

4. Smart contracts – a smart invention with no smart component

One of the most interesting features of blockchain technology, in particular in the context of international trade, is smart contracts. Smart contracts are not a type of blockchain *per se*, but rather a functionality of the blockchain technology.

The term “smart contract” is, in fact, a misnomer: smart contracts are neither “smart” (there is no cognitive or artificial intelligence component to them, only the automatic execution of a pre-defined task when certain conditions are met), nor are they contracts in a legal sense (Deloitte, 2018).

Smart contracts are computer programmes that automatically enforce themselves (self-execute) without the intervention of a third party when specific conditions are met (based on the “if... then...” logic – e.g., if the goods are unloaded at port of X, then funds are transferred). They state the obligations of each party to the “contract”, as well as the benefits and penalties that may be due to either party under different circumstances.

Unlike a traditional legal contract, they can also take information as an input, process it through the rules set out in the contract, and take any agreed action as a result. Such information is fed into the smart contract by so-called “oracles”*, i.e. data feeds – provided by third-party service providers – on the pre-defined conditions foreseen in the smart contract. Such conditions can be any external data like temperature, payment completion, price fluctuations, etc. A smart insurance contract could, for example, have as an oracle a sensor placed in a refrigerated container. If the temperature goes above a certain level, insurance payouts would automatically be triggered and a request for inspection sent. As blockchains cannot access data outside their network, oracles are the only way for smart contracts to “interact” with data outside of the blockchain environment. Smart contracts, in other words, usually work in conjunction with other technologies, in particular the IoT, i.e. networks of sensors and smart devices that are connected to the internet and that can send and receive data. Smart contracts generally use data generated from the IoT to trigger actions.

The concept of smart contracts was introduced and further fleshed out by cryptographer Nick Szabo in various publications during the period 1994-97, and was first introduced in the context of blockchain technology by Ethereum in 2015.¹⁷ Today, many blockchains offer smart contract capabilities. Smart contracts can exist outside of Blockchain, but they then retain the same potential problems as centralized databases, i.e. a single point of failure and the possibility to change the data easily.