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Blockchain and clockwork trust

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ABSTRACT

This article investigates the hypothesis that we can understand blockchain technology as a mechanization of trust. As inspiration, the author accesses the categories introduced by Bernard Stiegler, especially grammatization and proletarianization. The reflection on the social relation of trust and its mechanization in processes based on blockchain technology develops in the direction of the analysis of the way social time is generated in the process of "digging". The thesis is that blockchain is not only a mechanized ledger, but also has a more complicated function similar to the role played by subjectivities who generate social time in Jacques Lacan's concept of logical time. Only the appearance of time modalities, present, past and future, can guarantee a common memory of the past, which is the condition of the possibility of trust.

KEYWORDS

blockchain; automatization; mechanization; grammatization; trust; social time; Bernard Stiegler; Satoshi Nakamoto; Jacques Lacan

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> Always decode, chatters schizoanalysis; believe nothing, and extinguish all nostalgia for belonging. Ask always where capital is most inhumane, unsentimental, and out of control. [...] Always recode, the text of deconstruction tells us, but each time more subtly, more elusively, developing a little further the law's protracted parody of itself.
>
> Nick Land, *Making it with Death* (Land, 2012: 264).

THE MECHANIZATION OF THOUGHT

The French philosopher Bernard Stiegler[1] attempted to bridge the gap between academic humanities and the language of modern technology, also demonstrating that the process of the exterritorialisation and automatization of signs and symbols had started a long time ago. It was already with the introduction of writing that knowledge was made external and independent of the particular humans who formulate it. Stiegler termed this "grammatization". The problem goes back to Plato's arguments against writing and was discussed by many philosophers in the 20th century, including Jacques Derrida (Derrida, 2013), who insisted that every text should bear the author's "signature".

However, it is often noted that both oral and written discourses are incapable of conveying the colour, smell and specificity of inner experience. Is not language itself, including spoken language, a structure stabilizing experience? This occurs thanks to the system encoded in grammatical relations, modes, clauses and tenses, which help one to externalize the complex existential space of human beings. This internal topology becomes literally subject to some kind of "grammatization". Heidegger's struggle with the metaphysics inscribed in language was precisely an attempt to reverse this primordial process, which caused fixed logical clauses to obscure the clearings where truth appears.

Historical development has caused grammatization — the process of the exterritorialisation and autonomization of symbols — to be staggering and far-reaching. Stiegler points out that during the Renaissance its scale multiplied owing to the invention of print, above all by greatly increasing the accessibility to knowledge as fixed in symbols. The next step was the mechanization of work:

> the process of grammatization as spatialization, reproduction and repetition of gestural time. Gestures are thus turned into the automatic movements of the machine, just as speech became text at the time history began to take the form of *Geschichte*

[1] This discussion primarily refers to Bernard Stiegler's *States of shock: Stupidity and knowledge in the 21st century* (Stiegler, 2015).

> (and just as today, with digitalization and vocal synthesis, speech is automatically "written" and "read") (Stiegler, 2015: 332).[2]

Replacing physical toil with machine power has unbelievably increased the scale of work performed, providing the necessary conditions for the transformation of work into capital. Nowadays, however, not only symbols themselves and simple actions are being externalized, but also thought processes — work that can be done using symbols. Photography and film certainly paved the way, but it was the advent of computers, including home computers, as well as smartphones and artificial intelligence (Stiegler, 2014: 137–140) that exponentially increased the speed and complexity of ever-autonomizing processes.

In the 20th century, these processes, or grammatization, have had an increasing impact on what successive generations would think about and how, willingly submitting to "formats" imposed by the architecture of externalized thought. It has been already established that social media, streaming portals and personalized advertising have become a significant factor in determining both the content and form of thought, combining the promise of easy access to pleasure with immediacy and a lack of deferral or mediatization. The ensuing disappearance of theoretical thinking was described by Stiegler as: "a process of generalized proletarianization [...] that liquidates all forms of knowledge, including and especially, today, theoretical knowledge" (Stiegler, 2015: 123).

What Stiegler calls proletarianization is the result of the transfer of knowledge into the "machinic" domain. This fundamental process of transfer is severing the connection between thinking and individual or collective subjects. In result, there emerges a space that encompasses both subjects and machines, which are linked by common flows and movements. According to Stiegler, complex social relations and their representation in theoretical thinking are being replaced by mechanized and algorithmized procedures. This process, initiated by the invention of writing and extending from Gutenberg's revolution to modern means of communication and the Internet, has changed the nodes and "master signifiers" of the entire process of distributing knowledge and energy. Finally, it is a process that creates one of the most important "devices" — in the Deleuzian sense — of the future. It gives opportunity to the development of a new level of social control, unattained before. Stiegler quotes an interview with Jérémie Zimmermann, computer scientist and human rights defender:

> The major problem is the so-called baseband chip that is found at the heart of the device. All communications with the outside — telephone conversations, SMS, email, data — pass through this chip [emphasis — A.L.]. More and more, these baseband chips are fused with the interior of the microprocessor; they are

[2] Stiegler draws inspiration from Gilbert Simondon's reading of passages about the machine in Karl Marx's *Grundrisse* (Stiegler, 2015: 329, n. 36).

> integrated with the main chip of the mobile computer. Now, none of the specifications for any of these chips are available, so we know nothing about them and cannot control them. Conversely, it is potentially possible for the manufacturer or the operator to have access, via these chips, to your computer.[3]

For our perspective, however, the most important is the moment when the automatized control replaces the relation of trust.

AUTOMATIZATION OF THE RELATION OF TRUST

One of the pinnacles of the automatization and grammatization of trust relationships are cryptocurrencies, among which Bitcoin is the best known, and the supporting blockchain technology. This is particularly true in areas where trust has long since moved from a personal, private relationship based on good will (or bad, in the case of perfidy) to a network of relationships among anonymous individuals. With the birth of modern mass societies the latter form has been already institutionalized through legal and procedural coercion or control; for example in market contracts that assign greatest importance to the commodified part of an interpersonal relationship and are guaranteed by the sovereign's delegates — tribunals and polices of different kinds. In this sense the essential transformation of the trust relationship from one based on a personal relation with all modalities possible in such a situation to something controlled by the institutionalized society started already long ago.

Thus in the mass society, up until the end of the 20th century, there was always a third party involved, one guaranteeing trust, usually in the written form of traditional registers and books replacing memory. Simple ledgers, in use for a long time, are a good example of such an exteriorization. In this light, the definition of blockchain provided by Henrik Suikannen is informative: "Blockchain is a decentralized ledger which facilitates trust and makes peer-to-peer transactions possible without a third party authority" [emphasis — A.L.] (Suikkanen, 2017: 1).

This definition outlines two basic functions of a ledger where records are kept not in any traditional form but online. To begin with, an ordinary ledger contains records of all past transactions, but only ones made by a single company, and is based on the public-trust profession of an accountant, who acts as the third party that guarantees the correctness of the exchanges and the accuracy of the records. Accountants are also delegates of the sovereign, political power, their competence and integrity ensured through state examinations necessary to obtain appropriate licenses and credentials. Any abuses are

[3] Zimmermann, J. (2013). La surveillance est massive et généralisée *Philosophie magazine*, 19 September, quoted from: Stiegler, 2014: 138.

prosecuted by the state and severely punished — in this sense the voluntarism of the personal trust relation is replaced by coercion and control. If one enters the sphere of institutionalized trust, one must act in accordance with the coercive nature of the law and is controlled by its representatives. Moreover, the state forces accountants to protect themselves and their clients from risk of error through compulsory insurance. What this has entailed is a shift of trust from private and personal relationships to legally enforced ones. We can trust accountants because even if they make a mistake, we shall be reimbursed for our losses by the insurance company.

Blockchain ensures the integrity of ledgers without any third party or sovereign power, providing a different basis for trust: "all Bitcoin processing computers have access to a ledger that contains all transactions since the very beginning of Bitcoin, but all that can be seen are the public addresses used in the transaction" (Davolt, 2016: 5).

This allows one to access the records of all transactions made by all entities while all market participants have a unique identification that makes it impossible to connect nodes with real people. Moreover, with every new transaction, the entire history is verified. Thus proceeds the mechanization of memory, or its grammatization, in Stiegler's categories. It automatically controls the past, guaranteeing trust.

UNIVERSALITY OF BLOCKCHAIN TECHNOLOGY AND ITS POLITICAL IMPLICATIONS

In contemporary financial operations, blockchain technology could hypothetically replace hierarchical "ledgers" — where settlements between the accounts of individual banks are recorded at a central bank — with a constantly updating, non-modifiable and non-falsifiable "ledger" transmitted by network users to each other with each transaction. This means eliminating the hierarchical structure, or the third party that was supposed to guarantee the integrity of all operations and facilitate trust.

Incidentally, this may also apply to other social relationships that require institutionalized trust. For example, just like accounting books, land and mortgage registers, which record changes in property ownership, are also a system of trust guaranteed by the sovereign, whose delegate is the notary public.

Thus, if blockchain were to replace this and other similar systems, it would reduce the scope of the state's political sovereignty in favour of a networked system, or a "rhizome" described by Gilles Deleuze and Felix Guattari in their two-part study *Capitalism and schizophrenia*. This is also the political desire outlined in manifestos penned by proponents of cryptocurrencies. However, algorithms do not write themselves. They carry within themselves attitudes,

prejudices and the enthymematic arguments of their authors. Behind strings of binary characters entire epistemologies are hidden.

The algorithms behind Bitcoin were written by Satoshi Nakamoto. In his article "Bitcoin: A peer-to-peer electronic cash system" (Nakamoto, 2008) — published in the year of global crisis in confidence and trust, partly caused by failures of institutions meant to supervise and ensure the security of financial transactions — he clearly outlines how cryptocurrencies and blockchain work:

> The steps to run the network are as follows:
> 1) New transactions are broadcast to all nodes.
> 2) Each node collects new transactions into a block.
> 3) Each node works on finding a difficult proof-of-work for its block.
> 4) When a node finds a proof-of-work, it broadcasts the block to all nodes.
> 5) Nodes accept the block only if all transactions in it are valid and not already spent.
> 6) Nodes express their acceptance of the block by working on creating the next block in the chain, using the hash of the accepted block as the previous hash (Nakamoto, 2008: 3).

When a user opens a digital wallet in order to make Bitcoin transactions, thus creating a node, the entire history of all transactions made by all users is verified within twenty-four hours. Then, this ledger becomes recorded in the wallet and any attempt to forge it will generate errors. Nakamoto suggests that the growth of computer memory in the nodes will always outpace the increase in the amount of transaction data that needs to be verified.

THE IMPORTANCE OF THE TRANSFER OF EVENTS TO THE PAST

The temporal aspect of the blockchain operation, the relation of the past to the present, inscribed in the ledger, is of crucial importance. As we will see, the technology produces the temporal gap, during which the sequence of events can be inscribed. If the past moment would be indistinguishable from the present one, the control of the past operations would not be possible, as the inscription of events would have a chaotic character. Universal and absolute memory connected with the stretching of the present moment makes records of the past immutable.

The outstanding aspect of blockchain thus is the question of past production: mining, or digging. Problems of social time generation and of the certainty of the past connect with the general questions in the social sciences regarding socially shared time, addressed, for example, by Norbert Elias and Jacques Lacan. We will show how the networked blockchain technology somehow replicates the intersubjective process of the social time emergence described by the latter. This process appears as indispensable for the constitution

of the common past, which can guarantee trust and avoid discrepancy between the time of technology and the time of social relations.

In a networked world, near-simultaneity reigns supreme, with electric signals travelling almost at the speed of light. However, this can only be a quasi-simultaneity as new events in the network occur at individual nodes in different sequences. This is because the distribution of the information about events has a chaotic character — due to the minimal differences in the conduction time between nodes, different patterns representing the sequence of events can appear in different nodes. For the blockchain system this feature would produce a difference in the contents of the ledger and could be a way of working around the system.[4] The absolute and universal memory of the system, guaranteeing trust without the third party, would disappear. The question thus arises how the sequential difference can be neutralized.

Let's dig deeper into the question. The philosophical inference rooted in this technological reality evokes the question of the logical modes of the present, past, and future. Since Georg Wilhelm Friedrich Hegel and Søren Kierkegaard (Kierkegaard, 2009: 140–152), at least, we know that different temporal tenses have also different logical modes. The future can be seen in the modality of possibility or potentiality, the present as actuality or the real and the past with the attribute of necessity. This necessity of the past — which means also its immutability — is indispensable for maintaining trust, for each party can legitimately believe that in turning to the other it will meet them at the common point of reference, the same place of reality. This means that the common point of reference must be stabilized. It must be displaced from the inflated and chaotic present to the immutable past.

The production of the past is thus the answer. Since transactions are put in blocks, those from the same block are considered simultaneous. Each block in the chain has a specific place, pointing to the previous one in order to define the sequence of blocks. As all nodes must agree on a single, defined sequence of blocks, competition between nodes starts which will permit to one of them to determine the sequence. For it to happen, those that received the information first have to wait and delay registering until the last ones receive the same set of data. This requires one to create a quasi-lapse of time. To account for this, each block must contain the solution to a mathematical task common to all nodes. The task consists in transforming, using a special function, the contents of an entire block into a short string of characters that satisfy a certain condition. With all nodes in the network doing this in parallel, the time necessary to solve the equations is approximately ten minutes. Then, the node that

[4] User A sends information to user B that A is paying him for the goods (trans #1) sent by B. Then, user A sends information that he is paying from the same pool to himself (trans #2) and this information reaches most users earlier (trans #1), so that (trans #2) is added to the blockchain, while (trans #1) is not. In effect, user B loses both goods and money.

completed the task sends the solution to others, situating its block as the next in the sequence forming the chain. The first one is usually the node with the greatest computing power, or consuming the most energy.

Solving the mathematical task — which means wandering along the deductive reasoning which has to be, on a certain level of generality, similar for each node — stretches the "moment" in a way that causes events across the network to line up in the same sequence, turning the running times of individual nodes/users into a uniform time for the entire network. As in the "logical time" model described by Jacques Lacan (Lacan, 2006), "social time" emerges. It is social in the sense that it produces a common past for all nodes/users.

THE PHILOSOPHICAL SENSE OF THE LACANIAN MODEL

In the Lacanian rationale three people are stuck in the situation where they have to deduce their own symbolic identity, observing the identity of the two others. The one that achieves it first, will come out free from the trap. Their master tells them:

> There are three of you present. I have here five disks differing only in colour: three white and two black. Without letting you know which I will have chosen, I will fasten one of them to each of you between the shoulders, outside, that is, your direct visual field (Lacan, 2006: 162).

They will thus observe each other and — taking into consideration the actions of the other two — try to infer the colour fastened on their back. The essence of the sophism consist in the fact that every one solves the same problem — they have to represent in their mind the observations of the second one and of the third one, and then the deduction they make:

> I am a white, and here is how I know it. Since my companions were whites, I thought that, had I been a black, each of them would have been able to infer the following: "If I too were a black, the others would not have necessarily realized straight away that he was a white and would have left immediately; therefore I am not a black." And both would have left together, convinced they were whites. As they did nothing of the kind, I must be a white like them. At that, I made for the door to make my conclusion known (Lacan, 2006: 162).

As everyone needs the time to infer this conclusion, all three stop the movement. This makes the time pass. But at the moment, where they acquire certainty, they try to profit from it and they make the step in the direction of the door. All the three make that at the same moment, which gives them

the impression their reasoning was falsified in reality and all three stop. They infer then the new conclusions from the new situation and they start to move again...

In Lacan's mental experiment, subjects pause their actions in order to align with the actions of others who are doing exactly the same thing. The time emerges, as to make the representation of the mental operations of others, one has to repeat the sequence of their mental operations. They are doing it simultaneously. In the case of Bitcoin, nodes/users pause in order to align with others who are solving the same function. In blockchain technology thus, each actant — node — has to represent the sequence of events represented by the others in a simple string, and they are doing so also in parallel. The time necessary for the mathematical function to transform the extended sequence into the simple string becomes the "social time", necessary for the uncertain present to become an immutable past. Although there are important differences between Lacanian sophism and blockchain technology — the main one consisting in the fact that in blockchain technology one "node" achieves to impose its string to all others — the pause necessary to constitute the flow of universal time is the common feature of the two models. This pause is "produced" when the actants of the processes try to represent sequences of events occurring in the network in their "inner space".

CONCLUSION

Withholding direct action — both by humans (Lacan) and machines (Nakamoto) — generates the passage of time, which emerges in the spaces between relations, be they social or virtual ones. It is necessary for the present to become the past if blockchain is to turn into a unified ledger of transactions. Otherwise, it would be stuck in a quasi-permanent present, as in the case of computerized stock-exchange transactions since 1990. In Lacanian language we would say that for a sentence to acquire an unequivocal meaning, it is necessary to be finished, to be finalised with a full stop. Otherwise you could always add words and that would change the sense of the utterance.

For instance, for the sentence "This is a beautiful painting..." the meaning will change literally depending on whether it ends with a dot or a new word appears, e.g. "...however...". A sentence that is never completed cannot be displaced into an unequivocalness of the past because its meaning remains undetermined and can be retroactively changed. In the model of *Logical Time* the pause stopping the movement of subjects plays the role of the "dot" at the end of a written sentence.

The social creation of the past replaces the "endless present" and enables trust. Only located in the past, which is no longer subject to change, common

and unified knowledge, can become trust's condition. This social function has been traditionally played by accounting books, land registers and other forms of unifying knowledge.

Today, however, it is undergoing mechanization or, in Stiegler's vocabulary, automatization. Paradoxically, automatization of the emergence of social time, guaranteed in the process of digging, appears as the condition for the possibility of the mechanization of trust. Paradoxically again, the computerized "digging of the past" could be viewed as an automatized action aimed: "to reduce the disadjustment between the technical system and the social systems by preserving the latter" (Stiegler, 2015: 176), as Stiegler writes. Nevertheless, deeply embedded in the capitalist logic is energy exploitation, at the end it duplicates the given distribution of power. This subject, however, exceeds the limits of this paper.

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