



Ethics and Decisions in Distributed Technologies: A Problem of Trust and Governance Advocating Substantive Democracy

Antonio Carnevale^(✉) and Carmela Occhipinti

CyberEthics Lab, Corso Cesare Battisiti, n. 69, 80024 Cardito, NA, Italy
a.carnevale@cyberethicslab.com

Abstract. The distributed architecture of applications such as blockchains, wireless sensor networks, multi-agent platforms, and the Internet of Things charges technological development to face, by default, with two aspects of responsibility that were usually accorded to human beings: the “decision” (Who is enabled to make decisions in a decentralized system? What about the mechanism for deciding? Authorized by whom? With what kind of consensus?) and “ethics” (To which principles must respond the decision-making mechanism? And, if decisions are distributed, what is the role of ethics? To guide or to laissez-faire? Permissive or restrictive? For everyone or only for those who are authorized?). Responding to these epochal questions can lead to rethinking the distributed technologies in view of a game-changing transformation of models of trust-in-governance. From a model signed by centralization of trust, we have come to progressively more decentralized forms until the contemporary “distributed trust”. This paper constitutes an endeavor to introduce and address the main philosophical foundations of this historical passage.

Keywords: Ethics · Philosophy of technology · Blockchain · Governance · Trust · Decision-making · Relation of economics to social values

1 Ethics and Decision in Distributed Technology

1.1 Philosophy as Pilot of Technology? the Moralizing of Things and the Informatization of Morality

The title may seem a provocation: How can technology be guided by philosophy, being they are two forms of rationality so distant? Philosophy means meditation, contemplation; technology instead is pragmatic, speed, anticipation, and consumption. How can philosophy guide the technological development? The answer starts with observing technological development.

For centuries the technique has been understood as the human instrument par excellence to forge nature and replicate its strength and capacity for regeneration. Think to the myth of Prometheus and fire. Today, technologies appear to shape a societal power far beyond the nature and instrumentality [1]. The so-called “4th

Revolution” [2] has transformed ICTs in environmental forces that create and transform our realities. Data technologies are changing the links between *sociality* and *privacy*: in the past they were contrasting concepts and one represented the groundless intrusion in the other’s domain [3], today they are slowly adjoining and aligned [4], so much that someone hypothesizes the birth of a “group privacy” [5].

In the past, many philosophers and thinkers have been concerned for many decades to understand the nature of this power and stable norms and methods to regulate it: John Dewey, Martin Heidegger, Herbert Marcuse, Günther Anders, just to name a few. It can be assumed that the main anxiety that worries those thinkers is that, if one day technology will hold a *teleological* power – the capacity to establish its own ends for itself – this would not only be a danger for limiting the human responsibility, but it would undermine the entire foundations of human rationality.

The inquiry with these accounts about the dangerousness of technology lies in a split vision of being human and technology struggling over the world. Humans and technologies are figured as superpowers that play the hegemony over a world made up of dumb and unarmed things. The novelty is that the technological development pushes the world toward a disruptive scenario where things can communicate. The number of smart objects is keeping growing. Different studies forewarn that by the 2020th around 34 billion smart devices will be connected to the Internet (24 billion IoT objects and 10 billion more traditional devices such as smartphones, tablets, smartwatch, etc.) [6].

A world in which even things contribute, with their M2M communications, to shift meanings and make decisions, it is a world no longer human-centered in a philosophical sense. This implies a set of imperative queries: What is the moral consistence of a M2M communication? When is it *really* true? In more exhaustive words: To which logical and ethical *criteria* this communication must respond? Do human being have already embedded by history or experience the *conditions of thinkability* of these criteria or, otherwise, do we have to learn novel way of thinking the truth?

It therefore seems evident to envisage that digital technologies and ICTs will place philosophy once again at the center of knowledge. This is the background thesis of paper, a legacy of philosophy with a supplementary role. No longer investigating separately the construction of human subjectivity and the being of the world, rather quite the opposite, intersectively: *the construction of the world though the being of agents operating such a construction*. There are trends observable in society that seem to authorize this thesis:

- *The moralizing of things*. Objects are increasingly designed for having already incorporated value-laden settings [7, 8].
- *The informatization of reality*. ICT have populated not only the devices of technology but also the language and its “metaphors we live by” [9], that is the key vehicle to construct the meaning of the world and collect a shared social imaginary. Our experiences are formed in a reality that is conditioned by computer technology in a consistent manner [10]. This substrate filters through the cognitive and emotional processes also in the ways in which we elaborate visions of the world, especially in all those types of technologies that are based on the relationship in order to be performative (machine learning, AI, blockchain, IoT, total no-gate solution).

1.2 Distributed Technologies: Strengths and Weaknesses of an Announced Technological Revolution

According to many experts, the blockchain and more generally distribute technologies [DTs] represent the most suitable candidate technologies capable of maintaining an immutable log of transactions happening in a distributed network, building a truly decentralized, trustless and secure environment for the IoT [11], representing the infrastructure of reference for the operation of this “spiderweb of intelligent objects” [12]. The most known DTs are represented by the blockchain, namely, a digital ledger that allows for verification without having to be dependent on third-parties. When the blockchain first term appeared, in an article of 1991, it referred an abstract description of “a cryptographically secured chain of blocks” [12]. However, Nakamoto, an anonymous person (or group of persons) is universally recognized being father of the blockchain formally theorizing the blockchain technology [13] and implementing it (in 2008 and 2009, respectively) as a core component of the cryptocurrency Bitcoin. From this starting point, the theoretically-disruptive impact of DTs has been addressed as response that offers benefits in several other domains of application. But, along with the benefits, the worries have also grown. In the Table 1 we resume the most evident potentiality as well as weaknesses of DTs.

Table 1. Most evidence-based strengths and weaknesses of DTs.

Strengths	Weaknesses
<ul style="list-style-type: none">• Validating identity management, without the use of an independent third party mainly in education and training fields [14, 15]• Storing trade-able information records and transactions to foster smarter business supply chain [16]• E-governance tool for creating decentralized platforms for storing, sharing and verifying qualified public services [17]• Enabling green energy technology for low-carbon transition and sustainability [18]	<ul style="list-style-type: none">• Global undefined personal data protection due to the “eternal” feature of DTs; privacy issue [19]• Far slow process to certificate that all nodes in the network come to an agreement that the transaction is valid; double-spend issue [20]• Disproportion between the growth of the distribution network and the quality and the amount of the nodes that constitute it; mining issues [20]• Expensive energy consumption technology [21]• Futuristic and still intangible technology [21]

1.3 “Distributed”, the Quality Beyond the Border of Technology: The Case of PERSONA Project

Despite the many qualities and faults, DTs cannot be totally considered as hoaxes or, opposedly, as revolutionary not only because they are too new technologies to be assessed. Rather, the crux of the matter concerns the *ontological* transformation – if we may say so – DTs concurs to promote of the “border of technology”. Thinking of technology as a rationality that designs smart and intelligent “agent” (robots,

autonomous vehicles, artificial intelligences) means failing to see an important facet. So that these devices can work best, technology must be rethink beyond the border that previously separated the agents from their environment. This distinction has been reconceptualized and we have to assume it in form of a flow that relates agent and environment within enabling *architectures*. Against this backdrop, “distributed technology” is no longer a defined type of technology – such as blockchain or distributed ledger technology – rather it becomes an interpretative paradigm of technological development. “Distributed” is the environmental characteristic that will characterize future integration between moral agents, technological architectures, and security systems to overcome the current practices of “border”. From this point of view, an interesting case study is represented by the EU project PERSONA of which the authors of this paper are partners [22].

The project does not deal with DTs commonly understood. Its main aim is to design and establish effective methods in order to carry out an impact assessment of no-gate border-controlling technology. Nevertheless, the distributed nature of the no-gate technologies, theoretically, favors the integration and facilitation both of crossing the border (*i.e.*, no-gate solution), and controlling people (*i.e.*, intensive use of technology to handle personal data and risk of data manipulation). Precisely this new possibility of combination makes important the role of decision-making and ethics in guide distributed technology.

1.4 The Importance of Ethics and Decision-Making to Guide the Environmental Architecture of Technology

For many years we have become accustomed with physically technological artefacts that constituted a “presence” in the world. They needed to be crossed, to be installed, and “power supplied” by switching or physical operations. In this sense, DTs aims to be no-gate, flowing, environmentally installed, and monitored by other technology and as much as possible designed for self-supply. Philosophically speaking, it seems a move from *presence* to *absence*. Against this backdrop, such a configuration needs also to be accompanied in its progressive development according to two guidelines:

- *Decision-making.* The rules of the decision represent the main technical and regulatory aspect for the good functioning of the system and its elements. Therefore, both decision-making rules relating to the experience of the agents (transparency, security, privacy, immutability) and decision-making rules relating to the maintenance of the distributed nature of the environment (adaptability, resilience, level of consensus, trust) are important. Agents well educated to the distribution but living in an environment without rules and not very protected, end up succumbing to external attacks. On the contrary, a too top-down and vertically managed environment that protects itself from everyone, including its elements, loses the essential quality of distribution in the long run.
- *Ethics.* For guaranteeing the accurate balance between the instances of agents and those of environment, the decision-making process needs to be guided by rules that respond to ethical principles. Ethics gives the rules the value-laden contents that allow rules not only to be observed as “commands”, but to be chosen as an intrinsic

and rational aspect of a more universal vision [23] or, in the case of an artificial intelligence, as an agent performing different levels of abstraction [2].

2 Distributed Technologies, Trust, and Governance of Democracy

2.1 Trust, a Complex Human Feeling

It is commonly believed that trust has to do with having moral certainty and security, but it also includes the idea of risk [24].

Trust therefore moves between two opposing poles, on the one hand security, on the other vulnerability. It plays an important role both at interpersonal and impersonal level. But as the classical theorists of sociological thought – among others Georg Simmel and Émile Durkheim – trust is a pre-contractual element of social life, that is, with those basic solidarity and implicit cooperative agreement (both moral and cognitive) that allow to ‘hold together’ the society. In impersonal systems such as economics or law, trust develops a general social bond that leads to the internalization of common values, that is an active adherence to the normative order [25], or to a blind mechanism of adhesion to society released from the motivational structures of the actors [24]. Finally, at the political level, trust is the moral basis of the consensus that allow the legitimacy of the institutions [26].

2.2 Are We Experiencing a Real “Crisis of Trust”?

Today, many facts of the reality speak about a “crisis of trust”. Rachel Botsman in a recent book [27], analyzing the 2017 report of *Barometer of trust*, underlines how the trust regarding the intermediate bodies of society is the lowest of recent decades. The most interesting aspect is that the people interviewed said they had lost confidence not only in governments and private companies – a consideration perfectly explainable in the view of the ongoing economic and political crisis – but also for media and NGOs, thus those agencies of society that should act as a critical marker of democratic values such truth, cooperation, solidarity, etc. By the 82% of the contexts surveyed, media are considered part of the elite. This misrepresentation has caused an implosion of trust in participatory processes and generated a parallel tendency to prefer self-referential truths and rely on own peers. It seems that people try to confirm the beliefs already they have, often turning to people they already know. Today trust and influence are directed more towards “people” – family members, friends, classmates, colleagues – than towards hierarchical elites, experts and authorities.

However, social behaviors that seem to disconfirm this negative picture are observable in society. An interesting study is the *Science Barometer*, a representative survey of German citizens on science and research: The 2018 report shows that, despite the mentioned hostility towards elites, the public trust in science and research remains stable. But above all, the phenomenon of greater empirical relevance is the fortune of global companies that operate in the online marketplace. In a society apparently closes to the hierarchical elites, where individuals’ preferences count more than abstract

institutions, it happens inexplicably that millions of people share billions of sensible personal data on remote and de-materialized platforms, sharing imagines, memories, emotions with virtual (often unknown) contacts on social forums.

Is there an effective crisis of trust?

2.3 The Crisis as Change of Trust-in-Governance Model

It is evident that trust, even today, remain the same complex feeling between risk and inclination, egoism and reliance. The novelty is rather represented by the fact that we are faced with a *profound transformation of the models that link trust and governance*. From an era of *centralization of trust*, we have come to progressively more *decentralized* forms until today where an era of *distributed trust*.

The main advantage of the distributed trust model is that it brings the community of experts closer to the community of stakeholders, the flaw is that it remains a model of engineering computing [28].

2.4 Democracy for Trusting Distributed Technology

Nevertheless, these models outlook *how* trust has changed, but they do not explain *why* trust changes in this determined way, nor do they offer counteractive tools to intervene in case the human development should not be directed as desiderata. Although these models fit into an appreciable and shareable interpretive line – i.e. the environmental character of DTs favors transparent and secure processes of decision making and theoretical respect of fundamental ethical principles – however, they alone are not enough to guarantee democracy. Extra distributed decisions and deeper ethical load are not a sign of better democracy. From the point of view of distribution, as economist Amartya Sen has argued, a more transparent and equal distribution has little meaning if we do not understand the weight that the distributed good has in the capacity of individuals to realize their life plans [29]. On the other hand, if we mean ethics as respect for fundamental human values, it is not enough to make those values a real practice. There is no proportional automatism between more distributed technology and better ethical quality of life. Such automatism is but a possible version of how the two can be governed together. Therefore, the definition of decisions and ethical values are *necessary* aspects so that trust can be a constituent of DTs architectures, but they are not *sufficient conditions*. Sufficiency is reached when decisions and ethical values are “problematized” rather than “defined”. Problematic in the sense of being subjected to the democratic scrutiny of the public discussion. Problematization is the better distributed form of governance of democracy. It does not mean inventing difficulties where there are not, but rather enhancing democracy as an *epistemic* [30] and *communicative* [31] space to offer and to take reasons. Democracy is a problematization of facts in view of better collectively participated solutions. In so doing, DTs will help people to regain the trust in institutions, that is providing political decentralizations that give citizens or their elected representatives more power in public decision-making [32].

3 Conclusions

No-gate border-controlling technology, IoT, blockchain, multi-agent platform, and any other DTs can increase the perception of reality, but this does not in itself imply an increase in democratic quality of the empirical experience. The positive philosophical aspects of the DTs – emphasizing decision-making and ethical principles at the center of the policy agenda – are just the initial step (and not the solution) of the slow integration of the digital revolution with the human development and the environmental eco-sustainability. The return of philosophy as insightful disciplines in constructing the world does not simplify things, nor complicates them, simply *questions them* in the positive sense, that is, makes them more democratic. In this sense, DTs and democracy will converge if the former will provide the latter an informational and socialized space to trust the democratization of the decision-making mechanism. We need more distributed technological media to enhance the dialectical game of democracy: giving and requesting public reasons to discuss socially-relevant facts, to involve citizens in public consultations, to deliberate solutions that solve the actual problems but, at the same time, create responsibility and accountability for the future sustainability.

Acknowledgements. This work is supported by the project PERSONA funded by the European Union's Horizon 2020 programme EU.3.7.6. under grant agreement No. 787123.

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