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Sharing of Knowledge as a Condition of Rural Area Development – Fuzzy-Set Qualitative Comparative Analysis Approach

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ABSTRACT

One of the common challenges exist throughout Europe is to compiling knowledge ready for practice. A key element for development and progress is distributing and sharing the knowledge.

With sharing of knowledge is related a number of issues, such as trust (the not surprising conclusion that people who trust one another are more willing to share information than those who do not), risk taking, well-being (increasing has an incremental effect on knowledge sharing behavior). Knowledge sharing behavior is affected by the complex interplay of well-being, social capital tendency and organizational culture.

Authors have been used a fsQCA (fuzzy set Qualitative Comparative Analysis) as a methodological concept to examines the impact of identified behavior on the level of knowledge application in local level organization. This type of technique is ideal for this study for two reasons: on the one hand, in order to analyze whether identified behavior in organizations enables knowledge sharing or not. The second aspect regards the size of the sample. The advantage of this method is that it allows researchers to work with medium-sized samples. This type of technique allows a detailed analysis of how causal conditions contribute to a particular result, and is based on a configurational understanding of how a combination of causes leads to the same series of results.

Based on a survey and interview of local level organisations in Poland involved in rural areas development, this study has examined the relationship between the impact of identified behavior on the level of knowledge application in local level organization. The findings reveal that the presence of regular meetings and openness, low level of subjective risk of losing position in the organization, presence of platform for sharing information and the care of the young workers determines the level of application of knowledge in organizations and community.

KEY WORDS: rural areas development, local organizations, knowledge management, knowledge sharing, fuzzy-set Quality Comparative Analysis (fsQCA)

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1. Introduction

With the development of new policies in the European Union which are the result of the changes in the environment and the world, new opportunities for agriculture in the circular economy emerge. The agricultural European Innovation Partnership (EIP-AGRI[1]) works to foster competitive and sustainable farming and forestry that "achieves more and better from less" (EIP-AGRI). It contributes to ensuring a steady supply of food, feed and biomaterials, developing its work in harmony with the essential natural resources on which farming depends.

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Currently, socioeconomic development, including rural development, has gained a new character and accelerated because new properties of external environment have determined an unprecedented increase in the value of knowledge. Knowledge has become a new source of change.

Compiling knowledge ready for practice is one of the common challenges across Europe. The idea of Thematic Network will generate tangible benefits. For example, it will collect existing knowledge and best practices, transform it into practical information which will be available to all. Thematic Networks should lead to a better uptake of existing solutions across Europe and other countries. There is a wide debate about boosting knowledge and innovation such as capacity building/ training of actors in innovation (various advisory services) and knowledge transfer and exchange of good practices on innovation from research (various).

Bearing in mind the aforementioned arguments as well as current needs, the study focuses on the key element which is knowledge sharing.

The study, based on a survey and interviews in local-level organizations, employed the method of fsQCA to explore the relationships between practices of knowledge sharing and the level of its application. The examination supports the argument that different causal paths explain application of knowledge in organizations.

2. Theoretical background

Knowledge sharing is gaining more and more attention in the scientific world. Many researchers (such as Boughzala & Briggs, 2012; Fulton, 2009; Hall & Goody, 2007; Hersbserger, Murray, & Rioux, 2007; Krok, 2013; Mikuła, 2016; Millen & Dray, 2000; Sonnenwald et al., 2008; Widén-Wulff & Davenport, 2007; Widén-Wulff & Ginman, 2004 & Ziemiańczyk, Krakowiak-Bal & Mikuła, 2014) explored aspects of information sharing in a variety of contexts. Papers dealing with "knowledge sharing" study documents share, information transfer through messages, access to databases, direct interpersonal communication in person or at meetings (Andreeva & Kianto, 2012; Berkowitz, 1987; Wilson, 2010).

It is vital to note that the amount of information is constantly increasing and adjustment of information handling strategies in the workplace, to an individual, a task, a group, and organizational levels is indispensable (Berryman 2008; Lloyd, 2013; Abrams et al., 2003). Information and knowledge exist in different forms, have different aims, and are handled by many different actors, with different and new tools (Allen & Shoard, 2005). This is affected by social elements such as culture, climate, and community. In fact, information behavior and practices are changing because of the changing information arena while organizations are facing challenges (Carlson, Charlin & Miller, 1988; Burke & Ng 2006; Virta and Widén, 2011).

Authors of the paper concentrated on understanding of "knowledge" as mental processes involving understanding, inter-personal communication and learning. It is a different form of messaging and the messages may or may not be information bearing for the recipient (Mikuła, 2012; Wilson, 2010; Oeberst & Kimmerle & Cress, 2016).

Four relatively common variables are identified in literature review. These are trust, risk, reward (or benefit), and organizational proximity. Each of the specified variables has to be measured. Due to the fact that this process is challenging, numerous authors made an attempt to handle this problem (Wilson, 2010; Sankowska & Paliszkiewicz, 2016; Steinmo & Rasmussen, 2016; Esquivel, Tjernstad, Mac Quarrie & Tamariz, 2017). In the authors' approach variables are represented by:

1. meetings and openness (number of meetings per week and openness in communication - in seven point Likert scale);
2. subjective risk of losing position in the organization (in seven point Likert scale);
3. platform (understood as a place where you can see the activity and easily get a reward (or benefit) –assessed by a manager;
4. care of the young (older, more experienced colleagues in organization ae role models for young people), understood as an internal system in organization. Output is understood as a level of application of knowledge in organizations.

3. Research methods

3.1. fsQCA

The method of Qualitative Comparative Analysis (QCA) is a Boolean-algebra-based approach for formal testing of the accuracy of complex statements of contingent relationships among recipes of antecedent

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conditions in predicting outcome conditions (Woodside, 2010). QCA represents a particularly interesting technique for management analysis where sample sizes are small. This type of technique allows for a detailed analysis of how causal conditions contribute to a particular result, and is based on a configurational understanding of how a combination of causes leads to the same series of results. More importantly, QCA is suitable for analyzing high levels of causal complexity.

The crisp set QCA (or conventional QCA) was first developed by Ragin (1987), and then improved to fuzzy set Qualitative Comparative Analysis (fsQCA) (Ragin, 2008). The fsQCA is growing in the management sub-disciplines (Woodside, 2014). Calibration in this approach is based on assigning a value between 0.0 and 1.0 to the variables, depending on their grade of membership (Woodside & Zhang, 2013).

This type of technique is ideal for this study due to the fact that it allows for analyzing whether identified behavior in organizations enables knowledge sharing or not and also it is suitable for the size of the sample. The method is advantageous owing to the fact that it enables researchers to work with medium-sized samples (Ragin et al., 2003; Ragin & Rihoux, 2004). This study employed the statistical software package fsQCA 2.5 for its analysis (Ragin & Davey, 2014).

3.2. Sample and calibration

The fsQCA does not solely analyze the isolated effect of two or more variables on the result of interest, but also explores all the possible (intensifying or moderating) interactions between these variables.

The research was carried out in the previously selected organizations actively involved in the process of rural development in Poland. They were local-level organizations. The questionnaire was handed to managers and leaders in 250 organizations involved in rural development. The questionnaire was distributed using Computer Assisted Web Interviews (CAWI) technique. The response rate was at 52%. The next step was to choose the organization which would meet the authors' assumptions that is the level of application of knowledge in organizations (understood as a number of completed project) and the size of the local organization. Nine organizations were selected and an interview with a person in a management position was conducted.

Subsequently, the calibration applying "the direct method" that appears in Ragin (2008) and transforms the interval, using a crossover point was conducted. In order to calibrate the observations, they were transformed into two different measures, whose values were between 0 and 1. These values did not represent probabilities but rather transformations of the quantitative scale in degrees of integration within the category (Ragin, 2000; Schneider, et al., 2010). The fsQCA analysis generated three possible solutions: complex, parsimonious, and intermediate (the last one is presented here).

4. Results

In this section, the authors verified whether they could consider any of the causal conditions as a necessary condition of the outcome. A condition is necessary when the outcome constitutes a subset of the cases of that causal condition (Ragin, 2006; Schneider et al., 2010). The authors utilized consistency measures in the fsQCA in order to gauge the degree to which observations would comply with the strict rule. A consistency score of "1" indicated that the combination of causal conditions complied with the rule in all cases. A condition or a combination of conditions is necessary or almost necessary if the consistency score is over the 0.9 threshold.

The fsQCA results of consistency and coverage test which revealed relationships between the variables are shown in table 2. It was revealed that the consistency in three terms were from 0,92 to 0,98.

The next step was to verify the conditions of sufficiency after establishing the necessary conditions. The authors need to create the most suitable types by converting the set of values of pertinence for the causal conditions into "fuzzy-set values". A causal condition can be considered sufficient to lead to the outcome if, for each case, the fuzzy membership value of the causal condition 'X' does not exceed the fuzzy membership value of the outcome 'Y' (Ragin, 2000; Schneider et al., 2010).

The fsQCA analysis generated three possible solutions: complex, parsimonious, and intermediate (the last one is presented here).

The intermediate solution (Table 3) indicated two combinations of causal conditions that could be helpful.

According to Eng and Woodside (2012), in fsQCA, a model is informative when the consistency is

Table 1. Analysis of necessary conditions

Conditions tested*	Consistency	Coverage
meetopenn	0.664894	1.000000
~ meetopenn	0.606383	0.651429
limbeliefs	1.000000	0.921569
~ limbeliefs	0.361702	0.708333
platf	0.659574	1.000000
~ platf	0.601064	0.642045
leadyoung	0.521277	0.933333
~ leadyoung	0.558511	0.538462

Note: * Following the nomenclature, the symbol (~) represents the negation of the characteristic.

Table 2. Analysis of subset

Terms	Consistency	Coverage	Combined
meetopenn*limbeliefs*platf*leadyoung	1.000000	0.441489	0.661116
meetopenn*limbeliefs*leadyoung	1.000000	0.494681	0.699810
meetopenn*limbeliefs*platf	1.000000	0.590425	0.764540
limbeliefs*platf*leadyoung	1.000000	0.441489	0.661116
meetopenn*platf*leadyoung	1.000000	0.441489	0.661116
meetopenn*limbeliefs	1.000000	0.664894	0.811323
limbeliefs*leadyoung	0.980000	0.521277	0.718376
meetopenn*leadyoung	1.000000	0.494681	0.699810
limbeliefs*platf	1.000000	0.659574	0.808071
meetopenn*platf	1.000000	0.590425	0.764540
platf*leadyoung	1.000000	0.441489	0.661116
limbeliefs	0.921569	1.000000	0.984886
meetopenn	1.000000	0.664894	0.811323
leadyoung	0.933333	0.521277	0.714738
platf	1.000000	0.659574	0.808071

above 0.74. The coverage (0.845745) and consistency (0.940828) of the two conditions seem to be adequate. The sufficient conditions explain 84% of the empirical evidence (Woodside, 2014).

Empirical importance stems from the degree to which the causal condition or combination of conditions explains the result. And the empirical importance is assessed by two scores, the raw coverage and the unique coverage, suggested by Ragin (2006). When the unique covariance differs from 0, it means that there is more than one path. In the study, the results indicated that most of the outcome was covered by the causal paths.

Table 3. Findings from fsQCA intermediate solution of sufficient conditions for the occurrence (and no occurrence) of sharing of knowledge in local organisations

	raw coverage	unique coverage	consistency
Model: needsinapp=f(leadyoung, platf, limbeliefs, meetopenn)			
~leadyoung*~platf*limbeliefs*~meetopenn	0.484043	0.404255	0.900990
leadyoung *platf*limbeliefs*meetopenn	0.441489	0.361702	1.000000
solution coverage:	0.845745		
solution consistency:	0.940828		

The two sufficiency condition combinations were ~leadyoung*~platf*limbeliefs*~meetopenn (raw coverage: 0.484043; consistency: 0.900990) and leadyoung *platf*limbeliefs*meetopenn (raw coverage: 0.441489; consistency: 0.1). The raw coverage for single causal paths ranged from 0.484043 to 0.441489. All these conditions were adequate as raw coverage was between 0.25 and 0.65 (Eng & Woodside, 2012).

Looking at the results, it can be seen that a combination of the four identified variables led to successful outputs. In other words, regarding sufficient conditions, all variables were present for the occurrence of knowledge sharing in local organisations environment.

5. Discussion and conclusions

Knowledge plays an important role in almost every human activity, its value in the development process has been a topic of extensive debate. According to a number of authors, such as Boon (1992), Camble (1994), Ziemiańczyk (2010), Cymanow (2011), lack of information negatively influences the development process.

Distribution and knowledge sharing are the key element for the development and progress. Much has been done (for example the so-called Agricultural and Knowledge Information Systems (AKIS) which exist at national/regional level in the 28 European Union Member States) in this field but there is need to improve it and a number of issues such as trust (it is not a surprising conclusion that people who trust one another are more willing to share information than those who do not), risk taking, and well-being are challenging. Knowledge sharing behavior is affected by the complex interplay of well-being, social capital tendency, and organizational culture. (Chumg, Seaton, Cooke & Ding, 2016).

Using the method of fsQCA, this study examined the impact of identified behavior on the level of knowledge application in local-level organizations. The findings revealed that the presence of meetings and openness, subjective risk of losing position in the organization, platform and the care of the young determined the level of application of knowledge in organizations.

5.1. Contributions

This paper explores the impact of identified behavior on the level of knowledge application in local-level organization, thus offers theoretical insights in two areas.

First, this paper examined four factors of knowledge sharing. In doing so, it offered theoretical insights into the knowledge management research. This fills a gap in the theoretical and practical literature on the knowledge sharing.

Secondly, this study, based on a survey and interviews in local-level organizations in Poland which are involved in rural areas development, also contributes to the literature by using the method of fsQCA to explore the relationship between the impact of identified behavior on the level of knowledge application in local-level organization. In comparison to the general "regression analysis" method, this approach enables the authors to make good use of the available data and explore the complex relationship in the future.

5.2. Limitations and future research

Despite covering an existing gap in the literature, this study presents several limitations, which may inspire future research. First, the results were based on the sample of local-level organizations, and as a result the findings might be subjective. Therefore, it would be beneficial to study this issue in different levels of organizations (for example regional or national) and in different sectors. Secondly, although this study employed reliable conditions from the literature, future studies should consider other factors. Thirdly, cross-country organizations may be another option for future studies. In this respect, future examinations could study and even compare knowledge sharing in various aspects.

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Endnotes

[1] *The European Innovation Partnership for Agricultural productivity and Sustainability (EIP-AGRI) was launched in 2012 to contribute to the European Union's strategy 'Europe 2020' for smart, sustainable and inclusive growth. This strategy sets the strengthening of research and innovation as one of its five main objectives and supports a new interactive approach to innovation: European Innovation Partnerships.*

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