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FUNCTIONING OF UNITED TERRITORIAL COMMUNITIES IN UKRAINE AS SMART MICROREGIONS: ADVANTAGES, CHALLENGES, RISKS, EXPECTANCIES

Key-words: united territorial community, smart microregions, digital technologies, advantages, challenges, risks

Objective factors show that socio-economic progress of Ukraine is much slower to compare with the majority of Central and Eastern Europe; however, hypothetic ways of the state development confirm that transformation rates could be much higher if the reforming is optimal.

Redistribution of powers and improvement of administration at the local level in Ukraine face the problems as administrative elites, having relations at international level, “need not” local institutions, and their imperfectness prevents seriously the access of citizens to the formation of business and self-governing organization which is integral component of a mechanism to support systems with limited access. However, there is

such a situation in the EU when adopting of rules of public-access system in terms of economic, political, and other spheres of society's activities; thus, implementation of European Institutional Standards of regional development is vital for the successful reforming of local administrative system.

World practice demonstrates that for the majority of countries just forms of solidarity, partnership, and cooperation between authorities, science, industry, and business are the bases for system implementation of smart digital technologies providing the development of open (democratic) society, improving labour productivity, favouring economic growth, and raising living standards.

Currently, regional European policies are focused on the development of endogenic potential and mobilization of local resources, investment in innovative and human potential, raise of living standards, and resource-saving problems. Regions across the European Union are on the move on innovation. They are developing innovation strategies for Smart Specialization (RIS3). These forward-looking strategies provide a modern framework for innovation-driven economic transformation. They set out the main priorities for investments. They address opportunities and market developments to build competitive advantage – by developing and matching research and innovation strengths to business needs.

This event showcases the work to date. It will also work out how best to go forward. It needs to speed up the implementation of smart specialization. It needs bottom-up driven growth, for top European innovation priorities.

Smart regions are finding partners in other regions. They can then work together to:

- scale-up their investment efforts;
- create EU-wide value chains;
- see how to manage all this effectively.

The High-Level Event is taking the strategic decision to target three priority areas:

- Industrial Modernization;
- Energy;
- Agri-Food [1].

Implementation of smart technologies from a village and town or city to the whole regions is topical for Ukraine; the matter is that it can provide economic growth owing to energy saving, energy efficiency, and increase in productivity resulting from use of smart technologies and the development of digital economy. Those particular problems stipulate topicality of the study.

Having no sufficient growth potential of their own, local territorial units tend towards more powerful centre forming a microregion. As a functional association, the microregion provides greater opportunities for each of its members through achieving cumulative or even synergic effect resulting from common accumulation of all types of resources.

The objective of the research is to answer the question if economic growth of local territorial units in Ukraine is possible, and whether it is acceptable to transform them into Smart Microregions through intensification of business, educational, scientific and research activities to improve the life of the society as well as development of smart economy. Substantiation and systemization involve challenges and risks arising in the process of implementation of new advanced Smart technologies at the level of local territorial units as well as

prognostication of new priorities to support positive effects of future development of certain Ukrainian microregions and to neutralize negative ones.

Such scientists as P. Hall [2], K. Hansen, L. Winther [3], Ch. Landry [4], T. Manzi, K. Lucas [5], B. Van Heur [6], G. Waitt, C. Gibson [7] devoted their studies to the cross-light of the problems of implementation of sustainable regional development principles on the basis of modern technologies in terms of local territorial-administrative European systems. Papers by Hambleton [8] deal with a role of innovative models implementation in multifunctional regions. Unfortunately, Ukrainian science does not focus extensively on the problem of implementation of Smart technologies at the level of association of settlements (being smaller than towns) forming a microregion. A problem of the ability of the territorial unions to implement local policy towards formation of Smart Microregions remains unsolved. Determination of specifics concerning implementation of advanced technologies for such territorial unions is important.

A concept of smart territories, in particular “smart”, “safe”, “electronic” town/city or region is becoming more and more popular. Basing upon a microregion, it is possible to state that Smart Microregion is the territorial and business system consisting of a number of small settlements (as a rule, small towns and villages) where available resources of municipal services are used in the best way providing high-quality services for the territory residents as well as ensuring maximum safety of everyday life. To do that, the information and communication technology (ICT) is applied on the basis of three types of core networks: communication network, the Internet, and so called Internet of Things [9].

It is possible to consider the basic objective of Smart Microregions functioning is the improvement of operation of all services available in the settlements by means of information and communication technologies application thus widening “bottle necks” and avoiding excessiveness in the process of information production and use [10].

Fig. 1. demonstrates basic problems to be solved by Smart Microregions [11].

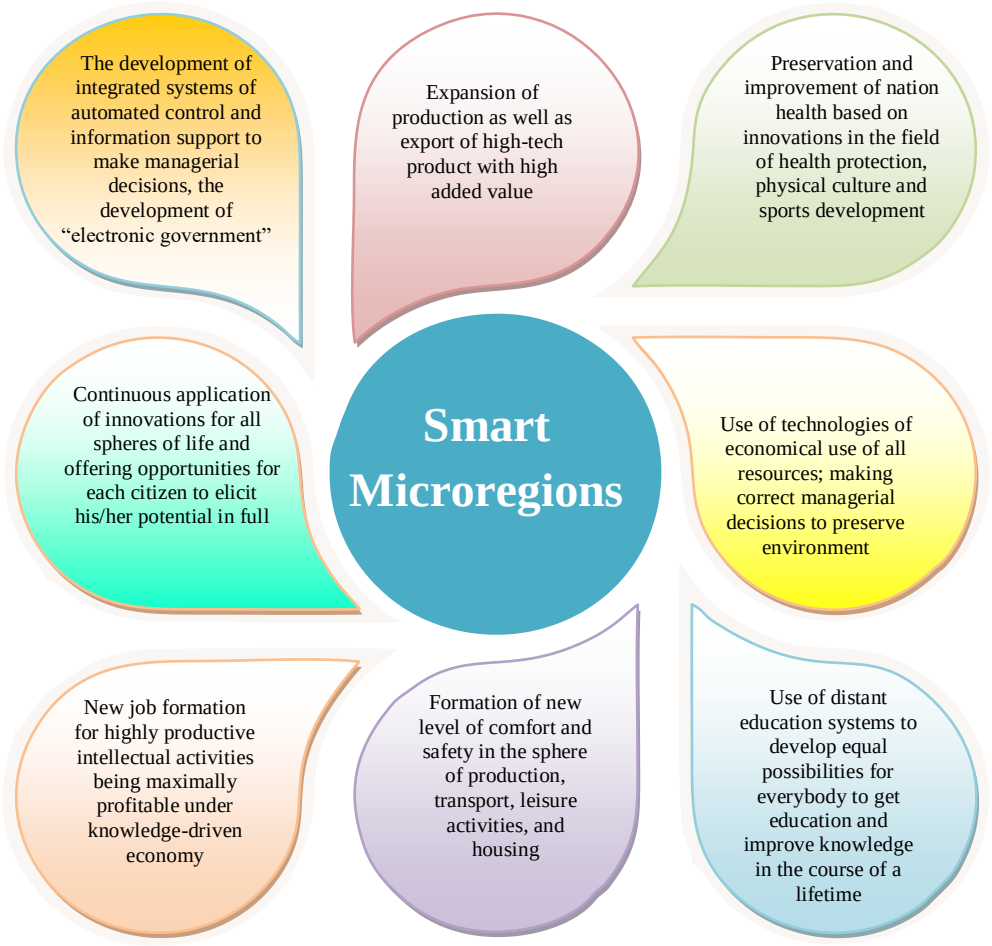

Fig. 1. Basic tasks to be solved in Smart Microregions

Policy of regional development should take into account the typology of regions as well as involve support and help in efficient combination of approaches to regional development connected with the aspects being polycentric and oriented to growth/agglomeration poles as well as back of small settlements in the provinces, in particular as for the assurance of state services. It does not mean that the interests of less developed territories should be neglected. It means certain smoothening of the differences and reasons that can distort the potential of the development of depresses or underdeveloped regions on the constant basis. It should be one the goals set clearly by regional policy as well as the aim of national strategy of regional development which will involve specific smoothing mechanisms and measures in terms of raising the possibilities for efficient resources use [12].

Relying on the aforementioned, the Baikivtsi united territorial community (the Baikivtsi UTC hereinafter) of Ternopil region of Ukraine has been selected as an example for the object of the research [13]. The Baikivtsi UTC is the separate territorial unit with well-defined boundaries of the lower regional level (but higher than village level). It is a primary economic region (in case of further division the features are lost). It is a relatively integral renewable social, ecological, and economic system showing up its economic and geographical position, complex of natural, material, labour, and financial resources characterized by insufficient level of development.

The Baikivtsi UTC founded in October 2015 is considered now as one of the most successful communities in the Ternopil region. The Baikivtsi UTC occupies the advantageous geographical position as it is located not far from the regional center of Ternopil and transient centers

of Western Ukraine. The distance to the airport from the center of Baikivtsi village is 6.4 km; the distance to the railway station is 12 km. The united community includes 7 villages. General population is 4735 people.

Center of the territorial community is located on the right bank of the Gnizdechna River at the distance of 5 km from Ternopil. Settlements being involved into UTC are located at the distance of 6-18 km to the community center (Fig. 2.).

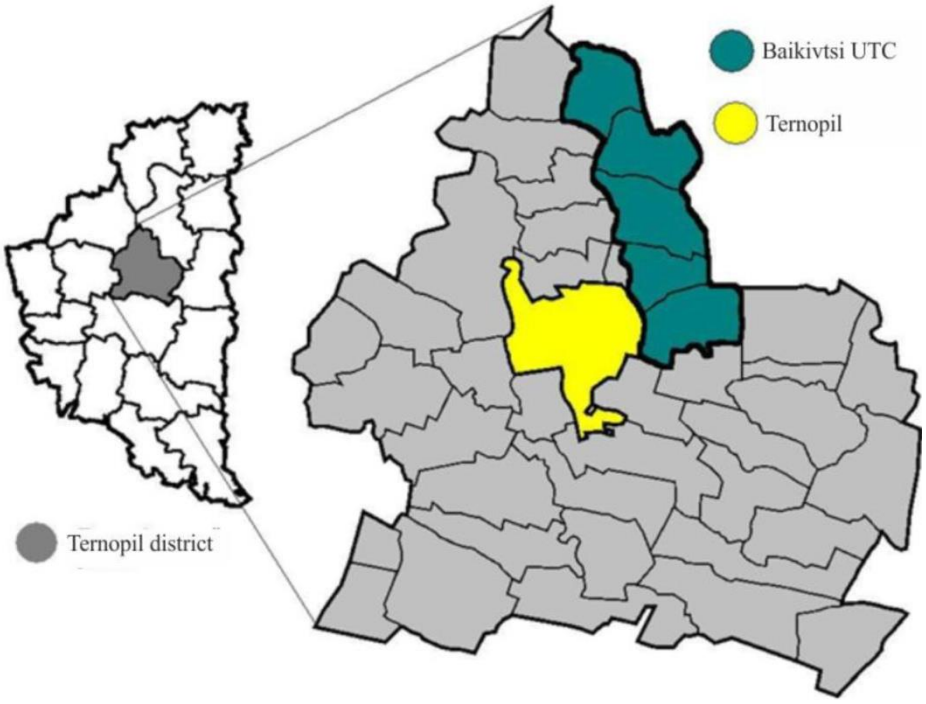

Fig. 2. Position of Baikivtsi UTC within the administrative division of Ternopil region and Ternopil district

In the context of cooperation of local self-government bodies with the university scientific potential, the expert and research laboratory on financial and economic problems has been founded as a functional unit of the "Science Park "Innovation-Investment Cluster of the Ternopil Region" Corporation.

The scientists were given the task to determine the conceptual framework for the principles of selecting the priorities and approaches to sustainable development and supporting dynamic balance between the studied microregion (as an integral constituent part of meso- and macroregion) and the external medium (Fig. 3.).

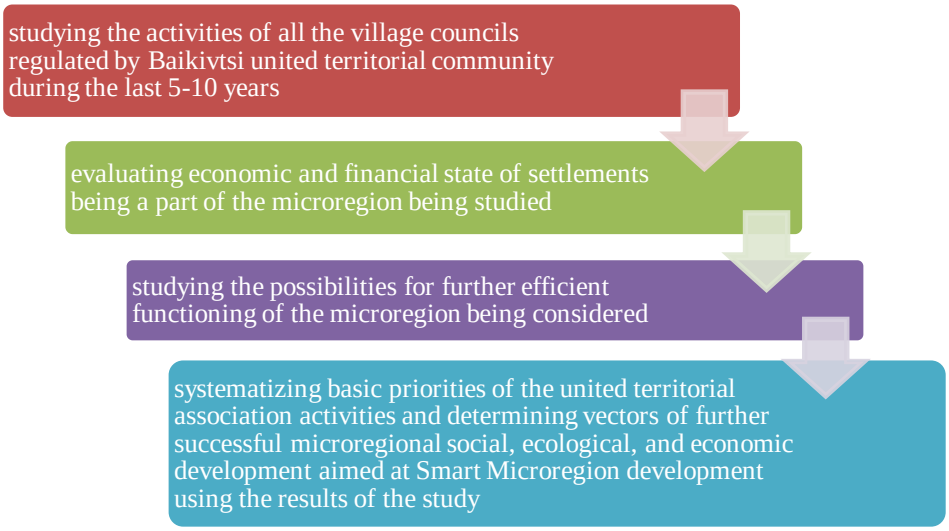

Fig. 3. Tasks for scientists of the expert-research laboratory on financial and economic problems "Science Park "Innovation-Investment Cluster of Ternopil region"

It could allow ensuring its progressive complex development in the process of implementing the Strategy of sustainable development "Ukraine – 2020" taking into account the vectors outlined in the document: development, safety, responsibility, and honour [14].

Economic basis of the Baikivtsi UTC is formed at the expense of enterprises and institutions belonging to different types of economic activity, in particular: road freight transport, fuel retailing; retailing; wholesaling; renting own or rented property; maintenance and repair of motor vehicles; complex maintenance of the facilities; manufacturing of building materials and structures; restaurant business, catering; dental practice; printing of various materials; computer services; grain (except rice) and legume growing; other types of education; manufacturing of medical and dental appliances; manufacturing of paints, lacquers and similar products; manufacturing of electric and electronic equipment for automobiles; hairdressing and beauty salon services.

Strategic analysis of the peculiarities of the Baikivtsi UTC functioning involves the study of its advantages and disadvantages forming the internal environment of the community as well as detecting risks for its functioning and possibilities for its development (external environment).

Structuring of certain components of the analysis is possible owing to the construction of the corresponding SWOT matrix (Table 1).

Table 1

SWOT-analysis of the Baikivtsi UTC to determine prospects of its development as a Smart Microregion

ANALYSIS OF ADVANTAGES AND DISADVANTAGES OF BAIKIVTSI UTC IN TERMS OF COMPONENTS	
Natural and resource potential	
Advantages	**Disadvantages**
1. High level of natural land fertility 2. Available ground waters with high silver and organic substances content 3. High concentration of water resources that may be used in various spheres of activity 4. Developed sand deposits 5. Moderately continental climate favouring agricultural activity	1. Available illegal garbage dumping 2. Small area of free land plots for business activity 3. Lowering of the level of ground water for residential use 4. Expansion of local contaminations within UTC territory
Scientific and technical potential	
Advantages	**Disadvantages**
1. High demand of business in terms of innovative technologies 2. Available well-established relations with scientific structures 3. Willingness of business to diversify income sources at the expense of implementation of innovative technologies	1. Low level of funded developments of scientific and technical potential of the community 2. Lack of fund-rising experience 3. High level of moral obsolescence of the available long-term investment assets
Human and labour potential	
Advantages	**Disadvantages**
1. High percentage of employable population in the community structure 2. Positive balance of population migration 3. Low level of labour potential use	1. Low level of labour resources motivation 2. Lack of self-identification of socially responsible community members as active ones 3. Available unemployment is higher then its natural level
Economic potential	
Advantages	**Disadvantages**
1.Available well-established economic relations with both regional center and other UTCs 2. High concentration and multi-vector character of the activity areas of business entities 3. Involvement of high-skilled labour force of Ternopil 4. Low-cost labour for foreign enterprises	1. Lack of alternative-energy enterprises 2. Low purchasing power of the population 3. Limited number of free investment land plots
Development of infrastructure	
Advantages	**Disadvantages**
1. Developed network of road service between UTC settlements and regional center 2. Closeness to the railroad infrastructure and communications	1. Old engineering facilities and municipal utilities 2. Non-uniform mobile communication and Internet network cover in terms of UTC

3. Functioning system of constant patrolling of UTC territory	settlements 3. Poor condition of road surface of certain UTC areas 4. Insufficient level of lighting of common facilities within UTC territory 5. High level of housing stock depreciation 5. Undeveloped network of educational and art as well as sports and recreational institutions 6. Low level of staffing and technical support for infrastructure facilities 7. Insufficient number of people in general educational institutions

Table 2 systematizes the analysis of external factors effect upon the Baikivtsi UTC:

Table 2

Analysis of the external factors effects upon Baikivtsi UTC

ANALYSIS OF THE EXTERNAL EFFECT FACTORS IN TERMS OF BAIKIVTSI UTC	
Possibilities	**Risks**
1. Activation of the practices of international material and technical and economic aid 2. Expansion of the enterprises possibilities to raise credit resources 3. Increase of the agriproduct demand level on the world market 4. Growth in rural tourism popularity 5. Budget financing of UTC development projects 6. State support of the implementation of alternative energy sources 7. Exposure to the potential alternative energy sales market 8. Profitable exchange rate of national currency unit in terms of export operations 9. Formation of integrated business-structures 10. Intensification of the interaction of "power-business-community" cluster components 11. Transition of the community to the use of energy-saving technologies 12. Development of alternative energy sources 13. Deepening of decentralization processes in the economic sphere 14. Increase in the number of successful UTCs becoming future equal partners in regional development 15. Reformation of health protection system to be patient-oriented one	1. Instability of legal groundwork for business operations 2. Continuation of military conflict in Ukraine 3. Ceasing of budget-forming enterprises operation at UTC territory 4. Uncertainty of the volumes of inter-budget transfers in the context of reverse subsidies 5. Decrease of the level of the community social activity 6. Disbalanced community ecosystem 7. Complete depletion of the reserves of engineering buildings and utilities serviceability 8. Transition of the responsibility for the community social sphere upkeeping from national to local level 9. High ratio of unemployable-aged people per one employable person 10. Natural disasters, hazards etc. 11. Technogenic catastrophes at the territory of the Baikivtsi UTC and neighbouring communities 12. Change in Budget and Tax Codes in favour of the centralization of financial resources in state budget 13. Reduction of the volumes of educational and medical subsidies 14. Change in the economic conditions of the

16. Implementation of mass educational system and involvement of the community population into it 17. Rational use of the community land resources both by the enterprises and its population 18. Implementation of complete wastewater treatment system 19. Expansion of the planted lands	region 15. Community antagonism to the changes 16. Involvement of "poor" villages into UTC

To show the dependence between probability of implementation of the possibilities or risks and their effects, corresponding matrices have been developed to demonstrate positions of each SWOT-analysis component concerning the external factors effecting the Baikivtsi UTC (Table 3).

Table 3

"Probability of implementation – effects of implementation" matrix of possibilities for Baikivtsi UTC economic environment

<table>
<tr><th rowspan="2">Probability of possibilities implementation</th><th colspan="3">Effects of possibilities implementation</th></tr>
<tr><th>Significant (S)</th><th>Potentially significant (P)</th><th>Insignificant (I)</th></tr>
<tr><td rowspan="3">High (H)</td><td rowspan="2">Community transition to the use of energy-saving technologies</td><td>Deepening of decentralization processes in economic sphere</td><td rowspan="3">Increase in the number of successful UTCs becoming equal partners in regional development in future</td></tr>
<tr><td rowspan="2">Profitable exchange rate of national currency unit in terms of export operations</td></tr>
<tr><td>Government support of the implementation of alternative energy sources</td></tr>
<tr><td rowspan="2">Medium (M)</td><td rowspan="2">Activation of the practices of international material and technical and economic aid</td><td rowspan="2">Formation of integrated business-structures</td><td>Increase of the agriproduct demand level on the world market</td></tr>
<tr><td>Exposure to the</td></tr>
</table>

	Intensification of the interaction of "power-business-community" cluster components		potential alternative energy sales market
Low (L)	Expansion of the enterprises possibilities to raise credit resources	Budget financing of UTC development projects	Growth in rural tourism popularity

According to the formed matrix there is a great possibility to expand the projects aimed at the increase of energy-saving and energy-efficiency level. Such projects can effect considerably the community development by means of economic tools of benefits distribution.

Moreover, possibility of community participation in various practices of material and technical and economic aid by international organizations is a highly potential factor to activate processes of the Baikivtsi UTC transition to the level of SMART-region.

Increase of the level of credit resources availability may also effect positively upon UTC economic environment; the resources may be used to cover insufficient current and investment capital. Entrepreneurship activation is the basis of gradual progressive development of the community.

The strategy of the Baikivtsi UTC development up to 2021 means sustainable economic growth based on the innovative development of multibranch economy, implementation of high living standards, preservation and development of the microregion territories.

The strategy of the Baikivtsi UTC development up to 2021 involves following strategic aims (Fig. 4.):

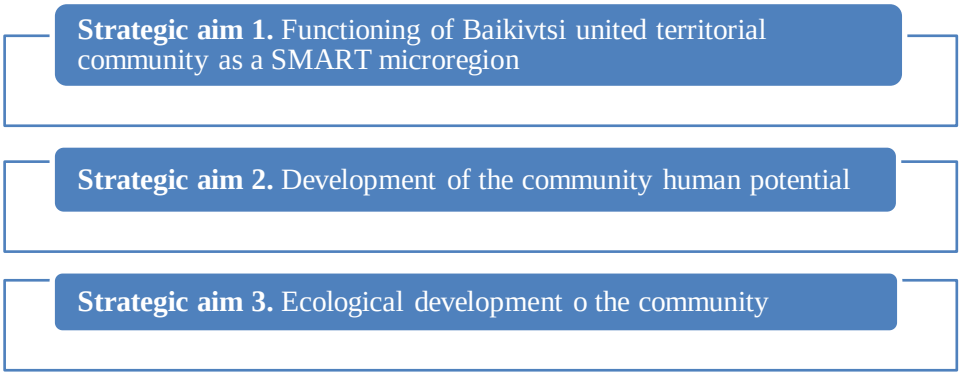

Fig. 4. System of the aims for further the Baikivtsi UTC development

To accomplish and implement the aims, in particular, strategic aim 1, both operational and component aims are determined as it is shown in Fig. 5.

One of the strategic directions to facilitate the development of the Baikivtsi UTC as a SMART region is the activation of business and economic growth based on the combination of economic, social, and ecological interests of the community with the maximum efficient use of resource potential to improve living standards of the population.

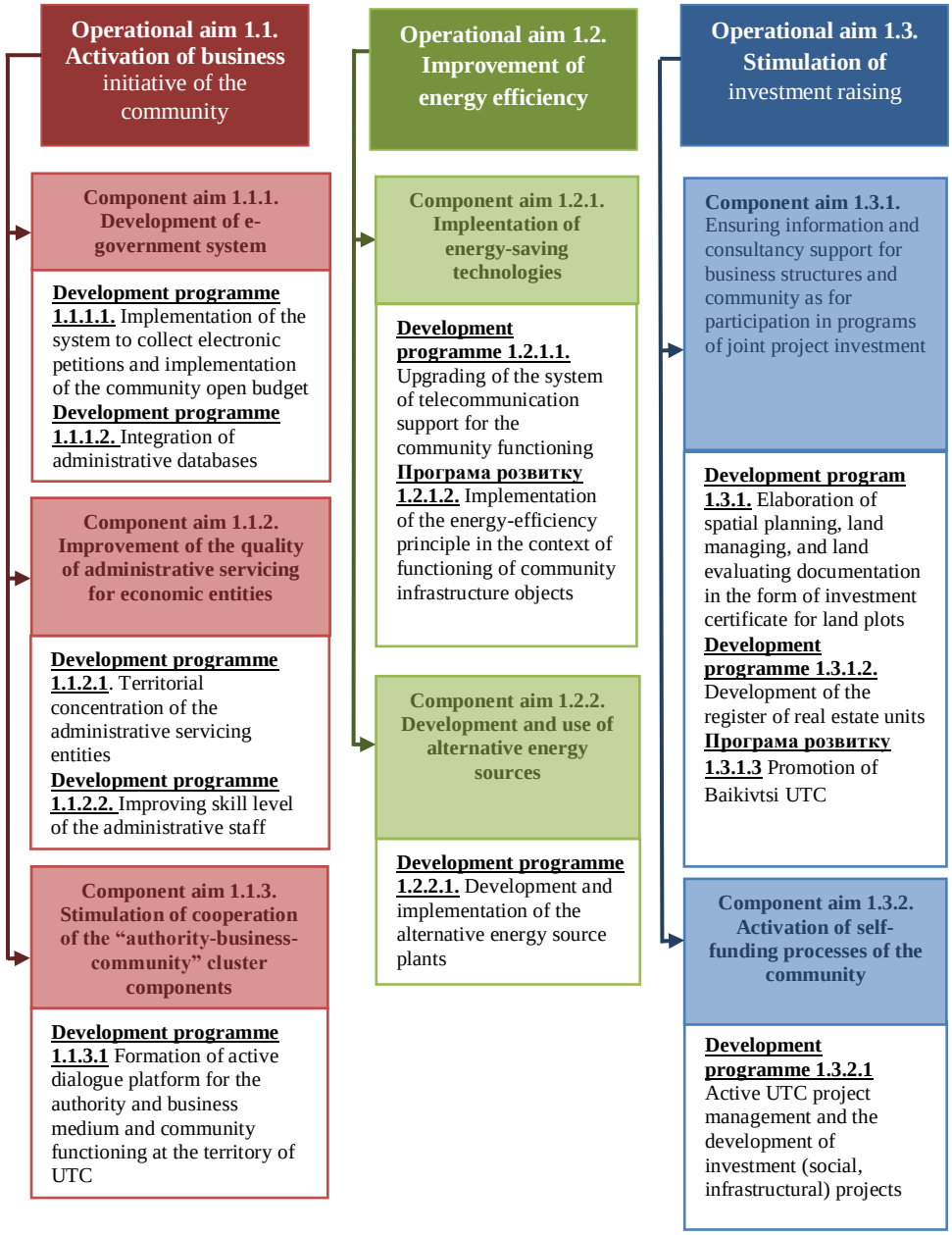

Fig. 5. Structuring of strategic aim 1 "Functioning of the Baikivtsi UTC as a SMART microregion"

There are the following prospective tendencies of the UTC economic complex specialization: generation of alternative energy, industrial production (in particular, construction of the Industrial park), logistics (planning, purchasing, transporting, and storing of agricultural and other types of products), development of the objects to serve the community (recreation, entertainment, trading, catering, public services etc.) and activation of small and medium businesses.

The Baikivtsi UTC has the prerequisites to increment industrial potential at the expense of free labour forces and available territories that may be aimed at industrial and social application.

Development of entrepreneurship, particularly, small and medium business enterprises applying advanced technologies, is the basis for further progressive development of the Baikivtsi UTC and its formation as a SMART microregion (Fig. 6.).

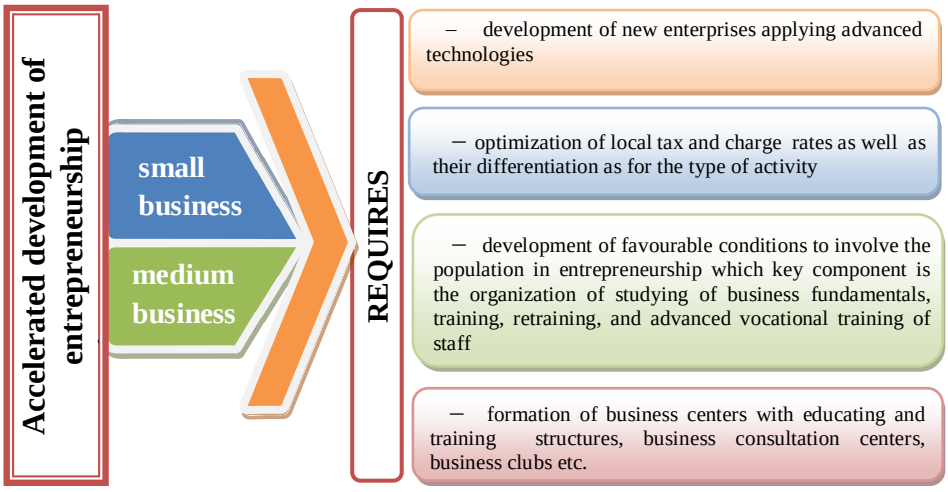

Fig. 6. Accelerated development of entrepreneurship is the basis to form the Baikivtsi community as a SMART microregion

To provide the population with high-quality services, the Baikivtsi UTC authority should act clearly and publicly. In this context it is reasonable to implement certain measure to improve methods and mechanisms of effective interaction with the community as well as public character of administrative decisions.

Implementation of electronic government as well as open budget projects, discussion of strategic issues concerning community development during open public hearings, participation of the community in consulting with representatives of current information technologies while forming feedback with the community and implementation of the mechanism of electronic petition are rather prospective.

Increase in the number of the people involved in the individual labour activity is considered to be in future.

To create favourable conditions necessary for running the business in the community, the authority should aim their efforts at following:

– overcoming of administrative obstacles on the way of small business development;

– all-round support of priorities in small business development;

– further development of cooperation between the authority and entrepreneurship sector of the economy;

– stimulation of business activity to reduce social tension, first of all, at the expense of job creation and self-employment of the population.

Further development of the entrepreneurship is also expected in international project and investment activity.

Successful implementation of the Strategy will depend on the responsibility of those being interested in it. That is why it is required to form the Committee on the Implementation Control (CIC) involving the

most active members of the municipal community taking into account all the interested parties. The task of CIC will be to monitor the performance of all the operational aims (projects) of the Strategic plan as well as drafting of the proposals for UTC authorities as for the changes and supplements to the Strategy.

It should be noted that the implementation of the model of innovative development and advance of SMART microregions are complicated by a number of objective factors resulting in considerable challenges for the economic safety of the development of territorial and economic systems, namely (Fig. 7.):

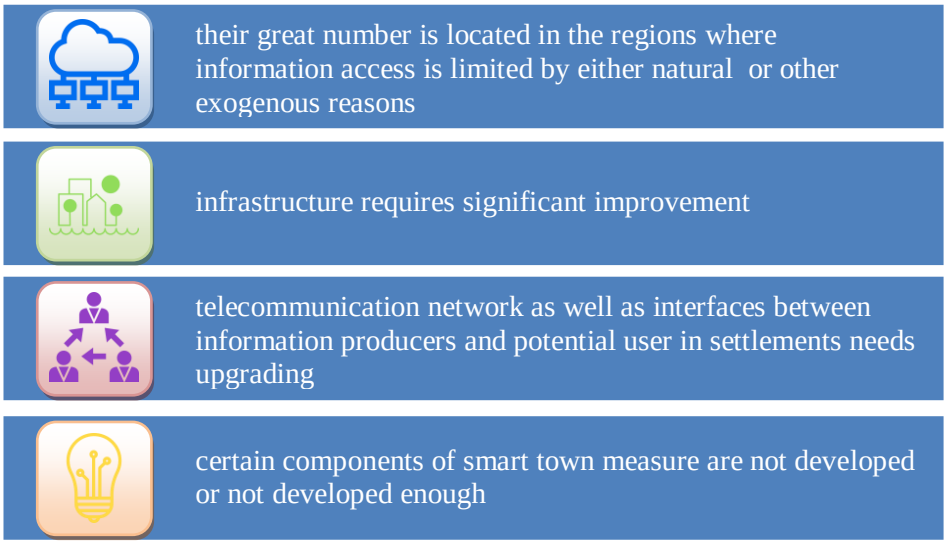

Fig. 7. Factors decelerating development and advance of SMART microregions

Implementation of the microregion SMART model requires complex adherence to the principles of economic safety ensuring – from

the balance of economic interests of all the people, enterprises, communities, and regions up to integration of local economic safety with regional and state economic safety [15].

Taking into consideration European experience, basic priorities to implement the microregion SMART model are as follows: development of the network of "smart" buildings, implementation of electronic technologies to solve infrastructural problems, in particular, in housing and utilities sector and energy saving, implementation of the technologies of e-governance and electronic document flow, application of current information and communication means to improve social servicing etc.

Obtaining the status of sustainable, progressive SMART territories by Ukrainian microregions which are able to have breakthrough in their economic development thanks to modern technologies as well as to neutralize or prevent economic instability is of vital importance for modern Ukraine.

Reference list

1. Smart regions (2016), Conference Proceedings, Square, Brussels, 1-2 June, [Online], available at: http://ec.europa.eu/regional_policy/sources/conferences/smart-regions/agenda.pdf [7 April 2017].

2. Hall, P. (2013) 'Good Cities, Better Lives: How Europe Discovered the Lost Art of Urbanism', London: Routledge, 356 p.

3. Hansen, K., Winther, L. (2012) 'Small cities and the sociospatial specificity of economic development: a heuristic approach', *Cultural Political Economy of Small Cities*, London: Routledge, pp. 31-43.

4. Landry, Ch. (2008) ‘The Creative City: A Toolkit for Urban Innovators’, London: Routlege, 352 p.

5. Manzi, T., Lucas, K. (2010) ‘Social Sustainability in Urban Areas: Communities, Connectivity and the Urban Fabric’, London: Routledge, 256 p.

6. Van Heur, B. (2010) ‘Small Cities and the Geographical Bias of Creative Industries Research and Policy’, *Journal of Policy Research in Tourism*, Leisure & Events, vol. 2, no. 2, pp. 189-192.

7. Waitt, G., Gibson, C. (2009) ‘Creative small cities: Rethinking the creative economy in place’, Urban Studies, no. 46, pp. 1223-1246.

8. Hambleton, R. (2014) ‘Leading the inclusive city: Place-based innovation for a bounded planet’, London: Policy press, 398 p.

9. Modern concept of ‘smart city’ [Online], available at: http://infocom.uz/2017/02/18/koncepciya-smart-city-ot-a-do-ya/ [19 March 2017].

10. Smart City Model [Online], available at: http://www.smart-cities.eu/model.html [6 March 2017].

11. Department of improving the region competitiveness of Kharkiv regional state administration official site (2017), [Online], available at: http://www.smartregion.kharkov.ua/ua/home [21 April 2017].

12. Regional development in the European Union: lessons for Ukraine, (2012), Publication of project ‘Sustainable Regional Development in Ukraine’, Kiev

13. Bajkovecjka joint territorial community official sites (2017), [Online], available at:

http://gromada.info/gromada/baykovecka/ ;

http://www.bsr1653.gov.ua/ ;

https://ukua.facebook.com/%D0%91%D0%B0%D0%B9%D0%BA%D0%BE%D0%B2%D0%B5%D1%86%D1%8C%D0%BA%D0%B0%D0%BE%D0%B1%D1%94%D0%B4%D0%BD%D0%B0%D0%BD%D0%B0-%D0%B3%D1%80%D0%BE%D0%BC%D0%B0%D0%B4%D0%B0-156973864500356/ [20 April 2017].

14. Official website of the President of Ukraine (2015), 'On the Strategy for Sustainable Development 'Ukraine – 2020', available at: http://zakon2.rada.gov.ua/laws/ show/5/2015 [28 April 2017].

15. Zhukova, N.V. (2014) 'Adherence to economic security principles within the sustainable growth models of small towns: experience of european countries', *Scientific Bulletin of Kherson State University*, issue 9-1, Part 4, pp. 122-128.