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Strategic decision-making model for the regional development of rural areas: A Serbian case study

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Making decisions about the activities aimed at enhancing rural development often requires implementing a multidisciplinary approach and including the opinions and attitudes of several regional stakeholders. This paper proposes a hybrid SWOT-ANP model for selecting an optimal scenario to realise the vision for developing a rural area in Serbia. The four-phase decision-making approach applied in this paper consisted of the following elements: vision, strategic goals, SWOT analysis, and alternative scenarios. The results indicated that the most appropriate strategies for regional development of this rural area were those related to the more sustainable utilisation of natural resources. This model should be of significant help to decision-makers when defining the main determinants of the future development strategy of any rural area.

Keywords: rural area, regional development, SWOT analysis, ANP method, strategies

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1. Introduction

Nowadays, there is an increasing economic and social inequality on global and regional levels. Therefore the need to resolve regional imbalances is becoming more pronounced. A regional development policy is based on ensuring coherent develop-

ment by reducing the differences in the level of development of certain regions and the backwardness of less privileged regions (European Economic Community, 1958). There is some debate about the impact of regional accessibility differences on regional development, but systematic research studies from developing countries are still infrequent (Karahasan et al., 2016).

Opportunities for faster regional development in many countries have been seen in agricultural production, the growth of rural tourism, and other forms of rural economic activity. Natural and cultural characteristics reflect the disparities between rural and urban locations. The success of the development of rural regions is influenced more by economic changes than it is in the case of urban ones. Thus, models used to develop rural areas differ significantly from the urban development models.

Numerous authors have studied and tried to find the best ways to improve regional development. Significant attention has been paid to the analysis of interaction between rural and urban areas (Caschili et al., 2015). Ward and Brown (2009) examined two trends that influenced the rural areas' position in regional development: the distinction of rural areas in the global change context, and the changeable nature of travel and communication, i.e. mobility. The new policies should support rural-urban cooperation initiatives promoting essential synergies between these communities (Gallardo, 2010).

Rural policy provides an articulated design of the regional concept and bottom-up approaches (Mannion, 1996). The decentralisation and strong integration of rural areas should be the starting point for creating rural policies. The rural web is a model that emphasizes the heterogeneity of rural development and offers a comprehensive overview. According to Guinjoan et al., (2016), this model represents an extremely useful way of setting up a framework for rural development policy and evaluation.

Managing a specific region is difficult and demands a holistic approach to many critical challenges for developing and implementing an efficient and unambiguous strategy. Functional management balances societal needs, economic and environmental principles. In the long term, it ensures the region's sustainability through more rational resource utilisation, more effective investment allocation, and increased tourism potential (Laing and Lewis, 2017; Sisto et al., 2018). Regarding rural development management, the significant number of groups affected by rural areas' economies creates several obstacles for decision-makers when defining management phases, hence they use various techniques that facilitate their decision-making. Therefore, this paper aimed to define an integrated model for selecting the optimal scenario for implementation in a rural area. The defined model of strategic decision-making was performed based on a comprehensive analysis of the situation in the case study of the Jablanica-Pcinja district (JP district). In addition to the theoretical contribution, the proposed model can be applied in practice to rural areas and elsewhere due to its universal structure. The results of the case study will help to define the basic determinants of the future development of the selected rural area by proposing the most effective activities.

2. Literature review

Rural development is a long-term process that is territorially determined, multi-sectoral, and managed by local actors in development (Chapple and Montero, 2016). The rural development policy is a programme of activities that address the needs of the rural community (Haider et al., 2018), and is based on natural resources management that integrates economic, social, and environmental concepts (Straka and Tuzová, 2016). A high level of development in rural areas can be achieved only through the coordinated use of available human, technical, financial, and natural resources. To improve the rural population's living conditions, their interconnection and cooperation with state, regional, and local structures are necessary (Wellbrock and Roep, 2015).

When addressing rural development, one need to consider its sustainability. Sustainable development promotes decentralisation, organizes local people, and motivates and encourages participation. Efforts to preserve and strengthen rural regions aim to achieve a more sustainable society (Haider et al., 2018). Land consolidation can also contribute to long-term rural development in a general context (Pašakarnis and Maliene, 2010). By studying rural modern industrial development in China, it has been concluded that it is desirable to implement four strategies: modify thoughts and concepts, create an excellent infrastructure, establish a secure and perfect management system, and provide a hard and soft base for rural industrial development (Liu, 2011).

SWOT analysis is a very effective tool for creating management plans, and enables the perception of the real state that characterises a certain rural area (Khatoonabadi and Rastghalam, 2012; Iemsomboon and Tangtham, 2014). This technique collects information from an environment classified into internal (Strengths, Weaknesses) and external (Opportunities and Threats) factors. Furthermore, while a SWOT analysis is an excellent strategic planning technique for developing strategy formulation, its fundamental flaw is its inability to quantify the weights and impacts of alternative strategic criteria (Lee, 2013). In order to overcome these shortcomings, integral and hybrid models are created in which the SWOT analysis is combined with various multi-criteria decision-making methods (MCDM). The tools applicability has been greatly extended to increase the quality of its implementation by quantifying SWOT elements, therefore providing many options for decision-makers to make objective decisions under uncertain surroundings (Sevkli et al., 2012; Kheirkhah et al., 2014). In recent decades, the application of SWOT analysis has expanded into many other fields, not only business. Numerous researchers employed SWOT analysis to plan regional and local development of certain areas (Halla, 2007; Knierim and Nowicki, 2010; Khalifipour et al., 2012; Shieh and Mirzadeh, 2014). Many studies have also utilised SWOT analysis to establish management strategies for advancement of rural regions both in developed and developing countries (Alina, 2015).

The main purpose of conducting the SWOT analysis of a region is to evaluate the resources and values that region possesses. The aim is to make the region competitive, reach the leading position within the national and/or international frameworks, and continuously track opportunities and potential risks (Kasztelan, 2014). By applying the SWOT analysis to the example of the village of Sânmartin in Romania, strategies for the economic development of this rural area have been proposed (Alina, 2015). Chinese researchers used the SWOT analysis in the research on the emergence of rural banks. They concluded that "the support policies, current demand, and shortage of financial supply create the conditions for the development of rural banks" (Lu and Yadong, 2012). Abbas and Zhor (2017), using the MCDM method based on the fuzzy concept, concluded that the elements of culture and the application of information and communication technologies in rural communities were the most important preconditions for developing these areas. The cataloguing and promotion of rural architecture through the creation of a database of traditional rural facilities in Andalusia (Spain), with the help of the GIS system and the creation of a website of the Association for Rural Development, proved that this was a good way to promote rural culture and develop the studied region (Cano et al., 2013). A hybrid MCDM-GIS model was used to plan and rank rural service centres (Bastaminia et al., 2016). The application of the hybrid model based on the combination of GIS and the Promethee II method can be observed in the study by Faraji Sabokbar et al. (2011).

Defining the integral model is appropriate when creating different scenarios (based on the interconnections between the SWOT factor and sub-factors) and selecting the best option (Arsić et al., 2018). Numerous studies have shown that the decision-making process can be greatly facilitated by integrating SWOT and AHP methods (Kajanus et al., 2004; Kangas et al., 2016; Arsić et al., 2017). To prioritise activities that support the development of rural areas in Chile based on community preferences, a decision-making model based on the AHP method was applied (Oddershede et al., 2007). However, decision-makers often face complex modelling problems requiring a classical linear hierarchy. For these purposes, the most appropriate is the Analytic Network Process (ANP) method, which replaces the hierarchical structure with a network structure, showing decision-makers the interrelationship among clusters (Hsu et al., 2012; Arsić et al., 2017). Based on the previous studies, it can be concluded that if policymakers use the SWOT and ANP approach, they will obtain a more sophisticated decision-making tool for performing strategic decisions than employing traditional approaches (Bottero and Lami, 2010; Liao-Ji and Liu, 2013; Živković et al., 2015). There are also many studies in which the application of this model was examined at the environmental stage for different subject matters of the study (Partani et al., 2013; Siavashan and Khari, 2013; Kabak et al., 2016). Table 1 presents an overview of the applied MCDM methods in some rural areas.

Despite extensive scientific literature, the appropriate synergy between theory and practice in rural development will yet have to be more developed. One of the

reasons for this resistance is that the practice and currently applied approaches need to be firmly based and consistent with the selected theoretical frameworks. On the other hand, the theoretical perspective needs to consider the real conditions in the environment for the decision-makers' needs. Thus, there is a gap between theoretical and practical approaches.

Table 1

Application of SWOT analysis and MCDM techniques in rural areas

	MCDM techniques			
	AHP	**ANP**	**Fuzzy environment**	**Promethee II**
SWOT	Kajanus et al. (2004); Oddershede et al. (2007); Wickramasingne and Takano, (2009); Kheirkhah et al. (2014); Kangas et al. (2016)	Liao-Ji and Liu (2013); Bottero and Lami, (2010); Živković et al. (2015)	Partani et al. (2013)	
GIS	Javadian et al. (2011); Afshari and Mafi, (2014); Bastaminia et al. (2016)	Pourkhabbaz, et al. (2014); Aminu et al. (2014)	Ma et al. (2006);	Faraji Sabokbar et al. (2011)

Source: Scopus database.

This paper aimed to overcome the problems of rural development by developing a hybrid SWOT-ANP model, choosing the most suitable scenarios for further progress. In other words, to select the optimal solution for achieving the defined vision of a certain rural area. The proposed model was applied in the paper through the following sections: Section 3 describes the analysed area (Jablanica-Pcinja district), and it is followed by the methodological flowchart that consists of four steps. Section 4 discusses the obtained results of the proposed model. Finally, Section 5 presents the main conclusions of the research.

3. Case study

This paper proposes a universal model of the systematic approach to managing rural areas in the JP district (Serbia).

3.1. Analysed area

The field of research in this paper is a rural part of Serbia, namely the JP district which is located in the southern part of the Republic of Serbia. The district borders Macedonia in the south and Bulgaria in the east (Figure 1). It covers the territory of thirteen municipalities and occupies a total area of 6289 km^2. The structure of the terrain contains the hilly-mountainous areas with a moderate continental climate and fertile land that favours the development of agriculture, crop, and livestock. The total

area partly comprises agricultural land (351,611 ha), and forests (234,000 ha). Bearing in mind that the JP district is a rural area located in the most underdeveloped region of Serbia, it is oriented, primarily, towards developing agriculture and agri-industry as the drivers of economic development in this region (Agriculture Institute, 2010). Besides its significant natural resources, there are also valuable cultural and historical monuments (Avramović et al., 2005).

Fig. 1. Jablanica-Pcinja district

Source: developed by the authors.

The JP district has a favourable geostrategic position because one of the most important crossroads of European corridors, i.e. Corridor X (Salzburg-Thessaloniki, Budapest-Belgrade, and Niš-Sofia-Istanbul), is located on the part of its territory. Due to the extremely attractive geostrategic position, this region is also suitable for tourism development (Sharrocks, 2007). The tourist orientation in this district is directed towards the mountains, lakes and spas (Avramović et al., 2005). Generally, the region has the potential and perspective for developing the wood processing industry, chemical and textile industries, agriculture, livestock, and rural tourism (Regional Strategy, 2013).

3.2. Methodology

This research was based on the integration of the SWOT analysis and the ANP method. The network structure model allows the identification and classification of different indicators and the determination of their relative significance (Liao-Ji and Liu, 2013). The next section describes the ANP method and presents the steps for creating the proposed model.

3.2.1. The Analytical Network Process (ANP)

The ANP (analytical network process) method belongs to multi-criteria decision-making methods (MCDM), created by the generalisation of the AHP method (Analytical Hierarchy Process). Unlike the AHP method, which does not provide the possibility of investigating the interdependent relations within a cluster of factors, the ANP method enables the examination of interrelations among elements (Saaty, 2008; Ergu et al., 2011). The interdependence of network elements allows for a more reliable modelling of the problem, since most real-life problems are non-linear. It is a network-based system that replaces one-way relationships with dependencies and feedback. Feedback relations enable a more precise determination of the elements' priorities and more reliable decision-making.

In this paper the ANP method was applied in four steps (Saaty, 1996; 2005): 1) problem structuring; 2) pairwise comparisons between every two nodes or clusters 3) supermatrix formation, and 4) an evaluation of the obtained result. Firstly, the network structure of the problem needed to be formed, and next a set of pairwise comparisons between the network elements had to be provided. Then, in the second step, the interdependence of criteria within the cluster was determined, and their comparison using the nine-point priority scale developed by Saaty (Table 2).

Table 2

Saaty's 1-9 scale for AHP preference (Saaty, 1996)

Intensity of importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favour one over another
5	Strong importance	Experience and judgment strongly favour one over another
7	Very strong importance	Activity is strongly favoured, and its dominance is demonstrated in practice
9	Absolute importance	The importance of one over another affirmed in the highest possible order
2,4,6,8	Intermediate values	Used to represent a compromise between the priorities listed above

Source: developed by the authors.

In the third step, the supermatrix was formed as an outcome of pairing. First, local priority vectors were introduced into the corresponding matrix columns to achieve a global priority in the system with inter dependable influences. Then, a supermatrix was obtained in which each element described the relationship between the two clusters in the system, i.e. in the W_{21} matrix, local priority vectors could be found, which represented the influence of the strategic goals on the vision.

Additionally, the W_{23} matrix illustrated the impact of the strategic goals on the SWOT factors, while the influence of the SWOT factors on the strategic goals was shown in the W_{32} matrix. In the same supermatrix, the W_{43} matrix indicated the influence of the SWOT sub-factors within the defined SWOT factors. Finally, the W_{54} matrix showed the impact of the suggested alternatives on the SWOT sub-factors. Figure 2 depicts the standard form of the supermatrix.

$$W = \begin{array}{c} \\ V \\ S_g \\ SWOT_f \\ SWOT_{sub} \\ A \end{array} \begin{array}{c} \begin{array}{ccccc} V & S_g & SWOT_f & SWOT_{sub} & A \end{array} \\ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ W_{21} & 0 & W_{23} & 0 & 0 \\ 0 & W_{32} & 0 & 0 & 0 \\ 0 & 0 & W_{43} & 0 & 0 \\ 0 & 0 & 0 & W_{54} & 0 \end{bmatrix} \end{array}$$

Fig. 2. The supermatrix of the network

Source: developed by the authors.

The last step involved selecting of the best alternative, based on the synthesis of the criteria and priorities of alternatives (Yüksel and Dağdeviren, 2007).

Since the ANP methodology could also be used in group or expert evaluation (which was the case in this research), by applying the geometric mean (equation 3), it was possible to translate individual evaluations of experts (stakeholders) into the values of the whole group using the following equation:

$$a_{ij} = \left(\prod_{p=1}^{s} a_{ijp} \right)^{1/s} \tag{1}$$

While a_{ij} is the aggregate assessment of the stakeholders for the compared pair of decision-making elements, a_{ijs} is the individual score for the compared pair of decision-making elements by p stakeholders (Arsić et al., 2018).

3.2.2. Integrated SWOT-ANP model

This study aimed to develop a strategic decision model based on the SWOT analysis, which can be applied to evaluate and select appropriate alternative scenarios in rural areas. The proposed procedure of the defined model shown in Figure 3 has four steps and consists of the following elements: vision, strategic goals (SGs), SWOT factors, and alternative scenarios.

The initial step of the proposed model is reflected in defining the vision, i.e. determining the position of the analysed region to be pursued in the future. The realisation of this phase required firstly, a detailed overview of the existing literature and documents of public interest and the collection and analysis of information and

conclusions obtained at the authors' meetings with key stakeholders. Based on this, the following steps were precisely defined, which formed the basic elements of the network structure of the proposed model (Vision, SGs, SWOT criteria and sub--criteria, and alternative scenarios). The suggested research phases in the defined model are depicted in Figure 4.

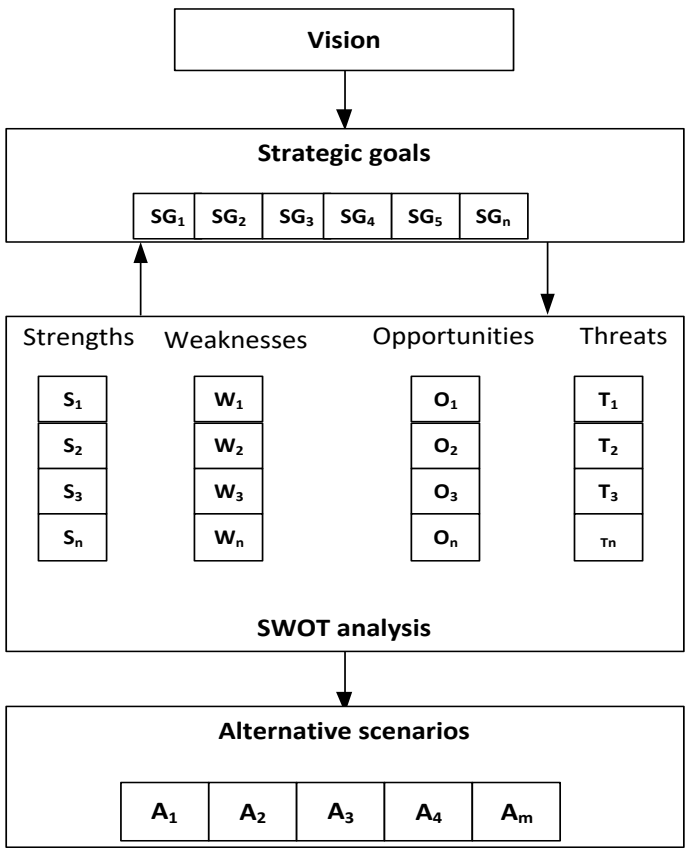

Fig. 3. The network structure of the proposed model

Source: developed by the authors.

The second step was to determine the relation between clusters in the model (Figure 4), and in this way the significance of each defined cluster was determined. The comparison was made between the SGs and Vision, the SWOT and the SGs, and the SGs and SWOT factors. The mutual significance of the SWOT sub-factors within each SWOT factor was also defined.

In the third step, local action group representatives (LAG) compared the suggested alternative scenarios in the model, and their priorities were estimated regarding each specified SWOT sub-factor.

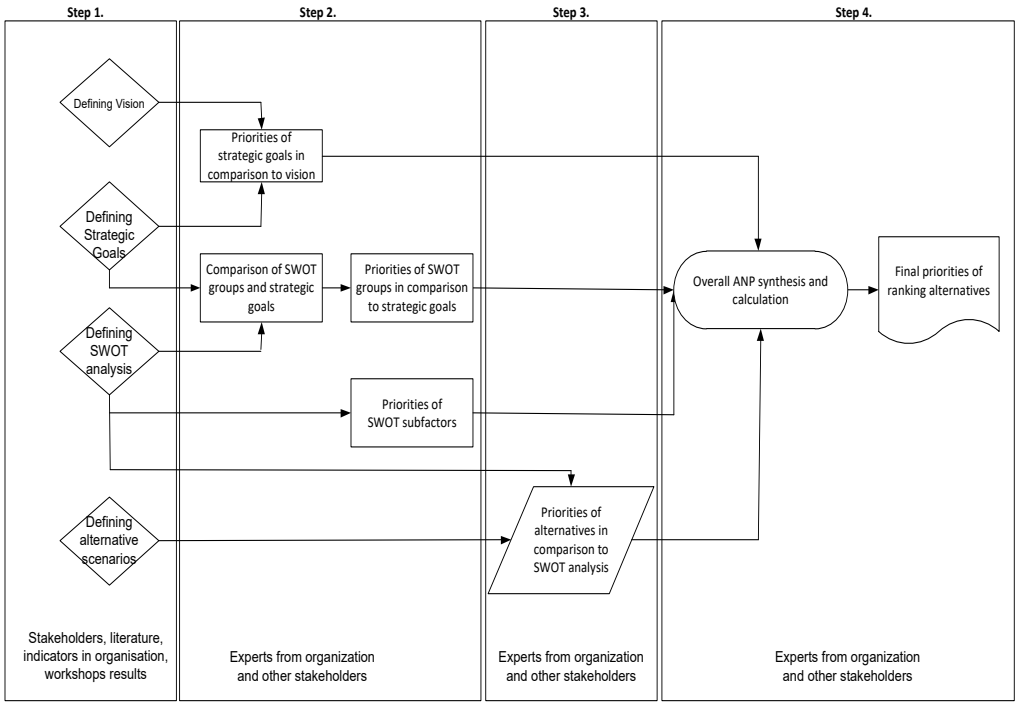

Fig. 4. The steps of the proposed model

Source: developed by the authors.

Finally, the total synthesis of the obtained weights was performed in the fourth step. The final ranking of the proposed alternatives in the model was performed based on determining interdependencies between the clusters. With the obtained results from the second and third steps, the evaluation of the supermatrix was achieved using the Super Decisions software (Super Decisions, 2000). By doing so, LAG representatives (the decision-makers) were presented with an insight into the final decision regarding the future roadmap of action.

4. Results

This research focused on selecting an optimal scenario for the development of the JP district. Applying the classic benchmarking approach to similar rural areas around the world (Caschili et al., 2015) could contribute to the realisation of the defined vision of this region. Hence, making a comprehensive strategic development plan was very significant. The proposed model results presented in the rural JP district case study are shown in the following four steps.

4.1. Step 1

The starting point of the research was a comprehensive analysis focused on the region's social, economic, political, ecological, and technological characteristics. The local action group representatives were invited to attend the workshops, where they first conducted a detailed overview of the existing literature and official documents and strategies of public interest in this region. After that, they expressed their opinion on the current situation in the area and came to common conclusions. Then, through a series of brainstorming sessions, the analysis of strategic and programme documents for the development of the region included representatives of 13 local governments, the chamber for development, development agency, public and educational institutions, institutes, tourist agencies, non-profit organizations, and organizations for environmental protection. This rural area's vision, strategic goals, SWOT factors, and alternative scenarios were defined as a result of those workshops. The results of the conducted SWOT analysis are presented in Table 3. Additionally, the participants also came to the adoption of the following strategic goals that could contribute to achieving the defined vision of the analysed area: 1) increase in employment and population standards; 2) development of small and medium enterprises; 3) cross-border cooperation; 4) sustainable utilisation of natural resources; 5) strengthening tourism potential; 6) preservation of biodiversity and cultural heritage. Thus, four possible alternatives were identified: A1 – status quo; A2 – development of the industrial sector; A3 – utilisation of natural resources; A4 – sustainable development.

Status quo – the decision-making process is usually problematic due to uncertainties and risks in doing business. Hence, decision-makers, in the desire to avoid choosing between alternative directions of action, fearing that the choice may not be the right one, decide not to take any action. They do not recognise that they have just made another choice, instead they choose not to make any changes (Bernard, 1956). Such a choice favours the status quo (Dean et al., 2017) since it does not support differences and synergies between the participants in the environment. In this way, the risk and uncertainty in business are not eliminated but ignored. Moreover, everyone continues their own business without a joint initiative to benefit the entire region.

Development of the industrial sector – the organized activity of producing new goods and values with the help of technical and technological achievements, or industry, can be improved in several ways. Creating conditions for the supply of an adequate labour force, providing financial opportunities for the development of logistics, and promoting entrepreneurship through the international development of small and medium enterprises are some of them (Dželetović et al., 2017). When making strategic decisions for the creation of industrial policy, it is necessary to carry out an analysis of all resources, which include: industrial practice, the educational infrastructure of workers, structure and availability of the labour force, determination of priority industrial sectors in local authorities, etc.

Utilisation of natural resources – the use of natural resources as a potential for the region's development can be achieved through the controlled use of thermal waters, forest resources, fertile soil, natural beauty, rare healing plants, and the hydroelectric potential of rivers. These natural resources, which distinguish this district, are abundant. To ensure their sustainability, it is necessary to balance the rate of consumption with the capacity of the resources needed for regeneration. Nowadays thermal water is increasingly being used for various purposes, ensuring a higher degree of economic valorisation (Moiwo et al., 2010). The district is also highly suitable for the development of the timber industry and wood processing due to the great wealth of the forests (Ilić et al., 2004). In addition, the timber industry has been one of the most attractive sectors in Serbia for the last ten years (Serbian Chamber of Commerce, 2016). Furthermore, opening small hydropower plants as renewable energy sources encourages the better exploitation of the local hydro potential. The development of agricultural production and livestock farming in this region with a range corresponding to the climatic and meteorological conditions leads to stable income for individual farms if the conditions of placement of products are ensured, which creates the possibility for further personal investment in the development of the infrastructure.

Sustainable development – within the long-term improvement of the population's living standards, special attention is paid to the use and protection of all existing natural resources. One should consider its sustainability when developing rural areas. Sustainable development promotes decentralisation, organizes local people, and motivates and encourages their participation at all levels (Haider et al., 2018). The focus of this scenario is the utilisation of agricultural potential and the service sector based on the district's natural resources. A possible direction of future action could rely on the development of rural tourism, which is an important component of the integral and sustainable development of rural areas and an important factor in encouraging the development of local agricultural activities (Đenadić et al., 2016). Many underdeveloped rural areas have seen developmental opportunities in rural tourism (Barkauskas et al., 2015; Gao and Wu, 2017). Rural tourism is closely linked to the natural environment and environmental values, representing essential resources for attracting attention of visitors and developing the whole region through such a service segment. New values created in the rural area provide conditions for sustainable development.

4.2. Step 2

In the second step of the defined model, the participatory formation of elements of the supermatrix was carried out. Based on the first phase's elements output, the SWOT matrix was defined and used in the second step of the model. Within the Strengths factor, six sub-factors were identified, while a total of five determinants were defined within the SWOT group of Weaknesses. Among the external factor

Table 3

Priorities of SWOT factors and SWOT sub-factors

SWOT factors	SWOT sub-factors	Local priorities	Critical values of stability intervals
1	2	3	4
Strengths	S_1 – good geographical location (highway, railway, and vicinity to the airport)	0.250	0.508[a] 0.523[b]
	S_2 – favourable climatic conditions for agricultural production and fertile land	0.101	0.634[a] 0.572[b]
	S_3 – long-standing tradition in the production of fruits, vegetables and livestock	0.064	0.611[b] 0.543[a]
	S_4 – geographical diversity of the region and preserved nature	0.160	0.351[b] 0.522[a]
	S_5 – preserved ethno-ambience and recognition of traditional local products	0.043	0.518[a] 0.653[b]
	S_6 – significant potential natural resources (forests and thermal waters)	**0.382**	0.226[b] 0.469[a]
Weaknesses	W_1 – underdeveloped physical and economic infrastructure and restricted access to public services	0.419	0.096[b] 0.438[a]
	W_2 – ageing of villages and depopulation of rural areas due to poverty	0.097	0.566[a]
	W_3 – lack of purchase centres for placement of agricultural products	0.062	/
	W_4 – lack of awareness among the population on the importance of environmental protection	0.160	0.514[a] 0.613[b]
	W_5 – uneducated population for the application of new technology in agriculture and rural tourism	0.263	/
Opportunities	O_1 – development of rural infrastructure with support from the budget and EU funds	0.151	0.508[a] 0.547[b]
	O_2 – lower labour costs compared to the EU	0.058	0.509[a] 0.820[b]
	O_3 – creation of a regional distribution network for the purchase of agricultural products	0.091	0.622[b] 0.693[a]
	O_4 – raising the level of knowledge of the rural population for new rural development opportunities	0.151	0.570[b]
	O_5 – greater utilisation of available resources (organic production, tourist sites)	**0.256**	0.318[b] 0.472[a]
	O_6 – development of small and medium enterprises	0.256	0.332[b] 0.508[a]
	O_7 – increased demand for products with a special quality label – protected area	0.039	0.650[a]

Table 3, cont.

1	2	3	4
Threats	T_1 – strong regional competition	0.243	0.270[a] 0.648[b]
	T_2 – political instability with possible conflicts in some parts of South Serbia	**0.377**	0.209[a]
	T_3 – short-term planning of measures to support the development of rural areas	0.088	/
	T_4 – stricter regulations in the field of environmental protection	0.150	0.590[a]
	T_5 – oscillations in prices of agricultural products in the market	0.054	0.112[a] 0.652[b]
	T_6 – lack of investments in agriculture and processing of agricultural products	0.088	0.616[b]

Note: a – change at first ranking position, b – change at second-ranking position

Source: developed by the authors.

Opportunities, seven sub-factors were identified, whereas six sub-factors were identified within the SWOT factor Threats, resulting in a common SWOT matrix presented in Table 3, and the local weights within each SWOT factor (the W_{43} matrix within the supermatrix).

The weight coefficients of the comparison of the SGs concerning the vision (matrix W_{21} in the supermatrix) and the comparison of the SGs concerning SWOT factors (matrix W_{23} in the supermatrix) are presented in Table 4.

Table 4

Priorities of strategic goals concerning vision and SWOT groups

	Vision	**Strengths**	**Weaknesses**	**Opportunities**	**Threats**
SG_1	0.064	0.041	0.167	0.043	0.043
SG_2	0.250	0.070	0.167	0.250	0.064
SG_3	0.101	0.100	0.167	0.064	0.160
SG_4	0.382	0.380	0.167	0.382	0.101
SG_5	0.043	0.159	0.167	0.101	0.250
SG_6	0.160	0.249	0.167	0.160	0.382
CR	0.020	0.029	0.000	0.020	0.020

Source: developed by the authors.

Next, the influence of the SWOT factors on the strategic goals (matrix $W32$ in the supermatrix) was determined. The results are presented in Table 5.

Table 5

Priorities of SWOT groups concerning strategic goals

	SG_1	SG_2	SG_3	SG_4	SG_5	SG_6
Strengths	0.230	0.320	0.507	0.487	0.280	0.455
Weaknesses	0.154	0.139	0.143	0.139	0.079	0.086
Opportunities	0.541	0.455	0.264	0.303	0.501	0.320
Threats	0.076	0.086	0.086	0.071	0.140	0.139
CR	0.042	0.030	0.008	0.043	0.010	0.030

Source: developed by the authors.

The analysis of all the pairs of comparisons fulfilled the internal coexistence (CR<0.10), and the obtained results indicated that the SWOT factor Opportunities had the most dominant influence on the realisation of SG_1, SG_2, SG_5, and the SWOT factor Strengths had the most significant impact on the realisation of SG_3, SG_4, SG_6.

4.3. Step 3

This step explored the interdependence within the SWOT factor for the proposed alternative scenarios (matrix W_{54} within the supermatrix). Due to the volume of the obtained results, the results for each cluster needed to be presented in detail. The Super Decisions software (Super Decisions, 2000) pointed the interdependencies between the mentioned clusters. The collected data represented the input parameters for the next phase. Together with the priority vectors from Tables 3 to 5, the derived priority vectors were collected in a weighted supermatrix (Appendix A1 of Supplementary Material).

4.4. Step 4

The overall synthesis of the obtained results from the previous phase using the ANP method was determined within the last step. As a result, the final ranking of the alternative scenarios is presented in Table 6.

Table 6

Final priorities of alternatives for the Jablanica-Pcinja district

Alternatives	Final priorities	Rank
A_1 – status quo	0.208	4
A_2 – development of the industrial sector	0.265	2
A_3 – utilisation of natural resources	0.268	1
A_4 – sustainable development	0.260	3

Source: developed by the authors.

5. Discussion

Analysis of the local weights presented in Table 3 indicated that the most important sub-factors within the SWOT factor *Strengths* were: the significant potential of natural resources (0.382) and good geographical position with infrastructure (0.250). The smallest influence came from the sub-factor – preserved ethno-ambience and recognition of local products (0.043). The SWOT factor *Weaknesses* had the dominant influence on underdeveloped physical and economic infrastructure, limited access to public services (0.419), and an uneducated population applying new technology in agriculture and rural tourism (0.263). The best *Opportunities* factors, which should be used from the environment due to the biggest extraction of local weights (0.256), were the greater utilisation of the available resources (organic production, thermal waters, tourist sites) and the development of small and medium enterprises (0.256), whilst the most dominant influence of negative *Threats* from the environment, which needed to be eliminated, was political instability (0.377).

The influence of SG_4 on sustainable natural resources exploitation (0.382) and SG_2 represented the development of small and medium enterprises (0.250), whose results are presented in Table 4, had the greatest influence on achieving the defined vision of the JP district. SG_3 and SG_6 followed with a similar strength of their influence on the defined vision of the district (0.101 and 0.160, respectively). Table 4 also shows the results of the influence between the SG and the SWOT factors. The results indicated that the SWOT factor *Strengths* had the strongest influence on the realisation of SG_4 (0.380) and SG_6 (0.249), while *Weaknesses* had an equal impact on all the SGs (0.167). The analysis of the influence of external *Opportunities* showed that they made the greatest impact on the realisation of SG_4 (0.382) and SG_2 (0.250), and the *Threats* coming from the environment had the most negative effect on SG_6, i.e. the preservation of biodiversity and cultural heritage (0.382). Examining the influence of the SWOT factors on the SG (Table 5), it was found that the increase in employment and standard of the population (SG1) contributed the most to the use of external *Opportunities* from the environment (0.541).

In contrast, the most negative influence on the environment originated from *Threats* that needed to be eliminated. In order to intensify the development of small and medium enterprises (SG_2), it was necessary to use *Opportunities* (0.455) and the key forces (0.320) from the district. In order to intensify cross-border cooperation (SG_3) and achieve sustainable use of natural resources in the district, the key forces should be used more intensively. In order to strengthen the tourism potential (SG_5) and promote a district-level range of tourist attractions, *Opportunities* should be adequately utilised. Preservation of biodiversity and cultural heritage (SG_6) was one more objective of the region's development policy that the stakeholders from the region tended to achieve by relying mainly on the key forces. *Threats* were only some of the important factors in achieving any strategic aim.

By applying the proposed model based on the upgrade of the SWOT analysis by the ANP method, four scenarios representing possible strategic acting directions were proposed. By comprehensively synthesising all the obtained results based on the final ranking for the management of the JP district, the following three scenarios were recommended to be applied in future: A_3 – utilisation of natural resources, A_2 – development of the industrial sector, and A_4 – sustainable development. As the generated alternatives using the proposed model offered the following weights: A_3 (0.268), A_2 (0.265), A_4 (0.260), and A_1 (0.208), the obtained results did not indicate a clear differentiation between the possible alternatives. These facts highlight the differences between the stakeholders' interests and their knowledge about the region. The share of only 0.208 in the alternative A_1 (status quo) indicated that a certain number of existing stakeholders did not need the changes and that the conditions of the transition economy suited them.

The obtained hierarchy of the defined alternatives in the tested model demonstrated that scenario A_3 (0.268), based on the rational use of the natural resources available to the examined region, was a priority. It indicated that the first step should be creating the projects to identify and use the available natural resources such as agricultural and forest land, thermo-mineral waters, flora and fauna, cultural-historical values, etc. The development of the necessary infrastructure (roads, electricity net-works, water supply, communal systems, communication networks, protection systems, etc.) should precede the realisation of this scenario to make these resources accessible to interested stakeholders (Liu, 2011). In addition, it should be necessary to continue implementing the second scenario, A_2, which referred to the development of the industrial sector, primarily in smaller urban areas, town centres, and larger villages. The development of the industrial sector for the processing of primary products derived from the use of natural resources in this region (processing of medicinal herbs, forest fruits, vegetable products, purchase as well as milk and meat, both processing and selling) implied the creation of small and medium enterprises as future barriers of the development of the rural region (Laing and Lewis, 2017; Sisto et al., 2018). To realise the A_3 and A_2 scenarios, strategic planning should be used as a comprehensive tool for regional development and territorial structuring (Pazouki et al., 2017). Strategic planning was seen as the basis for implementing the A_4 scenario related to the region's sustainable development. Based on the created value through scenarios A_2 and A_3, continuous growth and development in the region would be ensured. In this way, the functional management of this rural region would be realised, more efficient allocation of investments made, and tourism potential could be improved (Sisto et al., 2018).

The synergy of the agricultural potential and the development of the industrial sector would improve the intensive development of small and medium enterprises and the revival of the economic infrastructure in the rural part of the region. Since the high protection level has been significant for the sustainability of natural resources, the intensive development of the SME sector would influence short-term economic

development. Yet, the protection of environment should be prioritised because it is crucial for ensuring the resources for the needs of future generations. Therefore, it is necessary to implement the proposed scenarios successively: $A_3 \rightarrow A_2 \rightarrow A_4$.

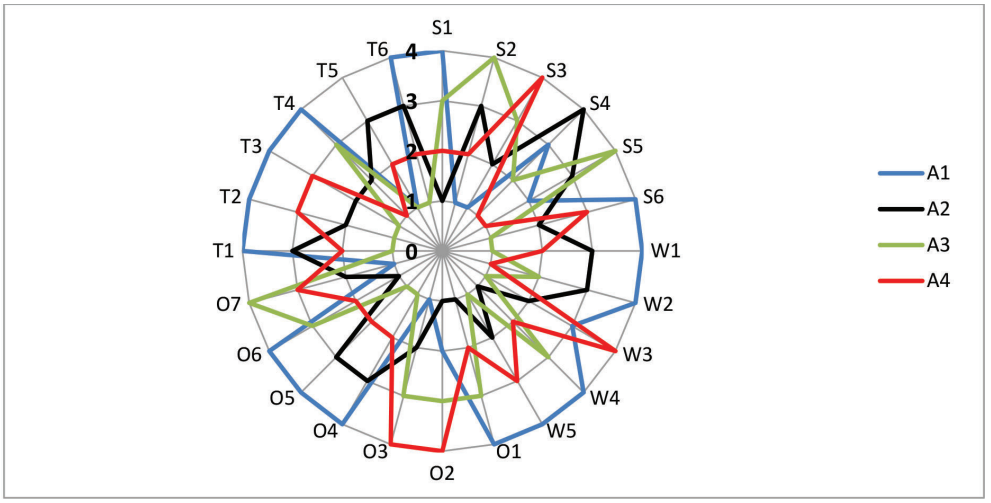

Fig. 5. Sensitivity analysis of alternative ranking orders considering the changes in the importance of SWOT sub-factor weights

Source: developed by the authors.

Furthermore, a sensitivity analysis was carried out to test the final ranking results of the considered scenarios compared to the SWOT sub-factor weight changes (Pamučar et al., 2017). The critical weight values for each SWOT sub-factor that caused the change in the position of the examined scenarios are given in the last column in Table 3. The biggest changes were noticed between the A_3 and A_2 alternative scenarios (changes were performed 14 times) and A_2 and A_4. After changing the weight coefficients of the SWOT sub-factors, alternative A_2 was found to be in first place five times, and alternative A_4 four times. In comparison, alternative A_3 remained dominant and appeared eleven times in first position (Figure 5). Finally, it can be concluded that after the sensitivity analysis, the final ranking of the scenarios was very sensitive to the changes, which was also indicated by the low tolerance of the coefficients during the weights change. Such results of the sensitivity analysis were expected due to very small differences in the received weights between the ranked alternative scenarios.

Conclusion

The management of rural areas requires a complex multidisciplinary approach and the inclusion of various stakeholders. Hence this research aimed to illustrate the application of an integrated SWOT-ANP model for selecting the optimal scenario for

developing rural areas. The solution was obtained using group decision-making based on the opinion of local action group representatives. Thus, the realisation of the generated scenarios (the first three by rank) based on sustainable development was expected to meet the district's development goals and improve the local population's living standards.

The order of applying the generated alternatives should exploit the potential of the local community by promoting the decentralisation of urban areas. The economic segment of rural policy was seen as a decisive prerequisite for rural areas' continuous and sustainable development. This strategic approach, which included all relevant stakeholders from the region, should contribute to the promotion of entrepreneurship in rural areas and create conditions for new job opportunities.

The contribution of this study is reflected in the fact that the proposed model enables the prioritising of the defined alternatives and offers the possibility of achieving the analysed district's vision and strategic goals. Additionally, the created solution proposal will allow decision-makers in this rural area to undertake future activities and further expand the existing management strategy in the JP district to achieve sustainable development in this region. The additional contribution of the proposed multi-criteria decision-making model is reflected through its flexibility and possibility for application in other rural areas. This means that its hierarchical structure and rules enable the performance of minor adjustments for the implementation needed in different research areas.

It is important to note that this study has some limitations. First, the majority of real-world decision-making problems are complex and poorly structured. Each decision-making is based on the decision-maker's expertise, preferences and some bias. Consequently, the research results reflect only the opinions of the local action group representatives who showed their interest and willingness to support this research. Moreover, the generalisation of these research findings is limited because it was generated in a small rural area in Serbia. However, the universal character of the defined hybrid SWOT-ANP methodology implemented in this research enables its implementation in other regions or sectors. In further research, the authors can use methods in a fuzzy environment to ensure greater reliability of the results.

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APPENDIX

			Strategic Goals						SWOT groups				SWOT subfactors																						Alternatives			
		Vision	SG1	SG2	SG3	SG4	SG5	SG6	S	W	O	T	S1	S2	S3	S4	S5	S6	W1	W2	W3	W4	W5	O1	O2	O3	O4	O5	O6	O7	T1	T2	T3	T4	T5	T6	A1	A2	A3	A4
Vision		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Strategic Goals	SG1	0,06	0	0	0	0	0	0	0,04	0,17	0,04	0,04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SG2	0,25	0	0	0	0	0	0	0,07	0,17	0,25	0,06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SG3	0,10	0	0	0	0	0	0	0,10	0,17	0,06	0,16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SG4	0,38	0	0	0	0	0	0	0,38	0,17	0,38	0,10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SG5	0,04	0	0	0	0	0	0	0,16	0,17	0,10	0,25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SG6	0,16	0	0	0	0	0	0	0,25	0,17	0,16	0,38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWOT groups	S	0	0,23	0,32	0,51	0,49	0,28	0,46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	W	0	0,15	0,14	0,14	0,14	0,08	0,09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O	0	0,54	0,46	0,26	0,30	0,50	0,32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T	0	0,08	0,09	0,09	0,07	0,14	0,14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWOT subfactors	S1	0	0	0	0	0	0	0	0,25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S2	0	0	0	0	0	0	0	0,1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S3	0	0	0	0	0	0	0	0,06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S4	0	0	0	0	0	0	0	0,16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S5	0	0	0	0	0	0	0	0,04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	S6	0	0	0	0	0	0	0	0,38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	W1	0	0	0	0	0	0	0	0	0,42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	W2	0	0	0	0	0	0	0	0	0,10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	W3	0	0	0	0	0	0	0	0	0,06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	W4	0	0	0	0	0	0	0	0	0,16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	W5	0	0	0	0	0	0	0	0	0,26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O1	0	0	0	0	0	0	0	0	0	0,15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O2	0	0	0	0	0	0	0	0	0	0,06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O3	0	0	0	0	0	0	0	0	0	0,09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O4	0	0	0	0	0	0	0	0	0	0,15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O5	0	0	0	0	0	0	0	0	0	0,26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O6	0	0	0	0	0	0	0	0	0	0,26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	O7	0	0	0	0	0	0	0	0	0	0,04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T1	0	0	0	0	0	0	0	0	0	0	0,24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T2	0	0	0	0	0	0	0	0	0	0	0,38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T3	0	0	0	0	0	0	0	0	0	0	0,09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T4	0	0	0	0	0	0	0	0	0	0	0,15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T5	0	0	0	0	0	0	0	0	0	0	0,05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	T6	0	0	0	0	0	0	0	0	0	0	0,09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternatives	A1	0	0	0	0	0	0	0	0	0	0	0	0,12	0,46	0,51	0,25	0,37	0,12	0,23	0,14	0,09	0,28	0,14	0,14	0,28	0,28	0,25	0,12	0,14	0,46	0,14	0,33	0,20	0,16	0,09	0,08	0	0	0	0
	A2	0	0	0	0	0	0	0	0	0	0	0	0,37	0,18	0,19	0,09	0,14	0,23	0,09	0,14	0,26	0,47	0,26	0,46	0,47	0,47	0,25	0,23	0,46	0,27	0,14	0,17	0,20	0,28	0,16	0,12	0	0	0	0
	A3	0	0	0	0	0	0	0	0	0	0	0	0,11	0,09	0,16	0,19	0,07	0,42	0,46	0,26	0,51	0,09	0,46	0,14	0,16	0,16	0,25	0,42	0,14	0,09	0,46	0,33	0,40	0,09	0,47	0,53	0	0	0	0
	A4	0	0	0	0	0	0	0	0	0	0	0	0,40	0,27	0,14	0,47	0,42	0,23	0,22	0,46	0,14	0,16	0,14	0,26	0,09	0,09	0,25	0,23	0,26	0,18	0,26	0,17	0,20	0,47	0,28	0,27	0	0	0	0

Source: developed by the authors.