Ontology of Organizations: A Brief Survey of the Literature

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Part I

Introduction

- In our contemporary society organizations play a central role. Every part of our life is tied with them, from our born to our death.
- We live in *states*, we work for *companies* or *institutions*, some of us belongs to *parties* for their political activity, and so on.
- Although, the ontological nature and structure of organisations begun to be investigated only recently.
- The main goal of this survey is to select the most interesting approaches to organizations, ranging from Philosophy to Computer Science.

We can say that almost all approaches share this intuition: an organization coordinates a multitude of agents by means of communication and norms. Therefore, we can distinguish three main levels for organizations:

1. level of agents
2. level of rules
3. level of interaction and communication

- Organizations coordinate plurality of agents, therefore it is important to understand:
  - what an agent is
  - what a plurality of agent are
- In many accounts, also organizations are seen as agents.

There are different kinds of rules relate to organizations.

- ▶ Rules that define the organization itself, the roles that agents can play in it and new kind of actions that can be performed.
- ▶ Rules that establish what its agents are allowed or not allowed to do.
- ▶ Rules that specify procedures in order to accomplish a particular goal of the organisation.

- The link between these two previous levels is possible only if agents are able to interact an to communicate
- The most detailed accounts of organization are strongly committed in analyze or model these two notions
- As we shall see below, in this survey we'll focus more on illustrating the first and the second level.

Part II

Philosophy

Philosophy

In this section we'll review briefly the philosophical literature concerned with these aspects:

1. the problem of collective intentionality;
2. the ontological nature of organizations;
3. the level of rules;
4. the structure of organization.

1. Agents and Collective Intentionality

- In this approach analyzing the level of agents means understanding the intentional dimension of agents taken as individuals or as groups.

- This literature, execept the work of Raimo Tuomela, is not properly focused in giving an accont of what is an organisation, and is more interested in social groups.

- In a social group, agents think or speak about themselves in terms of 'we'.
- Some of the authors, consider this 'we' as a primitive notion [Gilbert, 1992, Searle, 1990].
- Others, believe in the reducibility of this we-modality to a complex composition of I-modalities [Bratman, 1992, Castelfranchi, 2003, Tuomela, 2003].

Gilbert's Treatment of Social Groups

- A social group is seen as "a set of people who are conscious that they are linked by a certain special tie" [Gilbert, 1992].
- In order to understand this "special tie" the study of the semantics of we has a key role:
  - "there is an use of the English pronoun 'we' in which 'we' refers to a plural subject of some kind"
  - "social groups are plural subjects" [Gilbert, 1992].

Gilbert: Social Groups as Plural Subjects

With respect of a certain goal, we can say that the plural subject of this goal is constituted by:

- those who currently jointly accept a goal,
  - e.g., those on the verge of starting a conversation.
- those currently engaged in (joint) pursuit of a joint goal,
  - e.g., those who are traveling together, each keeping an eye on the other so as to reach their goal more effectively.
- those who, in certain circumstances, are jointly ready to do something together, if others do,
  - e.g., those who, in a stadium, are jointly ready to do the so-called 'ola', if others do.

2. Nature of Organisations

A significant part of the philosophical literature on organizations is focused on understanding the metaphysical nature of organizations, trying to answer questions like:

- are organizations social groups?
- are organizations agents? What kind of agents they are?

Organizations and Social Groups: Gilbert Again

- Very few pages on this argument.
- Organizations and social groups are different.
- This position is (weakly) sustained by providing two examples:
  1. An organization in which are replaced, one by one, its workers and employees with automata. At least in Gilbert's sense, it is difficult to see it as a social group, even if it can be still taken as an organization.
  2. An organization in which every people working for it don't know each other and don't know the goals of the organization. We can say that this is an organization, but it's difficult to say that this is a social group.

Organizations as Agents: Moral Philosophy

- The problem of agency in organizations is principally considered by moral philosopers.
- Here, it's strongly linked with the problem of moral responsibility, even we believe that it's not necessarily relared to it.
- So the question is: are organizations (moral) responsible for their actions? According to [Risser, 2005], two main extreme positions are available:
  1. Methodological individualism: organizations cannot be held morally responsible, and that they have no moral status beyond their individual members [Ladd, 1970].
  2. Moral personhood: organizations are full-fledged moral persons capable of being held morally responsible and of possessing the same rights and privileges as any other (e.g. human) members of the moral community [French, 1984].

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3. Rules

- ▶ Rules, in philosophy, are not studied in the framework of organization, but we believe that this approach can be very useful in modeling this kind of entity.
- ▶ Well'take briefly in consideration
  - ▶ John R. Searle's classical distinction between regulative rules and constitutive rules.
  - ▶ Amedeo G. Conte's account on anankastic rules.

There are two kinds of rules:

- Regulative rules
- Constitutive rules

Regulative rules

- "regulative rules regulate activities which can exist independently of the rule".
- are typically of the form 'Do X'
- e.g. rules of driving, such as 'drive on the right hand side of the road'

Constitutive rules

- they "not only regulate but rather constitute the very behavior they regulate, because acting in accordance with a sufficient number of the rules is constitutive of the behavior in question.".
- 'X counts as Y in C' form
- e.g. rules of chess, such as 'a checkmate is made when the king is attacked in such a way that no move will leave it unattacked'

[Searle, 1969, Searle, 1995, Searle, 2005]

- Conte's account on anakastic rules starts from von Wright's notion of directive, or technical norm.
- Technical norms, as pointed out in [Prien, 2003]:

  are concerned with the means to be used for the sake of attaining a certain end

- Conte uses the notion of constitutivity from Searle, in order to distinguish two types of rules:
  - Anankastic-constitutive rules
  - Anankastic rules

Anankastic-constitutive rules

- Anankastic-constitutive rules are costituives rules that lay down a necessary condition for their own validity
- e.g. The olographic testament is that which is written by the testator himself.

- Anankastic rules assume a necessary condition for achieving a goal.
- They are, in Searle words, 'regulative rules'.
- e.g., 'to download this file, click on the following link...'

[Conte, 1988]

4. Structure of Organizations

- ▶ Is difficult to find in philosophical literature an explicit study on the structure of organizations.
- ▶ An important exception is Tuomela's account.
- ▶ His analysis is part of a wider project regarding institutional reality, strongly based on the analysis of the notion of collective intentionality.
- ▶ In his [Tuomela, 2002] also a formal account of organizations is provided.
- ▶ In order to describe what an organization is, several notions are accounted, so it is impossible to provide an exaustive account for all of them.

Tuomela on Organizations

An organization is composed by two fundamental complex systems: a system of social practices and a normative system.

- Social practices are "repeated collective social actions based on collective intentionality" [Tuomela, 2002].
- A system of social practices states:
  - a group of agents;
  - a type of attitude that this group has
  - the types of collective social actions that the agents play
- A normative system is "a set of positions, each positions consisting of obligations and rights".
  - Obligations and rights are represented by sets of action types related to positions or also to groups.

The types of actions anchor the normative system to the system of social practices: each normative action type is identical to (or is a proper part of) the type of action of a social practice.

Part III

Computer Science

Here we'll sketch briefly some of the basic entities of two of the most interesting models done in this field:

- the first one [Colombetti et al., 2002] is mostly focused on *institutions and commitment*
- the second one [Dignum, 2004] tries to put organizations in the wider dimension of *sociality and interaction*.

Institutions and Commitment

- In the social dimension communication is essential. But agents in a social domain tie themselves by means of commitment.
- In [Colombetti et al., 2002] this central notion is developed relying on another notion, that of institution. An institution imposes "role-dependent authorizations and interaction rules on groups of agents" .

An institution is made of these components:

- *a set of registration rules*, that define the procedure for agent registration, if this procedure is successful, the agent is assigned a role in the institution;

- *a set of interaction rules*, that establish, in term of permissions and obligations, how an agent can interact with the others members of the group (viz. the collection of agents filling the roles of a particular institution);

- *a set of authorizations*, that specifies which actions may be performed by an agent, depending on its role in the institution;
- *an internal ontology*, that
  - accounts for the institutional facts and events of the institution;
  - provides for the conceptual framework necessary to define the actions that may be performed within the institution.

Organizations, sociality and interaction: Dignum's Model

- Dignum's model of organization, provided in [Dignum, 2004], is one of the most complete in literature.

- She provides a formal model - using temporal logic with fixed domain - based on a multidisciplinary approach involving knowledge management, agent theory, organization theory and, partially, philosophy.

- According Dignum intuitively an organization

  can be seen as a set of entities and their interactions, which are regulated by mechanisms of social order and created by more or less autonomous actors to achieve common goals.

Introducing OperA

Her model, called OperA(**O**rganizations **per A**gents) is composed by:

1. an Organizational Model (OM) that specifies the organizational characteristics of an agent society in terms of four structures: social, interaction, normative and communicative.

2. a Social Model (SM) that deals with contracts. "In the Social Model (SM), the enactment of roles by agents is fixed in social contracts that describe the capabilities and responsibilities of the agent within the society, that is the agreed way the agent will fulfil its role(s)"

3. an Iteration Model (IM) where "interaction scenes are dynamically created by role-enacting agents, based on the interaction scripts specified in the OM. Role enacting agents negotiate specific interaction agreements with each other".

The Social Structure of Organizations

- We'll focus briefly on social structure of the first model, the organizational one.
- This part of the model is ispired on the work done in role theory [Biddle, 1979].
- Basic elements of the social structure of an organization are:
  1. their **roles**
  2. possible **groups of roles**
  3. **relations between roles**

Roles "identify activities and services necessary to achieve social objectives and enable to abstract from the specific individuals that will eventually perform them".
Roles are described in terms of these notions:

- *Objectives*
    - they are "what an actor of the role is expected to achieve"
    - "role objectives are defined as states of affairs expected to be achieved in the environment"
    - "roles are identified by its objectives (that is, different roles have different sets of objectives) and all roles must have at least one objective"

- *Norms*
  - role norms specify "how is an actor expected to behave", in other words "the rules of behavior for actors performing that role"
  - norms are expressed as deontic expressions
- *Rights*
  - "indicate the capabilities that actors of the role receive when enacting the role"
  - "these are capabilities that an agent usually does not possess but which are inherent to the role"

- *Type of enactment.*
    - There are two types of roles:
        - institutional roles: they "are fixed and controlled by the society and are designed to enforce the social behavior of other agents in the society and to assure the global activity of the society"
        - external roles: they "can in principle be enacted by any agent, according to the access rules specified by the society, and describe the overall (domain related) objectives of the society"
    - typically, actors of institutional roles are mutually trusted agents, whereas operational role actors do not necessarily trust each other.

2. Group of Roles

Groups of roles "The basic idea behind the notion of role groups is to provide means to collectively refer to a set of roles. Moreover, groups are used to specify norms that hold for all roles in the group".

3. Relations between roles: dependency

- Role dependency "between two roles means that one role is dependent on another role for the realization of its objectives".
- Role depencency is reflexive and simmetric.

Biblio I
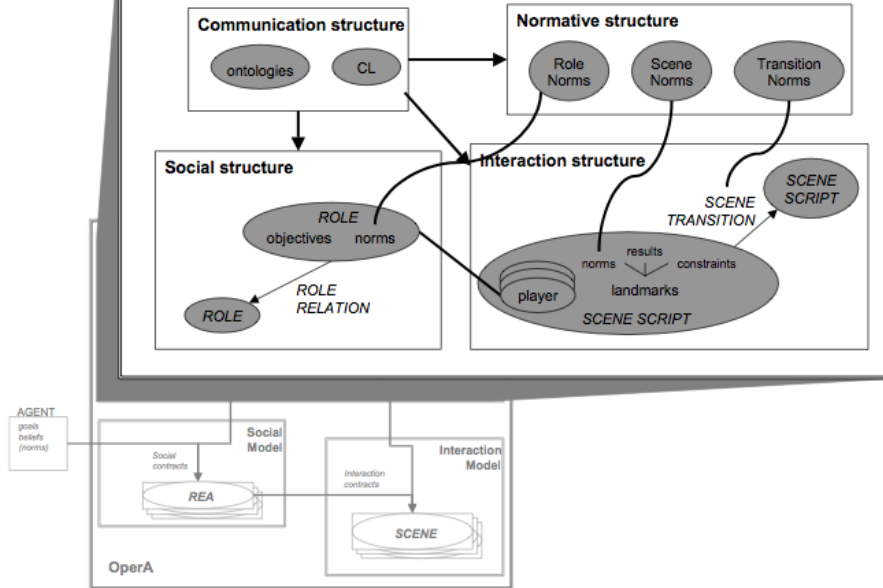
Biddle, B. J. (1979).
Role Theory. Expectations, Identities, and Behaviors.
Academic Press, New York.

Bratman, M. E. (1992).
Shared cooperative activity.
The Philosophical Review, 101(2):327–341.

Castelfranchi, C. (2003).
Grounding we-intention in individual social attitudes: On social commitment again.
In Sintonen, M. and Miller, K., editors, *Realism in Action - Essays in the Philosophy of Social Sciences*. Kluwer, Dordrecht.

Biblio II

Colombetti, M., Fornara, N., and Verdicchio, M. (2002).

The role of institutions in multiagents systems.

In *Workshop on Knowledge based and reasoning agents VIII Convegno AI*IA*, Siena, Italy.

Conte, A. G. (1988).

Eidos. An Essay on Constitutive Rules.

Poznan Studies in the Philosophy of the Sciences and the Humanities.

Dignum, V. (2004).

A Model for Organizational Interaction: based on Agents, founded in Logic.

PhD thesis, Universiteit Utrecht.

Biblio III

French, P. A. (1984).
Collective and Corporate Responsibility.
Columbia University Press.

Gilbert, M. (1992).
Social Facts.
Princeton University Press, Princeton, New Jersey.

Ladd, J. (1970).
Morality and the ideal of rationality in formal organizations.
The Monist, 54(4):488–516.

Prien, B. (2003).
Can constitutive rules guide our actions?
In *GAP.5, Fifth International Congress of the Society for Analytical Philosophy*.

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Biblio IV

Risser, D. T. (2005).

Collective moral responsibility.

In *Internet Encyclopedia of Philosophy*.
http://www.iep.utm.edu/c/collecti.htm.

Searle, J. R. (1969).

Speech Acts: An Essay on the Philosophy of Language.

Cambridge University Press, Cambridge.

Searle, J. R. (1990).

Collective intentions and actions.

In Cohen, P. R., Morgan, J., and Pollak, M. E., editors, *Intentions
in Communication*, pages 401–415. MIT Press, Cambridge,
Massachusetts.

Biblio V

Searle, J. R. (1995).
The Construction of Social Reality.
The Free Press, New York.

Searle, J. R. (2005).
What is an institution?
Journal of Institutional Economics (to appear).

Tuomela, R. (2002).
The Philosophy of Social Practices.
Cambridge University Press, Cambridge, UK.

Tuomela, R. (2003).
The we-mode and the i-mode.
In Schmitt, F., editor, *Socializing Metaphysics: The Nature of Social Reality*. Rowman and Littlefield, Lanham, Md.

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