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FACILITATING AUTONOMY IN RURAL REGENERATION PROGRAMS: AN APPLICATION OF THE VIABLE SYSTEM MODEL AS A METHODOLOGY FOR SELF-ORGANIZATION IN NON-HIERARCHICAL COMMUNITIES

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ABSTRACT

This paper presents a case study about a non-hierarchical community developing an independent regeneration project. From the beginning of this 10 years project, operational groups have worked on a self-organized and non-hierarchical approach but they have experienced tensions and difficulties in achieving their goals. In the recent years, some noticeable improvements have been apparent and the case study analysis suggests that the ongoing cybernetic (VSM) intervention has facilitated a more effective path to self-organization, as well as creating a more robust context in which to allow for the emergence of innovative organizational structures.

INTRODUCTION

Regeneration programs, mainly oriented towards the provision of housing and the rise of living standards, started to be implemented in Britain at the end of World War II. Since then, modifications have been introduced, accompanying the variation in public policies in the last 60 years, generating changes in the orientation, management and participatory mechanisms of these programs; this increasingly gave the communities more autonomy in the design and execution of such initiatives.

Generic ideas of self-organization (SO) – such as bottom-up and participatory decision-making processes – have been adopted by some regeneration initiatives, in which the increasing participation of the recipient communities seemed to enhance success in the implementation of these programs. Despite these insights regarding the importance of SO in regeneration processes, these practices have not always been supported by clear methodologies designed to include and provide guidance to the empowered communities about how to present, administrate and implement autonomously their regeneration initiatives. Thus, the development of intervention tools in regeneration became a future field of research (Moobela, 2005).

This paper draws upon a case study of an independent rural regeneration initiative in order to present key-questions about SO processes in communities and their organizational requirements, as these aspects are crucial for the success of Area Based Initiatives (ABIs). Following from this, the implications on the emergence of independent (non-official) regeneration initiatives will be presented as issues for future research, since these initiatives frequently explore new business models and/or novel associative forms (e.g. product-service systems, community-oriented business).

LINKING CONCEPTS

The nature and evolution of the regeneration programs

A sequence of initiatives can be traced from the 1950s, when national and local strategies were focused on reconstruction, rising the quantity and quality of housing living standards (e.g. Town and Country-planning act of 1944), which was largely financed by public sector investment. This strategy continued into the 1960s with the execution of a revitalization

program and the introduction of Area Based Initiatives (ABIs), which activities were oriented towards social and welfare improvements supported by the public and private sectors (e.g. The Urban Program in 1968, particularly under the partnerships scheme in rural areas). In the 1970s a new plan was introduced to support neighborhood and local initiatives with an increasing participation of the private sector while the local government function was decentralized (e.g. The Partnership Program¹ in the Inner Urban Areas Act, 1978). The most significant changes affecting the nature of these policies were introduced in the 1980s with the implementation of the redevelopment plan (e.g. Urban Development Corporations, 1981; Urban Regeneration Grant, 1987); this plan favored an extensive participation of the private sector through the partnerships mechanism, additionally introducing self-help as a delivery mechanism – where communities act as the promoters and operators of the regeneration programs – with a small and selective support of the State. In the 1990s, a regeneration initiative aimed to increase the participation of the private sector in the supply/improvement of affordable housing (e.g. Single Regeneration Budget, 1994), enhancing the partnerships scheme with the inclusion of the voluntary sector (Roberts & Sykes, 1999). More recently, under the title of *Sustainable Communities Plan* (Office of the Deputy Prime Minister, 2003), the concept of sustainability was incorporated into regeneration programs. With emphasis on the development of both urban and rural areas through Regional Sustainable Development Frameworks², the plan provided guidance on how to involve local communities more actively and parameters by which to measure sustainability locally. A complete description of these programs can be found in Appendix 1.

The analysis of the evolutionary process of all these regeneration programs has revealed the importance of working with and between different relief agencies to plan and design strategically locally-oriented regeneration initiatives, as well as the importance of promoting the autonomy and empowerment of the local communities and local relief offices. For example, the choice of priority projects and the (local) autonomous budget administration demands inter-agency interactions and participatory mechanisms. Consequently, due to the increasing (bureaucratic) complexity, the need to start a discussion on the skills and knowledge required has emerged in practitioner circles as well as in the academic sector (Kearns & Turok, 2000; Newman, 2001).

Complementarily, the changes in the nature of the regeneration programs also underlined the increasing importance of partnerships: to include the community and the private sector in the decision-making process and implementation, and to allow the recipient communities to participate as investors in the local regeneration initiatives. Furthermore, the need to re-orientate regeneration towards the integration of “soft” elements of development (people-based outcomes such as leisure facilities, education and health) has been highlighted as well (Beatty et al, 2008; Diamond & Liddle, 2005).

With regards to the evolution of the partnerships scheme, it has evolved in such a way that the partnerships have to compete in a bid among each other for public resources. This competitive nature has generated fragmentation of power, inequity and exclusion, constraining the community’s participation in the decision-making process. At the same time, the bidding process itself tends to discourage the losers to participate in further initiatives (Kearns & Turok, 2000). Since its aggressive introduction in the 80s, the autonomy and enterprise-driven nature of the partnerships scheme (e.g. Urban Development Corporations, 1981; Urban Regeneration Grant, 1987), that literally bypassed the government’s and community’s participation and control, has become suspicious and has generated discomfort in the recipient communities. It is perceived that the partnerships are cosmetic arrangements with local actors displaying those attributes/qualities which they think the government wishes to see. This is once again due the competitive nature of the bidding process (Beswick & Tsenkova, 2001).

¹ The partnerships can be described as associations between private and public organizations, where the public sector participates mainly by providing the funds while the private part and the local community execute the project. Since the adoption of the Partnerships Scheme, recipient communities and voluntary sector have become more active in this associative model.

² Participative mechanisms where Regional Chambers, Government Offices, Regional Development Agencies, businesses, local authorities, charities and voluntary groups participate in the definition of objectives and priorities for sustainable development.

In order to approach the undesirable effects of the partnerships scheme from a different perspective, the planning procedure for regeneration programs has been recently understood as a complex phenomenon where the (traditional) planning approach proves itself unable to integrate the different factors and processes involved. Particularly complex are the dimension and multiplicity of problems related with the intentions initially defined to orientate the transformation process and its dynamic change (evolution) as the regeneration programs are implemented (Breda-Vazquez & Alves, 2004). Some applications of complexity demonstrate that the planning process in regeneration initiatives under the ABIs and the new policies of participatory design presents emergent properties as mechanisms of adaptation and evolution. Therefore, if the decision-making process in regeneration can be described as a SO process, a new perspective for intervention to facilitate/induce the creation of partnerships without violating the complex/dynamic nature of such process should be embraced as an important analytical tool for future regeneration programs (Moobela, 2005).

In this sense, Osborne et al (2002) and Tsenkova (2001) suggest that improvements should be made in the 'bottom-up' approach of the regeneration process, giving more autonomy and control to the recipient communities, and providing more efficient tools of (self-) organization that would enable them to deal with both the organizational and technical aspects of program implementation.

This bottom-up approach, presented originally by Axelrod and Cohen (1999), suggests that the self-organizing regeneration schemes are not new. Their study indicates that empirical evidences of successful relations (among individuals, and individuals with institutions) share a similar pattern of interaction in the construction of social capital (civism), facilitating coordination and cooperation. The foundations of such SO mechanisms are the principles of proximity and activation: describing the factors determining how agents come to interact, and the factors determining the sequence of their activity, respectively.

In concordance with conceptual developments coming from the paradigm of complex systems, tools and guidelines to foster self-empowerment of individuals and self-directed sustainable development of communities have been presented. Some of these tools suggest the use of Evolutionary Systems Design and Social Systems Design to drive the transition towards sustainable communities (Laszlo, 2004), also, the idea of embodied systems, acceptance of uncertainty, recognition of the failure of control paradigms and the necessity of reflexive processes to generate co-evolutionary governance in social systems (Rotmans et al, 2005). A description of the most relevant of these tools is presented here below.

Management tools for regeneration

After more than three decades of implementation of regeneration programs in the UK, several management tools have been adapted and developed to fit the specialized demands in the practice of community development. Some are merely replicas of current administrative tools and some are special adaptations of existent administrative tools, guides and toolkits; yet others are sophisticated toolsets closely related with the recognition and application of systems and complexity theory, where their functional principles are applied in regeneration programs. Nevertheless, despite the understanding and use of the complexity theory in the development of these new tools, none of them provides a hint about the organizational structure(s) that facilitate(s) the self-organizing behavior. A more comprehensive description of the characteristics and main attributes of these tools is summarized in Table 1.

TOOL	NATURE	ORIGIN	ORIENTATION
PQASSO	"Off the Shell" Quality Assessment Systematic	Voluntary Sector	- Planning - Budget/Resources Management - Time control

Visible Communities	National Standard	Community Associations	- Governance. - Charity regulation, trustee's duties - Community anchors & standards for other groups (Tenants & Residents Associations)
Local Multiplier 3 (LM3)	Measurement of Economical Impact	New Economy Foundation	- Measurement of Economic Impact
Project SIGMA (1999)	Quality Administrative Management Systems	British standards Forum for the Future AccountAbility	- Toolkit/guidelines to address specific sustainability challenges
KALIF (*)	Complexity & evolutionary sciences	Consultancy in Knowledge Management Learning Futures Ltd & Clbit	- Construction of knowledge and learning infrastructures
Moobela (*)	Complexity	Research	- Diagnostic and Planning

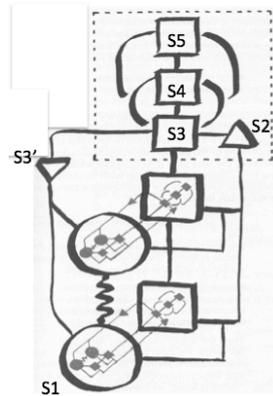
*Table 1: Tools for regeneration. These tools have a systemic approach.
(*) Have foundations in complexity sciences.*

Since SO seems to play an important role in the success of autonomous regeneration programs, the foundations and principles of this phenomenon when applied in social systems are explained as follows.

Self-organization (SO)

In general, the study of SO in social systems is a convergent development from different lines in the study of complex systems and cybernetics (Complexity Theory, Complex Adaptive Systems, Cybernetics, Socio-Cybernetics, and Synergetics). Despite the shared use of core concepts and of some theoretical developments in SO theory (e.g. recursive structures and organizational – mental – models as described by Beer, 1966; Haken, 1984; Klabbers, 1986), there is not yet a clear unification in conceptual and methodological definitions, generating two main approaches/groups of methodologies in the study of SO, as will be seen in the next section. Both concentrate on communication to explain and support SO processes but, while one of them is focused on the manipulation of connectivity and information channels, and is oriented to drive the communication process under the positivist paradigm of control and prediction of the final outcomes, the other approach is focused on the provision of environmental conditions and communicational spaces without controlling or anticipating the final outcome of the SO process. However, none of these approaches informs about the mechanism which is needed for the emergence of the organizational structures, neither reports detailed observations on the nature of these emergent structures resulting from SO. In relation to this, the Viable System Model (VSM; see Figure 1) assumes the existence of mechanisms generating these organizational structures and concentrates (rather than suggests) on the properties that such self-organizing entity must show to be viable.

The VSM (Figure modified from Beer, 1985)



- S1: Operative
- S2: Coordination
- S3: Optimization and monitoring (here & now)
- S4: External Scanning & forecasting (there & then)
- S5: Policy, Intentionality & Identity

Figure 1: The Viable System Model

Beer (1985) suggests that a viable organization is the one that can survive – maintain a separate existence – in a particular environment. To do so, and taking into account the dynamic nature of the environment, the organizational structure must present a form of adaptive connectivity to assimilate the external changing conditions. Therefore, Beer presents an organizational structure divided in two categories of activities distributed in 5 systems inside the VSM:

- Primary Activities, where the system(s) 1 (S1) attend the operational activities
- Secondary Activities (composed by the meta-systemic functions), where system 2 (S2) coordinates and solves conflict among systems 1; system 3 (S3) concentrates on the distribution of resources, optimisation, monitoring (via S3') and generation of synergy among the S1 activities; system 4 (S4) scans environmental changes and suggests strategies to cope with them; and system 5 (S5) generates policies and preserves the identity of the organization (Walker, 2005).

Varela (1984) identifies the key-principles of SO in the organizational context as:

- Organizational closeness (internal structural regularity and coherence).
- Interpretation of the external variances through which the context is provided by the internal – organizational – coherence.

As a parallel and complementary development in the identification of SO principles, Beer (1979, 1985) indicates that the comparison between a conceptual model of itself (the organization, embodied in an organizational system) and the environment provides the capacity to produce a self-reference (the capacity to reflect upon itself, in aspects such as its identity, goals, tasks or activities), and self-awareness processes, constituting key-elements of the self-organization, in cybernetic terms.

Klabbers (1986) also indicates that, for a self-steering system, an embodied (recursive) system must be present, producing information that generates global understanding/awareness, which facilitates the capacity for abstraction (forecasting, perspective) and general coordination of activities. In addition, Holland (1995) identifies 'tagging' (for example, group identity; in concordance with Axelrod & Cohen, 1999) and the internal model (a simplified representation of the organization and its environment) as mechanisms for SO.

To summarise, the common characteristic in these theories is that the ability of the organization to contrast the external environment with a model of itself (the organization in its current state) generates global awareness or consciousness of the state of the organization's components (self-reference). Thus, it facilitates the creation of autonomous and coordinated decision-making processes among the operative groups (self-organization), which emerge easier when occurring within a recursive organizational structure.

In order to gain in the understanding of the SO principles, some studies and experiments have been carried out in different social systems (ants, robots, simulated agents); among them, a study founded by the Engineering and Physical Sciences Research Committee, as part of the research project “Defying the rules: How self-regulatory social systems work”. From this research project, the case study presented in this paper and a model that explains the division of labor between ants³ were produced and are being tested in artificial social systems (Arcaute et al, 2008). The computational model of the ants offers some elements to be considered in the interpretation of the SO behavior in communities, such as:

- 1- The task allocation (identification) is the element that generates local processes of self-regulation/SO.
- 2- The tasks act as attractive fields, emitting information about their status constantly.
- 3- The ants (or agents) are sensible to such information and will prefer to perform the task that presents the highest relative signal (the closest one).
- 4- Each task receives just a certain number of ants (agents) and then suspends the emission of information – the task is satisfied and, therefore, closed.

With time, the ants (agents) are sensitized due to the repetitive attendance to a particular task (learning), and then specialized/differentiated (they are more sensitive to perceive information from certain tasks). One of the basic assumptions in this study is that people self-organize themselves around a task; therefore, it is expected that some – or all – of the principles of the ant model may help to explain the distribution of people among tasks and the organizational structures that favour an autonomous task distribution in a human non-hierarchical community.

To identify which principles of SO have been applied in the creation of methodologies to induce SO processes in communities, examples of the most representative ones – relative to human communities/activities – are presented next, to support the eventual suggestion of a (new) SO methodology.

Methodologies for self-organization

Consequently to the various convergent studies of SO in social systems, the methodologies to facilitate this SO process have been also developed from different perspectives, such as game theory (e.g. Ostrom, 1995), complexity (e.g. Sociocracy - Buck & Endenburg, 2004), systems thinking (e.g. AGIL/SCRUM - Takeushi & Nonaka, 1986; Open Space Technologies - Harrison Owen, 1991; World Café - Brown & Isaacs, 2001), communication theory and networks theory (e.g. Dynamic Social Impact Theory - Latane, 1981), cybernetics (e.g. Team Syntegrity - Beer, 1994), and complex adaptive systems (e.g. KALIF - Haldane & Bond, 2004).

As has been introduced briefly in the previous section, these methodologies can be classified into two categories. The first group of methodologies and tools are related with game theory and synergetics: these theories are based on mathematical and probabilistic models to explore/explain, model and control the internal mechanisms of the self-organizing process. The diagnostics of connectivity and social network structure are used to selectively introduce information and activate specific agents, changing in this way the structure of the social network (e.g. Ostrom; Latane - Dynamic Social Impact Theory). The second group of methodologies and tools, based on the dynamic of complex systems, is oriented on providing guidelines concerning how to create environments which facilitate communicational processes and coordination of activities (i.e. AGIL, Open Space Technologies, World Café, Team Syntegrity, KALIF), rather than exploring or controlling the internal mechanism of the SO activity. A complete description of these methodologies can be found in Appendix 2.

³ The ants have been used to describe SO in communities due to the simplicity of their behaviour. The fact that there is no centralized information in the ant colony, their – relative – uniformity and the mechanism to identify and assign tasks make of them a good experimental subject to explore the rules of SO in social systems.

Research objectives

This exploration on the evolution of concepts and methodologies has not found elements conceived specifically to facilitate the emergence of the organizational structures that catalyze the SO behavior. In consequence, to explore this – apparently – unexplored issue, the questions defining this research are stated as follows:

- What kind of organizational structure results from the introduction of self-organization principles in non-hierarchical communities?
- Which methodologies and tools would be useful to support self-organization in communities striving to improve their organizational flexibility?

The case study presented in the next section will illustrate and support this research work.

THE CASE STUDY – DESCRIPTION AND ANALYSIS

The case study was set in a community-based organization (hereafter referred to as XOOD), legally registered as a charity in Ireland, that has developed functional economies in the form of emergent operational/business groups via non-hierarchical (flat), participative and consensual decision-making processes. The study of the organizational structures related to the SO behaviour in this community is based on an organizational cybernetic intervention – using the VSM – facilitated by Espinosa and Walker (2009) on the XOOD⁴. This intervention project was broken down into three groups of small-scale operations/interventions, outlined below in three descriptive stages, offering a theoretical opportunity to explore some of the elements of SO.

The beginning

The XOOD set up 10 years ago and was focused on education/experimentation for a sustainable lifestyle. Its most important initiative has been the development of a sustainable environment (Eco-Village) for the associated families. This consists of fully-serviced sites to build eco-houses, the use of green technologies, the development of green areas and spaces to practice organic agriculture and the construction of communal buildings. All have strong foundations in communal/ecological values (such as consensual, egalitarian, non-hierarchical participation in the administration and decision-making processes, and the adoption of permaculture and principles of eco-design in the conception of the lifestyle and of the community's facilities).

The Eco-Village project finally materialised five years ago with the acquisition of land and the execution of the eco-housing development, creating an intentional neighbourhood characterised by fully equipped private dwellings distributed in clusters, with extensive common facilities designed and managed by the residents. Just three years ago, coinciding with the peak point of the Celtic Tiger – i.e. the colloquial term used to refer to the years of the economical boom in Ireland – all the elements associated with the development were in place. The first intervention was carried out precisely when the organization had its transition from the planning (theoretical/dreaming) stage to the creation of the business-oriented (practical/development) stage.

First intervention stage

The first group of systemic/cybernetic interventions (from July 2007 until December 2007) consisted of a series of workshops to introduce the VSM as a language/code to help the

⁴ The author of this paper participated in the last stage of the cybernetic intervention as an academic observer of the process of SO, and provided in-house coaching for the implementation of the VSM.

community to describe their own organizational structure. The outcome of these workshops was the identification of a highly decentralised management (consequent to the non-hierarchical structure of the community), with the board doing some operational tasks (beyond its strategic and planning functions), and an elevated number of groups/activities (more than 20) in which the resources were dispersed .

As an additional outcome of the workshops, the organizational diagnostic made evident the lack of management functions (VSM meta-systemic roles/functions S2-5) such as monitoring, coordination, strategic planning and policy/identity definition. Furthermore, it was noticeable that the consensual mechanism to make decisions was not diligent and succinct enough to cope with the new management challenges like the hiring of external contractors and advisors to start the building operations. In addition, the VSM diagnostic showed a high number of groups performing activities (VSM-S1) without a clear differentiation among the ones that could be defined as proper primary activities (e.g. building, farming) and the ones that are supportive activities (e.g. communications and legal issues groups). Related to the secondary – supportive – activities, the board (VSM-S5) presented a high level of intromission in the activity of the VSM-S1; the function of scanning the external environment was not present (VSM-S4), and in consequence the feedback necessary to do planning didn't occur (link VSM S3-S4). Finally, the VSM diagnostic made evident that the monitoring mechanism of the activity of the VSM-S1 was inexistent (VSM-S3'), and that the general coordination of the VSM-S1s didn't work efficiently (VSM-S2).

At this stage, none of the (new) business opportunities/groups was clearly defined beyond the outline of a future potential business development and was without an explicit location/relation within the big picture of the project. For instance, one of the suggested (new) businesses was the eco-farm group – with participation of the XOOB members providing voluntary work and distributing the harvest in equal portions. However, as with almost all the other groups (e.g. building, sustainable energy, education), this eco-farm proposal was poorly defined in its scope and functional planning and, despite the rural and developmental nature of the whole project, the XOOB had not recruited a farmer or people with expertise to build it.

Second intervention stage

The second group of systemic/cybernetic interventions (from January to December 2008) focused on the provision of advice, and the reinforcement of the conceptual domain of the VSM by the different task groups working in the project, with emphasis on those providing supporting activities (e.g. planning strategic and tactic outlining). The aim of this advice was to facilitate the dialog between the different groups and functions of operation, coordination, and existing management. To decrease the management complexity, the number of activities was reduced to those relevant to site development, integrating in some cases and eliminating in others some of the initial groups/activities (e.g. external communication, education, lobbying and partnerships were unified in a single group/activity: education). The meta-systemic functions (VSM – S2 and S3; coordination and planning) were more integrated into the organizational structure and a clearer definition of roles, functions and responsibilities – following the VSM introduction – increased the autonomy of the operational groups.

The insufficient procedures to coordinate the meta-systemic functions, in conjunction with a hostile and changing external environment, drove the organization towards a temporary stage where there was poor coordination amongst autonomous groups, and inefficient resources allocation. This situation was solved, among other measures, through the formalization of the operative groups' coordinators meeting, the reduction of operative groups, the regulation of communications via formalization of channels and procedures, and the implementation of basic reporting procedures from the operative groups to the management of the project. The VSM diagnostic at this stage showed a reduction of the number of S1s; these were redefined to be properly (key) primary activities. Some of the redundant or misplaced supportive activities were located as functions of the S2 or S3 (e.g. communications), providing more coherence and improving the general coordination and management of the organization. The monitoring function (VSM-S3') was not operational despite the improvements in the general management (VSM-S3), concentrated in the finances, and resources allocation.

Consequently, there was not a clear mechanism to identify needs in the VSM-S1, mainly because the lack of knowledge about the VSM-S1's work programs. This made evident the absence of formal standardised communications with and within the VSM-S1s. Evidence of that was the fact that the groups in charge of the building and planning procedures did not have a fluid communication with the other S1s, even when improvements were done in the coordination of the S1s activity via group/task coordinators meetings.

Simultaneously, wider external contextual changes were occurring as the Celtic Tiger was showing signs of deceleration, affecting severely the real estate market and the finance sector. The consequences of this deceleration reduced seriously the capacity of the project to incorporate new members and develop the sites, adding pressure to the financial constrains of the XOOB members. In addition, the project was facing the deadline for submission of the individual planning permissions, making crucial the coordination of all the groups/activities with the operation of the building/planning group to get all the houses plans on time, aligned with the main outlines of the whole project. Other than that, inside the project, the eco-farm was not reporting progress due to restrictions on the land use and poor volunteer participation of the XOOB members, and the building activities started to increase in complexity with the addition of external contractors and advisors. During this period, a qualified farmer and people with expertise in building joined the project.

Last (academic) intervention stage

The last systemic intervention (from January to December 2009) had the form of an in-house coaching practice (by the author, with Dr. Espinosa as a PhD supervisor); it aimed at reinforcing and pushing forwards the ongoing changes in the community's organization. The analysis of this last intervention offers a picture where the organization presents monitoring and coordination procedures for all the operative/primary activities (VSM – S1). Additionally, the meta-systemic functions were almost all present and a clear definition of objectives and development plans was found in groups such as the eco-farm, building and education. The absence of a forecasting and external environment scanning mechanism (VSM-S4) and a long and short term strategic planning (a function of VSM – S5) did, however, become evident.

Externally, economic pressure was increasing. The sales group had no positive report on the recruitment of new XOOB members and some existing members were starting to suffer the consequences of the economic downturn, implying substantial modifications in the design of their houses and, for a few of them, the necessity to consider the option of leaving the project.

Furthermore, because of the lack of coordination, the designs of the individual houses were not coherent with the general outlining of the project and, in consequence, 75% of the planning permission applications were rejected, postponing the building execution to another year. To prevent this situation from occurring again, a task force group (deeply associated with education and process groups/activities) was assembled to outline a strategic plan, and the creation of a permanent work group has been suggested to take responsibility for the VSM-S4 functions (external scanning and forecasting).

Under these circumstances and because of the lack of resources, to gain financial autonomy, the eco-farm moved most of its productive capacity to a bigger external-local farm, opening the door to the participation of non-XOOB members under a model of organic food for subscription. To do so, a new firm was created under the scheme of Community Supported Agriculture, as a subsidiary of the XOOB. Additionally, the management of the building activities was transferred to a new venture – the Building Company, subsidiary of the XOOB – to simplify the general management of the project and provide more autonomy to the building group. These new business units thus operate as subsidiaries, meaning that they are independent from the XOOB, but the XOOB's board is represented in the board of the new ventures. This scheme is conspicuous in the Building Company but not clearly defined yet in the structure of the farm, where the discussion and analysis about which might be the most beneficial relationship with the XOOB is still an ongoing process.

As a consequence of the circumstances described here above, members affected by the economical crisis are moving to a co-housing scheme (Frisk, 2007). The XOOB has also considered the development of a model of house leasing, which would admit non-XOOB members into the project.

Furthermore, the education group reported economical independence from XOOB budgeting, indicating full autonomy. The XOOB resources could thus be focused on the identified critical activities (sales, building and general coordination & management), and the project recognised that, at this stage, its priority was to finish the development of the sites (showing that its identity at the moment was also the identity of a development company). This is a fundamental part, but not the final stage in the creation of the desired sustainable community. Therefore, they envisage that further definition of new policies and of the project's identity will be necessary once finished the development phase.

The final VSM diagnostic shows a VSM-S5 (board) that is focused on the monitoring and definition of policy functions, and that is realizing that, in the future, the identity of the project must be revisited due to eventual changes in the main activities of the community – e.g. end of the building stage and focusing more on education. A task force group is being assembled to facilitate the strategic planning and external scanning (VSM-S4 function), and a management information system was set up, improving the monitoring function (VSM-S3') and the communication – status report – with the S1s (VSM-S3). The coordination meetings are fully operational and efficient, and the VSM-S1s' work plans are standardized, improving the general coordination and optimization roles/functions (VSM - S2 and S3); a more stable organizational platform is thus provided to the operation of the primary activities (VSM-S1). Besides, most of the VSM-S1s have a clear definition of their functions and objectives. Some of them have a recursive structure (e.g. education, farm, building) with an operational external scanning function – VSM-S4 within these S1s – providing them more autonomy in the identification and definition of objectives and tasks, thereby enabling a more efficient use of the information inside the work groups which can then make autonomous decisions that do not conflict with the guidelines provided by the board (VSM-S5) and the general management (VSM-S3). Under these conditions, new business opportunities were identified and developed successfully; however, the relationship of XOOB with the new emergent business units was not clearly specified (e.g. the farm). Nonetheless, the XOOB has had a direct representation in both the farm's and the building company's board, as a first attempt to formalize these relationships.

In all stages of the systemic/cybernetic intervention, the groups were working autonomously. It became noticeable that, as the XOOB members increasingly used the VSM to describe and improve their organizational structure, some of the SO groups gained in efficiency and autonomy. This was particularly evident in the eco-farm and building groups, after the recruitment of individuals with expertise in these areas.

ANSWERING THE RESEARCH QUESTIONS

The development of a shared – organizational – mental model, of communicational spaces (where relevant exchange of information occurs and facilitates general coordination), and a clear identification/definition of tasks are principles of SO, and were introduced to the XOOB via VSM workshops. These principles have led the XOOB – a non-hierarchical community – to the development of simple but necessary coordination, monitoring and optimization roles and functions (VSM – S1, S2, S3) in their organizational structure. These basic structural elements were mainly reactive, meaning that they supplied resources and conditions for SO at the operative level (S1) as a response to external and internal demands whenever some key-roles were present (e.g. farmer/gatekeeper in the eco-farm group; engineer/gatekeeper in the building group), but not at the strategic level where functions of forecasting and planning are necessary. Furthermore, despite the completeness of the (introduced) VSM theoretical model, the more sophisticated organizational roles and functions – such as external scanning and forecasting, strategic planning and policy & identity definition (VSM S4 and S5) – apparently did not develop appropriately, due perhaps to the reactive nature of the earliest emergent organizational structure.

Revisiting Arcaute et al (2008), it is clear that the task plays a determinant role in the mechanics of SO systems. Hence, the difference between the biological (ants) or artificial (robots) societies and humans' societies relies on the fact that, in the ants' (or robots) model, the task (and its context) is given. In human groups, as presented in the case, the task (and its context) is not given; it must be identified and defined by the group (or someone in the group – the gatekeeper?). The implication of this difference is that the mechanism to facilitate SO processes in human societies must start with a sort of insight about how to create a supporting organizational structure (VSM - S2 and S3, mainly) and a shared description/model of it (e.g. VSM diagnostic). Then, the scout-gatekeeper (farmer, function/role VSM-S4 in this case) would be able to compare and contrast the internal model with the new internal and/or external information and define the tasks that need to be done by the group.

To summarize, the introduction of principles of self-organization, such as task recognition (e.g. identification of S1s), generated in this case study community a kind of organizational structure that is in the process of being viable – in VSM terms – while facilitating the necessary organizational elements (VSM- S2-S5) to deal with the complexity of this particular social system – reducing in this way its complexity – and driving the organization from a reactive structure to one with more functions of anticipation and planning.

Answering the second question, from a methodological perspective, the VSM diagnosis suggested/provided the basic supportive and viable organizational structure based on a clear definition/identification of tasks (identification/definition of the VSM-S1). Additionally, the VSM made possible the creation of a conceptual representation of the organization's structure, of its context and boundaries, and of the relations of information and control. Thus, the VSM diagnosis facilitated the design of a recursive organizational platform, where the self-awareness and abstraction processes could take place and trigger a SO behaviour. An evidence of this is the creation of a reduced and manageable number of VSM-S1 groups, the improvement of the VSM-S1s' coordinators meetings, and the increased efficiency of some of the VSM-S1 groups – which was in part generated by the use of a common language (VSM) to describe the situation of the organization.

Indirect evidence of the task definition as a catalyst for SO exists in the reported tools/methodologies. The World Café and Open Space Technologies share the fact that they induce SO via a consensual and participative definition of the task and its context. It is also the first stage of the AGIL/SCRUM methodology. These methodologies might be complemented by the VSM to generate not just the adequate – communicational – environment, but also the organizational structures to facilitate the self-organizing processes; here, the uniqueness and the advantage of the VSM diagnosis (and implementation) is to facilitate the occurrence of SO in organizations while providing the organizational design that favours such behaviour).⁵

Along the development of the present research, new research topics emerged; the most relevant are presented as follows.

Shrapnel

The case study presents a community that has initiated a sustainable project and shows how some of the activities related with the execution of the project succeeded to become (almost) independent business units (e.g. the farm, the building company) as well as how some others have failed or could not be developed successfully (e.g. car-sharing scheme). Considering the biological examples as a source of inspiration, it would be of interest to know, for instance, which is the organizational structure that favours emergent new ventures (in ants terms, when – organizationally – the ant colony splits-off; in business terms, when/which are the adequate – structural/organizational – conditions to do a spin-off).

⁵ SO to be understood as a behavior that depends on (meaning can or can not be favored by) the organizational design, as suggested by Ackroff (2009).

With regards to the structures, the legal UK and Irish framework demand for new ventures a registration procedure that seems to impose a kind of hierarchical and rigid structure (e.g. board, chair, legal representative). This formal structure does not necessarily fit with the flat and autonomous nature of the new business models (e.g. product service systems, community supported agriculture, car-sharing). In this aspect, new research is needed to analyse how the legal framework favours or impedes the exploration of novel and alternative associative forms, related with community initiatives or community-oriented enterprises. This suggestion is justified by the apparent conflictive situations that emerged during the introduction and implementation of the VSM in the XOOB, where strong opposition was presented by some members of the community who argued that the VSM was about to change the – legal – organizational structure defined since the official formalization of the project by the community; and the perception of the existence of duplicated organizational structures (one, the imposed by the legal framework, and other reflecting the operational activities and mechanism of communication and control). This same apparent conflict and confusion may be affecting the widely extended regeneration initiatives in the UK and, particularly, by the emergent network of independent sustainable projects such as the Transition Network – with more than 300 initiatives registered – that encourages local communities to develop self-organized associative structures to implement sustainable life styles through the development of community-based endeavours (e.g. community farms, self-production of energy, shared-transport).

LITERATURE

- ACKOFF, R. L. (2010). *System Thinking for Curious Managers*, Axminster: Triarchy Press.
- ARCAUTE, E. et al. (2008). Division of labour in ant colonies in terms of attractive fields. *Ecological Complexity*. 162. DOI: 10.1016/j.ecocom.2008.10.001
- AXELROD, R. & COHEN. M. (1999). *Harnessing Complexity. Organizational Implications of a Scientific Frontier*. New York: The Free Press.
- BEATTY, C., FODEN, M., LAWLESS, P. & WILSON, I. (2008). *New deal for communities: a synthesis of new programme wide evidence: 2006-07: NDC national evaluation phase 2. Communities and local government*. London, Centre for Regional Economic and Social Research. Sheffield Hallam University Department for Communities and Local Government.
- BEER, S. (1966). *Decision and Control*. Chichester: John Wiley and Sons.
- BEER, S. (1979). *The Heart of Enterprise*. Chichester: John Wiley and Sons.
- BEER, S. (1985). *Diagnosing the System for Organizations*. Chichester: John Wiley and Sons.
- BEER, S. (1994). *Beyond Dispute*. Chichester: John Wiley and Sons.
- BESWIK, C & TSENKOVA, S. (2001). *Overview of Urban Regeneration Policies*. [Online]. University of Calgary. Available: http://www.ucalgary.ca/EV/designresearch/projects/2001/Urban_Regeneration/chapter2.pdf [Accessed 28 August 2008].
- BROWN, J. & ISAACS, D. (2001). *The World Café: Living Knowledge Through Conversations That Matter*. [Online]. The Systems Thinker. Pegasus Communication. Available: <http://www.theworldcafe.com/articles/STCoverStory.pdf> [Accessed 3 October 2008].
- BREDA-VAZQUEZ, I. & ALVES, S. (2004). The critical role of governance structures in Oporto city-centre renewal projects. In: *City Futures- International conference in Globalization and Urban Change*. Chicago: University of Illinois.

- BUCK, J. & ENDENBURG, G. (2004). *The creative Forces of Self-Organization*. [Online]. Governance Alive. Available: <http://www.governancealive.com/resources.htm> [Accessed 20 February 2008].
- DIAMOND, J. & LIDDLE, J. (2005). *Management for Regeneration*. Routledge.
- ESPINOSA, A. & WALKER, J. (2009). Complexity Management in Practice. A VSM Intervention in a European Eco-Community. *European Journal of Operational Research*. Submission in revision. Cod: EJOR-D-09-01248R1
- FRISK, S. (2007). *From Bowling Alone to Dining Together: a Sustainability Analysis of Cohousing in the United States*. Graduate thesis. Lund: Lund University, Master of Environmental Studies and Sustainability Science.
- HAKEN, H. (1984). Can synergetics be of use in management theory? In: Ulrich, H. & Probst, G. *Self-Organization and Management of Social Systems*. New York: Springer-Verlag, p.33-41.
- HALDANE, A. & BOND, P. (2004). *The Use of KALIF in the development of Complex, Emotioning, Innovating and Polytechnical communities*. [Online]. Learning Futures Ltd. Available: www.complexity-society.com/papers/polytech.pdf [Accessed October 25, 2008].
- HARRISON, O. (1991). *Riding the tiger: Doing Business in a Transforming World*. [Online]. Abbott Publishing. Available: <http://www.openspaceworld.com/literature.htm> [Accessed: October 14, 2008].
- HOLLAND, J. (1995). *Hidden order: How adaptation builds complexity*. Helix Books.
- KEARNS, A. & TUROK, I. (2000). Power, Responsibility and Governance in Britain's new Urban Policy. *Journal of Urban Affairs*. 22(2), p.175-191.
- KLABBERS, J. (1986). Improvement of (self) steering through support systems. In: *Sociocybernetic paradoxes. Observation, Control and Evolution of Self-steering Systems*. Geyer, F & van der Zouwen, J. (Eds) London: SAGE, p.64-88.
- LASZLO, A. (2004). Evolutionary Systems Design. A praxis for Sustainable Development. *Journal of Organizational Transformation and Social Change*. 1 (1), p.29-46.
- LATANE, B. (1981). The psychology of social impact. *American psychologist*. 36, p.343-356.
- LM3 (2004). *Local Multiplier - 3*. [Online]. London, New Economy Foundation. Available: <http://www.proveandimprove.org/new/tools/localmultiplier3.php> [Accessed 15 March 2008]
- MOOBELA, C. (2005). From worst slum to best example of regeneration: Complexity in the regeneration of Hulme, Manchester: *E:CO Issue*. 7(1), p.29-42.
- NEWMAN, J. (2001). *Modernizing Governance: New Labour, Policy and Society* in SAGE (Ed). London: SAGE.
- OSBORNE, S. P., BEATTIE, R. & WILLIAMSON, A. (2002). *Community involvement in rural regeneration partnerships in the UK. Evidence from England, Northern Ireland and Scotland*, Bristol, The Joseph Rowntree Foundation.
- OSTROM, E. (1995). Self-Organization and Social Capital. *Industrial and Corporate Change*. 4(1), p.131-159.
- PQASSO (2004). PQASSO. IN SERVICES, C. E. Ed., *Jackie Scutt, Scottish Social Enterprise Academy (SFEDI Endorsement)*. [Online]. New Economic Foundation. Available: <http://www.proveandimprove.org/new/tools/PQASSO.php#Section5> [Accessed 15 March 2008].

PROJECT SIGMA (1999). *The Sigma Project*. IN PROJECT, T. S. [Online]. Ed., Department of trade and industry, UK. Available: <http://www.projectsigma.co.uk/> [Accessed 15 March 2008].

ROBERTS, P. & SYKES, H. (1999). *Urban Regeneration. A Handbook*. London: SAGE.

ROTMANS, D., LOORBACK, D. & van der BRUGGE, R. (2005). *Transitiemanagement en duurzame ontwikkeling; Co-evolutionaire sturing in het licht van complexiteit*. [Online]. Dutch Research Institute for Transitions. Available: <http://publishing.eur.nl/ir/repub/asset/7631/DRIFT-2006-004.pdf> [Accessed 10 October 2008].

TAKEUCHI, H. & NONAKA, I. (1986). *The New Product Development Game*. [Online]. Harvard Business Review. Available: <http://www.navegapolis.net/content/view/674/62/> [Accessed 15 July 2008].

TSENKOVA, S. (2001). Partnerships in Urban Regeneration: From Top-Down to Bottom –Up Approach. [Online]. University of Calgary. Available: http://www.ucalgary.ca/EV/designresearch/projects/2001/Urban_Regeneration/partnerships.pdf [Accessed 15 July 2008].

VARELA, F. (1984). Two Principles for Self-Organization. In: Ulrich, H & Probst, G., Ed. Self-organization and management of social systems. Berlin: Springer-Verlag, p.25-32.

VISIBLE COMMUNITIES (1999). IN *MATTERS*, C.[Online]. Ed. London, Community Matters. Available: <http://www.communitymatters.org.uk/projects/VISIBLE/index.php> [Accessed 15 March 2008].

WALKER, J. (2001). *The Viable System Model. A Guide for Co-operatives and Federations*. [Online]. SMSE Strategic Management in the Social Economy training program. Available: <http://www.greybox.uklinux.net/vsmg/> [Accessed 12 January 2008].