FINANCIAL ENGINEERING IN COMMERCIAL BANKS

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Annotation: Today, in developing countries, the banking sector is an important institution of economic development through innovation. This article provides guidance on the innovative development of banks.

Key words: Financial engineering, financial management, banking management, banking activities , market.

The development of the banking sector varies from country to country, and some of the innovative products used may already be used in other developed countries. This situation creates problems in the creation or application of banking engineering in the banking sector of the country. The main development of this sector in the country can be assessed by three factors: social, economic and legal.
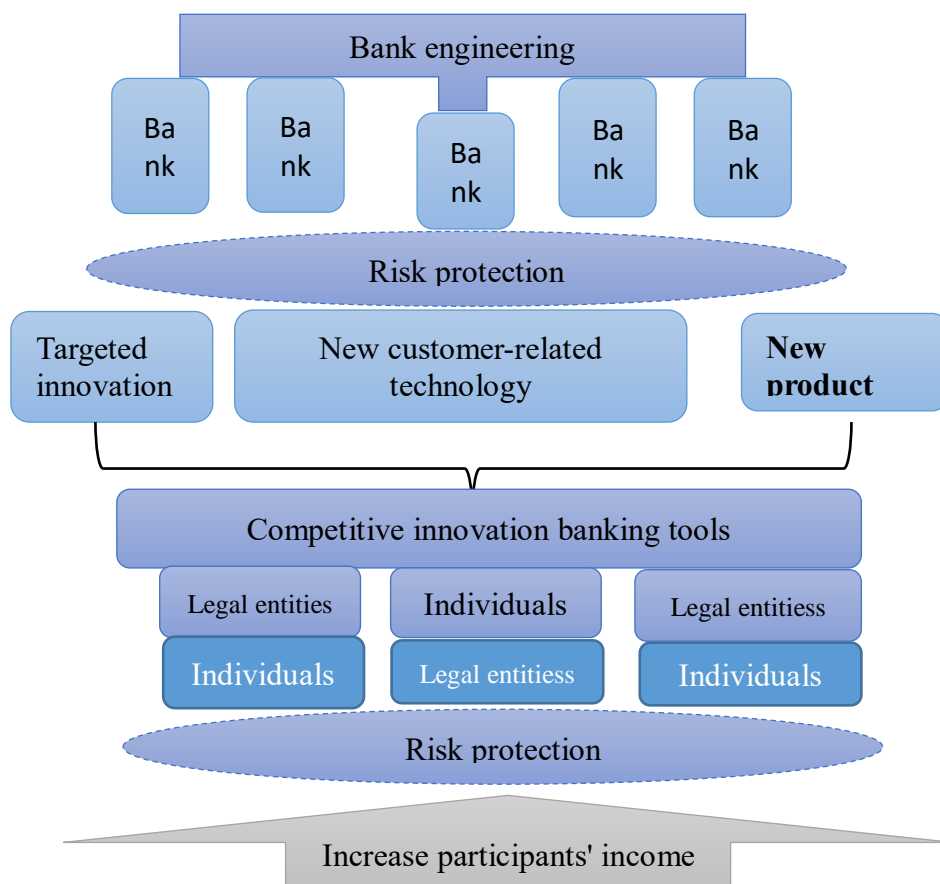

Figure 1. Occurrence of banking engineering

In the social sphere: low incomes, lack of interest in bank funds, lack of financial transactions, low retirement age. In the economic sphere: low liquidity of banks, low competition in the banking market, low bank output, lack of banks in the global banking market, low integration

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between enterprises and organizations and banks. In the legal field: low legal, financial literacy.

Based on the research, we conclude that financial engineering is the development and creation of financial innovation, banking engineering is the development and adaptation of banking innovation. It is therefore recommended that banks immediately apply financial engineering to their operations.

One of the second important features is the correct organization of "financial management" in improving the management of banks, which increases the ability of banks to find the right place in the market. Therefore, many studies conducted in foreign countries have tried to reveal the connection between "financial management" or "banking management" and "financial engineering".

Such scientists include T. Buy, L. Galits, R. Kolb, J. Overdaxl, V. Dyufe, N. Giddi, A. Proxorov, S. Ojegov et al. A. While Prokhorov put forward his conclusions on the definition of "technology" in the banking sector, S. Ojegov described the processes of connection with the banking system on the basis of the application of the concept of "technology" not in the banking sector, but in all areas. Application of technology in the banking sector through the processes of financial engineering. It is applied in all processes of banking activities in banking products, operations and other areas. It follows that one of the key factors in mitigating the processes of linking between financial engineering and financial management (banking) is a common understanding for them, risk reduction. These two concepts have the object of their own management system and the purpose of financial (banking) management is divided into two, namely, tactical and strategic. The purpose of financial engineering is assessed based on the circumstances that arise. The main objectives of bank management can be identified as follows.

- to achieve maximum profit;
- financial support and development of the bank's activities by shareholders and creditors;
- improving the efficiency of banking;
- risk management.

The subjects of the bank's management are the bank's financial officers, management and bank managers. So let's look at what distinguishes between financial (banking) management and financial engineering.

Financial (banking) management is a continuous process, the purpose of which is linked to the circumstances and the results obtained, which change over time. The purpose of financial engineering is clear and not tied to any situation. Therefore, its direction is clearly aimed at achieving a single goal. The graph of the interdependence of these two directions is as follows. We can formulate this relationship in space. To do this, we find the relationship between bank management in three-dimensional space using the straight-line formula, financial engineering using the three-dimensional space-based surface and volume formulas.

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The parametric and canonical equations of a straight line in space as we know it have the following form:

$$\begin{cases} x = x_1 + tm \\ y = y_1 + tn \\ z = z_1 + tp \end{cases} (1)$$

Here, m-result, n-target, p-time, t-equation change parameters. This formula is a parametric formula of a straight line or a parametric formula of bank management in three-dimensional space in our example. If we find the parameters of change of the t-equation here, we get the following:

$$t = \frac{x-x_1}{m}, \quad t = \frac{y-y_1}{n}, \quad t = \frac{z-z_1}{p} \ (2)$$

Here, $\frac{x-x_1}{m} = \frac{y-y_1}{n} = \frac{z-z_1}{p}$ (3) is equal, and in bank management the result is the equality of change of purpose and time, i.e., the same displacement of the points of change at any value. A change in the bank's purpose causes the outcome to shift to a certain point by influencing the change. For example, in the picture, moving the object to x_n changes the result to y_n. Their point of intersection gives K (x_n, y_n). (3) Equality is called the canonical equation of bank management in three-dimensional space.

The three-dimensional view of financial engineering is parallelopeped, the surface area and volume of which are calculated as follows:

$$S = 2\ (mn + np + mp) \quad V = mnp$$

Here, m-result, n-target, p-time. Analyzing from the formulas, the volume of financial engineering allows a change in time, outcome, and goal to achieve a single result.

Using the above formulas, we find the interrelationship between the surface of banking management and financial engineering. To do this, we use the formula for the angle between a straight line and a plane in space:

$$\sin \varphi = \frac{Am+Bn+Cp}{\sqrt{A^2+B^2+C^2} * \sqrt{m^2+n^2+p^2}} (4)$$

The formula for finding the angle between a straight line and a plane in space. In our figure, we assume that A (0,0,0) B (m + 1,0,0). As a result, the inter dependence formula looks like this:

$$S = 2\ (2m + 1) \ \ (5)$$

In the remaining cases, the change in result and time per unit shows that the three quantities are closely related according to the law of distribution. This leads to different approaches to the change of purpose between financial engineering and banking engineering, based on our above hypothesis. In particular, the change of n (result) and p (time) into equal units allows to ensure the uniformity of financial engineering and bank management m (goal); the fact that p is relative to n (p> n), the targets are different, and the process of interdependence is not noticeable; If p is relative to n (n> p), the targets are close to each other, and the correlation

process is average. Hence, the process of interrelationship between financial engineering and bank management allows analysis based on changes in goals. This made it possible to substantiate the hypothesis in research conducted on the basis of different economic views.

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