processes that guarantees that relevant ethical and social requirements have been met off-chain. Establishing a credible link between offline events and their online record is therefore crucial. In one of the first studies on the economic impact of Blockchain, Catalini and Gans (2017) note that, while it can be relatively easy and cheap to verify transactions of goods whose offline attributes are easy to capture and expensive to alter or fake (e.g. diamonds), in many cases, maintaining a robust link between offline events and distributed ledgers is still expensive, and may require not only one or more trusted intermediaries, but often also multiple parties within the same ecosystem to agree on rules for secure data entry and sharing. Connecting physical goods and events to a blockchain often requires enabling technologies like IoT. This connection can also represent a vulnerability, as physical items and IoT sensors can be tampered with (Carson *et al.*, 2018).

(b) Reduction in trade costs

Studying the economic impact of Blockchain, Catalini and Gans (2017) identify two key costs affected by the technology: verification costs (i.e. the ability to verify the attributes of a transaction cheaply) and networking costs (the ability to bootstrap and operate a marketplace without the need for a traditional intermediary).

The examples presented in the previous chapter confirm the potentially significant impact that Blockchain can have on verification costs, as the transparent and immutable nature of the technology, combined with the possibility to automate processes using smart contracts*, could reduce verification costs to virtually nothing. Information added to the blockchain can be automatically screened on the basis of conditions defined in a smart contract (e.g. to process applications and documents for customs processes or government procurement tenders); information can be easily tracked and audited; and the immutable nature of the technology facilitates the verification of individuals' identity and of the financial records of companies.

As for the impact of blockchain technology on networking costs, it is best evidenced by the emergence of peer-to-peer marketplaces such as OpenBazaar or Hijro, in which the business model consists in leveraging the opportunities opened by Blockchain to cut out traditional intermediaries to lower costs.

The previous chapter also shows that the technology could have a much wider impact on costs. Because of its decentralized, highly secure and immutable nature, and the possibility if offers of automating processes and payments, Blockchain could reduce a variety of other trade costs, in particular processing, coordination, transportation, logistics, financial intermediation and exchange rate costs. Its decentralized nature enables multiple entities to coordinate actions in real time and in a fully transparent and secure manner, thereby enhancing efficiency.