



# Research of local immunity components as part of complex diagnostics of peripheral territories

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**Abstract** The article provides the solution to the heuristic problem of formation and practical approval of methodology for local immunity components' research within a complex diagnostics of peripheral territories of agro-industrial regions located in southern Russia. This sphere of scientific-methodological research is relevant due to the need for finding internal reserves for territorial development by applying opportunities associated with image, reputation, trust, and safety. The article presents the elements of methodological approach allowing to estimate local immunity within a complex of system diagnostics of peripheral territories' viability determining scientific novelty and authors' contribution to the methodology of spatial analysis. In shaping the research methodology, we relied on the content analysis techniques enabling to draw several conclusions regarding the impact of peripheral localization of territory on its overall socio-economic perception by the population acting as key economic agents. Furthermore, content analysis strengthens the heuristic capacity of socio-metric empirical methods in diagnosing attribute

indicators and parameters of territorial development. For these parameters, we highlighted the following: population motivations for migration, capacity for social sustainability of territories, population passivity and activity in the global network space, and nature of relations between the local population and the place of residence. The results of diagnosing empirically characterize "local immunity of peripheral territory" institution reflecting its capacity for future survival.

**Keywords** Agro-industrial region · Economic space · Periphery · Spatial analysis

## Introduction

Negative socio-economic and spatial-economic processes in the development of rural areas in agro-industrial regions of southern Russia (Stavropol territory, Rostov territory, Krasnodar territory) force to approach systemic aspects of internal viability assessment of peripheral individual settlements from a new angle. During an economic recession, many peripheral territories have to find internal capacities to ensure their own survival. In this regard, a preventive internal diagnostics of the potential viability of the territory becomes topical. We call this process "territorial immunogram".

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The complex immunity of the periphery can be diagnosed by a special type of monitoring only. It includes two components: diagnostics of the general immune status and diagnostics of local territorial immunity. And if the general immunity gives summarized picture of territorial viability at macro- and meso-level of economics organization, local immunity reveals point survival factors of certain territorial units. Local immunity includes information on private, specific, individual processes, occurrences and regularities taking place in settlements of the periphery. Information about the territorial-immune status of periphery localities is collected, processed and economically interpreted with the system-diagnostic technique using a combination of selected markers of local immunity. The diagnostic and research value of this area of spatial and economic analysis lies in the possibility of getting a private evaluation and verbal characteristics reflecting the specificity and diversity of processes occurring in peripheral settlements of southern Russia's regions.

The main practice-oriented goal of the research is the development of analysis methodology and its application-based diagnostics of the local immune status of certain peripheral areas (districts) of a typical agro-industrial region of southern Russia.

## Methodology

General methodological approaches to the research of the immune status of peripheral territories' viability

To shape the conceptual and methodical basis of the research, the authors used the results of scientific works (Ersoy and Taylor 2012; Davis and Weinstein 1999; Head and Mayer 2004; Garretsen and Ron 2010; Fujita et al. 1999; Edwards 2007; Gerschenkron 1962; Richardson 1980; Berkowitz 1997). Meanwhile, we proceeded from the need to broaden the spatial analysis methodology and shape an appropriate frame taking into account the evolutionary and transitive nature of economic development.

The research of peripheral territories from the standpoint of addressing the question "What prevents the periphery from disappearing from the economic landscape?" made it necessary for us to conceptually appeal for the sources of internal territorial viability.

In Russian scientific literature, the discussion revolves around such prime postulates of regional geography as the core-periphery and the facade (Treyvish 2016), endogenous resource components (Tatarkin 1997) and the formed territorial environment (Tereshchenko 1991), specific spatial institutions in the sphere of economic genetics (Inshakov and Frolov 2007). Analysis of these papers indicated that an organic approach can be applied to peripheral areas as, for example, the design of territorial self-management systems (Stuchka 1923).

The phenomenon of territorial immunity is preceded by the concept of resilience (Chernyavsky 2008). Initially, the resilience was considered as an endogenous firms' characteristics (Koutu 2006; Sheffi 2006), and then the conceptual basis of territories' resilience was substantiated by transposing the provisions of the general resilience concept (Lidovskaya 2015). The resilience of territories is the synthesis of such territorial properties as competitiveness (Tatarkin 2012), self-realization (Vazhenin et al. 2009), and competitive territorial immunity (Vazhenina and Vazhenin 2009). As noted by the academician of the RAS (Russian Academy of Sciences) Tatarkin (2008), "not only firms compete, but also territories". At that, "competitive territorial immunity" represents the "organic" ability of the territory to fight for resources with rival territories in the future" (Michon 2014).

The viability of peripheral territories—and in particular, its economic aspect—derives from the issue under consideration regarding "historical non-competitiveness of the economy of Russia and its regions in the globalizing market space" due to the natural climatic, transport-geographical and other conditions requiring increased costs both for production and life support of territories' population (Hill and Gaddy 2007). Our country's inclusion in the world market space "causes instant death of our economy by historical standards" (Parshev 1999). This point of view is shared to varying degrees by other authors. It is noted that the periphery as a product of the society's evolutionary development was formed not accidentally, but due to the set of factors, which is characterized as disadvantageous in the given particular spatial point, therefore, slowing down the progress in the development of various social spheres (Kuznetsov 2005).

Given the territorial scale, peripheries in Russia are extremely dispersed unlike, for example, the ones of the United States of America (Khanin 2001). That bars

them from exploiting advantages of geographic concentration for survival (Ellison and Glaser 1997). Like in the USA, the Russian periphery, meanwhile, is a part of the mental space, the concentration of genuine national as well as cultural and historical features playing an essential public role in the national consciousness and self-identification (Kotkin 2002). In some countries, a territorial cohesion facilitates the resilience of territories (Alexiadis 2017), as well as a convergence being enforced by regional management bodies (Gilly and Lueng 2005).

The peculiarity of the periphery economy in Russia mainly represented by rural areas is far from the capitalist model (Prebish 1992). In terms of sustainable development, the Russian State policy shifts to the territories a responsibility for ensuring it, unlike, for example, the EU countries (Palmisano et al. 2016). Without a reliance on internal resources and the periphery resilience, without the State support, the economic space will turn into a single urbanized landscape (Geyer and Kontuly 1993). That's exactly why it is essential to study the local immunity under such conditions necessitating preservation of identity and equitable core-peripheral development, as well as urban growth limitation and the need to maintain socio-political control over peripheral territories. The local immunity should be studied as a unique a combination of "congenital" and "acquired" factors, conditions of real nature, as well as active and passive "results", "products" and "medium" for territorial functioning of artificial nature for implementing its own and its agents' subsequent life activity preventing its complete disappearance (Glinskiy et al. 2016). It will enhance understanding regarding the complex nature of the territory in terms of ensuring its survival (Simone et al. 2018) and improve functionalities of its management system, which requires constant improvement (Boisier 1992).

#### Methodological approaches for local immunity diagnostics of peripheral territories

Specifically during the methodology development for local immunity diagnostics, our approach was based upon consideration and detailed examination of the indicated aspects of territorial functioning following non-interrogative research principles (Neuman 1991, 1998): anisotropy and isotropy of socio-economic phenomena; presence of vernacular hotspots of the local continuum

activity; location of influence areas and space atrophy producing zones; frame stability of peripheral territories; socio-behavioral archetype of population; spatial interaction of objects of the periphery (Morén-Alegret et al. 2018; Benedetto et al. 2017; López-Iglesias et al. 2018; McDonald et al. 2018). At the next stage, we needed to base local immunity markers. From the initial list consisting 36 indicators, we selected 12 most relevant ones, in our opinion, that include: (1) settlement location (dead-end or transit); (2) distance from the centre (kilometres); (3) availability of railway station in the analyzed settlement; (4) length of paved roads (kilometres); (5) settlement population (number of people); (6) natural population growth (number of people); (7) migration growth in settlement (number of people); (8) number of enterprises (excluding budgetary institutions); (9) availability of systemically important commercial enterprises; (10) fixed investments (thousand rubles); (11) social infrastructure (availability of basic facilities (units)); (12) residential construction (square meters).

In the visual assessment of the socio-economic landscape of peripheral settlements implemented during the expeditionary observations in 2017–2018, all data received in the context of these markers was tabulated and assessed according to the actual level. As additional information, we use the data from the Internet as of the date of the research. This information array is divided into 3 blocks: the situation on the labour market, the fullness of the real estate market, and the Internet activity of the population.

In 2017–2018 we conducted the practical testing of the proposed methodological approach to local immunity diagnostics of territories. We tested two municipalities of the Stavropol territory on their factual basis revealing the worst and the best results analyzing the level of socio-economic development of peripheral territories (Kazakov 2018). To justify this choice (the best and the worst areas) it should be noted that we were interested in observing the differences and comparing the results of the local immunity monitoring of the territories that are diametrically opposite according to the level of socio-economic development to identify localities with the best and the worst immune status.

An application of content analysis as an additional tool for the immune status diagnostics of peripheral territory

An important stage of local immunity monitoring is an analysis of image and reputation characteristics of territories in the global and national information area. We selected a content analysis method as a research tool that allows to convert the information about the territory into standardized form and to enhance the picture of the research from the perspective of the external attractiveness evaluation of municipal entities for people's lives.

A vital aspect of the content analysis is the selection of information sources and the determination of the research period. We selected an electronic resource *Yandex.ru* (the Russian-speaking Internet segment) as the aggregating database, which allows making sampling in the context of certain dates and phrases.

The next step is to define the target request (words, phrases) being the core object of the research, the frequency of its mentioning in the sources aggregated in the database as well as the reference tone (negative, positive, neutral). As the period of the content analysis applied research, we selected the year 2017 with a fully formed Internet query statistics.

As a part of the economic space, peripheral territories are also subject to global trends like "netization" and "creativization" of the economy. In the light of these trends and the described concepts, the periphery becomes an incorporated element of a virtual market and social-labour netized space with "blurred" boundaries (Castells 1996). In modern conditions, its development is determined by the penetration degree of network information technologies (Schuler 1992). In this regard, urban areas are certainly more developed in the information and communication context (Capello 1994). The key to the survival of the periphery lies in its integration into the network space (Shibusava 2000). How to understand the integration degree of peripheries into the global network information and communication space? According to our hypothesis, for this purpose, we need to analyze the territory in terms of four reliable aspects: decontextualization, recontextualization, categorization and compilation, which is fully achievable through content analysis (Bengtsson 2016). Content analysis allows to analyze the economic activity of agents of the periphery, its

population and figure out how viable the periphery is (Worek et al. 2018).

## Results

Diagnostics of local immunity markers in the peripheral territory with backward status in socio-economic dimension

Among the peripheral territories of the Stavropol region, the lowest rates of socio-economic development are recorded for Apanasenkovsky district. Visual evaluation of its socio-economic landscape during expedition observations demonstrated the following results.

The spatial dispersion of settlements is uneven from the centre, the localization of peripheral settlements is predominantly of an enclave nature contributing to marginalization and a decelerated socio-economic development. The low population density is recorded in most settlements (up to 2000 people) being a destabilizing factor for the entire area because of the low capacity for natural reproduction and a high risk of demographic "desertification" for the territories of dead-end ultra-small settlements. The region is among the driest that explains the narrow economic specialization of enterprises. As the leading branches of economic activity, it is possible to define agricultural production and local trade hotspots within the borders of separate settlements and fragments of trade networks.

We include territories with the minimum population and a negative value of its reproduction in a separate group: Aigursky village council, Belye Kopani, Malaya Jalga, and Kievka villages. Monitoring of socio-economic processes occurring in these territories revealed the following:

- since 2015, there is a significant number of offers in the real estate market, whereas the placement of ads is of prolonged character (more than 2 years) due to the high initial value of the real estate and lack of demand on specific objects;
- on the date of the study there are no vacancies in these settlements in the official vacancy database of the district employment centre, with periodic update of information the current vacancies appear in Belye Kopani village within 12 months;

moreover, presence of vacancies in education indicates the outflow of a qualified personnel and an absence of a replacement labour reserve;

- issues of infrastructure prevail among topical problems of rural settlements: territorial improvement and beautification, repair of roads, street lighting maintenance; the population's involvement in solving local issues is mostly passive, they are absent from meetings of residents, do not participate in surveys;
- according to official reports from heads of municipalities, the majority of the regional population has private subsidiary farms allowing a self-sufficient provision of basic foodstuffs;
- Monitoring of publications in local Internet communities demonstrates the low involvement of municipalities' population into the information content usage, whereas the suppressing amount of information is represented by private advertisements of commercial nature: this points to the fact that the population is in the constant search of additional income sources to deal with daily issues.

The territories of the following settlements have a more positive level of local immunity markers and, consequently, a level of viability. These settlements are Voznesenovskoe, Vozdvizhenskoe, Apanasenkovskoe, Manychskoe, Raguli villages. This is attributable to more favourable natural and climatic conditions for the formation of diversified agricultural production. We point out the following additional characteristics of territories:

- a more well-appointed territory of municipalities due to activity and initiative of village-forming enterprises and population at beautification of public and house areas;
- an active business continuum participating in charitable initiatives during cultural and mass events;
- availability of residential construction and requests to expand the area of personal subsidiary farms reflecting the development of productive activities among the population.

The diagnostics of the markers during the visual evaluation of the socio-economic landscape demonstrated that the following settlements within the boundaries of the Apanasenkovsky district have a

stable level of local immunity: Divnoe and Derbetovka villages.

At the same time, Divnoe village, being a district centre, accumulates the suppressing mass of vacancies in the district, a more concentrated real estate market, acts as a place of internal migration from nearby rural settlements. There is a high volume of infrastructural issues (water supply, lighting of certain streets) as well as problems with transport and logistics (impeded movement of population within the village). A significant rate of residential construction makes the settlement preferable as a place of residence for young families. The active entrepreneurial activity allows to partially resolve the problem of population employment and raise tax charges supplementing the local budget.

This suggests the positive projections of survivability of these two settlements.

#### Diagnosics of local immunity markers in the peripheral territory with advanced status in socio-economic dimension

The research revealed that the economic and geographical location of the Budennovsky urban district within the borders of the Stavropol territory positively affected the overall socio-economic state of the territory. The combination of basic, natural and climatic resources diversified the local economics at most. The large agricultural and industrial city district includes 32 settlements.

Spatial localization of settlements in the Budennovsky urban district historically has a linear structure. The majority of settlements united by road network are transit both locally and regionally. It is worth noting the high level of attraction of rural settlements to the administrative centre:

The average distance between them is 24 km. This aspect has a direct impact on the level of socio-economic development of the periphery.

The transport component of the urban district is represented by the road network with a hard surface. There are roads of regional and federal importance passing through most of the settlements. The railway stations partially cover the territory of the district (5 stations) and do not involve the eastern and south-eastern areas of the district.

The significant difference of the district is the high number of rural population across separate villages: three municipalities have a population of more than 5000 people, while it is not less than 1400 people in others. This fact indicates a high degree of stability for rural settlements and no threat of demographic desertification for the territories in the near future. Internal migration within the district follows the principle of population outflow from super small villages to larger ones or to the district administrative centre (Budenovsk).

The marker of entrepreneurship level allows estimating the degree of local population involvement into the regional economic space. The entrepreneurial sector is represented by trade, services and private agricultural producers. Diversification of activities is achieved through the availability of initial resources and high consumer activity of the local population.

The infrastructure base is represented by all necessary social and domestic institutions, but small and super small settlements are not equipped with pre-school and school facilities. Children are trained in large settlements of rural councils; transportation problem is solved either at the cost of social programs of municipal government or independently by parents. There is also a shortage of health facilities of various levels and their staffing, and ambulance stations were eliminated in small settlements.

Lack of residential construction in many peripheral settlements of the Budenovsk urban district does not allow to provide housing for needy social groups (families with many children, regrouped persons from hazardous dwellings, and orphans). This can also be explained by the lack of financial capacity of the population for self-building. The real estate market is filled with advertisements for housing and land properties, according to the [www.avito.ru](http://www.avito.ru) resource, there were about 800 ads for sale or exchange in the Budenovsk urban district at the time of the research.

An important marker of local immunity is the number of vacancies and their diversity. According to the official data of the Employment center in 2017, about 1546 various job positions were vacant. In a positive development, there are vacancies available not only in the budgetary sphere (education, health), but also in the private business sector (services, production). About 80% of vacancies are concentrated in Budenovsk explaining the active internal migration of the district residents.

A significant indicator of the socio-economic viability of the analyzed area is the response of the continuum to various initiatives. Residents of the district are active users of Internet resources. They create thematic forums and support its long-lasting functioning.

The administrative centre of the district is the Budenovsk urban settlement, which accumulates the main array of industrial enterprises in its territory. It is a large provincial city with a highly diversified economy, which in theory should attract labour from the less favourable areas of the region. However, there is a steady outflow of population from 2008 to 2017. The reason is the difficult ecological situation due to periodical technogenic accidents at chemical enterprises.

Results of the content analysis in research of additional parameters of the immune status in the peripheral territory with advanced status in socio-economic dimension

We started the content analysis of the selected territories by defining the target definitions for the research of the global information area, which were as follows: “Apanasenskiy district of Stavropol territory” and “Budenovskiy district of Stavropol territory” (an active query on the date of research). According to the statistics of the *Wordstat.yandex* resource of the Russian-language Internet segment, in 2017 the number of requests in absolute terms for the Budenovskiy district did not exceed 4000 times with the maximum level indicated in May and October. In general, an increase in the total number of requests was registered in 2017. The indicator illustrates the level of Internet users’ attention towards the Budenovskiy district.

Of particular interest is the geography of inquiries by which it is possible to identify the degree of the analyzed territory integration into the Internet space. Table 1 shows the quantitative data in absolute value indicating the mentioning frequency of the definition “Budenovskiy district of Stavropol territory” and the territorial distribution of views by main regions, from which the request “Budenovskiy district of Stavropol territory” was sent in 2017.

The regional popularity indicator is required for the selection of territories marked by the presence of the interest for the search request (below 100% is not interesting, above 100% is interesting). When

**Table 1** Reference frequency of the definition “Budennovsky district of Stavropol territory” and the territorial distribution of views by main regions, from which request “Budennovsky district of Stavropol territory” was sent in 2017 (according to the *Wordstat.yandex* service, Russian-language Internet segment) *Source:* compiled by authors

Reference frequency of definition		Territorial distribution of views per month		Popularity in regions	
Month	Quantity	Regions	Views per month	Regions	Specific value (%)
January	2250	Eurasia	3417	Eurasia	101
March	3050	Russia	3400	Russia	113
May	3100	North-Caucasus Federal District	2178	North-Caucasus Federal District	2590
July	2800	Stavropol territory	2148	Stavropol territory	5474
September	2900	South Federal District	590	South Federal District	239
November	3000	Krasnodar territory	453	Krasnodar territory	435

interpreting the results, it is necessary to consider their aggregation to higher levels. The greatest interest is shown by users geographically located in the Stavropol territory and the North Caucasian Federal District. The population of the Krasnodar territory and the Southern Federal District are also actively interested in the Budennovsky district. The interest is insignificant at the federal and the Eurasian area level.

The next logical step in the content analysis is a direct sampling and measuring the number of references for targeted requests in electronic information editions. We also used the service *News.yandex* with the sampling for 2017 for aggregation of information resources. Further, we manually determined the reference tone for target definitions and a thematic explication (Table 2).

The table analysis in accordance with a viability immunogram assessment made it possible to reach a number of important conclusions:

- average monthly number of references of the definition “Budennovsky district of Stavropol territory” by Internet media amounts on average to 129 times per month;
- in terms of periods, the highest activity is recorded in winter months (466 times), the lowest is in summer (345);
- the tone connotation of the target definition reference primarily tends to be negative: the average ratio for 2017 marks a significant excess (71% of negative references against 29% positive ones);
- among positive news, the articles about the launch of new productions, economic achievements

(investments, exhibitions, third-party interest in the economy of the territory) hold the leading positions;

- Regarding the negative news, the reports on criminal activity, road traffic accidents and technogenic situations are prevalent.

Results of the content analysis in research of additional parameters of the immune status in the peripheral territory with backward status in socio-economic dimension

The situation in the Apanasenskiy district is as follows: the total number of requests is less than for the Budennovsky district (on average 2200 queries for 2017), the amplitude of fluctuations is weaker, peak request values (up to 3500 times) are recorded in May and November 2017.

The interest in the territory was shown by Internet users from the Stavropol territory, the North-Caucasus Federal District and the Republic of Kalmykia. The latter is explained by the joint position of the territories, a single transport and logistics hub (multiple directions, located in Divnoe village), as well as close socio-economic ties between local communities (migration, trade, services, and tourist activities). Residents of the Krasnodar territory and the Southern Federal District (Tables 3 and 4) also showed an increased interest in the territory of the Apanasenskiy district.

Based on the results of the content analysis, the following conclusions can be drawn:

**Table 2** Content analysis of references of the definition “Budennovsky district of Stavropol territory”. *Source:* compiled by authors

Selection period	Mean frequency of references	Tone	
		Positive (%)	Negative (%)
Budennovsky urban district (region)			
Winter 2017	466	32	68
Spring 2017	369	25	75
Summer 2017	345	27	73
Autumn 2017	372	31	69
Total	1552	29	71
Positive		Negative	
Thematical connotation (in a decreasing order popularity)			
Opening of new productions		Criminal chronicle	
Economic achievements		Emergency situations	
Sports achievements		Road traffic accidents	
Updating of social infrastructure objects		Technogenic catastrophes	
Memorable dates and holiday greetings		Ecological situation	
Educational work with the population			

**Table 3** Reference frequency of the definition “Apanasenkovsky district of Stavropol territory” and territorial distribution of views by main regions, from which request “Apanasenkovsky district of Stavropol territory” was sent in 2017 (according to the *Wordstat.yandex* service, Russian-language Internet segment). *Source:* compiled by authors

Reference frequency of definition		Territorial distribution of views per month		Popularity in regions	
Month	Quantity	Regions	Views per month	Regions	Specific value (%)
January	2450	Eurasia	11,397	Eurasia	101
March	2750	Russia	11,345	Russia	113
May	3050	North-Caucasus Federal District	8952	North-Caucasus Federal District	2590
July	2450	Stavropol territory	8911	Stavropol territory	5474
September	2300	South Federal District	1690	South Federal District	239
November	3250	Krasnodar territory	1152	Krasnodar territory	435
X	X	Republic of Kalmykia	330	Republic of Kalmykia	3622

- average monthly number of references of the definition “Apanasenkovsky district of Stavropol territory” by Internet media amounts on average to 75 times per month;
- territories are mentioned more positively in autumn and spring; in this case, there is a seasonal fluctuation caused by news about sowing and harvesting progress filling the information space;
- in accordance with the year’s results, the excess of mentions with the positive tone is good news in the

context of the territory’s competitive image formation to attract migratory flows and maintain a permanent population.

## Discussion

Developed methodological approaches, recommendations were correlated taking a critical view with the latest published works in this subject area (Wei 2015; Breinlich et al. 2014; Peng et al. 2017; Wellhofer



**Table 4** Content analysis of references of the definition “Apanasenkovsky district of Stavropol territory”.  
Source: compiled by authors

Selection period	Mean frequency of references	Tone	
		Positive (%)	Negative (%)
Apanasenkovsky district			
Winter 2017	251	49	51
Spring 2017	205	52	48
Summer 2017	170	49	51
Autumn 2017	268	57	43
Total	894	52	48
Positive	Negative		
Thematical connotation (in a decreasing order popularity)			
Holiday greetings	Criminal chronicle		
Charitable work	Communal incidents		
News on sporting achievements	Emergency situations		
Cultural events	Road traffic accidents		
Economic achievements	Deteriorating economic situation		
Modernization of capacities	Social problems (unemployment, migration, orphan children, persons with disabilities, etc.)		
Financing of region’s economy	Negative comparisons on regional scale		

1995; Tsai 2018; Tirado et al. 2016; Hanna 1995; Aharon-Gutman et al. 2018; Antonescu 2014) and discussed with representatives of the scientific and expert community at a number of conferences, symposiums and panel discussions.

As a result of the discussion, it was revealed that in practice the use of methodological provisions on local viability diagnostics of peripheral territories was tested for the first time. Furthermore, we emphasize that the immune status diagnostics of the territories within the spatial analysis is quite a rare type of analytical and diagnostic procedures. This is due to the low level of scientific and methodological support as well as insufficient competence of state and municipal employees implementing the diagnostics.

In the opinion of the scientific community, to operationalize the proposed methodological approach, coordinate obtained analytical results and management decisions elaborated in the system of state and municipal administration it is undeniably necessary: firstly, to establish the corresponding institutional support for conducting regular immunogram research activities of the territorial viability of the periphery; secondly, to continuously broaden information sources on local immunity markers; and thirdly, create

the specialized infrastructure for reception, processing and storage both the primary information on periphery territories in region and results of an immune status diagnostics in dynamics (Banski and Mazur 2016; Palekiene et al. 2015; Bacior and Prus 2018; Tirado et al. 2016).

## Conclusions

The results of local immunity diagnostics of peripheral territories in the agro-industrial region indicated that the components of local immunity contribute to the general picture of the immune status of peripheral zones. The developed methodological provisions for diagnostics and substantiated immunity markers facilitated obtaining additional information. Furthermore, the application of the content analysis offered by the authors allowed to identify “problem areas” hidden from quantitative statistics, but been on the surface allowing to look from a different perspective at the socio-economic situation of analyzed territories and to reveal the reasons for negative social phenomena and the processes influencing the viability of territories. It is possible to distinguish three types of areas according

to the level of viability: (1) the area with favourable long-term prospects of viability and safeguarding the territory against disintegration; (2) the area with uncertain predictive characteristics of viability; (3) the area with unfavourable predictive characteristics of viability.

The presented results of the local immune status diagnostics for territories received through an application of the developed methodical approach can be beneficial for regional and municipal authorities and management for a formulation of spatial policies as well as programmes for the spatial and economic development of peripheral territories.

### Compliance with ethical standards

**Conflict of interest** The author declares they have no conflict of interest.

**Human and animal rights** No research involving human participants or animals has been conducted during the research.

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