

# An Introduction to Smart Contracts

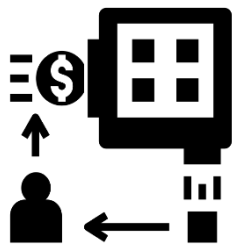
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With the success of cryptocurrencies such as bitcoin, blockchain technology<sup>1</sup> has created a new wave much similar to what internet did two decades ago. Blockchain technology's applications are much more than just cryptocurrencies. High levels of security and transparency demonstrated by public cryptocurrencies have shown that blockchain technology can provide intangible technological benefits which can eradicate the role of intermediaries, reduce transaction time and costs and bring in large scale changes in social, economic and political institutions. One of the major applications of blockchain technology is smart contracts which leverages this powerful technology for complex jobs.

## Introduction

The term 'smart contract' was first conceived in 1994 by a computer scientist Nick Szabo who referred to it as self-automated computer codes having the ability to carry out terms of a contract.



To understand the concept of smart contracts, consider the example of a **vending machine**. If a buyer wants to buy an item, let's say chocolate, he will have to deposit the money and press the button corresponding to that item. The button would trigger a lever, mapped to that particular item, which would throw out the chocolate. This transaction occurred without any role of intermediary and the vending machine acts as a self-executing entity which executes the task once the terms and conditions of the agreement are met, i.e. money has been paid by the buyer. A smart contract is similar to a vending machine which acts automatically as per the terms and conditions of an agreement preprogrammed in the contract.

***A smart contract can be defined as a computer code that is capable of automatically facilitating and executing the negotiations of an agreement upon the occurrence of pre-specified conditions.***

The code is stored and processed in a distributed ledger, i.e. in a blockchain and any resulting change or occurrence of a transaction is stored in this distributed ledger. Through blockchain technology, the set of terms and conditions are encoded, stored and replicated across all the nodes (computers) in the blockchain network. Smart contracts are based on 'if-then' situation, i.e., if x condition is met or fulfilled 'then' y obligation must be executed. This feature makes smart contracts suitable for financial and legal industry





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<sup>1</sup> <http://vinodkothari.com/2019/06/blockchain-technology-its-applications-in-financial-sector/>

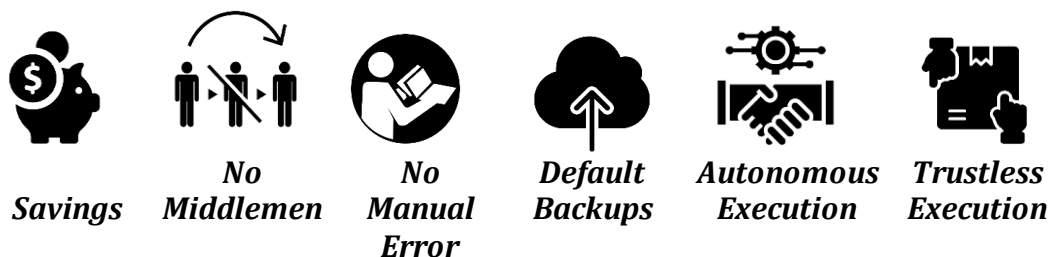
which are based on 'if-then' situation mostly. One of the important objectives of smart contracts is to complement legal contracts or to provide a superior system for contractual system based of computer codes.

## Traditional Contracts vs. Smart Contracts

Traditional contractual agreements are mostly paper based and generally involves a third party for enforcing the deal. Involving a third party is costly and time consuming and there are possibilities of misjudgment or errors. Smart contracts are digital contracts which contains all the necessary elements of a traditional contract in form of a self-executable code enforced by a distributed ledger system or blockchain network. This would make the role of third parties redundant and would lead to huge cost & time savings along with tamperproof execution. In case of traditional contracts, the legal material is proofread by only a handful of people which increase chances of non-rectification of errors in the contract. But in case of smart contracts the terms and conditions are encoded and this code is shared in the distributed ledger or in the blockchain network where all the nodes or members of the network can see and verify the code. Thus, in case of smart contracts the terms and conditions are read by large number of people which reduces the chances of error in the contracts. A comparison of traditional contracts and smart contracts is given below.

<b>Traditional Contracts</b>		<b>Smart Contracts</b>
1-3 Days	 <b>TIME</b>	Minutes
Expensive	 <b>COST</b>	Fraction of cost
Third party necessary	 <b>THIRD PARTY</b>	Third party not required
High chances of error	 <b>ERROR CHANCE</b>	Low chances of error

Summarizing, advantages of smart contracts are:



## The Indian Scenario

According to The Indian Contract Act, 1872<sup>2</sup>, the essential elements of a contract are:

- Agreement – Offer and Acceptance
- Legal Purpose
- Lawful Consideration
- Capacity to contract
- Consent to contract
- Certainty
- Possibility of Performance

Smart contracts have the capability to include all these elements as the blockchain can be programmed in a way that can meet specific needs of the contract. Offer and acceptance can be easily taken care since each party's terms and conditions are encoded<sup>3</sup>. Smart contracts work only when both the parties approve or provide consent to sanction the contract. To check whether the contract is legally binding, the government can also be made a member of the blockchain network so that they can regulate the contract. Likewise, other elements can be taken care of in smart contracts.

One of the major issues is with cryptocurrencies not being treated as a legal tender in India. While blockchain technology has been accepted by the government with SBI launching 'BankChain'<sup>4</sup> in 2017, which is a platform for banks to share KYC data among themselves using blockchain, the condition of cryptocurrencies is still unclear as it neither a recognized currency nor it is illegal. There is a hope that in the Union Budget 2019, government will take a firm stance on cryptocurrencies. Since the smart contract's source of transaction is cryptocurrencies, their fate is also uncertain at the moment in India.

Another cause of concern is The IT Act, 2000<sup>5</sup> which puts regulations on obtaining digital signatures. While it allows contracts to be validated by digital signature, but under section 35 of the IT Act it has been specified that digital signature can be obtained only through a government designated certifying authority. This is an issue for smart contracts as they use blockchain technology which generates unique identification codes or hash-key as individual signatures or to authenticate an individual.

## Conclusion

With the benefits provided by smart contracts and the current wave of technological penetration in every sector, the future of contracts looks like a hybrid version of traditional and smart contracts or **human-code model** where small, one-off transactions

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<sup>2</sup> <http://comtax.up.nic.in/Miscellaneous%20Act/the-indian-contract-act-1872.pdf>

<sup>3</sup> <https://www.dlapiper.com/~media/files/people/tank-margo/smart-contracts-is-the-law-ready-web.pdf?la=en&hash=003897A104F6A74DD9FC1C2E0FE2A4F16ADE500F>

<sup>4</sup> <http://www.bankchaintech.com/index.php>

<sup>5</sup> <http://www.legalserviceindia.com/cyber/itact.html>

being executed by the codes but human touch will be required for high value deals or where judicial intervention is imperative. Contracts would be error-free as authenticity will be verified via blockchain and human touch will verify it has proper legal structure. Even though there are regulatory concerns in India, certain amendments in The Indian evidence act 1872 and The IT Act, 2000 can help the cause of smart contracts and there is no doubt that they have the ability to revolutionize how the financial industry works.