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Structured Democratic Dialogue: An application of a mathematical problem structuring method to facilitate reforms with local authorities in Cyprus

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ABSTRACT

This paper reports on a Community Operational Research (Community OR) project consisting of ten applications of a problem structuring method (PSM) with the Local Government Authorities of Cyprus. The PSM, Structured Democratic Dialogue Process (SDDP), is a systemic methodology that sits somewhere between Soft OR and traditional OR methods. It uses natural language constructs to support stakeholders explore similarity and influence relations between their distinct observations, and directed graphs to illustrate and communicate the consensus results. Matrix operations that take place behind the scenes make it possible for people from all walks of life to deal with complex societal problems without needing to master systems science. The application of the SDDP methodology in the case of the Local Government Authorities of Cyprus created the trust and the momentum necessary to achieve large-scale consensus and facilitate envisioned societal reforms. SDDP may have value for Community OR more broadly because of its emphasis on meaningful stakeholder and community participation.

1. Introduction

Community Operational Research (Community OR) is concerned with meaningful community participation, and this requires a methodology and practice that is genuinely participatory and democratic (Midgley, Johnson, & Chichirau, 2017; Ufua, Papadopoulos, & Midgley, 2017). To this end, the authors present a Problem Structuring Method (PSM), centered on the theory and practice of Dialogic Design Science (hereafter referred to for simplicity as Structured Democratic Dialogue, or SDD), which has previously been known as Generic Design Science and/or Interactive Management (Warfield & Cardenas, 1994). The methodology is referred to as a Structure Democratic Dialogue Process (SDDP).

The influences on the early development of SDDP were from Systems Engineering (Sage, 1977). Applications in policy and planning started in the early 1970s (Warfield, 1973). Indeed, the first 'real-world' applications in 1973–74 were in transportation planning and urban budget planning in a budget-deficit situation with the City Council of Dayton (Fitz & Troha, 1977). The work was characteristically participative. The transition of the practice from large-scale engagements to engagements at the level of community is presaged by the career trajectory of the practitioner of those first engagements, Brother Raymond Fitz. Fitz conducted the Dayton applications while at the Kettering Foundation and moved to work on long-range planning for the Sahel region of Africa. But then he came to focus on issues of inner-city poverty at the neighborhood level. Fitz, a Jesuit, went on to become the President of the University of Dayton. These community interventions can be seen as missionary work with the oppressed in the Jesuit tradition (see Midgley & Ochoa-Arias, 1999, for a discussion of religious influences on Community OR). Early on, Fitz referred to the practice as a "technology of social learning" (Fitz, 1974). His work may represent the first applications of SDD at the community and neighborhood level, but it can only be found in practitioner reports and a few conference proceedings (e.g., Fitz, 1974; Fitz & Troha, 1977), and documentation of those applications has not been prepared for journal publication.

The approach was further developed and written up for refereed publication by systems thinkers in the Club of Rome (Özbekhan, 1969, 1970). Özbekhan, Jantsch and Christakis were responsible for conceptualizing the original prospectus of the Club of Rome, which is titled *The Predicament of Mankind* (Club of Rome, 1970). This prospectus was founded on a humanistic architecture and the participation of stakeholders in democratic

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dialogue. However, in the summer of 1970, the Club of Rome Executive Committee chose to refocus on simulation using System Dynamics (Meadows, Meadows, Randers, & Behrens, 1972), and they limited participation to technological and policy-making experts. Özbekhan, Jantsch and Christakis resigned from their positions. Driven by their passion, they (and other scientists) continued to develop a science of dialogue capable of addressing contemporary complex problems.

The theorizing of the science was systematically refined through years of deployment in Interactive Management (IM) by Warfield and his colleagues (Warfield, 1982; Warfield & Cardenas, 1994). Warfield and Christakis researched and developed the science at the Academy of Contemporary Problems of Batelle Memorial Institute, the University of Virginia, and George Mason University. Warfield developed the Interpretive Structural Modeling (ISM) algorithm (Warfield, 1974a, 1974b, 1976), which uses matrix math and digraph theory to allow ordinary people to use natural language to explore influence relations. The application of ISM in the context of face-to-face deliberations of stakeholders gradually produces influence maps between their observations. These maps represent, in a graphical way, the consensus on the problematic situation among the participants.

A characteristic of this approach is that it enables people from all walks of life to act as systems scientists and to harness their collective wisdom, but without needing them to understand all the complexities and jargon of systems science. The Christakis group, through their Institute of 21st Century Agoras, further refined the methodology into a scientifically and methodologically grounded dialogue practice that is supported by software specifically designed for the purpose (see Christakis, 1996, for the original CogniScope™ system; and Laouris & Dye, 2017, for IdeaPrism™, a new piece of software that exploits digital technology and enables the scaling up of dialogues). In the 2000s, the methodology became known as Structured Democratic Dialogue and the underlying theory as Structured Dialogic Design.

The Agoras Group has managed to address challenges of implementing efficient dialogues in small face-to-face groups using technology (i.e., using Warfield's original ISM Software, or Cogniscope™) to facilitate interactions and processes. A typical SDDP application manages to counteract phenomena such as Groupthink (Janis, 1983; Whyte, 1952), Clanthink (Warfield, 1994; Warfield & Teigen, 1993, pp. 4–5, 31) and the Erroneous Priorities Effect (Dye, 1999; Dye & Conaway, 1999), which are explained below.

Groupthink describes situations in which members of a group go along with what they believe to be the general consensus. Because of the fear of violating group norms, individual doubts or disagreements are set to one side. A Groupthink case has been observed in the period leading up to the Cyprus referendum on the UN's Annan Plan for reunification in 2004. One political agenda dominated, thus polarizing the public and discouraging experts and stakeholders from considering other options (Laouris & Christakis, 2007; Laouris et al., 2009, p. 362).

The extreme case of Groupthink is Clanthink, where "an incorrect view is held by *all or almost all members* of the group" (Warfield, 1994, p. 490), and yet that view is considered so obviously right by the members that it does not occur to anyone to question it. Groupthink and Clanthink are the main causes of what Warfield (1994) called "underconceptualization", and they can generate significant blind spots (François, 2004, p. 643). They ultimately lead to inferior decisions and solutions.

The Erroneous Priorities Effect, in contrast, refers to the fact that individual preferences may be 'erroneous' if those individuals vote for the most important ideas relevant to the problem situation prior to a relational inquiry among the ideas (Dye, 1999; Dye & Conaway, 1999). The key point is that it is the *relationships between* people's observations that matter most if intervention is to be targeted effectively, getting to the root causes of systemic problems (Laouris & Dye, 2017). The SDDP is particularly attractive because of its inherent capability to ameliorate or even completely preclude Groupthink, Clanthink and the Erroneous Priorities Effect (see later for the methods to enable this).

The implementation of a successful SDDP is not mired in obscure science. The basic principles of a good dialogue and their formulation into scientific axioms and laws have been well documented. The process is scientifically grounded on seven laws and four axioms of cybernetic/systems science (Schreibman & Christakis, 2007; Laouris et al. 2009; Laouris, Laouri, & Christakis, 2008). For full reviews see Christakis and Bausch (2006) and Flanagan and Christakis (2009); and for an introductory paper, see Laouris (2012). The key fundamentals of the science have been repeatedly confirmed in two- to three-hour co-laboratories (this term is preferred over 'workshop' to emphasize the fact that participants explore and discover together) in which participants are asked to identify the basic obstacles they face in attempting to harness collective wisdom during a dialogue (Christakis & Laouris, 2010; Laouris, 2012). When the observations of the participants are clustered into categories, the headings of these categories correspond more or less to the actual laws and axioms.

The typical SDDP is specifically designed to assist heterogeneous groups *deal with complex issues in a reasonably limited amount of time* (Banathy, 1996; Warfield & Cardenas, 1994). More recently, the Future Worlds Group started experimenting with virtual models of SDDP and hybrid applications (i.e., combinations of face-to-face with virtual phases) in an effort to engage larger numbers and reduce the time required in face-to-face interactions (Laouris & Christakis, 2007; Laouris et al., 2008). For reviews of large group methods, see Bunker and Alban (1997), Pratt, Gordon, and Plamping (1999) and White (2002). The effort to scale-up the process introduces new technological requirements (see, for example, Concertina™ or IdeaPrism™) and possible violations of the underlying SDD laws. For a critical discussion around the presentation and application of SDDP, see Chapter 7 in Romm (2010). For an on-going discussion around the continued development of the theory and practice of dialogic design science (and what it might mean to call it 'scientific'), refer to the community's wiki (Dialogic Design Science Wiki, 2016).

The authors have applied the SDDP in more than 100 different contexts, including peace and conflict resolution (Laouris et al., 2008, 2009); government and societal challenges (e.g., "Wine Villages" and "Merging of taxation systems," conducted by CAPA); discovering and collectively agreeing on research agenda priorities, thus influencing European Commission funding (CARDIAC, 2013); the support and capacity building of youth and civil society (Medevnet, 2011; Uniting for Citizenship and Participation, 2008); envisioning and designing new educational systems (Reinventing Education, 2017); and reinventing democracy (Reinventing Democracy, 2016). For a complete list of Future Worlds SDDP applications, see Future Worlds (2017).

In most cases, the SDDP application has been a one-off intervention and the lack of an orchestrated set of follow up activities makes it difficult to evaluate the possible impact. However, more recently, the authors have begun to experiment with a new approach to using SDDP, where it becomes just one among a number of systems approaches used in a coordinated manner to address issues where the SDDP methodology on its own would not suffice. In the OR literature, this practice of mixing methods is commonly called 'multi-methodology' (e.g., Mingers and Gill, 1997) or 'methodological pluralism' (e.g., Boyd, Brown, & Midgley, 2004; Jackson, 1987a, 1991; Midgley, 1992, 2000), and it is particularly useful for adding a follow-up process to an SDDP event. So far, there have been comparatively few such applications, but

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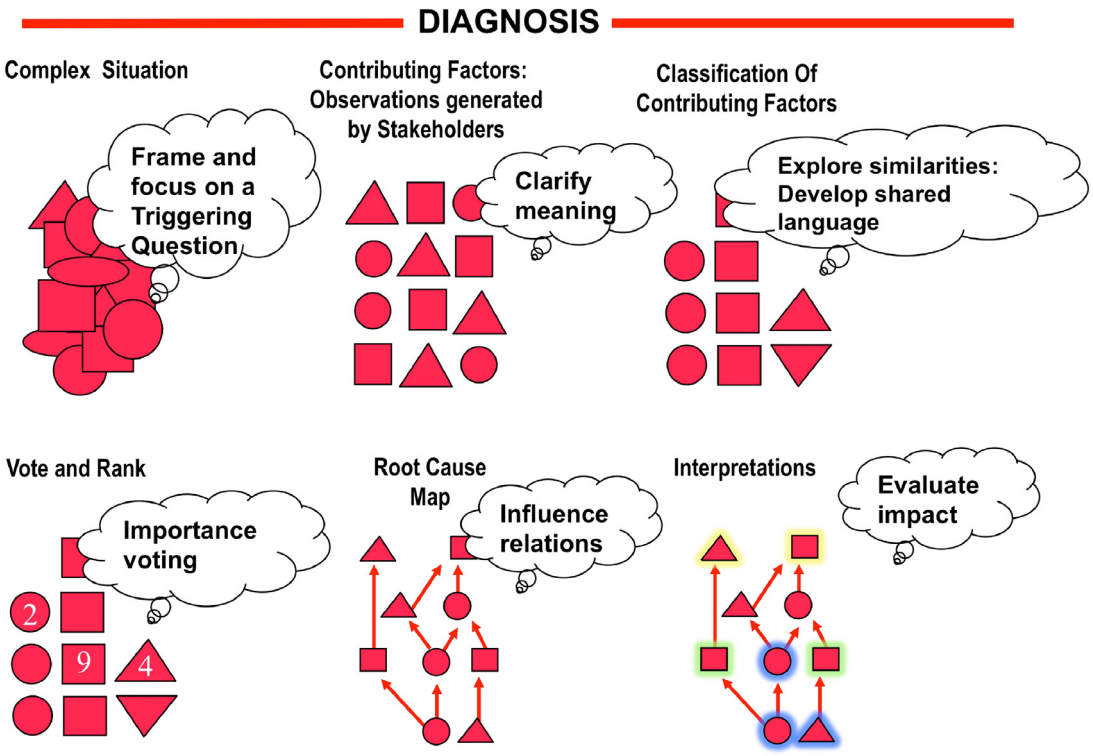

Fig. 1. Steps of SDDP implementation.

a particularly notable one is the Act Beyond Borders project (Act Beyond Borders, 2013), which aimed to increase dialogue among civil society actors, youth and local authorities in Israel and Palestine. The authors designed a system in which the SDDP was augmented by the development of four self-replicating peace activist groups equipped with skills, knowledge and enthusiasm to engage an exponentially increasing number of people in peace and reconciliation activities. Ultimately, hundreds of seemingly unrelated actors, but true stakeholders, came together to share the knowledge, vision and enthusiasm that the project generated.

While SDDP has been applied very widely, as discussed above, it is generally not mentioned in reviews of Community OR (e.g. Jackson, 1988) or Soft OR methodologies (e.g. Mingers & Rosenhead, 2004; Rosenhead & Mingers, 2001). This is possibly because most of the papers on SDDP have been published in systems journals and there has been no sustained attempt to communicate with OR practitioners (although we will give another possible reason later in the paper). It is therefore valuable to present SDDP here so it can be added to the armory of current methodologies for Community OR, and indeed OR more generally.

Below, the methods and process of application of SDDP are presented. Then the paper moves on to discuss an application with the Local Government Authorities (LGAs) of Cyprus.

2. The SDDP methodology

The full methodology and process of application to be used for a SDDP co-laboratory has been described elsewhere (Christakis & Bausch 2006; Schreibman & Christakis, 2007). Here we provide a summary sufficient to acquaint a Community OR audience with the key steps of a single implementation (Fig. 1).

Before a co-laboratory is convened, a Knowledge Management Team comprising of the dialogue host, one or two participants and at least one SDD Facilitator meets to formulate the *triggering question*, which provides an initial frame for the dialogue. These people also examine whether the invited participants meet the requisite variety criterion: i.e., whether they represent a rich spectrum of interests and points of view, which is essential if the consensus to be generated is to be wide spread and groupthink is to be tackled. The triggering question serves to kindle targeted responses and to assist the facilitator in keeping the dialogue focused.

When a co-laboratory is convened, the first step of the dialogue is the generation of observations concerning the problematic situation in response to the triggering question. Each participant is invited in a round-robin manner to contribute one response at a time as a single statement, which should contain only one specific observation. This is important because, when observations are examined for similarity between them or influence on one another, if one statement contains several ideas or is too general, the process is compromised. Contributions are numbered and their authors are registered. This step takes 1–2 hours. Giving individuals space to generate their ideas without criticism from others helps to counter groupthink and clanthink.

Once all the observations have been collected, in a second step each participant clarifies the idea behind it. The process might take several hours. In more recent implementations with remote participation, the clarification can also be done with short videos. During the clarification process, others can ask questions about meaning, but no judgment is allowed. This facilitation technique is intended to protect the autonomy and authenticity of participants so that no participant is discouraged, and no idea is prematurely evaluated and/or rejected.

The next step involves the categorization of observations using a bottom-up approach. This process takes much longer than top-down clustering methods, because it encourages discussion. Evolutionary learning takes place as the participants are encouraged to explore how specific aspects of their ideas might make them similar to other ideas; a process that forces them to draw further distinctions.

Only after this are individual participants requested to choose typically five out of the total set of ideas according to their

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perceived importance. The relative importance of an idea can be understood only when it is compared with the ideas of others (it is rare for people to choose only their own ideas as most important). All the ideas that receive votes (i.e., those that participants consider as the most important) enter the Interpretive Structural modeling (ISM) process, which comes next.

Participants are confronted with two ideas at a time (to reduce cognitive load) and are requested to discuss them and decide whether one influences the other. A relation is established only when it is supported by a large majority (typically 75%) following constructive debate. The application of Warfield's (1994) ISM algorithm reduces the number of questions that the software will ask. The binary connections that are established by the group are used to build up an influence map (see the example in Fig. 3). The Mapping step might require a few hours. Meaning and wisdom is produced only when the participants begin to understand the relationships (such as similarity, priority, influence, etc.) among their different ideas. The influence map reflects the shared understanding and the consensus of the participants.

Since challenges at the bottom of the structure correspond to the root causes of the problem, the method is also referred to as 'root cause mapping'. The factors that end up at the root of the map are the ones with the greatest influence.

Participants engage in further discussions on how to resolve the obstacles at the root, and as these influence all the problems further up the structure, the idea is that addressing the root causes should have positive knock-on effects throughout the interlinked system of issues that the participants want to tackle. This form of problem structuring helps to minimize the Erroneous Priorities Effect, which comes into play when strategic actions are targeted at isolated aspects of the problematic situation without their interconnections being considered.

3. The Local Government Authorities (LGA) application

We can now show how the above SDDP process was applied in practice with the Local Government Authorities in Cyprus. A distinguishing characteristic of this application, compared with many previous ones, is that the participants had more than 2 million Euro available to act upon the results of their deliberations. While previous SDDP applications involved the development of shared visions and jointly-agreed action plans, in the majority of cases the participants lacked the resources necessary to act upon their intentions. The most prominent (negative) examples are those SDDPs conducted in Cyprus (Broome, 1996) and the Middle East (Act Beyond Borders, 2013), in which the momentum created was phenomenal, but ultimately the resources were not available to implement the envisioned projects. An anecdotal example was the case of a historic bi-communal group of 32 peace pioneers (16 Turkish Cypriots and 16 Greek Cypriots) who worked for 9 months to develop a comprehensive vision, and subsequently trained almost 4000 citizens, preparing them to take action, but the UN responded to their request for help (Cyprus Conflict Resolution Trainers Group, 1995) with 3 years of delay. During this period, the momentum of the project stalled. Ironically, this resembles the case of the ambulance that arrived fully equipped after the patient had died (Laouris, 2004).

Other distinguishing characteristics of this application include the fact that the SDDP was embedded in an orchestrated application of a wider set of systems methods; and the whole process was also rigorously evaluated, both internally and externally. Several authors in OR have made the point that evaluation is important because researcher reflections alone are unreliable (e.g., Midgley et al., 2013; Rouwette, Vennix, & Felling, 2009; White, 2006).

3.1. The context

The Community OR application reported here was conducted in Cyprus, a country geographically and nationally divided into two parts in 1974 by the use of force. The two parts are the South, which is internationally recognized as the Republic of Cyprus, and a self-declared State in the North recognized only by Turkey. Turkish Cypriots live in the northern part, and Greek Cypriots live in the southern part. The study was conducted exclusively in the areas controlled by the Republic of Cyprus. Greek Cypriot representatives of districts located in the North were included, but no Turkish Cypriots participated in this application.

In the Republic of Cyprus, the President is both the head of State and the head of government. The government exercises executive power. Legislative power is vested in both the government and the parliament. Cyprus has 33 municipalities (9 in areas now controlled by Turkish Cypriots) and 355 communities (131 in areas now controlled by Turkish Cypriots). Approximately 62% of the population lives in municipalities, and the remaining 38% in villages. The responsibilities of the municipalities currently include construction; maintenance and street lighting; the collection, disposal and treatment of garbage; protecting and improving the environment, including the good appearance of the municipality and its construction sites; the maintenance and improvement of parks and green spaces; the protection of public health; the arts; education; sports; and social services. They have certain powers to enforce laws, such as the Streets and Buildings Regulation Act, the Town Planning Act, the Marriage Act and the Sewerage Systems Act. All of the above functions require both coordination among many stakeholders and democratic participation. Overall, the country has 33 Mayors, 492 Community Presidents and 104 Municipal and Community Secretaries. 200 people serve as members of Municipal and Community Councils, and they oversee the work of 661 staff. To promote and protect their interests and aspirations, the Municipalities founded the Union of Cyprus Municipalities in 1981. Similarly, in 1992, the Union of Cyprus Communities was founded. Its key objectives are to improve the quality of life of residents and to demand (from central government) incentives against urbanization.

In recent years, the government has expressed an interest in engaging in dialogue, with the aim of reforming the system and possibly shifting certain powers from the center to the periphery. Such reforms may also serve, in the long run, an envisioned bi-communal, bi-zonal federal solution to the political problem of the division of Cyprus into two (Hannay, 2005), because it would partly resolve the 'sharing of power' challenge (Anastasiou, 2008). However, in the past, the conflicting interests among the different stakeholders have never brought such initiatives to fruition.

In this context, local people wanted more rights and powers, but they were aware that they did not have the know-how, the capacity, the democratic culture or the necessary infrastructure to implement reforms that entailed taking on increased responsibilities. Our task was to provide a democratic vehicle – i.e., the SDDP – to channel the desire for change and produce results that would be widely acceptable to different stakeholders.

Part of the issue we faced was that the 492 Community Presidents (and their associates) were serving less than a few hundred thousand citizens living in rural areas, and they said they were not ready to share powers with neighboring communities, merge services, or accept regionalization and the professionalization of processes. The top-level elected representatives were, in most cases, older people without much education, who were nevertheless generally respected personalities. They were quite aware that they might not be able to remain in their positions of power following modernization and reforms.

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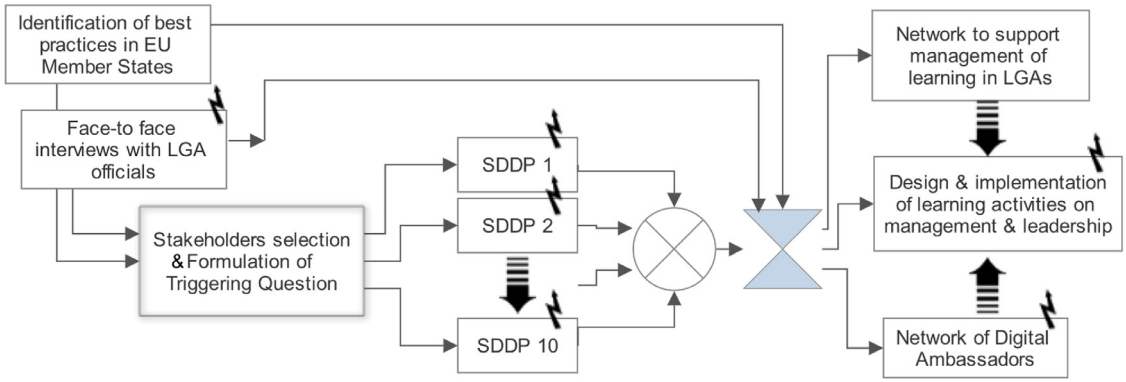

Fig. 2. Interdependencies between methods and interventions.

Table 1
Taxonomy of community OR attributes as they apply to this project.

Attribute	Description
Localized focus	The beneficiaries were local communities even though the overall project was designed to be self-replicable
Multiple conflicting objectives	Conflicts between central and local governments conflicts between neighboring local authorities conflicts between different stakeholders within the same local community
Multiple stakeholders	Mayors, Local Authority employees, local educators, local and global business people and developers, local agricultural and other producers, repatriated citizens, older people and youth
Role of the disadvantaged	Disadvantaged *stakeholders* included women, older people and economically disadvantaged citizens; *issues* of disadvantage included small villages, digital illiteracy, the digital divide (including internet/bandwidth issues) and small schools
Accountability	The project owner and coordinator was the central government, ensuring that the project results would be taken seriously by the authorities
Lack of resources	In connection with small village mentality rather than available funding
Uniqueness versus generalizability	The overall project was designed to match the specific needs of the LGAs in Cyprus, yet the SDDP methodology is generalizable, as demonstrated through many previous applications

Within the above context, the Cyprus Academy of Public Administration (CAPA) took the initiative to design and implement a project that aimed to directly help improve the skills of the human resources of the Cypriot Local Government Authorities (LGAs). The design was for a participatory, democratic process with bottom-up decision making, using SDDP (Laouris, Christakis, & Michaelides, 2010; Local Authorities Cyprus, 2009; Local Authorities Cyprus Project in Future Worlds Pedia, 2009). The mid-term goal was the operational modernization of the functioning of institutions and agencies, thus resulting in the provision of quality services to citizens. The overall objective was the strengthening of the administrative and leadership capacity of the LGAs of Cyprus through the training and support of their staff, elected or not. The Cyprus Ministry of Finance agreed to support this initiative using a palette of European funding, including structural and social cohesion funds.

3.2. Overall project design

The project design was characterized by the orchestrated application of `multiple` interventions (Fig. 2).

The results from the face-to-face interviews, as well as the results of the research to identify best practices in the European Union (EU) (see the top left hand corner of Fig. 2), served as inputs for the selection of stakeholders and the formulation of the SDDP triggering question. The results of the 10 SDDP co-laboratories (center of Fig. 2) were first compiled into one single report and then subsequently summed with the findings from the first interviews and the best practices research to support the design and decisions related to the setting up of a learning network and a Digital Ambassadors network (right hand side of Fig. 2). The lightning symbols indicate processes used to disseminate information to the wider public, thus generating civic momentum.

The application of the SDDP was central to the above design, and it is the focus of this paper. It was applied at launch, not only as a tool for the diagnosis of the root challenges, but mostly because it is especially effective in resolving multiple conflicts of purpose and values, and in generating consensus on organizational and inter-organizational strategy. The approach we will shortly describe fits Johnson and Smilowitz's (2007) definition of Community OR, as it satisfies all the criteria, as documented in Table 1.

The project can, in sum, be specifically categorized as Community OR for a number of reasons. The focus was local in that the aim was to resolve diverse conflicting objectives between local, regional and central stakeholders (Bardach, 2000; Gass, 1994). The design renders it applicable to other cases, thus satisfying the generalizability criterion. The SDDP involves modeling, and the modeling methodology and techniques are transferable to other contexts. Finally, and most importantly, the participation of stakeholders and community representatives was meaningful (i.e., genuinely democratic and authentic), as will shortly become clear.

4. Work packages

The project was carried out as 7 work packages (hereafter also called activities), each being implemented by a different contractor chosen through a public tendering process. The work packages and their respective durations and budgets are documented in Table 2. While the "Diagnosis of Learning and Development Needs" activity, which included the SDDP, had a relatively short duration and low budget (€110,000 over 8 months), it was effective partly because it was embedded within the wider set of methods.

The aims of each work package and key methods applied are described briefly below.

4.1. Identification of best practices in EU member states

The best practices followed in other EU Member States were studied and recorded. The focus was the development of admin-

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Table 2
Duration and budget across activities.

#	Activity	Duration (mo)	Approximate budget (K€)
1	Identification of best practices	13	34
2	Diagnosis of learning and development needs	8	110
3	Network for the management of learning	9	96
4	Learning activities on management and leadership	32	973
5	Promotion consultant	51	139
6	Technical consultant	39	78
7	External evaluation	8	24
8	Publications in local press	64	3
9	Experts supporting the network for the management of learning	9	30
10	Workshops in support of the network for the management of learning	11	11
11	Transportation expenses in support of the network's workshops for the management of learning	13	4
12	Cost for trainers in workshops supporting the network for the management of learning	10	14
13	Training of digital ambassadors	11	52
14	Transportation costs for digital ambassadors	11	1

istrative and leadership capacity in LGAs. Criteria were developed to aid the choice of five case studies with specific relevance to the Cypriot reality. Site visits were undertaken, and reports were written on how the learning from each of the case studies could be adapted to the context of Cyprus.

Methods: Desk research, personal interviews, site visits; development of legal, process, performance and impact indicators; scenario building of different models; and an application of SWOT analysis to choose the most relevant for Cyprus.

4.2. Diagnosis of the learning and development needs of the LGAs

- Interviews with LGA heads were used to diagnose the learning and development needs in relation to administration and leadership.
- Ten 2-day SDDPs were held throughout the country, and these detected, categorized and prioritized the 'root challenges' people faced;
- Data on the learning and development needs of the LGAs were compiled into reports, which also suggested how these needs could be met through educational programs.

Methods: Face-to-face interviews; questionnaires; SDDP; cluster analysis.

4.3. Setting up a network to support the management of learning in LGAs

A support network and learning management procedures for public authorities, members of the LGAs, the Union of Municipalities, the Union of Communities and CAPA were put in place. Regional learning management groups were established, and a coordinator for each group was chosen.

Methods: Workshops, lectures, one-to-one training courses.

4.4. Design and implementation of learning activities to enhance management and leadership

Learning activities aimed at improving LGA staff skills in management and leadership were designed. Participants developed a range of initiatives and applied them in their workplaces (work-based projects). Information systems provided updates on learning activities. The educational programs and knowledge transfer activities were evaluated by the participants in their workplaces.

Methods: Work-based project development, implementation and evaluation; site visits; best practice analysis; workshops; lectures.

Table 3
Number of beneficiaries of different aspects of the project.

Process	Beneficiaries
Personal interviews with elected LA representatives	36
Participants in SDDPs	207
Trained in SDDP methodology	15
Training for the network to manage learning	93
Visiting foreign countries to research best practices	25
Participation in 259 training programs in management and leadership	1619
Training of digital ambassadors	155
Total	**2150**

4.5. Promotion and dissemination

A major advertising company was sub-contracted to promote the activities and disseminate the results of the project to the wider public through paper and digital media.

Methods: Standard marketing and promotion approaches, including the development of a web site.

4.6. Technical Advisor

The role of the Technical Advisor was to support the Coordinator in drafting and monitoring the tenders for sub-contracting the various activities of the project.

Methods: Tender writing and tender evaluation according to set criteria.

4.7. External post evaluation

A post-project evaluation process was conducted by an external consultant between December 2014 and March 2015. This was considered important in light of the fact that the evidence for the effectiveness of processes like the SDDP is scant, other than mostly practitioner reflections (Midgley et al., 2013).

Methods: Development of quantitative and qualitative indicators, and evaluation using the SMART approach (Doran, 1981); comparisons between contractual obligations and final implementation reports.

5. Process of application and results

The project was implemented between 25.9.2009 and 25.6.2015. The total number of beneficiaries exceeded the contractual goal of 1500 (Table 3 documents the number of participants per key process).

In the sections below we report the results for each activity (or work package) summarized in Section 4.

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5.1. Activity 1: identification of best practices

The process engaged national LGA representatives in charge of management and training to record best practices from similarly sized communities in 13 EU member states (Austria, Belgium, France, Germany, Denmark, Greece, United Kingdom, Ireland, Spain, Italy, Netherlands, Portugal and Finland). The documentation included a brief analysis of the organization and functioning of each national training system of LGA members, depending on the philosophy of organization and functioning of local government in each government model. In collaboration with the Coordinator, five cases (in Greece and the UK) were selected. The selection was based on specific criteria (e.g., similarities to Cyprus Municipalities).

Following a communication process, representatives of the Contractor's project team visited the selected institutions and attended special presentations on their educational practices. During the visits, our experts compiled minutes of meetings and completed questionnaires (with information on the operation, the training practices, etc.). Visits were made to:

1. European Organization for Strategic Planning (Greece).
2. Institute of Local Government (Greece).
3. National School of Local Government (Greece).
4. Training Institute Leadership Center for Local Government (UK).
5. South Eastern England Regional Office – Local Government Employers (UK).

The first stage included the recording of personnel training policies and led to the identification, prioritization and standardization of best practice examples. Initially, we identified and analyzed, through literature review and desk research, important policies for personnel training, and we looked at their relationships to national and local government organization models. Particular emphasis was placed on training bodies that had been established by either national public sector organizations or by representative bodies such as local governments, and high levels of expertize in modernization and the strengthening of decentralization processes were sought.

The second stage focused on detailed analyses of some of the best practices on the basis of their special interest for Cyprus. Subsequent comparative analysis resulted in the documentation of four major models in terms of their usefulness: the Scandinavian, Corporatist, Anglo-Saxon and French models.

The selection of best practices was conducted based on a complex model that combined several criteria of good practice, which included:

1. Innovation in relation to content and/or teaching methods and tools.
2. The relevance of the content and implementation procedures of (re)training programs to the objectives and needs of the administrative reform.
3. Active participation and cooperation of local government in the design, implementation, monitoring and evaluation of training activities.
4. Organizational and managerial capacity that ensures sustainability regardless of sources of funding (especially for actions financed by supranational sources; e.g., Structural Funds of the EU or Local Development Projects of the World Bank).
5. Contribution to the strengthening of secondary factors, such as relation between training and career advancement, effectiveness in enabling the engagement of non-State actors, etc.
6. Repeatability/transferability to the Cypriot training system of public administration.

The systematic processing of the findings led to the development of two alternative scenarios: (1) creation of a centralized public training body; (2) creation of a training institution by the Associations of Municipalities and Communities.

Table 4
Criteria used for choosing the best scenario for Cyprus.

#	Criteria	Scen 1	Scen 2
1	Maturity of institutional framework	0	3
2	Viability	3	0
3	Implementation costs	0	2
4	National strategy service learning	3	0
5	Management	3	1
6	Domino effect for the design of new policies	3	1
7	Acquisition of expertize by executive management	3	0
8	Organizational changes	1	3
9	Technological changes	1	1
10	Human resources for implementation (recruitment)	1	3
11	Time to implement	1	2
	Total feasibility of implementation	**19**	**16**

The application of the indicators (0–3) documented in Table 4 favored the selection of the first scenario.

5.2. Activity 2: diagnosis of learning needs

The diagnosis phase consisted of two processes: face-to-face interviews with top-level elected officials and ten Structured Democratic Dialogues engaging approximately 250 community representatives. The results are reported below.

5.2.1. Diagnosis through one-to-one interviews

The primary objective of the interviews was to establish direct contact, engage top-level officials in in-depth discussions about difficult issues and secure their involvement, enthusiasm and commitment. In total, 41 individuals were interviewed: 7 Mayors, 11 Community Presidents, 7 Municipal Secretaries, 9 Community Secretaries, 1 Municipal Director and 6 other relevant stakeholders. Personal interviews provided flexibility to explore additional issues that could arise during the discussion and allowed researchers to understand the culture and identify potential barriers and drivers for change. They also served as a means to collect information to assist the planning of the Structured Democratic Dialogues. The questionnaire used to structure the interviews was divided into three sections: (1) demographic information about the individual and the Municipality/Community; (2) information regarding strategy and operations in the Municipality/Community, including challenges, learning needs and their approaches towards educational programs; and (3) questions about their potential engagements with the forthcoming structured dialogue. Pilot testing and cognitive validation of the questionnaire preceded the interviews. For control and quality assurance, interviewers held regularly meetings with the project coordinator. The interviews were conducted by an expert group of three experienced neuropsychologists. All completed questionnaires were checked prior to the analysis of the data, and the latter involved coding and data classification, qualitative content analysis, and comparative analysis.

The majority of respondents argued that there was a strategy and vision for their Municipality or Community, related to the improvement of the quality of life of their citizens. However, it was evident that their strategies and visions were not the result of a coordinated effort, were not clearly recorded, and nor were they communicated effectively to managers and staff (and, by extension, citizens).

A total of 54 learning and development needs in management and leadership were identified and prioritized in terms of their urgency as immediate, mid-term and long-term. Those related to strategy and vision were how to design, implement and monitor the implementation of the strategy and the vision; create and im-

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Table 5
Complexity indices.

SDDP	Ideas	Categories	Spreadthink (%)
Nicosia 1	84	17	43
Nicosia 2	55	15	38
Pafos 1	95	9	44
Pafos 2	84	13	55
Limassol 1	84	12	53
Limassol 2	93	7	59
Larnaca 1	95	14	32
Larnaca 2	76	18	46
Famagusta	87	10	41
Troodos	61	10	52

plement a plan for communicating the strategy/vision to employees and citizens; and establish a culture that encourages initiative, responsibility and team spirit. Other reported learning needs included knowledge of the relevant laws and procedures, and leadership and management skills at all levels. The lack of financial resources and bureaucracy stemming from central government were reported as root obstacles to their work. The full data is available in Learning and Development Needs for Cypriot Local Authorities (2010).

5.2.2. Diagnosis and root cause analysis using SDDPs

A total of 10 SDDPs were conducted: two per district for Nicosia, Limassol, Pafos and Larnaca; one for Famagusta; and one for regions now controlled by the Turkish Cypriots. The process was completed within 7 weeks (15 Dec 2009–17 Feb 2010) so as to create simultaneous momentum in all regions, which would facilitate a public dialogue. The SDDP methodology was chosen, not only because it could support the identification of learning and development needs, but also because, through the authentic engagement of regional actors, it would mobilize and empower local initiatives. Participants included elected Municipal and Community Presidents, Secretaries and other representatives, as well as their staff. All dialogues used the same triggering question in order to facilitate comparative data analysis and compilation of the results from all 10 dialogues:

- What factors limit the effective operation of the self-governance of Local Authorities?

The outcomes were very similar across all 10 SDDPs, and all quantitative measures were within what is normally acceptable in such dialogues (Warfield, 1976). Table 5 documents the key measures for the 10 SDDPs. The number of ideas generated ranged from 55 to 95 (81.4 ± 13.7); the number of categories those ideas fell into ranged from as few as 7 to as many as 18 (12.5 ± 3.6); and the spreadthink (see below for an explanation of this concept) ranged from 38% to 59% (46.3 ± 8.4).

Spreadthink is a measure of disagreement among the participants (Warfield, 1995), and it ranged from 32 to 59 (46.3 ± 8.4) with relatively small deviations. This reflects the fact that the participants invested enough time in the dialogues to converge to a satisfactory amount of agreement. Testing for possible correlations between the number of ideas, the number of categories and spreadthink revealed no statistically significant results.

The Influence Map from the Pafos SDDP is shown here as an example (Fig. 3). Following the 2-day SDDP, the root obstacles that ended up at the bottom of the influence tree (reworded slightly to make them easier to understand for readers unfamiliar with the context) were:

Obstacle # 44: The lack of legislation to make those who take wrong decisions accountable.
Obstacle # 1: The decisions of municipal councils are taken on the basis of political party interests rather than social good.
Obstacle # 24: There is no training academy for elected and non-elected members of the LGAs.
Obstacle # 43: The biased politics of some governments, involving political discrimination.

In this example, three out of the four key challenges (obstacles 44, 1 and 43) have to do, directly or indirectly, with corruption. However, obstacle 24 points to a potential solution: the creation of an 'academy' to train LGA representatives.

The map is constructed gradually as participants discuss and vote on specific pair relations. A relation is established when the great majority (usually 75%) vote "yes". Behind the scenes, matrix calculations connect the natural language used during the process (i.e., the question whether one factor influences the other) with the directed graph produced. To illustrate this, Table 6 documents the Reachability Matrix for the same Map as the one in Fig. 3.

Reading across the matrix (in a row), a 1 in the row indicates that the idea number in the left column influences the idea number at the top of the row where the 1 appears. Conversely any column below an idea number in the top row with a 1 indicates that the idea is influenced by the Factor on the left edge. A 0 indicates no relationship. Any idea always influences itself (therefore the diagonal is filled with 1s). Such a relation table is called an Adjacency Matrix. When more 1s are inserted using the logic 'if A influences B, and B influences C, then A influences C', the result is the full Reachability Matrix. Cycles (i.e., multiple ideas mutually influencing each other) are not shown here.

The SDDP has additional mathematical measures, which can be used to evaluate, for example, the complexity of a given dialogue; i.e., the Situational Complexity Index (SCI), defined as follows:

$SCI = DK(N-7)/R(R-1)$
V = Number of ideas receiving 1 or more Votes
N = The number of ideas
K = The number of connections in the map
R = The number of Ideas in the map
$D = (V-5)/(N-5)$
$V = 49$ $N = 77$ $K = 158$ $R = 25$ $D = 0$
➔ SCI= 11,26

This number represents the complexity of the situation as perceived by the particular participants and can usually be used to compare across dialogues.

In order to capture the breadth of the ideas collected across all 10 SDDPs, we extracted the ideas at the root (all the factors that made it to the lower 3 levels) of each map and 'accommodated' those with high affinity between them into general categories. Seventy nine (79) root obstacles were thus re-clustered into 11 general categories as shown in Table 7. It must be clarified that learning needs arise from all eleven categories and not only from the first category called 'Education–Training'. This label is used here only because it was used by participants in their respective SDDPs. It is also important to note that the categorization carried out here is to some extent arbitrary. It reflects the consensus between 4 and 5 members of the Knowledge Management Team (KMT) who undertook this exercise. Interestingly, out of the 79 root obstacles reclassified into new categories, 18 ended up in the general category 'Training–Education' (23%), and 17 (21%) in the general category 'Interventions by political actors'.

An additional analysis was undertaken, intended to capture the frequency with which certain problems made it to the root of the influence map. More than 75% of the issues identified as root obstacles aggregated in four categories: Education and Training; External Interferences (by corrupt politicians or technocrats); Legal Shortcomings; and Financial Constraints.

Considering factors from all 10 SDDPs, and identifying the 10 obstacles that received the highest numbers of votes prior to ex-

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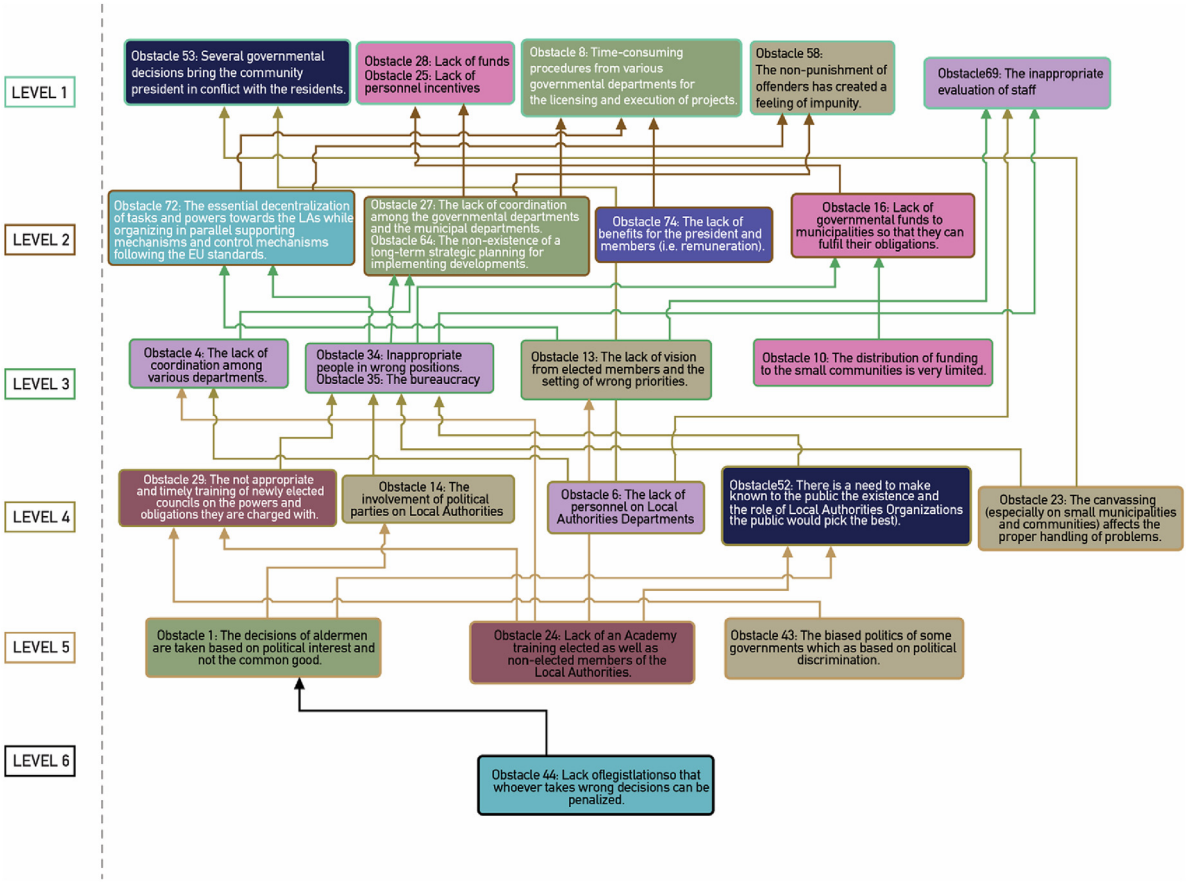

Fig. 3. Influence Map from Pafos SDDP; arrows should be interpreted as Obstacle A (lower) worsens Obstacle B (higher).

Table 6
Reachability matrix.

#	8	53	58	69	28	74	72	16	10	13	27	4	6	34	29	14	52	43	23	1	44	24
8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
13	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
27	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
4	1	0	1	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
6	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
34	1	0	1	1	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0
29	1	0	1	1	1	0	1	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0
14	1	0	1	1	1	0	1	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0
52	1	0	1	1	1	0	1	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0
43	1	0	1	1	1	0	1	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0
23	1	1	1	1	1	0	1	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0
1	1	0	1	1	1	0	1	1	0	0	1	0	0	1	0	1	1	0	0	1	0	0
44	1	0	1	1	1	0	1	1	0	0	1	0	0	1	0	1	1	0	0	1	1	0
24	1	0	1	1	1	0	1	1	0	1	1	1	0	1	1	0	1	0	0	0	0	1

ploring influences to identify the root causes, we extracted the following:

Weaknesses of top officials and corruption

1. Local governors and their officers take decisions mostly based on party benefits and not what is best for the greater good.
2. Untrained, unqualified and incompetent individuals reach the top ranks of local authorities.

Problems in relations with central government

3. The government does not provide the required 4% of GDP to the local authorities.
4. Long delays in government decisions.
5. The State constrains the powers of local governance.
6. Local authorities are financially dependent on the State.
7. Lack of cooperation with government services when problems need resolving.

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Table 7
Number of ideas per general category; re-clustering of 79 root obstacles.

	Category	Freq
1	Training - Education	18
2	Interventions by political actors	17
3	Legal issues	15
4	Financial issues	10
5	Peripheral cooperation - Decentralization	6
6	Vision/Strategy	4
7	Bureaucracy	3
8	Small communities	2
9	Human resources	2
10	Infrastructure	1
11	Occupation	1

Legal issues

8. The delayed process of reviewing the legal framework.
9. The legal framework does not comply with contemporary requirements of modern societies.
10. The legal framework.

The participants 'blamed' central government (5 out of 10 factors), the legal system (3 out of 10 factors) and, to a lesser extent, they recognized constraints relating to themselves.

It is interesting to compare the above list with the list of the top 10 factors that made it to the root of a hypothetical generalized influence tree when accounting for all 10 SDDPs (i.e., after influences had been accounted for):

Weaknesses of elected officials and/or corruption

1. Lack of vision and strategy among elected representatives.
2. Ignorance about laws and regulations among elected officials.
3. Interference of political parties in everyday operations.
4. The election of incompetent representatives.
5. The ineffective functioning of LGAs due to the interventions of political parties.

Legislation–Regulation

1. The legislative framework is not in line with today's needs and requirements.
2. Lack of revision of the legislative framework.
3. Stagnation in the modernization of the institutions of municipalities and communities.
4. Many communities (over 80%) with small numbers of residents.
5. Lack of a centrally coordinated training management agency to increase the skills of the LGAs' staff.

Following the SDDP, and specifically the exploration of influences and the identification of root causes, the participants recognized their own weaknesses much more than when they just voted for the issues early on: half of the root obstacles were related either to themselves or to the system that led to their election, as well as subsequent interventions by those political parties that 'placed' them in their positions. This is evidence that the systemic thinking that is engendered by the SDDP process makes a real difference.

Finally, it is obvious, when looking at the two lists, that the participants had high hopes that the expected reform of the legal framework would solve many of their problems.

5.2.3. Internal evaluation of the SDDPs

The evaluation of the SDDPs engaged 92 participants from 5 SDDPs (Nicosia Municipalities, Nicosia Communities, Larnaca, Municipalities in regions now controlled by Turkish Cypriots, and Communities located in mountain regions). They answered one questionnaire at the end of the first day of the co-laboratory and a second at the end of the second day.

The most striking finding was that more than 90% of the participants had never previously met 3 or more of the others in the co-laboratory. This indicates that there was not enough communication, and of course collaboration, between the councils. Thus, the co-laboratories offered opportunities for them to exchange views on common challenges, and the useful connections made across council boundaries was an identified outcome of the process.

The majority of the respondents found the interactive workshop much better than previous workshops they had experienced in terms of structuring (85.8%) and efficiency (86.9%). Many said that they would like to adopt this method in their own communities or town councils, and expressed interest in participating in further stages of the project.

The responses to open questions demonstrated that they considered the key purpose as an effort to develop ownership. Almost all respondents said that they believed the workshop achieved its goal, and several said they were eagerly waiting the next phases.

5.3. Activity 3: network to support the management of learning in the LGAs

A total of 203 executives from across the spectrum of local government (27 Municipalities, 105 Communities, 3 District Associations of Communities representing regions now controlled by Turkish Cypriots, the Union of Municipalities, the Association of Communities, and 4 Development Companies) were invited into a learning network. Ninety-eight (98) enrolled in the program, and 93 completed it. They were subsequently separated into 15 regional learning management groups (4 per district for Nicosia, Limassol and Pafos, and 3 for both Larnaca and Famagusta).

The 15 coordinators of the network, together with executives from the Association of Municipalities, the Union of Communities and CAPA, attended a 5-day training mission in the United Kingdom. The mission included a visit to local authorities that have implemented learning management practices. Following the mission, we organized an additional workshop on 'learning through action' in Cyprus. The implementation of these workshops was innovative for the local authorities, as it offered new possibilities of cooperation between officials.

It should be noted that, even well after the completion of the project, the network continues to operate (albeit in a more fragmentary manner), gathering and submitting proposals for training programs to CAPA. The maintenance of the network is considered to be a very important factor for the continuation of relevant learning activities, especially in view of the forthcoming reforms of the

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local government sector, which will generate additional training needs.

5.4. Activity 4: learning activities to support management and leadership

A total of 259 training programs in management and leadership were designed and implemented. These engaged 1619 people.

Furthermore, the following were achieved:

- Development and implementation of work-based projects by the participants.
- Preparation of the content of 5 meetings, of which one was in the form of a scientific conference, which was held under the auspices of the project.
- An Information Management System for Learning was developed to support organizational, administrative and educational aspects of the training.
- An evaluation of the learning activities and information system was undertaken.
- Scientific publications were written and published.

According to the internal evaluation data, 85.8% of the participants were able to utilize the knowledge, skills and experiences gained from the educational programs in their jobs, while 14.2% said that they could not do so.

5.5. Activity 5: promotion and dissemination

The creation of public awareness was supposed to be an essential element of the first phases of the project in order to support the process of inviting and securing participants, but this activity was seriously delayed. However, the impact on the SDDPs was mitigated somewhat because the subcontractor used the process of interviewing elected representatives (their first activity prior to the design of a public awareness campaign) as a dissemination tool to inform the LGAs about the upcoming co-laboratories. Thus, the latter were not compromised.

Once the public information campaign got going, Activity 4 (the learning activities to support management and leadership) enjoyed wide publicity, partly because of the organization of a conference in which top-level government and media participated.

5.6. Activity 6: selection and training of Digital Ambassadors

A total of 52 presentations to recruit Digital Ambassadors were given in the communities and/or rural municipalities. 155 participants then completed their training as Digital Ambassadors in sessions conducted in 16 teams. A total of 56 personalized support meetings (totaling 94.5 hours) took place too.

In addition, profiles for 165 communities and rural municipalities were created online to provide a general information service for the public ("Inform me": KEPA Information Center, 2016).

5.7. Project-related conclusions

The following conclusions are grounded primarily on the results of the external evaluation process, which ran after the project had finished, but they also include our own reflections.

The majority of those who participated in the evaluation (88%) reported that the project and its activities contributed significantly to the improvement of the administrative and leadership capacity of local government officials. The process of designing their own work-based projects, in connection with the option to choose a study trip to another country to benefit from experiencing a best practice example, was perceived as the most tangibly useful part of their training by 45% of respondents. The participation in project activities (especially the SDDPs, the networking and the traveling abroad) led to the development of friendships, links and partnerships between local authorities, and contributed to the exchange of views and best practices on various issues of common interest, such as (for example) the management of waste. Furthermore, the participants experienced and learned new approaches to governance, with the potential for implementation in their respective regions.

However, some problems with the project were also highlighted in the evaluation:

Viability issues: 90% of respondents claimed that a lack of resources threatened the sustainability of the project outcomes. However, 20% saw a pathway to viability through the reduction of bureaucracy and the potential for institutionalizing the network and integrating it into the wider functioning of the local government sector.

Problems of implementation: 45% of respondents suggested that the training programs should have been more flexible to allow the participation of those who faced constraints. 25% commented that the cases and practices taught were not always applicable in Cyprus, and the main reason for this was a set of factors that the respondents said made their contexts different: 'conflicts' with central government, bureaucracy, the legal framework and the lack of resources. A smaller percentage (20%) reported digital illiteracy problems.

Suggestions for future activities: The most frequently cited necessities for the future were the improvement of citizen services (94%); greater support from central government (74%); and further training of elected representatives and staff in the development of visions, strategic and operational objectives, and performance management and productivity measurement systems (92%). A prominent general conclusion was the need to continue programs like the one reported here: 88% of respondents mentioned this. Also, 88% of respondents favored the continuation of operational support for networking. A lower number (55%) felt that the visits abroad contributed towards the implementation of new and innovative approaches to the management of their local authorities, and should be continued.

5.7.1. Reflections on the SDDPs

Looking specifically at the SDDPs, we note that they engaged the top-level elected officials together with their elected secretaries and appointed staff in weeklong dialogues. Their authentic engagement was enabled by the SDDP, which (as described earlier) organized the dialogue in a manner that supported collective deliberation on the structuring of people's ideas (looking for root causes) and the emergence of a consensus. It was also useful that the process systematically documented the participants' learning in real time, giving them confidence that their inputs were being valued. In addition, the SDDPs facilitated the creation of a very positive atmosphere and encouraged mutual respect. There was a single incident in which a Community President threatened to leave the room if his opinion was not "respected" (i.e., given priority!). When the facilitator was not fazed by the threat, and asked him to stay *only* if he was willing to abide by the rules of the SDDP (giving people an equal opportunity to speak, engaging in active listening, etc.), he returned to the process, and from that point onwards he was most constructive and respectful of the ideas of others.

The failure of the Promotion Expert to launch the public awareness campaign in time challenged the organizers of the SDDPs somewhat in their effort to secure participants. At the same time, however, this forced them to use telephone communications with top LGA officials and their staff, thus creating a more personal connection. To some degree, we believe this strengthened their desire to contribute, and prepared them for what was to come in the dialogues.

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According to the findings of the internal and external post evaluations, the SDDP Methodology empowered people from all walks of life to act as systems thinkers, in the sense that it allowed them to address, and even propose solutions to, the complex challenges that affected their daily lives. The external post-project evaluation also showed that implementing all 10 SDDPs within a short time window helped to create a countrywide awareness, sensitization, mobilization and, more importantly, a deep and widely-shared understanding of what needs to be done to improve the LGAs. In addition, the project demonstrated how the application of SDDP, in connection with other methods, led to stakeholders developing a full sense of ownership. Elected and non-elected members of the LGAs engaged collectively in identifying obstacles and discovering the deep drivers for their resolution. Their work led to actionable and policy-relevant recommendations.

We further argue that the establishment of a new network of Digital Ambassadors provided a key to the long-term viability and sustainability of the intervention. The 155 individuals who completed their training as Digital Ambassadors, and the 52 presentations conducted in their respective communities and/or rural regions, provide good indicators of continuing commitment.

The long-term impact of this Community OR is likely to be substantial because emphasis was placed on using a methodology, methods and models that provide specific, theory-based guidance to local decision makers; and, at the same time, they can be easily replicated in different application contexts. Future modelers can use this work to address analogous complex socio-technical challenges. The specific project described in this paper was designed to address region- and domain-specific policy problems, but the methods may be applied to many other regions and/or domains.

6. Discussion

Community OR asks that the needs and interests of underrepresented populations be accounted for (Johnson, 2011; Johnson & Smilowitz, 2007; Johnson et al., 2016) and marginalization be addressed (Boyd et al., 2004; Midgley, 2000). In the case of the Cypriot LGAs, their elected representatives and their appointed staff, as well as other local stakeholders and citizens at large, believed that the central government did not pay enough attention to their needs, deprived them from access to financial resources, and lacked the will and the commitment to upgrade the legal and other frameworks to decentralize decision making. At the same time, the study highlighted deficiencies in the abilities of LGA leaders to develop a shared vision for their respective communities, to set and follow strategic and operational objectives, and to establish performance and productivity measurement systems. The fact that the overall project commenced with face-to-face interviews of the top-level elected representatives removed possible defensive attitudes and secured their commitment to act upon the results of the outcomes (also see Midgley & Milne, 1995, for a discussion of the problems caused by focusing on marginalized stakeholders to the exclusion of those in positions of authority and power).

Prior to the naming of Community OR in the 1980s, however, its parent discipline of OR emerged from scientific knowledge applied to military operations during the Second World War (Trefethen, 1954). Understandably, most of its methods are therefore grounded in mathematics and quantitative modeling. However, those involved with real-world Community OR applications know that many problems in organizations and society at large are best understood when the differing stakeholder perspectives are considered (e.g., Jackson, 1988). Yet many well-established methodologies and methods, such as Soft Systems Methodology (Checkland, 1987), Strategic Options Development and Analysis (Eden, 1989), the Strategic Choice Approach (Friend, 2006) and Decision Conferencing (Phillips, 1989) are sometimes referred to as 'Soft OR' (distinguished from 'Hard OR') or 'problem structuring methods' because they are not grounded on rigorous mathematical modeling (Ackermann et al., 2009; Mingers, 2009). For practical guides to many of these methods, see Rosenhead and Mingers (2001) and Jackson (2003). SDDP, on the other hand, claims a space in-between Hard and Soft, and in many ways offers a bridge across the paradigmatic divide. Natural language, matrix math and graph theory are used in concert to facilitate the process of discovering influence relations between the opinions and observations of different stakeholders participating in dialogue.

Earlier in the paper, we suggested that SDDP is not commonly listed as a problem structuring method because its authors have mostly published in the systems literature rather than in OR journals. However, another possible reason for its omission is that it violates the commonly accepted categories of Hard and Soft. While we advocate seeing it as a bridge between these paradigms, we recognize that it is often difficult to secure recognition for perspectives that challenge the convenience of thinking in terms of binary oppositions (Luhmann, 1986).

Midgley (2000, p. 199; 2003) talks about "three waves" of Systems/OR: the first wave was focused on expert-driven, objective modeling; the second wave switched attention to participative methods for the facilitated modeling of different stakeholder perspectives; and the third wave paid greater attention to power relations. The third wave also advocated methodological pluralism: mixing methods drawn from both previous waves. SDDP could be considered to be First Wave OR, being focused on mathematical modeling, but it also has characteristics of Second Wave OR, as it is focused on the facilitation of dialogue. But these waves did not actually occur within the evolution of SDDP: they were nearly simultaneous. *The mathematical techniques were developed to support facilitated dialogue.*

SDDP may also be misperceived as being "expert-driven" (Midgley, 2000, p. 199). Instead, it should be viewed as "facilitated modeling" (Franco & Montibeller, 2010, p. 492): "a process by which formal models are jointly developed with a client group, face-to-face, with or without the assistance of computer support". Fig. 3, presented earlier, fits Franco and Montibeller's notion of a "formal model" that represents activity or process flows, or cause and effect relationships. SDDP uses participants' own language to represent the problem situation, as well as their own judgmental preferences to evaluate decision options. Similar to the methods Franco and Montibeller refer to, SDDP was "developed for use with groups rather than being a method adapted to a facilitated mode" (Franco & Montibeller, 2010, p. 499).

Back in 1987, Jackson argued that 'impoverished OR', focused solely on mathematical techniques, was inadequate in the face of the complexity created in problematic situations when multiple actors hold different viewpoints (Jackson, 1987b). Seven years later, Jackson and Lane (1994) characterized Warfield's (1976) book, *Societal Systems* (a seminal work in the SDD community of practitioners), as an example of Soft Systems Thinking. We argue that mathematics, which focuses on topology and graphs, is actually a good tool for Soft Systems Thinking, participatory exploration and facilitated formal modeling, and it lends itself to computer supported collaborative work.

This brings us to the positioning of the SDDP applications in Cyprus within the Third Wave of Systems/OR (Midgley, 2000, p. 201), given that we emphasized both methodological pluralism (the mixing of methods from different traditions) and how to address power relations. We have already explained how we drew upon other social science and management approaches to complement the focus of SDDP. Concerning power relations, SDDP was first introduced to a bi-communal Cypriot cohort by Ben Broome, a protégé of John Warfield, as a follow-on to training in multi-track diplomacy and conflict resolution (Broome, 1996). The political

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context of this initiative was peace building and rapprochement to address the power asymmetry of a divided country, so right from the start in Cyprus, power was being addressed by SDDP advocates. This focus was then extended in the LGAs project, where the participative process enabled issues of corruption to be identified (instead of being swept under the carpet), so they could be properly incorporated into the root cause analysis. Midgley (2000, 2003) claims that each new wave of Systems/OR brings fresh insights that enable practitioners of methods from the earlier waves to enhance their practice, and we argue that this is exactly what has happened with SDDP: it has become more sophisticated with regard to issues of power and methodological pluralism. However, the SDDP practitioner community can do more to learn from, adopt and adapt practices from the Second and Third Waves. A firmer grounding in applicable political theories (as advocated by Midgley & Ochoa-Arias, 1999) may also enhance our approach to issues of power.

We also suggest that Community OR practitioners may wish to consider using SDDP, as its mathematical approach to facilitated formal modeling combines robustness with efficiency in the use of group time, and therefore enables the scalability of multiple applications at the local level.

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