ALGORITHM FOR DEVELOPMENT AND ASSIGNMENT OF INNOVATION PROJECTS

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INTRODUCTION

The article discusses the basic parameters that characterize a given project as an innovative design and technical solutions as an innovation.The requirements are analyzed for innovation in applied science projects and their ability to be efficient and competitive. Studied the conditions and opportunities for impact of these indicators on the economic result of many downstream enterprises. An attempt was made to determine the degree of innovation impact, which serves as a basis for assessing the design decisions. The following are findings with recommendations for the use of this method of evaluation.

Science - Applied Projects

The applied research projects are developed on the basis of feasibility or other IT study, which demonstrates the innovation of future development. The Gained experience in development and evaluation of innovative projects arguably way proves that the sequence of development and evaluation of design decisions depend on the impact of a number of factors and creating restrictive conditions in the process. Nature of the influencing factors allows them to be grouped by nature of impact in three main and two additional counts. Algorithmic ranking them in importance is given in Figure 1.

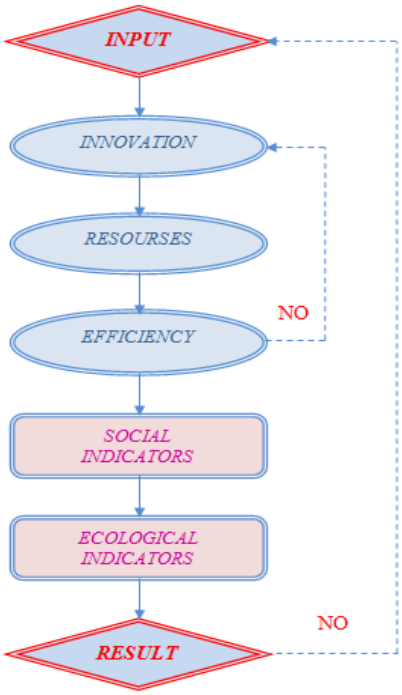

Fig.1. Algorithm for elaboration of innovative projects

Therefore, the level of innovation projects depends on a function of the following parameters:

$$N = F\left(In, E_f, Rs, Sc, Ec\right)$$

where:

In - Innovation;

E_f - Efficiency;

Rs - Resource

Sc - Social indicators;

Ec - Ecological indicators.

INNOVATION

The innovation is determined by the criteria of innovation and their quantification - degree of novelty. The classification of innovation is carried out depending on the result of various factors, and the purpose of their analysis. In this way they differ and classify by distinguishing signs. For the purposes of our study, we adopt the classification order which formed their innovative nature.

Therefore, the degree of novelty will appreciate only qualification definition, which forms the essence of product innovation. You then need to distinguish between innovation and innovative product. At last we can have some innovative solutions. Innovation in its pure form is very rare. Usually innovative product includes more than one innovative solution.

The level of innovation is determined by the degree of innovation aging predecessor innovation for the same purpose, the same type and the same satisfying human or social need.

Degree of novelty. The degree of novelty is a criterion for evaluation and includes many dependencies. Usually these are the indicators: productivity, efficiency, resource availability and more as, weight, time, fuel economy, materials, ease of use, maintainability and others (Tabl.1).

The quantitative measurement can be determined by comparing the indicators reached their level in leading companies and organizations in the world, including weight-saving materials, dimensions, energy saving and fuel reliability, saving time in production (productivity) design and ease of operation, introduce new technical, technological, organizational and other solutions that deliver quantifiable benefits to the consumer. Other benefits that can be quantified are ecology, hygiene, occupational safety, etc.

In the product innovation there are three stages of innovation: new product (the base), upgraded product (improved), adapted.

Tabl.1. Parameters, defining the degree of innovativeness of the new product

№ of order	*Technical characteristics of the performance*	*Measure*	*Reach level indicators*	
			New product	*Similar products*
1	*2*	*3*	*4*	*5*
1.	Output	pcs / h		
2.	Labor intensity	h		
3.	Weight	kg		
4.	Overall dimensions	mm		
5.	Reliability (Failsafe)	addr		
6.	Energy consumption	kw		
7.	Maintainability	h		
8.	Design			
9.	Cost of materials	kg		
10.	Others	-		

The degree of innovation intensity is determined by the formula:

$$Син = \frac{Ka_{n_1} + Ka_{n_2} + Ka_{n_3}}{a}.100\%$$

where:

a_{n_1} - proportion of indicators that define the growth of economy of time, such as productivity, efficiency and others. Expressed in value units (lev);

a_{n_2} - proportion of indicators determining the growth of economy of materials and fuels. Expressed in value units (lev);

a_{n_3} - share of the savings resulting from the impact of its performance in terms of design and more. Expressed in value units (lev);

a_c - percentage of the value of these indicators like product.

a_{n_1} - is defined as the difference in performance levels between the innovative and the base (equivalent) product expressed by saving time. Results are valued in lev.

a_{n_2} - is defined as the difference in performance levels between the innovative and the base (equivalent) product expressed by saving material components (materials, energy, etc.). Results are valued in lev.

a_{n_3} - is defined as the difference in performance levels between the innovative and the base (equivalent) product expressed by savings resulting from quality improvements (design, ease of operation, etc.). Results are valued in lev.

K_1, K_2, K_3 are coefficients of importance (weight) of the groups of indicators a_{n_1}, a_{n_2} a_{n_3}. Typically, $K_1 = 1$, $K_2 = 1$, $K_3 = 1$. If any of the indicators is given greater weight in any case, it remains a ratio C <100%.

If you want to express with a factor, then the formula yields the form:

$$K_{И} = \frac{a_n}{a_c}$$

where:

$$a_n = \left(a_{n_1} + a_{n_2} + a_{n_3}\right)$$

$K_{И}$ is in the range 0< $K_{И}$ < 1

Parameters defining the degree of innovation of upgraded product

These are similar to those used in a new product, but the baseline is set and the calculations are easier.

The degree of saturation of innovative product we can define with the following formula:

$$C_{ИН} = \frac{a_м}{a_c}.100\%$$

where: $a_м$ - relative share of the cost of upgrades (improvements) product (lev);

a_c - relative share of of the value of your old product (lev).

Parameters defining the degree of innovation of adapted product

We use the same parameters for both new and refurbished product, but the final calculations are considerably simplified.

Degree of innovation intensity is determined by the formula:

$$C_{ИН} = \frac{a_a}{a_б}.100\%$$

where: a_a - relative share of the fittest (adapted) product expressed in a single dimension;

$a_б$ - relative share of the underlying product, expressed in a single dimension.

EFFICIENCY

The efficiency is determined by the following indicators: return on the funds (years), cost and expected profit economic outlook (years). The efficient and economic trends associated with a market outlook for products or technology for production of these

products. This is done by market research summarized with the justification for the efficiency of production of the innovative product.

1. Return on funds / investments / for innovative solutions is carried out with the following methods to quantify the parameters:

Payback period (PBP). It is the period of time during which the investment must be returned using the calculations:

$$CO = \frac{IP}{PP + A}$$

where:
CO - payback period;
IP - an investment;
PP - average annual net cash flow;
A - depreciation.

Internal rate of return. It equates to a zero net present value (NPV) to conditionally taken discount rate. Fixed discount rate of each innovative project is compared to the required rate of income for projects with similar risk. Investment is profitable only if NPV> 0 and IRR = NPV = 0, where IRR - internal rate of return

2. Profitability. Profitability index is defined as the present value of the cash flows of the investment project is divided by net investment costs:

$$IP_p = \frac{PP}{IP}$$

where:

IP_p - index of profitability.

3. Economic perspective. This means that innovative product to market, there is provided at least three years. Experience shows that many innovative products do not find their place in the market despite the best indicators of innovation, making them unprofitable and non-marketable.

RESOURCES

The resources are determined by the resource areas as human resources (H_R), material resources (M_R) and financial resources (F_R) or:

$$R = F\left(H_R, M_R, F_R\right)$$

Human Resources

This is a crucial element in the success as part of the project work and the rapid ejection of the product. It is important for the company to have its own operational team including researchers, organizers, workers and others. Moreover, it must have its own staff and newly recruited researchers, workers, including attracted by contract researchers. It is also desirable to have a partner as a scientific organization Sciences, universities and others.

Material resources

Material resources are another important component of the company, to have the technical capacity to implement the project. Of particular importance is to have its own facilities to complete the project on its own. May use subcontractors using the facilities of subcontractors or partners.

Financial resources

These include conditions and alternatives for financing the project. If the company has its own financial resources, it may invest in the project activities. But may invest only a portion of the funds for the project, and the other part to be supplemented by loans, bank and other resources.

Additional indicators

The additional data concern the so-called social and environmental performance.

SOCIAL are those that relate to the creation of new jobs, the project can be achieved and other benefits for employees of the company, etc.

ECOLOGICAL are those through which can achieve to improve the environment – to improve the working conditions in the company and others.

Except the proposed parameters and criteria there can be used other like them. They are usually specific and have more qualitative nature such as social development of the production team, environment and degree of contamination, level of education and qualification, safety and labor protection, industrial staff motivation, ergonomic requirements, electronic adaptation and electronic environment, technical equipment of the activities and processes, etc.

Conclusions

Based on this analytical study of the influencing factors on innovation projects can draw the following conclusions:

1. The innovative design solution depends on many factors influences forming additional restrictive conditions to the effectiveness of the implementation of the innovation project.

2. The novelty in the innovation project is indispensable, but not always crucial to the marketability of product innovation. The predominant influence of other factors can not provide the required efficiency of the implementation of the product.

3. The innovation performance can not be considered as a permanent collection of quantitative measurement of these indicators due to the fact that each of them in different periods of time and different effects amend its share in it.

In conclusion, it can be assumed that an algorithm is proposed to develop and evaluate innovative projects on the type of product innovation. Influential factors were examined and the selection of the main parameters that determine the efficiency of the design decisions. It has been shown that the efficiency of innovative designs depends on the expression of these factors creating new effects, dynamic time varying. In various production and market conditions, they have different levels of impact and different impact on innovation of design solutions. The proposed sequence of determining the impact of these dependencies is a practical guide for businesses and organizations developing and evaluating innovative projects.

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