Volume 3, Issue 2, 2020 ISSN: 2617-4596
DOI: https://doi.org/10.31058/j.mana.2020.32003

Research of Methods of Analysis, Optimization and Management of Integration Business Processes

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Received: 24 December 2019**; Accepted:** 10 April 2020**; Published:** 16 May 2020

Abstract:

The main areas of integration of business processes are considered. Methods of evaluating economic performance are demonstrated. Approaches to the task solving of efficiency estimation of private financial flows in a single portfolio or business process are considered. The basic definitions of integration business-processes and parameters of efficiency are offered. Methods estimation of integrated streams efficiency of economic system are offered. Approaches to the decision of problems estimation efficiency of the integrated structures as a whole and the private financial streams of business processes entering into integrated structure are investigated.

Keywords:

Integration, Integration Process, Business Process, Integration of Business Processes, Estimation of Efficiency, Parameters of Efficiency

1. Introduction

The currently available scientific and practical development of methods and mechanisms for managing the integration processes in the construction of an adaptive management of economic systems (ES) as a model which is used as a model of business processes (BP) are not systematic, are usually fragmented and in need of development. As it is known, that the formal representation of ES in a portfolio BP is a suitable model for solving the problems of synthesis, analysis, simulation, optimization and control of EC. Economic system, developing at time, is exposed to many internal and external factors.

As analysis of many important areas for the development of methods of analysis, optimization and management of the integration process remain.

The purpose of this study is development of models and methods for solving problems of management integration processes.

This goal requires the following key tasks:

The study of development theory of basic management of integration processes in the context of justification perspectives, objectives and priorities of the national economy;

An analysis of domestic and foreign research and practical experience, and methods of analysis, optimization and management of the integration process;

Development of new methods for the evaluation of social projects and the formal apparatus for describing the integration process;

Development of methods for the analysis of integration processes and the effectiveness of their risk assessment, taking into account the functioning of economic systems;

Development of cost-effectiveness models of private business processes using models as portfolio of business processes consisting components of different nature;

Development of methods for evaluating the effectiveness of the integrated flow of the economic system and approaches for solving problems of evaluation of integrated structures efficiency in general and private financial flows of the business processes involved in the integrated structure;

Development of an econometric models system and multi-criteria search for Pareto - optimal boundaries of risk management integration processes.

As a result of the research it will obtain the following results:

Justifying the place and role of the integration processes in the context of justification perspectives, objectives and priorities of the national economy;

The analysis of domestic and foreign research and practical experience, and methods of analysis, optimization and management of the integration process;

Proposing new methods for evaluating the effectiveness of social projects and the formal apparatus for describing the integration process;

The methods of integration processes analysis on the effectiveness of their risk assessment and taking into account the functioning of economic systems;

Developed models of financial efficiency of private business processes using models as portfolio of business processes consisting of components of different nature;

he methods of evaluating the effectiveness of the integrated flow of the economic system and approaches to solving problems of evaluation of efficiency of integrated structures in general and private financial flows of the business processes involved in the integrated structure;

Investigating and proposing to implement methods and econometric models for multicriteria search Pareto - optimal boundaries of risk management integration processes.

The expected economic results.

The study shows how using a model portfolio of business processes can be found effective portfolio of business processes, synthesized on a set of business processes of an arbitrary nature. We propose a common way of writing the internal structure of any business process.

The methods developed for evaluating the effectiveness of the integrated flow of the economic system will compare individual lines of business performance, and find

the "bottlenecks" in the portfolio, to assess the effectiveness of changes for the business development, etc.

Application management integration processes will enhance the effectiveness of decision-making and give companies and organizations analysts fairly universal tool that allows for each case to assess the advantages and disadvantages of integration projects.

2. Research Methods

Description of scientific research methods is that, the methodology of the project is based on the popular methods of research such as dialectical, Comparative Analysis, Statistics, Economics and Mathematics; systematical; a meaningful analysis and formal evaluation of the effectiveness of social projects. To use developed and proposed theoretical concepts, methodological principles, methods, models and recommendations allow scientifically manage the integration process and to assess their risk to the operation of economic systems with the use of models in the form of a portfolio of business processes within the integrated structure.

Scientific novelty of the work is that, for the first time new methods of evaluation of social projects will be developed which ensure the application of the methodology, tools and mechanisms for effective management of arbitrary integration of business processes (IBT) in the economic system using the idea of compounding cash flows (based on the NFV - approaches).

Integration (integration, portfolio) business process (BP) is a convenient model for the solution of problems of synthesis, analysis, modeling and optimization of integrated economic systems and a system consisting of components (business processes, subsystems) of different nature (see [1,8]). Such methods will compare individual lines of business performance, and find the "bottlenecks" in the portfolio, to assess the effectiveness of changes for the business development, etc. Issues considered in the work [3], is a continuation of the studies reviewed in [1,2].

We (see [9]) studied a model in a random integration of business processes (UPS). This means that such models may consist of business processes related to manufacturing, insurance, credit, publishing, research, and many other activities. Thus, the model in the form of the UPS can be configured based on a variety of business processes of different nature.

In [12] the issues of building adaptive management of economic systems (ES), which generalizes the model described in [10,11] includes the network, streaming, math (operator, functional, algorithmic) models and data business processes, as a tuple.

As it is known, that the formal representation of ES in a portfolio of business processes is a convenient model for the solution of problems of synthesis, analysis, simulation, optimization and controlling. Economic system, evolving at time, subject to many internal and external factors. Moreover, these effects may be in the nature that makes ES rebuild, "read to be adjusted." These effects may be, for example changing demand for goods, changing prices for raw materials, etc., in addition to the change in the EC can occur deliberately (planned). As an example of the latter can cause such as the expansion of production, replacing (upgrading) of equipment, change of supplier of raw materials, etc. These effects may be more complex, and

changes in the EC should aim to maintain the highest (best, optimal) efficiency of the EC in (if any) of such impacts.

In [14] we have considered a model of innovation and integration processes that are presented as a set of interrelated business processes (cluster of business processes). Integrated set of processes forms a cluster of innovative business processes. The effectiveness of the innovation cluster is proposed to estimate on the basis of compounding operations of financial flows.

In the problems of economic systems integration as discussed above, has given high priority on evaluating the effectiveness of the integration process (for example, see [13]). The second important task - to assess the risks of the resulting integration structures. In [15] the approach to solving the problem of determining the most effective investment project in a given set (package) projects. The basis of this approach is the performance indicators on the basis of the indicator NFV (net of future income) and the corresponding risks. Playback of scenarios project is carried out using the Monte Carlo method.

The urgency of this problem is due to the fact that the choice of direction for investments is that investors tend to face the need to choose the best alternative from a number of possibilities. The paper proposed and investigated models that can be used as the basis for the methods of analysis and management of integration processes and implemented in the relevant information systems.

We [16] have proposed new methods for evaluating the effectiveness of social projects, the model of which is represented as a set of interrelated business processes (business process portfolio). The basis of process models put threading models, resources, finance, etc., the underlying representation of social projects. Many projects (planned or realized) forms a portfolio of projects. The effectiveness of the portfolio proposed to estimate using the compounding operation cash flow projects.

importance of the project in the national and international level is that the developed and proposed to use theoretical concepts, methodological principles, methods, models and recommendations allow scientifically manage the integration of business processes of globalization with the system constraints and the strategic priorities of the national economy.

features of social projects and the impact of the results on the development of science and technology, which must be considered when evaluating their effectiveness are:

is not always obvious and easily to evaluate the financial results of such projects;

social projects working closely with the economic (investment) and social projects of their own (internal) and the environment (external environment);

as a rule, a tool for measuring the impact of social projects are development projects, related directly or indirectly.

Major differences between the ideas of the research from the existing analogue, is that this study, we introduce the new concept of "design of business processes", which allows to obtain the business processes, the design based on them to find an efficient portfolio of business processes. The approaches to solve the problem of estimating the risks of a portfolio of business processes.

These features impose restrictions on the models, methods and techniques (formulas and schemes) by which to evaluate the effectiveness of social projects. Therefore, it is proposed to:

1) Use the flow models of business processes as a mathematical tool to describe the (formal presentation) projects;

2) Use the portfolio theory to show (reflect) of the interaction of the projects within the system of social and economic projects, and with their environment (project-environment);

3) Use the clusters (complexes, interaction, communication) social projects and investment projects (and economies) in order to highlight the effect of social projects in general (for the integrated cluster) effect;

4) Evaluate the effectiveness of the projects are not using classical indicators based on the discounted cash flow (see [17,22]), and using the methods of compounding (building) flows (see [10,11]);

5) Use the idea of benefits (income) of the second level is achieved by cross-flow (redistribution) of some projects in other projects.

In the modern scientific community firmly proven and established term - Portfolio analysis of business processes, within which is the study of various aspects of the portfolio, portfolio diversification, dynamic portfolio management (see [23,24]), portfolio risk [25].

Portfolio of business processes is a convenient model for the solution of problems of synthesis, analysis, simulation, optimization projects and is an integrated system consisting of components (business processes) different social and economic orientation. The models in the form of projects are the portfolios of business processes (BP). These models may consist of business processes associated with the different parts (stages) of the projects in the socio-economic programs: improving fertility, improved health care, production of a certain type of insurance, subsidies and incentives, credit, research and development programs and many others.

What relation can be established between projects and business processes? As business processes - a language modeling socio-economic systems, the use of business process modeling portfolio may consist of the following:

1) some project is divided into separate enough independent parts, each of which is (written in the language of business processes) as a single business process, so that the project is formalized as a set of related business processes;

2) each project is recorded as a single business process, the number is used in this case, the business process is the number of projects (internal and external) in the system;

3) if the project requires only social costs (investments), and the return on its implementation is monitored (seen, it turns out) in the economic project, adjacent to the social, it is necessary to consider two related business process (cluster) corresponding to these projects.

Thus, the number of business processes involved in the stages of analysis, optimization, simulation, and control must be less than the number of projects. If this condition is not met and the number of business processes are less than the number of projects, this could lead to, for example, methods of analysis does not allow to

localize (identify) the source of some of the effects (for example, do not allow to define a specific project or accessory part of high sensitivity in the parameter space projects, etc.).

Just as some of the projects are in the environment of their own (internal) and extrinsic (environmental, environment, external) projects that are corresponding business processes will also apply to internal or external. Of course, the incomplete knowledge of the values and characteristics of the flow of external projects leads to the fact that for these business processes will reflect only the characteristics of the projects, which are known (from the general documentation for joint activities with these processes, or from other sources).

Note the fact that the classical performance indicators (such as *NPV, IRR, PI, DPP* and others), unfortunately, have drawbacks that make them less suitable (and sometimes useless and even harmful) for practical use in evaluating the effectiveness of projects. For example, the rate of *NPV* can cause problems with the numerical estimation efficiency projects because of its following properties. First, the procedure for selecting the discount rate is quite subjective, and her choice is largely dependent evaluation of the effectiveness (or ineffectiveness) of the projects. Second, the value of this parameter does not have a clear (understandable) make economic sense. Thirdly, the rate of NPV does not include income derived from the output flow of the project (the so-called second-level income). And so on (for more details see [11]). Since conventional indicators NPV and others are derived from the index Then, as you might expect, they have inherited from the "parent" some of the disadvantages. For example, the rate of IRR assess the upper limit for the discount rate, below which the value of is positive, however, it shows no direct yield value projects. For more details on these and other problems of classical figures are available, for example, in [11,12]. In the numerical estimation efficiency projects, we recommend the use of modified index and their derivatives, which remove many of the problems listed above. In particular, they can be used several different rates (the rate of bank deposits, bank rate on borrowed funds, the rate of output streams external business processes, and many others.) Then, in contrast to the classical rate Similar to the rate calculated on the basis of modification index (Indicators of species) Will be equal to project profitability.

Consider the problem of estimating the effectiveness of a cluster of projects on the assumption that the components of its projects (and their respective business processes) have a complex relationship, which corresponds to the majority of real-world problems. Note that the evaluation of the effectiveness of the cluster as a whole on a known input and output of the cluster is a relatively simple task. The solution of this problem depends on the internal relationships and flows (redistribution, eg, financial) between projects in a cluster, and determined by the input and output streams of the cluster projects. However, if the problem is becoming more widespread and required, for example to assess the efficiency of each of the projects of the cluster separately, then the solution of the problem much more complicated. The difficulty of solving the problem in this case by the fact that the effectiveness of the cluster private projects are dependent on each other according to their connections in the cluster.

The analysis of social projects is important in both theoretical and practical aspects of the problem. From a theoretical point of view, the problem is that the project is estimated as social and economic indicators based on the classic such as NPV, IRR, PP and many others. But these indicators have many shortcomings. On the other hand,

the specificity of social projects is such that it is incorrect or incorrectly evaluated the effectiveness of these projects can lead to consequences of socio-economic nature, which usually affect both the people (society), and the economic system in which these projects are to be implemented or being implemented.

3. Conclusion

The end result of the study will be a product, that is presented in the study algorithms for finding efficient portfolios of business processes, risk evaluation of portfolios of business processes, financial analysis and approaches to managing business processes are of both theoretical and practical significance for problems of portfolio analysis in general and can be used to create specialized software tool for managing a portfolio of business processes.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Author Contributions

Conceptualization: D.B.; Methodology: D.G.; Investigation: D.G.; D.B.; Writing – original draft preparation: D.B.; Writing – review and editing: D. G.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

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