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To cite this article: Y V Erygin *et al* 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **537** 042082

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Reproduction of innovative potential as a result of rocket-space industry enterprises innovative activity

Y V Erygin, L V Erygina, R V Votintsev and F P Shumakov

Reshetnev Siberian State University of Science and Technology, 31, Krasnoyarskiy Rabochiy Av., Krasnoyarsk, Russia, 660037

E-mail: 17917052@mail.ru

Abstract. The strategic significance of the output products defines advantage of innovative rocket-space industry activity. In order to implement such an activity innovation potential is needed. Its formation is carried out both on the basis of resource and strategic approaches. There appear difficulties connected with the specific aspects of rocket-space industry enterprises in the course of innovative activity determination. Permanent changes of external and internal conditions cause changes of goal-setting and requirements to innovative potential. The research reproduction of innovative potential as a criterion will allow defining current efficiency of rocket-space industry enterprises innovative activity.

Modern trends of domestic economy development are connected with innovative activity. The branch development strains in transition period have focused on commodity sector priorities, neglecting strategic military-industrial complex and rocket-space industry (RSI) enterprises in particular. The budget deficit of such enterprises has forced to pay attention to the prospects of civil products and dual-use products release. The market of a latter one is characterized by high competition. Nowadays such tendencies as dependence on state orders, low profitability, and low level of appeal to investments remain in the industry [1]. At the same time, RSI enterprises are not relieved of the strategic products release obligation, where the state, being a core customer, requires definite efficiency. The RSI enterprises are assigned a part of innovative leader in the system of public production that provides strategic superiority at a macro level. The permanence of innovative activity and its effectiveness mean presence of particular innovative potential that demands continuous updating and adjustment on way to the designated purposes. In that context, the reproduction of innovative potential becomes an important condition of RSI enterprises strategic role preservation in achieving the goals of ensuring defense capacity and assistance of civil economy innovative development.

The objectives defined by the Law on space activity and the Federal space program and the Strategy of innovative development definitely stated material and scientific base for their realization is necessary and it determines the innovative potential of RSI enterprises from resource approach position. At the same time, the innovative potential of such enterprises should contain strategic component in the form of adequate and timely response to external and internal geopolitical, economic, social and other changing conditions. Theoretically, at symbiosis of resource and strategic approaches, RSI enterprises should have a sustainable innovative potential for effective functioning. A Sustainable innovative potential has to provide creation of any innovation taking into consideration



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randomness of changes of external and internal conditions. Since the objectives of RSI enterprises innovation activities are clearly defined by law, it is fair to believe that innovation potential is motivated by their implementation and in addition to the objective limitation of resources has subjective limits associated with goal-setting. Complex mutual influence should be noted here; when on the one hand, the goal setting determines the requirements for innovative potential, and on the other hand, the innovative potential indicates the critical goal setting. Thus innovation potential and goal-setting are in a certain balanced state. Changes of external and / or internal conditions determine one of the element's modifications to correct the leveler. Considering innovation in the time continuum, formal assessment of innovation potential gives an idea of innovator's capabilities in the period of time when changes in external and/or internal conditions are not observed. It is possible that the innovative potential will be adaptive to minor variations in the goal setting, and vice a versa, in this case balance will be maintained. External reasons causing progressive or regressive development, this balance is disturbed and it requires mutual adjustment of the leveler. Each material system seeks to preserve itself and uses all the potential for achieving it. According to the law of self-preservation, any organizational systems, as well as its separate element, seek to keep themselves as a unit. Due to change in goal setting adjustment of innovative potential will be forced with the catch-up strategy of innovative development what is unfavorable for the innovator. Considering the definition of innovative potential as the ability of enterprise to create promising models of rocket and space technology (RST), expressed in special research competencies, engineering and technological activities, R&D, developed material and technical base for testing and production of RST, qualified personnel and modern innovation management system, it should be noted that this choice is explained by the product and/or process innovation of RSI enterprises. It determines the structure of innovation potential, indicating the characteristics of industry and features of innovation. According to the definition, competencies, R&D and other elements are the components of innovation potential, but only in the context of promising models of the RST use. In the case of current activities such elements can rightly be attributed to ordinary resources. In terms of accounting the innovative potential, as well as ordinary resources, is formally material and/or non-material asset. Analyzing the contents of the Federal space programs implemented within the framework of the Law on space activity and earlier program documents defining development of space research vector, it is possible to reveal the benchmark genesis based on achievements evolution in cosmonautics. So initial innovative developments are ordinary products in the modern conditions [2]. Such continuity shows that if the promising model of RST stops working, then, the innovative potential can't be considered as an advantage for elements making it and actually expresses their nominal par. It means that innovative potential elements won't stop their existence as competence, but their collection doesn't work anymore. It is fair that if transformation of innovative potential in separate elements is possible, then transformation of separate elements in innovative potential is fair too.

Time factor is of great importance in the course of innovative activity. In relation to definition innovative potential of the RST perspective example can rarely be innovate for long time [3, 4]. The chronology of space development shows that only continuous updating of technical means can be an effective tool. The RSI enterprises production is unique and short-run so taking into account strategic tasks; such products have to be innovative. The time frame of innovations development at the RSI enterprises, as a rule, is longer than in ordinary branches of economy. In this regard the probability of external and internal conditions change increases in the course of innovations development. That causes the necessity of goal-setting and/or innovative potential correction. In the course of RSI enterprises innovative activity there is a continuous specification of goal-setting and innovative potential that provokes transformations of ordinary resources in innovative potential and back. The speed of creation innovations is influenced by the speed of ordinary resources transformations to innovative potential. The model of such transformations is presented schematically (figure 1).

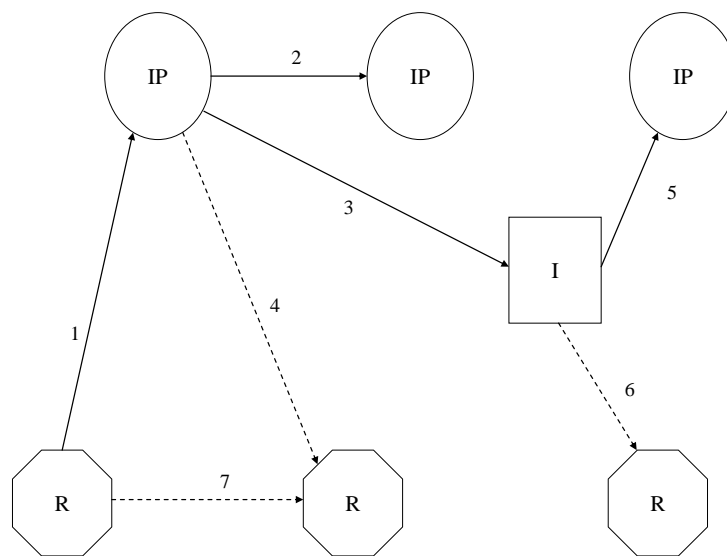


Figure 1. Transformation Model.

Convention:
IP-innovative potential;
I-innovation;
R-resources.

Transformations of elements occur partially or fully, subject to certain conditions (table 1)

Table 1. The options and terms of elements transformations.

Transformation	Initial element	Finite element	Completeness of use	Conditions
1	Resources	Innovative potential	Complete Partial	Sufficiency of resources Resource surplus
2	Innovative potential	Innovative potential	Complete Partial	It is impossible to create innovation, but it is possible to use the innovative potential for creation of other innovation; goal-setting change; innovative potential use for creation several innovations at the same time Use of innovative potential part for creation of another innovation
3	Innovative potential	Innovation	Complete Partial	There was no need to adjust the innovation potential during innovation creation There was an adjustment of innovation potential during innovation creation
4	Innovative potential	Resources	Complete Partial	Creation of innovation isn't completed, innovative potential is utilized to resources There was adjustment of innovative potential during innovation creation, a part of

				innovative potential has been utilized to resources
5	Innovation	Innovative potential	Complete	Created innovation is innovative potential to create another innovation
			Partial	Impossible
6	Innovation	Resources	Complete	The innovation turns into the current production
			Partial	Impossible
7	Resources	Resources	Complete	Resources don't correspond the requirements of innovative potential;
			Partial	innovative potential doesn't need additional resources. Use part of resources for innovative potential

Continuing building this model, three groups of elements are formed: resources, innovation potential and innovation. These groups have various opportunities of transformations: self transformed and innovative potential transformed ones; innovations – to innovative potential and resources; innovative potential – to innovation and resources.

Such a chain of transformations represents a counterpart of reproduction cycle the following processes are in it: production, distribution, exchange, consumption [5]. Actually there is a choice and consolidation of resources for required innovative potential formation during reproduction of innovative potential. Researchers note that reproduction of innovative potential depends on ability to accumulate major resources within innovative process and on innovative sphere compliance tasks to the managing subject's interests. In this case such indexes of reproduction as speed and volume together with the goal-setting testify the RSI enterprises opportunities to carry out innovative activity. Productive implementation of innovative projects, as well as increase in their quantity and/or significance is the proof of such opportunities. If no innovations are created, it is an ambiguous situation. On the one hand there is innovative activity and innovative potential is formed, but the innovation isn't created, thus the main objective of innovative activity isn't carried out. On the other hand, the resources created in the course of innovative activity can be used further as innovative potential, as well as already available innovative potential will be productive. Then it is possible to observe permanent innovative activity resulting in not only creation of innovations, but also formation of resources and/or innovative potential. In this case it is fair that production of space technique creates conditions for development space services market [6]. Creation of such technique assumes presence of necessary innovative potential which defines further goal-setting of future innovations.

As a result, researching reproduction of innovative potential at the RSI enterprises it is possible any time to define the stage of transformation and/or face value and advantage of resources. Results of such analysis demonstrate efficiency of innovative activity. The effectiveness of RSI enterprises being a part of military-industrial complex consists in generation of innovations and new technologies which then make a revolution in all economy. Hence the idea to use reproduction of innovative potential as a criterion of effectiveness is rational in terms of adaptation features of managing RSI to competition conditions is explained by the absence of direct economic effect.

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