

## **MBTI MODEL APPLICATION FOR THE ACMEOLOGICAL-INVARIANT ORGANIZATION MANAGEMENT AS AN INSTRUMENT FOR “BREAK-THROUGH” INNOVATIONS IMPLEMENTATION**

**Olena Shcherbak**

*Procter&Gamble*

*Igorevskaya Street 13/5a, Kyiv 04070, Ukraine*

*shcherbak.o@pg.com*

**Liudmyla Ganushchak–Efimenko**

*Kyiv National University of Technologies and Design*

*Nemirovich–Danchenko Street 2, Kyiv 01011, Ukraine*

*glm5@ukr.net*

**Nataliia Kulak**

*Kyiv National University of Technologies and Design*

*Nemirovich–Danchenko Street 2, Kyiv 01011, Ukraine*

*nkulak@meta.ua*

### **ABSTRACT**

*The most urgent development strategy for Ukrainian economy lies in the “break-through” concept. This concept is based on a steep increase of innovation activities with the goal to get to the next efficiency level. The key to success of this model is an optimal use of highly qualified workforce, technology innovations, efficient infrastructure and integration into a global market system. The goal of this research is to develop a method of MBTI model implementation to create an optimal structure of an acmeological-invariant Organization management as an instrument of “break-through innovations” incorporation. A complex system of a project group creation is represented in the research. Its goal is to initiate and successfully realize “break-through innovations”, based on the example of JSC “Pharmaceutical company Darnitsa”. A described system is based on the realization of a 4-phase algorithm. The goal of acmeological-invariant Organization management structure development is to obtain such an organization structure, where an interaction between its separate elements will lead to a new level of an overall organization development. An economic-mathematical evaluation was conducted in order to identify project group members interaction efficiency (according to their new project roles). The purpose of this evaluation is an empirical relationship validation between new structure components relevance. As a next step, a clusterization of possible staffing combination variants of the project group was carried out, it was based on the results of the evaluation of interaction level between project group members according to their functional responsibilities. The choice of the most optimal organization structure was done with the help of ANOVA toolkit. A conducted research proves that the application of MBTI model is a logical continuation of the process called to amplify and deepen non-standard solutions to successfully initiate and realize “break-through innovations”. A creation of a principally new optimized organization structure is a key to success in a progressive development path, where balanced staffing serves as one of its invariants.*

**Keywords:** *MBTI model, acmeological-invariant control, invariant, breakthrough innovations, functional-structural approach*

### **1. INTRODUCTION**

Modern economic reality creates an objective necessity in the trend reconsideration of future possibilities' development so that subjects of economic activity can realize their needs and

interests in economic development. It is due to the fact that current quality transformation of the society requires initiation and implementation of break-through recommendations. This requirement is reinforced by the number of conditions such as globalization; uneven level of economic development of different countries; increasing complexity of the nature, structure and forms of economic activity and competitive relations. Ukrainian economy nowadays requires the model of “possibilities”, “chances”, “break-through”. This model will be built on the steep innovation activity increase in order to timely create further possibilities for economic growth, so that innovation technical basis and new technological way of production will stimulate economic transition to the higher level of its efficiency. The keys to success of this model are highly qualified labor forces, state and international investments to the priority areas of national economy, technology innovations, effective infrastructure, as well as production and sales methods integrated into global market system. In order to launch the break-through model outlined above, the following investment invariants are required: 1) into education along entire life path of the population to enable leading economic growth rate of 10% GDP; 2) into healthcare and sports activities development that will serve as human resources potential support and development and create the growth rate of 8% GDP; 3) into science, social-cultural and other areas of value stream creation such as ideas and technologies that will serve as break-through elements to contribute to 5% of GDP growth rate. However, it is obvious that investments into the above mentioned areas are realized in the size that is significantly lower than required to correspond to society interests. One of the effective instruments to enable synergy break-through is the right combination between such invariants as psychological traits of employees with specific job requirements on one hand and between employees’ psychological characteristics within an organization structure on the other. An effective tool that can help with this task is MBTI model (Mayers Briggs Type Indicator). The implementation of this model enables the increase of Organization management efficiency through organization restructuring or system optimization, in order to increase economic results and decrease micro-level losses. Based on the above we formulate the goal of this study: to prove the most efficient organization structure that will enable break-through technologies implementation in the enterprise.

## **2. LITERATURE REVIEW**

“Break-through innovations” are innovations that open new technology cycle or new innovation business cycle, as their goal is not in existing and established base technology’s development and improvement, but in the complete technology change and market redirection. The model of “Break-through innovations” was created by Clayton Christensen [1], which he introduced in 1997 for the first time in his book “The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail” [2]. This model can be used to describe new technologies’ influence on companies’ functioning. Clayton Christensen engaged himself in the study of the reasons why the biggest world leading companies were rapidly losing their dominating positions when new technologies entered the market. J. Schumpeter was the first one who concluded this correlation, concluding that radical innovations were accompanied by creative destruction transformation process [3]. R. Foster and S. Kaplan demonstrated on the examples of Johnson & Johnson and General Electric that in order to maintain their competitiveness and remain dominant for a long time, modern companies need to master the strategy of discrete evolution and the processes of creative destruction [4]. Lindy Ryan proves that in order for new companies to create their own market, it is required to implement progressive changes through creative destruction as a self-destruction strategy [5]. The empirical studies on companies’ productivity in 24 countries conducted by M. Arthur and Jr. Diamond prove the same idea – that creative destruction is extremely important for companies’ productivity improvement [6]. Further possibilities of break-through technologies introduction with the help of an enterprise’s

available resources and implemented ERP-systems were reflected in research of Hanushchak–Efimenko L., Shcherbak V., Kaplun V. [7]. The process of a creative destruction is often studied from the productivity increase point of view that means the use of the key resource – human capital. For an effective implementation of this resource it is required to involve modern HR-technologies, which apart from an administrative function will include employees' psychological characteristics consideration for certain tasks performance and interaction within the team. Different typology of team roles exist. Team role is a description of the behavior model that influences team members' interaction for a joint goal achievement [8]. Thus, in a project management, a classification of team roles, suggested by Allan J. and Lawless N. is the most widely accepted, also known as the typology of MTR–i [8]. Furthermore, in psychological science, different personality typology approaches exist. The most common are of C.G. Jung and his predecessors. For corporate management goals, the most useful is the model offered by Myers-Briggs [9]. It is important to note, that individual roles in the project team often do not coincide with his/her inborn psychological characteristics. Work experience and gained qualification influence individual behavior within a team, while a psychological type according to Myers-Briggs typology reflects psychological specifics of a person and is less dependent from the external circumstances and experience, but more from inborn qualities of a nervous system. It is therefore to conclude that the application of unique individual creative characteristics identified with the help of MBTI model will enable break-through innovations implementation [10].

### **3. METHODOLOGY OF MBTI MODEL APPLICATION FOR THE ACMEOLOGICAL-INVARIANT ORGANIZATION MANAGEMENT AS AN INSTRUMENT FOR “BREAK-THROUGH” INNOVATIONS IMPLEMENTATION**

“Break-through” in Economics means significant progress in those its foundations that create several original institutional basis (institutions): education (human capital), science, high-technology production (intellectual property), investments and social values. Development level of institutions mentioned above and their quality composition determine the possibility of a break-through in Economics. Furthermore, it is only possible in case of a leading economic development, where the model's substantial form is an Economics of Innovations. Therefore, a country's transition to the new long-term wave of economic growth (that consists of 5, 6 and 7 technology patterns) is only possible under Economics of Innovations conditions, which target itself at the development of high-technology sectors. The authors of the methodology have empirically come to the method of a structural function description. This method is described in the literature as a functional-structural approach (FSA) that is a methodological basis of an explication and analysis of the organization-functional structure of an enterprise and the logic of tasks distribution based on their psychological characteristics with the help of MBTI model. Key foundations of FSA in a short form can be expressed in the following: company's tasks including existing processes and development patterns come as the first priority; company's functions (its subsystems and elements) have regulatory nature and end-to-end functional approach to its analysis and synthesis; functional designation of an organizational unit's is primary in relation to the company's structure; any function reports to the existence purpose and mission of the company; an interaction between company's function and structure in the development process is characterized by their controversial coherence; their consistency and correspondence is temporary and has a cycle nature.

Phase 1: Functional structure should be separated from the existing organization structure. In this case the objects' hierarchy is extracted from divisions' goals, and operations from a functional subdivision. The function's structure might be represented in the form of either a

two-dimensional matrix (table), or a system matrix (for every level of the hierarchy). Matrix field represents an elementary function.

Phase 2: A functions' classification is realized based on the matrix in order to integrate it into ERP-systems and to control its sustainability. At the same time, the provided approach simplifies the design of an organization structure at an enterprise: a target function of the highest subdivision is formulated, whereas cycle performance's elements are created based on existing classifications or via decomposition.

Phase 3 includes analysis of the existing functional performance division. Variability in personal interests according to R. Hogan, R. Blake [11], G. Staggs, L. Larson, F. Borgen [12], is related to the differences in individual characteristics. At the same time, temperament's intensity and professional competencies (TCI) suit especially well for roles differentiation within a project team or an organization, since they measure adaptive functioning better than other modern cadasters [13].

The difference of TCI model vs MBTI is that it measures seven parameters of adaptive functioning, each of which relates to the functioning and adaptivity as managers and/or employees in such critical roles as decision-making, interpersonal relationships and emotional intelligence [14]. These traits include three aspects of one's character (intellectual agility, including self-direction, ability to cooperate and self-improvement), as well as four aspects of one's temperament (reaction to emotional stimulus, including harm avoidance, openness to new experience, dependency from appreciation and stability). TCI model should be used to create teams/organization for already set-up processes within stable functioning companies. In order to introduce "break-through" innovations a team structure should correspond to certain demands regarding creativity, innovative thinking and ability to work with information in order to implement brave plans. Therefore, MBTI model is more suitable for these purposes. Under this criterion, sixteen psychotypes can be divided into four groups of subtypes: EN, IN, ES, IS. It is also important to allocate subtypes that describe the relationship of leadership and subordination, as the project team always has a certain hierarchy: TE, SI, NE, FI. It is believed that the combination in the following psychological types' constructs is a prerequisite for the fruitful introduction of "breakthrough technologies": N – Intuition and E – extraversion [15]. That is, for a psychological characteristics combination «EN – Brainstormer», generally, the form of conducting is an extraversion process [16]. Sensor and intuition for this subtype (EN) is usually balanced, since EN lives in the world of abstract reasoning; nothing is dogma to him/her; in its reality everything is interconnected and everything is possible; he easily connects facts widely known, however, the interconnection between which is not obvious to others [16]. Let's consider the interaction of project team members with different psycho-types during problem-solving by brainstorming. At the first stage in the process of collective discussion, the following psycho-types must take part ENTP, ENFP, ENTJ, ENFJ, INTJ, ESTJ, ESTP (Table 1). They put forward ideas and discuss them. Psycho-types ESFP and ESFJ it is advisable to engage in a discussion to bring a creative atmosphere. Psycho-types INTP, INFP, INFJ can put forward ideas, but collective discussion can be an obstacle for them. For these psychotypes, individual, written brainstorming, brainstorming using e-mail, etc. are more appropriate. Psycho-types ESTJ, ESTP rarely put forward their own ideas, but they can pick up and develop the ideas of other project team members. Ideas, which were subsequently selected for implementation, put forward, most often, psychotypes ENTP, ENFP, ENTJ, ENFJ, INTP, INFP, INTJ, INFJ. In case of an individual brainstorming, written, using e-mail it is useful to involve only the data of the indicated above team members.

*Table 1: The optimal role of project team members based on psychotypes in the process of finding breakthrough solutions*

The role of team members Psychotype	Communicator	Generator	Critic	Solver	Scheduler	Organizer	Moderator	Finisher
ENTP	+	+	+	+		+		
ENFP	+	+				+		+
ENTJ	+	+	+	+	+	+	+	
ENFJ	+	+				+		
INTP		+	+	+				
INFP		+						
INTJ	+	+	+	+		+		
INFJ		+						
ESFP	+					+		
ESFJ	+					+		
ISTJ								+
ISFJ								+
ISTP			+	+				+
ISFP			+	+				
ESTJ	+		+	+	+	+	+	+
ESTP	+				+	+	+	

In the process of selecting ideas the participation of the following psychotypes is appropriate ENTP, ENTJ, INTP, INTJ, ISTP, ISFP, ESTJ. Naturally, the team members who took part in putting forward ideas should not participate in their selection. However, exceptions to this rule are possible with a team of four or less members. It should be noted that with a small number of members of the project team there is a certain hierarchy of how team members should be used. So the extravert types of ENTP, ENTJ, are better off in putting forward ideas, and introverts INTP, INTJ should lead the selection of ideas. After the previous stage of selecting ideas it is advisable to involve members of the ISTJ and ISFJ types, who can thoroughly analyze the shortcomings of ideas and obstacles on the way of their implementation. In addition ISTJ are good candidates for the preparation and fixation of the results of brainstorming. The best moderators of the discussion are the psychotypes ENTJ, ESTJ, ESTP. In a team of several people, it is expedient to assign an ESTP as a moderator, while ENTJ and ESTJ can perform other roles. ENTJ can take part in putting forward ideas, and ESTJ - in their selection.

Phase 4 covers mathematical reasoning of the model of organization structure optimization. The mathematical justification for the sequence of using the MBTI model to optimize the organizational structure was carried out with the help of the economic and mathematical apparatus of cluster analysis for the JSC “Pharmaceutical Company Darnitsa”. This company recently successfully implemented 2 breakthrough projects. At the end of 2014, the company launched an innovative production of infusion solutions and implemented the ERP system. To generate these breakthrough innovations, it was necessary to optimize the staffing of the performers who were pre-tested with the MBTI psychotype tests. For the hierarchical agglomeration clusterization, the Ward coupling method and the Half Square Euclidean distance were used as a measure of similarity for members of the project team (18 people), who have similar estimates of MBTI psychotypes. Representatives of each cluster are assessed as the average value inside the cluster, as shown in Fig.1.

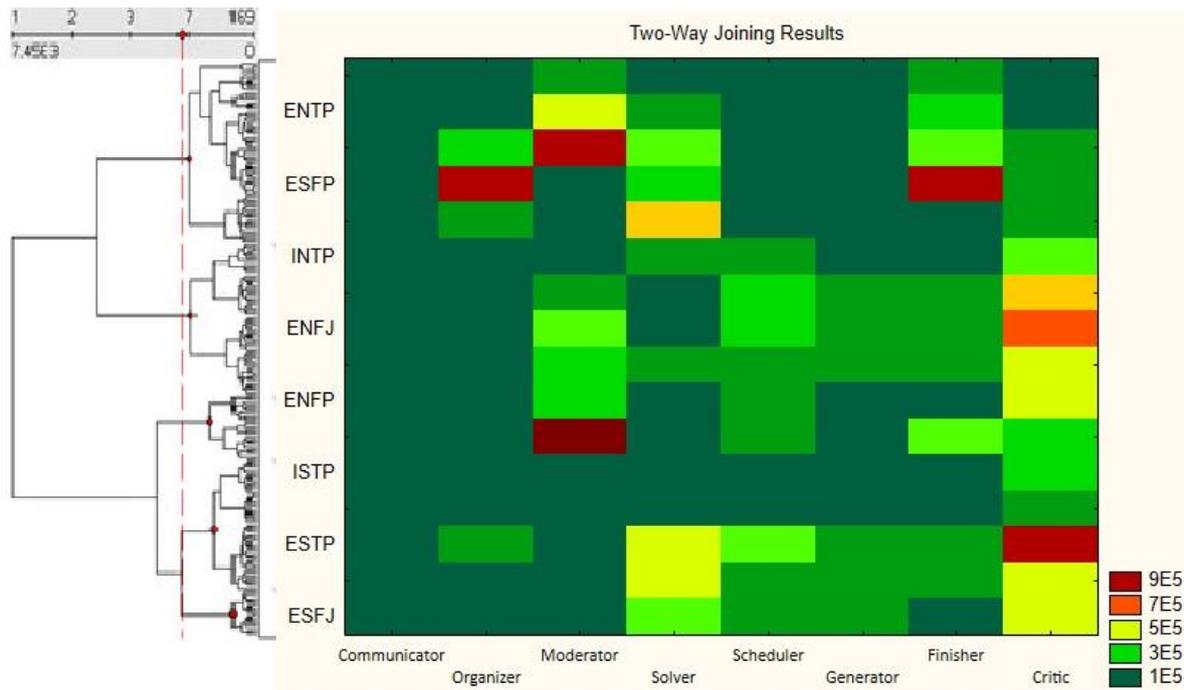


Figure 1: Identification of MBTI cluster psychotypes for optimal roles in the project team

In Fig. 2, clusters 1-5 are arranged in a sequence top-down (from cluster 1 to cluster 5). The optimal number of 5 clusters was calculated using the Davis-Buldin index [17]. The degree of an overlap between the two clusters was estimated by calculating the double probable intersection between them based on the hypergeometric distribution:

$$PI_{hyp}(P_i, G_j) = 1 - \sum_{q=0}^{p-1} \binom{h}{q} \binom{g-h}{n-q} / \binom{g}{n} \quad \begin{matrix} h = |P_j| \\ n = |G_j| \\ p = P_j \cup G_j \end{matrix}$$

where p observations belong to the set  $P_i$  of size h, and also belong to the set  $G_j$  of size n; and g is a total number of observations. Consequently, the lower the  $PI_{hyp}$  is, the higher is the degree of overlap. Here, the p-value of the hypergeometric test is used as a measure of aptitude / ability to perform a role in a team. The distribution of MBTI ratings across the sample is shown in Table 2. On average, members of the project team were exceptionally extreme, being very high in the sustainability of goals achieving. However, there is a significant variability around these mean values, which was considered by cluster analysis.

Table 2: Estimates of the roles of team members according to the MBTI psychotypes

Type of team activity	Descriptive factor	Percentage average	Evaluation meaning	Standard deviation of estimation
Generator	Low Medium (Optimistic)	38,6	-0,29	1,20
Communicator	Low Medium (Organized)	46,0	-0,10	1,20
Critic	Low (Separated)	21,2	-0,80	1,00
Solver	Very high (confident)	88,5	+1,20	1,00
Scheduler	High average (responsible)	65,5	+0,40	0,97
Organizer	High average (useful)	59,9	+0,25	1,20
Moderator	High Medium (Altruistic)	55,2	+0,13	0,99
Finisher	High average (stubborn)	47,2	+0,11	0,88

Clusters of team members who have similar profiles of MBTI psychotypes have been identified using the Ward clustering method without taking into account the current role in the project. The dimensions of the MBTI psychotypes were recorded from low to high, ranging from the mean value of the Likert scale for each sign, as shown by the color coding in Figure 2 for the convenience of visual inspection and pattern recognition. The optimal number of identified clusters of personality was five in accordance to the Davis-Budin index of validity (Fig. 2). Each of these five clusters were characterized by a separate personal profile.

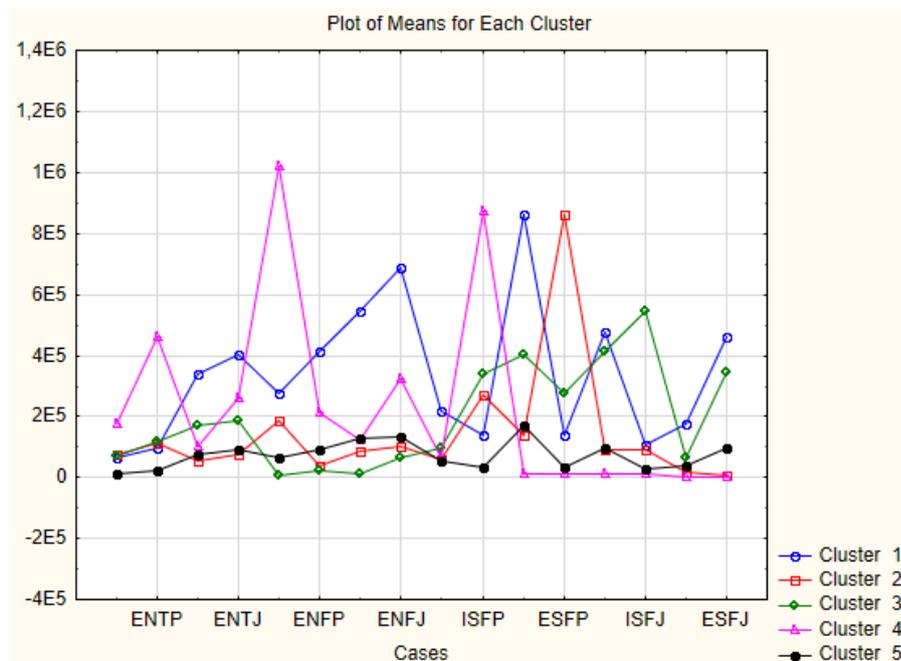


Figure 2: Profile of MBTI psychotypes' clusters average values matched with the current roles in the project.

As a next step, five personal clusters were validated for the relevance of the role in the project and the personal psychotype. Cluster 1 ("investigator") is inherent in the design function "Collective Discussion", 22% (4/18) of the team members correspond to this cluster. The profile of people in this cluster are goal-oriented, highly collegial and skeptical, which allows them effectively solve organizational and planning problems. Cluster 2 ("commander") is inherent in the design function "Criticism, selection of solutions", 28% (5/18) of respondents correspond to this cluster with high indicators of "independence", autonomy, self-direction, low level of shyness/self-criticism. Cluster 3 ("reliable") is inherent in the design function "Moderator," 17% (3/18) of respondents, they have a character of trust, they are persistent, controlling, but friendly and encouraging. Cluster 4 ("breakthrough"), inherent in the design function "Promoting ideas", 11% (2/18) of respondents. They are persistent, ambitious, resourceful. People of this cluster are impulsive with low responsibility and high level of search for innovations. Cluster 5 ("prosecutors") is 22% (4/18) of respondents. The respondents of this cluster have a friendly temperament, responsible, detail-oriented, persistent and hard-working. In analyzing the estimates of the received clusters and their relationship with the psychotypes, a correlation was found, that is typical for the general situation of the need to form an organizational structure for the development of breakthrough innovations (Fig. 3). The choice of the optimal organization structure was made using the toolkit ANOVA. The calculations have shown that the clusters were moderately correlated ( $p < 0.01$ ) with self-direction to find breakthrough innovations ( $r = 0.62$ ), the stability of the new organizational structure ( $r = 0.38$ ),

and the reduction of the risks of non-implementation of the project ( $r = -0,27$ ), but significantly correlated with co-operative ( $r = 0.18$ ) and dependence on remuneration ( $r = 0.16$ )

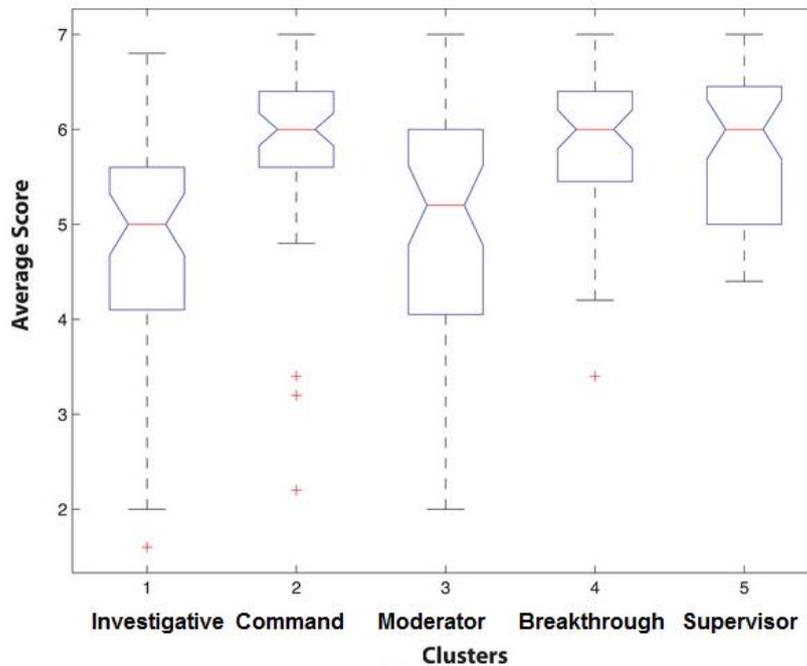


Figure 3: Graphs of mean value distribution of the project goal achievement, depending on project's roles correspondence.

The research has shown that the success of the implementation of a breakthrough innovation project depends on the qualitative and quantitative composition of the project team and their personal profile. The level of satisfaction from the team role may be conditioned by minor differences in personality characteristics that were not fully captured by the five aggregated cluster profiles.

#### 4. CONCLUSIONS

The conducted research explored the methodology of MBTI model as a tool to identify psychological types based on which an optimal design of an acmeological-invariant organization management will be justified, in order to introduce “break-through” innovations to an enterprise. The initiation and successful project realization directly depends on an optimally balanced project team, whose selection should be done depending on their identified psychological characteristics and roles' functional composition. Apart from that, research has shown that one psychological trait is heterogeneous to all members of the studied project team. This trait can be described as a high functionality that helps people to easily adapt and be flexible. This is proved by their significant level of self-direction, cooperation, persistence and overall high level of life satisfaction. Moreover, this trait was often identified among people occupying one positions more than others.

#### LITERATURE:

1. Dyer, J., Gregersen, H. & Christensen C. (2011). *The Innovator's DNA: Mastering the Five Skills of Disruptive Innovators*. Boston, MA: Harvard Business Press.
2. Christensen, C. (1997). *The innovator's dilemma: when new technologies cause great firms to fail*, Boston, Massachusetts, USA: Harvard Business School Press.
3. Schumpeter, J. (1989). *Essays: on entrepreneurs, innovations, business cycles, and the evolution of capitalism*. Paris: Transactions Publishers. 380 p.

4. Foster, R. & Kaplan, S. (2001). *Creative Destruction: Why Companies That Are Built to Last Underperform the Market and How to Successfully Transform Them*, New York, NY: Currency/Doubleday.
5. Ryan, L. (2013). Leading change through creative destruction: how Netflix's self-destruction strategy created its own market. *International Journal of Business Innovation and Research (IJBIR)*, Vol. 7, No. 4. <https://doi.org/10.1504/ijbir.2013.054868>.
6. Arthur, M. & Diamond, Jr. (2007). Schumpeter's Creative Destruction: A Review of the Evidence. *Econ Journal Watch*, 4(3). 15 p.
7. Hanushchak–Efimenko, L., Shcherbak, V. & Kaplun, V. (2017). Resource–innovative model of raising university autonomy. *Scientific bulletin of Polissia*, 1(9), P. 2. pp. 61–69. DOI: 10.25140/2410–9576–2017–2–1(9)–61–69.
8. Allan, J. & Lawless, N. (2005). Learning through online collaboration by SME staff a scoping investigation into likely team–role stressors. *Education + Training*, 47 (8/9). pp. 653–664. <https://doi.org/10.1108/00400910510633189>.
9. Briggs Myers, I. (1962). *The Myers–Briggs Type Indicator: Manual*. <https://doi.org/10.1037/14404–000>.
10. Myers–Briggs, I., McCaulley, M. & Quenk, N. (1998). *MBTI Manual (A guide to the development and use of the Myers Briggs type indicator)*. Consulting Psychologists Press, 131 p. <https://doi.org/10.1037/t01943–000>.
11. Robert Hogan, Rex Blake. (1999). John Holland's Vocational Typology and Personality Theory. *Journal of Vocational Behavior*. Volume 55, Issue 1, pp. 41–56. <https://doi.org/10.1006/jvbe.1999.1696>.
12. Gena D. Staggs, Lisa M. Larson, Fred H. Borgen (2007). Convergence of Personality and Interests: Meta–Analysis of the Multidimensional Personality Questionnaire and the Strong Interest Inventory. Volume: 15 issue: 4, pp. 423–445. <https://doi.org/10.1177/1069072707305760>
13. Richard A. Grucza & Lewis R. Goldberg (2007). The Comparative Validity of 11 Modern Personality Inventories: Predictions of Behavioral Acts, Informant Reports, and Clinical Indicators. *Journal of Personality Assessment*. Volume 89, Issue 2. pp. 167–187. <https://doi.org/10.1080/00223890701468568>.
14. Keirse, D. & Bates, M. (1978). *Please Understand Me. Character and Temperament Types*. Del Mar, CA: Prometheus Nemesis Book Co.
15. Walter, J. (2003). Neurolinguistic programming: temperament and character types. *BMJ* volume 326 issue 7394. pp. 132–133. <https://doi.org/10.1136/bmj.326.7394.s133a>.
16. Sievert M, Zwir I, Cloninger KM, Lester N, Rozsa S, Cloninger CR. (2016) The influence of temperament and character profiles on specialty choice and well–being in medical residents. *PeerJ* 4:e2319 <https://doi.org/10.7717/peerj.2319>
17. Igor Zwir Henry Huang Eduardo A. Groisman (2005). Analysis of differentially–regulated genes within a regulatory network by GPS genome navigation. *Bioinformatics*, Volume 21, Issue 22, pp. 4073–4083. <https://doi.org/10.1093/bioinformatics/bti672>.