



THE IMPACT OF AMALGAMATED TERRITORIAL COMMUNITIES INFRASTRUCTURE ON THE FORMATION OF THEIR COMPETITIVE ADVANTAGES

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ABSTRACT

The econometric analysis has been used in the study to assess the impact of Amalgamated Territorial Communities (ATCs') infrastructure on the formation of their competitive advantages. The results point to the lack of link between infrastructure development and ATCs' competitive advantages. ATCs' infrastructure refers to the characteristics of ATCs, which form competitive advantages, by which it is possible to assess the level of ATCs' competitiveness. Competitive advantages of the formed ATCs include: capital, labor resources and land resources. These indicators determine the level of infrastructure ownership and the amount of infrastructure funding for development, which ultimately determines the social-economic status of

ATCs' development. ATCs' infrastructure depends on the level of amalgamation of territorial communities. The modeling outcomes reveal the impact of human capital on foreign direct investment, as well as the influence of land resources, ATCs' land ownership and infrastructure financing on regional exports of goods, the impact of human capital on goods' imports in the regions

Key words: ATCs' infrastructure, Amalgamated territorial communities, ATCs' competitive advantages, ATCs' human capital

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1. INTRODUCTION

The approval of the Procedure and Mechanisms for Provision of Subventions to Amalgamated Territorial Communities (ATCs) for Infrastructure Development [1] in March 2016, depending on the population, area of ATCs' territory dictates the need for research of the financing effectiveness of community development projects, infrastructure changes and the impact of these changes on the ATCs' competitive advantages. According to the State Treasury Service of Ukraine [2], for the period from December 1, 2018 to September 3, 2019, 2 833, 332 million UAH of interbudgetary transfers were transferred for the formation of ATCs' infrastructure. The regions of Ukraine differ significantly in their ability to form ATCs'; it affects their rating, and therefore competitive advantages and opportunities to ensure dynamic social-economic development and the ability to attract financial resources. The above mentioned requires a detailed study of the impact of ATCs' formation, the ability to develop ATCs' infrastructure on competitive advantages.

2. LITERATURE REVIEW

The conducted analysis of scientific research for 2017-2020 shows that there is no gap in the studies between the relationship investigation of variables: infrastructure and competitive advantages. Studies are aimed at highlighting fiscal decentralization [3], processes of territorial community formation and the ATCs' financial viability [4], models and types of decentralization [5], ATCs' financial and organizational capabilities [6], positive and negative aspects of ATCs' formation [7].

The following trends in the ATCs' formation are lack of connection between ATCs' area and ATCs' income, level of subsidies and subventions; the unsatisfactory level of ATCs' staffing; low level of ATCs' infrastructure capacity [8]. The slow growth of financial decentralization is presented in the ATCs' formation in Ukraine, which negatively affects the ability of ATCs to develop infrastructure. The absence of institutional changes and the lack of community influence on decision-making is make ATCs' infrastructure ineffective [9]. The inter-sectoral partnership of decentralization authorities is become more popular [10].

An investigation of ATCs' infrastructure is highlighted in the work [11], where was indicated a lack of experience in preparing infrastructure projects due to the low qualification of specialists. The direction of funds determines the effectiveness of infrastructure financing: social orientation is inefficient due to the current financing of infrastructure [12]. The project approach contributes to the current development of ATCs' infrastructure through capital and current repairs of road and social infrastructure [13]. "The basic projects for which communities will spend money include: overhaul of roads, street lighting, social facilities,

purchase of special vehicles for public utility companies” [14]. The development of technologies, including the use of new technologies in infrastructure, is necessary to strengthen competitive advantages [15]. The infrastructure development of the amalgamated territorial communities is new government tool of new regional policy [16], precondition for democracy political system in Ukraine [17]. The infrastructure development is a consequence of budgetary, fiscal decentralization in Ukraine [18], where communities distribute funds in a decentralized manner based on an analysis of the most vulnerable infrastructure. However, the Fiscal decentralization in Ukraine and infrastructure financing remain problematic [19].

3. DATA AND METHODS

The study is based on a comparative analysis of the regions of Ukraine in terms of the formation of capable territorial communities by the state, indicators of financing the development of the ATCs’ infrastructure. Statistical analysis methods have been used to quantify the relationship between ATCs’ infrastructure financing and competitive advantages. Modeling based on regression analysis has been used to assess the impact of ATCs’ infrastructure on the formation of their competitive advantages.

4. RESULTS AND DISCUSSION

The amalgamated territorial community (ATC) is a new type of administrative-territorial, self-sufficient entity that start to develop after incept of Law On Cooperation of Territorial Communities [20]; it can become competitive under the conditions of effective management of its resources and involvement of other factors, promoting increase of its competitiveness [21].

Competitive advantages are the characteristics of the object that create opportunities for participation in competition; that is competitive advantages are a component of competitiveness. Competitive advantages determine the ability of ATCs to obtain financial, material, technical and human resources through the competition in order to achieve the goals, connected with social-economic and environmental development. Inequality in the resources’ ownership determines the possession of ATCs’ competitive advantages or lack of competitive advantages in a particular area. ATCs’ infrastructure (social (housing and technical, communal, medical, educational), production, information, transport, tourism and recreation, investment and other types of infrastructure) refers to the ATCs’ characteristics, which form a competitive advantage; they can be used to assess the level of ATCs’ competitiveness. It should be noted that currently in Ukraine the following infrastructure of municipal property is financed, namely: systems of the organization of community management - communication networks, the center of administrative services rendering, buildings of budgetary institutions, streets, roads, bridges of communal property, vehicles of educational institutions, objects of water supply and drainage, waste management objects, health care establishments, educational and social security institutions, etc.

During the period of 2015-2019, the number of ATCs increased from 157 in 2015 to 1029 in 2019, which led to an increase in the area of ATCs and the population in their territories (Table 1). The rating of the regions according to the indicators of ATCs’ formation indicates the existence of significant differences in the ability to form them and accordingly affects the competitive advantages of the territories. The regions with long-term plans for the formation of ATCs occupy lower positions in the ranking. The above mentioned requires an analysis of the impact of the territorial communities’ creation and amalgamation, their ability to develop infrastructure and create competitive advantages.

Table 1 Rating of regions according to the indicator of formation of capable territorial communities as of January 10, 2020 [22]

Regions	Overall rating	ATC population, thousand people	ATC area	Number of territorial communities that did not unite	Areas not covered by amalgamations	Number of ATCs with population of less than 5 thousand people	Coverage with long-term plans
Zhytomyr	1	5	3	3	1	11	3
Dnipropetrovsk	2	2	2	2	1	16	1
Chernihiv	3	4	4	4	1	14	4
Khmelnitsky	4	8	5	5	2	9	1
Zaporizhia	5	3	1	1	1	19	1
Volyn	6	10	6	6	1	12	1
Sumy	7	9	12	12	3	10	2
Donetsk	8	1	11	11	16	5	1
Chernivtsi	9	14	8	10	7	6	11
Ternopil	10	16	9	8	4	17	6
Mykolayiv	11	6	7	9	8	15	12
Luhansk	12	7	10	7	10	22	1
Rivne	13	21	15	14	9	8	1
Ivano-Frankivsk	14	22	17	18	5	3	8
Kharkiv	15	12	19	19	18	1	1
Poltava	16	11	16	16	6	18	7
Kherson	17	17	14	13	13	20	10
Cherkasy	18	15	13	15	2	21	15
Odesa	19	13	18	17	16	6	17
Kyiv	20	18	22	20	15	4	16
Lviv	21	20	21	22	12	7	13
Zakarpattia	22	24	24	24	14	2	9
Vynnytsia	23	23	23	21	11	13	14
Kirovohrad	24	19	20	23	17	23	5

For the convenience of analysis, let's introduce the conventions of the variables, selected as independent (X1-X15) and the dependent variables that act as indicators of competitive advantages (Y1-Y7). The regions differ in the number of ATCs formed during the period of decentralization (Table 2); it, respectively, determines the differences in area and population: the population and area are bigger in the regions with more ATCs. In fact, the area of amalgamated communities practically occupies 100% of the region's territory and includes 80-90% of the population in the regions with the biggest number of ATCs. Accordingly, the competitive advantages of existing ATCs are labor resources and land resources, capital. These indicators determine the level of infrastructure ownership and the amount of infrastructure funding for development, which ultimately determines the social-economic status of ATCs' development.

Table 2 Formation indicators of capable territorial communities as of January 10, 2020 [22]

Regions	Number of ATCs, 2020	Population of the region, thousand people	Population of ATC, thousand people	Population of ATC, %	Area of the region, sq. km.	ATC area	ATC area, %	
Convention of the variables	X1	X2	X3	X4	X5	X6	X7	
1	Vinnitsia	46	1560,4	870,1	55,8	26513	5839	22
2	Volyn	54	1035,3	773	74,7	20144	12137	60,2
3	Dnipropetrovsk	71	3206,5	3008	93,8	31914	23945	75
4	Donetsk *	13	1700,7	1637,6	96,3	17640	8274	46,9
5	Zhytomyr	56	1220,2	1008,4	82,6	29832	20191	67,7
6	Zakarpattia	16	1256,8	448,3	35,7	12777	1860	14,6
7	Zaporizhia	56	1705,8	1545	90,6	27180	20527	75,5
8	Ivano-Frankivsk	39	1373,3	773,5	56,3	13900	5010	36
9	Kyiv	24	1767,9	1067,5	60,4	28131	6371	22,6
10	Kirovohrad	27	945,5	568,2	60,1	24588	6160	25,1
11	Luhansk *	18	583,3	475,9	81,6	18480	9097	49,2
12	Lviv	41	2522	1478,3	58,6	21833	5368	24,6
13	Mykolayiv	42	1131,1	931,6	82,4	24598	13242	53,8
14	Odesa	37	2380,3	1666,6	70	33310	11942	35,9
15	Poltava	53	1400,4	1035,5	73,9	28748	10962	38,1
16	Rivne	45	1157,3	666,5	57,6	20047	8274	41,3
17	Sumy	38	1081,4	863,1	79,8	23834	10979	46,1
18	Ternopil	53	1045,9	691,7	66,1	13823	6904	49,9
19	Kharkiv	23	2675,6	1971,6	73,7	31415	8490	27
20	Kherson	33	1037,6	669,1	64,5	28461	12017	42,2
21	Khmelnysky	51	1264,7	1021,3	80,8	20645	12832	62,2
22	Cherkasy	57	1206,4	830,7	68,9	20900	9144	43,8
23	Chernivtsi	37	904,4	628,4	69,5	8097	4049	50
24	Chernihiv	50	1005,7	855,8	85,1	31865	20840	65,4
	Total	980	35168,7	25485,5	72,5	558676	254452	45,5

In [23] was studied the social-economic development of the regions of Ukraine. Scientists have identified 4 groups of regions: group 1. Regions with high economic potential; group 2. Regions with average economic potential; group 3. Regions with low economic potential.

ATCs' infrastructure depends on the level of amalgamations of territorial communities (Table 3). In the regions with the largest number of ATCs (Dnipropetrovsk, Lviv, Volyn, Poltava, Chernihiv, Zaporizhia) a larger number of infrastructure facilities is observed, which can potentially affect the efficiency of infrastructure development and competitive advantages of ATCs. It should be noted that the number of ATCs is not related to the number of cooperation projects. Thus, the human factor and intellectual capital can be determinants of cooperation between communities in order to develop infrastructure.

Table 3 Indicators of ATCs' infrastructure ownership as of January 10, 2020 [22]

Regions	Number of ATCs in PP* approved by the government	Number of ATCs not covered by PP	% ATCs of their total number, not covered by PP	The total number of cooperation projects	Number of secondary schools in the region	The number of secondary schools that have passed into the communal ownership of ATCs	Number of ATCs that received communal land plots for communal ownership
Convention of the variables	X8	X9	X10	X11	X12	X13	X14
Vinnitsia	66	169	23,9	95	771	200	34
Volyn	73	0	0	27	608	327	30
Dnipropetrovsk	93	0	0	12	870	684	55
Donetsk *	65	0	0	2	542	348	9
Zhytomyr	66	3	0,5	38	610	412	44
Zakarpattia	57	13	3,9	4	644	104	6
aporizhia	76	0	0	9	524	381	36
Ivano-Frankivsk	61	16	3,1	12	676	257	20
Kyiv	29	278	42,2	8	661	202	8
Kirovohrad	53	4	1	11	320	110	13
Luhansk *	45	0	0	4	278	53	8
Lviv	85	98	13,8	23	1 216	402	35
Mykolayiv	40	38	12,1	3	461	214	28
Odesa	44	298	60,8	2	746	303	23
Poltava	78	13	2,6	109	572	253	39
Rivne	66	0	0	16	573	177	25
Sumy	53	1	0,2	50	419	216	28
Ternopil	60	12	2	12	750	331	40
Kharkiv	60	0	0	25	746	287	12
Kherson	49	22	7,4	4	419	189	26
Khmelnysky	62	0	0	11	648	417	39
Cherkasy	62	142	25,5	33	537	251	26
Chernivtsi	42	29	10,7	6	401	227	26
Chernihiv	56	4	0,7	14	486	289	37
Total	1441	1140	10,2	530	14478	6634	646

*Perspective plans

According to [2] (Table 4), the regions differ significantly in the amount of subventions for the formation of ATCs' infrastructure. The correlation coefficient of infrastructure financing volumes and the number of formed ATCs is 0,8135; and population – 0,3841; and ATCs' area – 0,8478. Thus, the population and land resources are the prerequisites for the development of ATCs' infrastructure and its financing.

Table 4 Dynamics of subventions for the formation of ATCs' infrastructure (X15) in 2018-2019, thousand UAH [2]

Naming of the budget of the administrative-territorial unit	01.12.2018	19.12.2018	19.06.2019	03.09.2019	Total	Percentage, %
Vinnitsia	47 774,0	5 986,1	16 438,0	5 659,0	75 857,1	3%
Volyn	94 559,0	11 862,9	42 114,0	14 038,0	162 573,9	6%
Dnipropetrovsk	139 574,0	17 444,3	57 993,0	19 331,0	234 342,3	8%
Donetsk	29 406,0	3 726,8	12 339,0	4 113,0	49 584,8	2%
Zhytomyr	146 223,0	18 463,9	58 449,0	19 483,0	242 618,9	9%
Zakarpattia	14 185,0	1 770,9	4 932,0	1 644,0	22 531,9	1%
Zaporizhia	110 264,0	13 872,8	44 265,0	14 755,0	183 156,8	6%
Ivano-Frankivsk	51 893,0	6 508,2	23 775,0	7 925,0	90 101,2	3%
Kyiv	22 465,0	2 812,1	15 156,0	5 052,0	45 485,1	2%
Kirovohrad	20 652,0	2 576,3	13 326,0	4 442,0	40 996,3	1%
Luhansk	33 364,0	4 211,9	12 249,0	4 083,0	53 907,9	2%
Lviv	68 551,0	8 565,2	29 148,0	9 716,0	115 980,2	4%
Mykolayiv	76 616,0	9 580,5	27 000,0	9 000,0	122 196,5	4%
Odesa	84 684,0	10 672,0	33 774,0	11 258,0	140 388,0	5%
Poltava	79 566,0	9 990,1	31 461,0	10 487,0	131 504,1	5%
Rivne	55 508,0	6 934,4	24 204,0	8 068,0	94 714,4	3%
Sumy	68 460,0	8 565,8	24 771,0	8 257,0	110 053,8	4%
Ternopil	80 046,0	10 023,3	32 379,0	10 793,0	133 241,3	5%
Kharkiv	37 389,0	4 719,1	19 644,0	6 548,0	68 300,1	2%
Kherson	70 090,0	8 746,7	25 647,0	8 549,0	113 032,7	4%
Khmelnysky	127 189,0	16 075,5	48 396,0	16 132,0	207 792,5	7%
Cherkasy	41 650,0	5 186,0	31 875,0	10 625,0	89 336,0	3%
Chernivtsi	60 698,0	7 627,0	25 588,0	8 484,0	102 397,0	4%
Chernihiv	127 194,0	16 078,2	45 076,0	14 891,0	203 239,2	7%
Total	1688000,0	212000,0	699999,0	233333,0	2833332,0	100%

To assess the impact on the development of infrastructure of the initial prerequisites for regions' social-economic development, a regression model is created, where the dependent variable refers to a subvention for infrastructure financing, and independent ones include: the number of ATCs', the population of ATCs', the area of ATCs, the total number of cooperation projects, the number of secondary schools that have become communal property of ATCs', the number of ATCs' that received communal land plots for communal ownership (Table 5).

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Table 5 Regression model: Dependent Variable: X15, Independent Variable: X1, X3, X6, X11, X13, X14

Dependent Variable: X15
Method: Least Squares
Date: 05/18/20 Time: 13:09
Sample: 1 24
Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-288.7313	618.5591	-0.466781	0.6466
X3	-42.22260	13.61373	-3.101472	0.0065
X6	5.518601	0.948522	5.818105	0.0000
X11	-99.32474	169.1181	-0.587310	0.5647
X13	242.5203	83.91025	2.890235	0.0102
X14	1819.809	904.3054	2.012384	0.0603
C	2269.854	12043.01	0.188479	0.8527
R-squared	0.945505	Mean dependent var		118055.5
Adjusted R-squared	0.926272	S.D. dependent var		61634.86
S.E. of regression	16735.71	Akaike info criterion		22.52697
Sum squared resid	4.76E+09	Schwarz criterion		22.87057
Log likelihood	-263.3236	Hannan-Quinn criter.		22.61813
F-statistic	49.15925	Durbin-Watson stat		2.541397
Prob(F-statistic)	0.000000			

Statistically significant variables according to the criterion of t-Statistic and Prob. are variables X3, X6, X13 and X14. Thus, the financing of infrastructure and its development depends on the population (human capital) and land resources, in particular on the transfer of land to communal ownership. Ownership of general educational institutions also influences on the level of ATCs' funding.

To assess the impact of infrastructure on competitive advantage, the following data have been estimated, namely: the dependence of direct investment (share capital) in the regions of Ukraine (Y1); industrial production indices by regions (up to the previous year) (Y2); indices of construction products by regions (up to the previous year) (Y3) indices of capital investment in construction by regions up to the previous year (Y4); agricultural production indices by regions (up to the previous year;%) (Y5); volumes of exports of goods by region USD million USA (Y6); volumes of imports of goods by regions, million USD (Y7) from subventions for infrastructure development, ATCs' population, ATCs' area, number of ATCs that received agricultural land plots for communal ownership (Table 6).

Table 6 Regression models: dependent variables Y1- Y7, independent variables X3, X6, X14, X15

Independent Variable	Coefficient	Std, Error	t-Statistic	Prob,	Adjusted R-squared	F-statistic	Durbin-Watson stat	Hannan-Quinn criter,
Dependent Variable: Y1								
X3	1,099	0,188	5,841	0,000	0,661	12,205	1,880	15,274
X6	0,025	0,035	0,720	0,481				
X14	6,547	15,756	0,416	0,682				
X15	-0,004	0,005	-0,874	0,393				
C	-481,651	241,676	-1,993	0,061				
Dependent Variable: Y2								
X3	0,002	0,003	0,731	0,474	0,086	0,445	2,151	6,649
X6	0,000	0,000	-0,410	0,686				
X14	0,168	0,211	0,797	0,435				
X15	0,000	0,000	-0,481	0,636				
C	100,022	3,237	30,899	0,000				
Dependent Variable: Y3								
X3	-0,006	0,008	-0,722	0,479	0,119	0,640	1,529	9,062
X6	0,001	0,002	0,537	0,597				
X14	1,067	0,706	1,513	0,147				
X15	0,000	0,000	-1,139	0,269				
C	121,014	10,822	11,182	0,000				
Dependent Variable: Y4								
X3	0,000	0,009	0,014	0,989	0,069	0,355	1,849	9,172
X6	0,000	0,002	0,277	0,785				
X14	-0,135	0,745	-0,182	0,858				
X15	0,000	0,000	-0,407	0,689				
C	95,020	11,433	8,311	0,000				
Dependent Variable: Y5								
X3	-0,006	0,004	-1,399	0,178	0,181	1,047	2,229	7,553
X6	0,001	0,001	0,699	0,493				
X14	0,405	0,332	1,222	0,237				
X15	0,000	0,000	-1,299	0,210				
C	111,722	5,087	21,962	0,000				
Dependent Variable: Y6								
X3	2,289	0,388	5,908	0,000	0,711	15,175	1,606	16,720
X6	0,133	0,072	1,861	0,078				
X14	48,424	32,457	1,492	0,152				
X15	-0,021	0,010	-2,189	0,041				
C	-1098,943	497,835	-2,207	0,040				
Dependent Variable: Y7								
X3	2,048	0,313	6,538	0,000	0,645	11,452	2,084	16,282
X4	-20,359	14,927	-1,364	0,189				
X14	-9,883	25,650	-0,385	0,704				
X15	0,000	0,006	-0,047	0,963				
C	816,279	894,829	0,912	0,373				

The modeling results point to the impact of human capital on foreign direct investment (Dependent Variable equation: Y1), the impact of human capital, land resources, ATCs' land ownership and infrastructure financing on regional exports of goods (Dependent Variable equation: Y6), the impact of human capital on the volume of imports of goods in the regions (Dependent Variable equation: Y7). Thus, the assessment of the infrastructure's impact on the formation of ATCs' competitive advantages has not revealed significant links between the development of ATCs' infrastructure and their competitive advantages. With a significance level of 5%, it can be argued that an increase in ATCs' infrastructure funding by 1 000 UAH will lead to a reduction in exports by 21 000 USD. It is obvious that the ATCs' infrastructure has a significant potential for development, as the decentralization processes are characterized by punctuality and chaotic financing of its development projects. The initial processes of infrastructure development will influence on the competitive advantages of ATCs in the long-term period, which requires detailed study. As it has been pointed by [11], the amalgamated territorial communities receive funds from the state for infrastructure development, but the lack of experience in the preparation of infrastructure projects requires qualified support of specialists, including specialists from regional and district state administrations. Administrations should provide advisory, methodological, and coordination assistance to communities. This factor hinders the improvement of infrastructure and does not ensure the development of competitive advantages. An important factor, affecting the financing of infrastructure as a competitive advantage factor, centers around the focus of financing on social infrastructure facilities [12]. Intergovernmental transfers are directed to current expenditures, that is they do not provide infrastructure development, but only current maintenance. In other words, currently there is no effective financing of ATCs' infrastructure facilities in the long-term period. This discourages local governments from finding investment resources to finance not only the social but also the production and transport infrastructure of the regions. Such approach does not ensure the formation of competitive advantages and infrastructure development.

According to the data of the State Regional Development Fund, the territorial communities have implemented 371 projects for a total amount of 3 253, 133 million UAH for 2015-2017 [24]. These projects relate to reconstruction, modernization, winterization of municipal services centers, secondary schools, sports facilities and healthcare facilities, heat supply and sanitation systems, sewage systems, houses, ongoing and major repairs of roads, bridges. As was noted in [13, 25], the project approach to the development of ATCs' infrastructure contributes to capital and current repairs of road and social infrastructure. Attraction of international technical assistance is also aimed at implementing social projects. Similar results are contained in the study [14]: "the basic projects for which communities will spend money include: road mending, street lighting, social facilities, purchase of special vehicles for public utility companies". According to the data of the central and local executive authorities of Ukraine [26], as of 01.01.2020, 187 agreements have been concluded on the basis of PPP, of which: 52 agreements are being implemented (34 – concession agreements, 16 – agreements on joint activities, 2 – other agreements), 135 agreements are not being implemented (4 agreements – expired, 18 agreements – terminated, 113 agreements – not fulfilled). Herewith, 7 projects are being implemented in three regions on the basis of PPP.

5. CONCLUSION

The conducted study makes it possible to draw the following conclusions:

1. ATCs' infrastructure refers to the characteristics of ATCs', which form competitive advantages; they can be used to assess the level of ATCs' competitiveness. Labor resources and land resources, capital are competitive advantages of the formed ATCs'. These indicators point to the level of infrastructure ownership and the amount of infrastructure funding for

development, which ultimately determines the social-economic status of ATCs' development. The ATCs' infrastructure depends on the level of amalgamation of territorial communities.

2. The modeling results point to the impact of human capital on foreign direct investment, the impact of human capital, land resources, ATCs' land plots' ownership and infrastructure financing on regional exports of goods, the impact of human capital on imports of goods in the regions.
3. The reasons for the lack of impact of ATCs' infrastructure on their competitive advantages include: the lack of experience in preparing infrastructure projects and qualified support, focus on intergovernmental transfers to social infrastructure and current expenditures, lack of effective long-term funding of ATCs' infrastructure.

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