



Dynamic systems and the role of evaluation: The case of the Green Communities project



Valentina Anzoise ^{a,*}, Stefania Sardo ^{b,1}

^a European Centre for Living Technology, Ca' Foscari University of Venice, S. Marco 2940, 30124 Venice, Italy

^b Department of Innovation and Economic Organization, BI Norwegian Business School, Nydalsveien 37, N-0442 Oslo, Norway

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ABSTRACT

The crucial role evaluation can play in the co-development of project design and its implementation will be addressed through the analysis of a case study, the Green Communities (GC) project, funded by the Italian Ministry of Environment within the EU Interregional Operational Program (2007–2013) “Renewable Energy and Energy Efficiency”. The project’s broader goals included an attempt to trigger a change in Italian local development strategies, especially for mountain and inland areas, which would be tailored to the real needs of communities, and based on a sustainable exploitation and management of the territorial assets. The goal was not achieved, and this paper addresses the issues of how GC could have been more effective in fostering a vision of change, and which design adaptations and evaluation procedures would have allowed the project to better cope with the unexpected consequences and resistances it encountered. The conclusions drawn are that projects should be conceived, designed and carried out as *dynamic systems*, inclusive of a dynamic and engaged evaluation enabling the generation of feedback loops, iteratively interpreting the narratives and dynamics unfolding within the project, and actively monitoring the potential of various relationships among project participants for generating positive social change.

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1. Introduction

This paper introduces a new evaluation approach called Dynamic Evaluation (DE), aimed at supporting the monitoring, management, and development of projects and programs. DE rests on two theoretical foundations: on one side, ideas in the literature regarding evaluation practices, in particular the perspectives proposed by Participatory Evaluation (Cousins & Earl, 1992; Cousins & Whitmore, 1998; Cousins, 2003; O’Sullivan, 2012), Developmental Evaluation (Patton, 1994, 2011), and by Empowerment Evaluation (Fetterman, 1994, 2001); on the other side, the complexity-based theory of innovation processes, as developed in Arthur, Durlauf, Lane (1997), Lane and Maxfield (1997, 2005) and Lane, Maxfield, Read, and van der Leeuw (2009).

The debate about whether, and how, to apply system thinking (Cabrera, Colosi, & Lobdell, 2008) and complexity theory in the

evaluation practices has been raging for a decade. A recent review argued that few contributions to this debate have provided detailed considerations of what would constitute complexity-consistent methods (Walton, 2013). Here, we propose one approach to filling this lacuna.

Projects and programs can be considered as temporary organizations in agent-artifact space, which undergo continuous change (Lundin & Söderholm, 1995). These evolving organizations require continuous monitoring and interpretation to define and regulate the system of interactions among the changing set of agents and artifacts that comprise them (Lane & Maxfield, 1997, 2005). Not only do the organization of project and programs lack clear and static boundaries, but the dynamics of the processes through which they evolve are neither linear nor predetermined (Urban, Hargraves, & Trochim, 2014). Conceptualizing, nurturing and implementing projects and programs should be regarded as ongoing experiments, guided by a dynamic evaluation process. The primary aim of this paper is to contribute to the construction of such a process.

The paper is organized as follows. Section 2 presents the theoretical foundations of DE, based upon the two literature streams mentioned above. Section 3 introduces DE principles and

* Corresponding author. Tel.: +39 041 2347594; fax: +39 041 2347589.

E-mail addresses: valentina.anzoise@unive.it (V. Anzoise),

stefania.sardo@bi.no (S. Sardo).

¹ Tel.: +47 464 10 801.

methodology. Section 4 discusses the Green Communities project, which served as a test-bed for the design and development of DE, as well as for the ICT tools to support it. Section 5 describes the procedures and tools used to monitor the evolution of the case study, while Section 6 analyzes the DE of the GC project. Section 7 presents an overview of the main lessons learnt for evaluation practices and their implications for project planning and program policy-making. The final section offers some concluding remarks.

2. Theoretical foundations

2.1. Innovation and complexity studies

Our complexity theoretical framework relies on theoretical work in innovation dynamics initiated by Lane and Maxfield (1997, 2005) and developed by other authors, including Villani, Bonacini, Ferrari, Serra, and Lane (2007), Read, Lane, and van der Leeuw (2009), and Russo (2000). Even though complexity theory is not a single body of thought (see for example Simon, 1962, 1973; Anderson, 1972; Holland, 1995), the work by Lane and Maxfield has the merit of providing a synthetic theory of innovation processes and a corresponding minimal ontology for them (including a set of *entities* and their properties, their *interaction modalities*, and the *dynamics* through which interactions and their consequences are ordered in time). The theory takes as its primary unit of analysis *innovation cascades*, which include the construction and modification of entities (agents, artifacts, and attributions of identity) and the kinds of relations among them (Lane et al., 2009). Individuals and organizations participating in innovation cascades usually do not face situations where they can decide which action to take on the basis of a pre-defined set of possible consequences. Instead, the fact that everything is in the process of becoming and change means that participants face *ontological uncertainty*: they cannot even imagine which kind of consequences may derive from their actions—nor even the entities and interaction modalities that will mediate between these actions and their consequences. In this context, two concepts are central to analyze how agents generate action: *generative relationships* and the *narrative theory of action* (Lane & Maxfield, 2005).

Generative relationships among agents are the locus in which new attributions of functionality (for artifacts) and identity (for agents) arise. Even if ontological uncertainty might make it impossible to predict the consequences induced by a particular relationship, one may still “measure” and enhance the potential it has for generating system transformations. This *generative potential* depends upon several elements: *heterogeneity* among agents (with respect to their attributions, competences or relationship structures); *mutual* and *aligned directedness* (that is, reciprocity and mutual willingness to collaborate to transform a common zone of the agent-artifact space); *permissions structures* (which determine what agents can communicate about, with whom, in which illocutionary modes); and *joint action opportunities* to engage in change processes. A project team trying to induce a transformation in a specific zone of agent-artifact space can monitor possible relationships among project participants with respect to these elements and try to create interactions that enhance the generative potential of the more promising of these relationships. Obviously, generative potential is a moving target (as indeed are the set of agents involved in a project and the relationships among them), so it must be continuously monitored and nurtured.

The *narrative theory of action* provides an interpretative frame to understand how agents can act amidst the ontological uncertainty that characterizes innovation cascades (Lane, 2014, 2015). According to this theory, agents act out stories they tell themselves: these stories interpret their present contexts by

embedding them in narrative structures¹¹, which they have “learned” from stories that circulate in the narrative communities to which they belong, augmented by their own past experience.

A narrative can be thought as a sequence of events having a beginning, a middle and an end. It consists of a cast of characters, a plot that serves to structure events temporally, and a denouement centered on a change happening in some of the agents' characteristics and identities (Lane, 2014). Narratives do not just relate, but also explain and constitute reality (Bruner, 1991). Through their sensemaking function they enable human beings to act in the face of ontological uncertainty, because they provide legitimacy and accountability to these actions (Czarniawska, 2004). They help agents to explain the correlation among events in a process, and to encode data that may be relevant for the analysis of a wide range of organizational phenomena (Pentland, 1999). For all these reasons, they provide thick but synthetic descriptions, which make them privileged hermeneutic units and analytic tools for evaluation (Anzoise & Sardo, 2013), although there is still some resistance to the use of this non-standard type of “evidence” in policy-making (Epstein, Farina, & Heidt, 2014).

2.2. Combining evaluation with innovation and complexity studies

In recent years, there have been an increasing number of contributions applying complexity concepts to evaluation theories, practices, and methods (Walton, 2013). These complexity-informed evaluation approaches consider the interactions among components in a system as non-linear, and as giving rise to ‘emergent’ properties, which cannot be understood just by examining the components separately. Moreover, the interplay of different layers and the high interconnectedness among systems components imply that a change in one of them may have either a negligible or a large effect on the system as a whole (Byrne & Callaghan, 2014), making it difficult to forecast all the possible patterns of transformations that can occur. That is why systems with similar initial conditions may end up developing completely different properties over time (Room, 2011). One consequential proposition is that in evaluation practices one-size-does-not-fit-all projects, since they have to be adapted to the uniqueness of relationships and changes happening in time.

In the next paragraph, we will discuss the Dynamic Evaluation (DE) approach, which has been developed by the authors and other colleagues within the *Emergence by Design* (MD) research project, funded by the European Union.

3. Dynamic Evaluation

The Dynamic Evaluation (DE) methodology is not an all-encompassing evaluation, but can be complementary with others. It shares some features with Responsive, Empowerment, Developmental and Participatory Evaluation (Abma, 2001; Abma, Nierse, & Widdershoven, 2009; Wandersman et al., 2005; Patton, 1994, 2000, 2011; Cousins, 2003; O'Sullivan, 2012; Fetterman, 1994, 1995, 2001). Like these approaches, the principal aims of DE are to enhance reflexivity among project participants, and to foster and support adaptive changes and learning through the continuous generation of feedback loops among the evaluator, the management team, and the other project participants and stakeholders. With respect to evaluation practice, this process generates ideas and suggestions for adaptations and improvements, which proceed in an iterative and cumulative way, taking shape from the agents'

¹¹ A narrative structure is a kind of template for narratives. It consists of a set of character types, abstract descriptions of identities; plot elements, which consist of a set of allowable transformations for character identity, as well as the physical and social laws that determine how contexts may change outside of the characters' control and what kinds of coincidences are “normal” (Lane, 2014).

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