

# **AS THE TURBULENT ENVIRONMENT IN PERIODS OF ACCELERATED DYNAMICS MODIFIES STRUCTURES AND FUNCTIONS OF VIABLE FIRMS**

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Managing the tougher and faster dynamic changes in the environment has been the main competitive challenge for firms in recent decades. Firms have experienced the not so easy task of adapting to these environmental changes by acquiring superior dynamic capabilities (Teece et al., 1997) based on both distinctive resources (Rumelt, 1984) and knowledge management (Grant, 1997). Struggling for survival has turned into a continual learning process in order to adapt and self-renew both products and processes as well as the overall organizational structure (Volberda and Lewin, 2003).

Stemming from the perspective on organizational structure change, for more than forty years, the literature on organizations and firms considered as cybernetic systems has been rich in authors who favour this interpretation (Kast–Rosenzweig, 1972; Beer, 1981; Jackson, 1993) as well as in texts that affirm the difficulty if not the impossibility of considering organizations as cybernetic systems (Tannenbaum, 1972, Sutherland, 1975, Morgan, 1982).

This paper belongs to the first group. We are convinced that by nature organizations can adapt and thus survive environmental changes thanks only to the control systems that regulate their existence and, for this reason, they “are” “control systems”.

For this reason, even without recourse to the metaphor of mechanistic organization, which stands opposite to the organistic/organic one (Burns and Stalker, 1961), and recalling Norbert Wiener's statement that Cybernetics is the science of the study, design and simulation of “control and communication in the animal and the machine” (Wiener, 1948), we hold that “organizations” due to their intrinsic nature as self-regulating systems can in fact be observed as cybernetic systems (Ericson, 1972) that are self-controlled in order to remain vital and carry out the processes for which they were created.

The objective of this paper is to identify a framework for organizational structure design that enables firms to better cope with and adapt to rapid environmental changes, especially in turbulent environments and in periods of economic accelerated dynamics. A theoretical model will be proposed and empirical examples will be developed which shall consider the organizations-firms as Autopoietic Control Systems which structure and which goal is to control and maintain in homeostatic balance the vital variables even in the presence of environmental disturbances.

In particular an organization appears as a social system made up of a multitude of individuals, structurally linked together, that act in a coordinated and cooperative way to form organs specialized in various functions and processes that carry out a network of recursive processes that give rise to an emerging macro process attributable solely to the organization as a whole (Mingers, 2002).

There are several theories and models that allow us to represent the organization as a Control System in which man acts as apparatuses at any level.

Among the various approaches we consider first and foremost the autopoietic view, which considers the organization as an organizationally-closed system that appears in all respects as an autopoietic machine, which is

“ [...] a machine organized (defined as a unity) as a network of processes of production (transformation and destruction) of components which: (i) through their interactions and transformations continuously regenerate and realize the network of processes (relations) that produced them; and (ii) constitute it (the machine) as a concrete unity in space in which they (the components) exist by specifying the topological domain of its realization as such a network” (Maturana, Varela, 1980: 131)

that tends to endure by continually regenerating the coordinated and cooperative behaviors of its processors (organs) and the network of processes which is a necessary condition for maintaining over time the internal structural coupling among organs and individuals.

In order to demonstrate which *structure* and which *vital processes* should characterize all companies in order to remain viable and in order to survive in all conditions, especially in a *turbulent economy* we believe useful to consider above all the well known Stafford Beer's model, which is universally recognized as the Viable System Model, or VSM (Beer, 1979, 1981). This model interprets organizations as viable systems that are open, recursive and adaptable and that, thanks to their cognitive and control structure, which is capable of communicating with the economic and non-economic environment, tend to endure for a long time through continual adaptation, even in the presence of disturbances not foreseen at the time of the system's design and implementation.

The preceding models (autopoietic and viable system models) refer to all organizations independently of the nature of the processes they carry out. But what do production organizations and companies actually do to remain vital and effectively adapt to environmental changes?

To clarify this operative aspect, Piero Mella has introduced a particular framework in which he has identified five *vital functions* that are strictly necessary for any productive organization to survive for a long period of time overcoming turbulences with cognitive functions that all enterprises must play.

Mella's model (2005, 2012, 2014) interprets firms as systems composed of five interconnected sub-systems of transformation, each of which, operating with maximum efficiency, carries out a vital function similar to what is proposed in the VSM (fig. 3).

While the VSM represents organizations from the point of view of their structural synthesis, the Model of the Organization as an Efficient System of Transformation (MOEST) sees them from a functional viewpoint.

The struggle for survival induces firms to continually learn in order to adapt and self-renew both products and processes as well as their overall organizational structure (Volberda and Lewin, 2003).