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TRANSFER POTENTIAL AND PROGRAMS OF INNOVATIVE DEVELOPMENT

Definition of the problem. Despite a multitude of patterns of successful enterprise functioning in the framework of innovative structures the theoretical substantiation and methodology of formation and realization of the transfer potential of the innovative enterprises development, particularly those intending to launch a new or join an existing innovative structure, need further investigation. Today, the issues of transfer potential formation and realization have not been formalized as yet which, in most cases, is the reason for a high riskiness of transfer relations formation, difficulty drawing financial resources, irrational managerial efforts in finding and employing increase reserves as well as an increase in the transfer potential realization level of an innovative enterprise. Current theoretical, methodological and applied outcomes in the field of technologies transfer, innovative products, financial resources etc. are characterized by fragmentariness, non-systematic notions about causal and consequential relationships in the formation and application of industrial enterprises transfer potential which, in its turn, demands the elaboration of methodological, conceptual, and applied propositions as to formation and application of the transfer potential of the innovative enterprise development.

Analysis of the latest researches and publications. In most scientific works that touch forming and realization of transfer potential of innovative development of enterprises, paid attention to the economic ground and organization of transfer of technologies, introduction and service of the systems of transfer of information, to the methods of authentication of level of innovative development and others like that. Existent theoretical and applied works in the field of the transfer of technologies, innovative products, financial resources and others like that characterized by fragmentariness, nonsystemness of presentations of

researchers about causal copulas in forming and use of transfer potential of industrial enterprises.

The object of the paper is processes of forming and use of transfer potential of innovative development of enterprises.

Research results. With no exception, all economic activity entities are participants of transfer¹ relations (Fig.1).

Notes: conventional designations: P_1, P_2, \dots, P_n – structural subdivisions of an industrial enterprise; b_1, b_2, \dots – business partners, complete products consumers included; O_1, O_2, \dots, O_n – bodies of local authorities.

A great many of input and output information flows, financial and material resources, complete products and technologies is the permanent subject of coordination of organizations' economic interests. Today, there is a great amount of transfer systems which enable legitimate, safe, economically beneficial interaction of economic activity entities. Nevertheless, there is some evidence that the availability of these systems and the information on them is a necessary but not a sufficient condition of an innovative development of organizations [2-4; 6; 8; 18; 19]. The major factors hindering an innovative development of enterprises and limiting their interaction with other economic activity entities result from a low level of the transfer potential of the innovative enterprise development (TPIED)².

The lack of the systemic theoretically grounded propositions and methodological instruments of its formation and application results in an underdeveloped market of innovative products and technologies. The rate of innovation commercializing by domestic enterprises is dozens times slower than that in developed countries. According to the official statistics, no more than 11 percent of industrial enterprises implement innovations in Ukraine, meanwhile 60 – 80 percent in the USA, EU and Japan.

¹ Transfer (Latin *transfer* – move from one place, job, position etc.) the term usually identified with the process of transferring certain assets, skills, knowledge etc. from one economic activity entity to another both at charge and free of charge.

² TPIED is the aggregate of possibilities of accumulation, on the transfer terms, intellectual property rights, technologies, innovative products, financial and other resources as well as transferring them to consumers, business partners, bodies of local authorities etc. in the framework of the realization of innovation development programs.

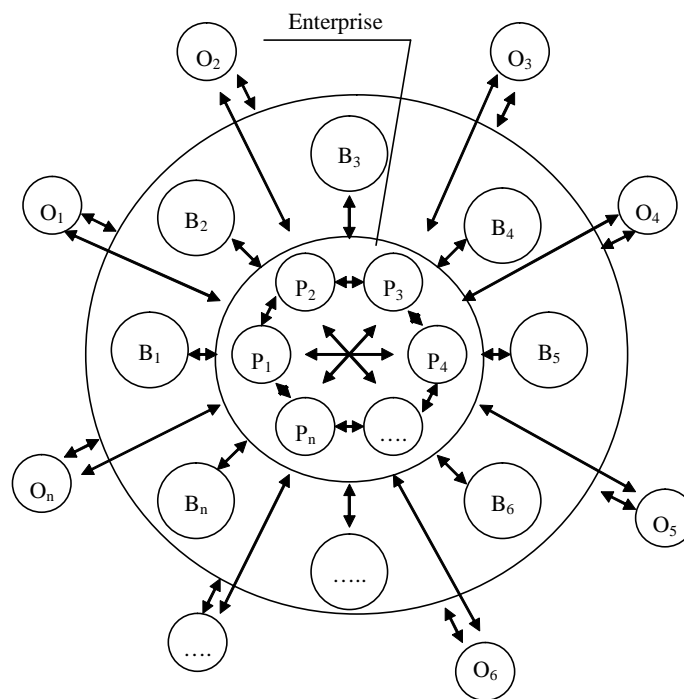


Fig.1. An industrial enterprise as a transfer relations participant

In recent years, alternative sources have provided information on the availability of the innovative potential of industrial enterprises as well as the level of their innovative development. The methods of estimating these parameters differ critically [1; 5; 9; 13]. To avoid subjectivity and fragmentariness at the innovation potential estimation as well as to promote the innovation development of domestic industrial enterprises, the indices adopted to the input and output data of EU research & innovation scoreboard, particularly those concerning the micro-level, have been employed. The computation of these indices demonstrated that among the total amount of enterprises under investigation the three groups of enterprises can be formed. The enterprises with a high level of both innovation potential and innovation development belong to the first group (*Kredmash* Public Company, *Peretvoryuvach / Transformer/* Public Company, R&D Institute; *MATS* Concern Private Company, *Motor Sich* Public Company, *INTER PET* LLC, *Mining Engines* Private Company). The second group was made up of the enterprises with a high level of innovative potential but a low level of innovation development. Here belong *ViAZ* State enterprise, *Electron* LLC, *Lutsk Automobile Plant* Public Company, *Lutsk Bearing Plant* Public Company. The third group covers the enterprises with low levels of both innovation potential and innovation development. These are *Lviv Locomotive Repair Plant* Public Company, *Drohobych Automobile Cranes Plant* Public

Company, *Genichesk Machine Building Plant* Public company, *HalytskyAutoPlant* Public Company.

The first and the second groups of the enterprises identified are of major interest. Since the enterprises with relatively similar levels of innovation potential are characterized by different levels of innovation development it is obvious that the traditional parameters of the innovation potential estimation may be, as a rule, non-sufficient and narrow.

Taking the above into consideration, the industrial enterprises have been analyzed according to their transfer potential for an innovative development. This has been preceded by TPIED parameterization considering the following features: transfer objects; means and terms of transfer. The multitude of these parameters can be formally presented in the following way [13,15]:

$$\left. \begin{aligned} \mathbf{U} P_t^n &= \mathbf{U}_{i=1}^4 x_i \cup \mathbf{U}_{j=1}^6 y_j, \\ x_i \in \mathbf{U} P_t^n &\Leftrightarrow \exists \mathbf{U}_{i=1}^4 x_i \in P_t^n, x_i \in \mathbf{U}_{i=1}^4 x_i, \\ y_j \in \mathbf{U} P_t^n &\Leftrightarrow \exists \mathbf{U}_{j=1}^6 y_j \in P_t^n, y_j \in \mathbf{U}_{j=1}^6 y_j, \end{aligned} \right\} (1)$$

where: $\mathbf{U} P_t^n$ – multitude of indexes characterizing TPIED, parts of a unity,

n – the total number of indexes characterizing TPIED,

$\bigcup_{i=1}^4 x_i$ – multitude of indexes characterizing the transfer possibilities of the internal enterprise setting, parts of a unity,

i – a feature to estimate the transfer possibilities of the internal enterprise setting,

$\bigcup_{j=1}^6 y_j$ – multitude of indexes characterizing the transfer possibilities of the external enterprise setting, parts of a unity,

j – a feature to estimate the transfer possibilities of the external enterprise setting.

As shown above, it has been suggested to compute TPIED on the basis of internal and external transfer possibilities identification. Internal enterprise transfer possibilities reflect the indices: transfer objects diversification; communication support of transfer; a guarantee of private property rights to transfer objects; transfer patterns diversification. It is reasonable to estimate transfer possibilities of external enterprise setting by means of indices of: transfer activity of off-shore structures, local innovation structures, venture financial organizations; diversification of financial resources transfer systems; development of advertising-searching transfer systems as well research-technological cooperation; the dependence of innovation commercialization on the intellectual property rights transfer.

A cluster analysis of the aggregate of the enterprises under investigation has been carried out as based on the computation of the TPIED indices as well as the identified level of innovative development. The results obtained are shown in Fig.2 [13,15]. Two groups of the enterprises are presented. One of them is characterized by high levels of transfer potential and innovative development. The enterprises with low levels of transfer potential and innovative development belong to the second group. The consideration of the fact that the innovative potential of both groups is identical makes it possible to claim that the level of the enterprises' innovative development depends linearly on the level of their transfer potential.

Notes: clusters have been constructed by means of a sphere method formalized by `clast_iomorph_trek` applied program. Conventional designations: 1) Kredmash Public Company – IED level (0,9), TPIED level (0,98); 2) Peretvoryuvach/Transformer Public Company, R&D Institute – IED level (0,62), TPIED level (0,74); 3) MATS Concern Private Company – IED level (0,87), TPIED level (0,59); 4) *Motor Sich* Public Company - IED level (0,59), TPIED level (0,96); 5) *InterPet* LLC – IED level (0,73), TPIED level (0,69); 6) *Mining Engines* Private Company – IED level (0,52), TPIED level (0,72); 7) *Iveko Motor Sich* LLC – IED level (0,56), TPIED level (0,62);

8) *ViAZ* State enterprise – IED level (0,29), TPIED level (0,12); 9) *Electron* LLC – IED level (0,36), TPIED level (0,46); 10) *Lutsk Automobile Plant* Public Company – IED level (0,29), TPIED level (0,35); 11) *Lutsk Bearing Plant* Public Company – IED level (0,12), TPIED level (0,29); 12) *Lviv Locomotive Repair Plant* Public Company – IED level (0,12), TPIED level (0,44); 13) *Drohobych Automobile Cranes Plant* Public Company – IED level (0,38), TPIED level (0,32); 14) *Genichesk Machine Building Plant* Public company – IED level (0,48), TPIED level (0,11); 15) *HalytskyAutoPlant* Public Company – IED level (0,48), TPIED level (0,47).

The conducted research proved that in the process of TPIED formation and application there may arise some contradictions (liquidity insurance and profitability of the entities of the innovation development when the expansion of their sources of financing needed; minimization of the expenditures on the innovation activity aimed at employees' motivation increase and information support improvement; retaining the private property right of the enterprise as well as its solvency insurance when the activity expansion demanded; maximization of the total volume of production and sales when the minimization of expenditures on products or technologies modification demanded as well as the possibilities to maneuver a profit share are limited. Their critical analysis demonstrated that all the indices characterizing the above contradictions are constituent elements of the financial stability of the enterprise and investment profitability directed into the innovative enterprise development. These parameters have been proved to be crucial for the development of transfer relations between enterprises. The essential dependence of TPIED on financial stability and investment profitability put into the innovative enterprise development has been grounded by statistical observation during 2007-2011 as well as by computation of the linear correlation index (0,9966). The indices of financial stability and investment profitability put into the innovative enterprise development can be formalized as shown below [13, 15]:

$$\left. \begin{aligned} \bigcup_{i=1}^2 E_{f_z}^n &= \bigcup_{i=1}^2 F_{y_i} \cup E_i, \\ F_{y_i} \in \bigcup_{i=1}^2 E_{f_z}^n &\Leftrightarrow \exists \bigcup_{i=1}^2 F_{y_i} \in \bigcup_{i=1}^2 E_{f_z}^n, F_{y_i} \in \bigcup_{i=1}^2 F_{y_i}, \end{aligned} \right\} (2)$$

where: $\bigcup_{i=1}^2 E_{f_z}^n$ multitude of the indices characterizing financial stability and innovation profitability put into the innovative enterprise development, parts of a unity; $\bigcup_{i=1}^2 F_{y_i}$ – multitude of the indices characterizing

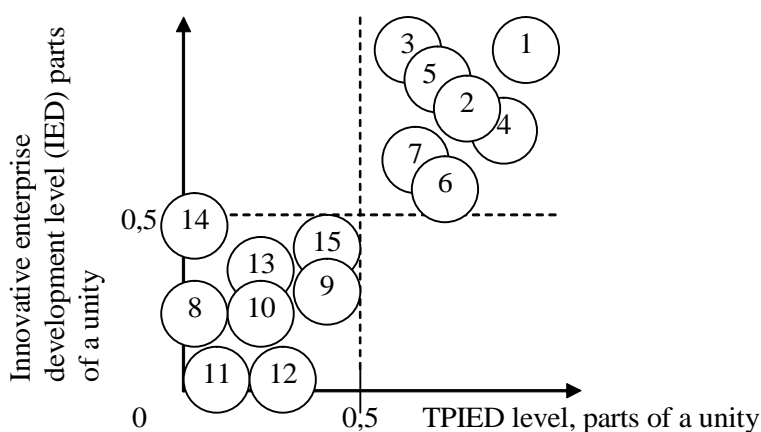


Fig.2 Constructed clusters

the financial stability of the enterprise, parts of a unity; $F_{y_i} = f(O_{vb}, K_y)$, where: O_{vb} – balance currency circulation, parts of a unity; K_y – index of the enterprise solvency, parts of a unity; E_i – investment profitability put into the innovative enterprise development.

The following formula has been suggested to estimate the investment profitability, put into the innovative enterprise development [13-15]:

$$E_i = \frac{W_p(1 - R_n) - W_k(1 + C_v)}{P}, \quad (3)$$

where E_i – investment profitability put into the innovative enterprise development, parts of a unity; W_p – enterprise assets increase as a result of the realization of investments, hryvnyas; R_n – index of deviation risk at some level of enterprise investment attractiveness (calculated on the basis of the identification level of information completeness, timeliness and objectivity used by the entities of the investment activity), parts of a unity; W_k – expenditures on accumulation resources for investment realization, hryvnyas; C_v – index of variation expenditures on investment realization, parts of a unity; P – volume of invested costs, hryvnyas.

The lack of the aimed impact on TPIED results in the irrational realization of their functions and inefficiency. When planning and organizing the TPIED, motivating creative search and innovation realization, controlling and regulating the TPIED level, enterprises are able to achieve the set goals on the basis of rational and creative application of their own and drawn resources, innovative products and technologies.

TPIED control has an information basis, i.e. it is based on the accumulation, procession and application of the data on TPIED indices value changes and factors affecting them. Achieving the expected values may cause some contradictions. As a result, getting the expected values of some indices managers obtain worse values of

other indices. This complicates the innovative development program realization and increases the riskiness of TPIED formation and application. The counteraction to these contradictions by means of applying conventional managerial strategies does not provide positive results. TPIED control demands applying the priorities diversification strategy which resists the contradictions following the TPIED formation and application and promotes expected positive indices changes. The priorities diversification strategy should be considered as a functional strategy which is a component of a higher order strategy. Thus, such strategies are to be elaborated on the decomposition basis. The formation of a new or choosing an existing strategy from a number of alternative ones is to consider internal and external enterprise setting factors having an effect on TPIED. These factors, in spite of their certain autonomy, are interrelated. Thus, on the one hand, setting TPIED goals as an internal setting factor is influenced by the tendencies on local, regional and world markets, conjuncture, a competition level etc. On the other hand, market segmentation, the level of demand for a certain product and its price depend on such internal setting factors as the maturity of heuristic managerial systems, the ability of activity entities to develop creative ideas and commercialize innovations promptly adapting communicative, intellectual and other possibilities to the needs and possibilities of consumers and business partners etc. Therefore, the elaboration of TPIED priorities diversification strategy is to consider the interrelations of TPIED internal and external setting factors as well as innovation process phases of the innovative enterprise development program. As a result of the research conducted it is claimed that the innovative development programs at different phases of the innovative process are characterized by different priorities. Thus, at the stage of conducting R&D and research-construction activities

Table 1.

Outcomes of the change of TPIED and IED levels resulting from the realization of TPIED priorities differentiation strategy

Enterprises	Increase of TPIED and IED levels in the reported period as	
	TPIED	IED
<i>Kredmash</i> Public company	0,01	0,06
<i>MATS Concern</i> LLC	0,05	0,02
<i>Peretvoryuvach (Transformer) R&D Institute</i> Public Company	0,03	0,08
<i>Element-peretvoryuvach</i> LLC	0,07	0,04
<i>Electron</i> LLC	0,02	0,02
<i>ViAZ</i> State enterprise	0,03	0,08
<i>Lviv Locomotive Plant</i> Public Company	0,04	0,07

the priority is given to their loss-free. At the stage of manufacturing and consuming the priority is given to the maximization of profitability, at the stage of innovation products improvement and modification – a longer life of an innovation product.

The consideration of this feature may promote the acceleration of the invested costs compensation, the decrease in the riskiness of the resources portfolio formation, the timeliness of identifying TPIED level increase resources and the rationality of making managerial decisions on their application,

Table 1 shows the outcomes of the change of transfer potential and innovative development levels at the analyzed enterprises as a result of the realization of the TPIED priorities differentiation strategy.

Thus, the realization of the actions foreseen by the TPIED priorities differentiation strategy in the cross-section of each phase of the innovative process during 2007 – 2011 has provided an additional TPIED level increase which had a positive effect on the IED level increase.

Conclusions. The application of the priorities differentiation strategy of TPIED realization belongs to the class of under-formalized tasks. The reason is the amount of assumptions of the prospective state of the

external setting and uncertainty of the state of the innovative development program realization. To sum up, to achieve the TPIED goals in the structure of the integrated enterprise managerial system it is necessary to set up a local sub-system of information support of the innovative development management. The realization of this task is the most rational on the basis of making decision support systems. But, despite some advantages of these systems, the best results are achieved in the dialogue mode between users and the system. The increase in costs of their total automation is irrelevant. The optimal variant is the realization of measures related with professional training of managers who are good at modern information technologies, methods and patterns employed in the decision making systems since it enables the control entities to correlate algorithms and terms of application set in them. Such an approach will promote the optimization of expenditures on management systems formation and TPIED indices.

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Князь С. В., Неоргиади Н. Г., Богив Я. С. Трансферный потенциал і програми інноваційного розвитку

У статті розглянуто сутність поняття „трансферний потенціал”. Це поняття трактується як сукупність можливостей із акумулювання на умовах трансферу активів, а також їхньої передачі бізнес-партнерам під час реалізації програм інноваційного розвитку. Увагу приділено також процесу формування трансферного потенціалу і його оцінюванню з позицій теорії множин.

Ключові слова: трансфер, інноваційний потенціал, прибутковість, фінансова стабільність.

Князь С. В., Георгиади Н. Г., Богив Я. С. Трансферный потенциал и программы инновационного развития

В статье рассматривается сущность понятия „трансферный потенциал”. Это понятие трактуется как совокупность возможностей из аккумуляции на условиях трансфера активов, а также их передачи бизнес-партнерам во время реализации программ инновационного развития. Внимание уделяется также процессу формирования трансферного потенциала и его оцениванию с позиции теории множеств.

Ключевые слова: трансфер, инновационный потенциал, прибыльность, финансовая устойчивость.

Knyaz S. V., Heorhiadi N. H., Bogiv Y. S. Transfer Potential and Programs of Innovative Development

The essence of the concept „transfer potential” is considered in the article. This concept is interpreted as a set of business opportunities on storage conditions on transfer and transmission business partners asset management experience, information, etc. during innovation development programs. Attention is paid also the logic of building evaluation method transfer potential with using of the set theory.

Key words: transfer, innovation potential, profitability, financial stability.

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