

S3LF: a Socio-Technical System for Self-Determinant Governance in Collaborative Organizations

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Abstract

This work presents S3LF, a socio-technical system in the form of a mobile application for facilitating a *digital self-determinant governance experience* in collaborative organizations. It consists of a technologically mediated adaptation of the decision making framework Sociocracy 3.0 a.k.a S3, turning it into an asynchronous and remote process with a facilitation mediated through the user experience (UX) and interaction design. S3LF enables digital and distributed organizations such as Collaborative Networked Organizations (CNOs) to adopt self-determinant governance

methodologies such as S3, and promises a faster onboarding into self-determinant governance and higher throughput of self-determinant decision making. Furthermore, we introduce in S3LF a self-diagnosis module that reports the level of self-determination perceived by each decision maker of the group for each decision made, over different contextual situations; whose analysis has the potential to allow organizations to self-correct dominant situations.

1. Introduction

This work presents a socio-technical system in the form of a mobile application we call S3LF, designed with the purpose of facilitating a *digital self-determinant governance experience* in collaborative organizations. In an organizational context, *self-determinant governance* refers to the implementation of organizational methodologies for collective decision-making based on consensus or consent, methodologies that enable people to freely *participate in every organizational decision they choose, and block* those decisions they subjectively believe may affect them either individually or to the organization (Endenburg & Bowden, 1988; Romme, 1999). By *digital governance experience* we mean that in practice the methodology for decision making is digitally implemented, that is, the practice of governance is *technologically mediated* (Schatzki, 2012; Latour, 1999), in this case through of a mobile application.

S3LF is presented as an artifact for *technologically mediated consensus-based collective decision-making*, with the aim of facilitating a digital experience of self-determinant governance. An approach that tackles an unexplored issue in the field of collaborative crowdsourcing and Human-Computer Interaction (HCI) (Bingham et al., 2015), that has the potential to offer distributed leadership solutions based on individual self-determination for new organizational typologies such as Collaborative Networked Organizations (CNOs) (Dutton, 2008). Precisely because of their distributed and multi-domain nature, these new organizations need to be self-managed in a digital and collaborative manner, since they emerge as a result of new opportunities for collaboration that arise in the processes of reconfiguration of access - between people, information, services, and other resources in the context of internet and the Information and Communications Technologies (ICTs) (Dutton, 2008).

There is no single model for CNOs, but rather models that encompass several possible levels of distributedness. One such level have the potential to be articulated on an initial capital constituted by an aggregation of individual resources, i.e., they allow ephemeral aggregations of individual domains to reach a shared objectives. Most of the examples described by the literature consider intangible resources such as private, proprietary or sensitive information. Regardless of the characteristic of the domain, in such CNOs, self-determination is not an option, but rather is given, as individuals maintain the authority to block any proposal of collective actions that impact on their individual domains. Such sovereignty over individual domains is not based on a predefined collective agreement, but rather it is implicit in the multi-domain model. Most of the use cases

described in the literature either implement their own governance methodology with conflict resolution capabilities, as it is the case for Wikipedia, or consider a dominant methodology in the form of a benevolent dictator. In the latter, members of the CNOs are subject to the risk of misuse of their sensitive resources. Should they choose to relax the dominance giving more sovereignty to individual users over their domains, they would require to implement a practical self-determinant governance to avoid one of the major limitation of self-determinant group decision: the risk of excessive blockage of collective decisions, which is precisely what motivates the design of decision-making methodologies specialized for self-determinant groups, in particular, S3. However, as mentioned earlier, S3 is hard to impossible to implement for CNOs due to their widespread geographical and time zones distribution, which results in extreme restrictions on the possible time slots available for synchronous meetings. This justifies the need an asynchronous artifact for self-determinant governance such as S3LF.

In an organizational context, (non-digital) self-determinant decision-making methodologies for governance based on consent have existed for decades: Sociocracy (Endenburg & Bowden, 1988), Holacracy (Robertson, 2007) or Sociocracy 3.0 (Priest & Bockelbrink, 2017) have been implemented in numerous value generating companies and organizations. However, the practices of these methodologies have not been digitized or implemented digitally in the form of socio-technological systems or artifacts for decision making. As a result, these consent-based decision making methodologies are not being considered, not even available, for the governance of CNOs or other digital organizations, since there is no instrument that allows this possibility, i.e., the possibility of a digital consent-based experience.

To the best of these authors' knowledge, digital systems of self-determinant governance have been unexplored, with the majority of developments in the area of socio-technological systems for decision making or digital governance being implemented for a socio-technological niche known as *civic technologies* or *civictech* (Patel et al, 2013), a set of technopolitical artifacts whose decision making mechanisms, i.e., their *social algorithms*, are restricted to those followed by the institutional models that develop or implement these socio-technical systems. Accordingly, the majority of developments are shaped to be framed in the context of public governance, i.e., digitally expanding the governance mechanisms of current public institutions. Moreover, since these mechanisms are based on voting as main mechanism for collective decision making, these socio-technological systems can not be considered self-determinant in the terms defined in this article.

S3LF, instead, consists of a technologically mediated adaptation of the self-determinant decision making framework Sociocracy 3.0 aka S3 (Priest & Bockelbrink, 2017), that enforces a self-determinant governance experience by hardcoding the S3 main organizational mechanism its user experience (UX) and interaction design. It also improves over S3 by generalizing its mechanism to operate remotely and asynchronously, thus allowing geographically distributed

individuals to execute their part of the S3 protocol for group decisions making at different times. This is of paramount importance for CNOs that by their very nature is operated by geographically distributed individuals over arbitrary different time zones, thus opening up the possibility for CNOs to adopt S3. Furthermore, S3LF overcomes some of the limitations that have been observed in the practical implementations of methodologies such as Sociocracy, Holacracy and S3. Basically two weaknesses are highlighted: *onboarding* and *throughput*. The first one helps to overcome the high learning curve of the organizational methodologies for acquiring ease and being able to operate without a facilitator. Usually, this governance frameworks require a human facilitator with a deep knowledge of the protocol for guiding the decision making processes following the methodology in an appropriate way. The second one, higher throughput, refers to the difficulty to advance the decision making process that requires synchronous circle meetings with most of its members present, usually hard to schedule due to agenda constraints of the circle members

Together with an implementation of the S3 protocol, S3LF includes a self-diagnosis tool. According to (Haraway, 1988) and (Nicoloni, 2012), self-determination in organizational decision making processes is strongly dependent on the actual situation that arises in practice. From their perspectives, a methodology does not guarantee a self-determinant governance experience *in practice*, where the human factors can affect the level of self-determination beyond the methodology and procedural structure. This motivates the need of the self-diagnosis service added to S3LF, designed to help analyzing how this technological mediation affects the experience of self-determinant governance. This service allows the organization to explore different factors that affect, beyond the methodology, the level of self-determination of each decision made in different contextual situation, providing the means to self-correct dominant situations.

The rest of the article is structured as follows: in section (2) the main concepts are presented, described and contextualized; in section (3) we present the decision making protocol of Sociocracy 3.0 (on which S3LF is based) and the main challenges and advantages of its digitization through S3LF. Section (4) describes how, through the field work, a methodological framework has been developed to measure self-determination and develop the self-diagnosis service; In section (5) S3LF is described in technical terms, focusing on the UX, HCI, its functionality as an experimental setup and the self-diagnostic service. Finally, in section (6) the main conclusions are presented and in section (7) the references used.

2. Background

In this section we describe basic concepts that motivate and contextualize the proposal of this work. First in (2.1), the main characteristics of socio-technological systems are described and an overview of those dedicated to the collaborative decision-making are presented. Then, in (2.2.) we describe the main characteristics of CNOs and the main requirements for implementing self-determinant governance methodologies such as Sociocracy 3.0 (S3).

2.1. Socio-technological systems for collaborative decision-making

The sociotechnical systems (STS) arise from an approach to study, analyze and design interactions between people and machines, originally in work environments. Leonardi in (Leonardi et al., 2012) describes how in organization studies the term *socio-technical system* has been used for some authors to claim that organization is made up of social systems (hierarchies, communication networks, etc.) and technical systems, which are usually defined as technological artifacts to refer to the interdependencies between people and things.

In this sense, the same authors point out that, from this approach, there is a direct correlation between the level of performance of an organization and the level of "jointly optimized" that exists between the social and technological subsystems. This last is where the demands of one system fit the demands of the other, and social and material agencies became *imbricated*. This is a perspective aligned with theories such as the Actor Network Theory (Latour, 1999), which define these human-machine relationships as socio-material practices where people's goals and technology materiality became "constitutively entangled".

On the other hand, *Human-Computer-Interaction* (HCI) has a long history of studying not only the interaction between individuals with technology, but also the interaction of groups mediated by technology. In this context, another sub-area arises that focuses on the study of technology-mediated collaborative intelligence, that conducts research on how to allow groups to achieve tasks together using a shared or distributed computer interface, either at the same time or asynchronously (Bingham et al., 2015), a sub-area named *collaborative crowdsourcing*. It is in this context that it is proposed that ICTs, UX design and HCI can contribute and facilitate the usability of self-determining governance methodologies through constraints imposed by the digital experience.

To the best of these authors' knowledge, most collaborative crowdsourcing artifacts for collaborative governance (or civictech), i.e., platforms, applications and digital infrastructures promoted by civil society organizations, institutions and companies with the aim of involving citizens in public decision-making (Patel et al., 2013; Poblet, 2017) are articulated through mechanisms or methodologies of governance based on voting, because the willingness to increase citizen participation and to strengthen the transparency over public accountability management, are among the main objectives of these artifacts. So there is no background of instruments for collective, consent-based, digital decision-making.

2.2. Self-determination in collaborative organizations

As stated in (Dutton 2008), Collaborative Networked Organizations (CNOs), are a new typology of organizations that emerge from opportunities for collaboration, among peers or between peers and organizations. These opportunities arise from the reconfiguration of access to services, people and

resources provided by the internet and ICTs, and enable the many to outperform the few by certain factors. Among these factors are the superiority of statistical averaging of individual judgments; bringing the attention of more people to the problem; aggregating information and intelligence that is geographically distributed; enhancing diversity; bringing together more heterogeneous viewpoints, perspectives, and approaches; enabling more rapid diffusion of questions and answers; avoidance of small group processes, such as “groupthink”; and provide greater independence of and less control by established institutions.

Dutton in (Dutton, 2008) proposes a taxonomy of CNOs from different case studies that highlights the potential of these networks in terms of their ability to take advantage of these new opportunities for collaboration that emerge in the network. By reviewing the aspects related to the governance of the CNOs, it is clear that there are many aspects that still remain unexplored. Therefore, it is considered that self-determining methodologies such as Sociocracy, Holacracy or Sociocracy 3.0, which promise to put collective intelligence at the service of the organization, could potentially be positive as governance tools for CNOs. However, these methodologies are face-to-face, synchronous, and with a human facilitator that put into effect organizational processes, so they can not be implemented in organizations where by nature are geographically distributed, with and greatly differing time zones between different nodes, thus requiring asynchronicity.

3. From Sociocracy 3.0 to S3LF

3.1. Sociocracy 3.0 as framework for self-determinant governance

Sociocracy 3.0 a.k.a S3 (Priest & Bockelbrink, 2017) is a modern adaptation of the Sociocracy governance framework (Endenburg & Bowden, 1988) that emerges with the objective of improving the Sociocratic Circle Method 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 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: (1) consent, do things in the absence of reasons not to; (2) equivalence, involve people in making and evolving decisions that affect them; (3) continuous improvement, change incrementally to accommodate empirical learning; (4) empiricism, test all assumptions through experiments; (5) effectiveness, devote time only to what brings you closer towards your objectives; (6) transparency, make all information accessible to everyone in an organization, unless there is a reason for confidentiality; and (7) accountability, respond when something is needed, do what you agreed to and take ownership for the course of the organization.

As stated in the oficial Sociocracy 3.0 documentation page, as well as in other references, Sociocracy is a governance methodology that has been referenced since 1851 and has always focused on *individual self-determination*. Auguste Comte was the first to adopt the term to refer to the power of the partners, distinguishing this term from the demos: i.e. the general mass of people with voting privileges. For Comte, the scientific method applied to society is "*the social order of the future*" - not yet achievable but inevitable. Later, in 1881 the American sociologist, Lester Frank Ward, redefined the term Sociocracy to describe the rule of the people with relationships with each other.

In the twentieth century, the works of Kees Boeke (1884-1966), a pacifist Dutch educator who created in 1940 a school where no action could be undertaken if there was no acceptable solution for all existing problems, established the first sociocracy in his residential school. This sociocracy, based on Quaker consensus principles, was a dissident religious society inspired by early Christianity book "*Sociocracy: Democracy as it might be*" (1945).

Finally, in the decade of the 70s, Gerard Endenburg, a Dutch engineer student of Kees Boeke, incorporated the principles of cybernetics from Engineering and Cybernetics in his company Endenburg Electrotechniek. He evolved "*The Sociocratic Circle-Organization Method*" (SCM) for businesses (later becoming "*The Sociocratic Method*") systematizing a model of decision making. He based it on the three principles:

Consent decision-making for policy decisions, including electing people to roles and responsibilities.

Circle meetings in which working groups meet as equals to make policy decisions.

Double linking of circles to form a circular hierarchy that functioned as a feedback structure.

3.2. Digitizing the governance experience

Once the main characteristics of the SCM and S3 have been described, the principles that are the basis of S3LF, a description of the main challenges is presented when adapting the principles of the SCM to a digital experience: from face-to-face and synchronous methodology with human facilitator to an asynchronous and remote methodology without a human facilitation.

From *face-to-face* to *remote*: it offers more flexibility for coordination between teams that are geographically nearby and allows the governance by geographically distributed teams. It is not necessary to be all in the same place. It is a requirement of CNOs and new organizations that in terms of location emerge in the context of the internet.

From *synchronous* to *asynchronous*: it offers more flexibility for team coordination. It is not necessary to be making decisions at the same time, even for the remote scenario. In this way, decision-making is favored as a distributed microtasking process. Each contribution to collective decision-making can take only seconds through the execution of micro-tasks that, despite their simplicity, can result in major advancements towards a fully consented decision.

From a *human facilitator* to *user experience*: the role of a human *facilitator* is outstanding in S3, because it guarantees to instantly revert situations of dominance that occur during the decision making process. Despite the involvement of human facilitation, some invisible power structures may not emerge and continue hidden. Also, a human facilitator itself may be influenced by this dominating, invisible structure. The benefits of a facilitation through UX is somewhat mixed. On one hand the UX is adamant to domination by human group members, while it lacks any means to revert any domination exerted to other humans. However, contrary to the analog implementation of S3, it is amenable to logging the decision process with data that when analyzed, can surface dominant patterns. In section (4) a self-diagnosis tool with this aim is presented.

As stressed before, the digitalization of the S3 governance framework presents some opportunities of improvement, namely, faster onboarding and higher throughput:

Higher throughput, asynchronicity and remote allow to process (more) tensions faster.

Faster Onboarding, an automatic facilitation based on UX and interaction design allows people to focus on the S3 protocol without limitations.

4. A self-diagnosis tool designed for the analysis of *governance practices*

This work tackles the idea of *self-determination* from a situated perspective, that is, from a critical epistemological perspective that states that no knowledge could be separated from its context or from the subjectivity of the person who emits it (Haraway, 1988). In addition, *practice theory* (Nicolini, 2012) is considered for analysing and evaluating the implementation of governance methodologies that promise self-determination in new organizational contexts. An integrative perspective that proposes a dialectic between social structure and human agency to understand the relationships between human actions and the system.

This approach of practice theory argues that the motivations of individuals who decide to participate in a project are given by their expectations, which in turn emerge from the practice and the way in which this practice is regulated (Schatzki, 2012). Accordingly, a methodology is not enough for a self-determinant governance experience in practice, since there are human factors that affect the level of self-determination beyond the methodology and procedural structure. From this perspective, S3 like any other standalone methodology, cannot guarantee self-determination in practice. In the case of S3, there is the role of the human *facilitator*, who joins the methodology to reduce the effect of and instantly revert situations of dominance that occur during the decision making process. That is, in order to offer a self-determining experience in practice, these methodologies use the figure of the facilitator so that dominance is not expressed (i.e., so that *invisible structures of power* do not emerge).

In the context of S3LF, which offers a digital experience, in order to guarantee self-determination, we propose a self-diagnostic service to analyze how this technological mediation affects the experience of self-determination. An idea that arises as a proposal to counteract the lack of human facilitation, that is, as a complement to the automatic facilitation provided through the UX and interaction design. Specifically, this service is based on measuring the level of self-determination of the organization following the methods proposed by the Self-Determination Theory (Ryan and Deci, 2000) that focuses on the different environmental factors of influence that could exert *dominance* over individuals. In terms of data-gathering, the main instrument of this self-diagnostic service is a questionnaire embedded in the app that pop-up after certain strategic decisions. This questionnaire considers different dimensions that could influence the level of consent or agreement in relation to the decision made, differentiating between issues related to: the decision taken (i.e., output), the deliberation process, or individual inputs related to participation. A more detailed description on how these questionnaires have been designed following the Self-Determination Theory is available on (Ribas & Bromberg, 2019).

S3LF also provides an automatic logging to capture, all the governance actions that have taken place during each decision-making process, i.e., tensions, proposals, objections, consent; contextualized by who performed the action, the circle in which it has been performed, among others. This pairing (questionnaire and logging) facilitates the exploration of positive correlations through different statistical analyzes, allowing the organization to explore different indicators that affect, beyond the methodology, the level of self-determination of each decision made in different contextual situation, providing the means to self-correct dominant situations.

5. S3LF: a socio-technical system for decision-making

This section describes how S3LF facilitates the technologically mediated experience of self-determinant collective decision-making within an organization by following the structure and protocols established by the SCM and S3 methods. As such, decisions within the organization are

organized in circles, with each circle operating as an asynchronous, geographically distributed and algorithmically facilitated assembly.

The usage of S3LF is structured in 3 main dashboards, accessible from the main (side) menu: (1) the main dashboard is the *tensions dashboard*, from which users can visualize the list of all tensions, and proceed to process them, (2) the *actionables dashboard*, from which users can visualize and process the actionable tasks or projects, and (3) the *navigation dashboard*, through which users can navigate the holarchical circle structure of every organization the user belongs to.

The tension dashboard is the main dashboard. As the starting point of the decision-making process it is shown directly at the start time of the app. In this screen, users can view the list of tensions in chronological order of appearance, with visual cues of the current state of the decision associated with each tension.

Unlike S3, in S3LF when a user creates a tension he/she has to specify its typology, which restricts what the content of the tension is about. There are two types of tensions: *operational tensions*, whose proposals refer to the *execution* of governance actions, a.k.a. *actionables*; and *governance tensions*, whose proposals refer to modifications of the organizational structure through the circles' definition (e.g., its driver, domain, accountabilities, sub-circles), as well as their membership. Interestingly, governance proposals may have their resolution automated, that is, the structural actions expressed by their proposals are executed automatically at the end of the decision-making process when a unanimous consent has been achieved. As examples, we have any EDIT CIRCLE proposal such as modifications of the driver, the accountabilities, or the domain; structural proposals such as ADD SUB-CIRCLE for creating new circles within the circle being edited, or membership proposals such as BAN MEMBER or ADD MEMBER.

Once a tension has been created, the decision making process opens up to the rest of the group. The goal is to come up with a proposal for the resolution of the tension that has a full consensus agreement over the whole membership of the circle. Once proposed, no other proposal can be presented to the circle unless the proposal is rejected by the group through a fully qualified objection (see more below). The proposal can be attached to the tension at the moment of its creation, (that is, the pair tension/proposal is presented), or, if only a tension has been presented, any members can attach to it a proposal. Proposals can be either consented or objected by the users. Objections express a disagreement, with at least one being sufficient for blocking a proposal. However, as described in Section 3, the SCM offers some guarantees so that there are no individuals who sabotage or block all the proposals, in this case every presented objection has to be qualified by the rest of the individuals of the circle, with a single disqualification by some member being enough to overrule the objection. The process would continue by the objector re-formulating his or her objection, or abandoning it.

Tension processing ends when the tension' reaches a state of unanimous agreement where all users has consented to the proposal, that, (if no invisible dominance forced the consent of one or

many members) represents a scenario in which the tension's latest proposal affects everyone positively, in a greater or lesser degree.

One advantage of S3LF is its ability for asynchronous processing of tensions. This is achieved by modeling the tension processing as a finite-state-machine, with the tension's state known by all users, and all users aware of the same state, that is, no inconsistencies of a tension's state among users. *Figure 1* shows this finite-state-machine for the S3LF decision making process, with tension states represented by blue boxes, and user actions represented by the arrow labels. The meaning of each state is as follows:

INIT. The tension is created and but has no proposal attached.

PROPOSING. Some user is currently writing down a proposal.

PROPOSED. A proposal has been written down by some circle's member.

OBJECTING. Some stakeholder is currently writing down an objection.

OBJECTED. The proposal has been objected, but the objection has not yet been qualified.

QUALIFIED. The proposal has been objected, and objection has been qualified.

AGREED. All the circle's stakeholder has accepted consented the proposal.

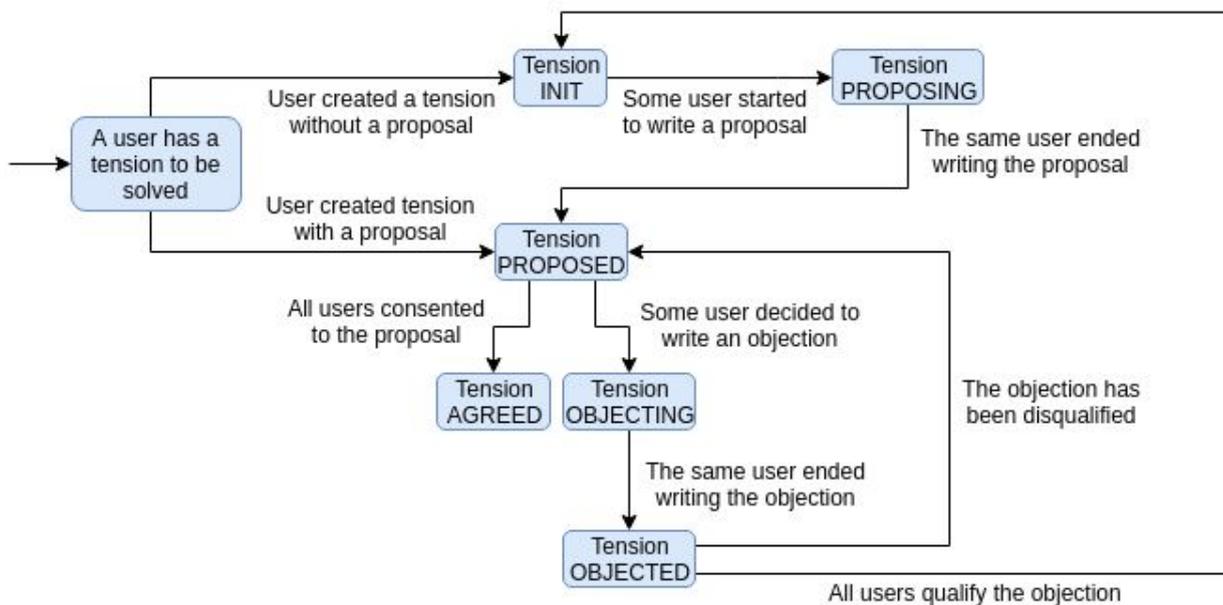


Figure 1. Simplified flux diagram of S3LF asynchronous and self-determinant decision-making process.

S3LF, the mobile app presented in this work, has been developed using MatrScript, an experience-based language developed by the open source Matr Project¹. This first prototype, that is in testing phase, presents most of the main functionalities of SCM, the core of S3 framework, however, some inter-circle functionalities, like double-linking between circles are not already

¹ <http://www.matrproject.com/>

implemented. There are also some missings in the UX and interaction design such as some governance patterns from Sociocracy 3.0 and in the graphic design of the user interface. The source-code is available on the S3LF project page in the Dharma Lab² webpage and could be seen and forked.

6. Conclusions

In this work S3LF, a socio-technological system in the form of a mobile application for consent-based decision-making, has been presented. As it has been argued, this instrument allows the implementation of a self-determinant digital governance experience through a digital adaptation of one of the main methodologies, Sociocracy 3.0.

In section 2, it has been shown that there is currently no socio-technological systems (Leonardi et al., 2012), civictech instruments (Patel et al., 2013) or collaborative crowdsourcing systems (Bingham et al., 2015) that allows a digital governance experience based on self-determinant methodologies, such as S3. As it has been argued, this is mainly due to the fact that the techno-political context of these developments, in terms of decision-making mechanisms, presents restrictive boundaries where the majority of developments focus or are shaped to be framed in the context of public governance, i.e., digitally expanding the governance mechanisms of current institutions. Therefore, S3LF enables a collaborative governance experience based on consent decision-making (S3) opening the development of socio-technological systems for collaborative decision making to new social algorithms designed to optimize the collective intelligence of organizations. In section 3 we described how S3 principles have been adapted to a digital experience, from a practice based on meetings guided by a human facilitator to a remote, asynchronous and UX facilitated experience. Also, this section has shown how the possibility of having a governance experience based on a digital adaptation of S3 not only opens the doors to new organizational typologies, like CNOs, for experimenting with this type of methodologies; but also, that digitizing S3 methodology could help to improve some of the weaknesses presented in his original flavor, specifically, faster onboarding and higher throughput.

Section 4 shows how from a situated perspective and an approach from practice theory, a self-determinant methodology is not sufficient for a self-determinant governance experience; for which a self-diagnostic service has been presented, based on validated data gathering and data analysis methodologies, which allows exploring different factors that, beyond the methodology, affect self-determination in decision-making processes in practice.

Finally, in section 5 the main features and functionalities of this socio-technological system have been described, showing how S3LF facilitates a technologically mediated experience of self-determinant collective decision-making within an organization by following the structure and protocols established by the SCM and S3 methods.

² <http://dharma.frm.utn.edu.ar/proyectos/s3lf>

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