Consideration of synergy in reforming the ICS RSI as a result of increasing high-tech civilian products

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Abstract. Large integrated structures dominate in the rocket and space industry, but current organization of these structures corresponds mainly only the tasks of fulfilling the state defense order. At the same time, one of the priority areas of the industry development is the focus on civilian products. The transition to it is caused by the changes in the system of integrated corporate structures. The article presents the main directions of transformation of integrated corporate structures in the context of increasing the share of high-tech civilian production, the sphere of synergy, as well as methods for estimating the synergistic effect in assessing the effectiveness of restructuring RCT enterprises.

1. The main factors and conditions for the restructuring of integrated corporate structures of rocket and space industry (RSI) while increasing the volume of high-tech civilian products

Due to the structure of interaction between enterprises of the same chain established in the rocket and space industry (RSI), as well as the presence of predominantly state funding within the framework of fulfilling the state order in the industry, organizational interaction with a rather high degree of control over property within integrated corporate structures (ICS) has developed.

The current integrated corporate structures of the rocket and space industry belong to holding-type structures, in which the parent company and entities of the structure are distinguished; the parent company manages companies in order to fulfill government orders. Technological ties have also determined the composition of participants in current ICS, which is associated with the tasks and portfolio of projects of the state defense order.

Today, the rocket and space industry is given a task to increase the proportion of high-tech civilian products as a result of innovative potential for commercial purposes use. When increasing the production and sales of civilian products state control decreases, the relationship between objects is mainly governed by market relations.

This task causes the necessity to form and develop competencies not existing at the enterprises previously, which determines the need to involve new participants in the ICS - organizations realizing a market approach in business. The development of the rocket and space industry is provided by the transformation of integrated corporate structures in order to ensure the commercialization of the innovation potential [1].
Each subject of the ICS is responsible for a certain role, thereby ensuring the balance of the full life cycle of civilian goods. The mechanisms providing each project with the search for funding sources, the establishment of production, the promotion of goods, sales, and after-sales service are defined.

In this connection, there arises a question in identifying network objects that should take on a competence previously unusual for enterprises, as well as the question of determining the relationship between the objects of the innovation structure from the point of view of the economic efficiency of these tasks.

The unique advantages of the rocket and space industry are the presence of a powerful scientific and technical base. As a result, there are enormous opportunities at RSI enterprises for the provision and execution of technologically complex tasks. The existing innovative potential of a number of scientific areas of RSI today are investment-attractive areas where demand has been creating.

Such key sectors of the economy as telecommunications, energy, healthcare, transport, electronic, oil and gas industries can be singled out among the core areas of market demand for civil RSI products and services for civil purposes. There is an intertwining of common interests, which is associated with the mutual convergence of science and economic structures in order to create favorable conditions for the implementation of economic activity [2].

The purpose of the formation and development of new infrastructure with a combination of strong and weak ties within the integrated structures is the effective distribution of existing resources and the potential of the scientific and industrial base. Efficient infrastructure implies the need to integrate military and civilian production at RSI enterprises, the need to unite and rationally use scientific, production and marketing areas within the industry, as well as the need to assess the market prospects for commercial use of available resources.

Taking into account the features of the scientific and production potential of the RSI, the technological ties within the integrated corporate structures should remain strong, while additional weak links appear at the borderline of resources engaged in both military and civilian production.

The form of integration of vertical rigid links with state control in the direction of the defense order with a combination of horizontal flexible links in the direction of civilian products is a strategic condition for accelerated access to technological capacity and skilled labor, which will lead to new markets and ensure payback of these industries in the future.

New flexible infrastructure should provide additional capacity for the creation of competitive civilian products, ensuring the inflow of investment resources from the private sector, which will be directed both to the production of high-tech products of the defense order, and to the production of civilian products.

Each project’s structure is formed individually. The specific nature, the goals of the project, as well as the identification of "bottlenecks" in the activities of current ICS determine the nature of communication within the framework of specific project implementation and effective interaction creation. The nature of the relationship between the subjects of the restructured ICS can be expressed both in the form of holding bonds in the implementation of long-term projects, and in the form of ties based on temporary associations (consortium) for the commercialization of small projects defined by definite time frames.

Depending on the lifespan of the project, cooperation can be classified as short-term - temporary integration, aimed at solving corporate problems during the period, while it is possible to use a form of communication such as a loan agreement. This is a contractual relationship governed by the terms of the contract for the execution of works or the supply of goods.

In the case of long-term cooperation, when it is planned to unite efforts for the implementation of the project, which results significantly affect the market, industry, region, restructuring of the corporation and a significant change in the form of bonds, the allocation of holding bonds is assumed [3].

Taking into account the implementation of projects for the commercialization of innovative potential, one should take into account the principles influencing the financial performance of the corporation when restructuring integrated corporate structures of cash-settlement management.
When deciding about the participants to be attracted for the project - the subject of existing holding or a third party, not only the commercial conditions offered by potential participants of the project, but also the overall economic effect that the current holding will receive is taken into account.

2. Evaluation of the synergistic effect in the restructuring of enterprises ICS RKO

When analyzing the effectiveness of the development of business processes integrated structure it is necessary to take into account the possibilities of the synergy effect. Synergy arises when a corporation includes several enterprises and a portfolio of ongoing projects, and perhaps one project is not effective, but inter-project synergy arises in combination with other enterprises and other projects.

When determining the scope of synergy, it is necessary to take into account that the nature of the manifestation of a synergistic effect, depending on the direction, is different.

2.1. Evaluation of the synergistic effect in the field of products

To assess the synergistic effect of the emergence of products, it is proposed to form an optimal product portfolio of the business being created.

Synergy in terms of the product during the restructuring of the enterprises of RSI arises because of the effect of diversifying the product line. At the same time, depending on the type of restructuring, new products can be either modified, technologically homogeneous with respect to the main product of the RSI enterprise, or they can be absolutely new products that are not technologically related to the product of the restructured enterprise.

The production of civil RSI products based on the results of innovation activity is possible at different stages of the innovation process, which forms the current RSI product, starting from the development and the idea itself to the patent and product use.

Space technologies, the existing technical and personnel potential of the RSI are of great importance in creating a unified information space and using advanced technologies for the production of civilian products as well as the provision of services for wider consumption - transport maps, vehicle traffic control, navigation with and using space satellites.

Taking into account synergy for the sphere of the emergence of "products", it is possible to use the portfolio approach.

A set of acceptable innovative projects that meet the standard level of profitability are being compiled. The formation of an optimal portfolio of innovative projects is carried out by the method of complete enumeration of projects (products) based on solving a linear programming problem using Boolean variables.

The result of solving a linear programming problem is an optimal portfolio of projects that determines the corporate strategy for the innovative development of RSI enterprises.

The number of projects, the volume of investments and the risk of each project are determined by the results of solving the problems of finding the optimal level of production capacity of the enterprise for each project, the project profitability rate and the risk of project implementation during the restructuring of the cash register companies.

2.2. Evaluation of the synergistic effect in the emergence of market outlets

In determining the most promising market opportunities for commercialization of projects, marketing campaigns are launched to bring innovative products to the market. The experience and results of the activities of RSI enterprises convince of the expediency of their integration in the part of centralization of marketing functions.

The synergistic effect in the emergence of a market outlet can be assessed by methods of both the cost approach and the income approach.

We can use one distribution network to promote and sell different products, thereby reducing conditionally fixed costs. Competences in the field of product sales contribute to the output of an innovative product to the market and securing strong positions for it, which is possible if ICS RSIs strive for a comprehensive increase in the efficiency of all activities [4].
To assess the synergistic effect in the restructuring of ICS RSI, the advantage method in profit (cost of services) is most applicable, since it is universal and is able to assess the additional effects of income. This method can be used to evaluate the entire set of assets from a goodwill perspective.

The cost of goodwill (additional profit associated with goodwill - $V_{na}$) is determined by the change in product price ($pr$) due to the appearance of goodwill (through the $K$ coefficient, which reflects that part of the price that is due to goodwill) and sales volume ($V$), which depends on product prices.

$$V_{na} = K \cdot pr \cdot V (K \cdot pr)$$

To assess the goodwill of a restructured structure, the use of two coefficients is proposed. The first of them takes into account the increase in the price of products associated with the use of goodwill. The second is a change in the quantity of products associated with the use of goodwill and an increase in the value of the price of products.

The net operating income ($P$) received by the company depends on the value of the product and on sales. The steps of the synergistic effect evaluation algorithm through the evaluation of goodwill are as follows.

- The determination on the basis of expert methods of the marginal coefficient $K$, which characterizes the possible increase in price associated with goodwill.
- Determining the dependence of the volume on the cost of production $V = f(pr)$.
- Determination of the optimal selling price of products. The solution of the problem:
  $$P = pr \cdot V \rightarrow \max$$
  $$pr \leq pr_{\text{max}} = (1+K) \cdot pr$$

- Determination of the estimated coefficient:
  $$K_{pr} = K_{\text{opt}} / pr$$

- Determination of the growth rate of sales:
  $$K_{v} = K_{\text{opt}} / V$$

- Determination of the synergy effect based on goodwill assessment:
  $$V = K_{pr} K_{v} \sum_{n} \frac{P_{n}}{(1 + r)^{n}}$$

2.3. Evaluation of the synergistic effect in the field of finance

When assessing the synergy effect during the restructuring of ICS RSIs in the field of finance, it should be taken into account that in the case of financing an investment project in conditions of insufficient funds, the initial enterprise borrows from financial institutions.

The effect of financial synergy is achieved by:

- the possibility of attracting a larger amount of borrowed funds, since the ICS has great opportunities, in comparison with a small company;
- an increase in sources of financing, which leads to a reduction in the need for credit resources, which ensures a reduction in debt servicing costs.

The spheres of the emergence of synergy together with the forms of interaction determine the methods for evaluating the synergistic effect that arises in the context of creating new business processes in connection with the commercialization of the innovation potential.

The most significant synergy effect is manifested for restructuring with holding bonds, which is associated with the presence of close ties between the restructured RSI enterprise and the business
being created. First of all, this is determined by the absence of the need to attract external sources of project financing while maintaining control over the business created in the process of restructuring.

When creating objects of the infrared infrastructure, the influence of the synergy effect is taken into account while determining the size of the sources of financing and the structure of attracted capital. The priority is to attract credit resources for the project, which allows you to maintain the current management structure and the composition of owners.

The effectiveness of the investment project (expected cash receipts) determines the maximum amount of credit funds. On the basis of what the maximum loan amount \(D_{\text{max}}\) is defined as:

\[
D_{\text{max}} = \sum \sum \text{Dit} / (1+r)^t \leq \text{NPV} \tag{6}
\]

\(\text{Dit}\) is the amount of debt on the \(i\)-th loan in period \(t\);
\(r\) is the discount rate;
\(\text{NPV}\) is the net present value of the future cash flow over the life of the loan.

Thus, in the event of insufficient resources for the project, the head company, ICS, will initially attract borrowed funds, provided that the maintenance costs and debt repayment are covered by future project revenues [5].

If the amount of the loan provided is insufficient or it is not possible to provide servicing and repayment of the debt at the expense of future revenues from the project, then it becomes necessary to look for additional own funds attracted at the expense of investors who will finance them on terms of equity participation in the project.

Thus, the emergence of civilian products in the portfolio of RSI enterprises leads to the inevitable restructuring of ICS, the creation of a new class, which is characterized by a combination of rigid corporate relations and flexible market. ICS retains its current structure to ensure the state defense order, and also begins to organize the completion of the current architecture, modifying the overall look of the system in order to implement projects for the commercialization of innovative potential.

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