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What is the impact of LEADER on the local social resources? Some insights on Local Action Group's aggregative role

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The Local Action Groups (LAGs) are supposed to contribute to the local development process through the enhancement of the territorial social capital. Stressing their aggregative role, the objective of this work is twofold: to find empirical evidence that LAGs' operation can foster the social capital of the local partnerships, and to contribute to the methodological advancement in detecting social capital. The relational computational system here presented detects the contribution of LAGs on logical basis by comparing the relations actually existing and the relations created independently of the LAGs' operation. The analysis reveals that the LAGs modified the morphology of their networks fostering the connectivity of their members and exalting the role of some actors as bridges among different polarities.

1. Introduction

The emphasis assigned to the concept of social capital as a potential driver for rural development is particularly evident in the case of LEADER Programme. Thus, the LEADER could be considered as a programme addressing the issue of rural development through the accumulation and use of social capital. Many studies (Scott, 2004; Pylkkänen, 2006; Nardone, 2010) highlight as the LEADER Programme contributed remarkably to the aggregation of groups with a high level of social capital even if, as Shucksmith (2000) observed, this is not an explicit aim of the initiative.

In this framework, the European Commission (2013) encourages the adoption of a Community-Led Local Development (CLLD) approach that should be community-led, and implemented by Local Action Groups (LAGs), that is the local development agencies of the LEADER¹ Programme. The underlying idea is that socio-economic well-being can be better achieved by focusing on needs and resources valorisation at local level.

¹ The European Commission initiative *Liaisons Entre Actions de Developpement de l'Economie Rurale* aims at fostering integrated rural development strategies at the level of very small rural territories.

This policy direction unavoidably leads to the decentralization of responsibility for intervention design and implementation to local communities (Ray, 2006). However, this power devolvement is strongly associated with the formalisation of the evaluation tools such as the programme evaluation (Moseley, 2003). According to the endogenous rural development logic, the evaluation process should account not only for the effectiveness of spending, but also for less tangible and locally-rooted effects such as the quality of participative process, the identity raising from the local community (Ray, 2006) and the improvement of the social resources (social capital) endowment.

Léon (2005) highlights as a community combining strong internal social bonds and a capacity to maintain diversified relations with the outside world enjoys real advantages and lower transaction costs for its development. Indeed it is the capacity of territories to enhance the value of social relations that underpins the LEADER Programme.

In this view, the research questions of this paper are: have the LAGs contributed to the enhancement of social capital of their partnerships? There has been a real improvement of the structural dimension of social capital?

From these questions derive the two specific objectives of this study: 1) to find an empirical validation of the hypothesis that LAGs activity can foster the social capital of the local partnerships; 2) to contribute to the methodological advancement in detecting social capital. The object of the analysis is the structural dimension of the social capital produced by the LAGs members during the operational period. The latter objective relates to the development of a relational computational system. This leads to the achievement of the former objective, since this computational system allows the identification of the contribution of LAGs in terms of relations created among their members.

The definition of social capital² here adopted stems from the work of Bourdieu (1986: p. 249) which, conceives it as “the sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit”. It fits particularly well with the aim of the paper, that is to investigate the changes in the structure of the partnership of the LAG.

Others relevant contributions to the aim of the paper are the work of Burt (1992) that, focusing on the presence of structural holes, looks at network

² The literature on social capital can be distinguished in: the micro level carried out by two of the most important researchers on social capital, Bourdieu and Coleman, who focused on individuals or small groups as units of analysis, and the macro level that considers social capital not as an individual asset but as an attribute of the community itself. This approach argues that nations or regions can have different stock of social capital affecting the level of democracy, crime rates, corruption or economic growth (Putnam, 1993; Fukuyama, 1995).

variables, and the multidimensional approach of Nahapiet and Ghoshal (1998), that allows the identification of three specific dimensions of social capital: structural, normative, and cognitive.

Across most of the literature on social capital there is widespread agreement on the importance of networks for social capital's existence and functioning. Differently from the individualistic approach, the network view emphasizes the structural dimension of social capital. This emphasis on social capital as a relational and embedded resource, led several scholars to adopt Social Network Analysis (SNA) as a technique for studying the characteristics of the social capital endowment of individuals and groups.

In particular, in the study, the network-based approach enabled us to investigate the structural dimension of social capital. This approach refers to the set of social structures allowing interaction among individuals and regards the global model of the connections between two actors belonging to the same community. Therefore, the total size of this kind of social capital in a defined community depends on the total amount of its links.

This theoretical point of view is translated in an operational way with the use of the SNA as a suitable and powerful methodology in the assessment of structural dimension of social capital at a *meso* level of analysis.

The SNA is still a very active research area, as shown from the many recent publications on this approach. Its development improved a lot in the early 80s, mostly due to the institutionalization of social network analysis. With mathematical graph theory as its basis, SNA is a useful tool for the description and the evaluation of social phenomena especially because it allows both a quantitative and qualitative approach to the problem.

Specifically, starting from the data gathered in some Italian LAGs, we have focused on their internal network. This choice enabled us to get insights on the social interaction mechanisms within the LAGs considered, highlighting how they have affected the quantity and quality of the social links in the partnership's network.

The reason for choosing the LAG as survey unit is threefold. First, because the LAG is the expression of local public-private partnerships among entrepreneurs, local authorities, rural associations, voluntary organizations etc. representing the organizational form of the local development agency (Romeo and Marcianò, 2014). Second, because the LAGs are the units targeted for intervention under the CLLD approach at the local level. Third because, despite the huge literature on LEADER and rural partnerships, relatively few empirical studies investigate social capital features processes within these partnerships applying quantitative analyses of networks characteristics. Therefore, in an attempt to overcome some of the limits affecting previous research, this work aims at contributing to the evaluation process

by proposing a framework for assessing the quality and quantity of social capital developed in the LAG partnership.

Section 2 provides a brief theoretical overview of the link between the Community-Led Local Development approach and social capital. Section 3 describes the SNA and the adopted methodology. Section 4 presents the case studies, the results and conclusion are in Section 5. Finally, section 6 concludes.

2. The Community-Led Local Development approach and social capital

The LEADER Programme is a key example of the European Rural Development Programmes' commitment to subsidiarity and partnership models as essential to area-based development. This is believed to occur through the project process, and through the creation of participatory decision-making structures, such as partnerships, in localities.

The emergence of LEADER reflected a growing consensus in Europe concerning what integrated rural development is and how it is best promoted. In many ways, LEADER embodies the essential elements of the bottom-up approach to rural development, which includes for example, an endogenous development accent, a territorial focus with the creation and implementation of local development programmes geared to local requirements, an emphasis on public-private-voluntary sector partnerships, and the genuine involvement of local people, through a mobilising process as resource for rural development. The promotion of LEADER, therefore, indicates the realisation within the European Commission that rural development involves «development by and of the local community, not just for it» (Moseley, 1997, p. 202) and the growing sense that decisions are more likely to 'stick' if they are taken locally and reflect a community consensus.

As highlighted by Macken-Walsh and Curtin (2012), the LEADER model was designed to operate on the basis of two principles: decision-making taking place as close as possible to the site of implementation (principle of subsidiarity); and hierarchical decision-making structures being replaced by mechanisms involving representatives from a wide range of governmental and non-governmental groups (principle of partnership) (Osti, 2000). Clearly inspired by models of integrated rural development (Shucksmith, 2010), underpinning the concept of intersectoral partnership boards (LAGs), in the LEADER Programme there is a strategy to facilitate the representation of different sectoral interests in local rural development decision-making processes.

By 2007, LEADER was delivered through over 1200 local action groups in the EU's 27 Member States, with funds in the order of 7 billion euro available between 2000 and 2007 alone.

Most of the LEADER projects have targeted specific needs of communities, such as strengthening economic capital through the promotion of rural tourism (approximately 30% of LEADER projects EU-wide), by adding value to agricultural production through local branding initiatives or other initiatives emphasising the value of locally produced food (15%), or by supporting small firms and craft industries (12%), and some LEADER projects have focused on strengthening social capital at community level by focusing on training and human development initiatives (10%).

As asserted by European Commission (2013), in the next programming period (2014-2020), there will be a more explicit support to the creation of multi-fund local community-led strategies.

CLLD, as part of LEADER, was designed to help rural actors considering the long-term potential of their local region, and proved to be an effective and efficient tool in the delivery of development policies. This approach aims at mobilizing and involving local communities and organizations to contribute to achieving the Europe 2020 Strategy goals of smart, sustainable and inclusive growth, fostering territorial cohesion and reaching specific policy objectives. Among the chief aims is the enablement of all areas to receive funds supporting the improvement of local public and private partnerships, capacity building, networking etc.

The units targeted for intervention are the local action groups (LAGs) as local public-private partnerships among entrepreneurs, local authorities, rural associations, groups of citizens, voluntary organisations etc. At the same time the local development strategies have to be coherent with the relevant programs of the European Structural and Investment Funds, thus a strategic approach is needed.

The study of Cavaye (1999) shows that a community-oriented approach not only stimulates community empowerment and involvement, but also social capital.

Even if this is not an explicit aim of the Initiative (Shucksmith, 2000), Yamaoka *et al.*, (2008) highlight the relevance of the LEADER Initiative for the creation of social capital as a publicly owned key resource that ensures sustainable development.

This is what should happen within LEADER Programme and, consequently, with Community-Led Local Development approach. On the one hand social capital in its several forms (networks, trust, affinity) encourages cooperation among local actors (Coleman, 1990). Furthermore, the heterogeneity and extension of social networks is «associated with openness to resources that are not generally accessible in the immediate surroundings and that help to strengthen and advance a project» (Franke, 2005, p. 16). On the other hand, once the plans are implemented, the interaction among group members and the effects of ac-

tion stabilise behavioural norms within the group. Finally, the perceived success of the project, its social consensus and the legitimisation gained by LAGs can produce stability in the relationships. Thus the use of social capital in participatory development projects can start a virtuous self-sustaining development process in which the outcome affects its corresponding input.

3. Methodology

3.1 The structural dimension of social capital

Nahapiet and Ghoshal (1998) argue that social capital is composed of three main dimensions: structural, relational and cognitive. The structural dimension gives an idea of the presence of social capital by enabling the access to resources depending on the relational structure within a social network. The total size of this kind of social capital in a network depends on the total amount of the links connecting its actors. The relational dimension refers to the kind of interactions between the individuals as a result of long lasting relationships. Thus, this dimension regards the governance mechanisms of relations embedded in these ties, that is, the kind of behavioral norms fostering cooperation such as confidence, reciprocity and solidarity. Finally, the cognitive dimension considers elements of social organization (values, beliefs etc.) that allow individuals belonging to a community to reach a shared vision of their own community.

As the aim of the paper is to evaluate the improvement of the social capital in the LAGs from a quantitative point of view, we will focus on the structural component.

In particular, the structural dimension can be studied adopting either an egocentric approach that is focusing on the potential of the network of which the individuals have use of, or a socio-centric approach, that is examining the total relations in a system to determine the endowment of social capital. In the present study, the study of social capital and in particular of its structural dimension, is addressed through the 'social network' approach and in particular SNA.

Social network analysis aims at investigating the network structure by description, visualization, and statistical modeling. It relies on social network data. Following the definition by Wasserman and Faust (1994), social network data can be viewed as a social relational system characterized by a set of actors and their social ties. Eventually, additional information such as actor attribute variables or multiple relations can be part of the social relational system. Social networks are defined as a set of nodes, individuals or groups, that are tied

by one or more types of relations (Wasserman and Faust, 1994). Network data are defined by actors (nodes) and by relations (edges). Network analysis focuses on relations between actors, and not on individual actors and their attributes as traditional analysis does. This relevant difference implies that, while non-network studies sample nodes independently, network analysis cannot sample nodes in the same way and sometimes does not use samples at all.

While traditional individualistic social theory and data analysis consider individual actors making without taking into consideration the social context, social network analysis focuses on relational data: the relationships between actors are the first priority, while individual properties are secondary.

A computational system for LAG contributions

To investigate the aggregative role of the LAGs, we adopted the SNA (Wasserman and Faust, 1994). Different authors have applied the SNA to analyze LAGs contribution to the network creation. In particular, Cristini *et al.* 2013 introduce the use of SNA as a tool for analysis of relational networks promoted by LAGs in Liguria to support the development of the local partnerships. Pisani & Burighel (2014) use SNA to assess the structures and the dynamics of transnational cooperation projects promoted by LAGs in the Veneto Region. Pappalardo *et al.* (2014) apply SNA as a methodological approach for investigating relationships within two LAGs from Sicily. At European level, Marquardt & Pappalardo (2012) employed SNA to assess how key LEADER features, such as the bottom-up and the participatory approach, are implemented in Romania.

Here we propose a computational system of the relations among local actors, produced by the LAGs operation, where the contribution of LAGs is detected on logical basis by the comparison among the relations actually existing and the relations created independently of the LAGs' activity.

SNA allows to analyze the relationships between different social entities. Within this frame, the social entities, representing the units of analysis, can be individual or collective and are defined actors. This does not imply that social entities have necessary a will or the ability to act. Some examples of actors can be the single persons in a group, the different departments in a company, the different towns of a country etc. The relationship can assume different forms and may include interpersonal relationships (e.g. friendship, affinity etc.), the transfer of materials or resources from one entity to the other (e.g. business transaction), affiliation relationships (belonging to the same group), behavioral relationships (e.g. exchange of information).

In this study, the units of analysis (i.e. the actors under investigation) were represented by the members of the LAGs. The relationships we considered were behavioral in nature, and were represented by: 1) exchange of information (this is referred to strategic or economic information transmitted by telephone, pa-

per, e-mail etc.) and 2) projects cooperation (this is referred to the collaboration between the LAG's members in one or more projects). We collected information on all the relationships belonging to these groups among LAGs' members, regardless to their association with the implementation of the local development plan of the LAGs. Indeed the aim of the survey was to depict the overall information and cooperation exchange among the investigated actors.

The analysis was dynamic, that is it focused not only on the number of the relationships but also on their evolution. Specifically, to measure the aggregative role of the LAG, the study took into account how the relationships were formed, without the LAG (members already knew each other or already cooperated in one or more projects before the LAG intervention) and through the LAG (members exchanged information or collaborated in one or more project following the LAG intervention).

In order to trace the evolutionary dynamics of these relationships we used the following variables:

- *tie* ($t_{i,j}$), it indicates the kind of relationship between each pair i,j of LAG's members and takes the following values:

$$t_{i,j} = \begin{cases} 0 & \text{if the relation does not exist at all} \\ 1 & \text{if the pair exchanges information} \\ 2 & \text{if the pair cooperates in one or more projects} \end{cases}$$

- *extra LAG tie* ($et_{i,j}$), it takes positive values if the relationship between each pair of members i,j was established regardless of LAG, as specified below:

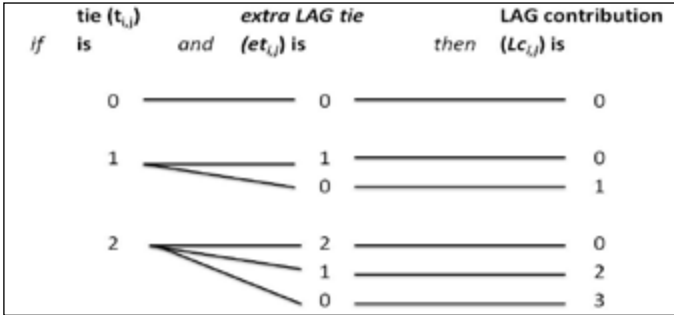
$$et_{i,j} = \begin{cases} 1 & \text{if the pair exchanges information independently of the LAG operation} \\ 2 & \text{if the pair cooperates in one or more projects independently of the LAG operation} \\ 0 & \text{otherwise} \end{cases}$$

The LAG contribution for each pair of members i,j ($Lc_{i,j}$) was then defined on logical basis by the comparison of $t_{i,j}$ and $et_{i,j}$ as explained in the following diagram:

Explicating, the values assumed by $Lc_{i,j}$ are:

- 0 if the LAG had no impact on the relation dynamics in the pair i,j ;
- 1 if the LAG favored the information exchange in the pair i,j ;
- 2 if the LAG favored the collaboration in one or more projects between the pair of i,j but they exchanged information independently from the LAG

Fig. 1. A computational system for LAG contributions



Source: our processing.

operation (i.e. they knew each other before becoming LAG members and they kept in touch);

- 3 when the LAG favored both information exchange and collaboration between the pair of i,j .

The analysis was facilitated using matrix calculation. The variables were represented in matrix form using the adjacency matrix reporting the relations between each pair of actors.

The basic assumption of this computational experiment were:

A1: the relations evolve, along a fashion of three stages of intensity: 1) not existing, 2) information exchange, 3) project collaboration. Implicitly we assume that the late stages include also the characteristics of the earlier stage, that is the project collaboration also implies an information exchange.

A2: We also assume that the higher the overall intensity of the relations the better the quality of the network social capital.

The former was assumed to characterize the contributions of the LAGs, the latter gave a direction in the interpretation of the results.

3.2 The SNA indexes

In order to give a more complete overview of LAGs' contribution in creating social capital among their members, the analysis is completed with a visual examination of the networks (pre and post LAG's operation) and with the use of some SNA indexes. We used (i) density and compactness index to analyze the overall network structure, (ii) core/periphery analysis to study the intermediate groups within each network, and (iii) average degree and normalized betweenness scores to examine actor's position in the network.

As we are working with binary networks, density is simply the proportion between the ties actually present in each network and all possible ties; the compactness of the network indicates the capacity of each node to reach quickly all the other nodes, in a range from 0 to 1, where bigger values indicate larger cohesiveness; core/periphery analysis identifies the most densely-connected block of core actors who have a structural advantage in coordinating and managing the decision making of the network; average degree is the average number of ties that each actor has with the other nodes of the network; finally, betweenness centrality is a measure showing the number of times a node acts as a bridge along the shortest path between two other nodes.

4. An empirical application

The investigation was conducted in two Italian Regions, Veneto in the North-East and Apulia in the South of Italy (Fig. 2), from September 2012 to February 2013.

The data used for the analysis were collected through face-to-face interviews, during a research project aiming at studying the social capital, either structural and normative-cognitive, promoted by selected Italian LAGs.

Each interview lasted about 20-30 minutes and the interviewed members were asked to compare their relations before and after the first edition of LEADER initiative to which their LAG participated.

In Veneto region two LAGs were selected as case studies: Prealpi LAG in Belluno Province, and Bassa Padovana LAG in Padova Province. They represent two different areas of the region, with different social and economic backgrounds (Tab. 1).

The former, Prealpi LAG, has a long history and includes 26 municipalities in a large, but fragmented, mountain territory. It is characterized by the presence of the National Park of Belluno

Fig. 2 LAG Location



Source: our processing.

Tab. 1. Key features of the study cases

Key features	Gargano	Meridaunia	Bassa Padovana	Prealpi
Number of Municipalities	14	30	30	26
Surface (square Kms)	1,7	2,275	526	1,344
Inhabitants	126	98,1	110	138,871
Population density (Inhabitants per square Kms)	74	43	209	103
Members	61	85	12	25
Total funds (euro)	25,285,770	21,757,985	9,515,451	18,103,048
public funds (euro)	15,231,048	14,564,803	5,538,834	10,141,914
Public Expenditure per inhabitants (euro)	121	159	87	130

Source: our processing on data from ISTAT and LAGs' Local Action Plans.

Dolomites, 19 Natura 2000 areas (covering about 36% of the area), 8 national natural reserves and 2 regional reserves. Its territory is considered a rural area affected from marginality in relation to the main infrastructures of the region.

Bassa Padovana LAG is a recent LAG, and is located in a flat area, including 30 municipalities, in the Southern part of the Province. Its territory presents a composite landscape, with a rich naturalistic, historical, and gastronomic heritage, and it is characterized by historic towers and castles of the medieval period and elegant villas born during the Republic of Venice.

In Apulia region, the investigation was conducted in collaboration with two LAGs (Meridaunia, and Gargano) operating in the Province of Foggia. Their socio-economic background is quite similar (Tab. 1). They share the most important social and economic features common to nearly all parts of the province. Except for the capital town of Foggia, the rest of the territory is rural. On average, more than 15% of total production in these areas comes from the agricultural sector and agricultural employment varies between a minimum value of 20% and a maximum of 40%.

In particular, the Meridaunia LAG is located in a mountainous area, characterized by a severe emigration flow and aging of the current residents. The main activity is the agriculture, particularly based on the cultivation of durum wheat and on the rearing of goats and sheep. It was formed during the second edition of LEADER and accumulated a certain amount of experience in planning activities but they faced different problems.

Most of the GDP of coastal areas of the Gargano comes from tourism. On the contrary, the economy of internal areas relies on the agricultural sector.

This LAG faces problems related to the failure of local initiatives during the first edition of LEADER. As a result, this area experienced a loss of faith in local institutions which prevented the formation of a partnership during the second edition of LEADER. The current partnership was formed with LEADER +.

Table 2 gives an idea of the action undertaken by the LAGs in order to stimulate the local development. It highlights the differences in the development strategies and the relative success in terms of socio-economic revitalization (participation of local actors) with respect to the resources employed. The Apulia LAGs have greater funds on the whole that are concentrated in measures supporting firms development (diversification and tourism activities). These measures have attracted the most part of applications in the period considered. The LAGs from Veneto are more interested in the conservation and upgrading of their rural heritage. They have also activated measures external to axis three (e.g. modernization and non productive investments). The most part of their effort is devoted to foster the cultural valorization and revitalization of rural landscape.

5. Results and discussion

5.1 The aggregative role of the LAGs

Table 2 shows the contribution of the LAGs in creating and transforming the relations among their members. Row (a) represents the number n of members belonging each LAG, row (b) is the number of possible relations occurring within each LAG. This number is calculated as $n*(n-1)$. Row (c) reports the amount of relations among the n members of each LAG, existing independently of the LAG's operation, that is the relations generated by other (alter) mechanisms or mechanisms external to the LAG. These relations are distinguished in information exchange (row d) and projects cooperation (row e). Each measure is expressed both in absolute terms and as a proportion on the total number of possible relations (in brackets).

Very interesting is the row (f) showing the amount of relations affected by the LAG's activity. These amounts have been split into three parts: relations of information exchange created *ex-novo* by the LAG (row g), projects collaborations created *ex-novo* by the LAG (row i), and existing information exchange evolved in projects collaborations thanks to the LAG (row h).

For each measure, three kinds of data are available: the absolute amount, and two relative measures expressed as the ratio of the relations affected by the LAG on 1) the total number of possible relations (in brackets) and, according to the A1, 2) the number of relations potentially under the effect of

Tab. 2 Advancement of LAGs expenditure

Measures activated	Gargano*		Meridaunia*		Bassa Padovana**		Prealpi**					
	Allocat.	Spent	Allocat.	Spent	Allocat.	Spent	Allocat.	Spent				
121 - Modernisation	-	-	-	-	566	532	29	456	189	5		
123 - Agric. and forest. Prod.	-	-	-	-	130	-	3	192	67	6		
227 - Non-productive investments	-	-	-	-	-	-	-	245	34	5		
311- Diversification	3,606	1,881	50	2,656	1,393	26	800	250	15	873	17	
312- Business Creat. and Devel.	1	129	19	667	290	38	153	0	0	1	801	37
313- Tourism Activities	3,54	1,118	27	5,094	2,75	33	213	0	3	1,793	319	21
321- Services for Rural Popul.	1,26	578	10	1,115	271	8	-	-	-	568	156	4
323- Rural Heritage	500	165	50	1	51	1	1,963	24	32	2,412	179	98
331- Training and information	1,307	-	11	1	-	0	-	-	-	99	99	6
421- Cooperation	496	-	-	496	-	-	-	-	-	-	-	-
431-LAG Management	2,752	973	1	2,686	1,62	1	626	491	1	1,146	626	1
Total	14,461	4,843	168	14,113	6,375	107	4,451	1,297	83	8,784	3,343	200

* data refers to 31/12/2013.

** data refers to 30/06/2013.

Source: National Rural Network, 2013.

Tab. 3. The aggregative role of the LAGs

Indexes	Gargano	Meridaunia	Bassa Padovana	Prealpi
# Actors (a)	61	85	12	25
# of possible relations (b)	3660	7140	132	600
Alter (%tot) (c)	933(0.255)	214(0.030)	61(0.462)	254(0.433)
alt-info (%tot) (d)	653(0.178)	191(0.027)	41(0.303)	160(0.255)
alt-Coop (%tot) (e)	280(0.077)	23(0,003)	20(0.152)	94(0.168)
Lag (%tot) (f)	474(0.129)	399(0.056)	47(0.356)	247(0.411)
Lag-info (%tot) [%potential] (g)	177(0.048)[0.065]	262(0.036)[0.038]	7(0.049)[0.098]	78(0.123)[0.223]
Lag-info_into_Coop(%tot) [%potential] (h)	280(0.075)[0.429]	0(0.0) [0.0]	40(0.278)[1]	155(0.245)[0.969]
Lag-Coop (%tot) [%potential] (i)	17(0.005)[0.006]	137(0.019)[0.020]	0(0.0)[0.0]	17(0.027)[0.049]

Source: our processing.

the LAG [in square brackets], that is those relations the LAG can potentially improve according to the computational system depicted in figure 1. Consequently, the potential of improvement depends on the kind of the relations under scrutiny. For the information exchange (row g), the potential is represented by all the possible relations that do not exist yet (b-c). For the projects cooperation (row i), the potential is represented by all the potential relations that are not yet projects cooperation (a-e). Finally, for the information exchanges transformed in cooperation (row h), the potential is represented by the relations that are already information exchanges (d).

As shown, the LAGs impacted on a large part of the potential relations. Their contributions are various and range from 5.6% to the 41% of the total relations. In absolute terms the largest contribution comes from Gargano LAG that affects 474 relations, however, as it has a large number of members, this represents the 13% of the potential. On the other hand, the best contribution in relative terms comes from Prealpi that reaches the 41% of the potential.

Some peculiarities emerge looking at the kind of links created by the LAGs. The LAG Meridaunia has created 262 information exchanges, but none of the 191 information exchanges due to alter mechanisms have been upgraded to the cooperation status. On the contrary the other three LAGs are very

good in doing this. They transformed a large part of pre-existing information exchange in cooperation (Bassa Padovana reaches almost a 100% rate of transformation). On the other hand, their contributions are marginal in producing cooperation *ex-novo* (row h). This is not true for Meridaunia that fostered the cooperation among 137 couples of members.

The analysis is completed with a visual inspection of the transformation of the relational patterns operated by the LAGs. The visual inspection is provided with the following 4 figures representing the status of the network *pre* (panel A) and *post* (panel B) LAG's operation. Neglecting the nature of the relations (information exchange and cooperation), the figures depict the overall relational patterns of the groups. The visual analysis vividly sketches the role of the LAGs in enhancing the aggregative of the partnerships. In order to have more in-depth hints on the overall contribution of the LAGs, we also represented a specific actors' attribute, namely their category of interest: public (red circles) or private (blue squares).

As shown, the networks become more dense when they pass from status A (relations generated independently from the LAGs) to status B (all the relations, including those generated by the LAGs). In absolute terms, the highest increase is related to Prealpi that improved its density from 42% to 58% (that is, after LAG operation the 58% of members are connected) and the average degree from 10 to 14. This corresponds to an improvement in connectivity around the 40%.

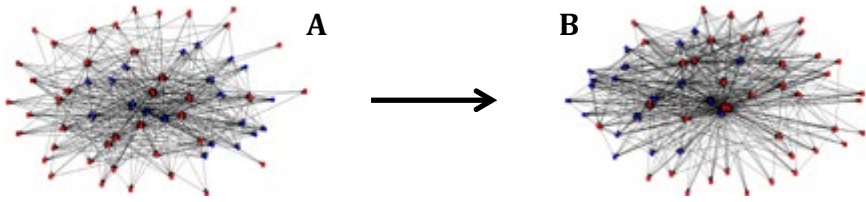
The highest contribution in relative terms comes from Meridaunia that produced an overall enhancement of 58% (that is an increase of the density from 10% to 16%). Concerning the average degree, its level was 3.74 in the pre-LAGs status (panel A) and 5.90 in post-LAG status (panel B).

The contribution of Gargano in relative terms is a 20% improvement in the aggregation of the group. It is an important increase in connectivity: the density improved from 25% to 30%, and the average degree from 15.21 to 18.18.

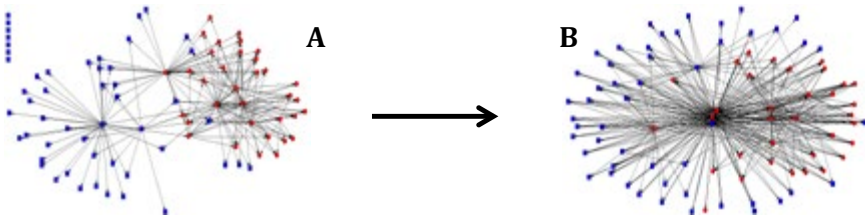
Bassa Padovana was already highly connected in status A (46% of density and 5 average degree) thus it shows the lowest improvement margin. In status B the density became 52% and the average degree 5.67. This corresponds to an overall improvement of 11%.

5.2 The role of key actors

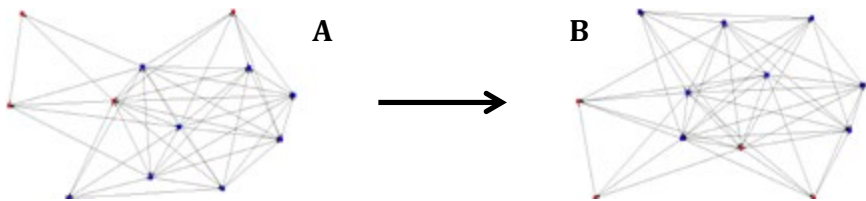
In addition, the visual inspection allows to grasp information on the role of some actors and on the public-private inter-connectivity (Figs. 3, 4, 5 and 6). Some central actors seem to play as relational hubs, as their removal from the diagram would disconnect many actors from the net. This is true in particular for the LAGs from Apulia, and especially for Meridaunia, that has few

Fig. 3. The relational transformation of Gargano

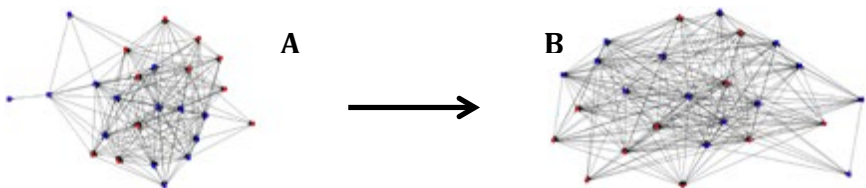
Source: our processing.

Fig. 4. The relational transformation of Meridaunia

Source: our processing.

Fig. 5. The relational transformation of Bassa Padovana

Source: our processing.

Fig. 6. The relational transformation of Prealpi

Source: our processing.

key actors who occupy very central positions. In the pre-LAG status 6 actors (all public) have a very high betweenness degree: it means that the majority of the remaining actors had the possibility to communicate or collaborate with other local stakeholders only through these central nodes of the network. Instead in the post-LAG status the compactness of the network has increased and only 3 members still maintain a considerable betweenness degree. Meridaunia is interesting also for another aspect: in its A status, it appears very polarized with two, highly centralized, groups of homophiles actors. That is the two groups are formed of actors belonging to the same category (private on one hand, and public on the other hand) with a couple of private actors playing the roles of bridges among the two groups. More than in the other cases, in this case the LAG acted as a facilitator, reducing the social distance from the two groups and increasing the connections among them.

Table 3 reports some indexes relating the position of actors to the overall structure of the LAGs' network they belong to. Row (a) reports the compactness of the network in a range from 0 to 1, where bigger values indicate larger cohesiveness. Row (b) shows the percentage of LAG's private members; row (c) reports the percentage of private members who belong to the core of the network, that is the most densely connected sub-group of actors; while in row (d) the difference in percentage of the two previous measures is reported. Finally, row (e) is the average normalized betweenness score.

Each index was calculated both in the pre-LAG status and in the post-LAG one.

Data immediately confirm the aggregative role of the LAGs, as shown by the previous graphs. In addition to this, Table 4 highlights that the presence of the LAG allowed to reduce the distance in the network among actors: the four LAGs have increased the compactness of the network, creating opportunities of direct contacts among their members. Moreover the equilibrium in decision making among the public operators and the private sector is better guaranteed in all case studies' status B: the percentage of private actors, considered on paper optimal by the LAG, in the core of the network has become concrete thanks to the LAG itself. The lowest contribution comes from Gargano LAG, whose network structure doesn't significantly change from status A to status B, due mainly to the fact that the percentage of private members in the centre of the LAG's network reflects perfectly the preexisting balance pre-LAG.

6. Concluding remarks

The contribution of the study is twofold, on one hand it is directed at finding empirical validation of the hypothesis that LAGs activity can foster the so-

Tab. 4. Private and public actors within the LAGs' networks

LAG	Gargano		Meridaunia		Bassa Padovana		Prealpi	
	A	B	A	B	A	B	A	B
Compactness (a)	0.042361111	0.044444444	00:23	00:37	0.05	0.053472222	0.045138889	0.052777778
%Private (b)	0.05		0.041666667		0.052083333		00:56	
%PrivateCore (c)	0.049305556	0.049305556	00:50	00:58	0.041666667	0.049305556	00:54	0.041666667
Delta (d)	0.06875	0.06875	0.0625	0.068055556	0.059027778	0.066666667	0.068055556	0.066666667
nBetweenness mean (e)	01:23	01:17	0.066666667	0.051388889	0.301388889	0.220138889	02:21	01:36

Source: our processing.

cial capital of the local partnerships, on the other hand it sought advancement in detecting social capital methods.

Concerning the former aspect, the specific focus of the work is the structural dimension of social capital that is the structural characteristics of the network of relations among LAG's partners. Two kinds of relations were considered: information exchange and project cooperation. The analysis reveals that the LAGs enhanced the social capital of their partnerships producing a diverse contribution in terms of kind of relations activated/enhanced. The LAGs modified the morphology of their networks fostering the connectivity of their members, connecting different groups of partners (public/private) and exalting the role of some actors as bridges among different polarities.

Another aspect that calls for a more close scrutiny is to investigate the kind of norms established within these networks, entering the domain of the cognitive social capital.

Regarding the latter aspect (methodological advancement), a relational computational system is set, allowing to answer to the research question. Specifically, starting from the available data, the contribution of the LAGs emerges on logical basis by the comparison among the relations actually existing and the relations created independently of the LAGs' activity. Moreover, the methodology proposed allows to identify the position and role of actors.

The variables studied in this work can contribute both to LAGs evaluation and selection processes by Managing Authorities (MAs). Concerning the evaluation, the indicators used can complete the assessment framework in order to evaluate the enhancement by the local agencies in the domain of social interaction, especially for the ability shown by these agencies to transform the social interaction in actual cooperation relationships. For what concerns the selection issue, the idea is to use these indicators as additional criteria to justify rewarding mechanisms for LAGs that exhibited virtuous interaction processes in previous editions. In particular, in order to endorse social resources as elements of rural development processes, these indicators can help in taking into account the social capital issue since the earlier phases of program elaboration (e.g. the set of intervention logic and the context analysis under Art. 8 of Reg. [EU] 1305/13). The analysis presented rests in the structural domain neglecting the outcomes of the structure investigated. However, the peculiarity showed by these structures deserves further investigation in order to study their attitude toward information spread and behaviors diffusion, that are the basic mechanisms in local development processes. In particular, the next step of the research will focus on the type of two-way impact, if any, between the endowment of LAG's social capital and all over the territory of the local community concerned by the implementation of the CLLD approach.

In order to foster the social capital of local partnerships, it is important, in particular, to involve the most active actors in the area. With this aim, the method here illustrated allows to identify the 'natural' leaders within the partnerships that should play relevant roles in future projects.

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