Connecting higher education and innovation to local development

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ABSTRACT

The aim of this paper is to describe, from the perspective of social cybernetics, a framework to design a mechanism to unlock local development processes. The framework is rooted in the notion of variety engineering (Beer, 1979, 1985; Espejo and Reyes, 2011). We introduce the concepts of complexity gradient, flow of complexity and complexity attractor as the main pillars of the proposed mechanism.

The design of these complexity attractors implies entering the black-box description of the social system to understand its operational dynamics. We use the capabilities approach of Amartya Sen and Martha Nussbaum (Sen, 1999; Nussbaum, 2000) to show how this mechanism can increase the inner complexity of the system to achieve desirable performance vis-a-vis its environment.

We exemplify this mechanism by describing a pilot project that has been developed in a small municipality in Colombia regarding local capabilities building to increase its quality of life. The attractor of complexity connects higher education and innovation with local development.

1. Requisite variety: a cyber-systemic approach

Ashbýs Law of requisite variety (Ashby, 1964) is a corner stone in all branches of cybernetics. It can be related to controlling mechanical and biological systems (Beer, 1979), but also to the self-regulation of social systems via the idea of viability (Beer, 1979, 1981, 1985). It has been also quite important to build conceptual models about organizational learning (Espejo et al., 1996) and to explain social phenomena like corruption and means to overcome it via self-organizing mechanisms (Espejo & Reyes, 2001).

Variety engineering is an applied branch of cybernetics whose purpose is to design specific mechanisms for a system in interaction with a changing environment to maintain its performance criterion within agreed ranges. Fig. 1 illustrates a rich conceptual model regarding variety engineering.

We distinguish three venues in the interaction between a system and its environment: relational, environmental and the inner venue. In the environmental venue, self-regulating and self-organizing mechanisms (that can be put in place either spontaneously or by design) may considerably reduce the variety of the environment (Ve). When this happens, the system has to deal with a smaller residual variety (Espejo, 1989). This can be done via attenuators and amplifiers of complexity set in the relational venue (Beer, 1981; Espejo, 1989). On the other hand, in the inner venue of the system, there can also be internal mechanisms to amplify and attenuate its own variety (Vs).

Using this conceptual model, we can think of different strategies for the system to achieve desirable performance vis-à-vis its environment. Some of them are: a) the development of self-organizing processes and self-regulating mechanisms in the environmental venue to reduce Ve, b) to attenuate environmental residual variety (Ev) and amplify systeḿs variety (Sv), and c) creating new variety in the inner venue of the system to increase Vs. The first two are well explored in the literature (Beer, 1985; Espejo & Reyes,
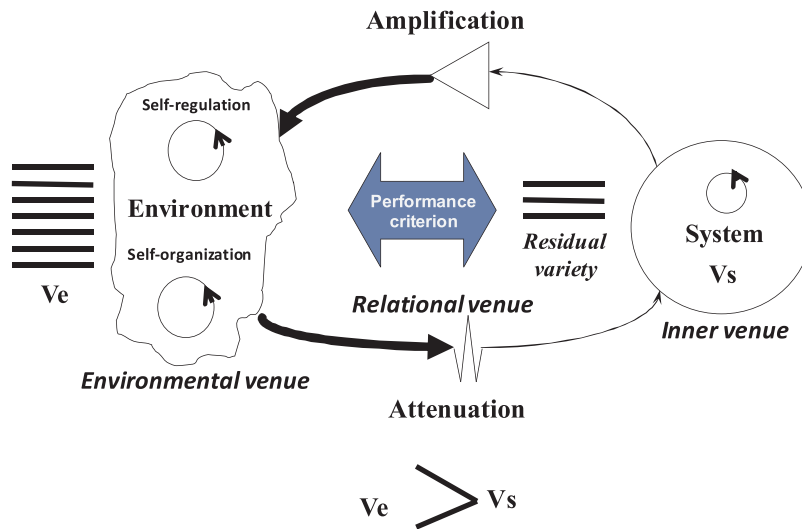
Fig. 1. Variety engineering (Espejo & Reyes, 2011).

2011) while the last one has received less attention (Espejo, 2015; Espejo & Dominici, 2016). This paper explores in depth this strategy regarding social systems and shows that to design mechanisms to increase Sv, we need to "enter into the black box" to understand its operational dynamics.

2. Variety engineering in the social realm: developing capabilities

This paper focuses on social systems that are constituted by people whose recurrent interactions through the social roles they engage on produce some form of organizational closure (Espejo, 1994). Examples of these systems are companies, social organizations and local communities.

Social systems may develop their complexity by the coordination of individuaĺs capabilities in different action domains. To understand this inner process, we should move from a black-box type of description to an operational type of description (Espejo & Reyes, 2011). In doing so, we will use Amartya Seńs idea of capabilities in relation to human development (Sen, 1999) and its later expansion by Martha Nussbaum (2000).

The concept of capability we use is that developed by Sen in his article "Equality of What" (Sen, 1980). His original concern was to focus on positive freedom, that is, in our actual ability to be and do something. This is closely related to the notion of freedom of choice because as we increase our capabilities we will have more options to choose among different action paths in particular situations. This freedom of choice, based on equal opportunities, is what Sen proposed as the corner stone of social development (Sen, 1999). This development implies both building individuaĺs autonomy and creating local capabilities. Let us see this with more detail.

In the capabilities approach to social development, it is important to distinguish between internal and basic capacities (Nussbaum, 2000). Basic capacities are intrinsic abilities determined by our biological makeup; they make possible the development of future abilities. They may change as we become structurally coupled with our environment. Therefore, we may develop new abilities (practices) but also, we may lose (or discard) others. As Maturana & Varela's early work propose, the history of these structural changes is called ontogeny (Maturana & Varela, 1987). Perhaps the primary basic capacity is our ability to make distinctions (Spencer-Brown, 1969).

On the other hand, our internal capacities develop through conscious learning processes. In fact, education is one of the more powerful mechanism to develop internal capacities, because it unlocks individuaĺs ability to make new distinctions and design corresponding practices. There is a strong connection between basic and internal capacities. A person with a physiological limitation, like blindness, may not develop some internal capacities like visual recognition of people, however, she may develop other forms of recognition by using their hands or listening to their voice. Something similar happens with cognitive limitations.

Internal capacities are the outcome of new distinctions we make and corresponding new practices we develop in specific domains of action (Espejo, 2000). However, they require of a political, social, economic and organizational context to be activated in concrete social domains. When this happens, Nusbaum call them combined capacities (Nussbaum, 2000). In this paper, we call them capabilities.

As we mentioned before, capabilities are closely related to our freedom to choose. Two persons may display the same capacity in an action domain, but they may have different capabilities in the same domain. A common example used by Sen to illustrate this point is comparing a person that is fasting with other who is starving. They share the same behavior regarding their nutritional domain, however they do not have the same capability. While the former is capable of not fasting (freedom of choice), the latter is starving because she does not have other choice (Sen, 1988).

On the other hand, we can think of social systems with structural conditions (social, political, economic and organizational) that