

Towards self-determinant citizen governance: Trust-boosting Sociocracy 3.0 with Blockchain

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Abstract

This work introduces a novel technopolitical artifact that opens up the possibility for a system of *non-dominant citizen governance* that eliminates the representative layer and puts citizens at the top of the decision making process. A socio-political approach that arises by merging two disrupting technologies: Sociocracy 3.0 as an organizational technology for efficiently governing large, self-determinant organizations; and Blockchain as a digital reputation technology for overcoming the limitations preventing standalone Sociocracy 3.0 of being used in *organizations* governing the *public domain*.

1. Introduction

Recent years has observed an increase in the distrust of the citizenship in public institutions and the traditional governance systems (Castells, 2017). It is our understanding that the main reason of this distrust is that, despite all the improvements achieved since the advent of democracy, it is still holding *representation* and *voting* as decision making mechanisms, resulting in a partially dominant system where large portions of the populations feels that many of their needs are excluded by the democratic decisions. Representation is dominant in that in most of today's governments, the ratio of representation is one to millions, making it rather impossible to representatives to processes all of his or her constituents' needs to achieve totally inclusive proposals. Voting is dominant as well, in that the majority's decision excludes those of the minorities.

The main contribution of this work is to propose a novel technopolitical artifact that addresses this issue, pushing forward the possibility of non-dominant societies (a.k.a. *self-determinant*), where no citizen can dominate others by forcing decisions that would hurt them. It is

our understanding that the best practical solution for self-determinant governance of organizations is the organizational method known as Sociocracy 3.0 (S3) (Priest & Bockelbrink, 2017), a largely improved implementation of the *Sociocratic Organization Circle Method* (SCM) (Endenburg & Bowden, 1988). Despite its disruptive organizational propositions, as we will argue in more detail below, S3 is not amenable to open, public environments that lack a certain minimum level of mutual trust, as private closed domains has. Our contribution is therefore completed by the proposal of incorporating a Blockchain-based reputation layer for trust-boosting the S3 method in open environments (Dennis & Owen, 2015).

This artifact opens up the possibility for a system of *citizen governance*, a new form of citizen involvement that eliminates the representative layer, putting citizens at the top of the decision making process. Such a system allows each citizen to participate in the decision making of all those issues that directly affects him or her; thus providing an *efficient* and *effective* process for *collective decision making* that guarantees inclusive proposals.

The problem of public distrust has been already addressed in recent years by a growing interest in innovative citizen involvement technologies, mainly through platforms for *citizen participation* that has seen an increase in importance since the advent of Information of Communication Technologies. These technologies opened up the possibility of larger portions of the population engaging not only in political issues but also social and cultural issues, leading to the emergence of a new technological niche of civic or social technologies known as *civic tech* (Duarte et al, 2015, Parra & Martins, 2017, Poblet, 2017). Most of these forms of political innovation in civic tech are designed for improving citizen political participation, whose main objective is helping the representatives to make their decisions more transversal, inclusive, and transparent. This is achieved by complementing their decisions with input from larger and more transversal portions of the population. In many situations this helps to mitigate one major impediment of the representational system by collectively producing proposals that address many more needs of the population than proposals tailored by solely the representatives and their immediate teams. However, citizen participation do not constitute binding models of citizen involvement in that at the end of the day, nothing prevents (and the system itself allows) the representatives to decide whether to act upon the collectively generated proposal, an amended version, or even a completely different proposal. *Citizen governance* is therefore a concept that we oppose to *citizen participation*, to stress self-governance of citizens effectively managing their social value with binding decision-making processes that overcome the distinction between elected representatives and citizenship. An equivalent, inclusive *citizen governance framework* for the direct, collective administration of value through collective information gathering, decisions making, and actions over the public domain of assets.

The problem of self-determinant governance has been already addressed In the private sector and the organizational theory literature, where it is better known as *dynamic governance*. *Sociocracy* (Endenburg & Bowden, 1988, Buck & Endenburg, 2012) is the oldest and first of these contributions dating back to the a nineteenth century. Also, there are several academic contributions in the context of organizational theory that produced several examples under the term *circular organizations* (Romme, 2003, Romme & Endenburg, 2006). The most recent contribution is Sociocracy 3.0 (Priest & Bockelbrink, 2017). An organizational framework that extends previous contributions with organizational patterns for agile operations, a novel structuring patterns between the autonomous organizational governance bodies (the circles). A key characteristics of all these methods is its *circular dynamicity*, an organizational pattern for periodically adjusting the governance body structure based on feedback from the “outer” layers of the organization embodied by its human members. This feedback is processed periodically by each circle (typically once a month), that could result in changes in the circle’s main purpose, its accountabilities (i.e., what it is offering as service to other circles), its internal structure of roles and sub-circles, and restructuring of its direct links with other circles.

Unfortunately, there is a key difference between private and public domains that renders these organizational frameworks ineffective as a system for the citizen governance of *public*

domains. The equivalence principle of these frameworks requires each circle to be open to any member sensible to its main purpose to participate. When open to the wilderness of the general populations, circles become vulnerable to ill-intentioned, lazy, or simply incapable individuals. This leaves the circles of almost no trace of mutual trust between its members, making it practically impossible for the circle to scale in the value it can produce. A similar scenario occurs among circles, leaving untrustful circles with no nurturing to express its purposes. To boost circles internal trust, private organizations use a recommendation system, both to incorporate employees in the organization (through recommendations of trusted institutions such as Universities or Companies), and to entrust newcomers in circles with high-value responsibilities. In a public environment trust is scarce, and thus recommendations from trusted parties, forcing S3 organizations in public domain to low-value activities. To scale the value managed by S3 public organizations we propose the integration of a Blockchain-based reputation system consisting on a collectively managed common storage of private, yet untamperable signed transactions (think of a bank account), eliminating any need of recommendations of (scarce or inexistent) trusted third-parties. Such a system would play a paramount role in a trust-boosting system when citizens share (willingly) their history of commitment transactions with their individuals or circles, that could when fed into an analytical tool of choice would provide a direct assessment of the other party's reputation. Interestingly, such a system maps exactly the capabilities Blockchains, being nothing else that collectively managed, untamperable ledges of signed transactions.

The rest of the paper is organized as follows. First, it discusses some background concepts and existing frameworks in Section 2; including in Section 2.1 a review of the major contributions in civic tech, an in Section 2.2 the main features of the Sociocracy 3.0 organizational framework for circular governance. Then, in Section 3 we present the main contribution of this work: a discussion on how the Blockchain-based reputation layer integrated into S3 overcomes the limitations of S3 to scale in value on open, public ecosystems. The work ends with a brief Discussion in Section 4 and some Conclusions in Section 5.

2. Background

2.1. Civic tech

In recent years there has been a worldwide massive arising of the so-called *Civic Technologies*, *Social Technologies* or *Civic Tech* (Patel et al., 2013), also defined as *Crowd-Civic Systems* (Poblet, 2017) or tools for *digital governance* (Parra & Martins, 2017). In this context, citizens, grassroots organizations, foundations, NGOs, research centers and start-ups have contributed to the emergence of a new technological niche that is giving hundreds of web-based services, platforms, apps and other socio-technological systems made up of people, digital technologies and data that have been designed to innovate in the forms of citizen involvement that not only repair in political action but also in cultural and social action, i.e., generating more sustainable urban spaces, improving citizens quality of life and health, solving problems of social exclusion and redesigning processes such as citizen participation (Duarte et al., 2015).

Some authors define civic technologies as platforms, applications and digital infrastructures promoted by civil society organizations, institutions and companies with the aim of involving citizens in public decision-making (Duarte et al. 2015). The willingness to increase citizen participation and to strength the transparency over public accountability management are among the main objectives of these artifacts (Duarte et al., 2015). Patel, Sotsky, Gourley and Houghton (2013) propose to categorize civic tools by differentiating between those that deal with (1) government data, i.e., access to public data and transparency, those which focus on (2) collaborative consumption, i.e., peer-to-peer exchange of goods and services, those dedicated to the practice of (3) crowdfunding, i.e., projects that improve public services and spaces, those which focus on (4) social networks, i.e., spaces based on a place and on the forums of a community, and finally, (5) those which aim to repair social causes and try to strengthen civic commitment.

On the other hand, Poblet (2017) proposes a taxonomy for the citizen participation crowd-civic systems artifacts that leverage some form of crowdsourcing, understood in this context as outsourcing input information from citizenship, such as, collecting data about candidate representatives and political parties or collecting ideas, comments, and petitions in a particular area, based on the different theoretical models of democracy and their underlying visions of citizenship distinguishing between: (1) liberal democracy, which is based on limiting deliberation and encouraging citizens to vote in electoral processes; (2) republican democracy, which considers necessary the political involvement of citizens in order to protect public interests or common good; (3) developmental democracy, where the proactive role of citizens is not restricted by the political sphere, i.e., citizens can reach agreements to improve the conditions of their communities; (4) deliberative / epistemic democracy, which considers that public deliberation, carried out by free and equal citizens, legitimizes political decision making and advocates for citizens to be active in the production of knowledge in a collaborative manner, i.e., make proposals or write legal texts.

To sum up, after an overview on the most outstanding civic tech artifacts referenced by Duarte et al., Parra & Martins and Poblet (Duarte et al., 2015, Parra & Martins, 2017, Poblet, 2017) such as: Pairwise, Liquid Feedback, Participate, Agora, Delibera, Decidim, Decide/Consul or Pol.is, it is noted that the vast majority share some general features: open source, designed to promote transparency, explicit goodwill on being technologically ethic, and scale-up oriented. However, no artifacts based on the idea of *self-determinant governance* have been found.

2.2. Sociocracy 3.0

Sociocracy 3.0 (a.k.a S3), is a methodological framework developed by Bernhard Bockelbrink, James Priest and Liliana David in 2015 (Priest & Bockelbrink, 2017) with the main objective of improving the implementation of Sociocracy (Edenburg & Bowden, 1988); a circular organizational model based in consent for collective decision making, developed by Auguste Comte in 1851. Sociocracy (1.0) was born as a social ideal for defending the right of people to participate in the decisions that affect the conditions under which they work and live, what was called the *equivalence principle*, and in parallel, as a dynamic method for collaborative governance of organizations. In this respect, Sociocracy is a social method based on the principle of self-determination, as defined by Romme (Romme, 1999).

Current democracies are still dominant in some respect as they are all implemented through a mixture of representatives (autarchic decisions) and voting (collective decisions). One of the main reasons is not political, but rather technological, in that including all interested parties in the decision process presents important complexity challenges. Voting is a well-known method for addressing this complexity, but it is efficient at the expense of exclusivity issues, were the interests of the minority are excluded in the proposal decided. On the other extreme is consensus, a methodology that guarantees all interests are included in the decision, but does not scale beyond a handful of participants. The main contribution of the Sociocracy framework is the introduction of the *Sociocratic Circle Organization Method* (SCM), a method that overcomes the complexity challenge while guaranteeing inclusive proposals. It is based in 3 principles: (1) Consent-based collective decisions where no proposal is accepted unless all parties consent, (2) Structuring of all parties in common-interest circles that take decisions collectively based on consent, and autonomously of other circles, (3) double-linking of representatives between circles to glue the organization together and producing a circular feedback for assessing the impact of a circle's actions over the rest of the organization (Edenburg & Bowden, 1988). Together, these principles results in an efficient method for self-determinant social governance.

Sociocracy 3.0¹ (Priest & Bockelbrink, 2017) is a modern adaptation of the SCM designed with the objective of improving the SCM over several fronts: (i) Reduce risk and restriction of adoption of integral, *all-or-nothing* solutions such as Holacracy (Robertson, 2007) or Scrum (Schwaber, 1997), by modularizing the method in a collection of patterns that can be adopted

1 www.sociocracy30.org

independently of each other, (ii) Inspired by *Non Violent Communication* (Rosenberg, 2005) and basic economical tenants, it shifts focus of circles from *purpose* to *need*, making much simple the application of the *equivalence* principle, by making self evident to people which circles are making decisions that affects them, (iii) Incorporates patterns for both operations and collaborations based on *Agile* and *Lean* mechanisms (Ohno, 1987) to help circles address complex tasks collectively, and (iv) Increase structural flexibility by providing patterns for structuring the circles beyond a hierarchy, the structure proposed in SCM, into more complex patterns that could even break beyond single organizations.

All these improvements has been integrated over 70 patterns and summarized in the following seven principles:

- **Consent:** Do things in the absence of reasons not to.
- **Equivalence:** Involve people in making and evolving decisions that affect them.
- **Continuous Improvement:** Change incrementally to accommodate steady empirical learning.
- **Empiricism:** Test all assumptions through experiments, continuous revision and falsification.
- **Effectiveness,** Devote time only to what brings you closer towards achieving your objectives.
- **Transparency:** Make all information accessible to everyone in an organization, unless there is a reason for confidentiality.
- **Accountability:** Respond when something is needed, do what you agreed to and take ownership for the course of the organization.

In essence, the *consent* and *equivalence* principles makes S3 a *self-determinant* governance system that guarantees no decision is made against the will of no individual; the *continuous improvement* and *empiricism* principles makes it a *circular organization* that can evolve both its structure and operational decisions based on feedback from empirical observations of both its internal mechanisms and external environment; and the latter three principles *effectiveness*, *transparency* and *accountability* simply makes it an effective governance system.

S3 does not provide a dedicated trust-boosting mechanism. Instead, it uses the most natural human mechanism for boosting trust: human relationships. As it has been argued, this lack of trust-boosting mechanism would be problematic for open circles, where this natural trust would be scarce as long standing relationships are harder to build up. . Furthermore What S3 do provides is a protection against this lack of trust protection, the consent based mechanism used by the SCM for collective decision making embedded in the SCM, that give individuals the power to block any proposal that he or she does not trust by simply raising objections against them. As a consequence, without a minimum trust between a circle's members, such a strong lack-of-trust protection mechanism could stop the circle's operations to a halt. Some minimum trust is necessary, This is not a problem in closed systems where all members are either known or are vouched by known third-parties, but could be problematic in open environments where it is not uncommon that newcomers come lacking any trustful credentials. We recognize two negative consequence of SCM operating in untrustful environments:

- The underutilization of the new human resources, i.e., assigning them tasks for which they are overqualified, limiting the expression of their full potential.
- The underutilization of their opinions, suggestions, strategic capacity or know-how.

3. Blockchain-based reputation for scaling up Sociocracy 3.0 to public domains

This section discusses the main contribution of this work: a discussion on how a Blockchain-based reputation system integrated to Sociocracy 3.0 makes the latter scalable to public domains. Being

Sociocracy 3.0 a self-determinant governance system, scaling it to the public domain promises a technopolitical artifact that pushes forward the possibility of a self-determinant citizen governance system that would address current distrust in the current, partially dominant democratic system based on representation and voting.

S3 and its predecessors, the Sociocratic Circle Method and Holacracy, has shown to be successful in private organizations, companies such as Zappos, Medium, Kolibri, Impact Hub Amsterdam and 30 more known organizations are Holacracy governed², and there also several examples of organizations managed by Sociocracy such as CitizenHive, Myweels, DarkHorse, Endenburg electronics or the School of Media, Culture, and Design from Woodbury University (USA)³. However, to the best of these authors knowledge, there has not yet been a successful attempt of implementing such a system in organizations for managing the public domains. In this section we present what we understand are the reasons for this limitation, while explaining why the Blockchain-based reputation system is a valid solution.

There is a key difference between private and public domains that renders these circular organizational frameworks ineffective as a system for the citizen governance of *public* domains. The equivalence principle of these frameworks requires the participation in each circle to be open to any citizen sensible to its main purpose. When we require such a system to be inclusive to all members of societies, we open it to the wilderness of the general populations, exposing its circles to ill-intentioned, lazy, or simply incapable individuals.

Private organizations, instead, are protected social environments that filter the entrance of members through careful recruiting processes, guaranteeing a certain minimal reputation through a portfolio of credentials and recommendations from trusted third-parties (e.g., University degrees, recommendations from known companies, recommendations from University professors, etc). This filtering process guarantees a minimal level of trust between employees of the same company, that even when completely unknown to members of some circle, are welcomed nonetheless. Without this minimum trust, a common situation in a public (open) organization, the circle would never entrust newcomers with valuable responsibilities until they've built up a reputation, an extremely long process that may take months or years, too slow for a dynamic governance system such as S3.

Widely spread untruthfulness within a circle strongly limits the circle's ability to achieve its purpose, a problem exacerbated when achieving the purpose implies the execution of collective actions managing valuable resources.

The same holds among circles. Whenever a circle itself is untrusted by other circles it would never obtain valuable request that would nurture it with the necessary resources to express its purpose. Both this sources of untruthfulness could be catastrophic to a circle, ending with its extinction when enough members leaves it disenchanted by the fact that the circle's purpose is unattainable.

We thus see that private organizations provide a trust system that guarantees an S3 organization to thrive, mostly based in a trusted recommendation system to boost trust between members of a circle, and between circles. In a public ecosystem, however, prior reputation of other parties is scarce, resulting in most recommendation being in themselves untrustful, rendering useless the bootstrapping system of reputation currently used in private organizations. So, the main point of failure of a public trust systems is this need of recommendations from, scarcely available, third-parties with known high reputation (legal system). ¿Why don't we get rid of the middle-man then? We thus propose as a solution integrating into S3 a community maintained trusted recommendation system that would allow each individual or circle to request, on-demand, the issue of reputation credentials.

To start, we must understand what trust is made of in S3. Achieving a circle's purpose implies producing inclusive proposals to then collectively execute them, properly and in timely fashion. Being an inclusive proposal, the outcome of the collective action is clearly in the benefit of all parties, but only when all parties *cooperate*, i.e., execute their assigned individual actions

2 <http://structureprocess.com/holacracy-cases/>

3 <https://evolvingcollaboration.com/who-is-using-sociocracy/>

properly and in timely fashion. But as exemplified in the well-known prisoner's dilemma (Rapoport et al., 1965, Axelrod, 1980), individuals has the incentive to *defect*, i.e., do not execute or delay their assigned action, whenever they are in believe that some other individual may defect. Only the belief that other would defect is enough to endanger a successful collective action. This proves that what we need is a *trust-boosting system* for providing individuals with the means to boost their beliefs in others cooperating or defecting. To compute these beliefs its is therefore sufficient the complete history of cooperations and defects of the other party. More precisely, a ledger of what we call *commitment transactions*, initiated when somebody commits to execute an individual action in some circle, and completed with a circle's evaluation of his/her performance, e.g., the labels *cooperated* or *defected*.

For instance, on-demand, an individual could request the public recommendation system to issue the history of *cooperation and defects* it had with some subset of the total number of circles he or she ever actively participated in, and share it with a circle he/she has just become a member. The main purpose of this registry is not public scorn, so histories should be kept private to each user, and issued to requesting parties only upon approval of its owner. Upon receipt of some history of *commitment transactions*, the requesting party could feed it to any analytical tool of choice to directly assess the other's reputation.

The final step is to propose an implementation of such a recommending system that would guarantee it could be absolutely trusted. For that, it should guarantee that: (1) Only the involved parties (e.g., an individual and the circle in which he/she performed the action) should be able to record commitment transactions, (2) No one, not even the involved parties, should be to tamper with the history of transactions; neither adding dummy transactions with good evaluations, removing existing transactions with bad evaluations, nor modifying the evaluations. Interestingly, such a system maps exactly the capabilities of Blockchain, being nothing else that collectively managed, untamperable ledges of signed transactions.

3.1 Blockchain as a trustful storage of commitment transactions

Blockchain has been recently highlighted as a technology with the potential to reconfigure our systems of trust for purposes other than financial (Radu, 2015).

Let us now explain what makes a Blockchain suitable for addressing the main requirement for scaling up S3 to the public domain, rendering it appropriate as part of a citizen governance framework.

As argued above, for S3 to scale up to the public domain it should be equipped with a trust-boosting system that would not depend on trusted third-parties for issuing recommendations. We proposed for that a system for registering the complete history of commitment transactions that each citizen may have had with any circle it ever interacted with. To be trusted, it should guarantee that: (1) Only the involved parties (e.g., an individual and the circle in which he/she performed the action) should be able to record commitment transactions, (2) No one, not even the involved parties, should be able to tamper with the history of transactions; neither adding dummy transactions with good evaluations, removing existing transactions with bad evaluations, nor modifying the evaluations. Interestingly, these requirements are exactly those promised by a Blockchain.

Let us then see what is a Blockchain. Simply put, a *blockchain* is an *untamperable community maintained ledger of signed transactions*. Let us break this in parts to understand it fully. By a transaction we understand an operation of registering information in the ledger, in sequential order. An example of such information could be accountings transactions of money transferred between parties, or any agreement in general, as could be simple the commitment of performing certain task, as it is the case discussed in this manuscript.

A *signed transaction* is one in which both parties sign it electronically through cryptographic signatures. This operation not only certifies their identities, but certifies that both parties agreed on

registering the transaction in the ledger. In other words, no one could register transactions in the name of others.

A Blockchain is also a ledger whose content cannot be tampered with, that is, no transactions could be deleted nor added, nor the content of each transaction could be modified by single individuals nor small groups (relative to the size of the community). Finally, it is maintained by a community, meaning not only that no external or specialized entities are required to process the transactions, but that the digital storage of the information itself is managed by the personal computing devices of the community. We thus see that a Blockchain-based reputation system satisfies both conditions for a storage system of commitment transactions.

Last but not least, a Blockchain-based reputation system would also overcome the major challenges of previous generation of distributed reputation systems over peer-to-peer networks: the requirement of fully trusted servers, based on tamperable distributed databases, identity of users may be duplicated, difficulty to resist ratting and collusion attacks (Dennis & Owen, 2015).

4. Discussion

This work aims to argue that extent to which, the described technopolitical artifact of S3+Blockchain is an efficient and effective framework for *citizen governance*, i.e., a framework for self-determinant governance over open social systems.

The whole argument is based on the assumption that trust is the only limitation for scaling up S3 to open systems. This begs the question of ¿What other cause, not already discovered, could prevent, limit or even block the success of the S3 as a framework for governance in open systems? An actual implementation of the artifact proposed -operating live over a human group in a simulation or in real context- has the potential to provide answers related with this topic.

Furthermore, there is also an intuition that a deeper validation of reputation as a trust-booster is needed, together with the consideration of other mechanisms for trust-boosting not based on reputation. In particular, the authors would like to explore to what extend the mutual knowledge of the real, underlying, subjective drivers of any two individuals (or circles) could be the basis for a stronger and more effective trust-booster. After all, ¿what better trust could one have on others that knowing that defection it is against their own drivers ?.

5. Conclusion

In this paper we have discussed the requirements for scaling Sociocracy 3.0 as a framework for citizen governance. First we showed that standalone S3 is insufficient as a framework for governance in public domains. As argued, S3 has no trust-boosting in itself, and this is problematic in open organizational system, where the inherent lack of trust may results in pour circle's operations due to the underutilization of untrustful human resources. We therefore proposed an extending it with a trust-boosting system based on Blockchain.

The core of our contribution is in Section 3, were we introduced the trust system for S3 based on Blockchain. As argued, boosting the trust of some entity in S3 (either person or circle) requires only its historical transactional records of commitments to execute actions, paired with the socially evaluated performance (e.g., cooperate, defect). To assure privacy and avoid public scorn, transactions should be private. With this information at hand, provided willingly by its owner, any other entity could compute (with his/her algorithm of choice) a belief on whether that entity will or will not cooperate in the future . We concluded the Section by arguing that Blockchain satisfies all the technical requirements of such a transactional system, being untamperable and signed.

Thus, as it has been argued, with a trust system in place, S3 becomes a viable citizen governance system for the public domain that is efficient, trustable, thriving, and most importantly self-determinant, with collective decisions that affects no one negatively.

5. References

- Atzori, Marcella. (2015).** Blockchain Technology and Decentralized Governance: Is the State Still Necessary?. Available at SSRN: <https://ssrn.com/abstract=2709713>
- Axelrod, R. (1980).** Effective choice in the prisoner's dilemma. *Journal of conflict resolution*, 24(1), 3-25.
- Buck, J. A., & Endenburg, G. (2012).** Sociocracy: The creative forces of self-organization. *Rotterdam: Sociocratic Center. The Netherlands, Tech. Rep. Retrieved May, 8, 2015.*
- Dennis, R., & Owen, G. (2015).** Rep on the block: A next generation reputation system based on the blockchain. In Internet Technology and Secured Transactions (ICITST), 2015 10th International Conference for (pp. 131-138). IEEE.
- Duarte, J. M. S., Huertas, M. V. B., Rosa, R. M., & Caffarena, V. A. (2015).** El papel de las tecnologías cívicas en la redefinición de la esfera pública/The role of civic technologies in the redefinition of the public sphere. *Historia y comunicación social*, 20(2), 483.
- Castells, M. (2017).** Ruptura: La crisis de la democracia liberal. Madrid: Alianza Editorial.
- Endenburg, G., & Bowden, C. W. (1988).** Sociocracy: The Organisation of Decision-making: "no-objection" as the Principle of Sociocracy. Stichting Sociocratisch Centrum.
- Ohno, T. (1987).** The Toyota Production System (Doctoral dissertation, Monterey Institute of International Studies).
- Parra Filho, H. C. P., & Martins, R. A. P. (2017).** Governança digital como vetor para uma nova geração de tecnologias de participação social no Brasil | Digital governance as a vector for a new generation of social participation technologies in Brazil. *Liinc em revista*, 13(1).
- Patel, M; Stocky, J; Gourley, S; Houghton, D. (2013).** The Emergence of Civic Tech: Investments in a Growing Field. Knight Foundation.
- Poblet, M. (2017).** Towards a Taxonomy of Crowd-civic Systems. Working paper. Forthcoming at: Linked Democracy. Foundations, Tools, and Applications (Springer Open).
- Priest, J., & Bockelbrink, B. (2017).** Sociocracy 3.0. *Sociocracy30.org*, 2017.
- Radu, R. (2015).** Blockchain and the Future of Governance. Available at SSRN: <https://ssrn.com/abstract=2670823>
- Rapoport, A., Chammah, A. M., & Orwant, C. J. (1965).** *Prisoner's dilemma: A study in conflict and cooperation* (Vol. 165). University of Michigan press.
- Robertson, B. J. (2007).** Organization at the leading edge: Introducing Holacracy™. *Integral Leadership Review*, 7(3), 1-13.
- Romme, A. G. L. (1999).** Domination, self-determination and circular organizing. *Organization Studies*, 20(5), 801-832.

Romme, A. G. L. (2003). Making a difference: Organization as design. *Organization science*, 14(5), 558-573.

Romme, A. G. L., & Endenburg, G. (2006). Construction principles and design rules in the case of circular design. *Organization science*, 17(2), 287-297.

Rosenberg, M. B. (2005). *Nonviolent Communication: A Language of Compassion*. W. Ross MacDonald School, Resource Services Library.

Schwaber, K. (1997). Scrum development process. In *Business object design and implementation* (pp. 117-134). Springer, London.