

# ABC-analysis technique of regional industrial investment development: theoretical and practical aspect

## La metodología del análisis ABC del desarrollo de la inversión de la industria de la región: el aspecto teórico y práctico

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#### ABSTRACT:

The purpose of the paper is to develop a technique for conducting the ABC-analysis, which provides for the revealing of significant activities of the industrial sector for its further investment. The result of the study is the developed technique for carrying out the ABC-analysis, which involves the implementation of several stages. The paper is of practical significance: the feasibility of the method is shown using the example of a specific region. At the same time, the contribution of industries in the region's GRP with investment in fixed assets was compared with the aim of justifying the most priority sectors for regional development. The analysis was carried out using statistical reporting data for 2012-2016 on the example of the Republic of Tatarstan.

**Keywords:** Region, industrial sector, investment in fixed assets, ABC-analysis, GRP of the region

#### RESUMEN:

El objetivo del artículo es desarrollar una metodología para llevar a cabo el análisis ABC que permita identificar actividades significativas del sector industrial para realizar la inversión. El resultado del estudio es la metodología desarrollada para llevar a cabo el análisis ABC que implica la implementación en varias etapas. El artículo tiene una importancia práctica ya que demuestra la viabilidad del método a modo de ejemplo de una región específica. Al mismo tiempo, se compara la contribución de las industrias en el PRB (Producto regional bruto) de la región con el volumen de la inversión en activos fijos con el objetivo de justificar los sectores más prioritarios para el desarrollo regional. El análisis se llevó a cabo utilizando datos de informes estadísticos para 2012-2016 de la República rusa de Tataristán.

**Palabras clave:** Región, sector industrial, inversiones en activos fijos, análisis ABC, PRB

## 1. Introduction

The relevance of the study is determined by the importance of the regional significant sectors' contribution to its overall development. Special attention in the work is paid to the industrial sector. The industrial sector in the economy of the regions is today the main component of their development, acting as a certain guarantor of regional development. This sector includes a set of industries and their enterprises, whose purpose is to increase the industrial potential of the entities of the Russian Federation.

Under the industrial sector of the regional economy according to the opinion of T.E. Nikiforova (2008) is understood the following: the industrial sector is "an organizational system that unites groups of industrial enterprises and industries whose characteristic feature is territorial belonging to the constituent entity of the Federation and which in conjunction with government authorities develop and implement industrial policies to enhance competitiveness and sustainable economy development of enterprises and the region as a whole".

According to the economic dictionary (Glossary, 2017), the industrial sector is "part of the economy associated with the production of goods without the direct use of natural resources in large quantities."

The analysis of the real sector of the economy requires its comprehensive analysis, which is carried out by a number of authors involved in the study of processes occurring in the region. Thus, the analysis of the real sector, as well as the issues of its financing, have already been presented in the works of G.M. Kvon (2015a, 2015b). The issues of investment development of the region, analysis of its investment environment, allowing to ensure the development of the real sector of the economy are presented in the works of E.G. Animitsa (2015), G.M. Kvon et al. (2017).

The development of the real sector is conditioned by the directions indicated in the strategic documents of the region. Thus, in Tatarstan such a document is the Strategy for Social and Economic Development (Strategy, 2015).

The main provisions of the study on the use of the ABC analysis method were substantiated by V. Pareto, who identified certain patterns in development and the uneven distribution of causes and effects. In the future this principle was called the "Pareto principle". The Pareto principle is popularized in R. Koch's book (2005).

## 2. Materials and Methods

This paper proposes a technique for conducting ABC-analysis, which is an instrument for identifying the significant positions of any object under investigation.

The essence of the ABC analysis is the following: the Pareto principle (20/80) is used, which is customarily formulated as "20% of the effort yields 80% of the result" ("vital few and trivial many"). The method allows dividing the list under study into three groups by their importance, that is, the ABC-analysis allows selecting the positions that make the most significant contribution to the result.

The peculiarity of this analysis is that the researcher does not work with the whole list, but only with three groups (A, B and C), in the future (when forming groups), each group uses its own way of working. The ABC analysis technique assumes a certain execution algorithm. It is necessary to consider it step by step (Table 1).

**Table 1**  
The technique of phased implementation of the ABC-analysis

Analysis stage	Characteristics of the stage
1. Definition of analysis objectives	The purpose of using ABC-analysis is to rank the positions under study and identify those whose contribution is most significant in the overall result. Positions are divided into three groups -A, B and C.
2. Selection of the research object	As an object of research in this paper, types of economic activities have been adopted, with a focus on the industries of the region

3. Selecting a parameter that has a numerical characteristic and work with it	As a numerical parameter, the parameter "investment in fixed assets" was chosen. Work with the parameter provides the following: - A list of activities is compiled, their total amount is calculated; - The proportion of the parameter (investments) for each type of economic activity is calculated; - For each position, the share of the parameter is determined by the cumulative total; - The list is sorted in descending order of the parameter.
4. Defining the boundaries of groups	In the analysis, the following group boundaries are proposed: - For group A, the upper boundary is the first position, the lower one is the position where the share of investments is cumulatively closer to 80%; - For group B, the lower boundary is the position of the list, in which the cumulative share is closest to 95%. All other positions belong to group C. Then the total number of positions is calculated
5. The result of grouping	The result of grouping requires certain conditions; Group A: 80% of the result - 20% of the items; Group B: 15% of the result - 30% of the items; Group C: 5% of the result - 50% of the items.
6. Interpretation of the analysis results and development of recommendations	The results of the analysis are used for: - Assessing the current state of affairs in the region; - Search for opportunities to improve it; - Analysis of the effectiveness of implementing a set of measures established in the process of ranking. As a result of the research, the most important industries determining the development of the region were identified and which are significant from the point of view of the funds invested.

The distribution of 80/15/5 is classical; however, another distribution is possible, for example, 50/30/20.

Using the method allows to reduce the time for analysis by studying only three groups, and not the entire series of data (indices) under study.

In order to ensure the practical implementation of the application of the ABC-analysis method and complementing its components other methods are used in this paper too. These include:

- Methods for analyzing the dynamics of socio-economic indicators in order to confirm the objectivity and relevance of the results.
- Methods of comparison with the purpose of revealing the tendency and variability of indicators by years of the period under study.

### 3. Results

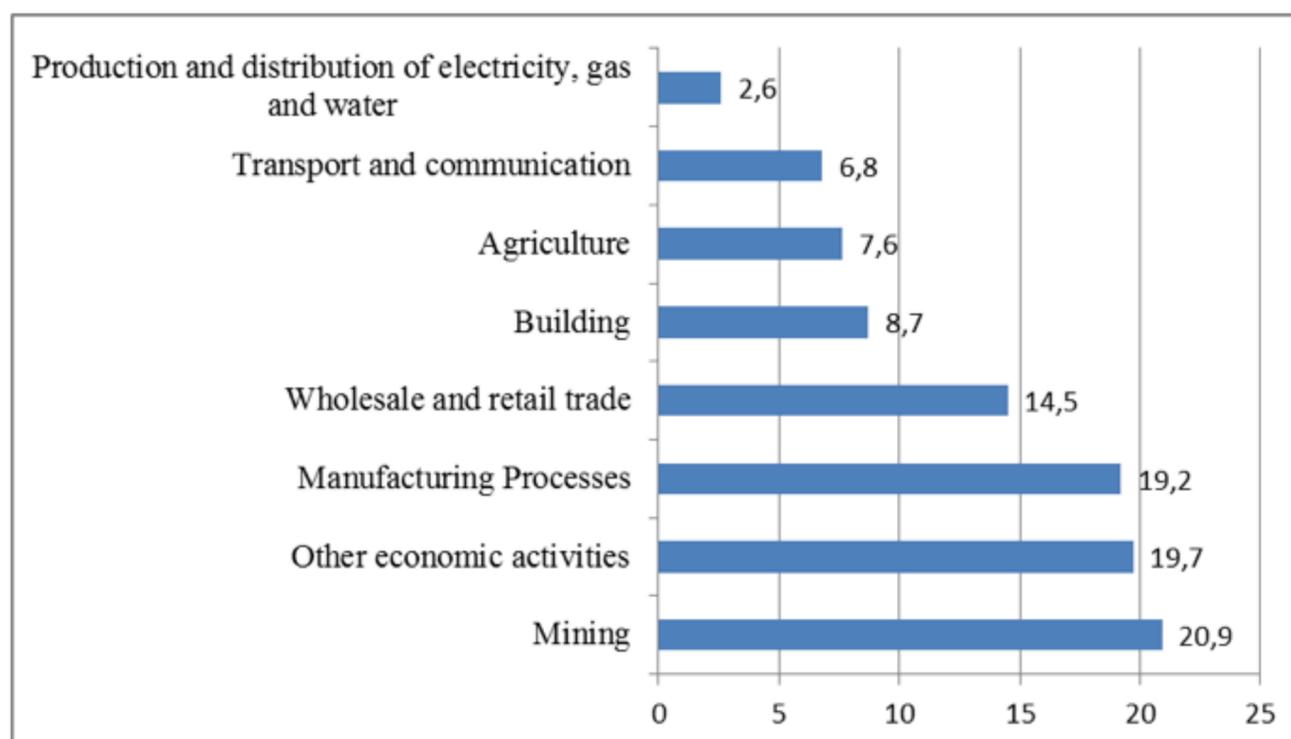
To substantiate the applicability of the proposed method, it is necessary to carry out the ABC analysis of the main economic activities of the region, focusing on the industrial sector of the region. As a region under the study, the Republic of Tatarstan is considered. Before the analysis beginning on the example of the above-mentioned region, analysis of economic activity types from the point of view of their contribution to the GRP of the region is needed.

Since 2005, according to the introduction in the Russian Federation of economic activities classifier (Regulation, 2005), harmonized with the European classifier NACE [Classification, 2006], there was a transition to the following classification of industries in which the volume of shipped goods of own production and performed works took place.

One can consider the types of economic activity of the Republic of Tatarstan and their contribution to the GRP of the region.

According to the report on the activities of the executive authorities in the region for 2016 (Report, 2016), the structure of the GRP of the Republic of Tatarstan by types of economic activities (largely) is presented in Fig. 1.

**Figure 1**  
The structure of production of the GRP of the Republic of Tatarstan by economic activity in 2016



In Figure 1, activities are presented by increasing their contribution to the GRP of the region. Traditionally, mining and processing industries are leading ones. At the same time, each type of economic activity includes many subsections within itself.

Speaking about the types of economic activity, it is necessary to clarify that this paper uses the classification (and names) of activities used before July 11, 2016 (Russian Classification of Economic Activities 029-2001). This is due to the fact that investments analyzed according to official statistics (Official statistics, 2017) are considered for the period 2012-2016, in addition, from 11.07.2016 classification and names for some species have changed.

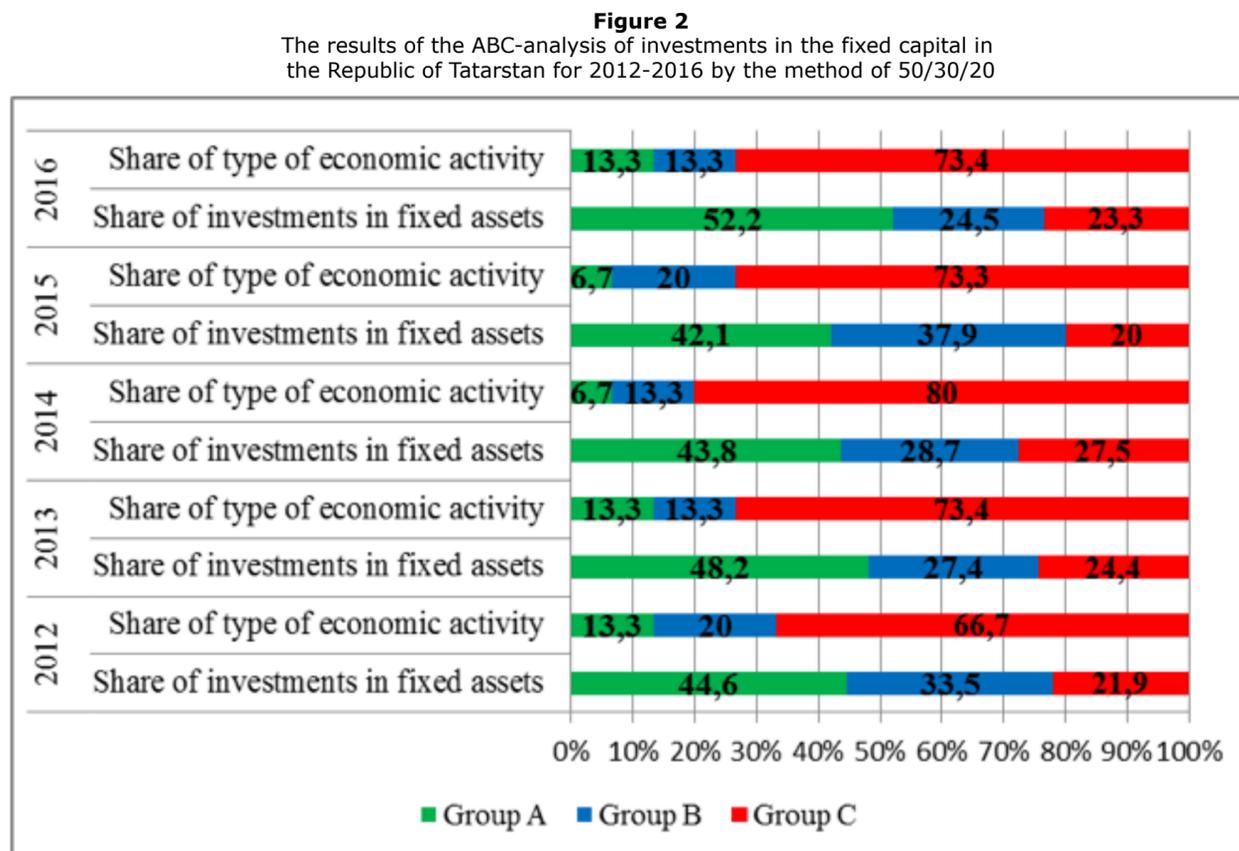
Thus, the number of activities has increased, some types have been separated (for example, the activity "production and distribution of electricity, gas and water" (section E) is currently divided into two sections: "provision of electricity, gas and steam, air conditioning" (Section D) and "water supply, sewerage ..." (section E.) In addition, the former sections A-"agriculture, hunting and forestry" and Section B-"fishing, fish farming" are combined in a single section A "agriculture, forestry, hunting, fishing, fish farming", etc.

As it can be seen from the statistics, the contribution of each type of activity is different. The largest share traditionally belongs to the extraction of minerals (20.9%). The share of processing industries accounted for 19.2%. Wholesale and retail trade occupies 14.5%, building - 8.7%, etc.

A relatively high share (19.7%) belongs to "other types of economic activity", which include financial activities, real estate transactions, rental and provision of services, public administration and military security; compulsory social security, education, health and social services, provision of other communal, social and personal services. That is, in addition to material production enterprises, the real sector includes enterprises and organizations of other sectors that reproduce goods and services on the market.

Each type of activity that contributes to the development of the region, nevertheless, is provided by its volume of investment, and there is a certain instability and unevenness. Conducting the ABC-analysis to determine the significance of each type of economic activity, we choose the parameter - investment in fixed assets (see Table 1).

One can carry out the ABC-analysis on the example of investment in fixed assets by types of economic activity for the period 2012-2016, using the method 50/30/20; the results are presented in Fig.2.



As it can be seen from Figure 2, the unevenness of investment by types of economic activity is observed, this trend is maintained for 5 years. Let's consider it in more detail 2016.

According to the 50/30/20 method, Group A comprises 13.3% of economic activities invested in the amount of 52.2% of the total investment in the region.

This is investment in manufacturing industries, as well as operations with real estate, rental and provision of services.

Group B-13.3% of economic activities invested in the amount of 24.4% (mining of minerals, transport and communications)

The remaining species form group C - 73.3% of activities with a total investment share of 23.3%.

We also carried out the ABC-analysis and by the method of 80/15/5, but in this paper the results are not given.

Summary table of activities significance in the region that form the structure of GRP production for 2012-2016 from the point of view of the funds to be invested, are presented in Table 2. We use classification data by the method 50/30/20.

**Table 2**  
The significance of economic activity types of Tatarstan Republic on the results of the ABC analysis for 2012-2016. (Parameter -investments in fixed assets)

Types of economic activity	2012	2013	2014	2015	2016
Manufacturing Processes	A	A	A	A	A
Transport and communication	A	A	C	B	B
Operations with real estate, renting and provision of services	B	B	B	B	A
Obtain of minerals from a mine.	B	B	B	B	B
Provision of other communal, social and personal services	B	C	C	C	C
Production and distribution of electricity, gas and water	C	C	C	C	C
Agriculture, hunting and forestry	C	C	C	C	C
Wholesale and retail trade; repair of motor vehicles, motorcycles, household products and personal items	C	C	C	C	C
Education	C	C	C	C	C
Building	C	C	C	C	C
Financial activities	C	C	C	C	C



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