Smart Contracts: Choices made by algorithms?

A perspective on current developments in contract automation

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First I shall give an overview on the current state of automation in different phases of contracting, enabled by digital technologies and services, while assessing the potential impact of mainstream adoption of certain strategies on Contract Law. Conceptually, automation may be applied to the negotiation of contractual agreements, the drafting of contractual documents and the execution/enforcement of contract terms. In all three branches digital information and communications technology (ICT) allows us to streamline, enhance or altogether replace manual, paper-based processes that have evolved in a pre-digital era.

My talk shall then focus on emerging technologies for automation in the execution/enforcement stage of contractual agreements, namely Smart Contracts. The self-guided, software-based and ICT-mediated execution of contract terms requires the embeddedness of contractual rules within the goods and services that are subject to contract-based exchange. Although mechanical design in physical devices and digital access control in cloud-based services is already a ubiquitous strategy to enforce contractual agreements automatically, such systems are isolated, special-case implementations of a more general theme. Smart Contracts then, are the technological generalization of that trend.

Unlike automation in the ex-ante phase of contract formation, which is primarily concerned with the organization of pre-existing information, automation in the ex-post phase is about the creation of a shared source of information. For that purpose, new kinds of computer network protocols are being developed, that allow an arbitrary number of agents to come to an agreement on the exact internal state of an information-storage and computation system, technically referred to as a Blockchain. Within the boundaries of such systems, the presence of a single coherent, shared source of truth enables participating agents to form binding contractual agreements with one another. The protocols in question are novel in the way that they employ economic incentive alignment to motivate a heterogenous group of agents to voluntarily adhere to a common set of rules, thereby creating a trustworthy base layer platform for contractual exchange.

Then I shall exemplify my general considerations on automating contract execution through concrete use cases of Blockchain-based Smart Contract technology. My examples will range from specific services that have already been implemented to more conceptual ideas as they are being developed and imaged today.

Finally I shall contrast benefits of Smart Contracts with challenges they face vis-a-vis Contract Law and the legal system as it stands today. I shall put forward ideas of how to bridge the gap between Blockchain-based contracting platforms and classical legal processes and regulations.