Resource and factor support for the competitive functioning of small and medium-sized enterprises: the potential of the cognitive approach

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Abstract. The study aims to substantiate and prove the feasibility of the cognitive approach in determining the role and impact of available resources to ensure the competitive functioning of small and medium-sized businesses. The authors have developed a toolkit for implementing the competitive functioning of small and medium enterprises through resource and factor support within the framework of the cognitive approach, acting as a methodological basis and applied in the implementation of expert analysis, designated as a methodological basis. Based on the concept of managerial roles of I. Adizes, the authors defined the functional qualities of competitive management of small and medium-sized enterprises, expressed through four functional indicators: production of results, administration of activities, proactive and creative development, and integration of internal and external environment. Under the theory of production factors of O.V. Inshakov, C. Hofer, the authors substantiated the content of eight resources of management of small and medium entrepreneurship: human, technical, material, organizational, information, institutional, financial, reputation. The article’s scientific novelty lies in combining the concept of managerial roles with the resource-factor approach and applying the cognitive approach to determine the degree of resource participation in ensuring the competitive functioning of small and medium-sized businesses.

1 Introduction

The problem of small and medium-sized enterprises (SMEs) for the country’s economy is now becoming particularly important due to the need for economic and geopolitical confrontation between Russia and Western countries. Studies of the development and functioning of SMEs in the present conditions are becoming especially demanded by economic science and practice.

The main problem that stood in the way of the development of the national economy and is in dire need of a solution is to ensure the competitive functioning of economic entities of any level under the prolonged influence of restrictive external sanctions.

The need to solve this problem is equally relevant for large economic systems (regions,
industries, industrial complexes, large companies) and SMEs. Competitive functioning, which means the production of competitive products, should concern SMEs as their adaptive activity and economic mobility traditionally characterize this sphere of economic activity. SMEs should occupy those market niches, the development of which by large businesses is impossible or unattractive for duration, small scale, high product diversity, etc. These are, first of all, various spheres of infrastructure support for the functioning of the national economy and the population’s life, the production of consumer goods and services, etc.

The cognitive approach in this study will be used for the construction and practical implementation of the resource-factor support process for SMEs’ competitive functioning. Cognitiveness is manifested in the possibility of acquiring and forming new knowledge based on expert analysis about the resource and factor support process for the competitive functioning of SMEs within a particular economic or territorial system. In this case, the subjects of management of territorial SME systems (primarily the authorities), implementing the cognitive approach, can successfully form and implement their own decisions and actions to ensure these systems’ competitive functioning. Indeed, cognitive economics is an economy built on cognitive knowledge, a system of economic constructions that includes as a basic element an understanding of how actors of different natures (individuals, groups and work teams, organizations) shape their actions in the economic space.

The study aims to develop a practical toolkit for implementing the competitive functioning of SMEs through resource and factor support within the framework of the cognitive approach.

2 Materials and methods

Resource and factor support for the competitive functioning of SMEs is the most important aspect of its success. This is confirmed by most authors’ research on the possibilities of various tools for identifying and strengthening this provision, including – and cognitive approach.

Thus, D.J. Teece suggests that a cognitive approach can help enterprises develop the dynamic capabilities needed to adapt to changing conditions and maintain competitiveness by focusing on knowledge acquisition, knowledge sharing and knowledge integration [1]. D.B. Audretsch argues that a cognitive approach can identify and develop entrepreneurial thinking and creativity (e.g., through training and mentoring programs), which is critical to SME competition [2].


Suppose the cognitive approach in this study serves as a methodological basis for developing management decision-making tools in managing SMEs within territorial economic systems. In that case, the methodological basis is expert analysis in implementing resource and factor support. The cognitive approach takes place in the implementation of expert analysis of the resource and factor support process of territorial SME systems, which contributes to the production of new knowledge about this process.

The cognitive approach as a methodological basis is implemented through expert analysis. The content of expert analysis makes it essentially a cognitive analysis aimed at determining the impact of some values on others in the process of resource provision of
competitive functioning of territorial SME systems.

Subjects of the expert (cognitive) analysis can be persons (individual and/or collective) carrying out the process of management of the business entity SME or interested in the successful implementation of this process.

The objects of expert (cognitive) analysis can be SME business entities operating separately or jointly within a particular territorial management system or industry.

In this study, as a methodological basis for the conditions of competitive functioning of territorial SME systems of various levels, the concept of managerial roles in the framework of the methodology of I. Adizes is considered [14-16]. The key feature of this methodological approach is its maximum proximity to the conditions of practical managerial activity.

To implement management that ensures the successful functioning of the organization, according to the methodology of I. Adizes methodology; the management process must be effective and efficient in the short and long term. Adapting the provisions of the methodological approach I. Adizes to the economic systems of SMEs, let us consistently formulate the conditions of management to ensure their successful, and therefore competitive, functioning.

According to I. Adizes for the successful functioning of the socioeconomic system and its competitive management, the system must be effective and efficient in the short and long-term time horizons, and its management must ensure the implementation of four functional qualities – functionality, systemic, proactive and organic. In the methodology of I. Adizes types of managerial behavior that provide these qualities are represented as management roles that business entities follow in their functioning.

Table 1 proposes economic values, which in their content can interpret the corresponding functional qualities. For ease of further application, we denote the functional qualities of competitive management of SME systems by appropriate functional indicators: production of results, administration of activities, proactive and creative development, and integration of internal and external environments.

Table 1. Content interpretation of indicators of functional qualities of SME systems.

<table>
<thead>
<tr>
<th>Functional qualities – functional indicators (designation of indicators)</th>
<th>Content interpretation of indicators of functional qualities of SME management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of functionality: Production of results (P.R.)</td>
<td>Effectiveness in the short term. The function aims to meet the business needs of the market and customers</td>
</tr>
<tr>
<td>Quality of proactivity: Proactive and creative development (PCD)</td>
<td>Enterprise. Proactivity. Business development for the future. The function is aimed at creating conditions and prerequisites for creative business development</td>
</tr>
<tr>
<td>Quality of organicity: Integration of internal and external environment (IIEE)</td>
<td>Development of employee cohesion in business, interpersonal trust and mutual respect between people. Integration with the external business environment</td>
</tr>
</tbody>
</table>

Source: Compiled by the authors.
Modeling of resource provision of the management process of SME economic entities functioning within the framework of territorial economic systems of various levels was carried out based on the analysis of resource provision of the process of successful functioning of economic entities of various levels within the concept of “Development Core” and the theory of production factors of O.V. Inshakov [17, 18].

The demand for the resource-based approach is due to its effectiveness in identifying and justifying the resource sources for socioeconomic systems’ successful and competitive functioning. The basic premise of the resource approach is defined as follows: any economic system can achieve sustainable competitive advantage provided it possesses and develops valuable, rare, difficult to imitate and irreplaceable resources and capabilities, and there is an organizational structure that can recognize and apply them.

We can say that the resource concept and the resource-oriented approach contribute to a fuller disclosure and understanding of the links and relations in the logical sequence of alternating states of the life cycle of the economic system, conditionally represented in the form: {...means (as resources) action (as management) – result (as competitiveness) – ...}. Successful and competitive functioning of SME subjects (as an object of management) is the goal of SME management [19-21]. The functioning of SMEs is a process for the successful and competitive implementation of which the necessary resources are mastered [22-24]. Therefore, the full functioning process here should be considered as a production process, the resources of management of this process – as resources of production, and the product of production – the successful and competitive functioning of SMEs.

Let us consider the content of the resource approach to managing socioeconomic systems, for which we will use the results of research by individual researchers. So, in his works, O.V. Inshakov [17, 18] considers the production function defined by the following resources: human, technical and technological, material, organizational, informational and institutional. In their works, such researchers as C. Hofer, D. Schendel [25], and R.M. Grant [26] came to similar conclusions and, in general, propose to allocate the following main categories of resources: financial, material, human, technological, reputational and organizational.

In work within the framework of the resource-based approach, a list of management resources, including eight resources, where financial and reputational resources complement six resource factors according to the methodology of O.V. Inshakov.

Thus, we have, in general, the following content for these resources (see Table 2). Since this paper examines the process of SME management, we consider the resources used for this purpose as SME management resources.

**Table 2. Content of SME management resources.**

<table>
<thead>
<tr>
<th>Resource name (resource designation)</th>
<th>High-quality content of the resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human (A)</td>
<td>People who are carriers of knowledge, abilities, skills, abilities of professional competencies necessary to carry out the process of production</td>
</tr>
<tr>
<td>Technical (T)</td>
<td>Technical facilities, means, machines, mechanisms, devices, appliances, etc., necessary for the implementation of the production process</td>
</tr>
<tr>
<td>Material (M)</td>
<td>Finance, as well as objects and conditions of artificial or natural origin (minerals, timber, electricity, natural gas, minerals, hydrocarbon fuels,</td>
</tr>
<tr>
<td>Source: Compiled by the authors.</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td></td>
</tr>
</tbody>
</table>

Based on the above, the following conclusion can be made: one of the main components of the SME management mechanism is management resources, meaningfully defined by eight groups. Each resource group represents a cumulative SME resource concerning the appropriate management level (federal, county, or regional). With the help of these factors, the subject of management (authorities at the appropriate level of government) to achieve the purpose of management, influencing the subject of management (SMEs at the appropriate level of government), implements the production process. The achievement of the management goal in this production process is accompanied by a product, which is the successful and competitive functioning of the SME. Therefore, the authors of this study chose the resource-based approach as the most appropriate in terms of methodological support for the expert analysis of the management process of business entities of SMEs.

The authors of this study considered expert analysis within the cognitive approach as a specific form of implementation of cognitive analysis aimed at expert assessment of the impact of some values on others in the management of SMEs operating within the boundaries of specific territorial economic systems.

Values, influence on which was estimated, are functional indicators of functional qualities of concrete SME system: production of results (P.R.), activity administration (A.A.), proactive and creative development (PCD), integration of internal and external environment (IIEE) (see Figure 1).
To perform expert analysis, we propose a method of expert ranking of the influence of one value on another, traditionally used in engineering forecasting tasks. The ranking is based on an expert comparison of the level of influence of each resource separately on the values determining the competitive functioning of SMEs.

Expert analysis is carried out in three stages. The content of the first stage of the expert analysis within the cognitive approach was presented in the form of a matrix: resources – functional indicators (see Table 3). Filling this matrix is carried out for a functional indicator by columns, in each of which the ranking (distribution of places) for a particular resource on the level of its use (development) of each functional indicator separately. Question for column 1, Resources ⇒ Functional Indicator “P.R.”: How are resources in the SME system allocated according to their level of use for the implementation of the functional indicator “Production of Results”? (1 – maximum level; 8 – minimum level). The questions for the other resources were formulated similarly.

**Table 3.** The content of expert analysis within the cognitive approach.

<table>
<thead>
<tr>
<th></th>
<th>PR</th>
<th>AA</th>
<th>PCD</th>
<th>IIEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inf</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At the second stage of expert analysis, within the framework of the cognitive approach, the values of the normalizing function are determined for the values of each column:

$$\varphi(i) = \frac{i}{2^{i+1}},$$  \hspace{1cm} (1)$$

where $i$ – the value of the expert evaluation.

Then its relative values are determined by the found values of the normalizing function. For each column for each functional indicator, the sum of the relative values of the normalizing function equals 1.0.

At the third stage of expert analysis, the cognitive approach determines the sums of the relative values of the normalizing function by row for each of the eight resources under study. At this stage of expert analysis, within the framework of the cognitive approach, resources (relevant resource groups) are compared by the level of their participation in the process of implementing the condition of successful functioning and competitive management, which is identified as achieving all four functional indicators: production of results, administration of activities, proactive and creative development, integration of internal and external environment. The obtained values are interpreted as the levels of participation of a particular resource in developing all functional indicators, thus ensuring the successful functioning and competitive management of SMEs.

### 3 Results

In the example of the Volgograd region, we conducted an expert analysis of the influence of resource groups on functional indicators in the management of the SME system.

According to the methodology of the online questionnaire (December 2022), respondents were randomly selected from among the SMEs of the Volgograd region, for which it was possible to collect information.

The required number of respondents was calculated with a 95% confidence level and 5% error using the formula:

$$n = \frac{z^2 \times p \times (1-p)}{e^2} = \frac{z^2 \times p \times (1-p)}{e^2 \times N} = 383$$ \hspace{1cm} (2)$$

where $z$ – confidence level (as $z$-score);

$p$ – percentage of responses;

e – margin of error;

$N$ – the number of SMEs in the Volgograd region as of 01.12.2022.

A sample of 383 respondents for a general population of 72,000 SMEs in the Volgograd region shows a 95% confidence level and a confidence interval of ±5%. That is, when
conducting 100 studies with this sample, 95% of the time, the responses obtained will be within ±5% of the baseline according to the laws of statistics. The presented sample is representative because the inclusion of each element of the general population took place with equal probability. Also, this sample is homogeneous, as the controlled parameter is evenly distributed, and there are no voids or clumps.

The results of the first stage of the expert analysis within the cognitive approach are presented in Table 4.

Table 4. The content of the expert analysis (SMEs of Volgograd region).

<table>
<thead>
<tr>
<th></th>
<th>PRB</th>
<th>AA</th>
<th>PCD</th>
<th>IIEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>T</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>O</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Inf</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Ins</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Rep</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: compiled by the authors.

At the second stage of the expert analysis, within the framework of the cognitive approach, we calculated the absolute values of the normalizing function by the formula (1) (see Table 5).

Table 5. Calculation of absolute values of the normalizing function (MSP Volgograd region).

<table>
<thead>
<tr>
<th></th>
<th>PRB</th>
<th>AA</th>
<th>PCD</th>
<th>IIEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>T</td>
<td>1.00</td>
<td>0.187</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>M</td>
<td>0.062</td>
<td>0.062</td>
<td>0.062</td>
<td>0.062</td>
</tr>
<tr>
<td>O</td>
<td>0.11</td>
<td>0.75</td>
<td>0.50</td>
<td>0.187</td>
</tr>
<tr>
<td>Inf</td>
<td>0.187</td>
<td>0.50</td>
<td>1.00</td>
<td>0.31</td>
</tr>
<tr>
<td>Ins</td>
<td>0.50</td>
<td>1.00</td>
<td>0.75</td>
<td>1.00</td>
</tr>
<tr>
<td>F</td>
<td>0.31</td>
<td>0.11</td>
<td>0.187</td>
<td>0.75</td>
</tr>
<tr>
<td>Rep</td>
<td>0.75</td>
<td>0.31</td>
<td>0.31</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Source: Compiled by the authors.

Then its relative values were determined using the found values of the normalizing function (see Table 6).

Table 6. Calculation of relative values of the normalizing function (MSP of the Volgograd region).

<table>
<thead>
<tr>
<th></th>
<th>PRB</th>
<th>AA</th>
<th>PCD</th>
<th>IIEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.255</td>
<td>0.255</td>
<td>0.255</td>
<td>0.255</td>
</tr>
<tr>
<td>T</td>
<td>0.255</td>
<td>0.048</td>
<td>0.028</td>
<td>0.028</td>
</tr>
<tr>
<td>M</td>
<td>0.016</td>
<td>0.016</td>
<td>0.016</td>
<td>0.016</td>
</tr>
<tr>
<td>O</td>
<td>0.028</td>
<td>0.191</td>
<td>0.128</td>
<td>0.048</td>
</tr>
<tr>
<td>Inf</td>
<td>0.048</td>
<td>0.128</td>
<td>0.255</td>
<td>0.079</td>
</tr>
<tr>
<td>Ins</td>
<td>0.128</td>
<td>0.255</td>
<td>0.191</td>
<td>0.255</td>
</tr>
<tr>
<td>F</td>
<td>0.079</td>
<td>0.028</td>
<td>0.048</td>
<td>0.191</td>
</tr>
<tr>
<td>Rep</td>
<td>0.191</td>
<td>0.079</td>
<td>0.079</td>
<td>0.128</td>
</tr>
</tbody>
</table>

Source: Compiled by the authors.

At the third stage of the expert analysis, within the framework of the cognitive approach, the sums of the relative values of the rationing function by row for each of the eight resources under consideration were determined (see Table 7).
Table 7. The level of development of resources in the implementation of all functional indicators (SMEs of Volgograd region).

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Percentage of participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.020</td>
<td>25.5%</td>
</tr>
<tr>
<td>T</td>
<td>0.359</td>
<td>9.0%</td>
</tr>
<tr>
<td>M</td>
<td>0.064</td>
<td>1.6%</td>
</tr>
<tr>
<td>O</td>
<td>0.395</td>
<td>9.9%</td>
</tr>
<tr>
<td>Inf</td>
<td>0.510</td>
<td>12.8%</td>
</tr>
<tr>
<td>Ins</td>
<td>0.829</td>
<td>20.7%</td>
</tr>
<tr>
<td>F</td>
<td>0.346</td>
<td>8.6%</td>
</tr>
<tr>
<td>Rep</td>
<td>0.477</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

Source: Compiled by the authors.

As shown by the analysis, the most active resource, which has the greatest impact on achieving the conditions for the successful functioning and competitive management of SMEs in the Volgograd region, is human. The least active resource, which has the least impact on achieving the conditions for the successful functioning and competitive management of SMEs in the Volgograd region, is material. The resources least requiring the development of their development processes are institutional and informational. The resources most in need of development processes are financial and organizational.

4 Discussion

SMEs are considered the backbone of the economy in many countries because they play an important role in creating jobs and stimulating economic growth. Resource and factor support is critical to the competitive functioning of SMEs. The study showed that applying the cognitive approach can act as a basis for understanding the various factors contributing to SMEs' successful functioning. Therefore, the cognitive approach’s potential in studying the resource-factor assurance of enterprise competitiveness is significant because it can help enterprises better understand and use their resources to gain a competitive advantage, which is critical for sustainable economic growth. In the works of D.J. Teece [1], D.B. Audretsch [2], R.H. Atkin [3], S. Frederick [4], R.A. Baron, R.A. Henry [6], T. Dirsehan, S. Kurtuluş [8], R.K. Goel, C.S. Yadav, S. Vishnoi [10], A. Chang, A. Wiewiora, Y. Liu [11], R. Bunduchi, C. Crișan-Mitra, I.I. Salanță, E.L. Crișan [12] this circumstance is also emphasized.

Another advantage of the cognitive approach is that it can help SMEs effectively prioritize their resources. The cognitive approach used in the study allowed to determine that the most active resource, which has the greatest impact on achieving the conditions for successful functioning and competitive management of SMEs in the Volgograd region, is human. This conclusion is confirmed by the studies of B. Kotey, P. Slade [19], C. Zheng, G. O’Neill, M. Morrison [20], J. Chowhan [21], M.V. Antyushin, I.V. Guskova, N.E. Serebrovskaya [22], C. Hoon, A. Hack, F.W. Kellermanns [23], J. Wongsansukcharoen, J. Thaweepaiboonwong [24], which emphasize the importance of human capital for SMEs and recognize that investment in personnel training and development can lead to a significant increase in labor productivity and overall efficiency of the enterprise.

The use of the cognitive approach allows to identify, analyze and justify the relationship of the resources under consideration to ensure the competitive functioning of SMEs. This conclusion is confirmed in the works of M. Wang, H. Wang [5], M.A. Hitt, R.D. Ireland, D.G. Sirmon, C.A. Trahms [7], T.A. Ghezzi [9], M. Zarrin [13]. The authors conclude that this advantage of the cognitive approach creates an opportunity for public authorities to focus on strategically important resources, making effective management decisions on developing their development processes, and ensuring their rational use in the current...
economic conditions of SMEs.

The discussion about resource-factor support for the competitive functioning of SMEs continues, and the cognitive approach is one of the research areas in this field. In general, the results obtained are consistent with previous studies [27, 28] and expand the existing research on the role of various resources in the functioning of SMEs.

5 Conclusion

The practical tools proposed by the authors on the management of SMEs within a particular economic system allows us to determine:

1) the most active resources (resource groups) that have the greatest impact on achieving the conditions for successful operation and competitive management;

2) the least active resources (resource groups) that have the least impact on achieving the conditions for successful functioning and competitive management;

3) resources (resource groups), the most/the least requiring the development of the processes of their acquisition;

4) ways of developing the process of mastering this or that (those or other) resources that have one or another (greater or lesser) degree of influence on achieving the conditions for successful functioning and competitive management.

In the example of the Volgograd region, were identified resources, in varying degrees affecting the achievement of conditions for the successful functioning and competitive management of small and medium-sized businesses. This expert evaluation of resources will allow public authorities to adjust several strategic and program documents on state support and regulation of small and medium-sized businesses, considering the identified moments and ensuring a more competitive development of business entities within a particular managed territorial system.

Thus, this paper considers and implements a cognitive approach to the management of SMEs, provided with the means of expert analysis, which allowed to determine the degree of participation of resources in implementing the conditions for their successful functioning and competitive management.

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