Smart contracts

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A smart contract is a programme stored on the ledger that executes when a transaction calls it. The word "contract" was chosen by Nick Szabo in 1994 and has misled lawyers ever since.[1] A smart contract is not an agreement. It is a machine that moves tokens according to rules fixed when it was deployed. Whether a contract in the legal sense exists between the people who interact with the machine is a separate question answered by ordinary contract law, as Part D, Chapter V and Part J, Chapter III explain. A smart contract may implement a contract, may evidence one, or may run with no legal relationship behind it at all.

Three technical properties matter. The first is that a deployed contract is usually immutable unless its author included an upgrade mechanism, typically a proxy pattern under which an administrator key can redirect calls to new code. The existence of such a key is the first thing to look for when assessing whether a protocol is "decentralised", because whoever holds it can change the rules for every user. The second is that smart contracts have no access to information outside the ledger and must be told prices, dates and events by an external data feed called an oracle, discussed below. The third is that the code is public and may contain errors that anyone can exploit. The DAO hack of 2016, the Wormhole bridge exploit of 2022 and the many flash-loan attacks since are all cases of code behaving exactly as written and quite differently from what its authors intended.

The Swiss Federal Council considered and rejected a special legal regime for smart contracts in its 2018 report, taking the view that the Code of Obligations already permits contracts to be concluded and performed by automated means.[2] Singapore's Electronic Transactions Act 2010, as amended in 2021 to adopt the UNCITRAL Model Law on Electronic Transferable Records, likewise confirms that a contract may be formed through automated message systems without human review.[3] Both systems therefore treat the smart contract as a tool of performance, with the legal analysis supplied from outside the code.

Notes

1. Nick Szabo, "Smart Contracts", 1994, and "Formalizing and Securing Relationships on Public Networks", First Monday vol. 2 no. 9 (1997).
2. Federal Council report of 14 December 2018, section 6.2 (no need for special legislation on smart contracts; general contract law applies).

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3. Electronic Transactions Act 2010 (Singapore), s. 15 (contract formation through automated message systems), and Part 2A as inserted by the Electronic Transactions (Amendment) Act 2021 on electronic transferable records.

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