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Modeling of Business Processes of Project Financing

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ABSTRACT

Need of transformation of means of support of project financing for commercial banks is proved. The analysis and modeling of business processes of project management by the contextual chart and the chart of decomposition is carried out that allowed to describe the main stages of project financing. With use of tools of programming the business application of project management which will promote operational assessment on selection of introduced drafts is created.

1. Introduction

Modern project management is a special type of management which is applied to management of various objects. These objects can not have design characteristics even. Modern practice shows that project management is used in rather various fields of management.

In the course of planning of optimization and modernization of production owners of business have to think of advantages of a design form of financing. To convince investors that their investments are cost-effective it is necessary to select the isolated project which will be supported by professional team. But to obtain the state or corporate

guarantees not easy. Many Russian companies are not able to provide mortgage providing therefore as a possible exit use of project financing in this situation can serve. One of such options is granting the target credits for realization and support of investment projects. It allows to use various combinations of standard bank tools and services. Such form is the effective instrument of attraction of financial resources in the conditions of unstable economy.

In recent years the Government focuses commercial banks on providing new type of service, connected with project financing that causes the necessity of development of new instruments of support of adoption of management decisions on financing of projects^[1,2].

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The Program of support of the investment projects implemented in the territory of the Russian Federation on the basis of project financing is carried out. The program is developed in pursuance of the Resolution of the Government of the Russian Federation of 21.02.2015 No. 154 "About the approval of the Program of support of the investment projects implemented in the territory of the Russian Federation on the basis of project financing". The purpose of the program consists in creation of a new financial instrument of the Russian banking sector which promotes increase in volumes of crediting of the enterprises of the real sector of economy on long-term and preferential terms^[3]. It promotes the solution of such tasks as stimulation of growth of economy, creation of innovative productions on the basis of the latest technologies, development of the production directed to creation of products of import substitution. The government of our country is interested in development of the direction of project financing of large projects. Banks, carrying out this activity, get support from the state and have some warranties from the legislation.

2. Methodology

Project financing is one of the types of investment activity that is always risky, especially in the current socio-economic conditions of Russia.

Project financing is the provision of targeted loans for investment projects. It is assumed that the funds generated during the project, are the main source of loan repayment. This is a relatively new form of long-term bank lending and is a priority and rapidly developing area of banking^[4].

The client, applying to the financial institution for a loan for the project, must provide a detailed business plan for the project. If the bank is satisfied with the results, then a decision is made to finance the project.

Preparing an investment project is a long and expensive process consisting of a series of acts and stages. In international practice, it is customary to distinguish three main stages of this process: pre-investment; investment; operational^[6].

Methods for evaluating the effectiveness of investment projects are ways of determining the feasibility of long-term investment of capital in various objects in order to assess the prospects for their profitability and payback. In general, the effectiveness of an investment project should be understood as the ratio of profit from a project to all costs incurred.

To assess the effectiveness of investments, 2 groups of methods are used: dynamic and static^[7].

The first group includes indicators:

a. discounted payback period or the period of recovery of the initial investment DPP

b. net present value NPV

c. internal rate of return or profitability IRR

d. modified internal rate of return method MIRR

e. profitability index, or income per unit of cost PI

The discounted payback period or the period of recovery of the initial investment is defined as the ratio of the investment amount to the average value of cash receipts, taking into account their time value:

$$DPP = \sum_{t=1}^n \frac{\frac{COF_t}{(1+r)^t}}{\frac{CIF_t}{(1+r)^t}}, \quad (1)$$

COF – total project payments in the period t,

CIF - total revenues from the project in the period t,

r - expected rate of return, or discount rate,

n- number of project periods.

Net present value is the difference between the present, discounted cash income from the implemented investment project (amount of cash inflows (CIF) and the value of the initial investment costs. The net present value is determined by the formula:

$$NPV = \sum_{t=0}^n \frac{FCF_t}{(1+r)^t} = \sum_{t=0}^n \frac{CIF_t}{(1+r)^t} - \sum_{t=0}^n \frac{COF_t}{(1+r)^t}, \quad (2)$$

FCFt – net cash flow in the period t.

General rule: if $NPV > 0$, then the investment project is accepted for implementation. If less than or equal to zero, then it should be rejected.

The internal rate of return or profitability in its essence reflects the profitability of an investment project, in which the current present value of future cash receipts for these investments is equal to the costs of these investments. In other words, this is the interest rate in the discount rate at which the net present value of the cash flow of the investment project is equal to zero. The higher the value of the internal rate of return, the greater the economic efficiency of investment. Internal rate of return is calculated:

$$NPV = \sum_{t=0}^n \frac{CIF_t}{(1+IRR)^t} - \sum_{t=0}^n \frac{COF_t}{(1+IRR)^t} = 0, \quad (3)$$

If $NPV = 0$, false the discount rate (reduction), which gave such a result, and will be the internal rate of return (profitability) for the project. If the internal rate of return is higher than the minimum allowable rate of return for a project, then investment in this project is acceptable.

This method shows:

a. the maximum rate of payment for attracted sources of project financing (in this case the rule applies: if $IRR > WACC$ is the weighted average cost of capital, then the project should be accepted);

b. the maximum level of return on investment;;

c. lower guaranteed level of profitability (profitability) of investment costs.

The general rule: if $IRR > r$, then the project provides a positive NPV and is accepted for execution. Otherwise, you must reject it.

The modified method of internal rate of return (MIRR), the difference from the previous one (IRR), makes it possible to more correctly evaluate projects with extraordinary cash flows.

It is usually defined as the rate of return at which all expected total receipts from a project in a period (CIF), brought to the end of the project, have a present value equal to the value of all costs incurred, or payments (COF).

$$MIRR = \sqrt[n]{\frac{\sum_{i=0}^n \frac{CIF_i (1+r)^{n-i}}{(1+r)^i}}{\sum_{i=0}^n \frac{COF_i}{(1+r)^i}}} - 1 = \sqrt[n]{\frac{FV_{CIF}}{PV_{COF}}} - 1, \quad (4)$$

The profitability index, or income per unit of expenditure, PI is calculated as the ratio of the present value of cash receipts to the sum of the costs of the initial investment:

$$PI = \frac{\sum_{i=0}^n \frac{CIF_i}{(1+r)^i}}{\sum_{i=0}^n \frac{COF_i}{(1+r)^i}}, \quad (5)$$

The project is considered acceptable when the value of $PI > 1$. Otherwise, it should be rejected as not providing the specified profitability parameter.

The second group of assessment methods (static criteria) includes accounting, or static methods. Among them are:

- the payback period of the project without discounting (PP)
- simple profit rate method ARR

The payback period of the project without discounting (PP) is defined as the period of reimbursement of the initial investment costs and not taking into account the time value of cash receipts.

It is calculated as the ratio of the total cost of the project to the average non-discounted income from the implementation of this project: $PP = \text{Cost of the investment project} / \text{Amount of cash flows for a specific period}$.

$$PP = \frac{I_0}{\sum_{i=1}^n CIF_i}, \quad (6)$$

The use of this PP method implies first of all a specific timeframe for reimbursement of initial investment costs;

The method of simple profit rate ARR is based on the accounting definition of income and is calculated as the ratio of gross profit to net investment costs:

$$ARR = \frac{P}{I_0} \times 100\%, \quad (7)$$

3. Results

The key moment of creation of IS for the purpose of automation of information processes of the organization is the analysis of functional interaction of objects of automation.

The functional model of business processes consists of charts, fragments of texts and the glossary having references at each other. Charts are the main components of model which display the sequences of the functions interconnected through the general objects (operations, actions, works – activity) of business process^[8].

All Fusion Process Modeler represents one of the most popular instruments of visual modeling of business processes which allows to present visually any activity or structure in the model form that gives the chance to optimize work of the organization, to check it for compliance to ISO standards 9000, to design its organizational structure, to lower costs, to exclude unnecessary operations, to increase flexibility and efficiency. BPwin supports three notations of modeling of business processes at once: IDEF0 (functional modeling), DFD (modeling of data flows) and IDEF3 and also methods of calculation of prime cost for the volume of economic activity (functional and cost analysis, ABC). This product is used by developers, system integrators, analysts, heads, logistics specialists, marketing specialists^[9].

The essence of the structural approach to the development of IP is its decomposition into automated functions: the system is divided into subsystems, which are divided into sub-functions, divided into tasks. The system maintains its holistic view, where all components are interconnected.

In IDEF0 the system is presented in the form of set of the interacting works or functions. IDEF0 — the methodology of functional modeling and a graphic notation intended for formalization and the description of business processes. A distinctive possibility of a notation is display not only inputs (what is processed by a system) and the outputs (result of activity of a system) of each block, but also "management" (managing strategy and procedures) and "mechanisms" (resources)^[10].

For creation of DFD two different notations corresponding to Yordona-Demarko and Geyna-Serson's methods are traditionally used. These notations slightly differ from each other in the graphics image of characters (further

in examples Geyna-Serson's notation is used).

According to this method the model of a system is defined as hierarchy of the dataflow diagrams describing asynchronous process of information transform from its input to a system before delivery to the consumer.

On the basis of CASE systems we structure process of project financing of commercial bank by means of chart IDEF0. At first the description of a system in general and its interactions with the world around — the contextual diagram (Figure 1).

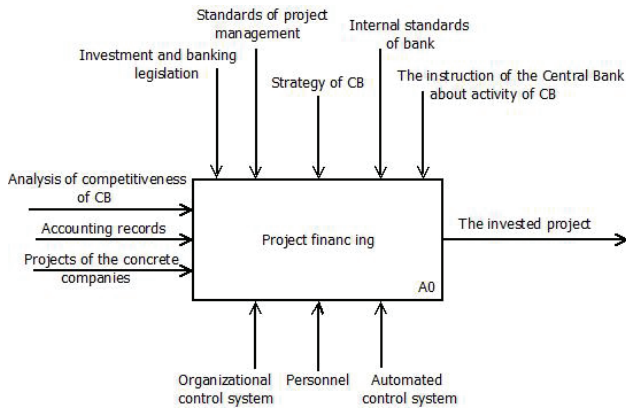


Figure 1. Context diagram of project financing of a commercial bank: selection of projects; preparation of projects; assessment of projects; negotiating and approval of the project; implementation of the project and control of the course of the project; assessment of results of implementation of the project

These processes practically coincide with management processes of the project in general. The bank is a direct participant, without executing only process of initiation and planning of the project.

After the description of a system in general splitting it on large fragments is carried out. This process is called functional decomposition, and charts which describe each fragment and interaction of fragments are called charts of decomposition. More detailed submission of the contextual chart is presented on the chart of the first level (Figure 2).

The analysis and the choice of specific projects for financing, proceeding from their priority. Selection of design offers is carried out on the basis of their compliance to certain criteria. Previously the general information on the project including data on type of the investment project, its branch and regional accessory, volumes of required financing, degree of development of the project, existence and quality of guarantees, etc. is estimated. The bank analyzes the market, checks financial model and the business plan, conducts a financial, legal and tax research of the company. Such characteristics of the project as its prospects, design risks, a financial condition of the borrower, etc. are considered.

Key stage of passing of the project is assessment of its investment qualities on the basis of the complex analysis of the feasibility study, the business plan and other project documentation.

After end of the project the retrospective analysis

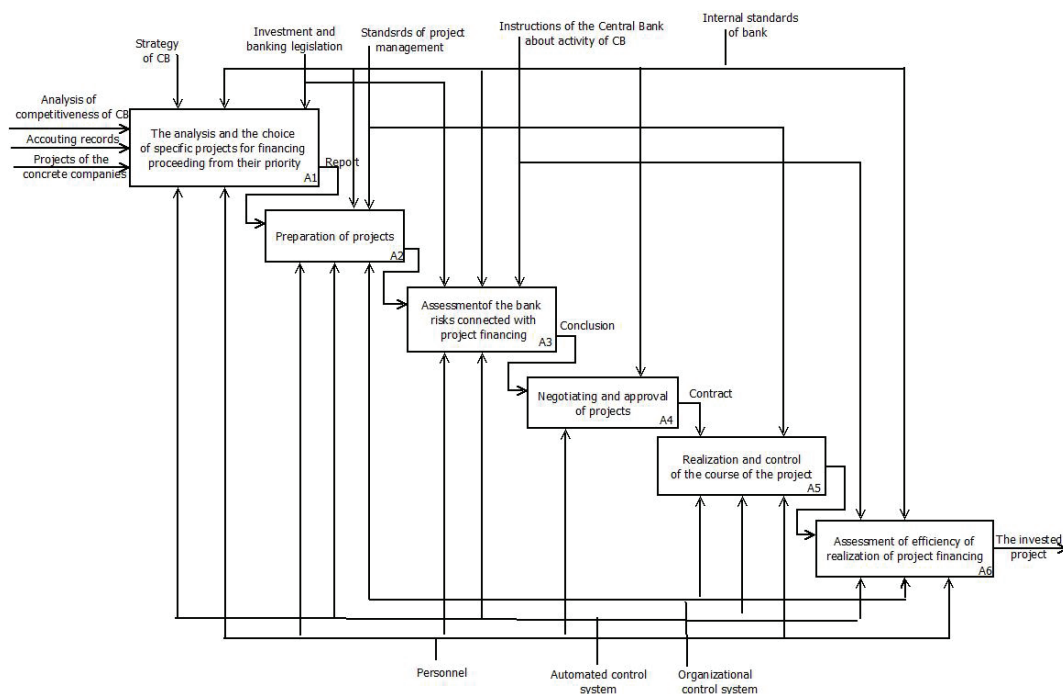


Figure 2. Decomposition of functional model of project financing of commercial bank

which allows to generalize the achieved results is, as a rule, carried out and to define efficiency of the implemented project. At this stage the bank leaves the project, new conditions of cooperation are negotiated.

Arrows which enter the top side of a rectangle designate rules, procedures or standards on the basis of which activity is carried out. Arrows which enter the left side of a rectangle are materials or information used for obtaining result. The shooters entering the lower side of a rectangle show resources which perform work. The shooters proceeding from the right side represent material or information which are performed in performance processes works. Each work has to have at least one arrow of an exit.

On the submitted chart input parameters of a system are accounting reports, the analysis of competitiveness of commercial bank, projects of the concrete companies output parameter is the invested project.

Activity of process of project financing is regulated by the investment and banking legislation, standards of project management, internal standards of bank, instructions of the Central Bank about activity of commercial bank, the strategy of commercial bank.

Personnel, the automated control system, organizational control system act as resources which carry out activity of work of a system. In more detail the analysis stage and the choice of specific projects is considered in Figure 3.

After decomposition of the contextual chart decomposition of each big fragment of a system on smaller and so on, before achievement of the necessary level of a detail of the description is carried out.

DFD describes information processing functions, doc-

uments, objects and also departments and the certain employees participating in information processing.

Actually process of the automated assessment of feasibility of the project consists of four main stages (Figure 4):

A. Input of basic data in a system

B. Carrying out analytical calculations on the basis of methods of assessment of investment projects

C. Interpretation. Comparison of the received indicators with norms

D. Result conclusion

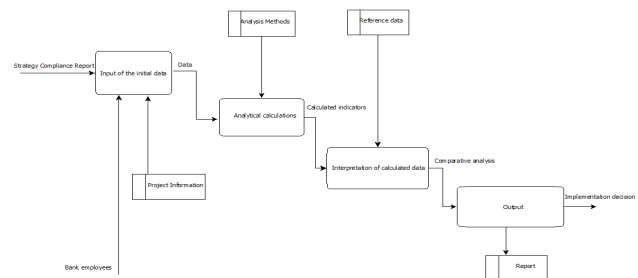


Figure 4. Chart of Decomposition in a notation of DFD

These four stages of business process in bank are implemented separately and not in a complex. It is necessary to systematize process of assessment of the project and to make them automatic. In bank the manager independently makes the decision on investment to the project owing to what the risk of mistakes in view of a human factor is very high.

Thus, the functional model has two levels of decomposition in notations of IDEF0, the chart of data flows in a notation of DFD that helps to reveal excess inefficient works.

4. Discussion

A commercial bank, providing funds for the project, must have certain guarantees in the success of the ongoing project. Therefore, the bank needs to have a structured system for evaluating potentially funded projects. This requires an effective computer system that could make an assessment in a short time and make a final decision based on it. But at the moment, despite the diversity of systems represented on the market of automated enterprise and project management systems, all of them are not well suited to the project evaluation system by commercial banks.

Software products on the market do not fully satisfy the requirements for

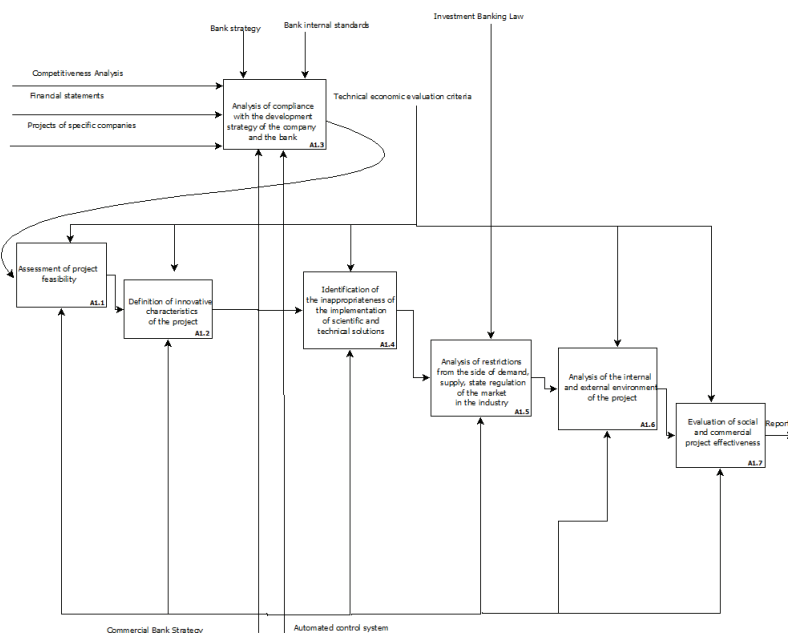


Figure 3. The chart of decomposition in a notation of IDEF0

an investment project evaluation process^[8]. Professional software is expensive. Their price is high both when purchasing licenses and at the stage of implementation and training of personnel. In most cases, it is sufficient to use only a small part of the functions declared in the programs. The possibilities of the programs overload the process of operating such systems by the manager of a commercial bank, who assesses the investment project.

Therefore, the development of a project finance management system in a commercial bank is essential for making a final decision. This system should contain only the necessary parameters for project evaluation and decision making in order not to lose its convenience and ease of use.

5. Conclusions

The developed application for the evaluation of the investment project will allow the commercial bank to analyze the projects of clients in a short time with minimal cost. The application is designed based on the use of business process automation systems. The structure of the business process for evaluating the project is structured in such a way as to standardize the activities of the bank employee performing the evaluation of the project and to make it as convenient as possible. The developed application allows you to increase the efficiency of obtaining solutions for a specific project.

This system facilitates the procedure of data entry into the system, performs the necessary calculations automatically, allows you to get quick results based on a comparative analysis of indicators with their norms. This, in turn, minimizes the likelihood of errors based on the human factor.

Thanks to the development, the bank will have the opportunity to effectively implement the process of evaluating investment projects of clients. Due to the speed of obtaining results for each project, the activity of the bank as a whole will improve. An important advantage is that there is no need for special training of personnel. To work with the application, it is enough to be able to use the tools of the Microsoft Office software package. The interface is devoid of unnecessary, distracting elements, which contributes to a more complete assimilation of the material without distraction to secondary matters.

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