performed for much lower transaction costs.

• **Smart Contracts:** The most obvious application is digital contracts, which can be processed remotely in a quick, efficient and tamper-proof manner using the blockchain technology, and the fulfilment of which can in some cases also be monitored by means of automation. The most famous example of this is the cryptocurrency Bitcoin (money transfers without the involvement of banks), but the system can just as easily be carried over to almost all other contracts, e.g. property transactions (without the involvement of notaries) or internet purchases (without the involvement of guarantee platforms such as Paypal).

• **Transparency (in the public sector):** A second key field of application for the blockchain technology is the creation of greater transparency in the public (and private) sector, by providing seamless, tamper-proof documentation of processes. This can include counterfeit-protected proof of identification (ID cards), patent applications and elections, as well as documenting the transfer of funds through different channels and decisions to allocate finances, which would make it much more difficult to misappropriate public funds.

What can blockchain technology do in the fight against poverty?

Both fields of application mentioned above are also relevant for developing countries. The considerable reduction in transaction costs that can be achieved with Smart Contracts enables poor people and those living in remote regions to gain access to goods and services, which would simply not be on offer in the offline world due to the high transaction costs (e.g. micro-loans, micro-insurance, etc). Even today, remittances from industrialised countries, for example, can be transferred to "connected" relatives in developing countries much faster (and at much lower costs) using Bitcoin. However, the key prerequisites for widespread use of the

blockchain technology are still lacking in most developing countries (see below). Things look a little better in terms of creating transparency in the public sector. To provide blockchain-secured elections, only the polling station itself and not every voter must be equipped with the requisite technology. The same applies for the issuing of identity papers and the traceability of budget processes (spending decisions, payment flows, control of corruption).

From hype to reality – first the prerequisites need to be fulfilled!

The theoretical applications of the blockchain technology and its potential benefits are huge. However, even in industrialised countries, practicable applications are often still in their infancy. In developing countries, the basic infrastructure (internet connection, computers, smartphones), the requisite knowledge among potential users (digital literacy) and a suitable regulatory framework (e.g. for data protection) needed to enable the widespread use of Smart Contracts by the poor is generally lacking. These prerequisites must be tackled as a matter of urgency (if necessary with the support of international development cooperation), but they cannot be fulfilled overnight. Somewhat faster and equally important successes in terms of the development process would seem to be possible by increasing transparency and efficiency in the public sector. Unlike for Smart Contracts, the infrastructure issue is easier to resolve here. The limitation is rather that there are few incentives for the private sector to develop appropriate applications. Although they provide great benefit to society, they promise minimal return for the private sector. Consequently, this is also an area where international development cooperation can make a difference.