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EDITORIAL

This is the fourth issue of the second volume of Czech Journal of Social Sciences, Business and Economics (CJSSBE) scheduled for winter 2013. The aim of CJSSBE is to facilitate the transmission of new scholarly discoveries in the fields of social sciences, business and economics. Thence, our journal offers a platform that supports scholars in building upon intellectual treasures and advancing our understanding about various fields of research in novel and meaningful ways. Capitalizing on this effort, we now focus on furthering our scope and consolidating our position in both conceptual developments and practical applications in the fields covered by the scope of this journal.

The research papers appearing in the fourth issue address a number of topics comprising the main three fields of the journal: social sciences, business and economics. The papers that belong to the first section include an array of works that deal with praxeological skills of future professionals, attitudes of German authorities and society of the prisoners of war kept in the Soviet Union.

The papers that represent the business section of our journal include the research of business failure prediction model, research of occupational prestige among young people in Belarus, and psychology of corrupt behaviour and resistance to corruption amongst public servants.

The economics section of our winter issue includes the paper on the loyalty programs in fast-moving consumer goods as well as the economic estimation of the effectiveness of using minerals in producing bottled drinking water.

We trust that you will enjoy reading the present issue, and we look forward to presenting you our next issue in spring 2014 that will start our Volume 3.

Wadim Strielkowski
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PRAXEOLOGICAL SKILLS OF FUTURE PROFESSIONALS IN THE CONTEXT OF COMPETENCE APPROACH: THE ESSENCE, ASSESSMENT SUPPORT, AND PEDAGOGICAL CONDITIONS FOR THEIR DEVELOPMENT

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Abstract

This paper is focused on solving a pedagogical task related to the development of praxeological skills of future professionals within the framework of competence approach. For this purpose the essence of praxeological skills has been revealed, and a set of these skills has been determined; criteria of their developedness have been considered, and quality levels of their manifestation have been characterized; pedagogical conditions for the development of future professionals’ praxeological skills have been worked out and substantiated.

Key words: praxeological skills, future professionals, assessment support, pedagogical conditions.

JEL classification: 120, 129

Introduction

The level of the competitiveness of modern innovation economy is greatly determined by the quality of professional human resources and their training in educational institutions. This requires modernization of the content of education, optimization of the ways and technologies of organizing education process, and revision of the aim and outcome of education. Under modernization, the entire existing system of higher professional education is oriented to competence approach. This approach supposes that learners acquire various competencies that will allow them to act effectively in future situations of professional, personal and social life. Here particularly significant are skills that enable one to act efficiently in new, indefinite, problem situations. These are praxeological skills. In the given context it becomes necessary to solve the pedagogical task related to revealing the essence, assessment tools and pedagogical conditions for praxeological skills acquisition during professional preparation of future specialists, taking into account the benchmarks of competence approach.
Overview of the research literature on the topic

To characterize the concept of “praxeological skills of a future professional”, let us construct a definition of this concept which will reflect the essence, structure and functional characteristics. The concept, “praxeological skills”, is generic and specific, and to be fully characterized, according to the laws of formal logics, it requires preliminary consideration of the concept of skills as a generic one.

The study and analysis of psychological and pedagogical literature shows that the problem of the development of skills is still a matter of debate among scholars. The diversity of opinions is accounted for by the fact that this category is regarded both as a psychological and pedagogical one, and has a multi-component structure. In addition, the ambiguous understanding of competencies and their consideration, using the concept of "skills" is a matter of controversy. Therefore, this explains why the viewpoints on the concept of praxeological skills are different.

On the basis of the analysis of conceptual approaches to the consideration of the concept of skills the following clarifications can be made:
- an activity approach treats a skill as a category of activity. This allows us to reveal content and operational aspects of the development of a skill, ignoring essential changes in the personality sphere. A skill is defined as knowledge in action, i.e., application of knowledge in learning and cognitive activity as a method and quality of activity. In this case the process of skill development is considered in close connection with the unity of external processes and psychic activity;
- a personality approach allows us to regard a skill as a personality trait, as the ability to carry out effective, purposeful activity, as the knowledge-based ability to achieve a consciously set goal;
- a personality-activity approach justifies the fact that a skill is developed during activity, is determined by its objective features, manifests itself as the ability to carry out purposeful activity, and is an important characteristic of the personality. In this approach a skill is an important component of a process-activity aspect of learning; it is regarded as ability and a result of the activity on the one hand, and as ability and a quality of personality on the other;
- a competence approach regards a skill as a structural unit of competence. It emphasizes a generalized integral nature of the concept of competence in relation to skills; and this concept includes its entire constructive content.

The selected conceptual approaches to the consideration of the concept of skills complement one another. In our opinion the activity approach most fully reflects the essence of this concept. By skills we mean modes of action learned by a person that ensure his/her ability to consciously and successfully perform an activity under new conditions in accordance with the available possibilities and purpose. In this understanding, skills are similarly characterized in the competence approach as a component of competency that allows one to act effectively in new, uncertain, problem situations for which it is impossible to develop appropriate means in advance.

The issue of praxeological interpretation of an activity has its own history, including the problem of the interrelation and relationship of theoretical and practical activities. The term "praxeology" comes from the Greek «praxis» (action, practice) and the Latin «praxeus» (action, deed). Literally translated, praxeology is "knowledge about actions", perception of practice in its philosophical sense, i.e. getting the most general information about what a
person does. To study practical implementation and consequences of an action is extremely important both for the transformation of practice and for the professional development of those who are engaged in it [1]. Praxeology can characterize real human capacity, define their objective and subjective actions, contribute to the establishment of their ideals and values, help optimize their livelihoods and life support both individually and in public, universal terms.

Summing up, we regard praxeology as scientific knowledge of organizing successful activity by teaching a person to consciously choose tools, techniques and methods of work that ensure the efficiency of labor, stimulate creativity under constantly changing conditions, in situations of risk and uncertainty, producing his/her rational system of internal motivation for active transforming activity. The main features of such activity are: rationality, transformative character, conscientiousness, self-knowledge, practicality.

Correlating the concept of "skill" with the meanings of "praxeology", we treat praxeological skills as a set of skills leading to successful activity due to a conscious choice of means, techniques and methods of work that ensure labour efficiency, stimulate creativity under constantly changing conditions and in situations of risk and uncertainty, and encourage active transforming activity. Accordingly, praxeological skills of future professionals are a set of skills acquisition of which leads the learners to successful professional activity due to a conscious choice of means, techniques and methods of work that ensure labour efficiency, stimulate creativity under constantly changing conditions and in situations of risk and uncertainty, and encourage their active transforming activity.

The study and analysis of psycho-pedagogical, and scientific and methodological literature [2,3,4,5], of educational standards of training professionals for various areas of economy and industry, personal experience in higher education allowed us to identify a set of common praxeological skills. These are the skills of: applying theoretical knowledge in practice; identifying problems in analyzing concrete situations and offering ways of their solution; collecting, systematizing and generalizing information; searching for information and preparing information reviews and analytical reports; applying basic and special methods of analysis; using computer technology for solving problems and working with information sources; taking management decisions, considering the effects and requirements of ethics and law; developing standard and non-standard models; systematically considering and clearly formulating goals of the forthcoming activity; organizing collective activity and working in harmony with colleagues; critically evaluating one’s strengths, weaknesses, mapping out ways and choosing means of development. We think that the number of skills is not restricted to this list; however, we believe that each of them corresponds to the essential characteristics of this group of skills.

To develop the assessment tools for determining the developedness level of praxiological skills of future professionals, we need to consider the criteria and levels of acquisition of these skills, and to describe quality levels of their manifestation.

When identifying and describing the essence of the criteria of the developedness level of praxiological skills, we must proceed from the assertion that skills are not only developed in the activity, but they are also manifested in it. Therefore, depending on the type of activity, skills can be considered from the point of view of their activity-related characteristics and evaluated according to their manifestation (measure of awareness; meaningfulness of activity techniques; variability; success and mobility of their performance regardless of changing circumstances; accuracy; speed and ease of the implementation of these techniques).
In pedagogy, various criteria of the developedness of a diverse group of skills are proposed. Thus, V.P. Bespalko distinguishes the following criteria of the developedness of general study skills: level of mastering an activity, degree of the abstraction of presentation, degree of the consciousness of the choice of action for solving a learning task, parameter of the automaticity of the action [2]. A.V. Usova is convinced that any kind of students’ activity associated with the skills being developed is composed of a system of elementary actions and operations; therefore, the following main criteria of the developedness of cognitive skills can be established: composition and quality of operations, their conscious performance, completeness, and curtailment [3]. L.V. Andruhiv identifies criteria of the developedness of future economists’ skills of working with information. They are: a value and meaning criterion that reflects students’ value-oriented and interested attitude to information activities, and their conviction that it is personally and socially important for future professionals to develop skills of handling information, i.e. the learner possesses information and cognitive need; an activity criterion involving mastering a set of actions to search for (collect), obtain, process, analyze and present textual and digital information; a cognitive criterion including the system of knowledge of the means and methods required for working with information [4]. A.P. Pozdnyakov suggests using a value-based attitude to management activity as a criterion of the developedness of management culture. This attitude manifests itself through a set of indicators, such as: understanding and evaluation of goals and objectives, awareness of the value of management expertise, recognition of the value of subject relations, satisfaction with the profession [5]. According to T.A. Tretiakova the main criteria of the developedness of creative abilities are intellectual activeness, availability of professionally important qualities, flexibility and variability of thinking, autonomy in decision-making, commitment to professional self-improvement [6].

Based on the analysis of the above-considered criterion characteristics of the developedness of skills of various groups, in order to form a holistic view of the efficiency of the process of developing praxeological skills of future professionals and to estimate the level of the developedness of the given group of skills, the following criteria are distinguished as major ones: cognitive, axiological, managerial and creative. The identified criteria are characterized by the composition and quality of the performed techniques (operations) that are the basis of the praxeological skills of future professionals; they serve as components of the indicated set of skills in elaborating the process of their development.

In order to systematize the criteria characteristics in the context of their manifestation, it is necessary to define exactly what is understood by each of them. A cognitive criterion of the developedness of students’ praxeological skills is characterized by the study of basic and special praxeological methods and operations, the knowledge of basic and special praxeological methods and operations, the conscious choice of major and special praxeological methods and operations for solving specific professional problems. An axiological criterion is characterized by a value-based attitude to the study of basic and special praxeological methods and operations, to acquiring praxeological skills as professionally significant, to mastering and choosing appropriate actions on the basis of their professional significance. A managerial criterion is characterized by the manifestation of managerial qualities (self-reliance, initiative, commitment) when studying basic and special praxeological methods and operations; by the use of praxeological skills when solving professional problems; by the manifestation of managerial qualities in solving professional problems. A creative criterion is expressed by mastering the techniques of creative
solution of professional challenges, by overcoming clichés and stereotypes of professional activity, and by exhibiting creative qualities in the unusual situations of professional activity. Thus, having considered the criteria of the developedness of students’ praxeological skills, we proceed to describe the levels of the developedness of these skills through characteristics of different levels of manifestation of the selected criteria.

By the category, “the level of developedness of skills”, we understand the degree of manifestation of developedness over all possible parameters. According to I.Ilyasova and N.A. Galatenko, any skills that a professional must have, are characterized by hierarchism, i.e. they have a number of levels - final and intermediate [7]. From the above, it can be assumed that the process of the development of praxeological skills can be represented as interconnection of separate stages at each of which different techniques of the development of praxeological skills are applied; these techniques require their mastering on a certain level of development, which serves as the basis for achieving a qualitatively different level of knowledge of techniques that form the structure of praxeological skills. Thus, the levels of the developedness of praxeological skills correlate directly with the stages of the development of these skills.

As the formation of praxeological skills is considered from the standpoint of the activity approach, so the characterization of levels by the included criteria and corresponding characteristics for their distinction enable us to detect the readiness of future professionals for professional activity. The levels of praxeological skill developedness were determined in accordance with the four-level structure of the quality of skill acquisition proposed by SV Ginne [8]. In her opinion the activity can be reproductive and productive, depending on how the information is used; each of these two kinds of activity can be performed either independently or with certain assistance (or “prompt”) from the outside. Thus, in the reproductive activity, such a prompt may be the teacher’s explanation, an instruction, a reference book or any other source of information about the rules of performing the action; and in the productive activity, the assistance from the outside means application of this kind of algorithms and modes of action, and their transformation according to the arising problem for obtaining a new algorithm. The independent productive activity is characterized by the elements of research, learning creativity, independent/unaided/autonomous finding of new activity methods and the formation of knowledge and skills that are subjectively new for the learner.

On the basis of the elaborated criteria (cognitive, axiological, managerial, creative) and S.V.Ginne’s ideas, we distinguish the following levels of the developedness of the given skills: empiric (relating to the skills that were developed during his own life), reproductive (relating to the skills of reproducing the activity according to the model and with the assistance of other participants of the educational process) and integrative (relating to the skills of acting in a non-standard economic situation).

To determine the total level of the developedness of praxeological skills, we apply quantitative processing of assessment results. This allows us to determine a qualitative index for the degree of the manifestation of each developedness criterion.

The numerical values of each criterion of the developedness of the assessed skills (Qₐ) are calculated by the formula:
\[ Q_k = \frac{\sum_{i=1}^{n} m_i}{n} \]  

(1)

where \( m_i \) is a numerical value of the characteristics of the respective criterion (empiric – one point, reproductive – two points, integrative – three points); \( n \) is the number of characteristics of the respective criterion.

The calculation of the complex index of the developedness of praxeological skills \( (Q_{ПрУ}) \) is made by the formula:

\[ Q_{ПрУ} = Q_{Пк} + Q_{Ак} + Q_{Ок} + Q_{Тк}, \]  

(2)

where \( Q_{Пк} \) is a numerical value of the cognitive criterion;
\( Q_{Ак} \) is a numerical value of the axiological criterion;
\( Q_{Ок} \) is a numerical value of the organizational criterion;
\( Q_{Тк} \) is a numerical value of the creative criterion.

The empirical, reproductive and integrative levels are in the ranges of 4,00-6,67; 6,68-9,34; 9,35-12,00, respectively. By comparing the calculated numerical value of the complex index of the given skills developedness with the numerical ranges for the established levels, the level of the praxeological skills developedness of future professionals can be determined.

The proposed assessment technique allows us to most adequately approach the evaluation of criteria and quality levels of their manifestation, as well as monitoring the dynamics of the formation and development of this group of skills. The proposed assessment system is sufficiently simple and rational; it enables us to really estimate the efficiency of the process of the development of praxeological skills of future professionals, i.e. to characterize both qualitative and quantitative aspects of this process.

Professional training of future professionals is carried out due to implementing pedagogical conditions involving its expedient filling with certain contents, forms and methods adequately reflecting its aspects. Let us establish the pedagogical conditions that facilitate the development of praxeological skills of future professionals in the process of training.

In the explanatory dictionary of the Russian language by S.I.Ozhegov, the term "condition" is interpreted as a "circumstance on which something depends" [9, p. 746]. In the theory of upbringing, conditions are commonly regarded as a medium where various pedagogical processes take place [10]. We consider the concept of condition to be the result of purposeful selection, construction and application of the content elements, methods (teqniques) and organizational forms of teaching for achieving didactic goals. Consequently, pedagogical conditions for the development of praxeological skills of the future professionals are regarded as a system of circumstances that imply the implementation of the contents, methods (teqniques) and organizational forms of teaching in order for the future professionals to achieve the required level of the developedness of the indicated set of skills.

Building on the ideas of competence approach from the standpoint of its main methodological and technological content, let us determine the choice of specific forms, means, methods and content of education which in their unity determine the essence of a particular pedagogical condition. The essence of educational process in competence approach
is creating situations that may lead to the development of a professional competency and, accordingly, of a praxeological skill.

In S.V.Maslovskaya’s opinion [11] competencies "are laid" into the educational process by means of the following teaching technologies: problem-based instruction (search methods, cognitive task setting), concentrated learning (teaching methods that take into account the dynamics of students’ working capacity), modular learning (problem approach, individual learning pace), differentiated instruction (methods of individual training), training of critical thinking (interactive teaching methods, involvement of students in various activities, compliance with three stages of technology implementation: challenge, comprehension and reflection).

Investigating the formation of the professional activity culture of future professionals on the basis of competence approach, L.V. Elagina [12] substantiates the scientific and methodological support of this process. This support includes: methods of pedagogical management (goal setting, planning, organization, motivation, relaxation, control, regulation, accounting, teaching analysis, correction); stimulation of activity behavior (developing requirements; reward and punishment; creation of educational situations of choice, crisis of competence and success; a debate; a report; an example); organization of activity and formation of behavior experience (an exercise, an assignment, a pedagogical requirement, public opinion, educational situations of reflection, situations of role-based communication); pedagogical conditions of scientific and methodological support of the investigated process. She proposes task and process support of the educational process by integrating humanitarian and project technologies (dialogue, business simulation games, research technology, problem technology, information and communication technology, simulation and modeling technology, etc.).

Considering the competence approach, N.F.Radionova points out the following pedagogical conditions for the effective implementation of educational programs: formation of learners’ motivation to learn, development of methods for pedagogical support, development and implementation of evaluation procedures of learners, analysis of their own activities, choice of self-education technology and others [13].

K.E. Bezukladnikov distinguishes the pedagogical conditions for the implementation of the competence approach, such as: teachers’ competence in controlling the development of future professionals’ professional competence, individual approach to students, stimulation of their personality development; provision of students with a subject position, enabling their self-determination in the educational process; motivation support of the subjects of pedagogical activities, and learning based on personality functions in this process; ensuring social and pedagogical equality of all the subjects of the professional education process; special arrangement of learning and spatial environment (combined desks, complex equipment, multimedia, computer equipment); creating favourable conditions for organizing innovative environment for professional education on the basis of educational process at university (value-meaning unity, technological integrity, favorable psychological climate) [14].

In Yu.A.Pavlova’s opinion pedagogical conditions for the development of information activity skills are positive motivation of students, attention to psychological and intellectual characteristics of personality, independent cognitive activity [15]. M.G.Hudeneva believes that the conditions for the development of gaming-technique skills are: development and implementation in the educational process of the development model for gaming-technique skills; implementation of reflection-activity approach; rational selection of the content, forms
and methods of teaching; assessment and self-assessment of the level of gaming-technique skill developedness [16]. According to S.V.Ginne, development of basic analytical skills of the future engineer-mechanics is associated with the following pedagogical conditions: stimulating students to acquire basic analytical skills, which contributes to their awareness of the professional significance of these skills; inclusion into the process of acquiring basic analytical skills implying clarification and conscious mastering of the analytical and synthetic techniques that are the basis of these skills; enriching of analytical work experience aimed at refinement of analytical and synthetic techniques in learning and professional activities. These conditions are implemented on the following basis: imitation exercises according to the model; analytical and synthetic processing of sources of educational and professional, scientific and research information; preparation of reports and review papers with some elements of analysis, preparation of plans, summaries, annotations; scientific and analytical reviews of literature; educational and professional tasks; such methods as discussion, peer tuition, projects, meaning vision; lectures with elements of a problem dialogue; practice-oriented and scientific seminars; laboratory and practical classes with elements of a production game; and others [8].

When analyzing scientific literature as to the development of praxeological skills, we did not find any studies on this process. Therefore, in general theoretical and practical terms, competence approach appears to be the benchmark that has determined the pedagogical understanding of the conditions of the processes under investigation. However, from studying various contexts of learners’ skill development, especially the competence context, we find that it is necessary to develop such conditions, methods, techniques and tools for their implementation that help learners understand the significance of these skills for future professional work, consciously acquire them in their content and activity aspect, and perfect them, striving to achieve competence.

Thus, in the pedagogical sense, development of praxeological skills of future professionals in the context of competence approach is a purposeful process of creating pedagogical conditions that facilitate understanding and recognition of the significance of these professional skills, comprehension and conscious acquisition of praxeological set of skills, and their perfection in educational and professional activity. The following pedagogical conditions for the development of praxeological skills of future professionals have been identified: future professionals’ orientation towards developing praxeological skills, which implies formation of a value-based attitude to the acquisition of praxeological skills as professionally significant, and to the study of basic and special praxeological techniques and operations; their inclusion into the process of conscious acquisition of praxeological skills implying comprehension of basic and special praxeological methods and operations; creation of an educational situation of perfecting praxeological skills, which contributes to the enrichment of their individual experience of professional activity by independent practical application of praxeological skills in a new non-standard situation.

Thus the conducted research has allowed us:
– to determine the essence and content of the concept, “praxeological skills of future professionals”: a set of skills whose acquisition by learners leads to successful professional activity due to conscious selection of means, techniques and methods of work that provide labor productivity, stimulate creativity and encourage active transforming activity;
- to specify the pedagogic meaning of “the development of praxeological skills of future professionals” as a purposeful process that facilitates understanding and recognition of the significance of these skills, their comprehension and conscious acquisition, as well as their perfection in educational and professional activity under the influence of pedagogical conditions, methods, techniques and means of their implementation.
- to determine criteria of the developedness of praxeological skills of future professionals and to characterize levels of their manifestation;
- to develop and substantiate pedagogical conditions for the formation of praxeological skills of future professionals: making them oriented towards acquisition of praxeological skills; including them into the process of conscious development of praxeological skills; creating an educational situation of perfection of praxeological skills.

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ATTITUDE OF THE GERMAN AUTHORITIES AND SOCIETY TO THE PROBLEM OF REPATRIATION OF GERMAN PRISONERS OF WAR

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Abstract

In this article the problem of the Second World War is concretized through the study of government policies of the two German states and the Soviet Union on the issue of repatriation of German prisoners of war. History of existence of the German prisoners of war in the Soviet Union and their repatriation is investigated in the context of international convention determining the status prisoners of war. The author, considering the fate of German prisoners of war in the context of ideological confrontation between Stalinist Soviet Union and Nazi Germany, proposes to regard German prisoners of war as victims of the struggle between two totalitarian states. Historical phenomenon known as "war captivity" refers not only to the history of wars; it also includes the internal policy of the ruling circles of the belligerent states, and defines relations between the authorities, society and the individual.

Keywords: Second World War; prisoners of war; the Geneva Convention; United Nations General Assembly; United Nations Special Commission; repatriation; ideological struggle.

JEL classification: N44, F51, K33

Introduction

The first half of the twentieth century saw the two most devastating war in human history. Occurred with an interval of only twenty years, two World Wars had similar features when viewed against the backdrop of the crisis of industrial and the emergence of post-industrial civilization. Crisis phenomena emerged in different areas differently but the most concentrated expression of them was the struggle between different paradigms of evolution of Western society, namely between the two models of social development; The First World War was the culmination of tensions caused by the crisis within the civilization. After the war, immediately emerged two opposing movements, each having their own ideas about the most effective model of development of Western society. Traditionally, democratic countries put forward evolutionary-reformist path of development, and in the countries of accelerated modernization the radical path was chosen, with revolutionary means for development, that created totalitarian and authoritarian models of society. The struggle between these two trends led to a new World War, even more devastating than the first. All these phenomena were accompanied by large-scale struggle between humanism, the best achievement of
mankind in the previous centuries, and totalitarian ideologies. This struggle tragically affected the lives of millions of people, including prisoners of war.

**Problem of repatriation of German prisoners of war**

Prisoner of war status and rules of their detention during the Second World War was determined by the Geneva Convention of 1929. In August 1945, M. Huber, President of the International Committee of the Red Cross, sent to governments of the U.S., Britain, France and the USSR memorandum mentioning the 75th article of the Geneva Convention, which pointed that the repatriation of prisoners of war should be carried out as soon as possible after the conclusion of peace. It is known, that at the Yalta conference representatives of the anti-Hitler coalition concluded bilateral agreements on the return of prisoners of war to their homeland. On the basis of these agreements, the repatriation of Soviet, American, British and French prisoners of war began in the period of the liberation of the European countries. But the great mass of POWs from the armies of the German block remained in the camps.

October 23, 1946, Minister of Internal Affairs of the USSR S.N. Kruglov informed I.V. Stalin, that in the camps, hospitals and labor battalions of the MIA of the USSR remained 1,354,759 German prisoners, including 352 generals, 74,506 officers, 1,279,901 non-commissioned officers and privates (Vojennoplennye, 2000: 817-819). First of all were sent home German prisoners of war that were ill and incapable of work. Problem of repatriation of German prisoners of war was discussed in 1947 at the fourth session of the Meeting of Ministers of Foreign Affairs of Great Britain, France, Soviet Union, United States and China, held March 10 — April 24, 1947. The session adopted the following decisions: 1) German prisoners of war that can be found in the territory of allies or other territories will be returned in the Germany to the December 31, 1948; 2) repatriation of German prisoners of war will occur on the plan which has to be developed by the Control Council before July 1, 1947. Using the fact that such a plan was not presented by the Control Council, the Soviet government was not eager to implement that decision; in 1950, 422,494 German soldiers were still in Soviet captivity (calculated on data of Vojennoplennye, 2000: 875). Also were kept German prisoners of war brought from the Soviet Union in Eastern European countries for reconstruction work.

German lawyers from the "Society of honor and rights," analyzing decisions of the Yalta Conference and the order of the Allied Control Council of 20 September 1945 for the charging of reparations from Germany, not only in the form of the supply of goods, equipment, etc., but also in the form of labor utilization, concluded that the western countries, signing together with the USSR these documents, made it possible to the Soviet Union to delay German captives after the war as laborers, as well as to deport the Germans to the Soviet Union for utilization in hard works (Kriegsgefangenenzertifikate). Indeed, the Soviet government paid great attention to the use of prisoners of war in the reconstruction work. So, Party secretary in the speech at the meeting of the Party and economic activists of Ministry of Internal Affairs of the Kazakh SSR in June 1946 stated: “A major role in the implementation of the fourth Stalin’s Five Year Plan can and should play a full and rational use of labor of prisoners of war and convicts. ... Only in 1946 the gross production of prisoners and detainees in the MIA of Kazakhstan should reach more than 200 million rubles. According to rough estimates, involvement of the labor of prisoners of war and convicts will produce goods in excess of half a billion rubles. Necessary to consider that the vast majority of
prisoners are used in the most important industries in Kazakhstan: in the extraction of the coal and industry; and organization of labor of prisoners of war will affect the fulfillment of plans for these branches of industry.” (Protokol sobranja). After the repatriation of the bulk of prisoners of war acute labor shortage emerged in the most difficult areas of reconstruction in war-torn regions and in the areas with harsh climates. Therefore, it was necessary to hold a certain number of German POWs. In the memorandum made by S.N. Kruglov and A.A. Gromyko to I.V. Stalin on December 24, 1950, among the main places of application of work of prisoners of war, were named Donbass, Stalingrad, Khabarovsk and the Urals. 

German lawyers believed that the decisions of the Yalta Conference and the order of the Allied Control Council contradicted the fundamental principles of the Universal Declaration of Human Rights adopted by the UN General Assembly on December 10, 1948. German prisoners of war in accordance with Article 3 of the Geneva Convention of 1929 retained their full civil capacity, so the main provisions of the Universal Declaration of Human Rights applied to them. In 1950, the government of West Germany presented a memorandum to representatives the U.S. and UK in the UN pointing unlawful detention in the USSR a large number of German POWs. This contributed to the adoption in December 1950 the UN General Assembly resolution "On measures to achieve a peaceful solution to the issue of prisoners of war" and the creation of the UN Special Commission on Prisoners of War. 

**Attitude of the Socialist Unity Party of Germany to the problem of repatriation of prisoners of war**

When Soviet troops entered the territory of Germany, prisoners of war, graduates of antifascist school in the USSR that worked at the front as propagandists directly by the decision of the Political Directorate of the Red Army, were sent to work in these areas. In connection with the revival of the Communist Party of Germany, the theme of the day appeared to provide reliable party cadres to carry out party’s pro-Soviet policies. To speed up the functioning of the party organization, central board of the German Communist Party early as June 1945 sought to identify the names of Communist Party functionaries in Soviet captivity, intending to ask the Soviet government to release them in the first place. The CPG planned to submit a request to the Soviet military administration in Germany. However, by the end of 1945 the situation changed. Now, neither the Army Political Department, nor the Soviet Military Administration in Germany could not address the issues of the release of POWs. This problem was within the competence of the State Committee of Defense of the USSR. Therefore, now the CPG (since 1946 Socialist Unity Party of Germany — SED) could only ask the Central Committee of the All-Union Communist Party (Bolsheviks) to release communist and antifascist prisoners of war. SED leadership during their stay in Moscow in early February 1947 attempted to solve the problem of priority release of the communist captives. It soon became clear that the Soviet leadership was not interested in discussing this issue. SED leaders were informed that the Central Committee of the VKP (b) were very busy and could not deal with this issue. And only when the delegation presented the prepared in advance lists of the communist POWs, the Soviet government agreed on preschedule repatriation of these specifically named prisoners of war (Bonwetsch, Bordjegov, 1994: 301). However, the Soviet government that was reluctant to fulfill the request of the SED. On the by the order in June and July 1947, about 500 anti-fascist prisoners of war were repatriated; approximately half of them were in the list of the SED. When selecting the names, Soviet
side mainly paid attention to the fact that the majority of the released captives were among the graduates of anti-fascists school, and the list of the SED stood in second place. In November 1947 were repatriated 274 antifascist school graduates, of which only 17 were from the list of SED. By the end of 1947 the Soviet government stopped accepting any lists from the SED, referring to the fact that in 1948 all the prisoners of war in the Soviet Union will be fully repatriated. Thus, in 1945-1947 from 2,800 prisoners included in the lists as communist cadres, the SED was able to release only 270 people (Morre, 1998: 222).

Local organizations of SED apparently took partial fulfillment by the Soviet government requests the German Communists as a friendly act of fraternal party. In 1947, the local organization of the SED and labor unions began to address to separate camps with petitions to release the communist prisoners of war, workers and peasants. Thus, on March 29, 1947, Political Department of Camp number 330 located in Petropavlovsk informed heads of departments that the camp had received a lot of requests from the communist organizations in Germany for the release of prisoners of war and offered to address such requests with detailed specifications on the POWs to a camp’s political authorities (Upravlenie lagerja).

When the bulk of the prisoners of war were repatriated and in the USSR remained mostly German captives, it was necessary to maximize labor activities of POWs. It was decided to release the prisoners of war in terms of their participation in the labor competition for the best productivity. In the camps were developed efforts to improve production performance under the slogan "Hard work to make amends to the Soviet people." Labor competition included all labor Platoons, battalions and camps (Plany: 1). May 29, 1947, the Ministry of Internal Affairs of the USSR adopted a directive on the individual sending the Germans, which distinguished themselves in the labor, to their homeland. There were selected 1,000 German prisoners of war among working in different sectors of the economy from 11 Soviet republics and 25 regions of the RSFSR.

September 10, 1949, at a meeting of the Political Bureau of the SED was discussed issue of utilizing the labor of generals returned from captivity, it was decided that General Latmann should be used in the engineering industry, General Freitag in the Ministry of Agriculture of Sachsen-Anhalt, General Walter in Department of Health (Sitzung, 10.September 1949). January 4, 1950 at a meeting of the Politburo of the SED was discussed issue of return of German prisoners of war. They decided to hold a solemn reception for last echelon of POWs from the Soviet Union. Agitation Department was given the task to publish a series of articles about the return of prisoners of war to prevent provocative slandering by the reactionary press and that the Secretariat had to submit a plan for the event (Sitzung, 4.Januar 1950).

Prior to 1949, at the SED still had the opportunity to ask the Soviet government to release certain categories of German prisoners of war motivating it with need for the party cadres. But after the establishment in the Soviet occupation zone the German Democratic Republic, in fact dependent on the Soviet Union, the leadership of the SED almost lost the opportunity to request release of German POWs. At the meetings of the Politburo of the SED in 1949-1950 were considered only the problems of organizing events to meet captives and their employment (Sitzung, 29. März 1949).

May 5, 1950, TASS broadcasted a report on completion of the repatriation of German prisoners of war: 1,939,063 German POWs returned home, while 9717 convicts, 3815 persons under investigation and 14 ill captives remained in the USSR (Kriegsgefangene, 1995: 89; Büro Staatssekretärs). This TASS statement completely closed subject of prisoners of war within the GDR and the SED no longer thought of German POWs remained in the
USSR. GDR media welcomed the release of the "last" prisoners of war, and promised that the GDR authorities will provide work for all POWs returned home. “All our concerns should be focused on helping those who have returned home from the Soviet Union. We need to turn them into new people: in peace activists and friends of powerful bastion of peace in the world — the Soviet Union,” wrote Neues Deutschland newspaper (BBC Radio).

**Attitude of the authorities and society of the FRG to problem of repatriation of German prisoners of war**

After the proclamation of the FRG problem of release of German citizens from captivity in the USSR and other countries became an issue of official authorities. Proposal for discussion about POW’s return to the homeland for the first time was introduced by the CDU/CSU in the Bundestag at September 29, 1949. Offers from faction was composed by Dr. Brentano, Dr. Gerstenmayer, Dr. Neuburger, Dr. Eilers and other Christian Democrats, and covered the following main solutions to the problem of prisoners of war in the early postwar years: 1) to ask the federal government to take all measures to expedite the return German prisoners of war held in several eastern countries; 2) to ask the federal government to provide legal protection for those Germans who are retained in some countries (France, Belgium, Netherlands, Luxembourg, Italy, Czechoslovakia, Poland, Greece, etc.) on suspicion or charges of involvement in war crimes; 3) to propose to Federal Ministry of Justice to establish a central institution for the legal protection of all interested persons and employees (Finanzielle: 49).

Due to the absence in the FRG Ministry of Foreign Affairs, gathering of materials and preparation of the report was assigned to the Committee on foreign affairs. Having heard the report of 24 November 1949, the Bundestag proposed to the Cabinet of Ministers to prepare statistical records of German citizens outside Germany, including persons under investigation, convicts, missing POWs and internees. It was pointed out in proposal to the Federal Government that: “Currently available statistical documents obtained as a result of January-October 1947 registration in the British and American occupation zones. Verification of these data shows that their conclusions contained 75% inaccuracy.” Therefore there was a need to identification and reregistration of all prisoners of war, internees and missing German citizens. The state budget allocated 600,000 Deutschmarks for making nominal lists and card files. This work was planned to be completed by January 1950, since at May the federal census should took place (Finanzielle: 149).

December 1, 1949, at the nineteenth meeting of the Bundestag it was decided to entrust the government of the FRG to lead efforts for acceleration of the return of German captives and internees, and the Ministry of Justice to establish a central institution for the legal protection of German citizens detained and convicted in foreign countries (Finanzielle: 301).

In issue of POW’s return to the homeland were also engaged the local authorities of the German Länder. Nuremberg city council, having gathered all the information about the results of the repatriation of prisoners of war from the European countries, made detailed inquiry and in October 1949 sent it the Chancellor Konrad Adenauer. Burgermeister of Nuremberg wrote: “It has been almost four and a half years since the end of the war, and for Germany there is still exists the problem of prisoners of war. ... Captivity per se completely lost its established under international law sense. Today it means forced labor, elaborate senseless repression against the powerless and disenfranchised hostages. The German people
are still waiting for the return of 300 thousand or even 500 thousand captives from the Soviet Union, 15 thousand captives and 8 thousand persons under investigation from Poland, from 2 to 6 thousand prisoners of war from Yugoslavia, thousands of persons under investigation from France, 500 persons under investigation from Czechoslovakia, 300 captives from Albania, 200 persons under investigation from the Netherlands, 150 persons under investigation from Belgium, 50 persons under investigation from Luxembourg, 30 persons under investigation from Denmark, 20 under investigation from Italy and 10 under investigation from Greece.” (Finanzielle: 625).

In Bad Nauheim was created Society on the issue of prisoners of war, missing and returned Germans. October 1, 1949, Society sent a letter to the Federal Chancellor requesting him to petition the governments the Great Powers for the release of German POWs held in their camps and the transfer of lists of the deceased.

In December 1949 the head of the federal government’s Konrad Adenauer sent a note to the Allied High Commission with a request to facilitate the return of prisoners of war and deported German citizens to their homeland: “Since the war ended May 8, 1945, has been more than four and a half years. Until now, the majority of the German people are waiting for the return of their relatives from the military captivity in the Soviet Union and other European countries. Moreover, in the last year of the war and postwar years, hundreds of thousands of German citizens were forcibly taken to the Soviet Union. Thus, most of the Germans today live in painful nescience about the whereabouts and fate of their spouses, parents and children. Over time, the darkness deepens over the head of prisoners of war and deported... The German people feel this delay of prisoners of war and deported as a bitter injustice. German officials and private organizations have been pointing out repeatedly that the international legal framework of military captivity, that is prevention of further participation of soldiers in military actions, have ceased to exist long ago, and thus the right to a further delay of these Germans became invalid. German defenseless captives are left on arbitrariness of the countries of captivity, since in the German state has no defense force that could advocate for the rights of German military captives. A large number of prisoners of war sentenced to imprisonment and hard labor, often on insignificant matter, without any opportunities of impartial legal protection. Despite repeated official promises to release all German prisoners of war until the end of 1948 or within the 1949, German citizens are still held in the USSR and East European countries” (Finanzielle: 122).

However, the Allied High Commission was in no hurry to address the problem of the return of the Germans to the homeland. January 6, 1950 ministerialdирigent of the Federal Chancellery V. Blanenhorn appealed to the Secretary General of the High Commission L. Handley-Derry with request about results of consideration of matter on prisoners of war (Finanzielle: 72). L. Handley-Derry advised to address with similar questions to the experts from U.S., UK and France officially designated to deal with the issue of repatriation of POWs the, and also announced that there soon will be meetings of experts to discuss that problem. The first meeting of experts, held January 11, 1950, was inconclusive because of the controversial statistics on the number of prisoners of war and internees held in the USSR and Eastern Europe and were found large discrepancies with the information given in the statement of V.M. Molotov on March 14, 1947. Then the V.M. Molotov at the Moscow session of the Council of Ministers of Foreign Affairs said that from May 1945 to March 5, 1947 were exempt 1,003,974 German POWs, 890,532 captives were still in camps. In fact, to March 1947 in the USSR remained 988,287 German prisoners of war. Judging by the
information given in this statement, Soviet troops captured 1,894,506 German soldiers. May 4, 1945 the Soviet Army General Command reported that during the war were captured 3,180,000 German soldiers (Sud’ba, 1996: 100-103).

Mentioned by V.M. Molotov figures did not correspond to the true statistics. Before the statement of V.M. Molotov at the Council of Ministers of Foreign Affairs, Soviet Ministry of Internal Affairs had been tasked to prepare reference on the number of German prisoners of war in the Soviet Union, as well as on released in 1941-1947. Reference was ready at March 8, 1947, and in the accompanying letter head of the Department of camps made the following resolution: “Report to the Minister that these data were urgently requested for comrade Molotov due to the fact that they are preparing documents for the decision, and what numbers can we show” (Vojennoplennye, 2000: 299-300). Thus these underestimated data were prepared by the Soviet side specially, apparently in order to hide, at first, a high proportion of deaths among German prisoners of war, and at second, the number of German POWs convicted as war criminals.

January 20, 1950, was held a joint meeting of all German institutions and public organizations dealing with prisoners of war, as well as organizations for search for the missing soldiers. Information obtained by comparing all numeric data and calculation were presented to Allied experts (Finanzielle: 698).

In the Bundestag was repeatedly discussed the issue of return of German captives. In January 1950, a group of deputies of the Bundestag presented a proposal for compiling catalogs of German prisoners of war sentenced to hard labor in the USSR, as well as missing and presumably located in Eastern and South-Eastern Europe German citizens; It was proposed to send materials on investigation of cases of convicts to the Allied High Commissioner with request to transmit that data to the United Nations and the International Committee of the Red Cross. A faction of German Party (Deutsche Partei) in the Bundestag suggested the government to appeal to the Allied High Commission with a request to promote the compilation of a list of German prisoners of war and internees deceased in the Soviet camps. Deputies expressed their indignation at the facts of the delay in the Soviet zone and sending back to the Soviet Union of transport with liberated POWs in violation of international law.

January 20, 1950, the CDU/CSU made a request for the return of 400,000 Germans from the Soviet Union (Finanzielle: 378, 385, 432). As a result of persistent requests of the FRG government Allied High Commission in 1950 at two meetings considered the problem of returning German prisoners of war, but did not make a specific decision.

In September 1951 at the Second Congress of the Federal Union of military and civilian invalids and families of fallen servicemen were adopted proposals for solving the problem of German captives return to their homeland: the document was sent to the Chancellor the FRG and to the UN Special Commission. The federal government collected numerous documents about German prisoners of war detained, convicted and deceased in foreign countries, to the early 50-ies, they accounted for more than 50 volumes. UN Special Commission on Prisoners of War August 27, 1952, held in Geneva a public meeting, which was attended by the delegations of Australia, Belgium, Brazil, Britain, Denmark, Italy, Luxembourg, Netherlands, USA, France and Japan. Delegation of the Federal Republic of Germany was also presented at the meeting. Representatives of Soviet Union did not arrived in Geneva. In his speech, leader of the German delegation expressed gratitude to the UN for the measures taken for the return of prisoners of war at home and said that because of it German captives were released from places of detention in several countries: 650 from the USSR, 160 from France, 80 from
the UK, 118 from the United States, 100 from Yugoslavia and 149 from Czechoslovakia (Kriegsgefangenenzertifikate).

After Stalin's death, the German side saw the first signs of change in Soviet authorities attitude to convicted and detained German POWs in the USSR. In November of 1954 businessman E. Baumgarten through the mediation of trading firm manager of the chemical enterprise Gunther Urbich told the Bundestag deputy Mende that in case a meeting with the deputies of the Social Democratic Party of Germany and the Free Democratic Party of Germany with the Soviet government circles, question of return German prisoners of war will be raised. E. Baumgarten also said that he would use his connections in the circle of people close to V.M. Molotov to set this meeting going. At first it was intended to organize a meeting in Vienna with Soviet intermediary Sergeyev, then to make a visit to Moscow of deputies of the SPD and the FDP for an appointment with Chairman of the Supreme Soviet of the USSR. During the meeting, representatives of the parliamentary faction of the two German parties would have mentioned the problem of the return of German prisoners of war at home. Leaders of the two parties reported this to the Federal Chancellor. Hereinafter became suspicious regarding connections of Baumgarten with Eastern security services, and the German side ceased contact with him (Die Kabinetts-Protokole, 1997: 185-186).

In the absence of diplomatic relations between the USSR and the FRG official German authorities could not address to the Soviet government with requests for consideration of the problem the return of German prisoners of war at home. June 7, 1955, in Paris, the Soviet Ambassador told the Ambassador of the FRG about the intention of the Soviet government to invite K. Adenauer in Moscow for talks to resolve the political relations between the two countries. In June, in the FRG was made an extensive preparatory work. June 25, Third department of Ministry of Foreign Affairs presented the draft of proposals for the problems that will be discussed during the visit of the delegation of West Germany in Moscow. The first application to the project provided an overview of the development and current state of the issue of prisoners of war in the Soviet Union, the second application includes detailed information on convicted German POWs in the USSR. In that draft, priority issues, from the positive solution of which depends the establishment of diplomatic relations between the FRG and the Soviet Union, were called the reunification of Germany and the return of captive and deported Germans. In August, the main tasks of the German delegation at the talks were defined. The purpose of the negotiations should be the creation of four German-Russian commissions: 1) political, to discuss the problem of German reunification and the establishment of diplomatic relations, and 2) economic, to engage the conclusion of a trade agreement; 3) cultural, to conclude a treaty for cultural relations, 4) commission on the issue of prisoners of war and deported. In case of refusal of the Soviet government to create a fourth commission, the problem of the captive and deported will be included in the competence of the political commission. Concerning the number of convicted and detained prisoners of war in the USSR initially it was decided not to voice figures, and wait for the message of the Soviet side indicating how many Germans they was intended to release. If the voiced by the Soviet side number of prisoners of war would not match the available data, then it was decided to propose for establish a commission to determine the exact number of remaining POWs in the USSR (Büro Staatssekretärs: 134-135).

In their notes dated 12 and 16 August 1955, the German government reported range of issues to be discussed at the upcoming meeting with the Soviet leadership, the most important of them were the problems of reunification of the German states and release of German citizens
from places of detention in the USSR. In response notes dated 19 and 23 August 1955, the Soviet government protested on reunification and informed that it was ready to discuss other issues. On discussion of the Soviet side’s response at the meeting of the Federal Government Konrad Adenauer drew the attention of the Cabinet that the Soviet leadership had passed over in silence the issue of repatriation German POWs. K. Adenauer recalled that during a meeting in Geneva on questions of U.S. President D. Eisenhower and British Prime Minister A. Eden on the repatriation of German captives, Soviet Defense Minister N.A. Bulganin responded that there was not any German POWs in the USSR already. Chancellor noticed that he had not harbored any illusions about the discussions in Moscow on problems of the release of prisoners of war (Die Kabinetts-Protokole: 185-187, 479-480). To prepare the material on the current situation in the USSR and Eastern Europe, at the direction of the Secretary of State, at August 30, 1955, was held a meeting between members of the Foreign Ministry and experts on the Soviet Union Dr. Brautigam, advisor Hilger and Dr. Meissner, as a result of which was compiled a review of the political, economic and military situation in these countries (Büro Staatsssekretärs: 239-241).

To prepare for discussion with the K. Adenauer of the issue of prisoners of war, the CPSU Central Committee, in its turn, created a special commission to develop proposals on the release of convicted foreign citizens. In a memorandum on July 4, 1955, Commission proposed to coordinate with the Central Committee of the SED the appropriateness of repatriation to the GDR and West Germany, in accordance with their place of residence, all German citizens convicted in the USSR; also it offered to release most of them from further serving of punishment, and to pass another part of them, who committed grave crimes on the territory of the USSR, as war criminals to the authorities correspondingly of the GDR and the FRG. Commission developed a draft of response of the Soviet government to K. Adenauer. July 14, 1955, N.S. Khrushchev, in a secret letter to the First Secretary of the Central Committee of the SED W. Ulbricht and Chairman of the Council of Ministers of the GDR O. Grotewohl, announced that “the issue of prisoners of war will undoubtedly be raised during talks with Adenauer on establishing diplomatic relations between the USSR and the FRG” and after the successful completion of negotiations with the Chancellor of the FRG, the Soviet government intends to exempt from further punishment serving 3708 German POWs, 1906 civilians and 180 former Nazi army generals (Büro Staatsssekretärs: 17-18; Vojennoplennye, 2000: 904-907).

September 10, 1955, in Moscow started negotiations between German delegation headed by Konrad Adenauer and the Soviet government. K. Adenauer asked to release 9626 German citizens detained in the USSR. The Soviets called convicted prisoners of war "war criminals." The German delegation indicated that without addressing this issue it was unthinkable to establish diplomatic relations between the USSR and Germany. During the discussion on POWs N.A. Bulganin presented claims for the repatriation of Soviet citizens who were located in West Germany. K. Adenauer reminded that these citizens had settled in West Germany under permission of the occupation authorities, former allies of the USSR, and the German representatives had not yet had the power. The German side expressed readiness to test this matter if it would be provided with the relevant documents. September 12, 1955, the negotiations on prisoners of war resulted in the adoption of a positive decision (Die Kabinetts-Protokole: 513-515).

When they began to figure out the number of Soviet people remaining in the western lands in Germany, it appeared that the figure of 100,000, called by the Soviet side was untrue. In 1955
in the FRG resided 37,000 former Soviet citizens who refused to return to the USSR. The rest had moved to Australia, Canada, USA, South America, where most of them were granted citizenship of the countries where they dwelt (BBC Radio).

September 28, 1955, the Presidium the USSR Supreme Soviet signed a Decree "On the early release of German nationals convicted by judicial organs of the USSR for their crimes against the peoples of the Soviet Union during the war period." In 1955-1956 from penitentiary institutions in the USSR were prematurely released and repatriated to the GDR 3104 people, to the FRG 6432 people; including 273 people handed over as war criminals to the government of the GDR, and 471 people to the Government the FRG; 28 Germans were held at the request of the State Security Committee of the Council of Ministers of the USSR, 4 people left in connection with initiation of the application for the admission of Soviet citizenship. Among the last group of repatriated German prisoners of war were 177 Wehrmacht generals and admirals. One of the generals sent to Germany was captivated in 1943 at Stalingrad General of artillery Walter von Seydlitz, who headed in 1943-1944 the "Union of German officers" organized by Soviet Union from number of captives. The question of repatriation of General von Seydlitz in Germany was decided in late 1949. Field Marshal Paulus and General Bamler appealed to A.Z. Kobulov to not to do so, but the Soviet side did not change the decision (Vojennoplennyye, 2000: 910-911, 986-987).

The liberation of German citizens from the Soviet camps and returning them back home were one of the first major successes of the Government of the FRG on the international scene. By estimation of S. Karner, 1,959,000 people returned to Germany from Soviet captivity (Karner, 1995: 204).

Care for prisoners of war in Germany was not limited with measures to liberation of convicted POWs from the Soviet camps. May 19, 1950, a law was passed on assist for returned from captivity. To the category of "returned from captivity" were referred prisoners of war and interned citizens of Germany. The law provided the payment for returnees with a single cash benefit and assistance for them in the transition period, i.e. on adaptation time to civilian life and employment, assistance in the settlement in towns and housing; guarantee of preservation of conditions of the employment contract that had been concluded with returnees before the internment or military conscription; protection against unjustified dismissal, conditions for mediation to find a job in the specialty; assisting unemployed returnees, social security, etc. (Bundesgesetzbblatt, 1951: 221-222).

In the FRG was also resolved the problem of obtaining by captives money that they had earned during their captivity in the Western countries. In the U.S., to German prisoners of war were given Certificates of Credit and Military Payment Orders, in the UK — Military Pay and Working, in France — Certificats de Dépot de Fonds (Certificates of Deposit of Funds). For the exchange of these certificates for Deutschmarks were organized special departments and services in major banks (Kriegsgefangenenzertifikate: 48).

The FRG Government allocated from the state budget a certain amount for the transportation of prisoners of war and internees, for the support and services for prisoners of war and internees still present in foreign countries and for legal services. So, in 1950, it allocated 60 thousand marks on the cultural service for POWs and internees in foreign countries (providing books, magazines and other printed materials), 200 thousand marks for transportation of released, 250,000 marks on parcels with food, medicine and clothing for 5,000 prisoners of war and internees in Western European countries and for the 11,648 captives in Yugoslavia and Albania, 2 million marks for the legal protection of prisoners of
war and internees (Finanzielle).

Conclusions

Thus, German prisoners of war were able to return home only after ten years of hard labor in the Soviet camps, contrary to the principles of international law demanding humane treatment of POWs. Detention of convicted captives until the end of a determined period of imprisonment, and detention of defendants until the judicial investigation and, if necessary, until the end of the sentence, did not contradict the 1929 Geneva Convention. However, initiation of proceedings, conduction of the trial and punishment of prisoners of war in the Soviet Union, in most cases, did not comply with the principles of international agreements. Once became known horrific crimes of the Nazis for the termination of large numbers of people from different countries, was generally accepted opinion accusing of this crime those who fought in the German army. Therefore, the word "victim" was completely inapplicable regarding died in captivity German POWs. But if we consider the fate of German prisoners of war in the context of the ideological confrontation between the Stalinist USSR and Nazi Germany, where priority was given to the interests of the state, ruling party and the elite, the German prisoners of war can also be considered as victims of the struggle between two totalitarian states. This demonstrates the cruelty of the war itself, started in the name of ideological confrontation. Historical phenomenon known as "war captivity" refers not only to the history of wars; it also includes the internal policy of the ruling circles the belligerent states, and defines relations between the authorities, society and the individual. Relevant in this context are not only matters of role of the states at war, as the fate of ordinary people participated in that war. Activities of the government of the FRG for the release of the German prisoners of war from Soviet camps showed how the West German democrats were willing to go through the deepening of democracy and the rule of law, to establish a democratic state where recently reigned despotism and tyranny of Nazi power.

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BUSINESS FAILURE PREDICTION MODELS BASED ON EXPERT KNOWLEDGE

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Abstract

This paper presents two business failure prediction models developed with multivariate linear discriminant analysis and multivariate logistic regression. The financial ratios as predictors for the models were selected based on results from previous empirical research. It was assumed that companies can be categorized into three classes – healthy (group 1), crisis-resistant (group 2) and insolvency endangered (group 3) – which are describing different economic conditions. Data for model building were obtained by a survey of 35 professionals from management consulting and banking industry. The results show consistency with findings of prior research. High values for equity-ratio, EBIT/total assets, operating cashflow/financial liabilities and percentage sales development are positively related to financial health. Within model building several problems occurred, which influenced classification accuracy. Non-normality of data had an impact on discriminant analysis, but also on logistic regression. Successful preliminary analyses of suitable predictors are not a guarantee that model fit including statistically significant variables will provide a superior prediction model. This indicates that model building is heavily dependent on the quality of metrics used. Logistic regression was less sensitive to outliers in terms of prediction sign within classification formula. It was also shown that crisis indicators used in practice are similar to those proposed by empirical research and literature.

Keywords: business failure prediction, discriminant analysis, logistic regression, financial ratios, early warning system, crisis indicators

JEL classification: C00, C38, C50, G17, G33

Introduction

Early detection of corporate crises in the wake of rapidly changing economic and environmental conditions is a topic of growing importance. The earlier a potential crisis can be detected, the more effective and better turnaround activities can be implemented. Therefore, managers need early warning systems, which assist in the detection of crises. An evaluation of companies is not only important from the perspective of banks, but is also interesting for other parties such as potential investors or shareholders.

In literature many early warning indicators had already been studied, which are based on both quantitative and qualitative factors. In counselling practice as well as in investment and
financing decisions the benefits of these results had been recognized. There are now technically sound methods (e.g. credit assessment models, rating models etc.) that assist in early detection of corporate crises. In the phase of a strategic crisis, the manifestations of the crisis symptoms are very weak, so it is especially difficult in practice to discover this early stage within a company. If detection is successful, there is little pressure to act and there is enough room to take appropriate actions out of this crisis as well as to avoid the transition into revenue crisis. The probability to detect a revenue crisis is far higher than for strategic crisis. Here the crisis is generally well advanced, but it remains sufficient time and space to avoid the risk of liquidity crisis, which is the last form of corporate crisis before insolvency occurs. It represents the most difficult phase, because there are hardly any room to handle and a high pressure of time.

Within this work a survey of 35 professionals from consulting and banking industry was conducted by questionnaire to determine crisis indicators, which are used in business practice to assess the economic situation of enterprises. Moreover an estimate of quantities for four selected financial indicators (equity ratio, EBIT/total assets, operating cash flow/total liabilities and percentage sales development) was questioned, with which a company could be divided in three categories (healthy, crisis-resistant and insolvency endangered). Based on this information multivariate linear discriminant analysis and logistic regression were estimated in order to develop business failure prediction models. The purpose is to test, whether a model built on expert knowledge is in congruence with models set up with empirical data from prior research. Additionally the potential limitations for setting up business failure prediction models are discussed.

This paper is organized as follows: Section 2 provides an overview about prior research in business failure and bankruptcy prediction, section 3 describes, how the data for model building were obtained, section 4 contains the results from statistical analyses and also the results from model building, section 5 provides a summary with implications and within section 6 a short summary of the relevant results and some implications for practitioners are given.

**Literature review**

One of the first papers in the field of business failure prediction was published by Beaver (1966), who introduced the dichotomous classification test for the separation of failed and non-failed firms based on some chosen financial ratios. The core of his work contains the liquid-asset-flow model. He defined the firm as a reservoir of liquid assets, which is supplied by inflows and drained by outflows. This reservoir is a cushion for the firm against variations in in- and outflows. The solvency of a firm can be defined as the probability that this reservoir will be exhausted. At this point the firm will be unable to meet financial obligations and slides into bankruptcy (Beaver, 1966, p. 80-83). The best discriminating variable was the ratio cash flow/total debt. His conclusion was that financial ratios can to a certain degree discriminate between failed and non-failed companies. The limitations can be seen in classification deficiencies concerning type I and type II errors, which were due to overlappings of distributions for the financial ratios of the different groups (Beaver, 1966, p. 101 – 102).
An extension of Beaver’s work had been proposed by Altman (1968). Altman recognized that there is a potential of ratios as predictors of bankruptcy, as failing firms exhibit significantly different ratios than non-failed firms. In contrast to Beaver he decided to use a multiple linear discriminant analysis, as it can combine several measures into a meaningful predictive model (Altman, 1968, p. 589 – 593). The result brought a linear discriminant function containing five ratios (working capital/total assets, retained earnings/total assets, EBIT/total assets, market value of equity/book value of total debt and sales/total assets) (Altman, 1968, p. 594). Similar to Beaver (1966) this classification function was not functioning perfectly as type I and type II errors appeared. He found that these misclassifications occurred for Z-scores between 1.81 and 2.67. This area was defined as the “zone of ignorance” or “gray area” and led to the conclusion that an optimal cut-off point between failed and non-failed firms can be defined in order to control for type I and type II errors based on costs of misclassification (Altman, 1968, 602 – 607). The great contribution of this finding was that the different stages of a firm should not be categorized into dichotomous states. It is rather a continuous scale denoting different economic conditions for a firm.

After Altman (1968) several other researchers used discriminant analysis as method for prediction of firm failure (Edmister, 1972; Altman, Haldeman & Narayanan, 1977; Houghton & Woodliff, 1978; Dietrich, Arcelus & Srinivasan, 2005; Mohamad, 2005; Vuran, 2009). Alternative derivatives of discriminant analysis like quadratic discriminant analysis or non-parametric discriminant analysis had also been tried for business failure prediction models. The quadratic form did not improve classification accuracy and disappeared as a possible method for business failure prediction (Altman, Haldeman & Narayanan, 1977; Gombola, Haskins, Ketz & Williams, 1987; Pacey & Pham, 1990). The non-parametric form only showed partially better results than the linear form and therefore was not able to break through within further research (Barniv & Raveh, 1989; Barniv & McDonald, 1992).

A methodological improvement was provided by Ohlson (1980), who introduced logistic regression (logit-analysis) for business failure prediction. The big advantage was seen in the less stringent statistical assumptions in contrast to multivariate linear discriminant analysis. Additionally logit-analysis can assign probabilities that a specific company belongs to a certain group. This was the great value of this work. Ohlson was able to find some significant factors for discriminating between failed and non-failed companies. Within his work the ratio “size of the firm” appeared as very important variable, which was separating well for several years before failure (Ohlson, 1980, p. 109 – 123).

Based on Ohlson (1980) numerous empirical research using logit-regression and the related probit-regression were conducted, whereas many of the papers also developed models with discriminant analysis to compare the prediction performance between the methods (Mensah, 1984; Zmijewski, 1984; Casey & Bartczak, 1985; Gentry, Newbold & Whitford, 1985; Gombola, Haskins, Ketz & Williams, 1987; Aziz, Emanuel & Lawson, 1988; Aziz & Lawson, 1989; Lau, 1987, Barniv & Raveh, 1989; Gilbert, Menon & Schwartz, 1990; Pacey & Pham, 1990; Barniv & McDonald, 1992). There are several papers preferring the logit or probit analysis (Gentry, Newbold & Whitford, 1985; Lau, 1987; Aziz, Emanuel & Lawson, 1988; Barniv & McDonald, 1992; Dimitras, Slowinski, Susmaga & Zopounidis, 1999; Pervan, Pervan & Vukoja, 2011). Other researches showed better results for discriminant analysis (Poston, Harmon & Gramlich, 1994; Yim & Mitchell, 2007; Muller, Steyn-Bruwer & Hamman, 2009). The remaining results provide equal or similar performance quality of the methods (Casey & Bartczak, 1985; Gombola,
Haskins, Ketz, & Williams, 1987; Boritz, Kennedy & de Miranda e Albuquerque, 1995; Doumpos & Zopounidis, 1999; Hwang, Cheng & Lee, 2007; Gepp & Kumar, 2008). Therefore it cannot be clearly argued that logit analysis is the better method for bankruptcy prediction.

With introduction of neural network applications a statistical method replicating the structure of human brain was used to set up business failure prediction models. In several studies it was concluded that this method produced better classification results compared to discriminant analysis or logit regression (Coats & Fant, 1993; Anandarajan, Lee & Anandarajan, 2001; Atiya, 2001; Charitou, Neophytou & Charalambous, 2004; Neves & Vieira, 2006; Yim & Mitchell, 2007). Nevertheless these results were not confirmed by other studies, as at least a similar performance in classification results to logit-analysis was found. In seldom cases the results of logit-analysis were superior to those of neural networks (Fanning & Cogger, 1994; Sen, Ghandforoush & Stivason, 2004; Pompe & Bilderbeek, 2005; Chen, Marshall, Zhang & Ganesh, 2006).

Researchers also applied other methods like recursive partitioning and decision trees (Marais, Patell & Wolfson, 1984; Frydman, Altman, Kao, 1985; Sung, Chang, Lee, 1999; Chen, Marshall, Zhang & Ganesh, 2006; Huang, Tsai, Yen & Cheng, 2008; Muller, Steyn-Bruwer & Hamman, 2009), Gambler’s ruin and survival models (Fanning & Cogger, 1994; Gepp & Kumar, 2008; Nam, Kim, Park & Lee, 2008), case based reasoning (Bryant, 1997; Lin, Wang, Wu & Chuang, 2009; Li & Sun, 2011), rough set theory and fuzzy set theory (Dimitras, Slowinski, Susmaga, & Zopounidis, 1999; Ahn, Cho, & Kim, 2000; McKee, 2000; Baetge, & Heitmann, 2000; McKee, 2003; Lin, Wang, Wu & Chuang, 2009), genetic algorithm (Brabazon, & Keenan, 2004) or support vector machines (Li, Sun & Wu, 2010; Lin, Liang, & Chen, 2011; Li & Sun, 2011). Even if some of these applications showed better classification results compared to discriminant analysis and logistic regression, the last two mentioned methods remain the most favoured for model building in business failure prediction.

Data for model building and methodology

The survey was initiated by means of a questionnaire, which was given to 35 practitioners in the consulting industry covering experts from restructuring, credit risk and turnaround management. Based on a literature review the following characteristics were discussed, in which the respondents were asked to give values for three economic conditions of business based on their practical experiences (the computations of the ratios are shown in the appendix of this paper). The four ratios appeared as predictors in previous studies and were chosen to to their popularity and appearance:

• Operating cashflow/total debt as a measure of the debt repayment capability:
• Percentage sales development in comparison to previous year:

The three economic conditions were described as follows.

• Healthy (group 1): are companies, which are potentially in a strategy crisis and not in a revenue crisis
• Crisis-resistant (group 2): companies, which are in a revenue crisis, but are having sufficient resources for a turnaround
• Insolvency endangered (group 3): are companies, which are on the verge of a liquidity crisis and may slide into insolvency

No explicit and deeper definition for the different stages was given. The three stages of crises are generally known by professionals in practice, but literature is not providing specific benchmarks, where they can be clearly divided. So the purpose was to leave some space to the respondents in order to receive potential values for the chosen ratios, which are suitable to determine the different economic conditions or crisis stages based on experiences of professionals. The developed models are replicating these experiences from a practical viewpoint, so that early warning systems could be constructed.

**Statistical analyses and model building results**

**Descriptive statistics of surveyed professionals**

The distribution of the 35 surveyed professionals is presented in graph 1. The majority of the respondents were management consultants followed by professionals from banking industry. Within the cluster „others“ people from interim management, private equity or creditor protection organizations are categorized. 86 percent of the respondents were located in Germany, whereas the rest came from Austria. This distribution provides a mix of different external partners of enterprises, which are having all different experiences and knowledge about how to assess the financial viability of a firm.
Graph 1: Descriptive statistics of surveyed professionals

Source: Own results

Statistical analyses

Based on the responses a record with a length of 105 (35 respondents multiplied by 3 groups) observations was obtained. The descriptive statistics show that the averages of groups differ fundamentally. "Healthy companies" clearly show higher values in all four variables in comparison to the other groups. The lowest values can be found for the "bad companies". Also, the standard deviations in the groups for the various indicators show differences. This would indicate that the financial ratios generally have good conditions for modelling. To analyse this more precisely, tests for normal distribution, F-tests in the course of an ANOVA and comparisons of means were conducted.

The tests for normal distribution by Kolmogorov-Smirnov and Shapiro-Wilks showed for all groups that at the significance level of 5% normality of distributions cannot be assumed. The calculated statistical significances (p-values) were all lower than 0.05, so that the risk of rejecting the null hypothesis was hardly given. Especially for discriminant analysis, a deviation from normal distribution can affect the classification results (Subhash, 1996, p. 263; Klecka, 1980, p. 61; Hopwood, McKeown & Mutchler, 1988). Even if the assumption of normality of data is not fulfilled, it is possible to reach satisfactory results. It was shown that discriminant analysis can at certain skewes of distribution provide better results than logistic regression, so that its application in research can be justified also with non-normally distributed data (Pohar, Blas & Turk, 2004, p. 159 – 160). For logistic regression this assumption is not essential and studies showed that this method is relatively robust against violations of normal distribution (Press & Wilson, 1978). However, classification accuracy can be affected to a certain degree (Hopwood, McKeown & Mutchler, 1988, p. 293). Therefore, it could be assumed on preliminary analyses that the application of logistic regression should provide better results than discriminant analysis.
Table 1: Test for normal distribution

<table>
<thead>
<tr>
<th>Group</th>
<th>Kolmogorov-Smirnov</th>
<th></th>
<th>Shapiro-Wilk</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
<td>Sign.</td>
<td>Statistic</td>
</tr>
<tr>
<td>Equity-ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.213</td>
<td>35</td>
<td>.000</td>
<td>.930</td>
</tr>
<tr>
<td>2</td>
<td>.218</td>
<td>35</td>
<td>.000</td>
<td>.902</td>
</tr>
<tr>
<td>3</td>
<td>.244</td>
<td>35</td>
<td>.000</td>
<td>.873</td>
</tr>
<tr>
<td>EBIT/total assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.233</td>
<td>35</td>
<td>.000</td>
<td>.869</td>
</tr>
<tr>
<td>2</td>
<td>.200</td>
<td>35</td>
<td>.001</td>
<td>.821</td>
</tr>
<tr>
<td>3</td>
<td>.273</td>
<td>35</td>
<td>.000</td>
<td>.770</td>
</tr>
<tr>
<td>Operating cashflow/total debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.226</td>
<td>35</td>
<td>.000</td>
<td>.710</td>
</tr>
<tr>
<td>2</td>
<td>.281</td>
<td>35</td>
<td>.000</td>
<td>.529</td>
</tr>
<tr>
<td>3</td>
<td>.358</td>
<td>35</td>
<td>.000</td>
<td>.382</td>
</tr>
<tr>
<td>Percentage sales development</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.273</td>
<td>35</td>
<td>.000</td>
<td>.888</td>
</tr>
<tr>
<td>2</td>
<td>.201</td>
<td>35</td>
<td>.001</td>
<td>.895</td>
</tr>
</tbody>
</table>

Percentage sales development is constant for group = 3 and was therefore not displayed

Source: Own results

Next an analysis of mean vectors was applied. The first three variables showed statistical significance of less than 0.05 (5% significance level), so that null hypothesis (equality of means between the groups) may be rejected. For the last variable "percentage sales development" the calculations were not possible as within this group all values were constant across all cases. Nevertheless it can be concluded that the variables are having good separation ability and are in principle suitable for model building. This should be particularly advantageous for the linear discriminant analysis, as this process is aiming to separate mean vectors optimally.

Table 2: Test for differences in means

<table>
<thead>
<tr>
<th></th>
<th>Welch-Test</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity-ratio</td>
<td>105.441</td>
<td>2</td>
<td>61.940</td>
<td>.000</td>
</tr>
<tr>
<td>Brown-Forsythe</td>
<td>80.948</td>
<td>2</td>
<td>85.614</td>
<td>.000</td>
</tr>
<tr>
<td>EBIT/total assets</td>
<td>46.880</td>
<td>2</td>
<td>55.630</td>
<td>.000</td>
</tr>
<tr>
<td>Brown-Forsythe</td>
<td>34.404</td>
<td>2</td>
<td>68.398</td>
<td>.000</td>
</tr>
<tr>
<td>Operating cashflow/total debt</td>
<td>9.657</td>
<td>2</td>
<td>65.862</td>
<td>.000</td>
</tr>
<tr>
<td>Brown-Forsythe</td>
<td>9.161</td>
<td>2</td>
<td>92.901</td>
<td>.000</td>
</tr>
<tr>
<td>Percentage sales development</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Brown-Forsythe</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

Source: Own results

The variances of the individual indicators within the groups are significantly lower than the value of 0.05. This means that the alternative hypothesis is valid, and the groups are statistically different in terms of their variances at 5 % level. This is also an indication that the ratios are having a high aptitude for the modelling of a prediction tool.
Table 3: Test for differences in variances

<table>
<thead>
<tr>
<th></th>
<th>Square Sum</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity-ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>1.043</td>
<td>2</td>
<td>.521</td>
<td>80.948</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.657</td>
<td>102</td>
<td>.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>1.700</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBIT/total assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.209</td>
<td>2</td>
<td>.104</td>
<td>34.404</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.309</td>
<td>102</td>
<td>.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.518</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating cashflow/total debt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.473</td>
<td>2</td>
<td>.236</td>
<td>9.161</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2.632</td>
<td>102</td>
<td>.026</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>3.104</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage sales development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.054</td>
<td>2</td>
<td>.027</td>
<td>41.076</td>
<td>.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.067</td>
<td>102</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.121</td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own results

Development of business failure prediction models

Multivariate linear discriminant analysis

First, a multivariate linear discriminant analysis was calculated with all variables. In addition to the criterion of normal distribution of the data covariance matrices must be the same (or similar) so that the method works well. For this purpose a box test was carried out. The significance shows a value of 0.175, so the null hypothesis (equality of the covariance matrices) can be maintained. Thus, in addition to the diversity of the group means another important criterion for the applicability of the method is given.

Table 4: Box-test – Test for equality of covariance matrices

<table>
<thead>
<tr>
<th>Box-M</th>
<th>14.902</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1.395</td>
</tr>
<tr>
<td>df1</td>
<td>10</td>
</tr>
<tr>
<td>df2</td>
<td>22106.773</td>
</tr>
<tr>
<td>Significance</td>
<td>.175</td>
</tr>
</tbody>
</table>

Source: Own results

A look at the canonical correlation coefficient shows a high value for the first function, so it can be assumed that it is having high separation power. Since three groups were analysed, there are two discriminant functions, which are orthogonal to each other. Essential for the quality of the model is Wilks' lambda. When the significance is less than 0.05, then a function is significantly discriminating between the groups. It is therefore sufficient to consider the first function for model building as the second function is not suitable for separation between the groups due to significance of 0.667. This was also confirmed by a check of group centroids.
Table 5: Eigenvalues und Wilks-Lambda of discriminant functions

<table>
<thead>
<tr>
<th>Test of Functions</th>
<th>Wilks-Lambda</th>
<th>Chi-Square</th>
<th>df</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 2</td>
<td>.300</td>
<td>120.928</td>
<td>8</td>
<td>.000</td>
</tr>
<tr>
<td>2</td>
<td>.985</td>
<td>1.567</td>
<td>3</td>
<td>.667</td>
</tr>
</tbody>
</table>

Source: Own results

Based on unstandardized canonical discriminant function the overall classification function can be set up. Due to the previous analyses it is sufficient only to consider the first function, which can be written as shown in equation 1:

\[ Z = -2.665 + 8.913 \cdot X_1 + 4.549 \cdot X_2 - 0.301 \cdot X_3 + 18.518 \cdot X_4 \]  

\( X_1 \): Equity-ratio  
\( X_2 \): EBIT/total assets  
\( X_3 \): Operating cashflow/total debt  
\( X_4 \): Percentage sales development  
\( Z \): Overall value

From the function one can see that the first two and the last variable contribute positively to the Z-value. This means that these ratios are having a positive association with “health”. This result is consistent with prior empirical findings. Contrary to expectations is the direction for the third ratio (cash flow/total debt), since there is a negative sign. This indicates that if a company has a high value in this ratio, it is negatively affecting Z-value. The importance of this measure within the formula is due to the very low weighting negligible. It can thus contribute to the formation of Z-value only incrementally.

The reason for this inconsistency of the sign compared to theory can only be explained from the data base. Within the third group an outlier with a value of 0.75 can be found, which distorted the results and thus caused the negative sign.

The allocation criterion is based on the calculated Z-values of the function:

- Values above 1.00: group 1  
- Values between -1.00 and 1.00: group 2  
- Values below -1.00: group 3

The obtained discriminant function assigned 78.1% (overall classification result) of the companies into the right group. In a cross validation of the model 75.2% were correctly classified. The model shows a quite good prediction performance, which certainly cannot be considered optimal. Nevertheless the model provides better results than a random model (AUROC: 70.63%). The misclassifications relate primarily to the second group. There was no company from group 1, which was assigned to the third group. Also, there were no companies in group 3, which were assigned to the first group.
Table 6: Classification results for discriminant analysis including cross-validation

<table>
<thead>
<tr>
<th>Group</th>
<th>Prediction</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Original Amount</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>71.4</td>
<td>28.6</td>
</tr>
<tr>
<td>2</td>
<td>20.0</td>
<td>68.6</td>
</tr>
<tr>
<td>3</td>
<td>.0</td>
<td>5.7</td>
</tr>
<tr>
<td>Cross-Validation Amount</td>
<td>24</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>%</td>
<td>68.6</td>
<td>31.4</td>
</tr>
<tr>
<td>2</td>
<td>20.0</td>
<td>62.9</td>
</tr>
<tr>
<td>3</td>
<td>.0</td>
<td>5.7</td>
</tr>
</tbody>
</table>

**Source:** Own results

**Multivariate logistic regression**

As second method a multivariate logistic regression was applied. From previous analyses it is expected that it should provide better results than multivariate linear discriminant analysis (lower sensitivity to non-normal distribution of ratios, discriminatory power of ratios based on ANOVA).

Table 7: Model quality of logistic regression analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>Criterion for Model-Fit</th>
<th>Likelihood-Ratio-Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-2 Log-Likelihood</td>
<td>Chi-Square</td>
</tr>
<tr>
<td>Constant only</td>
<td>200.468</td>
<td></td>
</tr>
<tr>
<td>Finally</td>
<td>63.705</td>
<td>136.763</td>
</tr>
</tbody>
</table>

**Source:** Own results

After applying several combinations of the ratios the best model was developed with only two variables (equity-ratio and percentage sales development). To appraise the quality of the model a test for model fitting is necessary, which can be found in the following table. The Likelihood-test showed that the two ratios significantly contribute to separation between the groups. The significance is less than 0.05, so the null hypothesis can be rejected. This means that the developed model is well suited for classification and provides significantly better results than a random assignment of objects to each group. The goodness of fit shows a significance of 0.995. This suggests that the developed model could adjust the data well.
Table 8: Goodness of fit for logistic regression analysis

<table>
<thead>
<tr>
<th></th>
<th>Chi-Square</th>
<th>df</th>
<th>Sign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>48.024</td>
<td>76</td>
<td>0.995</td>
</tr>
<tr>
<td>Deviation</td>
<td>46.659</td>
<td>76</td>
<td>0.997</td>
</tr>
</tbody>
</table>

Source: Own results

The McFadden R² is 0.593, which is a mediocre score. The higher the value, the better the model can explain the phenomenon to be measured. This means that about 59.3% of the variances between the figures can be explained with the measured values. Due to this, it is assumed that the model can indeed provide a good forecasting tool, but the prediction quality is partially limited.

Table 9: R² for explanation of the model

<table>
<thead>
<tr>
<th>Pseudo-R-Quadrat</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cox und Snell</td>
<td>.728</td>
</tr>
<tr>
<td>Nagelkerke</td>
<td>.819</td>
</tr>
<tr>
<td>McFadden</td>
<td>.593</td>
</tr>
</tbody>
</table>

Source: Own results

Table 10: Parameter estimation for logistic regression

<table>
<thead>
<tr>
<th>Group</th>
<th>B</th>
<th>Standard-error</th>
<th>Wald</th>
<th>df</th>
<th>Sign.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>constant term</td>
<td>3.863</td>
<td>1.058</td>
<td>13.339</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Equity-ratio</td>
<td>-10.477</td>
<td>3.512</td>
<td>8.898</td>
<td>1</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>Percentage sales development</td>
<td>-26.173</td>
<td>10.296</td>
<td>6.462</td>
<td>1</td>
<td>.011</td>
</tr>
<tr>
<td>3</td>
<td>constant term</td>
<td>9.604</td>
<td>1.923</td>
<td>24.954</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Equity-ratio</td>
<td>-42.283</td>
<td>11.051</td>
<td>14.641</td>
<td>1</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Percentage sales development</td>
<td>-997.589</td>
<td>.000</td>
<td>.</td>
<td>1</td>
<td>.</td>
</tr>
</tbody>
</table>

Source: Own results

Based on parameter estimation the final logistic regression function is:

\[
F = \frac{1}{1 + e^{(3.863 - 10.477X_1 - 26.173X_2) + e^{(9.604 - 42.283X_1 - 997.589X_2)}}}
\]  

(2)

\(X_1\) : Equity-ratio

\(X_2\) : Percentage sales development

\(F\) : Overall value

Using F-value following allocation criterion may be referred to the groups:

- Probabilities 100-50%: group 1
- Probabilities between 50% and 5%: group 2
• Probabilities less than 5%: group 3

The signs of the ratios within equation 2 are consistent with findings of previous literature. High values for both ratios are positively associated to “health”. The overall classification accuracy of the model was 81.9 %, which can be seen as a slight improvement in comparison to discriminant analysis. A logistic regression model including operating cashflow/total debt showed in contrast to discriminant analysis a consistent sign with literature. This means that a high value of the ratio can be associated with “health”. Such a result implies that outlier problems could be better optimized with application of logistic regression.

Table 11: Classification results for logistic regression

<table>
<thead>
<tr>
<th>Observation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Percentage correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27</td>
<td>8</td>
<td>0</td>
<td>77.1%</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>26</td>
<td>2</td>
<td>74.3%</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>2</td>
<td>33</td>
<td>94.3%</td>
</tr>
<tr>
<td>Percentage totally</td>
<td>32.4%</td>
<td>34.3%</td>
<td>33.3%</td>
<td>81.9%</td>
</tr>
</tbody>
</table>

Source: Own results

Summary and implications

Within table 12 some chosen performance measures are displayed. The accuracy was better for logistic regression, but AUROC and Gini-Coefficient are much higher for discriminant analysis.

Table 12: Performance measures

<table>
<thead>
<tr>
<th>Performance measure</th>
<th>Discriminant analysis</th>
<th>Logistic Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUROC</td>
<td>70.63 %</td>
<td>67.99 %</td>
</tr>
<tr>
<td>Gini</td>
<td>0.4127</td>
<td>0.3599</td>
</tr>
<tr>
<td>Accuracy</td>
<td>80 %</td>
<td>81.90 %</td>
</tr>
<tr>
<td>Precision</td>
<td>85 %</td>
<td>85.5 %</td>
</tr>
<tr>
<td>Standard-Dev. Sensitivity</td>
<td>4.95 %</td>
<td>4.60 %</td>
</tr>
<tr>
<td>Standard-Dev. Specificity</td>
<td>6.33 %</td>
<td>6.33 %</td>
</tr>
</tbody>
</table>

Source: Own results

This indicates that discriminant analysis is the more appropriate model for business failure prediction for this case. These results were only valid for the data of model building. Therefore further research concerning validity on real enterprise data is needed in order to assess the classification accuracy and suitability for practical application of the models. Three main reasons can be given why the developed models had no higher classification accuracy. First, the preliminary analyses showed that the data do not follow normal distribution. This is particularly problematic for discriminant analysis. As previously indicated this problem should be of minor relevance for logistic regression, but in case of this study this seemed to have a certain impact. Second, even if differences in means and variances were statistically significant, these significances were not sufficient for optimal model fit. The values for EBIT/total assets and operating cashflow/total debt showed a much
lower discriminatory power, so that their contribution for classification accuracy was limited and low. The tests are only a pre-condition for variable selection, but no guarantee that model fit including statistically significant variables will provide a superior prediction model.

Third, there was an outlier for the key figure operating cash flow/total debt, which produced an inconsistent sign within discriminant analysis. This was not in congruence with findings of prior business failure literature. This caused problems for this ratio as relevant predictor within the model, even if its contribution to Z-value is small. Interestingly this variable showed a positive sign in a logistic regression model, which is consistent to previous research. It seems therefore that logistic regression is less sensitive against outliers and extreme values in data. The results clearly show that the prediction depends largely on the quality of metrics, which are used for modelling. This means that there is the need for indicators, which are able to clearly separate between the different groups, so that misclassifications can be largely avoided. This will also be one of the important pre-conditions for establishing a currently missing theory of insolvency prediction.

The findings show that the chosen predictors obtained from expert knowledge are having a certain discriminatory power and that generally the signs of their contribution respectively their association to “health” are consistent with results from prior empirical literature. This indicates that theoretically relevant financial ratios are applied in management consulting by professionals for the evaluation of companies’ health. The developed forecasting models should be validated with respect to their applicability in practice based on a real data base. This could answer the question, whether they could be used as early warning systems in practice.

Overall conclusions

Financial ratios incorporated in multivariate models showed the ability to discriminate between the different economic situations of enterprises and are therefore suitable for prediction task to a certain degree. The application of discriminant analysis was violated due to lack of normally distributed variables, but the prediction performance was compared to logistic regression not influenced dramatically, so that a certain deviation from normality may be tolerated for model building. Nevertheless, logistic regression showed a better robustness concerning outlier problems in contrast to discriminant analysis. This was especially vacant for the ratio operating cashflow/total liabilities within this study. Based on the results from table 12 the models worked similarly well, so that none of both can be favoured.

For practitioners the results indicate that equity-ratio and the percentage sales development are two important indicators, which should be analysed, when assessing the economic situation of a company. Consistent with prior research a high equity-ratio can be associated with health. Firms with stagnation or decline in percentage sales development are more likely to be in a crisis. The relevance of EBIT/total assets is given, but was not assigned as that important like the two previously mentioned ratios. Operating cashflow/total debt was the least important potential predictor, which only had an incremental explanatory power within discriminant analysis. A business failure prediction model is useful in practice for professionals in order to receive a single measure (Z-score or F-value), which can give an indication about the economic and financial situation of the firm based on the three predefined economic conditions of this work. Nevertheless, the practitioner will beside of this also
have a look at other external and internal indicators, which are in many cases of qualitative nature. Prediction models are useful for setting benchmarks, but they are not the standalone solution to determine the “real” economic situation of a company.

Appendix

\[
\text{Equity – ratio} = \frac{\text{Total Equity}}{\text{Total Assets}}
\]

\[
\text{Profitability} = \frac{\text{EBIT}}{\text{Total Assets}}
\]

\[
\text{Debt Repayment Capability} = \frac{\text{Operating Cashflow}}{\text{Total Debt}}
\]

\[
\text{Percentage Sales Development} = \frac{\text{Sales Actual Year} - \text{Sales Previous Year}}{\text{Sales Previous Year}}
\]

References:


• Pompe, P. P. M., and Bilderbeek, J. (2005), Bankruptcy prediction: The influence of the year prior to failure selected for model building and the effects in a period of economic decline, _Intelligent Systems in Accounting, Finance and Management_, Vol. 13, pp. 95 – 112.


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RESEARCH ON OCCUPATIONAL PRESTIGE AMONG YOUNG PEOPLE IN THE CONTEMPORARY BELARUSIAN SOCIETY

Elena Semakovich
The Institute of Sociology of the National Academy of Science of Belarus

Abstract

The paper presents the results of the research of the occupational prestige based on the synthesis of the materials of sociological research. Measured on a social level, the occupational prestige influences processes of reproduction of employment of the younger generation. It is important to extend the research practice in this area.

Key words: occupational prestige, scientific profession, respect, scientist, youth

JEL: Z19

Introduction

The drop of salary level in the science sector from the beginning of the 1990s, and the decline in the social status of a scientist and in the prestige of scientific and pedagogical work have led to a mighty outflow of staff from the scientific sphere. Today, all over the post-Soviet space, including Belarus it has become urgent to determine the prestige of occupations, including a scientific one, and to attract young people's interest to science. Transformation processes in the Belarusian society have affected employment as a whole and produced new occupations that today firmly hold high ranking positions and provide ample opportunities for self-realization. As a logical result some occupational groups have become “outsiders”, among them scientists. An important factor is that these processes were accompanied by the breaking of social values. Against the general background of transformational changes, youth’s professional values have changed and formed the related sets of prestigious and not prestigious occupations, attractive and not attractive spheres of activity. It should also be noted that a considerable part of this social group expresses a desire to realize their creative potential not in science (as was typical in the soviet period) but in other spheres of occupational activity. Transformation processes in the Belarusian society have also affected science as a source of new knowledge and technological strength. The consequences of the collapse of the USSR, complicated economic situation in Belarus in the transition period have had a negative impact on science. Thus, as the result of the reduced state support for science, lack of demand for intellectual potential and the exodus of scientists, the prestige of science and the social status of scientists have fallen, negative evaluation of science sphere has become common,
and there is no valid inflow of younger generation of scientists. Qualitative changes in the functioning of science have determined the inadequacy of the former approaches to solving these problems and the necessity to seek new ones. At the same time, attitude to science remains poorly studied despite the fact that its significance as a socio-cultural phenomenon and a most important element in the system of fundamental values of our time is emphasized. Analysis of literature on these matters shows that science as a most important social institution is in the focus of attention of many researchers. Socio-economic issues of the development of science, the questions of financing, and material and technical support of the scientific sphere, the problems of training of scientific personnel, and intellectual migration are widely covered by Western and domestic researchers. However, the topics of the prestige of science as a sphere of activity, the prestige of occupations, including professions of a scientist and educator, confidence in science and scientists in the transforming society are insufficiently studied by Belarusian researchers.

Few studies raising the issues of occupational prestige and the prestige of scientific activity were carried out in Belarus during the years of independence, so today there is lack of sociological surveys on this subject. This creates, in our view, a vast field for research. It is the results of the study of the occupational prestige that this paper will deal with.

The present research was carried out by the author independently in spring 2012 in accordance with the planned theme of the Department of Political Sociology and Information Technologies of the State Research Institution, The Institute of Sociology of the National Academy of Belarus, within the framework of the task for 2011-2015, namely, “Socio-dynamics of political and cultural orientations of the population under the conditions of the innovative development of the Belarusian society and socio-legal problems of prevention of law violation among youth”.

The methods used were: questionnaire survey, analysis of literature on the topic of research, analysis of secondary data of sociological studies carried out in Belarus and in overseas research centres, of statistical data of the Ministry of Statistics of Belarus Republic, and internet sources.

The aim of the research is to bring out and give a general view of the opinions of students of Belarusian state higher educational institutions about the most prestigious professions, including scientific ones. Their opinions are assumed to be the expression of the opinion of social consciousness.

So, students of higher educational institutions (500 respondents aged 18-24) were chosen as a direct subject of research. It is necessary to turn to official statistic data that characterize peculiarities of forming a sample. In the framework of the conducted research, overall composition of the student youth of the republic was taken into consideration. Thus, according to the official statistic data of the country (see Statistics Knows Everything, 2012) their total number in the beginning of 2011/2012 academic year was 96 thousand young people. Among students the number of girls was greater than that of boys, 59% and 41%, respectively. Such features of the given sample reflect the general socio-demographic situation in the country, ensuring the representativeness of the information obtained.

In organizing and conducting the research we also took into account that the prestige of higher education in our country is high. The object of observation were senior students of six state higher educational institutions: Belarusian State University (BGU), Belarusian State Economic University (BGEU), Mogilyov State University named after A.A.Kuleshov...
We also added to this list the country’s leading higher educational institutions. In doing so we took into consideration the research data of 2011 obtained from the results of two stages of the rehearsal testing in BGU (total sample of 3327 applicants). Based on these data, a ranking system of the most prestigious higher educational institutions was composed. According to the obtained results (see Zhegulo, 2011), the Belarusian State University (BGU) took the first place. At the first stage of the rehearsal testing, this university was named best by 57.4% of the surveyed, at the second, 51.8%; the second place was taken by BGEU (12.2% and 11.7% respectively); the third place, by Belarusian National Technical University (BNTU) (8.7% and 8.4%); the fourth, by Belarusian State Medical University (BGMU) (6.3% and 8.0%); the fifth, by the Belarusian State University of Information and Radioelectronics (BGUIR) (3.7% and 5.4%); the sixth, by Minsk State Linguistic University (MGLU) (3.6% and 3.0%).

One should take into account the fact (see Gohberg, Kitova, Shuvalova (2010) that "students of leading higher educational institutions are involved in research; they are trained in teaching and research centers with quality equipment, and have access to modern information resources. Higher educational institution not simply gives them formal access to a scientific career, but also leads to a decision about choosing the profession of a scientist, it allows them to determine an area of future research interests". Thus it can be asserted that higher school plays an essential part as an important social institution preparing young people for choosing a profession, allowing them to orient themselves in a social situation.

Keeping in mind the leading position of higher education in the country, consider the students’ choice depending on the area of education in a higher educational institution as a whole. Based on the statistics of the republic, a ranking system of the most prestigious occupations among students can be constructed. Among the prestigious specialties, according to the "official statistics (see Statistics Knows Everything, 2012), are those of economic profile, “Equipment and technologies”, “Architecture and construction”, almost every fourth student of the republic was studying for them. In addition to these specialties, other profiles were recorded: "Agriculture and Forestry", "Landscape Construction" (6%), "Public Health", "Social Protection", "Physical Culture. Tourism and Hospitality" (about 8%), "Natural Sciences" and "Environmental Sciences"(4%), "Art and Design" and "Security Service" (2%)."

Taking into consideration the role of higher education in modern society and the existing disposition among students to the prestigious occupations, it should be noted that the professional aspirations of young people are shifting into the areas of business, politics, advertising, information technology, etc. From the indicated peculiarities, we can conclude that the students show interest to certain spheres of professional life, taking into consideration the appropriate skills and knowledge acquired at the university, which influences the evaluation of professions as prestigious ones.

Coming to the analysis of the data obtained in the course of our sociological research, it should be noted that we approached the study of the occupational prestige from a position of considering it as evaluation of a particular activity in which we included scientific activities in the eyes of a certain social group, particularly, of student youth expressing the views of the entire society.
Taking into consideration the above-noted aspect, we further focused on revealing public opinion about science. Let us consider the students’ evaluation of the level of science prestige in the framework of sociological research (Fig.1)

**Fig. 1**: Students’ evaluation of the level of science prestige in the Belarusian society

![Bar chart showing students' evaluation of science prestige](image)

**Source**: Own results.

We have obtained the following pattern of the level of science prestige in the Belarusian society: middle (40.64%), low rather than high (20.4%), low (14.4%). The proportion of those who thinks that science prestige is high rather than low amounted to 9.36% of the students.

Indicative is the comparison of the evaluations of the existing level of science prestige among students with the views of other social groups that have also formed a clear disposition to the level of prestige, i.e. of post-graduate students and researchers of academic research institutions of the National Academy of Sciences of Belarus (the sample of 900 and 143 respondents, respectively).

We believe that such scientific consideration of the opinions of the two social groups is one of the most important points in the framework of the conducted sociological research of the occupational prestige in the contemporary Belarusian society. Since the second group (young researchers) is directly on one of the steps of the hierarchical ladder of a scientific career, so they display their view of science from the inside. The first group (students) approach the understanding of the issue under discussion within the limits of the knowledge gained, but without experience of working on large-scale research projects and direct contact with the employees of research institutes, laboratories, etc.

It is noteworthy that the comparison of the data revealed respondents’ different perceptions of the level of science prestige in the contemporary society. In particular, “Babosova’s study (2008) shows that 38.1% of young researchers and post-graduate students acknowledge low rather than high prestige of science. At the same time, there was such evaluation as “high rather than low” level of prestige of science (27.1%) and an unambiguous evaluation, low (23%) (Figure 2).

**Figure 2**: Evaluation of the prestige of science by young researchers
After determining the attitude to science, by establishing the level of its prestige in the contemporary society, it was natural to find out the respondents' opinions about the prestigious occupations in order to draw up a pattern of the country's occupational prestige. When studying this subject we approached the issues of the prestige of and respect for the scientist. The given research was based on two levels: a personality level and a public one. Proceeding from the indicated features of the conducted sociological research, we turn to the analysis of the obtained results (see Figure 3).

**Figure 3:** Ranking of prestigious occupations as evaluated by the Belarusian youth

In the course of the research a hierarchical ranking of prestigious occupations in the Belarusian society was built. The findings indicate that the upper part of the ranking is occupied by professions of an entrepreneur and a businessman (12.48%). The second place in the judgments of the students is taken by a programmer (10.67%), the third, by an oil worker, a power engineer, a gas industry worker (9.0%). A little lower are: the head, a director, a banker, a doctor, a legal expert, a lawyer, a prosecutor, an actor, an anchorperson, a translator (8.33%, 7.95%, 7.57%, 7.48%, 7.14%, 5, and 10% respectively).

**Source:** Bobosova (2008)

**Source:** Own results
The survey of the population of Belarus made by HeadHunter in 2013 in the framework of the project RABOTA.TUT.BY (the sample equaled 543 respondents) recorded the rating of prestigious occupations (Figure 4).

Fig. 4: Prestigious occupations as evaluated by the population of Belarus

Source: HeadHunter Belarus (2013)

“According to the survey data (see HeadHunter Belarus, 2013) of representatives of 18 professional fields the leading positions were taken by: a programmer and a developer (46%), a businessman, an owner of business (43%), a director, a top manager (31%). Then, followed a banker, a bank employee (19%), a minister, a deputy, a public servant (16%), a diplomat (15%). The lowest positions in the ranking of prestigious occupations were occupied by an accountant, an auditor (3%) and a teacher (2%)”.

Analysis of the responses in this study, as in the previous one, has convincingly shown that the list of prestigious occupations in the contemporary Belarusian society does not include such a professional group, as scientists. This fact demonstrates the reduction of the prestige of the scientist and of scientific work in our country. Compared to the Soviet Union period when the prestige of science was unprecedentedly high, professions that now occupy a low position in the overall hierarchy were the most prestigious. In particular, Martynuk and Soboleva (2006) note that “while in times of the USSR the profession of a scientist was highly prestigious, under the influence of the last century 90s social upheaval, when a new value system was introduced into the social consciousness, the evaluations of the prestige of the profession of a scientist became noticeably moderate.”

The results of a poll conducted by a research team of the Institute of Social and Political Studies under the President of the Republic of Belarus (ISPR) in October-November 1999 (100 experts from 272 research institutions of the country were interviewed) also demonstrate a low level of prestige of the profession of a scientist in the Belarusian society. On the whole, as evidenced by the history of the country over the past decade, the decline in the prestige of the profession of a scientist is caused by a number of circumstances. Thus,
"according to the data presented in Khurs’s report (1999), one of them is the inappropriate use and depreciation of scientific and technical personnel in various organizations. Considering the results of the research in a general way, these evaluations can be reduced to such responses as “are "sometimes" (42.8%) or "often” (13.9%) used, ignoring specialty and qualifications.” In the overall analysis of the data the research team concludes that scientific and technical work does not increase the prestige of the scientist.

It was also found that scientific workers are greatly dissatisfied with the realization of their intellectual and creative potential. It is noted that in the contemporary society the system of stimulating scientists’ work is not efficient (66.1%), their prestige is very low (56.0%), and the demand for science in the society is insufficient (43.9%). In the current situation in the republic’s scientific and technical sphere the main thing to do is to attract talented young people to science. Among possible ways to achieve this goal should be, according to the respondents’ answers, raising the prestige of scientific activity (67.4%) and increasing the demand for scientific results (53.0%).

In order that the given data on the problem under consideration may fully reflect the reality, they must be complemented and compared with materials of other empirical sociological research.

Considering the features of interviews, conducted in other countries to establish public opinion on the stated problem, it is important to note that there is a certain practice of studying public attitudes toward science. Since 1947 western researchers (National Opinion Research Center (NORC) have been working out appropriate methods (ranking, professional scales) of making prestigious professions lists providing high representativeness of the data. In Belorussia, as well as in the whole of the post-Soviet space there is no such tradition. In this connection it is of scientific interest to consider the problem of determining social prestige of various occupations, of professional scientific activity along with the existing western experience concerning the issue under discussion.

In the USA the sociological investigations are done by various organizations, among them Harris Interactive Poll. For the last 30 years it has been doing annual research to determine occupations that enjoy high prestige. On the basis of the "results of a national telephone survey conducted in 2009 (see the Harris Interactive Poll, 2009), a list of the most prestigious occupations was made. It included a fireman, a researcher, a doctor, a nurse, a teacher and a military officer (62%, 57%, 56%, 54%, 51% respectively)."

Summing up the results of years of research on prestigious occupations in the American society, (Harris Interactive Poll) it was stated that the population of the United States trusts the members of prestigious occupations, including scientists, best of all (see Science and Engineering Indicators, 2010). At the same time during the 27 years of the polls notable changes in the high positions of occupational prestige ranking have been indicated. In particular, according to the obtained results (see Science and Engineering Indicators, 2006) “among the 11 occupations included in the survey since it began in 1977, only teachers saw an improvement in their rating, from 29% in 1977 to 48% in 2004. In contrast, the rating for scientists fell 14 points, from 66% to 52%, and ratings for doctors and lawyers fell 9 and 18 points, respectively”.

The evaluation of occupations is also carried out in terms of respect of the public. On the whole, respect manifests social significance of certain professional activity and is the basis of a prestigious status of occupations. It is taken into account that the prestige allows any professional activity, including scientific, to enjoy certain respect in society.
Analyzing the above presentation, it is necessary to consider the results of the research of respected occupations at the public level (Figure 5).

**Figure 5**: The most respected occupations in the public opinion.

As evidenced by the data obtained in our research, the following hierarchy of respected occupations and professional activities is reflected in the social consciousness: businessmen, doctors, lawyers, entrepreneurs, politicians, legal experts, scientists, bank workers, skilled workers, servicemen, artists, professors (12.43%, 12.37%, 7.65%, 7.53%, 7.05%, 6.99%, 6.27%, 6.09%, 5.91%, 4.54 %, 3.76% and 3.58%, respectively).

It is interesting to make a list of respected occupations from the perspective of the personality level of perception. This refers to the identification of occupations, taking into consideration differentiated evaluations which the subject himself/herself makes of a professional activity (Figure 6).

**Figure 6**: The most respected professions as evaluated by the Belarusian youth

As evidenced by the data obtained in our research, the following hierarchy of respected occupations and professional activities is reflected in the social consciousness: businessmen, doctors, lawyers, entrepreneurs, politicians, legal experts, scientists, bank workers, skilled workers, servicemen, artists, professors (12.43%, 12.37%, 7.65%, 7.53%, 7.05%, 6.99%, 6.27%, 6.09%, 5.91%, 4.54 %, 3.76% and 3.58%, respectively).

Analyzing the data obtained, we proceeded from the fact that when determining respectable activities, the subject approaches the choice from the standpoint of life goals, interests, professional qualities etc. On this basis, in the list of occupations respected among young people, professions that may differ from the previous level are included. So, doctors take the top line (13.69%); then follow businessmen, bank employees, military servicemen, lawyers (9.14%, 7.43%, 6.87% and 6.24%, respectively). It is noteworthy that in the very middle of
the ranking are scientists (6.18%) and entrepreneurs (5.96%), then lower, judges, lawyers, qualified workers and journalists (5.67%, 5.5%, 5.39%, 5.28%, respectively).

Now, for comparison with the results of the sociological surveys of the Belarusian youth, we should turn to the Russian experience of the research of occupational prestige. Thus, "the results of the research by the Institute for Comparative Social Research (TSESSI), “The attitude to the legality and the judicial system in Russia” in 2003-2005 (see the Current Generation of Scientists, 2009), show that there are differences in the evaluation by the population between the prestigious and the respected occupations. For example, 46% of respondents rated profession of a scientist as either very or rather prestigious, but 96% as very prestigious or as “I somewhat respect the people of this occupation”. An even greater contrast is seen as far as teachers are concerned: 18% of respondents consider this profession to be prestigious, while 93% of the respondents respect members of this profession. As for the attitude to the deputies of the State Duma, in this case on the contrary, 81% believe that being a deputy is "prestigious", 28% respect people of this profession."

For a more detailed study of the attitude to occupations it is necessary to add materials of western researchers. It is taken into account that in Great Britain and in the USA science professions and their subjects, scientists, enjoy respect, and as a consequence, trust of the public. (Figure 7)

**Figure 7: Respected occupations as evaluated by the population of Great Britain.**

![Figure 7: Respected occupations as evaluated by the population of Great Britain.](image)

**Source:** Ipsos MORI (2011)

According to the results of the research conducted by Ipsos MORI in Great Britain among young people in 2011 (see Ipsos MORI, 2011), the population highly appreciates scientists. For example, among the most respected professions are: “doctors, teachers, professors, judges, scientists, clergyman/priests, the police, the television news readers (88%, 81%, 74%, 72%, 71%, 68 %, 63%, 62%", respectively). From this it is assumed that public opinion about scientists has improved.

In general, the above data based on the analysis and synthesis of empirical sociological data, allow us to make a conclusion about the expediency of continuing the study on this issue. The recorded trends enable us to propose some recommendations. It is necessary:

1) to emphasize the state's interest in raising the role and prestige of occupations and of a scientist profession.
2) to increase science and technology propaganda, and educational work in the media in order
to correct misconceptions among all citizens and youth about occupations (including science
professions), their role, and the place of their representatives (scientists) in the society;
3) to increase the role of higher education as an important social institution, attracting and
involving younger generation in research, shaping their value attitudes to scientific activity;
4) to ensure consistency between the needs of society and the interests of the younger
generation;
5) to intensify communication between scientists and people, showing the public what is
really going on in science and research institutions;
6) to develop and strengthen methodology of the research of occupational prestige by
methods that can be used to promote understanding of and interest in science and the
scientist.

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PSYCHOLOGY OF CORRUPT BEHAVIOR AND RESISTANCE TO CORRUPTION OF PUBLIC SERVANTS

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Abstract

The paper concentrates on the substantiation of the psychological nature of corrupt behavior of public servants as a new scientific direction of psychology. New concepts have been introduced and defined: corruption pressure, corrupt behavior, resistance to corruption, propensity for corruption. The conception of corrupt behavior is considered in terms of the theory of alienation. A law of corruption norm has been formulated, and a concept of "corruptogenic personality" has been defined. Finally the author's diagnostic techniques "AKorD" (anti-corruption diagnostics) is briefly described.

Keywords: corrupt behavior, resistance to corruption, corruptogenic personality

JEL classification: Z19

Introduction

The aim of the paper is to substantiate the conception of corrupt behavior of civil servants in the light of the theory of alienation. Today, corruption is one of the most acute social problems. Over the past 20 years the fight against corruption in Russia has been one of the priorities of the society and state. However, despite a number of measures taken by the government, there have not been any significant results yet. Corruption at the political level is still a real threat to the sovereignty of the country, along with such things as economic disintegration, depletion of natural resources, and international terrorism. In order to strengthen counteraction to corruption, further research in this area is needed. It is no coincidence that in the last decade scientists in the fields of law, economics and sociology have focused on the reasons of the emergence and spread of corruption in the public service system. However, there is little psychological research in this area, which means that outside of scientific analysis are the motives and personality determinants of corrupt behavior of public servants. The structure of the article: first, necessity, timeliness and scientific novelty of the research are proved; then basic approaches to the study of corruption are considered; in the third part methodological foundation of the psychological research on the corrupt behavior is developed; finally, data of the field-testing of the author's diagnostic techniques, "AKorD", are presented.
Review of the research literature on the subject

Necessity, timeliness and novelty of the research

Over the past decades the phenomenon of corruption has attracted particular attention of journalists, politicians, citizens, scientists of various disciplines, the legislature, and various social institutions both in Russia and abroad. Back in 1990, the Eighth United Nations Congress in the resolution "Corruption in government" pointed out that the problems of corruption in state administration were universal, and their harmful effects were felt throughout the world. It also noted that the international community was concerned about transnational corruption and recommended that criminal responsibility for bribery abroad be introduced into national legislations. As Tarushkin (2005) rightly points out, the process of globalization and criminalization of the global economy, the activity of multinational corporations, as well as a high level of monopolization of the Russian economy pave the way for the involvement of Russia in the system of international criminal economic relations, and also for enhancing structural disproportions of the country’s economy and further stratification of the society. In our opinion, the citizens of Russia, for the most part, not only exhibit remarkably tolerant attitude towards corrupt officials, but often encourage them to commit unlawful acts. Due to this, corruption today has reached such a scale that it becomes a national disaster, destroying the country's economy, undermining the foundations of state policy and threatening the security of the state. The answer to these challenges must be sought, among other things, in epistemology through the integration of knowledge about man, law, society and state.

The scientific discussion around the topic of corruption has been held, over the past decade, in the framework of legal, economic and sociological aspects while psychological categories such as goals, motives, values, attitudes, emotions of civil servants have remained outside of the scientific analysis, which does not give us an opportunity to gain an integrated view of corruption as a systemic phenomenon. As Reshetnikov (1998) notes in the first monograph on psychology of corruption, it is hardly possible to do anything without psychologically based approaches because corruption is a legal and economic problem only as far as its consequences are concerned; however, initially, it is a purely psychological and common-to-all-mankind problem. The second monograph on this topic was written by the author of the present paper and was called “Psychology of Corrupt Behavior of Public Servants”. In the monograph it is proved that the psychological analysis of the problem of corruption can be carried out in the framework of various branches of psychological science. For example, the subject of personality psychology may be personality determinants of corrupt behavior (value-based, motivational, emotional and volitional, cognitive). The subject of psychodiagnostics may be diagnostic criteria for estimating propensity for and resistance to corruption, as well as methods for prognosticating the subject’s corrupt behavior.

In the framework of political psychology the phenomena of corruption may be treated as tools of election technologies and of the psychology of political struggle. In terms of legal psychology the corruption phenomena may be considered as structural components of legal consciousness and legal behavior. Special consideration should be given to the study of socio-psychological determinants of corruption, the conflict of interests, and professional deformation as sources of corrupt behavior, axiological aspects in the nature of corruption etc. In order for the fight against corruption to bear fruit, the national anti-corruption
programs require scientifically substantiated psychological support. This will allow institutionalization of the phenomenon of corruption both in the system of social consciousness and in the individual consciousness of every citizen; it will also provide a psychological toolkit for implementing a proposed set of measures.

**Major approaches to the study of corruption**

In Western and domestic research on corruption several major approaches are applied:
- structural-functional approach,
- economic, or market and centrist approach
- revisionist approach.

Within the **structural-functional** approach (D.R.Simon, D.S.Eitzen, K.Friedrich) corruption is seen as a dysfunction (deviance) of the ruling elites. Thus, K. Friedrich sees corruption as behavior deviating from the prevailing norms in the political sphere and resulting from motivation for personal gain at the public expense. In this approach corruption is "pathology of politics," its indispensable companion. The functionality of corruption is recognized up to a certain limit, and the final victory over it is admitted as a utopia. In the **economic** (market and centrist) approaches (S. Rose Ackerman, G. Neugebauer, M. Olson), corruption is considered to be a form of social exchange, and corrupt payments, to be part of the transaction costs. In addition, corruption is associated with an excessive state interference in economic processes, in consequence of which it is recognized as quite functional because it is a counterweight to excessive bureaucracy. Under the **revisionist** approach (Abueva J.V., Bayley D.H., Leff N.H., Leyes C.), corruption is regarded as a disease of developing societies, a result, a consequence and/or manifestation of incomplete modernization and poverty. The authors of this approach believe that corruption can perform positive functions in the matter of integration, development and modernization of the societies of the "third world."

In the studies conducted by the INDEM Russian Foundation one can also identify several approaches to the research on corruption. **The first** approach treats corruption as some deviations from the norms of law, ethics or universal moral principles. Thus, corruption is a collection of wrongdoings of concrete individuals: from criminal to unethical. **The second** approach sees corruption as implementation of the conflict of interests: a contradiction between the interests of office with which the public servant’s actions must conform, and his/her private interests. The public servant’s getting into the circumstances that generate a conflict of interests is a necessary condition for corruption. **The third** approach treats corruption as a set of universal behavior strategies of large social groups. Here two main strategies are identified: state capture and business capture. State capture refers to corporate and individual strategies of the behavior of business aimed at establishing shadow control over the decision-making of power. Business capture is understood as a set of strategies and tactics of power by which it strives (through their representatives, or even organizations) to provide shadow control over business for the purpose of collective and/or individual deriving of an administrative rent. **The fourth** approach considers corruption as a systemic inefficiency, as a certain common defect of the system (of the state, of the society, of the legal system, of the economy, etc.). Then, corruption may be regarded as "the force of friction" which the society has to overcome in solving its tasks; as "the entropy" of the social
system (a measure of internal disorder, a measure of uncertainty); or more narrowly, as the entropy of the system of governance.

The best-known developments in the field of comparative assessment of corruption in different countries are associated with socio-economic indicators of corruption. First of all, this is Corruption Perception Index (CPI) which has been calculated since 1995 on the basis of the data analysis of the studies carried out by independent institutions in various countries of the world. There is also Bribe Payers Index (BPI) assessing the propensity of companies of the exporting countries to bribe, as well as Global Corruption Barometer, Index of Economic Freedom, Opacity Index, etc. There is a large number of studies on the economy of corruption as a direction in the economic theory of crime and punishment (Timofeyev L.M., Kliamkin I., Timofeyev, L.M., Volkov V., Barsukov S.Yu).

From a legal point of view, corruption is a criminal activity in the sphere of politics or state governance, when the officials use the rights and power possibilities entrusted to them, for their personal gain. Imperfect legislation, corruption potential of legal norms, referential legal norms, their being not developed up to the norms of a direct action – these are the current study areas of jurisprudence both in domestic and in foreign science. A characteristic sign of corruption is a conflict of interests between the actions of a public official and the interests of the employer; or a conflict of interests between the actions of an elected official and the public interest. Any individual who has discretionary power (Klitgaard R., Maclean-Abaroa R., Parris L.), i.e., power over the allocation of any resources not owned by him/her, at his/her sole discretion (a civil servant, a deputy, a judge, a law enforcement officer, an administrator, an examiner, a doctor, etc.) may become corrupt. The main incentive for corruption is the opportunity for obtaining economic benefits of the use of power, and the main limiting factor is the risk of exposure and punishment.

Table 1 presents a comparative analysis of the understanding of the phenomenon of corruption in various scientific disciplines.

Table 1: Corruption as a subject of research in the system of sciences

<table>
<thead>
<tr>
<th>Science</th>
<th>Subject of research</th>
<th>Main lines of research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisprudence</td>
<td>Corruption: abuse of power for private gain</td>
<td>Imperfect legislation, corruption potential of legal norms, referential legal norms, their being not developed up to the norms of direct action</td>
</tr>
<tr>
<td></td>
<td>Corruption: the most latent kind of crime</td>
<td>Quazi law in the bureaucratic corporation of corrupt public servants</td>
</tr>
<tr>
<td>Sociology</td>
<td>Corruption: a complex social phenomenon, a product of society and social relations</td>
<td>Corruption as a social institution, element of the governance system, as a consequence of conflicts between different social groups and different values in society</td>
</tr>
<tr>
<td>Economy</td>
<td>Corruption: a form of social exchange, and corrupt payments as part of the transaction costs</td>
<td>Socio-economic indicators of corruption: &quot;Corruption Perception Index&quot;, &quot;Bribe Payers Index&quot;, &quot;Global Corruption Barometer&quot;, etc.</td>
</tr>
<tr>
<td>Politology</td>
<td>Corruption as a way of using power for political influence</td>
<td>Corruption potential of public political consciousness, political culture and political institutions</td>
</tr>
</tbody>
</table>

Source: Own results.

Table 2 examines promising (little-studied or unstudied) areas of research on the phenomenon of corruption.
Table 2: Corruption as a subject of promising research

<table>
<thead>
<tr>
<th>Science</th>
<th>Subject of research</th>
<th>Main lines of research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy</td>
<td>Corruption as a philosophical category, philosophical ontology of corruption, corruption epistemology, philosophical anthropology of corruption</td>
<td>Social philosophy and historiosophy of corruption, the nature of the distortion of morals and morality in terms of ethics, corruption as a consequence of degradation of aesthetic ideals</td>
</tr>
<tr>
<td>History</td>
<td>Corruption as an organizing and disorganizing factor in the development of society</td>
<td>Dynamics of the development of corruption in different historical periods; cultural and historical background of corruption</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>The problem of aimed development and the formation of resistance to corruption of a public servant’s personality</td>
<td>Creation of a system of pedagogical influence to prevent abuse of power; correctional labor pedagogy</td>
</tr>
<tr>
<td>Psychology</td>
<td>Corruption as a phenomenon of the behavior of the subject of state power</td>
<td>Systemic determination of corrupt behavior; motivational, value-based, and meaning determinants of corrupt behavior; resistance to corruption and the propensity for corruption as a personality trait, etc.</td>
</tr>
</tbody>
</table>

Source: Own results

From Tables 1 and 2, one can see that at the present time the level of knowledge of the phenomenon of corruption is clearly not sufficient for the formation of the so-called *corruptionology* that implies a complex approach to the phenomenon under study. In addition, within the framework of psychological science, corruption can also be identified as a research subject different from the corruption research subjects in other sciences. Singling out the category of a subject as the subject of research on corrupt behavior allows systemic consideration of this phenomenon, which is consistent with the ontological essence of corruption as a systemic phenomenon.

The research methodology of corrupt behavior

Psychological study of the phenomena of corruption requires the development of special methodology of the research. The main tasks on a methodological level in the study of corruption psychology are substantiation of the subject boundaries, principles, forms and methods of organizing scientific research on corrupt behavior, as well as the ways of establishing criteria of sufficient substantiation and verification of the knowledge gained. This leads the researcher of the corruption psychology to solving a number of epistemological problems. *First*, this is a problem of choosing a conceptual approach of research: a natural science approach or a humanistic one. Within the natural science research paradigm, such phenomena as ethical aspects of corruption, the issues of implementation of the meaning of life by civil servants, the issues of values, and of life orientations turn out to be beyond the methodological approach. In the humanistic paradigm, the ratio of experimental and theoretical data brings into focus the issue of the interpretation of the empirical material, depending on a conceptual basis of the theoretical analysis of this phenomenon. *Second*, the motives and motivation of corrupt behavior cannot be observed directly, thus they are inaccessible for direct perception. The study of the psychological aspects of corruption requires creation of a special methodology, application of a subject-oriented approach and conceptualization of interpersonal mechanisms of mediating the
psychological knowledge. Third, the multimodal structure of the investigated phenomenon requires a multidisciplinary approach. In particular, the psychological analysis of the phenomenon of corruption implies attribution of its legal, social, economic, and psychological phenomena. Fourth, there is an issue of the interpretation of scientific evidence. A consistently and systemically implemented principle of a subject-activity approach can serve as the conceptual core of the theoretical and methodological foundations of the research on psychology of corruption. The research is based on the main methodological principles of Russian psychology: the principle of determinism, the principle of systemacy, the principle of the unity of consciousness and activity, the principle of development, and the principle of historicism. Different types and levels of activity of a subject form an integral system of internal conditions through which it is indirectly affected by various external factors and influences. Systemic determination of a subject’s activity, thus, implies synthesis of external and internal determination (self-determination) and the existence of integrating and disintegrating tendencies.

We define corrupt behavior as behavior aimed at obtaining private gain through abuse of office. From the standpoint of the systemic determination of corrupt behavior two of its most essential elements can be identified: corruption pressure that serves as external determination; and resistance to corruption, or its opposite, propensity for corruption, that serves as self-determination. By the corruption pressure we mean a set of external and internal factors that influence an official, leading to the situation of choice between the abuse of power for private gain and the rejection of it. Resistance to corruption is a systemic personality trait which manifests itself in the ability to resist corruption pressure and make a choice between criminal and law-abiding behavior in favor of the latter. Propensity for corruption is personality predisposition to the choice of corrupt behavior in the situation of corruption pressure.

Another theoretical and methodological basis of the research on the psychology of corruption is a systemic approach as a set of cognitive tools, models and methods for multidisciplinary research. Singling out corruption resistance of public servants as a research subject makes it possible to speak about a systemic character of the sources of its formation and a level nature of the mechanisms for its implementation; one of the leading sources of destructive behavior - corruption and bribery - is a conflict of interests of the personality of the public servant. The mismatch of the motivational structure of personality actualizes decision-making mechanisms and the prediction of possible consequences of personality choices. The search for the conceptual foundation of the research on the corrupt behavior has led to analyzing criminological and psychological investigations which state that the majority of the offenders are at a certain socio-psychological distance from the society and its values. According to Y.M. Antonyan, M.I. Yenikeev, V.E. Eminov "they are sort of excluded and alienated from the society and small social groups (family, coworkers, friends, etc.), or they have significantly weakened their ties with them". On this basis, it is possible to explain the insensitivity of corrupt officials to the influence of moral, professional, and legal norms and values; and to systematize most views on corruption by referring to the category of "alienation" as a universal source of criminal behavior. In the light of the theory of alienation corrupt behavior can be seen as a mismatch between personal moral standards and social norms of morality and law. This mismatch can occur both in performing official duties and before taking office: perhaps the very desire to become a civil servant (in Russia) is born because of the possibility to use their office for personal gain. For example, young people may join traffic police for the sake of relatively easy illegal profits. There is a possibility that
people with propensity for corruption enter the public service system in order to obtain illegal profits. Therefore, of top priority is the diagnostics of resistance to corruption already at the entrance to the system. In this context creation of a special appropriate psychological tool kit becomes particularly important. In order to interpret the phenomenon of corruption behavior in the framework of the alienation theory, it is necessary to introduce the dichotomy, “ideal (normal) public servant – corrupt official”. Today, due to the systemic nature of corruption in Russia, in the public service system, getting illegal profits is a "standard". Considering this fact, it can be argued that it is the corrupt behavior which is a certain distorted "norm". In the corrupt environment there exists its own behavior norm, different from the ideal one, from how it must be. This allows us to formulate the law of a corruption norm: corruption is a norm in the public service system under the conditions of total alienation of public servants from the norm-consistent behavior. The corollary of this law is the following: a system with strong corruption pressure forces out those who are highly resistant to corruption. This statement makes sense for a social system in which there is a clear discrepancy between the declared norms of morality and law, and the implemented norms of behavior inside the professional community, in this case the community of public servants. In the media, counteraction to corruption may be declared as an aim of the state system, but in reality the existing corruption networks do not allow taking effective anti-corruption measures. In Table 3 we identify the main criteria of the difference between the ideal behavior of public servants and the corrupt ones.

Table 3: Comparison of the ideal and corrupt behavior of public servants

<table>
<thead>
<tr>
<th>Basis for comparison</th>
<th>Ideal behavior of a public servant</th>
<th>Corrupt behavior of a public servant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norms</td>
<td>Norm consistency</td>
<td>Alienation from norms</td>
</tr>
<tr>
<td>Values</td>
<td>Values of social duty and service</td>
<td>Egoistic values</td>
</tr>
<tr>
<td>Goals</td>
<td>Service to society</td>
<td>Personal gain</td>
</tr>
<tr>
<td>Social Attitudes</td>
<td>I am for society</td>
<td>Society for me</td>
</tr>
<tr>
<td>Morality</td>
<td>Moral normativity</td>
<td>Double moral standard</td>
</tr>
</tbody>
</table>

Source: Own results

As can be seen from Table 3 there is a great difference between the ideal behavior of public servants and the corrupt behavior, first of all, in the value and meaning sphere of personality. This correlates with the data obtained by E.N.Osin who describes alienation as a psychological mechanism of the loss of meaning. Alienation is understood by him as a steady condition of broken meaning relations in the structure of the life-world. In V.V. Abramenkova’s opinion the opposite of the concept of alienation is identification: "a joint mechanism of identification - alienation highlights one of the aspects of interiorization of cultural values in the process of personality development”. Two opposite traits, propensity for corruption and resistance to corruption, can be understood through the prism of attitude to corruption. The basic proposition of the psychology of attitudes (A.F.Lazursky, V.N.Myasischev) is that personality, psyche and human consciousness at every given moment are a unity of reflection of objective reality and man's attitude to it. Attitudes, gaining stability, pronouncedness and greater significance, become characteristic of the personality, become character traits. In this sense, a steady evaluative attitude towards
corruption may turn into a propensity for corruption or resistance to corruption as a character trait (personality trait). On the other hand, the formation of personality traits that determine the propensity for corruption is regulated by self-consciousness and self-attitude. For example, a person with pronounced resistance to corruption may be motivated by dignity and self-respect. Conversely, an individual predisposed to corruption experiences a distorting impact of negative self-attitudes and inadequate self-esteem on the personality legal behavior, which activates the search for compensatory mechanisms by way of raising the importance of the individual by material wealth. How can we diagnose the attitude towards corruption and to identify mechanisms of propensity for and resistance to corruption; what methodological tools will be adequate for the empirical study of these phenomena? First of all, we need to take into account the individual system of subjective meanings of objects such as "corruption", "gratitude", "extra income", "my salary", etc. This system of subjective meanings can be investigated using the methods of experimental psycho-semantics. Through the construction of a subjective semantic space, we can record the presence or absence of a specific alienation of the subjective "I" from certain common human concepts. Thus, with the help of cluster analysis, we can see the distance between various concepts important for our research. For example, the concept of "I" and the concept of "My conscience" may fall into different clusters, indicating a certain alienation of the moral category of Conscience from one’s own I. By attitude in this case, following E.J. Artemieva, we understand "an evaluative judgment recorded in the experiment". In the paper "Personality determinants of corrupt behavior", we propose a concept of “corruptogenic personality”, meaning a particular social type possessing high propensity for corruption and weak resistance to it. In the situation of corruption pressure such a person is more likely to choose the corrupt behavior, but there is very low probability that he/she will reject it. One can speak of certain internal determinants of corruptogenic personality and draw its psychological portrait. Such personality possesses the following characteristics: giving meaning to life through the acquisition of material wealth, desire for luxury as a measure of happiness, unconscious motivation and undifferentiated structure of moral behavior attitudes, low level of satisfaction with life, negative self-attitude and inadequate self-esteem, external locus of control, and impulsive type of response. Each of these characteristics increases the corruption propensity that can be described as an integral indicator. The main obstacle to the implementation of anti-corruption measures is marginalization of civil servants. In the given context of the research on corrupt behavior, concepts of "professional marginalizm" and "professional identity", proposed by the E.P. Ermolayeva, appear to be of interest. She proposes to study professional marginalizm as a psychological phenomenon, diametrically opposite to professional identity, efficiency of which has a negative sign: destruction, disruption of socially significant professional structures and relationships. Professional identity is understood as “an essence psychosocial structure in which basic relationships of a professional in the changing system, an individual–a professional—the society, are concentrated. This is a characteristic of the fully formed psychological correspondence and stable self-identification of the personality with the profession” (E.P. Yermolayeva, p.16). To assess the resistance to corruption we have developed a technique called “AKorD” (anti-corruption assessment). It consists of three scales: the scale of subjective semantics, the scale of self-regulation and the scale of self-sufficiency. The technique has been tested and checked for its reliability and validity. The comparison of the data obtained using this technique on the sample of convicts under articles 290-295 of the Criminal Code of Russia and on the sample of current public servants showed
statistically significant differences in the level of resistance to corruption (the convicts displayed a lower level - p <0.05).

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LOYALTY PROGRAMS IN FAST-MOVING CONSUMER GOODS (FMCG) SECTOR

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Abstract

One of the crucial tasks of a retailer is to attract the consumer and to build the long-time relationship called loyalty. In the paper, there are first described tiers of the relationship between retailer and customer. They can be classified as “satisfaction”, “repeated purchases” and “loyalty”. Then, based on the analysis of existing loyalty programs, their categorization has been made. In most cases the loyalty programs are based on financial remuneration of those who participate, usually according to the cumulative amount spent. This paper reveals the loyalty programs mechanisms that are typically used. Last but not least, the comparison of almost 30 specific loyalty programs has been made in order to reveal the remuneration principle and to establish the benchmarks.

Keywords: loyalty program, retail, customer loyalty, benchmark

JEL classification: M31

Introduction

One of the frequently discussed topics is the tough competition between retailers in all business sectors (see for example Machek 2012). Consumers think carefully where, and whether at all, to spend their money. Information about goods and services is available online, reading reviews and discussion forum before making purchasing decision is common behavior, especially in case of valuable purchase or choosing services. That enables comparing prices, availability and many other parameters. Purchases in the fast-moving consumer goods (FMCG) sector product categories are often based on quick decision. Buying decision is not a time-demanding process and, as well as making the first shopping decision, it is very easy for the customer to change the retailer when making the next shopping round. Also, the general trust of publics in business sector has decreased in Central and Eastern Europe, which can affect negatively the customer loyalty (Kollmannová, 2012). Therefore
creating the long time relationship with a customer and establishing the partnership based on loyalty is one of the topical themes.

Importance of the Targeting

Making a customer loyal is one of the strategic goals of any company. Customer’s loyalty is the result of many activities of a company that, if they are well balanced, can attract the customer and bind his mind with the company or brand.

But loyalty does not come into being immediately; usually it is a process of systematic steps. If well designed, the result is a loyal customer. It is useful to describe tiers that build the customer loyalty. It is presumed that repeated purchases need not always correlate with loyalty. We can distinguish three main tiers in “retailer – customer” relationship.

SATISFACTION – customer received what he expected, was not negatively affected in any touch point of the buying process, the product he has bought is now bringing him what he expected, or even better benefit.

REPEATED PURCHASES – customer buys the product or makes purchases at the retailer repeatedly. Motivators are usually based on positive experience, but repeated purchases can also be the result of laziness to look for alternatives, for example caused by geographical location of the shop.

LOYALTY – customer buys repeatedly, because he likes the company (brand). It is the result of both former positive buying experience and even more emotional and effective ties.

Acquiring new customers is a tough job and besides being time demanding it also includes financial cost. Therefore one of the focus activities that firms concentrate on is to motivate a customer for repeated purchases that are finally transformed into loyalty.

As mentioned above, it is much more worthy when the customer comes because he feels positive relationship with the company, than just because of the lack of other opportunities or by rote or laziness.

Marketers concentrate on conversion – it means turning the visitors of their shops to customers. Once a person has become customer the marketers should endeavor not to lose him, but rather force him to become a loyal customer.

Decades ago mass marketing was the main tool to build the customer relationship. It was hardly possible to collect and process the huge number of data, compute them and use the results for personalized marketing. (Tahal and Stříteský, 2013)

Nowadays loyalty programs have become very popular. If the program is well designed it can bring benefits to both sides - to the businessman and to the customer. Based on the SAS research, the successful loyalty programs from the customer point of view bring more award than only discount on goods that the customer would have bought anyway. One of the benefits of the loyalty program is building the evidence of the purchases done. Such data then can be a valuable source of information about the buying habits, shopping frequency and typical shopping basket. Based on the data analysis the goods flow can be optimized - and customized marketing can be implemented.

Literature review

The loyalty definition can be understood in different ways. Two types of loyalty are generally defined (e.g. Sczepanska and Gawron 2011; Choi et al., 2006; and Jacoby and Chestnut,
Loyalty can be perceived as an attitude and as a type of behavior. From the first point of view we investigate what customers say about their remaining with brand, brand preference etc. Behavioral approach deals with the real customer behavior concerning the brand and its usage including the comparison with competitive brands. Dick and Basu (1994) incorporated these different understandings of loyalty in one model (see Figure 1) which served as a generic model in further research studies (e.g. Schweizer, 2007). Despite the age of the model this approach can be viewed in current methodologies of meaningful research agencies.

**Figure 1**: Customer loyalty model by Dick and Basu (1994)

Customer loyalty is supposed to be positively related to profitability (Helgesen, 2006; Reichheld, 1993). It can be due to decreased customer acquisition costs, increased base profit, increased turnover, decreased operation costs, increased pricing, and positive word-of-mouth marketing (Sczepanska and Gawron, 2011).

Nowadays, we can observe an increasing popularity of loyalty programs (Ferguson and Hlavinka, 2007). This trend attracted an attention of researchers, too (Kivetz and Simonson, 2003). Motivation to offer a loyalty program can arise purely from the competitive market where all direct competitors invite customers to participate in their own loyalty programs and where inability and unwillingness to introduce similar programs might lead to a significant competitive disadvantage. (Ferguson and Hlavinka, 2007; Meyer-Waarden and Benavent, 2006). Generally, loyalty programs can achieve several main objective, that Szczepanska and Gawron (2011) described in three categories:

1. maximization of value for customers, offering value that matches customers’ expectations,
2. enhancement of relationships that bond a customers with a firm,
3. fulfilling loyalty program’s commitments and promises.

Loyalty program can deliver extra value for customers just through collecting virtual points. Loyalty programs can differ in many parameters, e.g. program objectives (boosting sales, image enhancement, competitive advantage, collecting data and others), program type, rewarding scheme and reward type. Furinto et al. (2009) distinguish between monetary and special treatment rewards. Regarding monetary-reward type of loyalty programs Yi and Jeon
(2003) warn against the risk of being perceived as similar to promotion programs. This can be specific problem of instant-reward loyalty programs. Efficient loyalty programs require sophisticated measurement that can be based on customer lifetime value (CLV). CLV is the present value of all future profits obtained from a customer during his or her relationship with a firm (Gupta et. al, 2006). Kumar (2008) emphasizes the problem of measuring only past purchasing behavior of customers (RFM value, share of wallet, past customer value. Loyalty programs can significantly reduce the value of loyal customers. CLV is thus the best alternative for measurement of customer loyalty.

Methods

For the purpose of this study a comprehensive desk research has been done. The survey covered chain companies operating in the Czech market. This study is based on the analysis of more than 50 loyalty programs. These programs are run by retailers that operate in the field (product categories) where frequent and repeated purchases are expected – FMCG, HoReCa, hobby markets, clothing and some others.

There are two main research objectives:
1) To indentify the main typical schemes the loyalty programs are based on.
2) Based on case studies - to calculate the amount of the financial benefit the loyalty programs bring to a consumer in order to compare existing running programs and to establish benchmarks.

Loyalty programs from company perspective and their classification

First task of the study was to categorize the existing loyalty programs and to describe the parameters they declare to customers. Based on the analysis there have been identified the following four basic schemes:
- Flat discounts.
- Points gathering.
- Multi-level partnership.
- Co-branded credit card.

Table 1: Schemes of loyalty programs

<table>
<thead>
<tr>
<th>Program scheme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat discounts</td>
<td>Immediate discount. Percentage of the discount depends on the volume of the purchases in the defined period (usually a year)</td>
</tr>
<tr>
<td>Points gathering</td>
<td>Customer gathers points by purchasing at the retailer. Consequently gathered points are converted into discounted purchase or material gift. This type is in some aspects similar to “Flat discounts” type, but reduced price option cannot be applied immediately but points must be gathered first.</td>
</tr>
<tr>
<td>Multi-level partnership</td>
<td>Customer chooses from several levels of partnership. The higher partnership level the more prestige title of the loyalty tier and more interesting bonuses or rewards. Minimal financial limit for receiving the discount price depends on the partnership level.</td>
</tr>
<tr>
<td>Co-branded credit card</td>
<td>Program is based on the partnership with a bank. When using the credit card for a payment at retailer’s, retailer charges a discount price from the total sum of the purchase.</td>
</tr>
</tbody>
</table>

Source: Own results
Now let’s have a look at each category of loyalty programs in more detail. Some loyalty programs are based on special conditions that do not arithmetically correspond to the amount spent. Such special conditions for receiving a consumer benefit can for example be: subscribe to a newsletter; send the shop link to a friend; reduced prices are determined ad-hoc on selected items; publish reference on the web site, etc. Other programs are based on collecting some stickers or clippings that customer can consequently exchange for material gifts. Our analyses do not cover those loyalty programs that are based on “Co-branded credit card” principle. That is because of extra fees or interest that can be charged by the issuing bank, and also customer administration is in those cases provided rather by the issuing bank than by the retailer’s company.

**Loyalty programs rewards analysis**

Beside the description of the main features of the loyalty programs our survey comes with the exact calculation of financial savings that these loyalty programs bring to their holders. For the purpose of such calculations we have defined several levels of annual spending. These levels are 5,000CZK, 20,000CZK, 50,000CZK and 100,000CZK – they represent the annual spending of the customer at a merchant.

**Table 2: Comparison of loyalty programs in the Czech retail industry**

<table>
<thead>
<tr>
<th>SECTOR OF THE RETAILER</th>
<th>YEARLY SPEND</th>
<th>PROGRAM SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5,000Kč</td>
<td>20,000Kč</td>
</tr>
<tr>
<td>DIY (hobby markets, gardening)</td>
<td>0 Kč</td>
<td>0 Kč</td>
</tr>
<tr>
<td>Chemist’s shop</td>
<td>25 Kč</td>
<td>100 Kč</td>
</tr>
<tr>
<td>Clothing and Fashion accessories</td>
<td>167 Kč</td>
<td>500 Kč</td>
</tr>
<tr>
<td>Optics</td>
<td>167 Kč</td>
<td>667 Kč</td>
</tr>
<tr>
<td>Jewellery</td>
<td>100 Kč</td>
<td>800 Kč</td>
</tr>
<tr>
<td>Chemist’s shop</td>
<td>250 Kč</td>
<td>1,000 Kč</td>
</tr>
<tr>
<td>Clothing and Fashion accessories</td>
<td>5 Kč</td>
<td>5 Kč</td>
</tr>
<tr>
<td>Sports and Outdoor equipment</td>
<td>350 Kč</td>
<td>1,500 Kč</td>
</tr>
<tr>
<td>Kitchenware</td>
<td>250 Kč</td>
<td>1,000 Kč</td>
</tr>
<tr>
<td>Sports and Outdoor equipment</td>
<td>250 Kč</td>
<td>1,000 Kč</td>
</tr>
<tr>
<td>desserts</td>
<td>250 Kč</td>
<td>1,000 Kč</td>
</tr>
<tr>
<td>Footwear</td>
<td>200 Kč</td>
<td>500 Kč</td>
</tr>
<tr>
<td>Horeca</td>
<td>500 Kč</td>
<td>2,000 Kč</td>
</tr>
<tr>
<td>Multispex</td>
<td>500 Kč</td>
<td>2,000 Kč</td>
</tr>
<tr>
<td>Multispex</td>
<td>500 Kč</td>
<td>2,000 Kč</td>
</tr>
<tr>
<td>Chemist’s shop</td>
<td>500 Kč</td>
<td>2,000 Kč</td>
</tr>
<tr>
<td>Chemist’s shop</td>
<td>500 Kč</td>
<td>2,000 Kč</td>
</tr>
<tr>
<td>Bookstore</td>
<td>750 Kč</td>
<td>3,000 Kč</td>
</tr>
<tr>
<td>Bookstore</td>
<td>750 Kč</td>
<td>3,000 Kč</td>
</tr>
</tbody>
</table>

**Source:** Own results
In the table below there are 27 loyalty programs that have been analyzed. These programs are characterized by clear scheme and algorithm. These retailers fairly publish in advance the relation between spending and financial benefits.

Each line in the table represents one retail chain operating in the Czech Republic and its loyalty program. The very left column characterizes the product category (categories) the retailer specializes in. The very right column characterizes the loyalty program scheme.

The columns between bring the exact calculations based on 27 existing loyalty programs in the Czech market. The financial savings are figured out both in the absolute value (CZK) and in relative value as well. The figures are in the ascending order driven by “20.000CZK annual spending” column.

The next table is based upon the same data but in the aggregated form. The percentage figures in the left column are calculated as a mean value of each sector – again on the level of 20.000 CZK annual spending.

**Table 3: Results according to sector**

<table>
<thead>
<tr>
<th>Percentage discount reflecting 20.000 CZK annual spending</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0%</td>
<td>DIY (hobby markets, gardening)</td>
</tr>
<tr>
<td>1.5%</td>
<td>Food chain</td>
</tr>
<tr>
<td>3.3%</td>
<td>Optician</td>
</tr>
<tr>
<td>4.0%</td>
<td>Jewellery</td>
</tr>
<tr>
<td>4.9%</td>
<td>Clothing and Fashion accessories</td>
</tr>
<tr>
<td>5.0%</td>
<td>Kitchenware</td>
</tr>
<tr>
<td>6.0%</td>
<td>Sports and Outdoor equipment</td>
</tr>
<tr>
<td>7.7%</td>
<td>Chemist's shop</td>
</tr>
<tr>
<td>8.0%</td>
<td>Footwear</td>
</tr>
<tr>
<td>9.3%</td>
<td>HoReCa</td>
</tr>
<tr>
<td>10.0%</td>
<td>Multiplex</td>
</tr>
<tr>
<td>20.0%</td>
<td>Bookstore</td>
</tr>
</tbody>
</table>

**Source:** Own results

In spite of certain limitations caused by relatively small sample size in some sectors, this classification can be used as a guideline in the companies when making strategic decisions about the loyalty program. The figures can be considered as the benchmark outline.

**Managerial Implications**

For establishing a long-life relationship with customers, firms use all the elements of the marketing mix. In case of luxury goods or fashion news the retailer can attract the customer with product parameters and product innovation. The convenience of distribution channels also works as a good field for the differentiation. In this study we have concentrated on chain retailers operating in FMCG sector and related product categories as well as services that are bought for everyday use and where repeated purchases are expected.

When a retailer decides to build in the loyalty program, it becomes a part of the total strategic marketing concept. Parameters of the loyalty program must be carefully designed. Once the loyalty program is promoted, its rules and conditions should not be changed too frequently, or
else it can cause confusion of the customers instead of increasing their advocacy and loyalty. In the long time perspective a loyalty program goal is to bring competitive advantage (increase market share when comparing with the sector benchmark; bring possibility to customize product offers; build up the data base of sales, customers and perhaps store effectiveness.)

A well designed loyalty program helps to create positive image of the brand, transforms customers into brand advocates, motivates for emotively based repeated purchases, but on the other hand it is not economically unfavorable for the company. In the long time period it must bring positive effects and increase brand awareness, not financial loss.

The crucial decision that must be made by the retailer is the type of the loyalty program and concrete benefits that will be provided for the customers.

This study reveals the main approaches to constructing the loyalty / beneficial programs.

Another key issue is establishing benchmark based on exact survey and financial calculations. Comparisons of several business sector and customer benefits in four levels of the yearly spending have been made. It should work as guidelines for retailers when calculating the remuneration they will pay back to the customers for repeated purchases under the heading of loyalty program.

**Literature:**

- Kollmannová, D. K. (2012). CEO and Businesses are Losing Trust: Comparison

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PROSPECTS OF USING NATURAL INORGANIC SORBENT, GLAUCONITE, IN THE PRODUCTION OF BOTTLED DRINKING WATER

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Ekaterina Baryshnikova  
*NPO “Ionit”*

**Abstract**

*Supply of drinking water to population is one of the most important factors in the security of any country. Water treatment technology has now become a very complex and multi-faceted branch of engineering technology that involves physical, chemical and biological processes. For the solution of the problems of water treatment for drinking purposes scientific substantiation is proposed of the use of an environmentally friendly natural sorbent (glauconite) which allows effective reduction of the cost of water purification carried out by companies.*

**Keywords:** inorganic nano-structured sorbent, glauconite, adsorption, profitability of production, energy and resource saving, efficiency, environmental safety.

**JEL classification:** L66, O31, O33, Q53

**Introduction**

In Russia consumption of purified water in plastic or glass containers increases every year with the gradual growth of incomes of the population and their attention to their health. According to the National Association of Bottled Waters the bottled drinking water market has increased in the last few years by 15-17 % per year. The reason of it is the deterioration of tap water quality due to the contamination of the hydrosphere by products of anthropogenic origin. The latter in its turn requires developing new energy and resource saving treatment technologies for waters of different origin.

**Drinking water purification, using natural sorbents**

One of the most common water purification methods is filtration. Currently, various granular media are used for filtering. Granular media filters are divided according to the key features, such as 1) filtration rate: slow (0.1-0.3 m / h), rapid (5-12 m / h) and high rate (36-100 m / h); 2) pressure at which they run: open (or non-pressure) and pressure; 3) direction of the filtering flow: single-flow (usually these are rapid filters), double-flow, multi-flow; 4) size of
the filtering material: fine-, medium- and coarse-grained; 5) number of the filtering layers: one-, two- and multi-layered. Rapid open filters are the most common ones in water supply technologies. The effectiveness of using open filters is mainly determined by the kind of the applied filtering material. The underlying requirements of its selection are the following: appropriate fractional composition, degree of grain size uniformity, mechanical strength, chemical resistance and sanitary-hygienic assessment for trace elements that pass from the material into the water. The most common filtering material is quartz sand. Much more rarely used are expanded clay aggregate, anthracite, burnt rock, shungizit, scorias and blast furnace slag, etc. The most important technological characteristics of filtering materials are density, the inter-granular porosity of the medium, and grain shape.

All of the above listed filtering materials mainly remove suspensions and colloids that are taken out and fixed on the grains of the filtering medium only under the action of adhesion forces. These materials can be regarded as "traditional". Their choice in each case is largely determined by economic reasons, i.e. by cost and availability in the location of the constructed filtration plant.

However, in recent decades the qualitative composition of the surface water sources has drastically changed for the worse because of the ever-increasing technogenic and anthropogenic impact: municipal and industrial waste waters, runoff of fertilizers and pesticides from the fields, sewage of livestock and poultry farms, etc. As a result, drinking water sources have got a whole new range of organic and inorganic contaminants in the form of various suspensions, emulsions, colloids, surfactants, complexes, molecules and ions. The content of pathogenic microorganisms and viruses in water has also increased. Under these conditions the traditional filter materials (and in most cases it is quartz sand) have proved insufficient or ineffective for obtaining water that would meet modern requirements.

Therefore, new active filtering materials began to be introduced; they not only purify water mechanically, but also have a chemical, adsorption and ion exchange impact on the contaminants. Today, natural sorbents come to the fore: zeolites (clinoptilolite), zeolite-containing siliceous rock, opokas (which are 97% micro-grained water amorphous silica, water mixed with clay, sand, glauconite, etc.). Cheap and available, they possess marked adsorption and ion exchange properties that allow the removal of a wide range of organic and inorganic contaminants of most diverse origins.

A great advantage of natural sorbents over other filtering materials is their significant porosity that provides for their fine adsorption and hydrodynamic properties in water purification filters. Compared to quartz sand, natural sorbents as a filter medium have the following basic advantages:

1. They improve the physical and chemical properties of water: turbidity (by 6-20%), color (by 1-8 degrees or more) and other water quality parameters.

2. They enhance the technological parameters of the filter run, increase the removability of fine mechanical suspension and the solids take-up capacity of the filter. When the crushed natural sorbents having particles of an irregular shape are loaded into purification adsorber, large intergranular space is formed. Apparently, it is due to this fact that their solids take-up capacity is greater than that of quartz sand, for example, for zeolite it is 10-12 kg/m2. This allows for the use of larger fractions (1-4 mm) of the filtering material than those of quartz sand; the increase of the filtration rate from 5-7 (quartz sand) to 8-10, and sometimes to 12-14 m/h; the reduction of the filtration cycle by 4-16 hours. Water consumption for the backwashing of the filter becomes 10-30% less, and the backwashing time is reduced. The
production capacity of water purification filters increases from 7-10% to 50% or more, depending on conditions. With this improvement of the filter technological parameters, it becomes possible in some cases to switch to direct filtering and abandon the construction and operation of settling tanks that are required when quartz sand is used.

3. Natural sorbent filters simultaneously remove and reduce concentrations of harmful components in a cationic form: heavy metals - lead, mercury, copper, nickel, and others, as well as iron, strontium, ammonium, phenols, petrochemicals, etc. The presence of iron in water negatively affects its quality; therefore, its content in water is determined by regulations according to SaN.PiN. 2.1.4.1074-01. Drinking water. Water supply in the populated areas. Iron is found in water as divalent ions. It is removed from water by means of ion exchange or by oxidation of chlorine and potassium permanganate, by ozone to Fe3+ followed by precipitation as iron hydroxide (III). There are methods of removing iron from drinking water by natural zeolites and opoka of various fractional compositions providing high degree of purification. Experiments on the removal of Fe3+ from water, using opokas with a diameter of 20 to 50 mm, were performed. The water was passed through the sorbent layer at a rate of 1 cm3 per second. The obtained results show that the dynamic adsorption is rather effective for the removal of iron by this sorbent.

Laboratory-technological and pilot plant testing of zeolite-containing siliceous rocks of Tatarstan as a filtering material for drinking water demonstrate that these rocks and the activated carbon exhibit approximately equal level of performance: according to the data of the Federal State Unitary Enterprise "TsNIIgeolnerud", they sorb cations Cu2+, Mn2+, Fe2+, 3+, Zn2+, phenol and petrochemicals equally.

4. Water treatment costs are lower than the costs incurred by filters with quartz or other filtering materials. Clinoptilolite medium significantly increases the production capacity of water purification plants. The reason of higher effectiveness of water purification by natural zeolite rocks as compared to quartz sand is that in the zeolite filtering material two mechanisms of water purification are implemented: adhesion, in the intergranular space, and physical-mechanical sorption on zeolite crystals; thereby it is capable of removing contaminants of most different nature and origin from water.

The ion-exchange properties of zeolite rocks are reflected in the ability of the solid phase to exchange its ions with the ions in water. In the general case the removal (sorption) of cations from water by natural zeolite rocks can be performed not only by their exchange without destroying the crystalline structure, i.e., actually by a cationic mechanism in the intercrystalline space but also by their sorption on the surface of the solid phase in meso- and micropores. Both these processes proceed simultaneously, and their role and ratio depend on many factors; functionally the two processes manifest themselves somewhat differently. In cation-exchange processes proper, mostly only charged cations, whose size allows them to penetrate intercrystalline micropores and channels of zeolite, can participate. As to the sorption in mesopores, not only charged cations can sorb there but also neutral molecules, as well as colloid and mechanical suspensions.

The effectiveness of the removal of various components out of water by natural sorbents depends on several physicochemical parameters of the sorbent and liquid phase: the type of the mineral, the amount of impurities, the composition of exchange cations, the volume and distribution of pores according to their size, the size of solid phase particles, water composition, the concentration of the substance being removed, the presence and concentration of the competing ions, etc. Static and dynamic capacity complemented by some
other parameters characterizing the rate and selectivity of the exchange during sorption is assumed as an integral characteristic of natural sorbents that to a large extent determines the efficiency of removal processes. It should be noted that there is no uniform standard technique for determining total exchange capacity, and the data relating to this parameter in the research literature are often not comparable with one another. As for the kinetic characteristics of cation exchange, the available data indicate that there are different positions of the exchange sites in zeolites, and the rate of the exchange on these sites may differ significantly from one another. For this reason the data on the exchange capacity obtained by some authors may prove unequal. In the experimental study of ion-exchange properties it has been found that cation exchange on zeolites is characterized by selectivity and discrimination with respect to certain ions. A general series of ion selectivity calculated on the thermodynamic parameters for clinoptilolite (Cs > Rb > K > NH4 > Pb > Ag > Ba > Na > Sr > Ca > Li > Cd > Zn) has been proposed. In this series of selectivity the competing ions are arranged in the order of the reduction of exchange capacity and binding force which is formed in cation exchange from aqueous solutions. For example, all other conditions being equal, on achieving equilibrium cation exchange, clinoptilolite will sorb more cesium than rubidium, more rubidium than silver and others following it, etc. From these series it follows that calcium and sodium forms of clinoptilolite are more preferable in cation-exchange processes than, for example, aluminum or potassium forms. To date, numerous studies on the possibility of using natural zeolites for water purification have been conducted. Recently, good results have been demonstrated by household filters that use zeolite and opoka media. Substantiation of the possibility of using opokas for drinking water purification was made. Based on this substantiation, pilot exploitation of sorption filtering material was organized. The resulting analysis of the data showed that the adsorption filtering material produced on the basis of opokas can be used to purify water for various purposes. This may be after-purification in individual or shared water purification units. It is also possible to purify river water, without its pre-filtering, using opokas as filters. The equipment used in water purification technologies are filters, ion-exchange columns and tanks. Purification processes may be conducted in a continuous or periodic pattern, with a fixed or moving layer of solid phase with or without regeneration. In the latter case, there is a problem of recycling the waste material as a fertilizer, a building material, or for other purposes.

Thus, the analysis of the data clearly shows that natural sorbents - zeolites, opokas, zeolite-containing siliceous rocks - used for water treatment provide a more effective removal of various contaminants from water than the currently used quartz sand, which makes it possible to replace it with the specified types of sorbents.

**The uniqueness of natural glauconite**

We have conducted research on the use of a natural mineral, glauconite, as an adsorbent in water treatment systems. Glauconite differs from zeolites in that it has a layered structure, not a frame one, and thus favourably distinguishes itself by the area of an active surface, which is expressed in its adsorption capacity. In addition, it is essential that glauconite is an environmentally friendly product, with high resistance to radiation and thermal impact, and is widely spread in regional deposits. Properties of all glauconites found in nature differ significantly. We suggest that for purifying tap water and, correspondingly, for producing bottled water (BW), natural glauconite of Bondarskiy deposits in Tambov region be used as a
sorbent, because, as shown in the earlier research by Vigdorovich V.I., this glauconite has high adsorption capacity with respect to ions of lead, copper, zinc, calcium, magnesium, phenol and aniline, i.e. it is effective for treatment of wastewater and industrial effluents of galvanic manufactures.

The basis determining the uniqueness of the natural sorbent, glauconite, is its ability for self-organization processes which is demonstrated by the following unique properties of this mineral:
1) high dispersion, leads to an increased hydrophilicity, the presence of colloidal dispersion properties;
2) when moistened, glauconite forms sol-gel phases determining cohesive-adhesive properties (stickiness) and its plasticity as a natural binding substance;
3) a set of buffering factors specific for these rocks ensuring (or controlling) the stable existence of glauconite in its typical pH environment (6.5 to 8) which depends on the substance composition and crystallochemical structure of the mineral;
4) high physicochemical activity of glauconite characterized by absorption capacity and the presence of the absorbing complex having complex composition;
5) characteristic natural pH level of glauconite medium due to easily and poorly soluble salts, humus and humic acids contained in it, as well as various organic compounds on their basis influencing the reaction of the rock medium;
6) ability for spontaneous isothermal restoration of the destroyed structure over time at a constant moisture content (called thixotropy), which reflects the actual manifestation of self-organization processes, which are the most typical of aluminosilicates, thanks to the mutual transitions of colloidal dispersed and sol-gel phases;
7) ability for regeneration in accordance with its inherent initial structure (genetic code).

Scientific substantiation of a new method for contaminant removal from water

The latter property of regeneration is used as the basis of a new conception that implies a mineral-genetic (regeneration) approach to the implementation of the processes of physicochemical transformation of chemically unbalanced technogenic wastes of various kinds into ecologically friendly material systems. This can be done by means of artificially initiated processes of regenerative mineral formation in dispersed aluminosilicates that underwent acid-base hydrolysis.

When manufacturers remove various contaminants from water, the methods they use give rise to new undesirable processes and phenomena that are caused by precipitates in the form of viscoplastic sludge (in the case of chemical reactant and biological methods) or by extremely concentrated liquid wastes (in the case of electrochemical, electrophysical, electrocoagulation, membrane, reverse osmosis, and sorption methods designed for regeneration of the used sorbents). As a result, new, more dangerous – because of the elevated concentration of contaminants – wastes are formed; they require special measures for their localization by burial in specially engineered landfills, which demands considerable funds and undesirable alienation of land. In this connection the considered methods for contaminated water regeneration cannot be regarded as ecologically fully reliable, and from the economic point of view, they increase costs of the disposal and purchase of new membranes, sorbents, etc.
Regeneration of contaminated waters according to the conception mentioned above is accomplished not directly by chemical reagents, but with the help of a specially prepared hydrolyzed aluminosilicate substrate: a polydisperse mineral-matrix and sol-gel system in the form of sorption-active paste (SAP) that by diluting with contaminated water is converted into sorption-active suspension (SAS). The resulting suspension is introduced and uniformly distributed throughout the volume of the liquid being treated, with the process of through-solution chemisorption of contaminants going on, accompanied by simultaneous formation of an environmentally safe precipitate. The clarification of the SAS-treated liquid occurs within 20-30 minutes. The precipitate is characterized by reduced hydrophilicity and adhesiveness, as well as by increased drainability. Further on, (within the first 2-3 days and then less intensively) in the precipitate, processes of self-organization occur - it lithifies.

The physicochemical essence of the new method of removing contaminants from water is as follows. When SAS is combined with the purified liquid, there occurs hemisoption uptake of contaminants by the sol-gel phase and polydisperse mineral matrix that consists of coarsely-, finely- and colloidally-dispersed particles (i.e., particles with diameters of \( d > 0.001 \) mm, \( d <0.001 \) mm and \( d <0.0001 \) mm, respectively). According to the well-known Le Chatelier principle of inhibitory counteraction, mineral matrix tends to restore its original chemical equilibrium state, which in this case is accomplished due to the artificially initiated process of "restorative" mineral formation. All kinds of chemically active contaminants are involved in this process, which is facilitated by the initial metastable state of the hydroisolated aluminosilicate matrix that exists as if in an "early diagenesis" state. Therefore, in the course of interaction with active components of the dispersion medium it undergoes corresponding phase transformations in accordance with the relevant genetic code of mineral associations represented in the given process.

The given explanations of the nature of the processes of chemisorption of water contaminants (first of all, heavy metals) by mineral matrix follow from the theory of synthesis of binders (TSB) in dispersion mineral media.

The core of the theory is in propositions about stages, relationships and successiveness of physicochemical processes in reagent-glaucnite systems (clay rock). The essence of the theory is as follows: the complex process of the interaction of chemical reagents with clay rocks is divided into five arbitrary stages of interaction (I - V). Here chemical reagents are substances that can shift the reaction of rock medium to an acidic or basic range, unfavorable for the sustainable existence of clay rock minerals.

Stage I: interaction of chemical reagents with clay rocks involves physicochemical processes of dissolution and dissociation of chemical reactants in the liquid phase of clay soil (rock);

Stage II: physicochemical processes of overcoming the buffer factors of the rock (exchange reactions, combination reactions, chemical uptake of reactant ions by solid, colloidally dispersed and sol-gel phases of the rock);

Stage III: processes of incongruent hydrolysis (destruction) of clay minerals, formation of a multi-component system of oxides taken out of the crystal lattices of clay minerals, formation of primary extremely hydrated metastable compounds, and of colloidally dispersed and sol-gel phases of new formations;

Stage IV: phase transformations of primary compounds into more stable secondary, tertiary ones, etc. (bifurcation processes of new formations), which generates compaction and increased stability of the sol-gel phase of new formations;
Stage V: formation (synthesis) of polynuclear aluminosilicate new formations that have binding properties, due to the spontaneous optimization of the ratio and composition of the products of liquid-phase chemical reactions, as the result of overcoming internal contradictions inherent in reactant-ground systems.

This theory, which confirms the explanation of one of the unique properties of this mineral, actually represents a major step in the process of self-organization of glauconite.

An important distinguishing feature of the considered chemisorption mineral-matrix technology (CMMT) is that it combines positive qualities of the known methods: chemical-reactant (high performance) and sorption (high quality treatment), thereby eliminating their shortcomings. The new method of regeneration of contaminated water is characterized by high efficiency, due to a relatively small consumption of SAP (recommended ratio: solid: liquid phase 1:400-1:1000 or more, depending on the degree of water contamination), and its low cost. The economic and ecological effectiveness is achievable thanks to our new mineral-genetic conception of solving problem tasks of engineering geoecology for purifying contaminated water, based on using the unique properties of glauconite described above.

The advantage of using glauconite in the production of bottled water

It should be noted that in the Russian market modern nano-structured sorbents used for water purification and production of bottled water are represented mainly by foreign analogs, such as AC and MC of the Alsis firm, BIRM, EcoSoft, Purolite, Manganese Greensand, PUROLITE etc. We have investigated major physicochemical parameters and sorption characteristics of the glauconite of Bondarsky deposit of Tambov region and have compared them with those of foreign analogs. Special attention was paid to the study of the sorption activity of glauconite in relation to the ions of iron (Fe²⁺, Fe³⁺), Ca²⁺, Mg²⁺, Cl⁻, SO⁴²⁻. The investigations were conducted on the basis of the NPO "IONIT", using their established technological scheme of tap water purification. It included the passage of water through an ion exchanger which is filled with glauconite. The results of ion sorption by glauconite derived from the data obtained in chemical analysis are shown in Table 1.

<table>
<thead>
<tr>
<th>The factor under investigation</th>
<th>Mass fraction of the sorbed adsorbate%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water hardness</td>
<td>79</td>
</tr>
<tr>
<td>Fe²⁺ and Fe³⁺</td>
<td>33</td>
</tr>
<tr>
<td>Ca²⁺</td>
<td>83</td>
</tr>
<tr>
<td>Mg²⁺</td>
<td>78</td>
</tr>
<tr>
<td>Cl⁻</td>
<td>74</td>
</tr>
<tr>
<td>SO⁴⁻</td>
<td>71</td>
</tr>
</tbody>
</table>

**Source:** Own results

Based on these results, it can be concluded that the natural glauconite of Bondarsky deposit of Tambov region has high sorption capacity for the ions under study. After passing through an ion exchanger with natural glauconite, water becomes structured, soft, saturated with useful natural elements and by all parameters meets the SaNPiN 2.1.4.1116-02 requirements for bottled water. Thus, glauconite, compared to foreign analogs, is more effective as far as sorption capacity, sorption kinetics and ion exchange parameters are concerned; therefore, it can be used in the production of bottled drinking water.
To confirm the effectiveness of glauconite adsorption capacity, here is an example of the investigation of Fe\textsuperscript{2+} cation adsorption kinetics in a stationary mode with an S:L ratio of 1:50 on commercial adsorbents, HRCM Golden Formula, AC, MC in comparison with samples № 9, 10, 11, 12. Composition of the obtained samples and values of specific surface area are given in Table 2.

Table 2: Composition of the samples under investigation and specific surface area values

<table>
<thead>
<tr>
<th>Number</th>
<th>Sample composition</th>
<th>annealing t, C</th>
<th>SSA m\textsuperscript{2} g</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>60</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>60</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>60</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>70</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>glauconite</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own results

The investigation of Fe\textsuperscript{2+} ion adsorption on granular samples of adsorbents was carried out by the method of measuring kinetic curves under stationary conditions; the analysis of the samples was carried out, using X-ray fluorescence technique according to the calibration curve method. Graph 1 (Table 3) shows the kinetic curves of Fe\textsuperscript{2+} content in water for all of the investigated samples in percents relative to the initial concentration of Fe\textsuperscript{2+}.

Graph 1: Kinetic curve of Fe(II) content in water relative to the initial concentration.
Table 3: Kinetic data of Fe^{2+} ions content in water for all of the investigated samples

<table>
<thead>
<tr>
<th>t</th>
<th>Golden formula</th>
<th>AC</th>
<th>MC</th>
<th>Sample 9</th>
<th>Sample 10</th>
<th>Sample 11</th>
<th>Sample 12</th>
<th>Glauconite</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<td>46</td>
<td>74</td>
<td>79</td>
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<td>20</td>
<td>9</td>
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</tr>
<tr>
<td>50</td>
<td>10</td>
<td>33</td>
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<td>60</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Own results

It should be noted that the kinetic adsorption curves for Fe^{2+} on samples № 9, 10, 11, MC have the same nature and differ in size insignificantly. These samples adsorb 20-30wt % of the initial concentration of Fe^{2+}, which agrees with low values of specific surface area (5-11 m^2/g); sample № 12 and the AC adsorbent adsorb 62-68 wt% Fe^{2+} of the initial concentration. In addition, sample 12 has a higher adsorption rate.

In the independent laboratory, ZAO "GIZ PV", chemical analysis has been made of the investigated water obtained by the passage of ordinary tap water through a specially designed technological scheme of water purification and saturation with mineral salt ions in an ion buffer. The resulting basic parameters were checked for compliance with SanPiN and other international standards. The results are presented in Table 4.

The data in the table demonstrate that the investigated water sample is harmless for a living organism. Note low levels of Ca and Mg concentrations in the investigated water (see Table 4), which is accounted for by the softening action of glauconite due to its ability to take up calcium and magnesium ions from water, giving its sodium ions instead. This property of glauconite is very important, as it is known that the increased water hardness (i.e. high Mg and Ca content) leads to cardiovascular diseases, as well as to rapid deterioration of the equipment due to salt deposition on its surfaces, increasing electricity overruns and monetary expenses.

From Table 4 it is also seen that by the rest of the characteristics ionized water is as good as first category bottled water.
Table 4: Requirements for the organoleptic properties of water and for the content of the main salt components in comparison with the investigated aqueous sample

<table>
<thead>
<tr>
<th>properties</th>
<th>measurement units</th>
<th>property value</th>
<th>Drinking water quality standards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>tap water</td>
</tr>
<tr>
<td>1. Criteria of aesthetic properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1а. Organoleptic properties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>odor at 20°C</td>
<td>points</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>taste</td>
<td>points</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>color</td>
<td>degrees</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>turbidity</td>
<td>FTU</td>
<td>&lt;0,5</td>
<td>2,6</td>
</tr>
<tr>
<td>hydrogen index, pH</td>
<td>units</td>
<td>8,1</td>
<td>6,0 – 9,0</td>
</tr>
<tr>
<td>total hardness</td>
<td>units</td>
<td>1,5</td>
<td>7</td>
</tr>
<tr>
<td>alkalinity</td>
<td>mmol/L</td>
<td>1,9</td>
<td>0,5 – 65,0</td>
</tr>
<tr>
<td>1б. Salt composition values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chlorides</td>
<td>mg/L</td>
<td>5,2</td>
<td>350</td>
</tr>
<tr>
<td>sulfates</td>
<td>mg/L</td>
<td>&lt;10,0</td>
<td>500</td>
</tr>
<tr>
<td>calcium</td>
<td>mg/L</td>
<td>17,8</td>
<td>25,0 – 130,0</td>
</tr>
<tr>
<td>magnesium</td>
<td>mg/L</td>
<td>7,1</td>
<td>5 – 65,0</td>
</tr>
<tr>
<td>2. Criteria of composition harmlessness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2а. Salt composition values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total mineralization</td>
<td>mg/L</td>
<td>147,3</td>
<td>1000,0</td>
</tr>
<tr>
<td>nitrates</td>
<td>mg/L</td>
<td>&lt;0,6</td>
<td>45,0</td>
</tr>
<tr>
<td>hydro carbonates</td>
<td>mg/L</td>
<td>114,7</td>
<td>30,0 – 400,0</td>
</tr>
<tr>
<td>2б. Toxic metals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aluminum</td>
<td>mg/L</td>
<td>&lt;0,02</td>
<td>0,5</td>
</tr>
<tr>
<td>total iron</td>
<td>mg/L</td>
<td>&lt;0,04</td>
<td>0,3</td>
</tr>
<tr>
<td>manganese</td>
<td>mg/L</td>
<td>&lt;0,005</td>
<td>0,1</td>
</tr>
<tr>
<td>cadmium</td>
<td>mg/L</td>
<td>&lt;0,0005</td>
<td>0,001</td>
</tr>
<tr>
<td>copper</td>
<td>mg/L</td>
<td>&lt; 0,0006</td>
<td>1,0</td>
</tr>
<tr>
<td>mercury</td>
<td>mg/L</td>
<td>&lt;0,0001</td>
<td>0,005</td>
</tr>
<tr>
<td>lead</td>
<td>mg/L</td>
<td>&lt;0,005</td>
<td>0,03</td>
</tr>
<tr>
<td>sodium</td>
<td>mg/L</td>
<td>4,3</td>
<td>200,0</td>
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<tr>
<td>potassium</td>
<td>mg/L</td>
<td>3,1</td>
<td>20,0</td>
</tr>
<tr>
<td>2в. Toxic non metal elements</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>arsenic</td>
<td>mg/L</td>
<td>&lt; 0,0005</td>
<td>0,05</td>
</tr>
<tr>
<td>ozone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2г. Halogens</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>residual chlorine</td>
<td>mg/L</td>
<td>&lt;0,01</td>
<td>0,3 – 0,5</td>
</tr>
<tr>
<td>fluorides</td>
<td>mg/L</td>
<td>0,49</td>
<td>1,5</td>
</tr>
<tr>
<td>2д. Organic contamination values</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>oxygen demand with permanganate as the oxidant</td>
<td>mg/L</td>
<td>&lt;0,25</td>
<td>5,0</td>
</tr>
<tr>
<td>ammonia (on nitrogen)</td>
<td>mg/L</td>
<td>&lt;0,04</td>
<td>2,0</td>
</tr>
<tr>
<td>nitrates</td>
<td>mg/L</td>
<td>0,06</td>
<td>3,0</td>
</tr>
<tr>
<td>petrochemicals</td>
<td>mg/L</td>
<td>&lt;0,005</td>
<td>0,1</td>
</tr>
</tbody>
</table>

Source: ZAO “GITs PV”, SanPiN Requirements
Cost effectiveness of using glauconite for water purification

An important advantage of glauconite is its cost, which is far lower than that of the foreign analogs (see Table 5). Therefore, from the economic point of view, the use of this sorbent in the technology of bottled water production is much more profitable.

Table 5: Market price of sorbents

<table>
<thead>
<tr>
<th>Sorbent</th>
<th>Market price, ruble/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glauconite</td>
<td>8000-15000</td>
</tr>
<tr>
<td>Birm</td>
<td>60 000-80 000</td>
</tr>
<tr>
<td>Manganese Greensand</td>
<td>100 000-120 000</td>
</tr>
<tr>
<td>AC/MC sorbent</td>
<td>100000-110000</td>
</tr>
<tr>
<td>HRCM Golden Formula</td>
<td>315000-400000</td>
</tr>
<tr>
<td>PUROLITE</td>
<td>70 000-80 000</td>
</tr>
</tbody>
</table>

Source: http://do.gendocs.ru; market.yandex.ru

We also believe that the use of glauconite in various water purification systems offered today in the Russian market will reduce the cost of the produced water purification systems and at the same time will increase their competitiveness in the market of water purification equipment. Low cost and high effectiveness of this sorbent applied in water purification systems will allow displacement of the currently used foreign analogs of sorbents from the domestic market and then from the external market.

Today, bottled water business is highly profitable. Gross profit margin is about 70%. The expenses relevant to the cost of production include the purchase of chemical ingredients for water purification, including the sorbent material we offer; the purchase of materials for making bottles; electricity, etc. (The listed costs will vary, depending on bottled water business).

Let us analyze, by the example of the Water World Ltd company, how the structure of the revenue allocation for 2012 will change if instead of using foreign sorbent, Birm, in water purification technology they purchase glauconite (see Chart 1).

Chart 1: Allocation framework of the revenue of "Water World" Ltd. for 2012

Source: www.MoneyMakerFactory.ru
As seen from the chart the bottled water production cost is 14%, including the cost of the sorbent. Accordingly, purchasing glauconite (which is much cheaper than the BIRM analogs), one can reduce the cost of the whole bottled water production by 4-5%; therefore, the average annual profitability before tax will increase, and the payback period of the investment into the organization of production will be essentially shorter.

Conclusions

Thus, the results of the conducted investigations show that the inorganic natural mineral, glauconite, of the Bondarsky deposits of Tambov region not only can be used as a sorption exchange material in the production of bottled drinking water, but it will make the business of purification and bottling of drinking water more profitable.

References

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- Proizvodstvo butilirovannyh vody (Production of bottled water) http://MoneyMakerFactory.ru/
- http://market.yandex.ru/
- SaN.PiN. 2.1.4.1074-01. Pit’yevaya voda. Vodosnabzheniye naselyonnykh mest. (Drinking water. Water supply of inhabited areas)

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GUIDELINES FOR AUTHORS

PAPER TITLE: TIMES NEW ROMAN 13 pt, CENTERED IN THE MIDDLE, MAXIMUM 40 WORDS IN LENGTH (NO REFERENCES IN THE TITLE)

Wadim Strielkowski
Charles University in Prague

Inna Čábelková
Charles University in Prague

Evgeny Lisin
Moscow Power Engineering Institute

Abstract

The abstract should not exceed 300 words and it should explain the goals and objectives of your paper (you might start with the words „This paper focuses on...“, „This paper aims at explaining...“, „Our paper is concerned with...“, etc.). It should very briefly outline what your paper is about, what concepts and methodology it applies and what main results it contains. The abstract should be kept to the minimum – you should keep the discussion of your results for the conclusions of your paper.

Keywords: attitudes to poverty, political orientation, responsibility, role of state, belief in God

JEL classification: A13, D31, J10, Q17 (Journal of Economic Literature Classification system available at: http://www.aeaweb.org/jel/jel_class_system.php)

Introduction (please do not number sections of your paper)
In the introduction you should present the main idea of your paper, outline the scope of your research and tell the readers what the rest of the paper is going to be about. Please feel free to use the following template:

“This paper is organized as follows: First, the overview of the research literature on the subject of our research will be presented. Second, the data and the theoretical model will be described. Third, the model will be run and the results duly presented and commented on. Forth, policy implications will be outlined and discussed in detail. Finally, in the conclusions the main outcomes of our research will be clearly stated”.

Please use only Times New Roman, 12 points, single spaced. Please do not use footnotes and hyperlinks in the text – all the references should be presented in the References. Please refrain from using complicated graphics and diagrams (Word Visio, Corel, Adobe Photoshop, etc.) – all graphs and diagrams should be provided as JPEG or PNG images in resolution not lower than 200dpi as separate files together with your paper.

Overview of the research literature

Should you use sub-chapters, please do so in the following way

Sub-chapters should be clearly identified by using Times New Roman, 12 points, bold font + italics.

A source for each table should be presented (in case it is a result of your own research or calculations state „Own research“, „Own results“ or „Own calculation“), Times New Roman, 12 pt.

Table 1: Each table should be named as the following (Times New Roman, 12 points)

<table>
<thead>
<tr>
<th>Times New Roman, 10 points, bold</th>
<th>Times New Roman, 10 points, bold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times New Roman, 10 pt, single spaced</td>
<td>Times New Roman, 10 pt, single spaced</td>
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</tr>
<tr>
<td>Times New Roman, 10 pt, single spaced</td>
<td>Times New Roman, 10 pt, single spaced</td>
</tr>
</tbody>
</table>

Source: Čábelková and Orkhan (2012)

The results of statistical analysis (regressions, correlations) should be summarized as the following:

Table 2: Results of the regression analysis

<table>
<thead>
<tr>
<th>Inflows</th>
<th>Std. errors</th>
<th>Outflows</th>
<th>Std. errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable 1</td>
<td>-0.277***</td>
<td>.177</td>
<td>0.784***</td>
</tr>
<tr>
<td>Variable 2</td>
<td>7.763***</td>
<td>2.180</td>
<td>-2.543**</td>
</tr>
<tr>
<td>Constant</td>
<td>-77.39**</td>
<td>64.399</td>
<td>-4.145*</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.378</td>
<td>0.305</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.370</td>
<td>0.296</td>
<td></td>
</tr>
<tr>
<td>No. of observations</td>
<td>150</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

Source: Own results

The results of estimating more complicated models can be presented in the following way:
Table 3: Results of the multinominal logistic regression

<table>
<thead>
<tr>
<th>Category</th>
<th>Group 1 vs. Group 4</th>
<th>Group 2 vs. Group 4</th>
<th>Group 3 vs. Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable 1</td>
<td>1.125 (.318)</td>
<td>.982 (.035)</td>
<td>.906** (.043)</td>
</tr>
<tr>
<td><strong>Category 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable 2</td>
<td>8.059 (18.119)</td>
<td>1.9138 (1.2674)</td>
<td>1.9239 (1.6957)</td>
</tr>
<tr>
<td><strong>Category 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable 4</td>
<td>1.026 (3.811)</td>
<td>1.9055 (2.9398)</td>
<td>1.557 (2.972)</td>
</tr>
<tr>
<td>Variable 5</td>
<td>1.151 (8.881)</td>
<td>41.024*** (37.304)</td>
<td>19.597** (26.475)</td>
</tr>
<tr>
<td>Variable 6</td>
<td>2.354 (7.376)</td>
<td>12.7514*** (12.291)</td>
<td>40.340*** (47.621)</td>
</tr>
<tr>
<td>Pseudo R²</td>
<td></td>
<td></td>
<td>0.49</td>
</tr>
<tr>
<td>Pseudo LL</td>
<td></td>
<td></td>
<td>-74.033</td>
</tr>
<tr>
<td>Wald</td>
<td></td>
<td></td>
<td>141.06</td>
</tr>
<tr>
<td>Number of observations</td>
<td></td>
<td></td>
<td>1141</td>
</tr>
</tbody>
</table>

Note: * Significant on the 10% level; ** Significant on the 5% level; *** Significant on the 1% level; RRR and standard errors in parentheses

Source: Sanderson and Strielkowski (2012)

All graphics must be inserted into the text (using Insert → Picture → Picture from file) and provided together with the paper as separate JPEG files with minimum resolution of 200dpi (in case of diagrams and drawings), or Excel files (in case of graphs and pie charts).

Graph 1: Remittances and development aid for aggregate groups of countries in 1970-2010

Source: Own calculations based on World Bank (2012).
Diagram 1: Intertemporal interactions between species over time

Source: Strielkowski, Lisin and Welkins (2012).

Literature

The reference list should only include works that are cited in the text and that have been published or accepted for publication. The referencing is done in the following manner:

In their paper Davenport and Prusak (1998) say… or: Results follow (see Davenport and Prusak, 1998).

A reference list should be provided at the end of the manuscript, following these formats:

- Author, (year), *Title of the book*, Publisher.
- Author, (year), *Title of the paper*, in: *Title of the journal*, Publisher, pp.
- Author, (year), *Title of the paper*, *Title of the proceedings*, Publisher, Location, pp.

Example:


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Information about the authors:

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