International Business Management 9 (5): 959-962, 2015
ISSN: 1993-5250

Evaluation of Integration Interaction Effectiveness for Innovation Process Subjects

Oksana Valerievna Vaganova, Tatyana Valerievna Balabanova,
Marina Valentinovna Vladika and Svetlana Alekseevna Kucheryavenko
Belgorod State University, Pobedy St. 85, 308015 Belgorod, Russia

Abstract: The effectiveness of integration cooperation during the implementation of an innovation process is proposed to assess according to the value of the project success complex index, reflecting the ratio of results and financial costs. Taking into account the complexity and multi-stage nature of an innovation process, the method of calculation based on the use of a number of factors: financial costs; the component of funding; indicator of innovative process effectiveness.

Key words: Economic efficiency, innovation process, stage indicator of financial costs, project success, Russia

INTRODUCTION

The effectiveness is a complex system phenomenon with heterogeneous structure and a strong organic relationship of elements. Considering the effectiveness in economic aspect, one may state that this category expresses the system of relations and links concerning the activity results of economic entities. The entities interacting between each other develop an integral component of economic system functioning and development, i.e., cost-effectiveness. This integral property is shown in each element of an inhomogeneous structure, including the effectiveness of innovative activity (Vasyuhin and Titov, 2010).

The efficiency of subject interaction is an integrated assessment of innovation process all stages which characterizes the system economic importance of the innovation implementation and their impact on certain mechanisms of integration interaction (Hague *et al*., 2005).

The efficiency regardless of its categories has its qualitative and quantitative parameters and criteria, the system forms of expression, the evaluations and their relationships (Glagolev and Vaganova, 2013). In the process of integration interaction, economic efficiency measurement different evaluation parameters may be used. The generally accepted indicator is the comparison of economic benefits with the investments that caused this effect (Balabanova, 2012). The methodology of this assessment is a form of comparative investment effectiveness formula and it is often used in practice without any comparative test of obtained results.

In modern conditions it is advisable to develop an improved methodology that helps to choose, systematically analyze, evaluate and economically justify the solutions at each stage of an innovation process implementation (Birkinshaw *et al*., 2008).

MATERIALS AND METHODS

Let's consider the main provisions of instruments for a formalized evaluation of an innovation process effectiveness taking into account its multi-stage implementation. The value of financial costs provides the information about the relation of funds spent on a project implementation in n stages, since the start of its implementation and the planned funds for its implementation as a whole. The index of financial expenses is calculated on an accrual basis:

$$K_f^{(n)} = \frac{\sum_{i=1}^{n} K_{fr}^{(i)}}{K_{fp}} \quad (1)$$

Where:

$K_{fr}^{(i)}$ = The funds actually spent on the project during the ith stage, including the sources of funding for all the subjects of an innovation process

K_{fp} = Funds planned for a whole project financing, including the sources of all subjects funding

The stage value of financial costs gives information about the relation of the amount of funds spent (used) for the project during n stages and the planned figure for the same period. The stage indicator of financial expenses calculated on an accrual basis:

$$K_{f1}^{(n)} = \frac{\sum_{i=1}^{n} K_{fr}^{(i)}}{\sum_{i=1}^{n} K_{fp}^{(i)}} \quad (2)$$

Where:

$K_{fr}^{(i)}$ = The means actually spent on the project during the ith stage, including the sources of all subjects funding

Corresponding Author: Oksana Valerievna Vaganova, Belgorod State University, Pobedy St. 85, 308015 Belgorod, Russia

$K_{fp}^{(i)}$ = The means planned for the project financing during the ith stage, including the sources of all subjects funding

Ideally, with proper planning of stages with the purposeful use of funds allocated for the project and the normal financing of the project at any stage the value $K_{fl}^{(n)}$ should strive for unity at any stage.

The index of entire project funding gives the information about the level of project funding at the end of n stages. The considered indicator is calculated on an accrual basis:

$$K_{f2}^{(n)} = \frac{\sum_{i=1}^{n} K_{fj}^{(i)}}{\sum_{i=1}^{n} K_{fp}^{(i)}} \quad (3)$$

Where:

$K_{fj}^{(i)}$ = The funds actually allocated for the implementation of the project during the ith stage, including the sources of all subjects funding

$K_{fp}^{(i)}$ = The funds planned for financing of the project during the ith stage, including the sources of all subjects funding

The ratio $K_{fl}^{(n)}/K_{f2}^{(n)}$ gives the information about the use of funds allocated for the project implementation after n stages. As the part of an effectiveness integrated assessment it is proposed to use the performance indicator. In this regard, let's distinguish two types of project indicators the accrued and current ones.

The value of the increasing indicator m at the end of the nth stage is calculated taking into account its absolute values of all previous stages, since the start of the project, i.e. on an accrual basis:

$$X_{fm}^{(n)} = \sum_{i=1}^{n} x_{fm}^{(i)} \quad (4)$$

where, $X_{fm}^{(i)}$ is the actually absolute value of a growing indicator m for the ith stage. The value of this indicator is its absolute value at the end of a stage (without taking into account its values during the previous stages).

The considered approach to the formation of a project performance indicator is applicable for rising type and for current type indicators.

For each indicator m of the total number of planned indicators, the values of which must be submitted by a particular contractor after the project completion the level of its planned final value achievement is estimated, characterized by the following coefficient:

$$Y_m^{(n)} = \begin{cases} X_{fm}^{(n)} / X_{pm}, \left(X_{fm}^{(n)} \triangleleft X_{pm}\right) \\ 1, \left(X_{fm}^{(n)} \geq X_{pm}\right) \end{cases} \quad (5)$$

Where:

$X_{fm}^{(n)}$ = The actual value of the indicator m at the nth stage (for the growing cumulative indicators)

X_{pm} = The planned value of the indicator m at the end of the project

The value of an innovative production indicator efficiency is defined as the weighted average of actually achieved final planned values of indicators at the end of the nth stage:

$$K_r^{(n)} = \frac{\sum_{m-1}^{N_p} Y_m^{(n)}}{N_p} \quad (6)$$

The value $Y_m^{(n)} = 1$, at $X_{fm}^{(n)} \geq X_{pm}$ is selected in order that one or two "very successfully" completed indicators of project at this reporting moment do not distort the non-performance of its dozen other indicators.

RESULTS AND DISCUSSION

Main part: Then, let's assume that all the indicators of the project are such that their implementation with a positive result occurs only by achieving or exceeding their planned values.

Within the evaluation of participant integration interaction effectiveness in the innovation process, it is offered to use another indicator of a project success. This indicator provides the information about the agreement on the level of actually spent funds per participant for the reporting period with the achievement of the planned indicator values for the same period (Vladyka and Nesvoev, 2012).

For the calculation of a project success at the end of the nth stage, the indicator of project implementation financial costs and the innovation process performance indicator are used determined by Eq. 1 and 6:

$$K^{(n)} = \frac{K_r^{(n)}}{K_f^{(n)}} \quad (7)$$

The project implementation after the end of n stage is proposed to consider a successful one if:

$$K^{opt} - W \leq K^{n} \leq K^{opt} + W \quad (8)$$

Where:

k^{opt} = Some optimum value of a success rate

W = Permissible deviation from the optimum value of the success indicator

For each indicator j for which at the end of n stages $X_{pj}^{(n)} \neq 0$ (if $X_{pj}^{(n)} = 0$, it means that for this indicator the representation of actual values at the end of n stages is not provided). Let's define the level of its planned value achievement at the nth stage:

$$Y_j^{(n)} \frac{X_{fj}^{(n)}}{X_{jp}^{(n)}} \quad (9)$$

Where:

$X_{fj}^{(n)}$ = The actual value of the indicator j at the end of the nth stage (for the growing cumulative indicators)
$X_{jp}^{(n)}$ = The planned value of the indicator j at the end of the nth stage (for the growing cumulative indicators)

Let's determine the success rate of its implementation at the end of the nth stage for each indicator j:

$$K_j^{(n)} = \frac{Y_j^{(n)}}{K_{f1}^{(n)}} \quad (10)$$

Like the project success indicator let's consider the fulfillment of the indicator j at the end of the nth stage a successful one if $K^{opt}\text{-}W \leq K_j^{(n)} \leq K^{opt}+W$ where K^{opt} and W are determined earlier.

We offer $K^{opt} = 1$. The choice of such an optimal value for the success indicator is conditioned by the following. If the project is underfunded the result is quite acceptable for the customers. This may indicate that during the planning of the project indicators they were too low that is the planning quality is not enough (ILCD, 2010). If at normal financing the results of the project implementation are lower than the planned ones, it may indicate an inadequate quality of a performer's work. Thus, the result of the project, ideally, should be directly proportional to the funds spent on its implementation and therefore, the success rate of the project which reflects the ratio of the obtained results and the costs at every stage of its implementation should strive for unity.

The selection of possible deviation from the optimum value of performance indicator should ideally be carried by the project customers individually. An acceptable determination of this value is impossible without a special examination (Dudin and Lyasnikov, 2014). The selection of universally permissible deviation may be made with regard to the factors which may lead to the fact that the project in some reporting moment becomes an unsuccessful one. Let's include uncoordinated actions between the actors of the innovation process to these factors. There may be the following actions: poor quality of a performer's work; insufficient funding of the project by a customer; not enough competent distribution of funds by a performer to solve the set tasks; poor quality planning of indicators by a customer (Al-Hakim, 2007).

Depending on a stage of the innovation process, according to the method of risk insurance calculation, the risk factor ranges from 0.15-2% of the sum insured, i.e., the probability of default (inadequate performance) of an innovative project is estimated at 0.1-2%.

Summary: The interest in the integration interaction of subjects at all stages of the innovation process is achieved by the orientation of all participants on the final result from research and development, innovation production to the participation in the implementation of high-tech products and servicing of a created object. This interest of subjects allows to create a mechanism of innovation activity enhancement for the subjects of different levels.

CONCLUSION

The effectiveness of integration interaction among the innovation process subjects is proposed to assess according to the value of the complex dimensionless project value $K^{(n)}$ which reflects the ratio of results and financial costs. The value of this index due to its generality will not allow to give definite proposals for a project adjustment however, this will demonstrate the success (or the failure) of the project for this reporting time and if it unsuccessful, it will allow to take a number of measures for its adjustment (Laforest, 2014). For example if the value of an index turned out to be unsatisfactory, a performer is offered to understand the reasons for obtaining such a result by himself. In case of repeated poor value of the indicator $K^{(n)}$ an expertise may be performed to identify the specific causes and factors of the project failure. The project execution during n stages, passed from the beginning of its implementation should be considered successful if the following equation is performed (Eq. 8) $K^{opt}\text{-}W \leq K^n \leq K^{opt}+W$, where the choice $K^{opt} = 1$, W = 0, 1. $K^{opt}+W$ was reasoned before.

If $K^{(n)} \triangleright K^{opt}+W$, then, it may mean that there is an under-funding of the project at a satisfactory result for the customers or the indicator values were reduced during the planning. You may need an adjustment of the project indicators and the funds allocated for its implementation.

If $K^{(n)} \triangleleft K^{opt}\text{-}W$ this may mean either an insufficient quality of a performer's work or the lack of consistency among the participants in the correct allocation of funds by stages which may also result in the adjustment of the project indicators and the funds allocated for its implementation.

REFERENCES

Al-Hakim, L., 2007. Information quality factors affecting innovation process. Intl. J. Information Quality, 1 (2): 162-176.

Balabanova, T.V., 2012. Methods of control system effectiveness evaluation based on the management of risk analysis within the conditions of economic uncertainty. Management Accounting, 4: 44-51.

Birkinshaw, J., G. Hamel and M.J. Mol, 2008. Management innovation. Academy Manage. Review, 33 (4): 825-845.

Dudin, M.N. and N.V. Lyasnikov, 2014. The problem of forecasting and modelling of the innovative development of social-economic systems and structures. Life Sci. J., 11 (8): 549-552. http://www.lifesciencesite.com/lsj/life1108/077_24896life110814_549_552.pdf.

Glagolev, S.N. and O.V. Vaganova, 2013. The Financial Mechanism to Ensure the Innovation Process. World Appl. Sci. J., 25 (12): 1729-1734.

Hague, R., M. Harrop and S. Breslin, 2005. Comparative government and politics An introduction. 4th Edn. haundmills: Macmillan, pp: 318.

ILCD, 2010. International Reference Life Cycle Data System. Handbook General Guide for Life Cycle Assessment. Detailed Guidance. European Commission Joint Research Centre First edition. EUR 24708 EN. Publications Office of the European Union, Luxembourg.

Laforest, V., 2014. Assessment of emerging and innovative techniques considering best available technique performances. Resources, Conservation and Recycling, pp: 11-24.

Vasyuhin, O.V. and A.B. Titov, 2010. Features of innovation competitiveness evaluation in the field of nanotechnologies. Bulletin of the Russian Academy of Natural Sciences (St. Petersburg), 3: 8-10.

Vladyka, M.V. and V.A. Nesvoev, 2012. The system of business process management within an innovative enterprise, based on key performance indicators. Humanitarian, Social, Economic and Public Sci., 4: 259-263.