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Lavrenenko V.
Ph. D. in Economics, Associated Professor,
Professor of Department of Business Economics and Entrepreneurship,
Director of the Institute of Innovative Entrepreneurship
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: vlave@ukr.net; ORCID ID: 0000-0003-1371-8452
Makhova H.
Ph. D. in Economics, Associated Professor,
Associated Professor of Department of Business Economics and Entrepreneurship,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: halyna.makhova@kneu.ua; ORCID ID: 0000-0002-0298-5857
Vostriakova V.
Ph. D. in Economics, Associated Professor,
Associated Professor of Department of Business Economics and Entrepreneurship,
Kyiv National Economic University named after Vadym Hetman, Ukraine;
e-mail: vvostriakova@kneu.edu.ua; ORCID ID: 0000-0001-8999-6323

DEVELOPMENT OF THE ENTERPRISE'S INNOVATIVE POTENTIAL ON THE BASIS OF RESOURCE THEORY

Abstract. Innovations play great role in the economic growth and development. And question of explanation enterprises' ability to generate and implement them are topical as from scientific, as from applied points of view. The article is dedicated to the issues of innovative potential and its development. Authors explain its essence on the basic of resource theory and propose to determine its main components such as innovative resources, innovative capabilities, innovative competencies and innovative project. Based on this it is proposed to define innovative potential as set of integrated characteristics, which let use innovative resources with help of innovative competencies on the basic of innovative organizational capabilities. Innovation resources include both traditional and intellectual resources. Innovative competencies are sets of personnel features to generate innovative ideas and provide their implementation. Innovative organizational capabilities characterize ability of enterprise use innovative resources by development of modern business-models, processes and procedures. Innovative projects are main tool of innovative potential realization. Research shows expediency for evaluation and monitoring of innovative potential development to use four-component matrix. These components are resources, competencies, capabilities and projects. First three are components of innovative potential, fourth — embodiment of the realization of innovation potential. These components are evaluated on the basic of binary logic of economic processes analysis. Dynamic model of innovative potential development is proposed. This model consists of such stages: analysis of innovative potential components; selection of target innovative projects; identification of correspondence between components of innovative potential and target projects; creation of innovation potential development program.

Keywords: innovation, development, innovation potential, resources, capabilities, competencies, innovative project, evaluation of innovative potential model.

JEL Classification O31, O32, O33

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Лаврененко В. В.
кандидат економічних наук, доцент,
професор кафедри бізнес-економіки та підприємництва,
директор Інституту інноваційного підприємництва,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: vlave@ukr.net; ORCID ID: 0000-0003-1371-8452
Махова Г. В.
кандидат економічних наук, доцент,
доцент кафедри бізнес-економіки та підприємництва,

Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: halyna.makhova@kneu.ua; ORCID ID: 0000-0002-0298-5857
Вострякова В. Ю.
кандидат економічних наук, доцент,
доцент кафедри бізнес-економіки та підприємництва,
Київський національний економічний університет імені Вадима Гетьмана, Україна;
e-mail: vvostriakova@kneu.edu.ua; ORCID ID: 0000-0001-8999-6323

РОЗВИТОК ІННОВАЦІЙНОГО ПОТЕНЦІАЛУ ПІДПРИЄМСТВА НА ЗАСАДАХ РЕСУРСНОЇ ТЕОРІЇ

Анотація. Інновації відіграють важливу роль в економічному зростанні та розвитку. Питання пояснення здібностей підприємств генерувати та впроваджувати інновації є надзвичайно актуальним. Присвячено проблемам інноваційного потенціалу підприємства і його розвитку. Пояснено його сутність з позицій ресурсної теорії та запропоновано виділяти такі його складові, як інноваційні ресурси, інноваційні компетенції, інноваційні здатності та інноваційні проєкти. На основі цього інноваційний потенціал визначається як сукупність інтегральних характеристик, які дозволяють використовувати інноваційні ресурси за допомогою інноваційних компетенцій і на основі інноваційних організаційних здатностей. Інноваційними ресурсами виступають як традиційні економічні ресурси, так і ресурси інтелектуального характеру. Інноваційними компетенціями є комплекс властивостей персоналу підприємства генерувати інноваційні ідеї та забезпечувати їхню ефективну реалізацію. Інноваційні організаційні здатності характеризують уміння підприємства ефективно використовувати інноваційні ресурси шляхом створення сучасних бізнес-моделей, процесів і процедур. Основним інструментом реалізації інноваційного потенціалу є інноваційні проєкти. Дослідження довело доцільність використання для процесів оцінювання та моніторингу розвитку інноваційного потенціалу чотирикомпонентної матриці, три компоненти якої відображають складові інноваційного потенціалу — ресурси, компетенції та здатності, а четвертий — конкретне втілення реалізації інноваційного потенціалу — інноваційні проєкти. Компоненти в межах цієї моделі оцінюються на основі бінарної логіки аналізу економічних процесів.

Для розвитку інноваційного потенціалу підприємства пропонується динамічна модель, яка передбачає реалізацію таких етапів: аналіз складових інноваційного потенціалу; відбір цільових інноваційних проєктів; установлення відповідностей між складовими інноваційного потенціалу і цільовими проєктами; розроблення програми розвитку інноваційного потенціалу.

***Ключові слова*:** інновації, розвиток, інноваційний потенціал, ресурси, можливості, компетенції, інноваційний проєкт, оцінка моделі інноваційного потенціалу.

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Introduction. The information revolution has changed environment of business-structures' functioning, created absolutely new conditions for their innovative development. Ability to create and implement innovations becomes prerequisite for long-term business success by providing competitive advantages on this basis. In modern economic literature innovations play key role among factors, which stimulate economic growth. Their positive influence is confirmed both on a theoretical and empirical level.

Transition of entrepreneurial structures to an innovative way of functioning presage some innovative potential as basis of such development. According to this, research dedicated to theoretical and methodical approaches to enterprises' development on basis of activation of their innovative activity, providing higher efficiency and effectiveness of innovative processes in terms of their nonlinear flow and application of principles of open innovation, tools design for justification of innovation potential development program is topical.

Analysis of research and problem statement. In scientific literature issues of enterprise' innovation policy development and research of mechanism of innovations management works of

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C. Freeman, P. Drucker, D. Teece, C. Christensen, H. Mintzberg, J. B. Quinn, S. Ghoshal, B. Milner, O. Butnik-Siverskiy, I. Halyzya, N. Goncharova, S. Illyashenko, I. Pavlenko, I. Petrova, I. Riepina, L. Smolyar, N. Chuhray, I. Fedulova and other are dedicated. Stages of innovation activity organization are considered in works of S. Ghoshal, J. B. Quinn, H. Mintzberg. Despite the thoroughness of the research some issues are insufficient studied, in particular, theoretical and methodical basics of forming and development of enterprise's innovative potential, choice and justification of model of its effective using. Term «innovative potential» is used by Ukrainian and foreign economists, but there is no unambiguous understanding of it. The majority of researchers focus on the study of certain aspects of innovative potential, that is why there are a lot of specific definitions in scientific literature, which are weakly correlated with each other.

It is considered that the definition of innovative potential that provides system's growth due innovations firstly was introduced by C. Freeman [1]. But, as some scientists claim [2; 3], first attempt of comprehend of innovative ability on the microlevel was offer by T. Burns [4] in 1961 to use new definition — «innovation capacity», which reflects ability of organization to adopt and implement successfully new ideas, processes or products. Basic for such approach is adaptation of operation management methodology, as a result of which proposed definition of innovation capacity came from logic of definition of production capacity as ability of company to produce product in a given range.

In these approaches and definitions important for modern economics terms of resources and capabilities are mentioned. Analysis of great number of national and foreign sources proved expediency of using the achievements of modern resource theory to understand innovation processes of the enterprise. Using of resource-based theory in the context of firm policy and strategy is reflected in the research of Jay J. Barney. In particular, it is analyzed how a firm's resources and capabilities affect its performance [5]. O. Borchert studied meaning of resource theory for formation of sustainable competitive advantage [6]. Development of resource theory and its meaning for company's organization and strategy is researched in the article of G. F. Davis and T. DeWitt [7]. Recently this theory has been fulfilled mission of sources of constant renewal and leadership of company on innovative basic searching. Thus, there is research about resource-based model for innovative enterprises [8].

Today concepts of resource theory are in the focus of researchers and its main category — assets, resources, competencies and organizational capabilities are subject of high scientific interest [9, p. 24]. Significant contribution of this theory is modernization of understanding of resources' essence — any assets, which let enterprises to achieve their goals. Intangible, intellectual resources play important role in the set of enterprise's resources. Among them knowledge, skills, organizational routines have considerable place. From this point of view, in our opinion, there is necessity, without rejection of other interpretation, to propose modern definition of innovative potential taking into account achievement of resource theory.

Research results. Research approach appeared due need to explain nature of sustainable competitive advantages of enterprise in a highly turbulent environment. Finally ideas about role of resources as basic of strategy's development and main source of profit designed in the single approach named «resource theory» in the end of XX century.

Main feature of this theory is expanded interpretation of definition «resources» that in west literature is used to give characteristics of almost all, that facilitates to create and implement strategies, which help to increase efficiency. In the post-Soviet space category «resources» is used in another, more traditional sense — as stocks or sources of certain economic goods. It should be noted, that the last view in category «resources» in domestic science correlates with category «potential». At the same time, according to the point of view of D. J. Teece resources are «firm-specific assets that are difficult, if it is possible to imitate» [10, p. 147]. Such wide view on resources conditioned, firstly, their diverse classification, secondly, priority attention of researches to the category of recourses that are intangible. Uniqueness of resource theory and its contribution into research of mechanism of competitive advantages forming on innovative basic are in expansion and modification of essence of resources as economic category by adding element of internal origin — organizational capabilities, competencies, business-routines.

Basic categories of resource approach despite long scientific and applied interest and discussion are defined in general. Term «enterprise's competencies» is interpreted as set of interrelated specific skills, technologies, knowledge and abilities that are collectively or individually possessed by staff. Forming of competencies is related with creation and functioning of corporate knowledge, experience, skills and other informative-intellectual resources. Complex relations of skills, resources and accumulated knowledge are dynamic organizational capability. Result of implementation of organizational capability in the strategic management is their using in business-processes and forming of business-routines.

It is worth, in our opinion, to give the newest definition of main categories of resource approach, proposed by one of the authors of the theory, D. Teece. Competencies may be interpreted as «clusters of know-how assets» [11]. Competencies are quite tangible and can be durable. They are supported by routines, which are not depended on one person and they are «placed» in functional departments of enterprises. They cannot be sold or bought, unless it is a purchase agreement about whole firm.

In many sectors of modern global market creation of competitive advantage requires dynamic capabilities — entrepreneurial potential of identification of new possibilities and reconfiguration: firstly, knowledge as assets, secondly, competencies, thirdly, complementary assets and technologies for achievement of sustainable competitive advantages [11].

For demonstration of dynamic capabilities enterprise should identify new opportunity and necessity in changes, plan appropriate actions and investments, implement modern mechanisms of functioning. Enterprise gets and interpreters messages about new markets, new technologies and competitors' treats from this identification. This information is evaluated in context of knowledge and experience of person and company. For plans' choice organizational routines are used. Routines and decision-making are part of procedural memory of organization. Procedures and rules make internal competition fair, objective and lawful [11].

Resource approach and concept of dynamic capabilities let justify importance of resource in more wide sense as sources of forming unique capability of enterprise — its competitive advantages. Such differentiated approach to enterprise's resources structuring and research of their influence on formation of key competencies identifies innovative resources, innovative competencies and innovative capability as independent and specific objects, which organically interact in a single process of managing of the company's innovation activity [12]. According to this logic we proposed to consider innovative potential of enterprises as complex of integrated characteristics, which allow using innovative resources through innovative competencies and on the basic of innovative organizational capabilities for achievement goals of innovation development. So, innovative potential is combination of resources, capabilities and competencies in innovative activity (*Fig. 1*).

According to this approach innovative resources are complex of scientific, material, technical, technological, organizational and financial resources, which are used for innovation activity [12]. Innovative capability of enterprises may be interpreted as set of its features, which characterize ability to plan dynamically, create and integrate innovative resources and use them in operational processes for implementation of innovative activity. Thus, innovative resources are independent from innovative capability characteristics of enterprise's activity, but they are base for their development, i.e. innovative capabilities demonstrate ability of enterprise to use, not only accumulate innovative resources.

So, innovative potential of enterprise is integrated phenomenon that characterizes current and future capability of enterprise to transform complex of economic resources by inherent abilities of personnel for goal-oriented innovative activity. That is, innovative potential may be defined as integrated characteristics of complex of economic resources, current and future capabilities and competencies of economic system to carry out goal-oriented innovative activity through transformation of set of resources taking into account system of internal and external factors.

Such approach to definition gives opportunities: firstly, to identify innovative potential as dynamic category, not static indicator; secondly, to characterize innovative potential as open

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system, which reacts objectively on the changes in external environment; thirdly, to characterize innovative potential as complex category that includes set of resources, capabilities and competencies of economic subject for carrying out innovative activity.

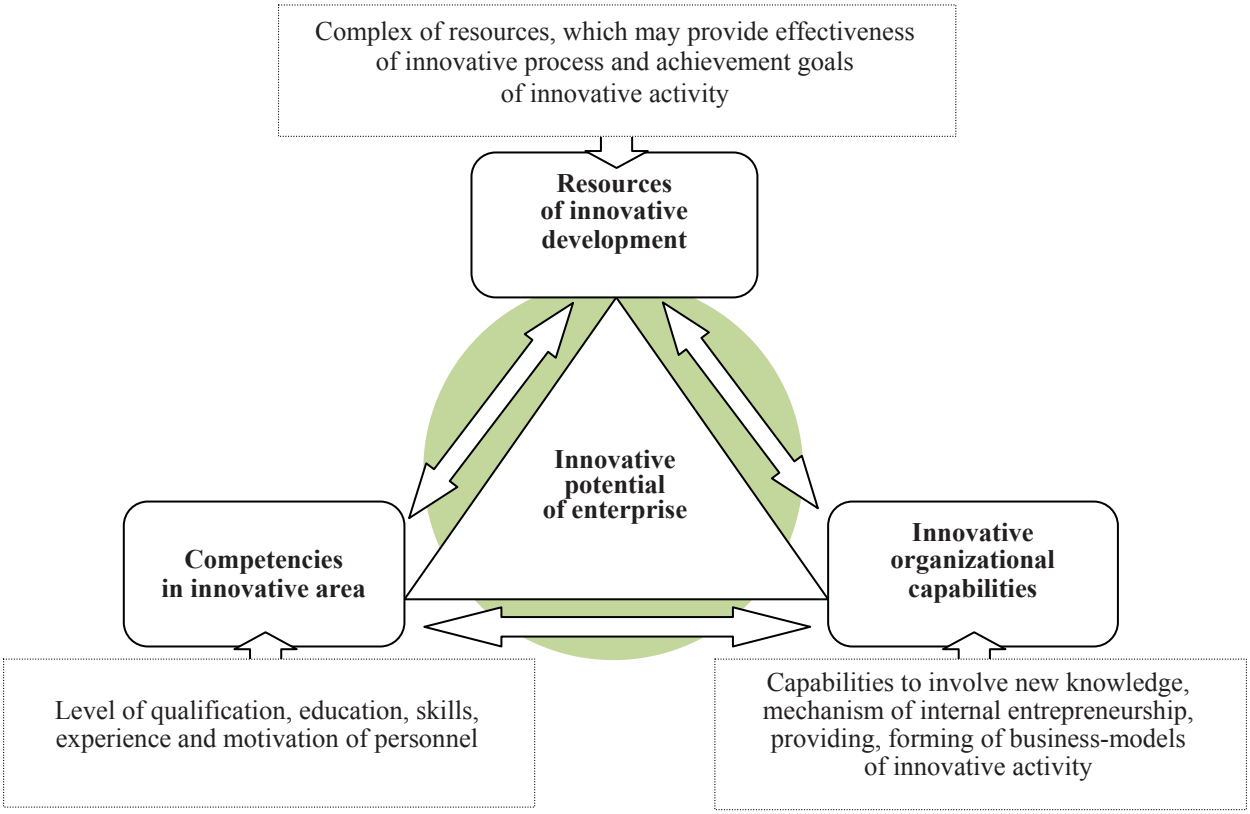

Fig. 1. **Elements of innovative potential of enterprises**

Source: Compiled by the authors.

Innovative capabilities may be considered from two points of view — intellectual and technology approaches (*Fig. 2*).

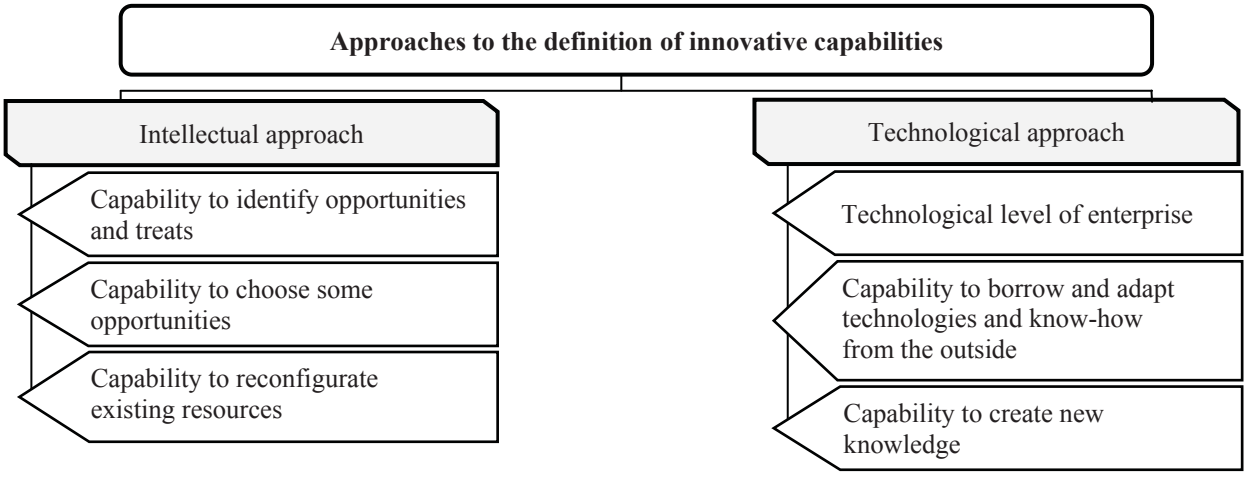

Fig. 2. **Approaches to the definition of innovative capabilities of enterprise**

Source. Compiled by the authors on base of [14; 15].

According to the technological approach, innovative capabilities of enterprise consist of three factors: 1) technological level; 2) capability to borrow and adapt technologies and know-how from the outside; 3) capability to create new knowledge. The obligatory condition and source of innovative activity is achieved technological level. The higher is technological level of production, the more radical innovations are and more inaccessible they are for imitation by competitors. Innovative capability is process characteristics of enterprise that reflects its ability to organize and implement innovative processes effectively according to the existing resources and defined purposes of development [13].

D. Teece for analysis of dynamic capabilities proposed to consider, that they consist of three components: capability to identify opportunities and treats, capability to choose some opportunities and capability to reconfigurate existing resources for results achievement [15].

Innovative resources, abilities and competencies are just potential of success. They can influence on enterprise's position in competition only when they will be transformed and reflected in final effective innovation projects, they will form new parameters of business, which provide increasing of its innovative potential. In this regard, the development of innovative potential should start from identification of resources, capabilities and competencies in the innovation sphere and analysis of possibility of their use in development of innovative potential programs.

For increasing effectiveness of enterprise's innovative activity dynamic model of forming and development of innovative potential is proposed. It is based on identification and analysis of innovative resources, abilities and competencies and includes next stages: first, analysis of innovative potential's components; second, selection of target innovative projects; third, establishing of corresponding between components of innovative potential and target projects; fourth, creation of innovation potential's development program. The scheme of proposed model is in the *Fig. 3*.

On the first stage full analysis of status of enterprise's resources that can be used for innovative activity is conducted, sources of competitive advantages are identified. Result of this stage is list of innovative competencies of enterprise. Analysis of competencies, which are required for creation of innovative potential development program, starts from analysis of implemented innovative projects. Then, it should be found out which resources are used for their implementation. Such approach shows from which internal components and in which proportion final set of innovative projects is formed. It helps to focus actions of innovative potential development program more precise. Capabilities, resources and competencies are ranked according to the level of importance using the method of pairwise comparisons.

Next step is identification of available innovative resources. Analysis of structure of providing projects with resources helps to reveal innovative capabilities and additional capabilities of enterprise, because capabilities are mediated by available resources. For analysis such capabilities may be identified as enterprise's business-processes.

Then available innovative competencies should be researched with taking into account that each innovative project has different weight for enterprise's innovation strategy realization. After stage of innovative competencies identification, which provided success of innovative projects earlier and what was their dynamics, next step is analysis of enterprise's opportunities, identification of way of potential's using for innovation projects realization according to chosen strategy. For this it is necessary to search for correspondence between activities that carried out and new ones within the framework of the chosen strategy, aimed at increasing of innovations effectiveness.

Further internal structure of interrelations of available resources, capabilities and innovative competencies should be modeled. It should be taking into account not only current level of resources' provision, but volume of resources required for future periods of activity and set of projects of innovative potential development.

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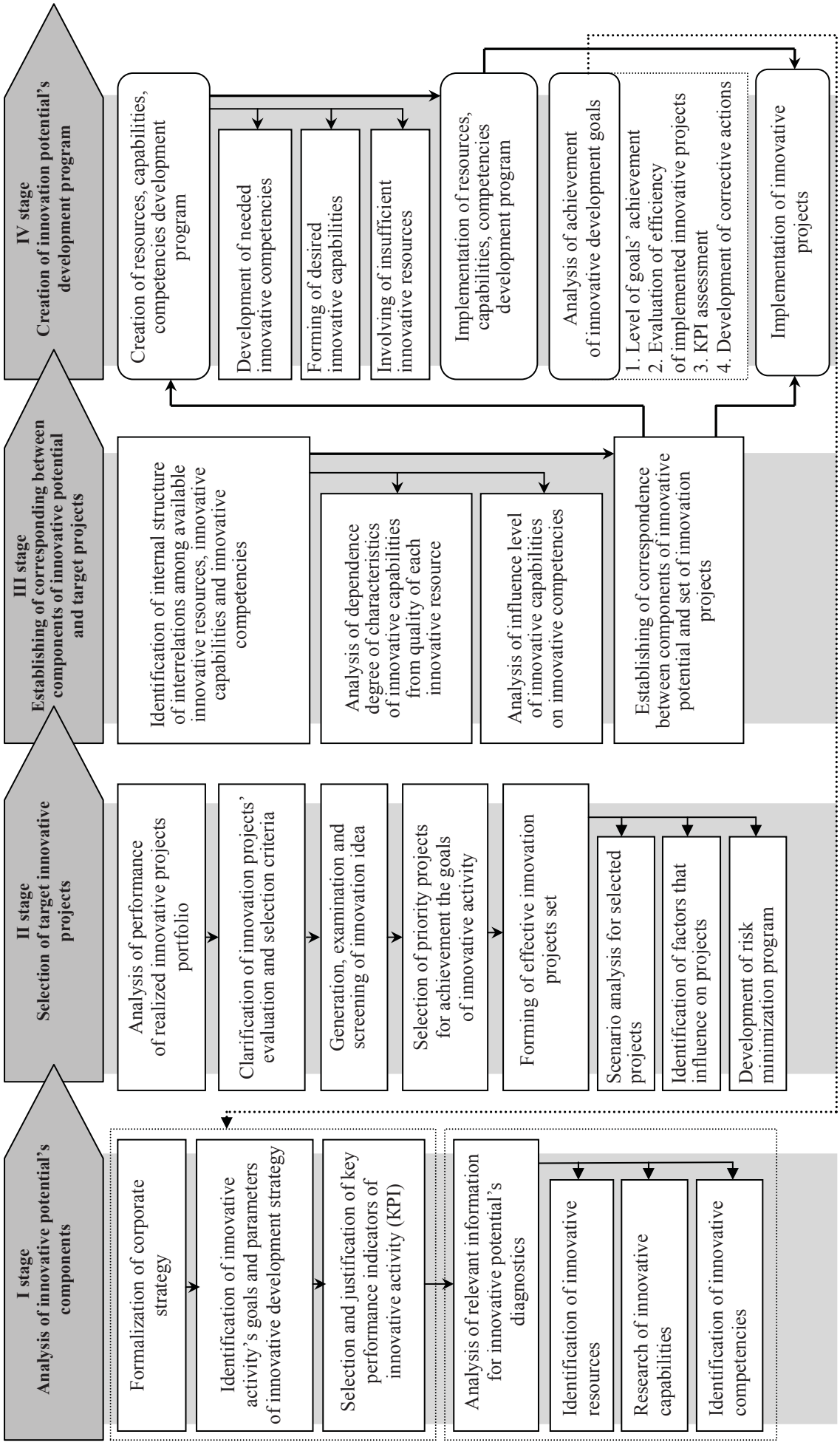

Fig. 3. **Dynamic model of enterprise's innovative potential development**

Source. Developed by authors.

As result of such approach to innovative competencies analysis enterprise has an idea about projects it can realize now, which competencies should be developed for innovation strategy's realization. At this stage selection of projects from innovation potential development program and resources appropriated to innovative competencies may be conducted. On the basis of innovation projects portfolio holders of innovative competencies are searched, capabilities and resources are identified and further business development is aimed at support and strengthening of these and related elements.

At the last stage innovative strategy based on innovative competencies are specified, indicators of development goals achievement are defined. For maximal efficient using of key competencies in strategy of increasing innovative activity efficiency it is proposed to use concept of key performance indicators (KPI).

The initial identification of innovative competencies set takes place in the process of acquaintance with enterprise's functioning and is carried out by the method of expert evaluation in cooperation with management staff. According to this approach it is necessary to conduct analysis for identification existing innovative competencies of enterprise. In this case characteristics of enterprise's innovative projects can be used as source of information. Gathered information is used for formation of innovative potential development program.

The aim of innovative competencies analysis is justification of new base for innovative potential development program formation, implementation of which led to appearance (support) of sustainable competitive advantages, and evaluation of this program's potential from the position of resources and capabilities of organization. It is important to identify those capabilities that have maximal influence on innovative competencies and which resources are involved in it. The hierarchy of existing innovation competencies is indirectly distinguished from the series of operationally and market-related combinations of capabilities and resources.

Technically, the task of performing this kind of «counter» analysis is solved by sequentially filling a set of relational matrices with secondary data obtained from the analysis of primary information and obtaining results on synthetic matrices. Degrees of dependence or forces of vectors among organization's capabilities, resources and competencies are put down in matrices' cells. That is why key to design software is mathematical apparatus for converting of appropriate analytical coefficients into integral synthetic indicators. A result of this stage is reference hierarchy of competencies (existing and target) with indication for each of them required level of development and involvement in management process. Planning of innovative potential development is based on results of competencies ranking, conducted according to external and internal conditions. Innovative competencies are derivative from capability of organization. Capabilities are conditioned by available for organization resources. Required resources are defined by characteristics of target innovative projects (*Fig. 4*).

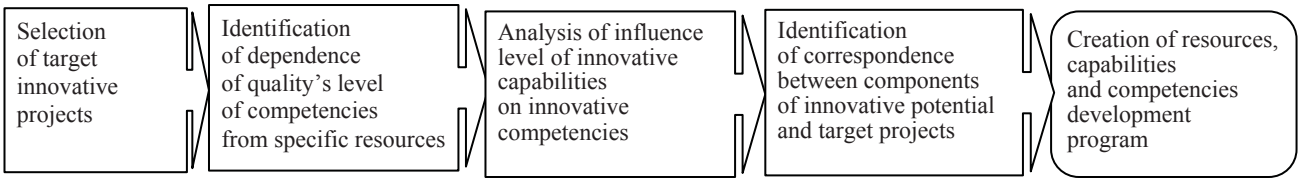

Fig. 4. **Scheme of analysis of interrelation of innovative potential's components**
Source. Developed by authors on the base of [16].

The study of theoretical and methodical principles of innovative potential's formation and development proved the feasibility of using for evaluation and monitoring of innovation potential development four-component matrix based on modified and adapted to innovations issues approach by V. Yefremov and I. Khanikov [16]. Mentioned approach involves evaluation of four components, three of them reflect components of innovative potential — resources, competencies and capability, forth — specific embodiment of innovative potential's realization — innovative projects implemented at the enterprise.

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If denoted by:

R = {r1, r2,…, rn} set of enterprise's resources;

Z = {z1, z2,…, zk} set of enterprise's capabilities;

C = {c1, c2,…, ci} set of enterprise's competencies;

P = {p1, p2,…, pj} set of enterprise's innovative projects;

then it is required to model the internal structure of the relationship between existing resources, capabilities and competencies inherent to the enterprise. It can be done by using principles of categories theory. Specific relations will be given by matrices on *Fig. 5* and *6*.

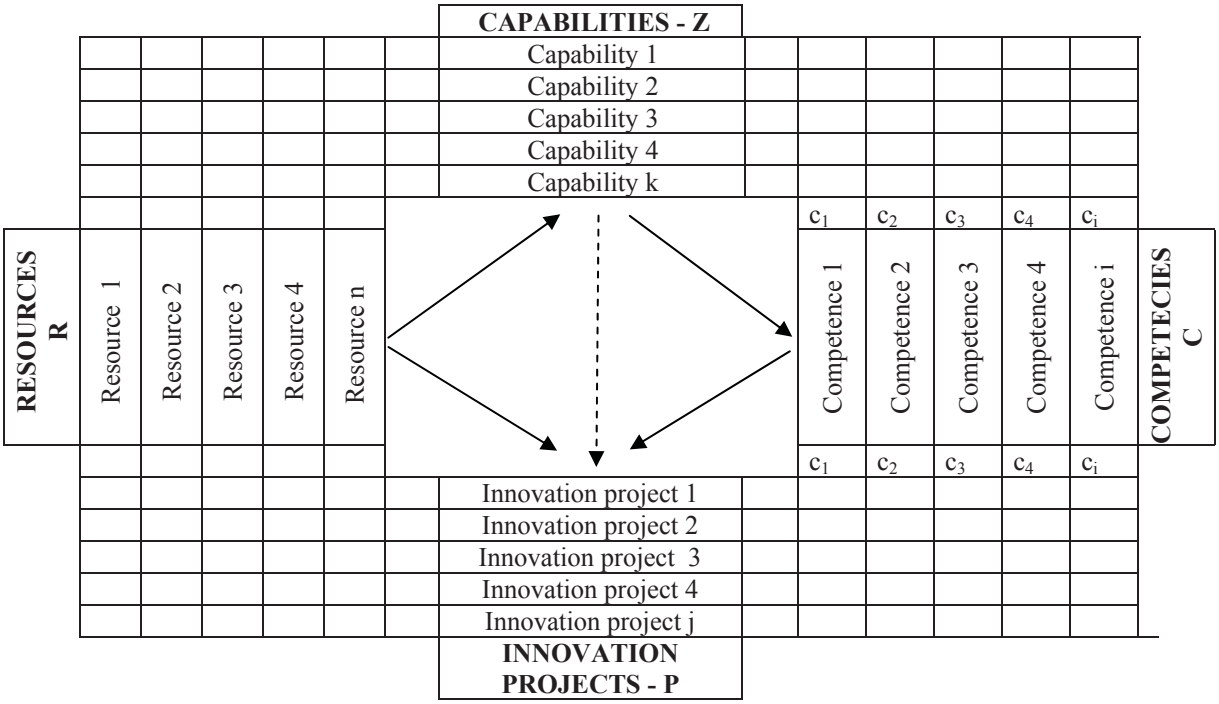

Fig. 5. **Descriptive matrix of evaluation of innovative potential development**

Source. Developed by authors on base of [16; 17].

The arrows show the vectors of influence, in the cells of the matrix quantified estimates of the degree of influence are evaluated on a five-point scale. Transition from sets will be made by sequentially filling of relational matrices complex, in the cells of which degrees of dependence or power of control vectors between capabilities, resources and competencies are adduced.

Therefore, set R→Z described level of resource's involvement in process *i,* accordingly, dependence of quality level of capability *zk* from specific resource *rn.*

The binary ratio {RZ} snows the degree of influence of each individual resource of individual capability, and, accordingly, the degree of dependence of capability from quality of corresponding resources. This relation in matrix form (here FRS: RxZ appropriate function) has next figuration (formula 1):

$$\{RZ\} = \begin{vmatrix} F_{RZ}(r_1,z_1) & F_{RZ}(r_1,z_2) & \dots & F_{RZ}(r_1,z_k) \\ F_{RZ}(r_2,z_1) & F_{RZ}(r_2,z_2) & \dots & F_{RZ}(r_2,z_k) \\ \dots & \dots & \dots & \dots \\ F_{RZ}(r_n,z_1) & F_{RZ}(r_n,z_2) & \dots & F_{RZ}(r_n,z_k) \end{vmatrix} \quad (1)$$

Quantitative evaluation of the dependence degree or impact are given on a five-point scale.

Similarly, in the part of matrix {ZC} the degree of dependence and controllability of capabilities *zk* from each determined competence *ci* is shown. This binary ratio is the degree of dependence of enterprise's capabilities from each competency, defined by expert method, and, accordingly degree of controllability each competence *ci* by individual capabilities *zk.*

In the part of matrix {CP} binary ration which is the degree of impact of each competency *ci* on each work of project *j* is considered.

In the part of matrix {RP} reflection of enterprise's resources set *rn* on the set of works of each innovative project *pj* is described. This binary ratio is the degree of using of each resource in separate works of project *j*, and, accordingly, dependence of the project works from quality of corresponding resources. Defined in this way sets give opportunity to identify resources' interrelations, capabilities and competencies of enterprise with innovative projects. For this operations sets of compositions should be used.

To determine relations of capabilities with some innovative projects, to obtain ratio {ZP}, we will sequentially lock the set of relations {RZ} to the set of relations {ZC}. For this it is required to compare the degree of dependence of capabilities on the quality of relevant resources with each competency *ci*, determined by expert method, and the degree of its controllability by capabilities *zk*. Quantitative evaluation of efficiency of specific capability's influence on the projects may be obtained by calculating the weighted average of the degree of resource involvement in each project. The composition rule used for this gives a relation, the elements of which are defined:

$$F_{ZP}(z_k, p_j) = \frac{\sum_{t=1}^{n} F_{RP}(r_n, p_j) x F_{RZ}(r_n, z_k)}{\sum_{t=1}^{n} F_{RP}(r_n, p_j)} \quad (2)$$

Similarly the calculation for competencies is made.

The ratio {ZP} obtained by using the composite rule is characterized by the corresponding matrix (*Fig. 6*), where the values are rounded to integers).

In the similar way compositional rule is used for finding locking ratio {ZP} by ratio {CP}.

				CAPABILITIES - Z					
				z_1	z_2	z_3	z_4	z_5	z_k
				procedures	business-models	culture	venture groups	providing	…
				z_1	z_2	z_3	z_4	z_5	z_k
PROJECTS - P	p_1	Project 1	p_1						
	p_2	Project 2	p_2						
	p_3	Project 3	p_3						
	p_4	Project 4	p_4						
	p_5	Project 5	p_5						
	p_j	…	p_j						

Fig. 6. **Influence of innovative capabilities on separate projects works performing**
Source. Compiled by the authors on base of [16; 17].

By using compositional rule in different combinations it is possible to determine the degree of project's relation from resources quality, knowledge, experience, skills, and quality of business-processes of enterprises. As a result, a comprehensive evaluation of resources base, competencies and capabilities of the organization required for successful implementation of innovative projects will be obtained. This method helps to define which innovative competencies need/don't need further development. On this base organization has a vision about those projects, which can be implemented now and which in the future in the case of development of corresponding competencies.

Conclusions. Innovative potential is set of integral characteristics, which let use innovative resources with help of innovative competencies and on the base of innovative organizational capabilities for achievement of innovative development goals. In this context innovative resources are both traditional economic resources and intellectual resources, which are involved for innovative activity. Innovative competencies are complex of enterprise's personnel abilities to generate innovative ideas and realize them, innovative organizational capabilities demonstrate skills

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of enterprise to use innovative resources in effective manner by creation modern business-models, processes and procedures.

Main tool of innovative development realizations is selected innovative projects aimed at defined goals and tasks.

For development of innovative potential model based on identification and analysis of innovative resources, capabilities and competencies is proposed. This model includes next stages: analysis of innovative potential components, selection of target innovative projects; establishing correspondence between components of innovative potential and target projects; creation innovative potential development program.

It is proposed to use four-component matrix for evaluation and monitoring development of innovative potential; such approach is oriented on evaluation of four components — resources, competencies, capabilities and innovative projects. Resources, capabilities and competencies in the framework of this model are analyzed on the base of binary logic of economic processes, that helps evaluate interrelations of innovative potential's components.

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