Cost management in terms of marginal analysis

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Abstract: The article provides an overview of the main economic indices characterizing operation of a modernized enterprise in terms of increasing efficiency of the enterprise's economic solutions. In the authors' opinion this problem should be examined from two sides. On the one hand, it is necessary to ensure that development and modernization strategy is chosen in accordance with the changing social needs. On the other hand it can be done through implementation of scientific advances and innovations. This preconditions the choice of cash flow directions and determination of their economic efficiency through cost reduction principle when costs are redistributed in favor of R&D, through minimizing semi-fixed costs with increase in output and through marginal approach to operational risk analysis.

Introduction

In general concept, efficiency is common for developed systems, processes and phenomena. It can be an index showing how developed an enterprise is. At the same time, efficiency can be a strong incentive for modernization and development of an industrial enterprise. Strive for increased efficiency in a certain line of business of an enterprise or some modernization project results in working out specific measures which contribute to development and eliminate activities leading to regress. In this aspect, efficiency is directly interrelated with evaluation of the obtained results and expenses and it is a purpose of management activity. Economic efficiency of an enterprise and its investment activity should be seen not only in dynamics but also with consideration of operational risk and utility. The paper looks into the issues which help throw light on search for additional investment sources to implement R&D:

1. Evaluation of an enterprise's investment activity efficiency.

2. Review of basic economic indices which characterize activity of a modernized enterprise.

3. Evaluation of an enterprise's investment activity efficiency on the basis of the cost reduction principle and a relevant model for the cost reduction principle application.

These issues are covered in the works of Russian researchers such as: A. Akayev, A. Andrianov, A. Asaul, V. Barancheyev, D. Bugrov, S. Valdaitsev, N. Voitolovsky, P. Vilensky, V. Volkov, V. Galasyuk, V. Glukhov, A. Gryaznova, D. Demidenko, E. Yegerev, I. Ivashkovskaya, A. Karlik, V. Kovalev, A. Kolesnikov, Y. Kulik, E. Koslovskaya, V. Livschitz, M. Limitovsky, S. Smolyak, D. Stepanov, T. Teplova, E. Shatrov, E. Shikin, A. Chkhartishvili, etc.

Review of major economic indices for modernized enterprise

Contemporary economic science characterizes economic efficiency (EE) as a relation of the obtained economic effect or result to the costs of factors and resources that have predetermined receipt of such a result [1, 2, 3].

As a rule, production scale of new products, demand for innovations, correspondence of innovations to the world level and size of innovation potential affect economic indices of investment activity (IIA) of industrial sector after modernization. Indices, broadly used in domestic and foreign practice and specific for modernization of production and innovative activity of an enterprise, the same as its innovative competitiveness, can fall under the following groups: expensive; by time; by update; structural. These are shown in Table 1.

Thus, discussion about evaluation of an enterprise's efficiency and its essence is basically related to two questions: what can be taken as an economic result of an enterprise's activity and what type of costs can it be attributed to? When analyzing the impact of a new or improving technology on economy of an enterprise the data about the enterprise before and after a modernization (investment) project can be used for making comparison. In order to choose the best line of development and modernization, to take a final decision about how attractive new products are, these indices have to be analyzed and an approach has to be used based on marginal analysis principles and maximization of the enterprise's market value.

Table 1. Major indices of modernization process, innovation activity and competitiveness of an enterprise

Most commonly, those indices are used which reflect total expenses of a company on R&D in sales and number of its scientific and technological divisions. TAT innovation index is widely used, which is an abbreviation of 'turn around time'. It implies a time period between the moment when the need or demand for a new product appears until it is sent to the market or customer in large quantities. Some other indices can be used, but not as broadly, for example structural ones, which demonstrate the number and character of innovation divisions. Such indices are often present in special analytical reviews [4, 5]. Efficient strategy of modernization and economy development of an enterprise include:

1) need for a system of innovative development;
2) capacity for innovative development satisfaction (innovative conformity index; index of innovative result conformity);
3) increment in the company's value;
4) multiplication effects of innovations.

Key indices of investment return on new product or modernization program: increment of intellectual capital, profitability of investments and increased sales of the new product, net profit growth, better labor productivity, growth of economic value added and higher competitiveness of the enterprise. The efficiency of the company's innovative activities has to be assessed and an investment plan of the modernized enterprise has to be selected and built up in terms of the following condition [6, 7]: economic value added, value increment (V) is maximum. V. Kovalev in his research expresses the following opinion: "none of the existing criteria – profit,

profitability, production volume, etc. – can be seen as a round-up criterion of efficiency for the decisions made. The criterion has to be based on forecast of company's owners' profits, be well-grounded, clear and exact, be acceptable for all aspects of managerial decision-making process, including search for funding, non-borrowed investment, income distribution. The criterion of equity capital maximization (i.e. market value of a company's common shares) is believed to be such a criterion".

Evaluation of enterprise's Innovative activities efficiency through cost-reduction principle

It is known from the theory that the main function of an economic system is to provide a maximally comprehensive result, to use limited resources efficiently and satisfy economic needs and interests both of the society and separate individuals. As practice shows, cost-reduction principle acquires a great role in justifying enterprise's innovative activity (EIA) (Figure 2 in form of IDEFO).
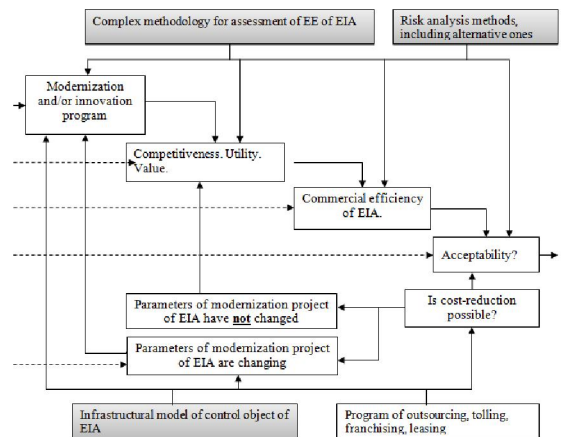

Fig. 2. Model of cost-reduction principle application (CR) in EIA

When analyzing EE of EIA the following major stages can be highlighted [8, 5]:

1. Innovative character of a modernization project is approved on the basis of data available – from "modernization program" projects, referring to products and technology.

2. "Commercial" efficiency of EIA is approved. There can be a large number of modernization projects in EIA with EE approved as commercial. These can include, in particular, EIA with a relatively short cycle of economic life.

3. Application of cost-reduction principle and technologies that correspond to implementation of this principle. When there is lack of individual principles and methods of economic feasibility for EIA and their EE is not confirmed, project cost-reduction programs can be used providing the

"invariability (equivalency) principle of the final result of the project" is unfailingly complied with.

4. After costs have been reduced, calculations have to be done again to check EE of the project, since cost-reduction that has been achieved so far can prove to be insufficient for overcoming EE threshold of the project. In this case an additional cost-reduction program of the project can be elaborated and implemented.

5. At the same time, the company's demand for final result equivalency, however, can be broken. This means that cost-reduction activities can change the domestic return index of EIA. In this situation, innovative character of the project has to be additionally proved and analysis procedures have to be repeated.

For EIA, due to project specifics, a special role can be attributed to outsourcing of works and services, which helps minimize project implementation cycle and obtain the expected result quicker. However, if this technology is used, project costs grow considerably. So, outsourcing can become an object of cost-reduction. Now, additional aspects of EE of EIA have to be analyzed with due reflection in the methods of economic feasibility. These, primarily, include institutional aspects: the company involved in EIA rejects to use such market service as outsourcing and, correspondingly, it rejects costs related with its purchase, which automatically results in additional costs on providing this service with the company's own resources. These internal costs are quite often lower than outsourcing costs.

However, as we know, additional costs of institutional character appear – transactional costs (TC). On the one hand, "external" transactional costs, related to purchase of services in the market (transactional costs of the first type) decrease. On the other hand, "internal" transactional costs, concerning reproduction of the service with the company's own resources (transactional costs of the second type) go up. That is why, transactional costs have to be optimized. Additional costs of the company for reproduction of the required services with the company's own resources can exceed the costs if these services are bought in the market, since specialized firms, as a rule, have lower operational costs. If the services of a specialized company are turned down, considerable economy can be reached due to the fact that profitability of service, provided by such a company, includes not only the standard component of profit on invested capital, but also risk components and, among others, the risk component of doing business with the company involved in EIA. Since the latter takes account of its risk anyway, there is a double accounting of innovative activities risks,

which brings additional complications when considering EE of EIA.

When using cost-reduction strategy, each of its variants is characterized with cost-saving (it can be measured as cost-reduction in comparison with expenses when no cost-reduction has been made – definition of cost-reduction efficiency). It matches with a certain proportion of TC, type 1 and 2 (it can be measured as increase/decrease of transactional costs TC in comparison with expenses if no cost-reduction has been made – definition of transactional cost efficiency). Upon that, the following equations appear: $CRE = CR_1 - CR_2$, $TCE = TC_1 - TC_2$,   (1)

1) $CRE > 0$, $TCE > 0$
2) $CRE < 0$, $TCE < 0$
3) $CRE > 0$, $TCE < 0$
4) $CRE < 0$, $TCE > 0$ (2)

In the first case, there is economy of transactional costs TC, which strengthens the positive economic effect of cost-reduction. In the last one, positive value of the institutional component of the effect can help "raise" EE of EIA to an acceptable level. The second case – is the case of "complete inefficiency", whereas the third one is "the compromise situation".

Economic result of the cost-reduction program can be also expressed analytically. Let Z be an expected cost-reduction value, X - expected cost-reduction due to purchase of services in the market, Y - expected cost-reduction due to doing works with company's own resources, «a» - ultimate cost-reduction on the project with market service increase on one unit, «b» - ultimate cost-reduction on the project with increase of services provided with the company's own resources on one unit. The following model of cost-reduction size on the project can be suggested:

$$Z = aX + bY. \qquad (3)$$

Condition of cost-reduction:

$$dZ \le 0, dZ = \frac{\partial Z}{\partial X}\Delta X + \frac{\partial Z}{\partial Y}\Delta Y, \qquad Y, \qquad M\frac{\partial Z}{\partial X} = a, \qquad \frac{\partial Z}{\partial Y} = b$$

Condition of marginal cost-reduction:

$$\frac{a}{b} \le -\frac{\partial Y}{\partial X}M \qquad (4)$$

So, if the formula $a/b = 0{,}5$, outsourcing cannot be decreased by more than a half of the company's own services growth. This condition means that the expected ratio of the cost-reduction on services provided by the company itself and ones bought in the market, when the company is involved in EIA, cannot be lower than the ratio of the ultimate norms of cost-reduction on the project. If EE of EIA is considered and confirmed, it does not automatically mean it should be accepted since there are risks that are of great importance. Risk analysis has to be an

integral part of decision-making about acceptability of EIA. The issues concerning analysis and risk management of EIA have to be considered separately.

Conclusions

EIA has to be managed with a structured system of indices, which allows managing goals and approving them at levels of management and centers of responsibility plus according to stages of the company's life cycle. With this a consistent structure of goals has to be built up and decision-making procedures must be elaborated to help provide well-directed management of EE of EIA from the positions of the general strategy that has been worked out (focus has to be on controlled parameters of EIA). This comes in agreement with principles of goal approach to business performance management. Analysis of operational effect (operational risk) of the enterprise's innovative activities (EIA) is an important aspect of adequate production planning. For example, with production plan, enterprises try to maximize their profits from EIA. Analysis of contemporary approaches, techniques and indices of industrial enterprises' performance make it possible to conclude there is no single criterion, being universal from the management standpoint, so a complex approach should be used when analyzing EE. Some indices can be used as local criteria, at separate stages of industrial innovation introduction, or when tackling different individual tasks. Economic efficiency (EE) within the entire economic life of innovation can be determined not only when increment of the company's value is analyzed, but relying on the size of production costs and capital investment on economic effect due to modernization of funds, introduction of innovative or science-tech products, value of economic effect obtained from the relevant cash flow, related with introduction of innovative or sci-tech products, R&D commercialization, modernization result; on the basis of relative economic efficiency of R&D and intangible assets measured on the basis of marginal theory; operational risk reduction; with the use of cost-reduction principle.

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