Advances in Economics, Business and Management Research, volume 128
International Scientific Conference "Far East Con" (ISCFEC 2020)

Management of Innovation Processes of Russian Banks Based on Cluster Analysis

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Abstract. The global financial system is an essential component of the global economy. Its role can be compared with the circulatory system that ensures the delivery of funds to economic entities. The total number of components of the global financial system is about 50,000 credit institutions, including microcredit financial institutions, the public sector, commercial banks, credit unions, cooperative banks, etc. The Russian financial system is presented by the Bank of Russia in Russia more than 876 credit organizations, including non-bank credit organizations. Most of them, about 91%, are banking organizations, about 9% are non-banking organizations. According to EY experts, most operations in the banking sector, such as payments and transfers, financing and capital management will be carried out using innovative approaches and technologies. This makes the development and management of the innovation process in Russian banks relevant. For the successful development and application of the innovation process in Russian banks, it is necessary to determine the development directions of the innovation process in the Russian banking sector. In order to determine the priority directions of development, it is advisable to divide financial organizations into groups depending on indicators reflecting the efficiency of their business activities. According to the results of the assessment, the existing set of global financial organizations was divided into 4 groups like the BCG matrix. On the basis of the analysis conducted, conclusions were made about the directions of innovative development for each of the groups.

1. Introduction

The modern banking system is important for the global economy. Its role is comparable to the human circulatory system, through which money is delivered to economic actors. Despite the importance of the world banking system for the global economy, there is no reliable statistics on the number of banks and credit organizations all over the world. Approximate estimates suggest 50,000 credit institutions, including microcredit financial institutions, the public sector, commercial banks, credit unions, cooperative banks, etc.

To obtain more reliable estimates, you can resort to the SWIF system data on the number of its customers, since largest and significant international banks and credit organizations are connected to the SWIFT system (see Fig. 1).

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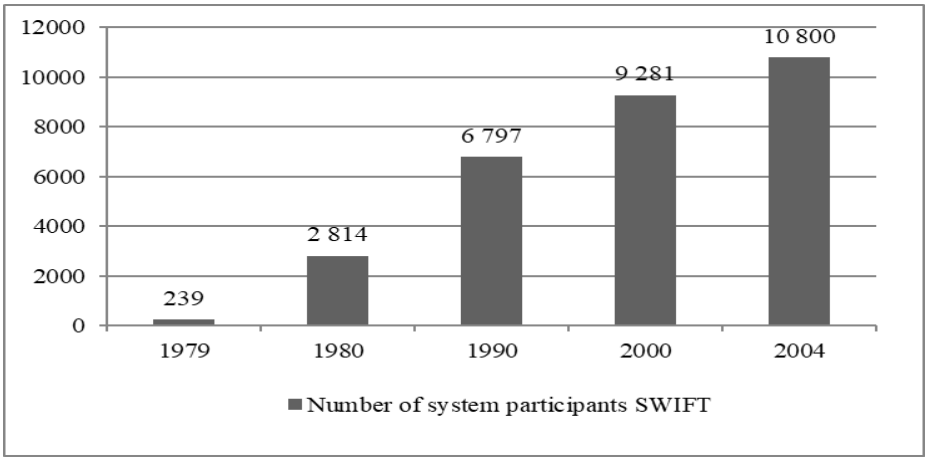

Figure 1. Dynamics of change in the number of SWIFT clients [1].

As can be seen from Fig. 1, the total number of SWIFT users constitutes more than 10,800 various banking and credit organizations. Thus, the number of banks operating at the international level is at least 10,800.

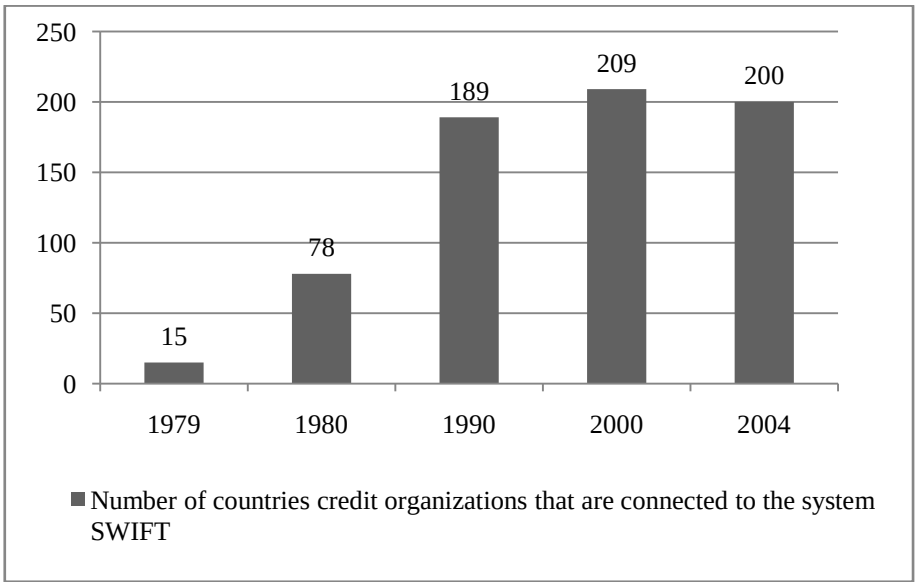

Figure 2. Dynamics of change in the number of countries credit institutions, which are connected to the SWIFT system [1].

It should be noted that the number of countries, credit organizations and banks, which are connected to the SWIFT system, began to decline, which is possibly due to the sanctions of the US and the European Union that allow you to disconnect the rogue state from SWIFT (see Fig. 2).

This increases the risks for the stable operation of any of the banking systems of the world, since disconnection from the SWIFT system lowers the country's banking system to a lower level due to the lack of access to international operations at the international level.

The dynamics of changes in the number of messages transmitted by the SWIFT system allows us to conclude that the number of messages transmitted by the SWIFT system has stopped growing exponentially, indicating that the system's growth rate has slowed down. A possible obstacle to the further growth of the SWIFT system is the artificial limitation of the number of participants caused by the sanctions of the United States and the European Union. This makes possible the development of inter-

national payment systems alternative SWIFT to avoid the restrictions imposed by the sanctions of the United States and the European Union.

As for the Russian financial system, according to the Bank of Russia, more than 876 credit organizations, including non-bank credit organizations, are registered in Russia. Of these, 91% are banks, and 9% are non-bank credit organizations.

In accordance with the methodology of the Bank of Russia, 11 of credit institutions belong to systemically important credit organizations. Their share is 1.26% of the total number of organizations. About a third (36%) of credit institutions have the right to conduct banking operations. According to the Bank of Russia, 82.64% of credit institutions are organizations attracting deposits, 98.14% carry out operations in foreign currency, and 44.21% carry out operations with precious metals. In general, the Russian banking system is highly efficient and highly resistant, including the influence of external factors, which include the sanctions of the United States and the European Union, the depreciation of the ruble exchange rate, etc.

2. First section

The Russian financial system is extremely important for the development and functioning of the country's economy. Therefore, it is relevant to assess its position in the global financial market and determine the banks of the leaders of the Russian banking market, as well as the prospects for the development of the Russian banking sector and the directions of innovative development of Russian banks.

We will assess the position of the Russian banking sector in the international financial market. At the first stage, the size of Russian banks is relatively world leaders.

In terms of assets, the palm is owned by Chinese banks, the number one bank in the world is a commercial bank Industrial and Commercial Bank of China (ICBC) located in China and has assets of $ 4 trillion. dollars, second place belongs to China Construction Bank Corporation 3.4 trillion. dollars, third place - Agricultural Bank of China.

Among the non-Chinese banks among the top ten, the Japanese Mitsubishi UFJ Financial Group and the American JPMorgan Chase have assets of 2.78 and 2.53 trillion. dollars and occupying the fifth and sixth place in the world rankings.

Of the ten largest, seventh place belongs to the British bank HSBC Holdings plc, and the eighth to BNP Paribas with assets of 2.52 and 2.36 billion dollars, respectively. Not a single Russian bank or financial-industrial group entered the top ten largest banks in the world.

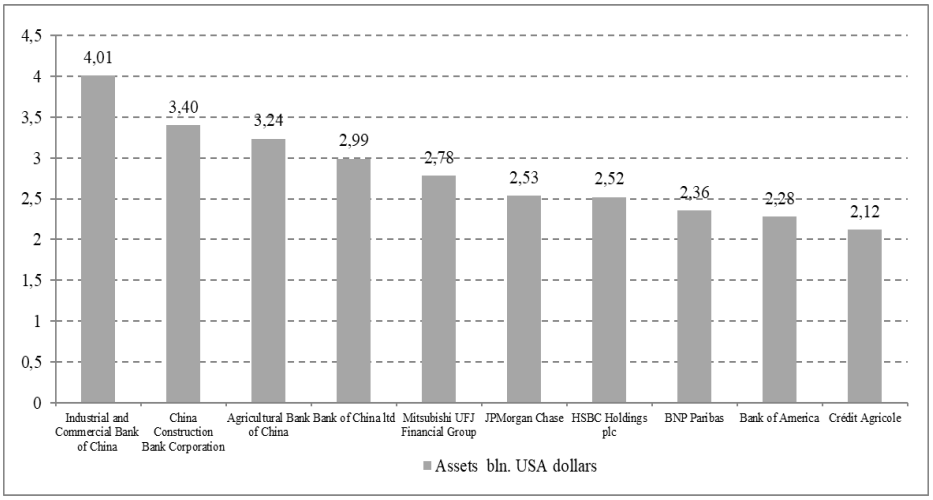

Figure 3. The ten largest banks in the world [2].

In terms of the number of banks entering the hundred with the largest amount of capital, China is in the lead - 18 banks, followed by the United States, and Japan is the third largest with 8 largest banks.

Russia has only one bank, which is included in the hundred largest - PJSC "Sberbank", and is in the last - 9th place.

Thus, the Russian financial system is significantly inferior to the largest international financial systems, which makes it necessary to actively develop it in order to increase its efficiency and size, especially taking into account the volumes of GDP and Russian exports, in which Russia is in 6th and 16th places, respectively.

Table 1. Data on the assets of the largest banks in the world.

Serial number	**Name of the bank**	Volume of assets USA bln. dollars	Change place in the ranking
1	**Industrial & Commercial Bank of China Ltd.**	3 473,24	0
2	**China Construction Bank Corp.**	3 016,58	0
3	**Agricultural Bank of China Ltd.**	2 816,04	0
…	…	..	…

We will assess the existing set of financial organizations in the world. We will conduct an assessment on the basis of the available data on the assets of banks, as well as on the basis of data on the change in the place of banks in the ranking of the largest banks in the world. The following Table 1 gives a summary of information about the largest banks in the world.

In order to assess the data on the assets of the largest banks in the world, we use cluster analysis to evaluate the data in Table 1. To determine the distances between existing objects, it is calculated using methodological approaches known as the Euclidean distance formula, calculated using formula (1):

$$r_w(y_i, y_j) = \sqrt{(y_i^{1,2,...,n} - y_j^{1,2,...,n})^2} \quad (1)$$

where $y_i^{1,2,\ ...,\ n}$ and $y_j^{1,2,\ ...,\ n}$ are the actual data of the parameters showing the position of the objects y_j and y_j. The selection of groups will be carried out using the "nearest neighbor" method, as well as to increase the information content and accuracy of the classification of indicators that assess the state of the automotive industry in a particular country. Grouping will be carried out to obtain four clear groups. To assess the position of banks in groups, we use the BCG matrix methodology (see Fig. 3). To evaluate the data bank data, we will modernize the existing BCG matrix, along the X axis we will post the data on the size of assets, and along the Y axis we will change the place in the rating of the largest banks in the world.

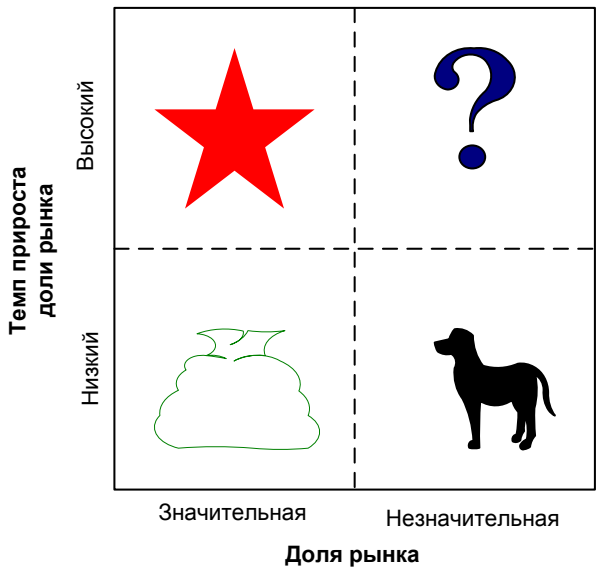

Figure 3. Schematic diagram of the matrix of the Boston consulting group

The resulting groups will be characterized as follows by the “star” group of banks, which has a significant amount of assets, with a significant growth rate of these assets and a growing place among the largest banks in the world.

"Money Bag" is a group of banks that occupy the largest amount of assets and occupy the first places in the rating. We will attribute the banks with a small volume of assets to the “dog” group, and with a decreasing rating among the largest banks. A “question mark” is a group of countries whose volume of assets is insignificant, but whose rating among the largest banks is growing.

3. Results and conclusions

The analysis performed revealed a clear division of the entire data group into four distinct groups. The first group of “stars” included banks such as the Japanese bank Norinchukin Bank with assets of 981.1 billion USA dollars, whose rating increased by 4 levels, the Canadian Toronto-Dominion Bank with assets of 928.69 billion USA dollars whose rating increased on 7 levels and other banks. In the process of growth, these banks will be able to take leading positions among the largest banks in the world.

In the second group of "money bag" got such Chinese banks as the Industrial & Commercial Bank of China Ltd. with assets of 3,473.24 billion USA dol-lars and China Construction Bank Corp. with assets in the amount of 3,016.58 billion USA dollars, as well as other banks occupying the first places in the ranking of the world's largest banks. These banks are world market leaders, and the innovative technologies they use will enable Russian banks to take a leading position in the global banking sector.

The third group “question mark” includes banks with a significant increase in the Bank's rating and at the same time not having a significant amount of assets. This group includes such banks as the Brazilian Banco do Brasil SA and ItaO Unibanco Holding SA, which grew by 8 and 9 points of the rating and assets in the amount of 426.19 and 415.76 billion USA dollars.

In the fourth group of "dogs" this group of banks included such banks as the American Bank of New York Mellon Corp. with assets in the amount of 333.47 billion USA dollars having lost 13 positions in the rating, the Russian PJSC Sberbank with assets in the amount of 413.58 billion USA dollars and having lost one position in the rating and other banks losing positions in the rating and having a small amount of assets. This group of banks needs innovative development measures in order to further develop and restore positions in the ranking of the largest world banks.

The carried out grouping allowed to reveal that the only Russian bank entering into hundreds of the largest banks of the world is in group of banks with the small size of assets and losing the place in set of the largest banks of the world.

This allows us to conclude that the majority of Russian banks need measures for their innovative development of their financial and economic activities.

The practice of economic activity shows that the success of the economic activity of banks contributes to the use of the following six macroeconomic factors:

customer-oriented approach;
use fintech and high technology;
customer orientation;
reducing cyber risk;
rethinking the workforce;
use of technology management.

Improvement of economic activities in the direction of these six macroeconomic factors will allow Russian banks to achieve stable growth and fairly high positions in the global financial rating [3].

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