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The Efficiency of Organizational Withdrawal vs Commitment

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***Abstract*—Actors within an organization usually do not behave as expected at design-time. There are diverse reasons for this, notably the actors' motivation and organizational commitment. In this paper, we explore the efficiency of a concrete public organization in the context of the Latin-American culture, to the light of the *organizational commitment* of its members. In order to evaluate how much each member of the organization is committed, we associate to each one a parameter that quantifies its commitment and we evaluate by simulation the impact of this parameter on its behavior an the organization performance. With a model of the organization as it was intended to operate at its foundation, we proceed to a number of simulations to find the parameter values that yield the actual observed working of the organization. By the way, we found that withdrawn behaviors have much more impact than committed ones.**

I. Introduction

Let us define an *organizational setting*, or an *organization,* as a set of *goals* to be achieved, or more generally some purpose, a set of *members* who contribute to their achievement, a set of *resources* (material or cognitive such as information, procedural knowledge, expectations, etc.), and a set of *rules* about the handling of resources by the members intended to enable the goals achievement, all these elements being more or less precisely defined and recognized depending on the nature of the organization.

The organization's rules are intended to shape and so to regulate the participants' behaviors in order to ensure, or at least to allow the achievement of the organization's goals. However, in most organizational settings, the participants do not behave as they are expected to do. This fact may be due to the quality of the rules, which are more or less easy to apply and demanding for participants, and also are more or less effective for the achievement of the organization's goals.

But rules are abstract in nature so that the participants need to interpret them in every concrete situation where their application might be considered. Anyway, in many particular cases, the letter of a rule can't be applied and it must be adapted to the specificity of the current case while keeping the spirit of the rule as much as possible. Moreover, a strict interpretation of rules does not suffice to ensure the proper operating of an organization and, insofar participants are interested in its success, they do collaborate and they work to rule only in exceptional circumstances.

In his interpretation of rules, each participant considers the organization's goals but also his own individual goals. Indeed, the membership of a participant to an organization is never completely motivated by the achievement of organization's goals and any member expects to obtain some individual rewards from his participation. Whatever the applicability of the rules of an organization, the behavior of each participant is driven by a mix of his own goals with the organization's goals, and this causes some deviation between his actual behavior and the intended implementation of the rules.

Let us call the *aim* of a participant the mix of his own goals and, according to its role(s) in the organization, the goals of the organization that drives his behavior with regard to other participants and the whole organization. The relative weight of these two components is mainly determined by his *in-group identification* that characterizes the strength of his membership to the organization and includes both a motivational component (his attachment to group goals) and a cognitive component (sharing of the group culture) (Simon, 1998). There are several models of this concept, see for instance (Kelly, 1993), (Tropp &Wright, 2001), (Cameron, 2004). According to (Leach et al., 2008), the in-group identification of an individual may be assessed by his self-definition – the self-stereotyping as being similar to others and the group homogeneity – and his self-investment – the satisfaction of being a member, the solidarity with others and the subjective importance of membership.

The in-group identification of a participant is a psychological trait tightly related to his *organizational commitment* attitude (Kanter 1968). This concept is the matter of a wide literature in management studies since the organizational commitment of employees is an essential factor of the proper working of firms and any organization, see for instances (Meyer & Allen, 1991), (Soligen et al. 2008) and (Subhashini et al. 20014). It determines behavioral attitudes such as lateness, absenteeism, turnover or organizational citizenship behavior to defend the group against threats. Notably, the organizational commitment determines the participant's willingness to make efforts to support the organization to achieve its objectives and so his propensity to collaborate with others. On the opposite, a withdrawal behavior gives rise to a weak, or even negative involvement in the running of the organization; it may come from job dissatisfaction, retaliation against unfairness, job stress, lack of empowerment or a strong identification in another organization (Beehr et al. 1978).

SocLab is a theoretical framework for the study of cooperation between the actors within an organization, based

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on power relationships (Sibertin-Blanc et al., 2013a). It is implemented in a platform that allows (1) to describe the structure of an organization as an instance of a generic meta-model; (2) to study structural properties of the model of the organization in an analytical way and to explore the space of its possible configurations (and so to discover Pareto optima, Nash equilibria, structural conflicts and so on); (3) to compute by simulation how it is plausible that each actor behaves with regard to others within this organizational context. The SocLab simulation algorithm makes each actors to adopt the behavior that provides him with the means to achieve his goals, so that in most organizational settings, actors reciprocally cooperate with one another (Sibertin-Blanc et al., 2013b). This algorithm does not cope with the relative organizational commitment or withdrawal of the actors, so that it falls short for the modeling of organizational settings where this factor plays a significant role.

Considering the importance of the actors' involvement for the performance of some organizations, the aim of the paper is to show how to deal with the actors' commitment in order to enhance the SocLab simulation algorithm, and to illustrate the application of this new model of actors' behaviors to a concrete organization. The paper is organized as follows. We first give an overview of the SocLab modeling framework and how, according to the current simulation algorithm, every actor selects his behavior with regard to others. In the third section, we will present the case of a real organization which functioning cannot be understand without considering the organizational commitment and the withdrawal of the actors. In the forth section, we present how to assess the withdrawal or commitment of each actor. Section five presents the SocLab model of the case while section six supplies and analyzes the outcomes of the simulation experiments before to conclude.

II. The SocLab Framework

To enable the modelling of social relationships between the actors of an organization, SocLab proposes a meta-model of organizations that catches the common concepts and properties of social organizations. This meta-model is grounded upon the Sociology of Organised Action (Crozier and Friedberg, 1980) and it is intended to be instantiated on specific cases as models of concrete or virtual organizations. Accordingly, the model of the structure of an organization is composed of instances of *Actors* and *Relations* that are linked by the *Control* and *Depend* associations.

Fig. 1 shows the meta-model of organizations' structures as a UML class diagram. A relation is founded on an organization's resource, or a set of resources to be jointly used, and it is controlled by a single actor. Resources are material or cognitive (factual, procedural or principled believes or expectations) elements required to achieve some wished actions, so that their availability is necessary for some actors. The *state* attribute of a relation represents the behavior of the controller actor with regard to the availability of the resource for the ones who need it. Its range of value SB (Space of Behavior) goes from the least cooperative behavior, -1, of the controller preventing the access to the resource, to the most cooperative behaviors, 1, favoring this access, while the zero value stands for neutral behaviors.

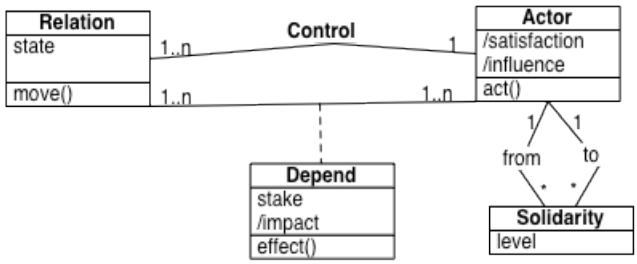


Fig. 1. The core of the SocLab meta-model of the structure of organizations

The *stake* attribute of the dependence of an actor on a relation corresponds to the actor's need of the relation, that is the usefulness of the underlying resources for the achievement of its goals and the relative importance of these goals. Stakes are defined on a scale:

null = 0, negligible = 1,… , significant = 5,… , critical = 10.

The *effect function* evaluates how much the state of the relation makes the resource available to the actor and so provides him with an amount of *capability* to reach his goals. A function $effect_r : A \times SB_r \dashrightarrow [-10, 10]$ has values in:

worst access = -10, ..., neutral = 0, ..., optimal access =10.

The shape of an effect function is designed according to the potential contribution of the resources underpinning the relation to the actor goals.

In addition, actors may have solidarities the ones with regard to others, defined by as a function *solidarity(a, b)* ---> *[-1, 1],* where negative values correspond to hostilities and positive values to effective friendships.

Defining the state, or configuration, of an organization as the vector of all relation states, each state $\boldsymbol{s} = (s_{r1}, \ldots, s_{rn})$ determines on the one hand how much each actor has the means he needs to achieve his goals, defined as:

$$satisfaction(a, s) = \sum_{c \in A} \sum_{r \in R} solidarity(a, c) * stake(c, r) * effect_r(c, s_r)$$

and, on the other hand how much it contributes to the satisfactions of each other actor:

$$influence(a, b, s) = \sum_{r \in R;\ a\ controls\ r} \sum_{c \in A} solidarity(b, c) * stake(c, r) * effect_r(c, s_r)$$

and $influence(a, s) = \sum_{b \in A} influence(a, b, s)$.

The aggregation of the actors' satisfaction determines how much they have the means to achieve their goals. As these goals include the goals of the organization, it determines how well the organization operates. The simplest way to aggregate the satisfactions is obviously to sum them, and we do so in the study of the case, but any other operator may be used according to the specificity of the case under consideration.

This interaction context defines a *social actor game*, where each actor seeks, as a meta-objective, to obtain from others enough satisfaction to reach its goals and, to this end, adjusts the state of the relations he controls. At each step of the game, every actor has the possibility to move the values of the states of the relations he controls, and this change of the game's state modifies the satisfaction of actors who depend on these relations. Let $(s_{r1}, \dots, s_{rm})$ be a state of the organization and $(c_{r1}, \dots, c_{rm})$ be moves such that $(c_r + s_r) \in SB_r$ and c_r is chosen by the actor who controls r. Once each actor has chosen such an action, the game goes to a new state defined as

$$\textit{Transition: } [-10; 10]^m \times [-10; 10]^m \rightarrow [-10; 10]^m$$
$$(s_{r1}, \dots, s_{rm}), (c_{r1}, \dots, c_{rm}) \mapsto (s_{r1}+c_{r1}, \dots, s_{rm}+c_{rm})$$

Unlike games considered in economics, the end of a social game is to reach a stationary state: there, actors do no longer change the state of the relations they control, because every one agrees with the level of satisfaction provided to him by the current state of the game. A *regularized* configuration has been reached and the organization can lasting operate in this way.

The simulation module of SocLab makes the actors to jointly play the social game. We just give an overview of the principles, the simulation algorithm is detailed in (Sibertin-Blanc et al, 2013b). The actors are assumed to follow a bounded rationality (Simon 1982) that is implemented as a self-learning process of trial and error based on a system of rules of the kind (*situation, action, quality*). Each actor manages a variable that corresponds to his *ambition*, and the game reaches a stationary terminal state when every actor gets a satisfaction that exceeds his ambition. The length of simulations is a good measure of the difficulty of actors to find how to cooperate and in some cases they do not succeed (for instance in a circular organization where a depends on b, which depends on c, which in turn …). This ambition is initiated at the highest possible value of the satisfaction for that actor and it progressively comes closer to its current level of satisfaction, according to a reality principle. Each actor also manages a dynamic rate between exploration and exploitation that determines the strength of its search for a higher level of satisfaction. An essential property of this algorithm is to assume that actors have no information about the structure of the game, very few about its current state and bring into play limited cognitive capabilities, see (Sibertin-Blanc et al, 2013b) for details.

To sum up, each simulation run yields a regularized configuration characterized by the state of each relation, i.e. the level of cooperation of the actor who controls this relation, and the resulting levels of satisfaction and influence for each actor.

III. The Modelled Case: A Team in a Latin-American Public Foundation

The study of a concrete organization is introduced to illustrate how taking into account of group identification can help in auditing organizations or designing policies likely to promote collaboration. *TDPM* is a team inside a Public Foundation that is an agency of the Ministry for Science and Technology of a Latin-American country. This Public Foundation (or *the Foundation*) is entrusted with the investigation, development and spreading of socially pertinent free technologies and conducts various projects. TDPM (Team for Designing a Planning Methodology) is in charge of designing a methodology for Institutional Planning in the Public Sector and its functioning evidences in-group identification issues.

A. The origin of the agency: The historical/cultural context of the organization

The motivation for the design and creation of the Foundation was the lack of pertinence of technology, due to certain cultural problems. Consequently, to understand why this Foundation (of which the TDPM is part) has been instituted, and which is its aim, a short description of his historical/cultural context is necessary (following (Fuenmayor, 2006)).

A culture is in a good state if people looks for and *cultivates/cares* common good, and if it is auto-generative. On the other hand, a culture is ill if it is not autonomous, for instance, when it is highly imitative and oriented by external influence, actors and interests, creating some processes of change that disturbs its auto-generative capacities.

Until the first decades of 1900, the Latin-American culture was in a good state. It was mainly of a rural character and auto-generative. Common good (including the culture) was cultivated. After these decades, a high percentage of people from the country side moved to the cities (the rate: "people in the cities / people in country side" changed from 20/80 to 80/20 in many countries). Along this, imitation of other cultures promoted by, for instance, communication media like radio, TV, CINEMA, etc., increased the demand for material instruments, things, and technology that were poorly pertinent for the Latin-American society. Over time, also the quality of education and caring of common good in general decreased. Finally, the culture became ill (at different degrees, in almost all countries) in the sense described above as it lost its auto-generative capacity. As a result, socially negative attitudes appear in organizations, e.g., workers distract their effort towards activities different from their duties, creating an institutional problem in the public sector.

B. The Foundation: activities and work process

In one of the Latin-American countries facing the strongest cultural difficulties, a group of researchers and public servants have promoted the creation of the Foundation (of which the TDPM is part), aiming at dealing with and changing this cultural and institutional situation. The aim of the Foundation is to create free pertinent technologies. In this sense, there should be promoted: i) a critical/reflexive attitude (*reflective/Critical Action*), in order to be able to discern about pertinent/appropriate technologies; and, ii) spreading of the products in the

society, in order to increase their impact. The Foundation is then designed as having four departmental units for its basic activities, supervised by a Management Unit. The basic units are:

- Pertinence Unit: advises other units about the relevance of technologies. Its main concern is to reflect on the nature of the society, its problems and needs.
- Research Unit: designs free-technology methodologies, organizational patterns and tools.
- Development Unit: produces the tools for the methodologies.
- Technological Spreading Unit: spreads the use of the methodologies and tools in the society.

The Foundation is involved in projects of software, hardware and telecommunications, including organizational forms, in collaboration with other public institutions and enterprises. TDPM is a team gathering Foundation's employees in charge of one of these projects: developing a planning methodology. The work process of TDPM follows the path shown in Fig. 2. The meeting/dialogue activity (in the middle of Fig. 2) allows to coordinate actions of the members of the team and to increase their common understanding/view of the project.

C. *The TDPM*

The analysis of TDPM organization regarding group identification issues leads to identify seven actors: two actors from the Research Unit, two actors from the Development Unit, and one actor from each of the three other units. Their work process is schematized in Fig. 2 and we summarize the duties of each actor as follows:

Director: It manages the work of others and allocates the means they need. It is also responsible for delivering the products of the Foundation to the society and the Ministry for Science and Technology.

- Researcher_C: It designs the planning methodology, and specifies the requirements of the tools. It is responsible for the quality of the methodology and its effective pertinence.
- Researcher_W: It operatively helps the Researcher_C in elaborating detailed requirements of the methodology.
- Developer_C: It designs and develops software tools for the implementation of the methodology and is responsible for the quality of the tools.
- Developer_W: It helps the developer_C actor operatively, developing particular functionalities of the software.
- PertAdviser_C: It investigates the state of the art and is responsible for advising the rest of the team, notably the researcher about the social pertinence of methodologies.
- TechSpreader_W: It is responsible for spreading the product, i.e., for promoting the use and social impact of the methodology.

D. *The members' expected and actual behaviors*

At the time of its creation, the Foundation was design assuming workers being highly identified and committed with the Foundation and strongly collaborative with their partners. The workers are expected to show a critic and autonomous attitude, cultivating themselves in this way, in order to find out the sense and pertinence of the technology in the country. As in any organization, the more the collaboration of actors and the coordination of their activities, the better the suitability and quality of the products provided by the team.

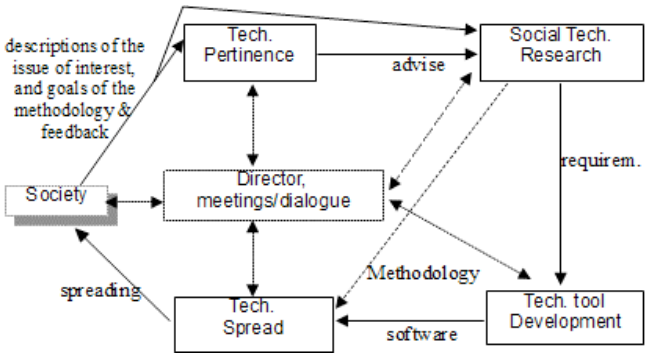


Fig. 2. Main interactions within TDPM for developing the planning methodology. It completes a loop from identifying requirements of the society to spreading the methodology into the society.

However, the Foundation suffers from the above mentioned cultural problems and from negative attitudes that prevail in the considered country. A common withdrawal attitude pays little attention to organizational duties and gives preference to personal activities such as the membership to a political party or involvement in the academic milieu. Fortunately, not all actors have this kind of behaviour and there are also actors highly involved with the organization. Some actors of TDPM are highly engaged and creative, identified with the organization and hardworking, while other actors are weakly identified with the organization, and thus their work is of poor quality and they are little creative.

In the TDPM, the actors pertAdviser_C, researcher_C and developer_C reveal to be highly Committed while the other four actors are Withdrawn at different degrees.

IV. Evaluation of the Commitment and Withdrawal of Actors

There are obvious differences in the commitment of the actors of TDPM, so the question arises to evaluate their respective levels of commitment in order to evaluate the magnitude of the management actions that could improve the involvement of the withdrawn actors. This evaluation can be done using a GI (Group Identification) parameter associated to each actor, where GI = 1 corresponds to a fully committed actor, GI = -1 corresponds to a fully withdrawn actor while GI = 0 corresponds to a neutral attitude which is not particularly committed or withdrawn.

What about the impact of the GI parameter on the actors' behavior-selecting process? In the SocLab simulation algorithm, actors are mainly utilitarist as they just search to obtain a good level of *satisfaction*, i.e. the capability got

from others to reach their own goals by having a good access to the resources they need. To account for the commitment of an actor, we may assume that it is also interested in exerting a high level of *influence*, i.e. in the capability it distributes to others. As for a withdrawn actor who devotes its energy to another matter than its job, it searches on the contrary to reduce its influence. This leads to consider that the behavior-selecting process of an actor will no longer be driven by just its satisfaction but by its *aim,* defined for an actor *a* in a state $\boldsymbol{s} = (s_{r1}, \ldots, s_{rn})$ of the organization as:

*aim(a, s) = (1 - abs(GI(a)))*satisfaction(a, s) +*
*GI(a)*influence(a, s)*

where the *abs()* function returns the absolute value of a number. A neutral actor will search just for a high satisfaction, a committed actor will also search for a high influence while a withdrawn actor will also search for a low influence.

In the capabilities exchanged among actors, there is a specific amount that appears both in the satisfaction and the influence of an actor, that is its auto-satisfaction *influence(a, a, s)*. For committed actors, this term is not affected by the value of GI, and for withdrawn actors it means that the actor searches to disfavor itself. To avoid these inconsistencies, we take off the auto-satisfaction of an actor from its influence and so define the aim as:

*aim(a, s) = (1-abs(GI(a)))*satisfaction(a, s) +*
GI(a)(influence(a, s) - influence(a, a, s)).*

For the modeling of TDPM, we could design a model describing the actual observed configuration with a neutral GI for all actors, and then search for a distribution of GI that makes TDPM to operate properly as wished by its promoters. Proceeding in this way would provide the deficit of commitment of actors; for instance, for a withdrawn actor, we will find a positive GI that indicates how much it should increase its (negative) investment for the organization to recover a better working. This way would assume that the effect of a change in the Group Identification of an actor is quite linear and that withdrawal is just the opposite of commitment. This is a very strong hypothesis that is not always verified in psychological matter, as shown by the well-known case of risk-aversion (this is why SocLab use bipolar scales for behaviors (i.e. the state of relations) and capabilities).

So we will process in another way. We will model TPDM as it was expected to operate by its designers (see A and B above) with actors featuring a neutral GI, and then search for a distribution of GI whose outcomes correspond to the actual observed behavior.

V. The SocLab model of TDPM

We will now apply this approach to the TDPM case study. The SocLab model includes the seven actors previously introduced and each actor controls a single relation that synthesizes its means to influence others. This model has been developed in interaction with persons who are or have been involved in TDPM, with whom also the simulation results have been shared and discussed. A more extensive description of TDPM and its model are given in (Terán et al., 2013) and indications about the designing of SocLab models are given in (Sibertin-Blanc et al. 2013a).

Table I shows the actors' stakes and Table II the effect functions. We cannot discusses these tables in detail and just give some comments. The distribution of stakes shows how much each actor depends on the behavior of each other for the achievement of its goals, assuming that these goals are just determined by its role in the organization. Reserecher_C depends only for 2 points on itself (while others depend on 3 or 3.5) because it is the responsible for the project. The shape of the effect functions is very standard: each one benefices of the work done by others and is fully satisfied by a moderate effort.

Table III show the solidarities of each actor toward its colleagues that reveal to be reciprocal. It is due to actors common interests and activities related with: (i) academicism, i.e., accumulation of academic curriculum that are beyond the benefice of TDPM and result from a personal interest, in the case of actors TechSpreader_W and Researcher_W; (ii) politicism, related with their participation in a political party that favours the involved actors, in the case of the actors Director and PertAdviser_W. Due to the solidarity between the Director and PertAdvis_C, the former will get a lower satisfaction than the other withdrawn actors, and PertAdvis_C a higher one than the others committed actors.

VI. Results of experiments

All the simulations are run 100 times and we just present the average values. We first give the simulation results with a null GI for all actors, i.e. as intended by the promoters of the Foundation. In this case, TDPM operates well and simulations are short: actors do not have difficulties to cooperate and they do collaborate. Then we calibrate the actors' GI parameters to find the values that provide simulation results close to the operating of TDPM that is actually observed.

A. The expected operating of TDPM

Table IV shows the distribution of capability of actors one another at the mean configuration resulting from simulations; the standard deviations are between 0.3 and 1.4, quite small with regard to the range of values (around 190). Table V shows the same results in percentage, i.e. as *(value – min_value) / (max_value – min_value)*. The differences in value do not produce the same differences in percentage because the actors do not have the same range of capabilities. As the actors of the TDPM model are strongly dependent on one another, each one cooperates to the best of its possibilities so that results are very close to the ones at the "optimal" configuration where each actor gives 100% of its influence and the maximum of the total actors' satisfaction is reached. However, due to the shape of the effect functions, satisfactions at the mean configuration are

higher (6 or 7 points) than the mean satisfactions (respectively: Director 83.69, Researcher_C 83.03, Researcher_W 85.54, Developer_C 83.93, Developer_W 83.73, PertAdviser_C 83.17, TechSpreader_W 84.35).

TABLE I. DISTRIBUTION OF THE ACTORS' STAKES (IN COLUMN) ON THE RELATION; VALUES ON THE DIAGONAL SHOW THE WEIGHT OF AUTO-SATISFACTIONS.

	director	research_C	research_W	develop_C	develop_W	pertAdvis_C	techSpread_W
projectSupport	**3.5**	2.0	1.5	1.0	1.0	1.0	1.5
researchMeth_C	1.5	**2.0**	2.5	1.5	1.5	1.5	1.0
researchMeth_W	1.0	1.5	**3.5**	1.5	1.5	1.0	0.5
develTools_C	1.0	1.0	0.5	**3.0**	2.0	1.0	1.0
develTools_W	1.0	1.0	0.5	2.0	**3.0**	1.0	1.0
pertinence	1.0	1.5	1.0	0.5	0.5	**3.0**	1.5
techSpread	1.0	1.0	0.5	0.5	0.5	1.5	**3.5**

TABLE II. THE SHAPE OF THE EFFECT FUNCTIONS OF EACH RELATION (IN ROW) ON EACH ACTOR; THE X-AXIS CORRESPONDS TO THE STATE OF THE RELATION AND THE Y-AXIS TO THE RESULTING CAPABILITY FOR THE ACTOR. THE TABLE SHOWS ONLY THE FIRST TWO ROWS, THE EFFECTS OF THE RELATIONS PROJECTSUPPORT AND RESEARCHMETH_C. THE EFFECT FUNCTIONS OF OTHER RELATIONS ARE SIMILAR REGARDING THE SHAPE OF THE FUNCTION FOR THE ACTOR CONTROLLING THE RELATION AND THE SHAPES OF THE FUNCTIONS FOR OTHER ACTORS.

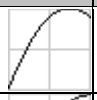
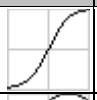
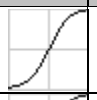
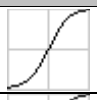
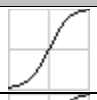
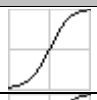
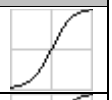
	director	research_C	research_W	develop_C	develop_W	pertAdvis_C	techSpread_W
projectSupport							
researchMeth_C							

TABLE III. THE SOLIDARITY OF ACTORS (IN ROW) TOWARD ITS COLLEAGUES

	director	research_C	research_W	develop_C	develop_W	pertAdvis_C	techSpread_W
director	0.8	0.0	0.0	0.0	0.0	0.2	0.0
researcher_C	0.0	1.0	0.0	0.0	0.0	0.0	0.0
researcher_W	0.0	0.0	0.9	0.0	0.0	0.0	0.1
developer_C	0.0	0.0	0.0	1.0	0.0	0.0	0.0
developer_W	0.0	0.0	0.0	0.0	1.0	0.0	0.0
pertAdviser_C	0.2	0.0	0.0	0.0	0.0	0.8	0.0
techSpreader_W	0.0	0.0	0.1	0.0	0.0	0.0	0.9

TABLE IV. THE DISTRIBUTION (IN VALUE) OF CAPABILITY OF EACH ACTOR (IN COLUMN) TOWARD OTHERS AT THE MEAN CONFIGURATION RESULTING FROM 100 SIMULATION RUNS WHEN GI IS NULL FOR ALL ACTORS. THE LAST ROW SHOWS THE INFLUENCE OF EACH ACTOR AND THE LAST COLUMN ITS RESULTING SATISFACTION. THE BOTTOM-RIGHT CELL GIVES THE MEAN SATISFACTION (AND INFLUENCE) OF ACTORS.

	director	research_C	research_W	develop_C	develop_W	pertAdvis_C	techSpread_W	Satisfaction
director	28.6	13.3	8.7	8.6	8.7	12.9	9.6	90.5
researcher_C	17.9	19.2	13.1	8.6	8.7	13.5	8.8	89.7
researcher_W	13.4	20.9	31.1	4.7	4.8	9.4	7.3	91.7
developer_C	8.9	13.3	13.1	29.4	17.4	4.5	4.4	91.0
developer_W	8.9	13.3	13.1	17.2	29.2	4.5	4.4	90.7
pertAdviser_C	13.9	13.3	8.7	8.6	8.7	24.7	12.3	90.2
techSpreader_W	13.4	10.2	7.3	8.2	8.3	13.0	31.0	91.5
Influence	105.0	103.7	95.1	85.4	85.9	82.5	77.8	90.8

TABLE V. THE DISTRIBUTION (IN PERCENTAGE) OF CAPABILITY OF EACH ACTOR (IN COLUMNS) TOWARDS OTHERS AT THE MEAN CONFIGURATION RESULTING FROM 100 SIMULATION RUNS WHEN GI IS NULL FOR ALL ACTORS.

	director	research_C	research_W	develop_C	develop_W	pertAdvis_C	techSpread_W	Satisfaction
director	98.4 %	96.1 %	95.2 %	94.7 %	95.2 %	100.0 %	95.5 %	97.0 %
researcher_C	96.4 %	98.0 %	95.2 %	94.7 %	95.2 %	96.6 %	95.5 %	96.2 %
researcher_W	96.4 %	96.1 %	98.8 %	94.7 %	95.2 %	96.6 %	99.8 %	97.2 %
developer_C	96.4 %	96.1 %	95.2 %	99.0 %	95.2 %	96.6 %	95.5 %	96.7 %
developer_W	96.4 %	96.1 %	95.2 %	94.7 %	98.7 %	96.6 %	95.5 %	96.5 %
pertAdviser_C	100 %	96.1 %	95.2 %	94.7 %	95.2 %	98.3 %	95.5 %	96.9 %
techSpreader_W	96.4 %	96.1 %	99.7 %	94.7 %	95.2 %	96.6 %	98.7 %	97.1 %
Influence	99.6 %	98.4 %	99.2 %	98.8 %	99.1 %	99.7 %	99.7 %	

B. Variation of the distribution of actors' GI

Tables VI to IX show simulation results according to the decreasing GI of the withdrawn actors (director, researcher_W, developer_W and techSpreader_W) and increasing GI of the committed actors (researcher_C, developer_C and pertAdviser_C).

Table VI shows that simulations runs are short when GI of all actors is null (the top-left cell); the structure of the game is simple and the seven actors have no difficulty to find a (good) compromise. A glance at each column shows that the decrease of the GI of withdrawn actors makes simulation runs systematically longer, meaning that it becomes more difficult for the actors to find a consensual configuration. On the opposite, the increase of committed actors' GI makes simulation runs systematically shorter, but with a smaller effect: values on the diagonal are increasing.

Table VII shows that the decrease of the GI of withdrawn actors diminishes the global satisfaction of actors more and more from 0 to -0.4, whatever the GI of committed actors. For the (0, 0) distribution, the 83.81 satisfaction corresponds to 95% of the optimal operating of TDPM, while for the (-0.5, 0) distribution the 10.9 satisfaction corresponds to 57% of the optimal operating (the minimum and maximum global satisfactions are respectively -96.5 and 92 respectively). Except in the absence of withdrawal (the first row), the increase of committed actors' GI also decreases the global satisfaction, while slightly.

Table IX shows that withdrawn and committed actors have similar satisfactions when all GI are null (the slight difference 0.81 comes from the responsibility of the project for the Researcher_C committed actor), and that the formers take advantage of whatever departure from this situation. The higher involvement of committed actors increases the gap between the withdrawn and committed actors and this explain why it also decreases the global satisfaction seen in Table VII: a systematic cooperation of committed actors ensures withdrawn actors a high level of satisfaction and by the way exempt them to cooperate, so that its impact on the whole organization is negative. In average, the increase of

commitment from 0 to 0.5 increases the gap by 4.3 while the increase of withdrawal from 0 to -0.5 increases the gap by 5.1.

To sum up, in all tables the main variations occur between rows and not between columns: the effect of withdrawal is much more important than the one of commitment. Withdrawal and commitment are not at all opposite phenomena since, if one except the first and the last rows of Table VII, the increase of both decreases the global satisfaction (Table VII) and benefits to withdrawn actors (Table IX). Moreover these effects are quite independent: all rows exhibit the same variation pattern (up to translation) and the same holds for columns. The effect of commitment (examine each row) is quite linear while the effect of withdrawal (seen on each column) is not: e.g. in Table VII, the effect is increasingly important from 0 to -0.4, while the change from -0.4 to -0.5 requires specific explanations. As mentioned at the end of section V, the solidarity between Director and PertAdvis_C lessens the effect of GI variation, increasingly with the gap between withdrawn and committed actors.

TABLE VI. MEAN NUMBER OF STEPS TO REACH A REGULATED CONFIGURATION DEPENDING ON THE GI LEVEL OF WITHDRAWN (IN ROW) AND COMMITTED (IN COLUMN) ACTORS.

	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**
0	1673	1082	653	455	388	344
-0.1	2697	2128	1649	1303	1034	910
-0.2	4292	4154	3906	3564	3231	3172
-0.3	6680	6536	6569	6266	5910	5501
-0.4	9638	9649	9713	9410	8922	8321
-0.5	11033	11236	11239	11099	10659	9994

TABLE VII. THE AVERAGE SATISFACTION OF ALL ACTORS DEPENDING ON THE GI LEVEL OF WITHDRAWN (IN ROW) AND COMMITTED (IN COLUMN) ACTORS.

	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**
0	83.81	84.41	85.25	85.65	86.13	86.71
-0.1	83.01	83.09	83.01	83.11	82.92	82.99
-0.2	77.36	76.44	76.14	76.95	77.88	75.60
-0.3	60.18	59.93	58.39	59.10	57.45	53.68
-0.4	32.15	32.55	31.75	31.08	31.30	28.64
-0.5	10.93	12.20	13.27	13.40	13.25	13.63

TABLE IIX. THE AVERAGE SATISFACTION OF WITHDRAWN ACTORS DEPENDING ON THE GI LEVEL OF WITHDRAWN (IN ROW) AND COMMITTED (IN COLUMN) ACTORS.

	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**
0	84.15	85.56	86.79	87.56	88.30	89.16
-0.1	83.94	84.49	84.94	85.16	85.34	85.68
-0.2	79.37	79.21	79.18	80.29	81.16	79.27
-0.3	64.04	64.25	63.21	64.22	63.09	59.43
-0.4	36.87	37.85	37.50	37.01	37.58	34.89
-0.5	13.42	15.40	17.12	17.55	17.63	18.38

TABLE IX. THE GAP BETWEEN THE MEAN SATISFACTIONS OF WITHDRAWN AND COMMITTED ACTORS DEPENDING ON THE GI LEVEL OF WITHDRAWN (IN ROW) AND COMMITTED (IN COLUMN) ACTORS.

	0	**0.1**	**0.2**	**0.3**	**0.4**	**0.5**
0	0.81	2.69	3.59	4.44	5.05	5.73
-0.1	2.19	3.27	4.50	4.78	5.66	6.28
-0.2	4.70	6.47	7.10	7.79	7.64	8.57
-0.3	9.02	10.08	11.25	11.95	13.16	13.43
-0.4	11.02	12.37	13.42	13.83	14.66	14.60
-0.5	5.82	7.47	8.98	9.69	10.21	11.08

The GI distribution -0.3 for withdrawn actors and 0.2 or 0.3 for committed actors is quite close to the observed configuration, even if more precise distributions distinguishing the GI among the withdrawn and among the committed actors should be considered (see (Terán et al., 2013)).

VII. CONCLUSION

Organizations seldom operate as intended and expected. It can be caused by the very structure of the organization that render the necessary cooperation among the actors difficult to establish, by the presence of structural conflicts that force actors either to opposition or to fragile compromises, or by lack of fairness or empowerment. The SocLab simulation algorithm studies how each actor is likely to cooperate within an organization, assuming that it is interested in the duration of the organization, and thus its proper functioning, and thus cooperates to the extent this is beneficial for him, according to the reciprocity principle (Sibertin-Blanc et al. 2013a; 2013b). The deviation from the intended working of an organization can also be caused by the lack or even the excess of commitment of actors who do not cooperate in an appropriate way with others.

In this paper, we have shown how to account for the withdrawal or the commitment of actors by the introduction of a parameter associated to each actor, its Group Identification (GI), that indicates to what extent it deviates from the standard level of cooperation, in excess or in default. Applying this model to a very concrete organization that features troubles due to a dysfunctional GI of some of its members, we have found values likely to approximate the level of GI of actors of the organization. By the way, we have found that withdrawal is much more effective than commitment. Withdrawal is not just the opposite of commitment, since the later does not compensate the former, and a change in withdrawal has much more effect than the same change in commitment. Surprisingly, it seems that high commitment of some actors' is not always beneficial to an organization.

Even if this quantification of withdrawal is approximate, it allows making comparisons between different cases, what is the basis of any engineering practice. It is also likely to indicate the order of magnitude of actions to be undertaken in order to modify the GI of the members of an organization.

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