

Designing organizations: some ontological aspects

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Important aspects of organizations

An organization can be intended as:

- ▷ *structured/multilayered*: with a structure that is not necessarily reducible to basic roles and their interrelations;
- ▷ *designed*: created with specific functions;
- ▷ *agentive*: with mental attitudes (e.g., goals and intentions);
- ▷ *realized*: ultimately built by autonomous agents playing specific roles;
- ▷ *situated*: immersed in an environment;
- ▷ *dynamic*: its structure and its realization may change through time.

- ▷ An organization is a set of **interacting roles** (at least at a specific level of refinement) [van den Broek et al., 2005].
- ▷ An organization is a **structured** entity in which agents playing roles **interact** in a specific way in order to achieve **organization-wide goals** (analysis of the relations between individual and organizational goals) [DeLoach and Matson, 2004].

- ▷ An organization consists of **social structure**, i.e. roles and groups of roles, and **interaction structure**, which contains the interaction relations between the elements of the social structure [Dignum, 2004].
- ▷ “[A]n organization is **structured** through a set of roles, to which are associated deontic notions (...), that apply to the agents that are the actual holder of such roles, when playing those roles” [Pacheco and Carmo, 2003].

Levels of description

It is possible to distinguish at least two different levels of description of organizations:

- ▷ The *abstract organization* “does not contain any reference to the real agents, i.e., it consists only of the organization roles, their links and groups, global plans and permissions/obligations. It may be seen as a kind of recipe of how should collective activity occur” [Sichman et al. 2005].
- ▷ The *concrete organization* is constituted by real agents that play the organizational roles. The concrete organization is supposed to achieve the organizational top-level goals acting in the environment through the players.

Agents

Basic components of a *concrete* organization that are characterized by:

- ▷ *private/mental attitudes* (beliefs, desires, goals, intentions, etc.);
- ▷ *agency* (and capabilities);
- ▷ *interaction and communication*;
- ▷ *social dimension* (conventions, trust, delegation, expectations, etc.).

Roles

Basic components of an *abstract* organization that are characterized by:

- ▷ the *functions/objectives* they have in the organization;
- ▷ the *interactions* with other roles in the organization that normally are regulated by norms (dependences, rights, obligations, powers, etc.)
- ▷ the *requirements* agents need to satisfy in order to play the role.

Note: *competences* (assigned to roles) seem to be a sort of mixture between the three components listed above.

Agents play roles

The ‘glue’ between the concrete and the abstract aspects of an organization is constituted by the *social commitment*:

- ▷ agents are committed in various ways to other agents to do what is specified in the positions/roles they play;
- ▷ as pointed out by many theorists (Castelfranchi, Tuomela, Searle) an emblematic case of social commitment is the *promise*;
- ▷ promises strongly depend on *trust* and *delegation* considerations;
- ▷ promises are made public and precise by means of *contracts*;
- ▷ contracts have *deontic* implications (*obligations, rights, permissions*, etc.).

Agents vs. Roles

Roles seem abstractions on agent, they apply to agents like properties/types (rigidity, definitional dependence, etc.).

- ▷ The same agent can play different roles simultaneously.
- ▷ The same role can be played by different agents simultaneously or at different times.
- ▷ Agents can change role.
- ▷ Objectives, norms, and requirement are *assigned* to roles, i.e. they are pre-established.

Some interesting problems

- ▷ How the goals of the agents relate to the functions associated to the role they play?
- ▷ If an agent can play different roles (in the same or in different organizations), how is it possible to represent the fact that the responsibilities he has depend on the role he is playing (link to the *counting problem*)?
- ▷ In which sense the organizations act in the environment?
 - Are the organization acting through their members?
 - Do actions performed by the members have some social or institutional relevance? Do they *count-as* social or institutional actions?

Groups

- ▷ Similarly to agents, groups seem to have mental attitudes and to act/interact **but**
 - there is a huge discussion about the possibility of reducing the groups' mental attitudes/actions of groups to the ones of their member.
 - some mental attitudes/actions seem to *emerge* from the complex interaction between members.

Multilayered organizations

- ▷ Similarly to groups, the overall objectives/actions of an organization may be distinct from the sum (or composition) of all the objectives/actions of the roles and sub-organizations constituting the top organization.
- ▷ This seems to imply that the structure of a complex organization is not **flat**: it comprises not only interrelated roles but also sub-organizations with emergent objectives/capabilities, i.e. organizations are not only structured but **multi-layered**.

Normative dimension of organizations

- ▷ Some accounts consider organizations as completely made up of norms [Miller, 2007]. Without committing to such a strong position, undoubtedly, norms are central in organizations.
- ▷ There are several ways in which the normative layer affects the organization and the behavior of its members, we have already seen how they can be used in the specification of
 - roles and interactions;
 - the social commitment and the contracts agents have with respect to an organization.

Regulative vs. Constitutive norms

- ▷ *Regulative norms* regulate antecedently existing forms of behavior.
- ▷ *Constitutive norms* ‘create or define new forms of behavior’ (its syntax is the *counts as* locution ‘*X counts as Y in C*’.)
- ▷ Roles in an organization can be intended as defined by constitutive norms that constraint the behavior of the players and the requirements they need to satisfy.

This suggests that organizations can be *designed, created, and specified* to achieve a specific objective and that norms play a central role in this process.

The Artifact Metaphor

- ▷ Organizations can be seen as **artifacts** whose function is to constrain some collective behavior to obtain a specific objective [Tummolini and Castelfranchi, 2006].
 - As in the case of a chair, each part contributes to the main function of the chair, that is something to sit on.
 - Similarly, competences are assigned to every part of an organization (roles+sub-organizations) and they contribute (via the structure) to its general objective.
- ▷ The specification of an organization can be **refined** during the process of design.
- ▷ Organizations that are unstructured at a specific level of refinement can be structured at a deeper level.

Designed organizations

- ▷ A designer starts by figuring out an organization with some general objectives.
- ▷ Successively, (s)he refines that organization by introducing new sub-organizations (with new objectives) linked in a specific (and possibly normative) way.
- ▷ Then, (s)he establishes how the objectives declared for the whole organization can be ‘decomposed’ into simpler objectives attributed to simpler sub-organizations.
- ▷ Finally, (s)he establishes how these sub-organizations are linked by means of institutional relations.

Top-down vs. bottom-up approaches

- ▷ The described process of refinement of an organization is strictly top-down, but bottom-up “grouping operators” can be introduced in order to take into account how agents can join (they organize themselves) to achieve a (common) objective.
- ▷ In addition to completely top-down designed organizations, the situation of agents that having compatible, complementary, or coinciding objectives decide to share their objectives and join in a plural entity, needs to be considered.

Advantages of multilayered organizations

- ▷ Multilayered organizations allow to model both process:
 - a designer may decompose the objective of an organization into sub-objectives assigned to sub-organizations or roles that are purportedly created to accomplish those objectives;
 - agents that have compatible, complementary, or coinciding objectives can decide to share their objectives and join in a plural entity.
- ▷ and make possible to perform a check on the feasibility of the overall objective by the analysis of the chosen structure (*validation* of the design).

Situated organizations

- ▷ We discussed the way internal components of an organization (roles and sub-organizations) can interact, **but** organizations interact with
 - other (external) organizations to which they are necessarily related without a complete control, and
 - the physical environment.
- ▷ The network of the external interactions and the physical environment must be part of the organizational model.
- ▷ The links to external organization can be explicitly considered at the design level.

Foundation as acceptance

We need a mechanism for social acceptance on the structure of the organization.

- ▷ This is what turns the *description* into a *prescription*, a simple description into a (systems of) norms: norms are those descriptions that are *valid* within and for an organization.
- ▷ Note that an organization, even if founded, could be – in principle – void, i.e. without any agent as its member.

Foundation as an inter-organizational relationship

- ▷ The foundation is a way to link an organization with other organizations.
- ▷ The norms of the upper (external or internal) organization are part of the *institutional environment* of the newly founded organization.
- ▷ The upper organization holds the normative machinery in order to accomplish the registration of the organization in question:
 - in order to be accepted an organization must meet some formal requirements.

Dynamic organizations

Three kinds of dynamics:

- ▷ the dynamics of the realization;
- ▷ the dynamics of the structure (due to some change/evolution imposed by a refinement/change of the design);
- ▷ the dynamics of the structure (due to meta-norms).

The dynamics of the realization

- ▷ New agents can commit to play roles in the organization.
- ▷ Old agents can leave an organization (or change role inside the same organization) or the organization can dismiss them.

Note that in this case the structure of the organizations is stable.

The dynamics of structure (due to design)

- ▷ The entire design process can be described using *operators* that determine a *transition* from a design object description to another.
- ▷ A transition at design's level happens, before any realization of the organization exists, when, for instance, the designer creates a new department to accomplish some particular objective of the organization.

Meta-norms

- ▷ Organizations often live in a changing environment and therefore they must be flexible. Nonetheless, not all the changes should be admissible.
- ▷ In order to regulate the evolution of an organization, the designer can specify and constraint how the structure of the organization can evolve.
- ▷ The acceptable changes can be specified by **meta-norms**, i.e. norms that describe how norms can be changed.

To Sum up

We think that a framework that integrates the aspects just described in a model which:

- ▷ is a multi-layered structure
- ▷ distinguishes structure, design and realizations
- ▷ integrates top-down and bottom-up processes
- ▷ is driven by teleological considerations
- ▷ takes into consideration the environment in which the organization is situated
- ▷ can evolve through time

is very important, but also very difficult to be developed. Fortunately researchers from different areas contributes to it.