Identifying Key and Constraining Resources for Ensuring the Competitiveness of the Regional System of Small and Medium Enterprises (The Case of Volgograd Region)

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Abstract: In this study, the authors propose an original methodology for determining the key and constraining resources for ensuring the competitiveness of the regional system of small and medium enterprises, based on the application of tools of correlation analysis to determine the relationship between resources ensuring the functioning of the regional system of small and medium enterprises and the values of the final indicator of its competitiveness. The following resources are identified as the basic ones to ensure the functioning of the socio-economic system: human, technical and technological, financial, organizational, informational, and institutional. To determine the final indicator of competitiveness of the regional system of small and medium enterprises, the authors used the popular science method of I. Adizes. The authors implemented the proposed toolkit for identifying key and constraining resources for competitiveness of system of small and medium enterprises using the example of Volgograd region. According to Russian Classifier of Economic Activities 2, 11 industries of Volgograd region were identified, each of which was structured according to the corresponding resources for ensuring the functioning of the regional system of small and medium enterprises. The calculations were made for the period from 2019 to 2021, according to the official statistics available for the current period. Based on the analysis, the authors identified key and constraining resources for ensuring the competitiveness of the system of small and medium enterprises in Volgograd region and assessed their impact on regional industries. In the conclusion the authors, from the position of public authorities, make proposals for the development of resource provision of functioning of the system of small and medium enterprises in Volgograd region in order to increase its competitiveness.

1 INTRODUCTION

The resource-based approach has traditionally been used in studies conducted in the field of management of socio-economic systems. This approach as a methodological toolkit is becoming demanded by the theory and practice of managing socio-economic systems at various levels (Newbert, 2007). The demand for the resource-based approach is primarily due to its effectiveness in identifying and justifying resource sources for the successful and competitive functioning of socio-economic systems. The basic premise of the resource-based approach is that any economic system can achieve sustainable competitive advantage if it possesses and develops valuable, rare, difficult to imitate and irreplaceable resources and capabilities, and has an organizational structure that will recognize and utilize them (Barney, 1986; Barney, 2002).

A notable development of the resource-based approach took place in the 1980s and 1990s. A study by B.A. Wernerfelt (Wernerfelt, 1984) noted the usefulness of analyzing an enterprise in terms of its resources rather than products, and suggested that this approach could become a new paradigm for studying strategies.

To adapt the resource-based approach to the objectives of this study, O.V. Inshakov's interpretation was used, according to which resources, before becoming appropriated, are in states of objects,

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processes and conditions of nature. Resources are then transformed into factors of production in the process of product production. First, objects and processes of nature as external conditions must become resources, and then factors of production, but this requires their initial appropriation in the process of labour, regardless of its types (Inshakov, 2003). Objects, processes and conditions of nature, as human-appropriated resource-conditions, are used in the process of product production as production factors. The finished product of this production is then involved in new production as a new resource and a new factor.

In this study, the resource-based approach is considered as the methodological framework most suitable for theoretical and empirical research into the processes of ensuring the competitiveness of the regional system of small and medium-sized enterprises (hereinafter SME system).

The resource-based approach allows decision makers to focus on the one hand on the development of key resources that maximize the competitiveness of the socio-economic system and, on the other hand, to identify resources constraining the achievement and enhancement of competitiveness and requiring attention to adjust them.

2 MATERIALS AND METHODS

The study of the competitiveness of the regional SME system from the perspective of resource endowment implies that the efficient use of resources contributes to the achievement of competitive advantages of enterprises. Despite this, few studies test this hypothesis empirically at the conceptual level.

The resource-based approach views the enterprise as a set of resources and capabilities combined to develop competencies. Resources and capabilities form the basis for sustainable competitive advantage. Resources according to Wernerfelt (Wernerfelt, 1984) can be classified into: physical capital resources (including plants, equipment, finance), organisational capital resources (e.g. organisational structure, management systems, human resource systems) and human capital resources (knowledge, skills, competencies).

According to Penrose's theory of enterprise growth (Penrose, 1959), an enterprise is a set of inputs that can be combined in different ways to produce outputs, and it is this combination of inputs that makes an enterprise unique. This theory provides a theoretical basis for the meanings of different types of resources for the overall efficiency and competitiveness of an enterprise (Roxas, 2011). Penrose's theory of enterprise growth suggests that enterprises can achieve and maintain competitive advantage if they possess valuable, rare, unique and irreplaceable tangible and/or intangible resources (Barney, 1991). Further, it is argued that heterogeneity of resources among firms leads to differences in performance (Peteraf, 1993). Intangible resources are necessary for the efficient use of available tangible resources and the creation of competitive advantage (Racela, 2020).

According to O.V. Inshakov's methodology (Inshakov, 2003), the production function of a socio-economic system can be represented in the following form:

$$Q = F\,(A, T, F, O, Inf, Ins) \qquad (1)$$

where Q – produced product, A – human, T – technical and technological, F – financial, O – organizational, Inf – information and Ins – institutional resources spent to produce the product. The subject of management, using each resource, affects the object of management, within the boundaries of which the process of creating the product of the socio-economic system is carried out. Such resources, as human, technical-technological and financial, carry out the transformation or transformation of the relevant conditions, processes and objects of nature into the product of the production system in the process of production. These are transformational resources. Correspondingly, the organisational, informational and institutional resources produce and maintain the necessary relations and connections, i.e. transactions, for the realisation of such a transformation. These are transactional resources. At the same time, transformational resources contribute to the direct transformation of resource-conditions into a product, while transactional resources produce the necessary transactions, providing connections and relations for this purpose.

The paper proposes a list of 6 resources according to the methodology of O.V. Inshakov (Inshakov, 2003) within the framework of the resource-based approach. The expert comparison of the values proposed for the meaningful interpretation of each specific resource allowed the authors to determine the most authentic values in relation to the corresponding resource for ensuring the competitiveness of the regional SME system (Table 1).

Table 1: Qualitative content and meaningful interpretation of the regional SME system competitiveness resources.

Name	Quality resource	Meaningful

Resources	content	interpretation of resources
Human Resource	People who are carriers of the knowledge, abilities, skills, competencies required to carry out the production process	Total number of employees
Technical and technological Resource	Technical facilities, means, machines, mechanisms, devices, appliances, etc. required to carry out the production process	Volume of fixed assets at full book value
Financial Resource	Finance, financial instruments and the means necessary to carry out the production process	Working capital
Organizational Resource	Means, conditions and facilities used to implement the organisational and organisational support required to carry out the production process	Average number of employees per business entity
Information Resource	Information and communication facilities, conditions and opportunities for information and communication links and relationships necessary for the implementation of the production process	Number of publicly available sources of information used for substantive activities
Institutional Resource	The means, conditions and opportunities of a regulatory, legal and legislative nature necessary to carry out the process of production (laws, norms, regulations, written and unwritten rules, traditions, behavioural habits, etc.)	Rate of formation of new small and medium enterprises

Source: authors.

The importance of the impact of the resources presented in Table 1 on the competitive advantage of small and medium enterprises is highlighted by many researchers:

-human resource – B. Kotey, P. Slade (Kotey, 2005), C. Zheng, G. O'Neill, M. Morrison (Zheng, 2009), J. Chowhan (Chowhan, 2016), C. Hoon, A. Hack, F.W. Kellermanns (Hoon, 2019), J. Wongsansukcharoen, J. Thaweepaiboonwong (Wongsansukcharoen, 2023);

-techno-technological resource – C.H. Wang (Wang, 2008), G.Ö. Danişman (Danişman, 2022);

-financial resource – S. Choi a, H. Liu b, J. Yin c, Y. Qi d, J. Y. Lee e (Choi a, 2021), E. Mills, J. Dong, L. Yiling, M. Baafi, B. Li, K. Zeng, (Mills, 2021), Z. Dong, Z. Zhang (Dong, 2022), C. Tang, M. Irfan, A. Razzaq, V. Dagar (Tang, 2022);

-organisational resource – T.C. Powell (Powell, 1992), C. Camisón, A. Villar-López (Camisón, 2014), G. Azar, F. Ciabuschi (Azar, 2017);

-information resource – D.J. Collis (Collis, 1994), F. Wu, S. Yeniyurt, D. Kim, S.T. Cavusgil (Wu, 2006), S. Tseng (Tseng, 2008), H. Mao, S. Liu, J. Zhang, Z. Deng (2016);

-institutional resource – C. Oliver (Oliver, 1997), Z. Yousaf, M. Radulescu, C. Sinisi, Serbanescu, L., L. Păunescu (Yousaf, 2021).

At the same time, there is no single opinion about which of the presented resources is key in ensuring the competitiveness of the regional SME system, and which constrains (weakens) it.

As a methodological basis for targeting the competitive functioning of the regional SME system, the research of I. Adizes is used in this paper. I. Adizes proposes conditions for the successful functioning of socio-economic systems (Adizes, 1979; Adizes, 1985; Adizes, 1999).

The authors propose a new model for implementing the tools to identify key and constraining resources to ensure the competitiveness of the regional SME system, which includes the following procedures:

1. Determination of the sectoral affiliation of small and medium-sized enterprises through the Russian Classifier of Economic Activities 2 (Russian Classifier..., 2014) based on the identification of industries that traditionally determine the situation in the region and set the vector of its development in the future.

2. Collection and analysis of statistical data on the indicators presented in Table 1 and reflecting for a certain period (at least 3 years) the provision of the regional SME system with appropriate resources.

3. Calculation on the basis of collected relevant statistical data of the values and analysis of the dynamics of the final indicator of competitiveness of the regional CME system (hereinafter CI) for a certain period (at least 3 years) according to the formula:

$$ПК = \sqrt{(\sqrt{A \times B}) \times (\sqrt{C \times D})} \tag{1}$$

where: A – sectoral structure of small and medium enterprises in the region; B – sectoral structure of investment in fixed capital of small and medium enterprises in the region; C – sectoral structure of enterprises turnover in the region; D – sectoral structure of small and medium enterprises turnover in the region in % per 1,000 people employed in the industry.

4. Application of correlation analysis tools to determine the relationship between the values interpreting the resource provision of the regional SME system functioning (according to item 2) and the values of the final indicator of its competitiveness (according to item 3).

5. Allocation of 9 groups of values of the calculated correlation coefficient and assigning them respective impact scores (from -4 to +4; step – 1 scores) depending on the following variants of the degree of impact:

-strong negative impact – -4;
-moderate negative impact – -3;
-slight negative impact – -2;
-significant negative impact – -1;
-no impact – 0;
-significant positive impact – +1;
-slight positive impact – +2;
-moderate positive impact – +3;
-strong positive impact – +4.

6. Score assessment of the values of the calculated correlation coefficient between the relevant resources and CI of the region with calculation of the final sum of points of positive/negative impact of resources on CI by resources and industries.

7. Identification of key and constraining resources of the regional SME system competitiveness. The key resources are those with the difference between the sum of positive impact by industries exceeding the sum of negative impact, and the restraining resources, respectively, on the contrary.

3 RESULTS AND DISCUSSION

The implementation of the proposed toolkit for identifying key and constraining resources for ensuring the competitiveness of the regional SME system in the work was carried out on the example of Volgograd region.

Human, financial, technical-technological and institutional resources were identified for the analysis, as the current statistics on small and medium entrepreneurship of Volgograd region provides a clear picture of their substantive dynamics.

By means of Russian Classifier of Economic Activities 2 the sectoral affiliation of small and medium-sized enterprises of Volgograd region was determined on the basis of the industries that traditionally determine the situation in Volgograd region and set the vector of its development in the future. Further, the following designations are used for the selected 11 industries:

-(1) – agriculture, forestry, hunting, fishing and fish farming;
-(2) - mining and quarrying;
-(3) – manufacturing;
-(4) – provision of electricity, gas, and steam; air-conditioning;
-(5) – construction;
-(6) – wholesale and retail trade; repair of motor vehicles, motorbikes;
-(7) – activities of hotels and catering establishments;
-(8) – activities in the field of information and communication;
-(9) – activities in operations with immovable property;
-(10) – education;
-(11) – health care and social services activities.

Table 2 analyses the dynamics of statistical data on the indicators reflecting for 2019-2021 the provision of Volgograd region's SME system with relevant resources – human, financial, technical-technological and institutional.

Table 2: To provide appropriate resources for the functioning of Volgograd region's SME system under Russian Classifier of Economic Activities 2 in 2019-2021.

Types of economic activity	Provision of human resource (total number of employees, thousand people)				
	2019	2020	2021	Average value per year	Average growth rate, %
(1)	26,58	26,08	24,83	25,83	98,58
(2)	0,83	0,82	0,78	0,81	98,79
(3)	30,05	29,49	28,07	29,20	98,58
(4)	0,88	0,86	0,82	0,85	98,47
(5)	22,23	21,81	20,77	21,60	98,58
(6)	61,01	59,87	57,00	59,29	98,58
(7)	10,44	10,25	9,75	10,15	98,59
(8)	5,30	5,20	4,95	5,15	98,57
(9)	14,77	14,50	13,80	14,36	98,59
(10)	0,86	0,85	0,81	0,84	98,83
(11)	5,46	5,35	5,10	5,30	98,55

Types of economic activity	Provision of technical and technological resource (volume of fixed assets at full book value, million roubles)				
	2019	2020	2021	Average value per year	Average growth rate, %
(1)	82402,68	82633,42	80147,88	81727,99	99,59
(2)	5186,04	5164,57	4161,13	4837,25	96,58

(3)	25950,69	25331,85	16644,52	22642,35	93,41
(4)	1,59	1,79	1,37	1,58	99,79
(5)	8445,25	8070,41	0,00	5505,22	80,74
(6)	15189,15	15186,05	12770,36	14381,85	97,31
(7)	3443,69	2804,29	2521,28	2923,09	92,13
(8)	1844,84	1640,63	840,43	1441,97	88,41
(9)	36343,27	35505,10	42021,26	37956,54	102,20
(10)	143,49	122,93	112,74	126,39	93,85
(11)	1906,33	1859,78	1824,34	1863,48	98,87

Types of economic activity	Provision of financial resource (working capital, million roubles)				
	2019	2020	2021	Average value per year	Average growth rate, %
(1)	38106,90	43850,30	58945,30	46967,50	111,02
(2)	1977,50	1971,89	1601,10	1850,16	96,73
(3)	79273,70	69158,84	71147,70	73193,41	96,09
(4)	2518,50	5336,92	6525,60	4793,67	137,96
(5)	52318,60	56454,81	57177,00	55316,80	102,83
(6)	225402,40	234454,19	246155,40	235337,33	102,18
(7)	8481,10	7879,50	7279,00	7879,87	96,39
(8)	6471,60	6753,85	8666,40	7297,28	106,19
(9)	25691,20	24634,95	21967,00	24097,72	96,85
(10)	224,70	303,06	406,00	311,25	117,69
(11)	3977,00	5195,27	6670,50	5280,92	115,23

Types of economic activity	Provision of institutional resource (rate formation of new small and medium enterprises, %)				
	2019	2020	2021	Average value per year	Average growth rate, %
(1)	98,50	97,93	99,26	98,56	100,03
(2)	94,44	93,14	107,37	98,32	102,03
(3)	94,42	87,63	97,50	93,18	99,34
(4)	94,84	92,89	99,10	95,61	100,41
(5)	98,75	93,73	95,58	96,02	98,61
(6)	91,68	86,46	98,65	92,26	100,32
(7)	100,47	92,53	97,53	96,84	98,18
(8)	92,20	95,83	97,83	95,29	101,66
(9)	99,38	96,28	100,38	98,68	99,65
(10)	99,83	96,66	99,42	98,64	99,40
(11)	97,44	95,86	99,67	97,66	100,11

Source: calculated by the authors according to: (Small and medium business…, 2022; Volgograd Region…, 2019; Volgograd Region…., 2020; Volgograd Region…, 2021).

As it can be seen from the data of table 2, for all 11 analyzed industries of Volgograd region the indicator of the total number of employees, meaningfully interpreting the human resource in providing the functioning of the regional SME system, tends to decrease in value – the average growth rate of this indicator is less than 100%, but above 98.4%.

Ensuring the functioning of Volgograd region's SME system by technical and technological resource in the meaningful interpretation of the indicator of fixed assets at full book value only for the industry (9), reflecting the activities on operations with real estate, tends to increase this indicator – the average growth rate is 102.2%. For other sectors, a steady downward trend in the average growth rate of this indicator is observed. The lowest value of the average growth rate of the indicator (80.74%) belongs to industry (5) – construction.

The best results for the value of the average growth rate of the interpretive indicator belong to the financial resource for ensuring the functioning of Volgograd region's SME system – the average growth rate of the indicator of working capital of enterprises is above 100% in 7 out of 11 industries. The maximum value of the average growth rate of this indicator (137.96%) belongs to the sector (4) responsible for the provision of electricity, gas and steam, as well as air conditioning.

The institutional resource is inferior to the financial resource – in 6 out of 11 industries, the average growth rate of the indicator of the rate of formation of new small and medium enterprises, meaning this resource, is above 100%. At the same time, the maximum value of the average growth rate of this indicator (102.03%), which belongs to industry (2), reflecting the extraction of minerals, is much lower than the corresponding value of the financial resource for ensuring the functioning of Volgograd region's SME system.

The results of calculation on the basis of collected relevant statistical data of values and analysis of dynamics of CI of Volgograd region by industries in 2019-2021 are presented in Table 3.

Table 3: CI of Volgograd region by industries in 2019-2021, %.

Types of economic activity	2019	2020	2021	Average value per year	Average growth rate, %
(1)	10,63	10,97	12,26	11,29	103,04
(2)	0,97	0,92	0,81	0,90	96,32
(3)	11,28	9,85	9,59	10,24	95,28

(4)	0,67	0,93	0,99	0,86	113,51
(5)	11,75	11,62	11,16	11,51	98,97
(6)	21,69	20,62	20,34	20,88	98,12
(7)	1,81	1,65	1,52	1,66	95,77
(8)	1,51	1,47	1,60	1,53	100,55
(9)	6,21	5,82	5,32	5,78	96,50
(10)	0,18	0,20	0,23	0,20	106,28
(11)	1,43	1,56	1,71	1,57	104,67

Source: calculated by the authors according to: (Small and medium business…, 2022; Volgograd Region…, 2019; Volgograd Region…., 2020; Volgograd Region…, 2021).

As can be seen from Table 3, 5 out of 11 industries in Volgograd region have an average CI growth rate above 100%. Its maximum value (113.51%) belongs to industry (4). The next highest value of the average growth rate of CI (106.28%) belongs to industry (10). The minimum value of the average CI growth rate of Volgograd region (95.28) belongs to industry (3).

In the present paper, the canonical correlation analysis in the STATISTICA system was used to determine the relationship between the values interpreting the resource provision of the regional SME system functioning and its CI values, which allows us to investigate the relationship between two sets of variables. The resulting solutions are canonical roots, each of which explains a unique proportion of the variability between the two sets of variables.

The correlation coefficients take values between «-1.00» and «+1.00». A value of «-1.00» means that the variables are strongly negatively correlated. A value of «+1.00» means that the variables are strongly positively correlated. A value of «0.00» means there is no correlation. All intermediate values determine the correlation between the indicated boundaries.

The paper used simple linear correlation (r-Pearson correlation coefficient), which assumes that the two variables in question are measured on at least an interval scale. It determines the extent to which the values of the two variables are «proportional» to each other. Importantly, the value of the correlation coefficient is independent of the scale of measurement. For example, the correlation between the number of employees and working capital will be the same regardless of whether the measurement is «thousand people» and «million roubles» or «people» and «roubles». Proportionality means a linear relationship.

The correlation analysis (Table 4) was applied to determine the relationship between the values interpreting the resource provision of Volgograd region's SME system (Table 2) and the values of its CI (Table 3).

Table 4: Values of the r-Pearson correlation coefficient between relevant resources and CI of Volgograd region.

Types of economic activity	Human resource and CI	Technical and technological resource and CI	Financial resource and CI	Institutional resource and CI
(1)	-0,996578	-0,960391	0,997424	0,802340
(2)	0,990342	0,952062	0,950418	-0,916347
(3)	0,811601	0,665743	0,945378	0,068260
(4)	-0,860840	-0,205850	0,993609	0,381479
(5)	0,998216	0,983094	-0,774049	0,365429
(6)	0,844544	0,664884	-0,923172	-0,281470
(7)	0,952347	0,986694	0,998453	0,417847
(8)	-0,858685	-0,900182	0,930314	0,584700
(9)	0,985189	-0,845201	0,986153	-0,309166
(10)	-0,957683	-0,972790	0,999330	-0,077591
(11)	-0,980477	-0,994903	0,999485	0,600973

Source: calculated by the authors according to: Table 2, Table 3.

Based on the data obtained in Table 4, 9 groups of values for the calculated r-Pearson correlation coefficient (with an initial and a value for each group) are identified and their respective impact scores assigned (Table 5).

Table 5: Point values of the extracted groups of values of the calculated r-Pearson correlation coefficient.

Degree of impact of the allocated groups of values of the calculated correlation coefficient	Initial value	End value	Impact points
1. Strong negative impact	-0,996578	-0,747071	-4
2. Moderate negative impact	-0,747070	-0,497563	-3
3. Slight negative impact	-0,497562	-0,248055	-2
4. Significant negative impact	-0,248054	-0,000001	-1
5. No impact	0,000000		0
6. Significant positive impact	0,000001	0,250960	+1
7. Slight positive impact	0,250961	0,500468	+2
8. Moderate positive impact	0,500469	0,749976	+3
9. Strong positive impact	0,749977	0,999485	+4

Source: authors.

The scoring (according to Table 5) of the values of the calculated r-Pearson correlation coefficient between the relevant resources and CI of Volgograd region with the calculation of the final sum of points for the positive / negative impact of the resource on CI by resources and by industries is presented in Table 6.

Table 6: Scoring the values of the calculated r-Pearson correlation coefficient between the relevant resources and CI of Volgograd region.

Types of economic activity	Human resource and CI	Technical and technological resource and CI	Financial resource and CI	Institutional resource and CI
(1)	-4	-4	+4	+4
(2)	+4	+4	+4	-4
(3)	+4	+3	+4	+1
(4)	-4	-1	+4	+2
(5)	+4	+4	-4	+2
(6)	+4	+3	-4	-2
(7)	+4	+4	+4	+2
(8)	-4	-4	+4	+3
(9)	+4	-4	+4	-2
(10)	-4	-4	+4	-1
(11)	-4	-4	+4	+4
Total score of positive / negative impact of resources on CI – by industries	+24/-20	+18/-21	+36/-8	+17/-9

Types of economic activity	Total score of positive / negative impact of resources on CI – by resources
(1)	+8/-8
(2)	+12/-4
(3)	+12/0
(4)	+6/-5
(5)	+10/-4
(6)	+7/-6
(7)	+14/0
(8)	+7/-8
(9)	+8/-6
(10)	+4/-9
(11)	+8/-8

Source: calculated by the authors according to: Table 4, Table 5.

Based on the data in Table 4 and Table 6, the following conclusions can be drawn by resources and by industries.

In terms of resources, 7 industries have the greatest positive impact on CI of Volgograd region: (7) – +14/0 impact points, (3) – +12/0 impact points, (2) – +12/-4 impact points, (5) – +10/-4 impact points, (9) – +8/-6 impact points, (6) – +7/-6 impact points, (4) – +6/-5 impact points. There are 2 industries with the greatest negative impact on CI of Volgograd region in terms of resources: (10) – +4/-9 impact points, (8) – +7/-8 impact points.

We can say that for industries (1) and (11) (+8/-8 impact points) the positive impact of resources on CI of Volgograd region is leveled by their negative impact.

In terms of industries, human resource has either a strong positive or a strong negative impact on CI of Volgograd region. Thus, a strong positive impact on the CI is diagnosed for 6 out of 11 industries in Volgograd region: (5) – r=0.998216, (2) – r=0.990342, (9) – r=0.985189, (7) – r=0.952347, (6) – r=0.844544, (3) – r=0.811601. CI for the remaining 5 industries is strongly negatively impact by human resource: (1) – r=-0.996578, (11) – r=-0.980477, (10) – r=-0.957683, (4) – r=-0.860840, (8) – r=-0.858685. The positive value of the r-Pearson correlation coefficient in this case indicates a positive relationship between CI and the total number of workers in the industries, whereas one of the variables increases, the other also increases. The negative value of the r-Pearson correlation coefficient means that as the total number of employees grows, CI of Volgograd region for a given industry decreases.

Similarly to the human resource, the financial resource has either a strong positive or strong negative impact on CI of Volgograd region by industries. At the same time, the number of industries in Volgograd region, on CI of which this resource has a strong positive impact, is greater than the similar indicator of human resource by 3 industries – 9 out of 11 industries: (11) – r=0.999485, (10) – r=0.999330, (7) – r=0.998453, (1) – r=0.997424, (4) – r=0.993609, (9) – r=0.986153, (2) – r=0.950418, (3) – r=0.945378, (8) – r=0.930314. And on CI only 2 out of 11 industries, financial resource has a strong negative impact: (6) – r=-0.923172, (5) – r=-0.774049. Thus, almost all industries under consideration in Volgograd region have a positive linear correlation between working capital growth and CI growth.

Technical and technological resource has a strong positive, strong negative, as well as a moderate positive and significant negative impact on CI of Volgograd region in the context of industries. Thus, the strong negative impact of the techno-technological resource on CI of Volgograd region in the following 5 industries: (11) – r=-0.994903, (10) – r=-0.97279, (1) – r=-0.960391, (8) – r=-0.900182, (9) – r=-0.845201. This resource has a significant negative impact on Volgograd region industry (4) – r=-0.20585. In Volgograd region industries with negative r-Pearson correlation coefficient, an increase in the volume of fixed assets leads to a decrease in CI. The strong positive impact of technical and technological resource has on CI of Volgograd region in the following 3 industries: (7) – r=0.986694, (5) – r=0.983094, (2) – r=0.952062. This resource has a moderate positive impact in Volgograd region for the following 2 industries: (3) – r=0.665743, (6) –

r=0.664884. In the industries of Volgograd region, having in this case a positive r-Pearson correlation coefficient, the increase in the volume of fixed assets causes an increase in CI.

Institutional resource has a strong positive impact on CI of Volgograd region by industry (1) – r=0.80234; moderate positive impact by industry (11) – r=0.600973 and industry (8) – r=0.584700; slight positive impact by 3 industries – (7) – r=0.417847, (4) – r=0.381479, (5) – r=0.365429; slight positive impact by industry (3) – r=0.068260; strong negative impact by industry (2) – r=-0.916347; weak negative impact by 2 industries – (6) – r=-0.281470 and (9) – r=-0.309166; slight negative impact by industry (10) – r=-0.077591. The negative value of the r-Pearson correlation coefficient in this case means that as the rate of formation of new small and medium enterprises increases, CI of Volgograd region in terms of certain industries decreases.

It should be noted that no situations of a moderate negative impact of the resource (r-Pearson from -0.747070 to -0.497563) on CI of Volgograd region by industries were detected.

4 DISCUSSIONS

According to established economic views, the competitiveness of small and medium enterprises depends on the action of various external and internal influences, differentiated by the degree and direction of influence on it. The structure of these influences includes the resources that ensure the functioning of the SME system as a whole. Most studies are limited to the definition of a simple list of these resources, excluding a deeper study of their impact on the competitiveness of the SME system and not aimed at determining the key and constraining resources.

The author's model for implementing the tools to identify key and constraining resources to ensure the competitiveness of the regional SME system presented in the study consists of 7 procedures and is based on the appropriate combination of two methodologies: I. Adizes's methodology of identifying indicators for calculating the final indicator of system competitiveness (Adizes, 1979; Adizes, 1985; Adizes, 1999), and O.V. Inshakov's methodology of allocating 6 resources within the resource-based approach (Inshakov, 2003). The calculation was carried out on the basis of officially published statistical data (which did not require special surveys to collect missing information) on the example of Volgograd region's SME system for the period from 2019 to 2021.

According to the results of the study, financial, institutional and human resources are determined as the key resources for ensuring the competitiveness of Volgograd region's SME system in terms of ranking, while the technical and technological resource is a constraining one. The obtained conclusions confirm and prove the data presented:

-in studies of S. Choi a, H. Liu b, J. Yin c, Y. Qi d, J. Y. Lee e (Choi a, 2021), E. Mills, J. Dong, L. Yiling, M. Baafi, B. Li, K. Zeng, (Mills, 2021), Z. Dong, Z. Zhang (Dong, 2022), C. Tang, M. Irfan, A. Razzaq, V. Dagar (Tang, 2022), that financial resource plays a vital role in improving the quality of enterprise development, stimulating the vitality and stabilizing their economic development;

-in studies of C. Oliver (Oliver, 1997), Z. Yousaf, M. Radulescu, C. Sinisi, Serbanescu, L., L. Păunescu (Yousaf, 2021), that institutional resource is a source of sustainable competitive advantage for enterprise survival and development;

-in studies of J. Chowhan (Chowhan, 2016), C. Hoon, A. Hack, F.W. Kellermanns (Hoon, 2019), that human resource is sufficiently important success factor to improve business performance, attract and retain new charismatic highly skilled employees and develop staff mindset and behaviour that provides sustainable competitive advantage to business, and consistent with the findings of B. Kotey, P. Slade (Kotey, 2005), C. Zheng, G. O'Neill, M. Morrison (Zheng, 2009), J. Wongsansukcharoen, J. Thaweepaiboonwong (Wongsansukcharoen, 2023), that human factor affects the performance of SME system and helps through competitive advantage develop long-term business performance.

Determination of technical and technological resource as a constraint having a negative impact on the competitiveness of Volgograd region's SME system argues C.H. Wang (Wang, 2008), G.Ö. Danişman (Danişman, 2022), that low availability of this resource contributes to reducing the competitiveness of enterprises, especially in today's business environment.

The results are consistent with previous studies (Korobov, 2017; Korobov, 2020) and extend the existing research on the role of various resources in the functioning of the SME system. The authors determined that financial, institutional and human resources, determined as key resources, have the greatest positive impact on the competitiveness of Volgograd region's SME system, while the technical and technological factor, determined as a constraint, has a negative impact on it.

The identification of key and constraining resources objectively substantiates the need for the public authorities of a given region to focus on the development of the identified key resources and to assess more carefully the status and trends of constraining resources in order to improve the efficiency and effectiveness of the regional SME system.

5 CONCLUSION

In general, according to the final degree of impact, financial, institutional and human resources are determined as the key resources for ensuring the competitiveness of Volgograd region's SME system by the degree of ranking.

For 9 industries, the financial resource has a strong positive impact (+36 impact points), and only for 2 industries – a strong negative impact (-8 impact points).

Institutional resource according to the final degree of impact has a positive (strong, moderate, slight, significant) impact in 7 industries (+17 impact points), and only in 4 industries – negative (strong, slight, significant) impact (-9 impact points), which in general does not overlap the result of its positive impact on CI of Volgograd region.

Based on the final degree of impact, human resource has a strong positive impact in 6 industries (+24 impact points), but in 5 industries – a strong negative impact (-20 impact points), which on the whole quite seriously levels the result of its positive impact on CI of Volgograd region.

The technical and technological resource according to the final degree of impact has more negative than positive impact: in 6 industries it has a negative (strong or significant) impact (-21 impact points), and only in 5 industries it has a positive (strong or moderate) impact (+18 impact points), which does not cover the final sum of points of positive impact of the resource on CI of Volgograd region and on this basis defines it as a deterrent resource, in general negatively affecting competitiveness of Volgograd region's SME system.

Proceeding from the logic of formation of the state programmed of support to small and medium-sized enterprises the following conclusions can be made:

1. Attraction of federal subsidies, investments, subventions have a maximum positive impact on the competitiveness of most industries in Volgograd region and proves the high efficiency of their spending in the region.

2. The current state of regional legislation to support and develop of Volgograd region's SME system also has a strong impact on its competitiveness. Nevertheless, in a number of industries, it needs to be improved (developed) to achieve its full positive impact.

3.Human resource balances on the verge of having a neutral impact on competitiveness of Volgograd region's SME system, which determines a number of reserves for its more effective use in 5 industries of Volgograd region. Measures to increase the efficiency of human resource utilization can be programs of professional development, competence development centers, raising the prestige of working professions, etc.

4. Based on the analysis of technical and technological resource, it is obvious that this resource should become the object of increased attention of public authorities of Volgograd region. In fact, this resource is restraining, which shows the low efficiency of fixed assets use in at least 6 industries of Volgograd region. That is, the region needs programmes of technical modernization, opening of new high-tech productions, creation of a fully functional infrastructure for support of innovative entrepreneurship, etc.

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