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Cooperatives as agents of social capital: An evidence from a post-socialist country

Abstract

Agricultural cooperatives in post-socialistic countries often fail to justify their purpose. Lack of trust and social capital are plausible reasons. The aim of this paper is to map the relationship structure of farmers in region where operational cooperative exists. The Social network analysis demonstrates low levels of social capital however, the cooperative acts as valuable information provider for its members, serving as information mediator to the rural development program's resources, required for farmers' investment initiatives. This is a positive evidence for small-scale farmers and a step forward in motivating changes of farmer's attitudes towards cooperation and re-establishment of agricultural cooperatives.

Keywords: cooperatives, networks, RDP, social capital, FYR Macedonia.

1 Introduction

High levels of mistrust and low levels of social capital were generated by the distortions of the economic and institutional systems in the post-socialist countries. Due to the weak and inadequate institutional and legal structures, caused by their transition to market economies, most of the agricultural cooperatives in the post-socialist countries ceased to exist (Chlupkova *et al, 2003*). The concept of cooperation and cooperatives, as imposed by the socialistic governments, often characterized by corruptive and self-interest politics, contributed for the additional destruction of trust in the voluntary cooperation arrangements (Paldam and Svendsen, 2000).

Transition countries such as FYR Macedonia are still confronted with different types of limitations of the horizontal and vertical relations in the agricultural sector (Kotevska and Martinovska, 2015). Agriculture is the main source of income for the small-scale farmers which constitute around 90% of the rural population in the country. Because of their small size, farmers should be able to recognize the benefits of their membership in agricultural cooperatives. Even though agricultural cooperatives' transformation was supported by foreign donors and institutions, farmers are still unwilling to accept the idea of cooperatives and cooperation (Kakkamisu, 2016). In spite of the tradition of agricultural cooperatives during the socialistic period, the number of functional agricultural cooperatives in the country is still small, i.e. around 30 registered agricultural cooperatives in 2016. Most of these cooperatives are micro or small size; with an average of 12 members per cooperative and an average land per member of 6.20 ha. Only 401 of the registered 192,675 farm households participate in the agricultural cooperatives (SSO, 2007; Kakkamisu, 2016). The reason behind this low rate of farmers' membership in agricultural cooperatives is one of the first indications for the level of social capital in the rural areas (Kotevska and Martinovska, 2015).

Cooperation among individuals and social capital creation are interrelated concepts both implying to social interaction and levels of trust (Murray, 2006). Social capital is defined as the level of benefit that each individual can extract from their personal network (Bourdieu, 1986). It is based on trust and embedded in the formal and informal social structures of cooperation (networks) and is believed to have impact on rural development, networking and decision making in rural areas (Wiesinger, 2007). Networks enable activities for joint problem solving and often provide more efficient flow of the much needed information, knowledge, extension and development activities for the rural population (Mikulcaka *et al*, 2015, Woolcock, 1998). They also support the transfer of information among

farmers in rural areas, and the transfer of information and experience on rural development program (RDP) which is often dependant on the existence of social networks.

The aim of this paper is to show the structure of relations among farmers in a region where an agricultural cooperative operates, as well the role and potential benefits from the cooperatives in terms of information flow for the existence and application for rural development programs (RDP). The paper will more specifically analyse the following issues: (1) How do farmers communicate and transfer information regarding RDP's in the selected region where a successful agricultural cooperative operates, and (2) Which are the key farmers (actors) in the cooperative network with the highest levels of relations (SC), and if they can be used for more efficient transfer of RDP and other type of information and knowledge.

2 Materials and methods

Analysing social structures (networks) requires specific data for conducting social network analyses. A frequently applied mean of data collection in social network analysis is a structured questionnaire, carried out through a face-to-face survey (Marsden, 1990; Wasserman and Faust, 1994). Close to 150 farmers from the Strumica region were surveyed in the period from November to December 2014. The selection of the specific region was based on the fact that one of the most representative and efficient agricultural cooperative in the country, the vegetable cooperative "Vegefresh", is situated in. It is a cooperative which has been the most successful in applying and receiving financial support for acquiring agricultural equipment (Kakkamisu, 2016).

A whole-network approach was applied, as a common method of data collection in which the largest portion of dyadic relations in the network are included. This approach produces networks that are bounded (Hanneman and Riddle, 2005) with a relatively small number (21) of additionally nominated farmers from the list of 150 farmers which was already registered and offered to the surveyed farmers (total of 171 farmers in the final network). The whole-network approach is also an analytical design, suited for performing ego-centric network analysis, which examine local network structures in order to extract network structures (DeJordy and Halgin, 2008).

The questionnaire which addresses the social network analyses was constructed in the form of a "name-generating table". It is a table which collects information on each farmer's relation to other farmers (Lin, 2005; Wasserman and Faust, 1994). Each of the surveyed farmers was asked to nominate certain number (most often three to five) of other people with whom they discussed or shared information on important issues regarding RDP. The number of nominations was given as a motive for more nominations, having in mind that limitation of this number could produce measurement errors (Lin, 2005; Wasserman and Faust, 1994). The "name generator" included part known as the "name interpreter" which refer to the attributes of each nominee (i.e. relation to other farmers, age, educational level, main reasons for and frequency of cooperation, past experience with R&D support, and membership affiliation with an organisation) (Borgatti et al., 2013). Trough adjacency matrices (NxN in terms of number of nodes) the actors in the network were coded (1 in the case of an existing relation and 0 when the relation was absent).

The total network of all the farmers in the selected region (member and non-members of the cooperative) and the structure of the cooperative network are presented through sociograms. Additionally, the ego networks of the most influential actors in the cooperative network were presented in order to expand the understanding of their role and position in the transfer of RDP information. Ego networks can reveal the key players in the groups, their sources of information, social support, the patterns of information diffusion, and many other characteristics which influence the behaviour patterns of the selected nodes (actors) in the network. Ego network analysis include:

network size (the number of relations) each of the analysed ego's (central farmers) have, effective size of relations, structure (how it connects other farmers, and if it have relations with other significant farmers in the network). The ego network measures also include the measure of structural holes which can reveal the benefits of absence of ties among the egos' alters (others), indicating to the potential benefits such as autonomy, control, information (DeJordy and Halgin, 2008). The coded data were analysed using UCINET, which is a specialised software tool for analysing social structures (Borgatti et al, 2002), and their visualisation was presented using NetDraw (Borgatti, 2002). The basic network cohesion measures (network density, average node degree, average distance, betweeness centrality, reciprocity, network fragmentation) represent the social capital structures and the patterns and flow of information in the surveyed region.

3 Results and discussion

Social network analysis applies several measures by which abstract concepts such as trust and social capital can be quantified (Sabatini, 2009). Social network measures give valuable inside about the general patterns of relations among nodes in the network and the overall description of the studied social structure. It often provides more evident illustration of the most important features of the network structure (Hanneman and Riddle, 2005). In this respect, we present the primary cohesion measures for the farmers' network for RDP information transfer in table 1.

The network of farmers in the selected region in Strumica is constituted of 140 components which indicates to a very fragmented network, fact supported by the fragmentation measure which is very close to 1 (0.971). This fragmentation also contributes to the low level of density, which shows the probability that a relation (tie) exists between any pair of nodes in the network, and is one of the primary indicators of social cohesion of the network. The density measure, is relative to the network size and in bigger networks are expected to express lower values (Borgatti *et al., 2013*). However in this case, the overall social capital and information transfer trough the network expresses extremely small values. The average degree of the nodes or the farmers in the network is also very low, mostly due to the significant number of outliers (nodes without relations), and dyads (separate pairs of nodes) disconnected from the major component in the network (see Figure1), Another measure of social capital and trust is the reciprocity value which is 0.335, meaning that 1/3 of the ties in the network are reciprocal (ties between the nodes in both directions). The majority of this reciprocated ties are between the isolated pairs of nodes (see Figure 1). The "distance" measure analyses the shortest path between the more distant nodes, and if the connecting relations are absent than those nodes would be unreachable (Wasserman and Faust, 1994). The average distance in the studied networks has a value of 1.581, indicating that the network contains relatively close relations in terms of informational flow (Kadushin, 2012), and each actor in the network might be reached in les then two steps, regardless of the apparent fragmentation of the network. Because of the expectation of larger network disconnections, we also included the measure of "breadth", or the distance weighted fragmentation which shows the average distance among nodes in the case of removing certain nodes in the network (Borgatti and Everett, 2006).

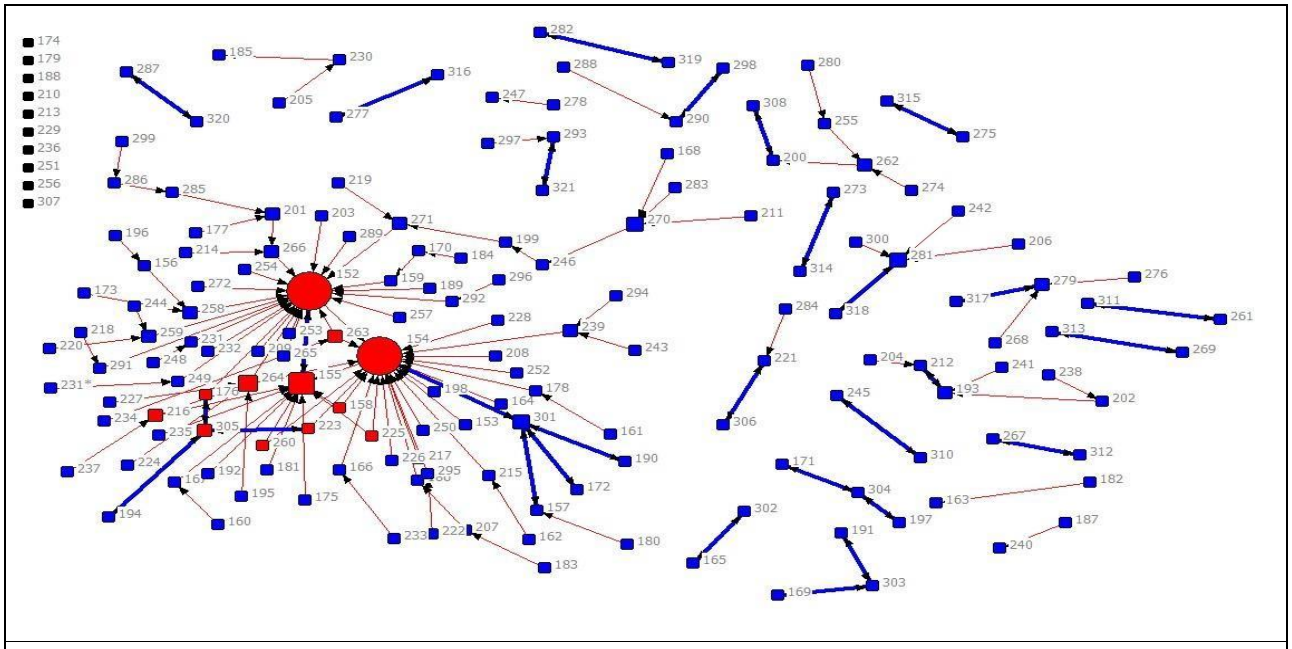
The majority of the nodes in the network are at distance close to 1 point to a complete graph. The diameter of the graphs shows the maximum distance on which the information in the network can travel between any pair of nodes in the network, or how distant are the remotest two actors in the network, which in this case is eight steps.

Table 1. Selected network measures for the selected region

	Values	Range and explanations *
Average degree	1.018	○ Average number of ties of each node.
In degree (H-index)	4	○ Average of ties received by each node
Density	0.006	○ Values closer to 1 - better connectedness of the actors in the network
Components	140	○ Number of component comprising the network
Component ratio	0.822	○ 1- every node is isolate, 0 – there is one component
Connectedness	0.029	○ 1 – each node belongs to the same component, 0 – every node is in a different component
Network fragmentation	0.971	○ 1- all nodes are at distance1 from each other (complete graph), 0 – all nodes are isolates
Average distance	2.966	○ The time length for information diffusion across the network
SD distance	1.581	○ Sees distances beyond actors' direct relations.
Diameter	8	○ The longest path of the information flow (between the furthest nodes in the network)
Distance - Breadth	0.987	○ Average distance among nodes when certain nodes in the networks are removed (when all nodes are distance 1 from each other - complete graph, and 0 when all nodes are isolates)
Reciprocity	0.335	○ Average reciprocated ties (ties in both directions)
Dyad reciprocity	0.201	○ Reciprocity between pairs

* Source: Wasserman and Faust, 1994, Hanneman and Riddle, 2005

The graphical analysed network of RDP information diffusion (Graph 1) clearly shows the existence of one large component with higher density of relations, within which there is a group of nodes which constitute the cohesive sub-group of the network, so called the k-core. These are the nodes where the highest level of social capital is concentrated. Most of the nodes in this component and sub-group are members of the analysed cooperative.



LEGEND

- Node colour – red coloured nodes constitute the networks' k-core.
- Node size represents the degree of ties each of the nodes (larger node size – larger degree)
- Node shape – the betweeness (circle for the nodes with the highest betweeness, and square for all the rest)
- Line thickness and colour – reciprocity of ties (red, thin – non-reciprocal; blue, thick – reciprocal).

Graph 1: Network for RDP information transfer

In order to further identify the existent subgroups (clusters) which are embedded in this network of farmers, we extracted the farmers which form cohesive groups - farmers with such close relations that can characterize them as a separate community (Borgatti *et al., 2013*). In our network we identified six cliques constituted of eight farmers, most of which are also part of this network's k-core. Seven of the eight identified farmers in these cliques are member of the cooperative. Three of the nodes (clique 1: farmers 152, 154 and 155) are notable both in the graphical presentation of the network and in the cluster groups (Table 2).

Table 2. Identifying cliques (subgroups)

	Farmer's code		
Clique 1:	152	154	155
Clique 2:	152	154	263
Clique 3:	152	154	264
Clique 4:	155	154	158
Clique 5:	155	154	225
Clique 6:	155	154	260

These farmers participate in the management structure of the existing agricultural cooperative, and are the nodes with the highest degree and eigenvector values measuring their direct and indirect connections with alter (other farmers). Those nodes have also the highest values of betweeness, showing their role as information brokers in this network. As such they have the ability and power to regulate the flow of information in the RDP information network (normalized brokerage close to 1). Their potentials rooted in their position to control the information also seen in the large number of structural holes.

The basic measures which describe their ego-networks are presented in Table 3. "*Power is a fundamental property of social structures"* (Hanneman and Riddle, 2005, ch:10) and cooperative managers have the largest total network and effective network size, as well as the largest number of indegree, which in relation to the survey question (How do you seek RDP information from?); would mean that those are the persons which are mostly consulted regarding RDP issues. The 2-step reach is a measure that accounts the share (%) of all actors in the whole network that are within two directed steps of ego ("friend-of-a-friend" distance), i.e. all of the analysed nodes transfer the message to around 60% of the actors within the selected network.

Table 3. Basic ego-network measures – selected nodes representing management structure of the "Vegefresh" cooperative

Node	Network size	Effective size	Out degree	In degree	Density	2-step reach	Broker	Normalized broker	Ego between	Number of Structural holes
152	24	23.7	2	53	0.54	68	274.5	0.99	42.00	549.0
154	24	23.6	1	63	1.27	65	272.5	0.99	58.00	545.0
155	11	10.3	1	59	3.64	52	53	0.96	16.00	106.0

4 Conclusions

RDP application depends on the access to information and resources often embedded in the personal networks of farmers in the rural areas. However, the mechanisms to diffuse these information and resources are often underdeveloped in socialistic countries in the transition, such as FYR Macedonia. In order to investigate the existing structures which might be available for the purpose of RDP information transmission, in this paper we studied the structure of relations among farmers in a region

where one of the few agricultural cooperatives in FYR Macedonia exists. The role and potential benefits from the cooperatives in terms of information flow for the existence and application for rural development programs (RDP) was analysed through social capital lens and social network analysis on the macro level, or the network of relations in the region and on ego network level, or farmers' personal network structures. In this paper we perceived the relation in the network as a representation of the level of social capital and trust or trustworthiness in certain actors in the diffusion (access) of RDP information.

Based on the results of this study, we can conclude that in general, the levels of social capital in a relatively narrow rural region is very small. However, information travels fast in the network, regardless of the fact that the network is constituted of large number of components, constituted of farmers which in most instances are not members of the cooperative – membership in cooperatives maters. The agricultural cooperative in this region is the nucleus of this network, where most of the access to RDP information is concentrated.

The cooperative managers and managerial terms have an essential role in the information diffusion and the enhancement of confidence among the cooperative members. The managers of the "Vegefresh" cooperative which operates in the surveyed region are the most important social capital hubs and the most trustworthy when information on RDP is acquired. Because of their ego network size and position in the network they can have positive or negative effect on the information channelling as they can regulate the type and amount of information that goes through them. Identifying these individuals can be beneficial in the process of constructing cooperation models in which these powerful individuals can have valuable role.

The agricultural cooperative in this study provides evidence that cooperative members have better access to information and resources, thus it can serve as a positive example for small-scale farmers still doubting the concept of cooperation. In this respect, this research was only the first step describing the social capital structure and benefits. In order to motivate changes of farmer's attitudes towards cooperation and re-establish social capital potentials, further research on the relational aspects and role and attributes of the cooperative and cooperative members is advises.

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