
Social Expectations and Satisfaction with Professional Activity of Pedagogical Personnel of Research University (evidence from the State University of Mordovia)

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Abstract:

At the present time Russian higher school enters highly active phase of transformations defined as structural transition from soviet mono-level model of higher education with strict administrative management methods to entirely different so-called “western model”, the main evaluation criterion of which is the results. As it follows from the logic of higher school transformation for more than recent 20 years, the transformations have covered primarily conceptual and technological components of education, then organization-and-administrative, organization-and-financial ones and at last - the components of social structure.

In modern Russia the matter of special importance in the recent years is the problem of reproduction of highly-qualified personnel (candidates and doctors of sciences). Additionally, the capability of Russia even to draw near the developed countries of the world on a technological level, in the foreseeable future, depends to a large extent on the intellectual potential, the reproduction of which is performed by higher school and scientific institutions.

This paper on the basis of multiple correspondence analyses (MCA) studies results of social survey of teaching staff of the research university. Its authors distinguish definite clusters of teachers according to social and professional capital and social comfort. The paper also reveals interdependence between distinguished groups and their orientation in professional terms, appraises social expectations and satisfaction with professional activity of scientific-pedagogical personnel of the research university.

Key Words: *Higher school, multiple correspondence analysis, correspondence map, social and professional capital, social comfort, reproduction of scientific-pedagogical personnel, research university.*

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1. Introduction

1.1. Introduce the Problem

Under conditions of knowledge society development the indicator of competitiveness of modern state is the level of its intellectual potential. At the present time all the spheres of society directly depend on the development of science and therefore results of scientific activity and scientific and technical innovations are being not just necessary, but also the main condition for progress of any type of human activity.

Scientific staff plays the most important role in creation of intellectual products and research and technology achievements ultimately defining stability of innovation process - for this reason their distribution by sectors (industry, state, universities) and functions (production, researches and teaching) is the basis for the policy concerning use of limited social resources.

Strengthening of influence of intellectual resources for the purpose of social and economic development of state actualizes the problem of preservation and development of scientific and pedagogical personnel, its reproduction management. Realization of this strategy is largely related to young generation being active creative resource for innovative transformations of society, particularly, in respect of the part of youth social group that deals with scientific and research and/or scientific and pedagogical activities in the area of applied, fundamental science and higher professional education and possesses significant sociocultural and innovative potential (Osburg, Schmidpeter, 2013).

Thus, the chances for realization of technological breakthroughs depend not so much on the state of national industry, as on the scales and quality of high-skilled specialists' training. The losses of such staff during the years of reforms turned out to be so tremendous that there is a necessity of their extensive training together with elimination of negative consequences due to wrong decisions stipulated with the former personnel policy (Saraliev & Balabanov, 2002).

1.2 Importance of the Problem

At the present time the problem of personnel of higher educational institutions and science sector is being rather vexed for there are process of staff ageing on the one hand and decrease of scientific and pedagogical labour prestige on the other. At the same time, one of the key target indicators of realization of tasks of state scientific and pedagogical personnel development program is the considerable youthification of workers of science. Thus, it is planned that in 2020 the average age of researches will make 40 years (against 49 in 2008) and the share of researches aged less than 40 years old will increase to 25% (against 14,2% in 2008) (strategy of innovative development of the Russian Federation for the period up to 2020, 2011). However, the personnel policy of many higher education institutes is characterized with the fact that within recent 5-6 years the inflow of young people to higher school has

significantly reduced or just ceased, which is caused by consequences of demographic crisis of 90s. Thus, for example, the development program of university of Mordovia even in the case of the most optimistic development scenario realization implies 25% reduction of rates of professional and pedagogical staff inflow by 2015. Realization of such a scenario distinctively promotes no youthification of workers, especially if we take into account high level of conservatism of higher education structures.

Realization of task on increase of inflow of young people to fundamental and applied science cannot be performed only due to increase of number of workers involved in the sphere. The process of youthification of scientific staff should be performed in parallel with certain reduction of ineffectively working research workers and divisions. The general criteria for evaluation of quality and efficiency of fundamental researches should be international recognition, publication and conference activity of workers and collectives. In case of applied science the most important criterion is the need for results of carried out researches by Russian and foreign enterprises, regulatory bodies of different levels, public organizations, etc. (Sonin, Khovanskaya, 2009).

1.3 Literature Review

Russian and foreign policy documents highlight the decisive role of education in globalized, transcultural, information society. In the report of UNESCO called "Toward knowledge societies" international experts state that modern most effective ways of human capital using require new models of higher education development based on knowledge (report of UNESCO - Toward knowledge societies, 2005). The same idea stipulates the position of authors of information society concept, who have erected the proposition that higher education will turn into defining social institution (Toffler, 1970, Bell, 1973).

The necessity for recovery of normal process of reproduction of science personnel potential that turned out to be destroyed to significant extent in the recent decades is noted by the authors of strategy of development of the Russian Federation (strategy of innovative development of the Russian Federation for the period up to 2020, 2011).

One of the critical tasks of Russian education and science is the development of modern national research universities. Significant matter of such development is the formation of its personnel structure. The fact that the very procedure of formation of research staff structure is the key factor in creation of research university is underlined in the article that became a reason for broad discussion regarding the practice of academic employment in Russia made by the principal of State University - the Higher School of Economics Kuzminov Y. and the head of the Laboratory of institutional analysis Yudkevich M. (Kuzminov Y., Yudkevich M., 2006). The same fact is emphasized by the experience of foreign universities. For instance, Harvard University in the USA taking the lead in the world list of research

universities among general principles of research activity management specifies the general form of quality control is the high standards of professionals' selection. Formation of personnel structure of higher education institution is performed with account of dynamics of teaching staff, qualification, demographic, official and other factors. Russian scientists, among which there are Glinsky, Makaridina (2011), Fadeeva (2004), Strikhanov et al. (2003), consider problems of changes of scientific and pedagogical staff in the terms of posts, age, qualification composition, etc.

1.4 Hypotheses and Their Impact on Research Structure

Taking into account importance of considered problem it should be noted that one of the most relevant objectives of modern research university is the formation of optimal and effective structure of scientific and pedagogical personnel of higher education institution. The present research is dedicated to analysis of the following conceptual problems:

- definition on the basis of multivariate statistical analysis methods of social space, in which there are scientific and pedagogical personnel of region and clusters of teachers with similar social expectations and satisfaction with professional activity;
- revealing of statistical interrelation between defined teachers' clusters and plans of their professional activity, which with consideration of differentiated personnel structure of higher education institution will promote realization of the task of human resources effective management.

Complexity and multidimensional nature of the present process require adequate methods for its studying. To analyze the structure of research university personnel we have chosen the method of multiple correspondence analysis (MCA).

2. Method

2.1 Selection

The sample consists of 126 teachers of State University of Mordovia named after Ogarev N.P. (8% selection) who participated in the research. There is proportional representation of all the structural subdivisions of the higher education institution (faculties, institutes).

2.2 Instruments

The source of information was sociological survey of higher-education teaching personnel of National Research State University of Mordovia held in 2011 by REC "Socium-M". Questionary consisting of four parts was filled in with self-filling method.

Within questionnaire process respondents answered blocks of questions linked to health, social comfort, attitude towards profession, carrier and mobility. Initially, to distinguish teachers' clusters from the viewpoint of their attitude towards higher education institution and professional activity nine key parameters characterizing

their sociodemographic status, rank in higher education institution, expected financial health and social comfort were selected.

2.3 Description of the Method

Analysis of correspondences refers to the methods of preliminary or exploratory analysis of data. The present kind of methods is designed primarily for research of data structure, not for testing of statistical hypotheses or determination of cause-and-effect relations (Beh, Lombardo, 2014).

Exploratory methods are not based on probabilistic suppositions about nature of data and as opposed to classical approaches of mathematical statistics produce results that are referred to selection, not to general totality. They can be effectively used whether at preliminary stage of data research (for revealing of discordant observations and probable clusters), or for interpretation of modeling results (Adamov, 1991). In such a way, the exploratory methods are designed to generate hypothesis about distribution and interrelations of data. Subsequently - at the next stage - the obtained hypothesis can be tested with confirming methods.

For the purpose of effective research of data structure exploratory method should be maximally adaptable and possess as few limitations and requirements to initial data as possible. Analysis of correspondences places virtually no requirements to data and can be applied to any rectangular matrix. In fact the only limitation is the non-negativity of numbers in the points of matrix (Nishisato, 1980). This is being especially important factor in analysis of sociometric indicators, for which classical methods of analysis can be applied with quite significant limitations (Kutlaliev, Popov, 2005).

In analysis of correspondences the process of testing of hypotheses used in classical methods of mathematical statistics is replaced with interpretation of data graphical representation - so-called "correspondence maps" (Blasius, Greenacre, 2014). Such an approach to description of data by means of visualization is based on peculiar research strategy or, more specifically, on peculiar style of thinking typical above all for French sociologists and mathematical statistics specialists. The best way of description of this philosophical approach is the well-known aphorism of J.-P. Benzekri, one of method's founders: "a model must be result of data and not the reverse" (Benzekri et al., 1973). Benzekri underlines the importance of viewing data as they are, as opposed to adjusting data to preliminarily assumed model. In general, this position quite explicitly expresses the very nature of exploratory analysis of data. Since the data collected in the course of sociological research were categorical, measured in ordinal or nominal scale, we have decided to fall back on making of cross tables as the form of representation of such data. Analysis of correspondences allowed us to research these tables by means of graphical representation of table's lines and columns as the points in small dimension space, which promoted significant simplification of results interpretation (Ayvazyan et al., 1989).

We should also note that in analysis of multidimensional sociological data traditional methods of parametrical statistics, as a rule, turn out to be non-effective, as they were developed in the frameworks of natural-scientific approach or industrial statistics. Being an instrument for testing of statistical hypotheses they ignore the tasks of description and complex analysis of data structure, while such tasks are being quite relevant for sociological researches. Besides, the traditional methods imposing a number of significant restrictions on initial data (normalcy of distribution, independence of features) considerably confine the practice of their use in sociology, where such restrictions can not be applied (Shafir, 2009).

The advantages of MCA in the practice of sociological researches are obvious. First of all, the present method can work with huge massifs of data imposing no restrictions on them and promoting getting of coherent idea about their structure. The peculiarity of the method is that it produces hypotheses about distribution and interrelations of data. As it was mentioned above, in analysis of correspondences the process of hypotheses testing used in classical statistical methods is replaced with interpretation of graphical representation of data - so-called "correspondence maps". Thus, in analysis of correspondences the categories having compatible distribution features will be represented with the points situated close to each other, while the categories with different features will form the points situated far from each other (Bolshakov, Karimov, 2007).

3. Results and Discussion

On the basis of questionnaire results we have built the Burt tables, for which there are correspondence maps and their subsequent analysis.

The analysis of correspondence map (figure 1) shows that in the left quadrant there are doctors of sciences of older age groups; the adjoined group represents teachers of preretirement age; in the center of the map there are 30-40-aged candidates of science; the separate quadrant is taken by the group of young teachers under 18 years old.

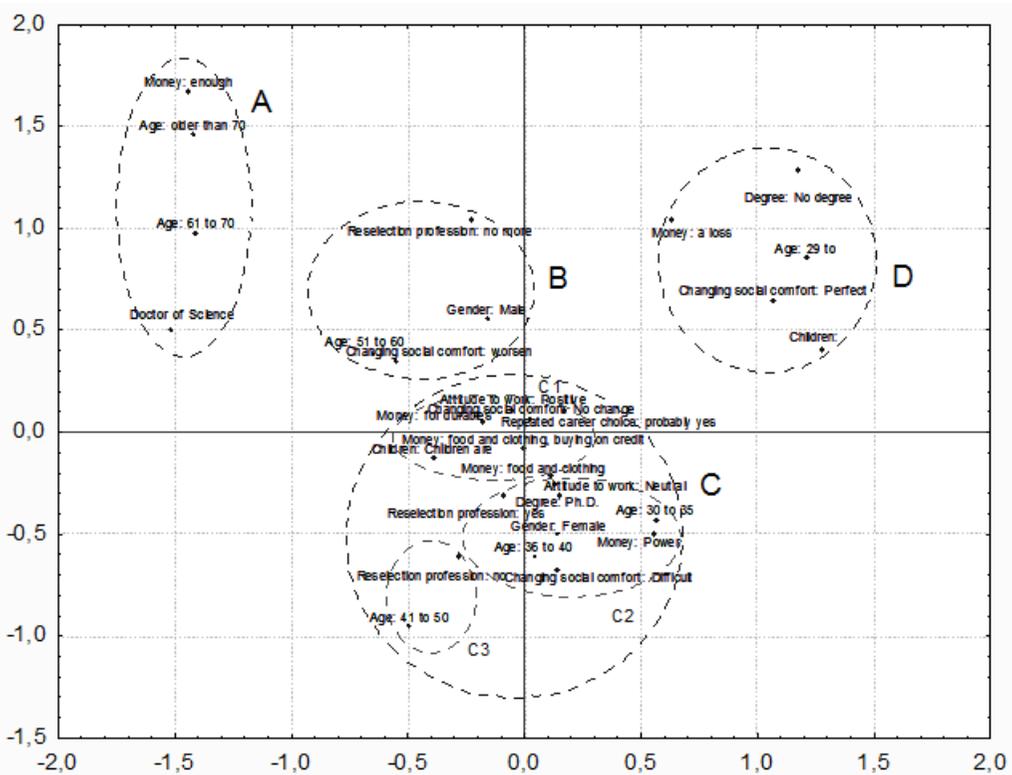


Figure 1. The map of answers' correspondence made on the basis of multiple correspondence analysis

Taking into account the fact that close correlation dependence between age category of teacher and his academic degree is typical of higher education institutions, it seems reasonable to define horizontal axis using the terms of various forms of capital considered by Bourdieu (1983). The absolute and relative contributions and graphical analysis show that X-axis to large extent characterizes the following composition: the point of “Academic degree: doctor of sciences” is at the left pole contrary to the point of “Academic degree: no degree” at the right pole. In addition, the essential contribution to coordinates by horizontal axis is made with age category: older persons, mainly, the persons of pension age are to the left, while young people are to the right. Thus, it seems logical to interpret the axis as the axis of “social-professional capital” in the sense of “aggregate of accumulated professional knowledge, skills and abilities obtained in the process of education and advanced training, which subsequently can bring profits - in the form of wage, interest or earnings (Radaev, 2005).

The points situated to the right characterize relatively low level of social-professional capital - they represent young teachers without academic degree. The

end points to the left describe high level of social-professional capital of higher education institution's teachers - the doctors of sciences, mainly, of pension age.

The vertical axis is defined as the axis of social comfort considered as correlation between person's subjective values and objective state of well-being formed under the influence of aggregate of different conditions being the most advantageous for exercising of functions in social sphere. Thus, along the vertical axis there are answers concerning financial health, evaluation of social feeling, attitude towards vocational choice. It should be noted that statistical relation between these answers is rather complex and explicitly non-linear.

As a result we get two-dimensional social space, where the main axes are the social-professional capital and comfort. By analysis of joint distribution of answers' points in predetermined social space we can distinguish the following clusters of teachers (figure 1).

"A" cluster is represented by doctors of sciences over 60 years old. This is the only group of respondents, who to definite extent share the opinion that "they earn enough money". These are the teachers, who has realized themselves in social and professional terms, proven their status in higher education institution and are sanguine about the present and the future. The group makes 5-10% of total number of higher education institution's teachers.

"B" cluster is made by the age group of preretirement age (50-60 years old), mainly represented by males, who consider that social comfort of living will deteriorate in the nearest time and being disappointed in their vocational choice. The specific feature of the present cluster is that answers of its respondents substantially have no links to the category of academic degree. The cluster makes approximately 15-20% of total number of teachers.

"C" cluster is the most difficult for interpretation group that includes teachers with academic degree of candidate of science aged 30-40 years old. This group is the largest group (50-60%) making personnel basis of higher education institution. Analysis of points' concentration in the present block allows distinguishing of three sub-clusters:

- "C1" sub-cluster: the group of positively oriented teachers being, as a rule, married and having no doubts in their vocational choice. Respondents of the group answer that they have quite enough money for purchase of durable goods (20-30%);
- "C2" sub-cluster: made mainly with females of 30-40 years old with neutral attitude towards changes that have place in higher education institution, considering they have enough money for essential commodities and being at loss to define change of their comfort in the nearest future. However, they, as a rule, are sure they have chosen the proper profession (20-25%);
- "C3" sub-cluster: the group of 40-50 years old teachers considering the choice of their profession poor (5-10%). The present sub-cluster is formed

by the generation that started their professional activity in higher education institution in the beginning of 90s, when social and economic transformation of Russian society caused serious outflow of the most active and mobile part of teacher from higher education institutions led to so-called generational gap (Fadeeva, 2004). At the present time this is expressed with age vacuum of 40-50 years old teachers and definite dissatisfaction of few teacher of such age group with their vocational choice.

- “D” cluster: the group of young teachers without academic degrees and children. Representatives of this group consider social comfort will improve in the nearest time; however in financial terms it is at loss to define its financial health. The group makes 10-15% of total number of higher education institution’s teacher.

In the frameworks of analysis of the process of change of higher education institution’s scientific-pedagogical personnel structure we find it important to analyze the map of correspondence of answers of distinguished clusters of teachers to such answer of questionnaire as “How do you plan your professional activity in short and distant prospect?” There were the following answer variants (in time range from one to ten years): working on candidate's dissertation and its defense; working on doctor’s dissertation and its defense, management activity, organization of innovative structure in higher education institution; other. The graphical result is shown in figure 2.

For the purpose of results’ interpretation the revealed clusters are distinguished in corresponding way. As a result it turns out to be that clusters “A” and “B” do not associate their further work to neither type of activity (i.e. there are doctors of sciences of older age groups achieved high status in higher education institution on the one hand and “disappointed” group of teachers of preretirement age on the other hand).

In our view the revealed self-sustainability and satisfaction with available resources, absence of obvious relation to innovative activity in higher education institution of its elite part (doctoral and professorial staff) are the indicator of growing problem of regional science isolation. The positive experience of young people is not encouraged either with negative experience of older teachers, whose most active stage falls at 90s. Thus, administration of higher education institution has to overcome current situation, for example, by means of support of existing or formation of new schools of sciences and scientific-pedagogical collectives.

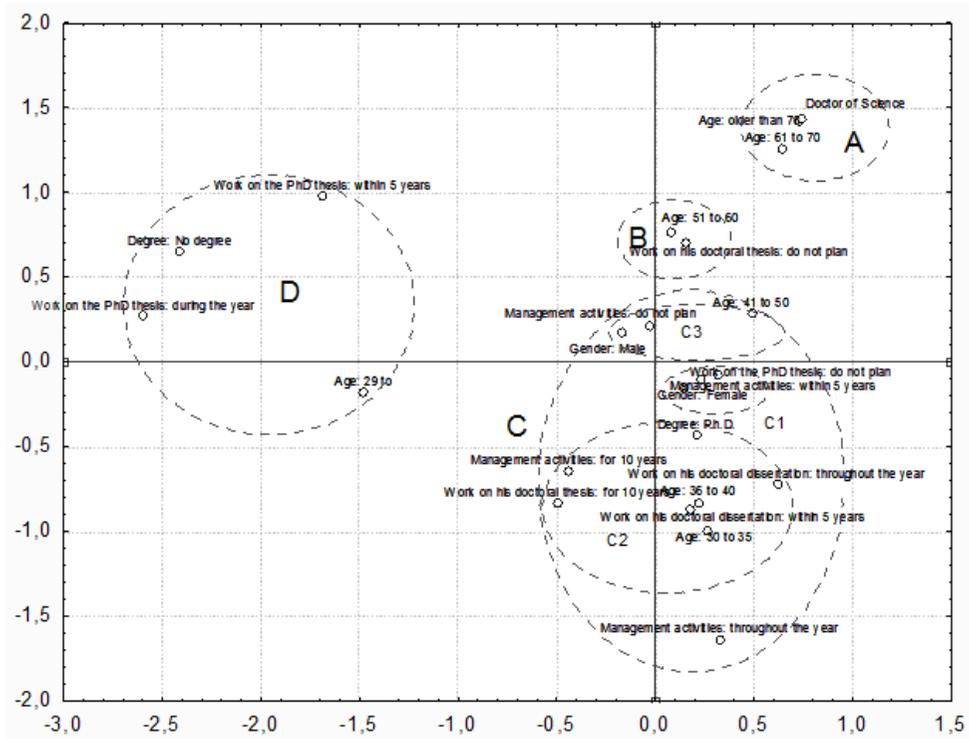


Figure 2. The map of correspondence between distinguished clusters' answers and planning of further activity in higher education institution

The situation with teachers being “inefficient” under modern conditions (clusters “B”, “C3”) is much more difficult. Under the conditions of significant limitation of higher education institution’s resources (financial, material and technical) the current situation is considered by these teachers unfavourable and requiring struggle for remaining resources. The task of administration in such a case is the introduction of new relationships between workers for the purpose of their inclusion to the tasks of national research university and gradual optimization of the structure of internal subdivisions of higher education institution.

At the same time, the most actively planning their future life are the teachers of “C” cluster. It should be noted the present group is oriented, above all, at short- and long-term planned activity. There are some specific features as well. The teachers of “C1” sub-cluster are largely oriented at management activity and plan to deal with it within the nearest five years; the teachers of “C2” sub-cluster are oriented at scientific carrier and plan to work on doctor’s dissertation in medium-term; while the teachers of “C3” sub-cluster do not plan their professional activity in higher education institution. On the correspondence map one can see that the last group of teachers is adjacent to clusters “A” and “B”.

Thus, there is the following interdependence: candidates of sciences, who are generally satisfied with their earnings, are aimed at management activity to a larger degree ("C1" sub-cluster); the teachers answered they "have enough money just to buy food and clothes" in medium-term are mainly aimed at scientific activity ("C2" sub-cluster).

The second group is ready to make significant efforts for the purpose of providing not so much carrier growth, as growth of incomes due to upgrading of scientific qualification and consequently emerged opportunities of secondary employment. It should be also noted our results are well-conformed to the results of national scientists (Saraliev, Balabanov, 2002).

The relevant objective for administration of higher education institutions in respect of the most active and prolific part of teachers is the creation of conditions for realization of their creative potential, extension of their scientific contacts, publication of scientific researches' results, support of dissertation studies.

However, the warning fact is that in respect of the group of young teachers possessing no academic degrees ("D" cluster) the answers concerning probable period of working on candidate's dissertation are being rather poorly associated on correspondence map. Most likely such situation is related to low prestige of science and higher school sphere as the area of professional activity. Besides, the situation is being exacerbated with the fact the worsening demographic situation in the country, reduction of key figures in regard of entrance to higher education institutions and decrease of students' number studying on commercial basis will lead to decrease of number of university's personnel. Transition to two-level system of higher professional education - when at the first and most popular stage (the Bachelor's programme) students study only 4 years - will also lead to reduction of academic load. These circumstances cause a high degree of uncertainty in further professional carrier of young people and low confidence in the necessity of dissertation defense that is linked to high probability of staff reduction.

The process of realization of personality's potencies is closely connected with self-attitude as towards the subject of activity and appraisal of capabilities existing in higher education institutions and society. The attitude is the teachers' perception of their own personality and the circumstances (factors) that have impact on their professional activity.

The highest degree of attractiveness of higher education institutions as the place of work is referred by its personnel to the factor of "creative character of labour" (75,6%), the second place is taken by "staggering schedules" (67,8%), the third is the "interest towards pedagogical activity" (65,3%). The factor of "capability of professional growth" was mentioned by 41% of respondents. The least important factors turned out to be "the prestige value of work in university", good moral-psychological atmosphere, opportunity of teaching own children in higher education

institution and opportunity of turning them to science (the indicators range from 15% to 29%). However, the most attractive factors in teacher's work in opinion of all age groups are: creative character of labour, interest towards scientific and pedagogical activity, opportunity of communication with young people (about 70% of respondents). Thus, the priorities of academic profession attractiveness are shifted to axiological aspects.

At the modern stage of development of Russian society the existence of teacher's carrier orientations is the necessary condition for formation and development of his personality in the process of professional achievement and growth. The leading carrier orientations are stipulated with structural changes having place in higher school, specific character of professional activity and interrelated to changes of official status, age-specific parameters, personal and gender features of teacher.

The carrier orientations reflect existence of priority occupational needs in the personality structure and emerge in the process of socialization on the basis and as the result of accumulation of professional experience and serve for integration of individual into professional society. The sociological science represents any carrier as a part of the process of social and professional mobility. It is understood as the rise of individual in professional, social and production hierarchy.

The question about importance of teaching carrier was answered in positive key by the majority of respondents. The complete confidence in positive answer was shown by 25,0% of respondents, 49,2% of respondents answered "rather yes, than no". The negative answer was received from 4,8%. In the aggregate of positive answers in the group under 30 years old it was received from 39,1%, in the group from 31 to 35 years old - 32,0%. In older age groups this factor was less important. In the aggregate of negative answers the results are the following: group of respondents from 41 to 50 years old - 46,2%, from 51 to 60 - 42,1%, from 61 to 70 (table 69). High carrier intents are also possessed by the group of respondents over 71 years old: almost all the answers here were positive. Thus, interest towards carriers is being most typical for polar groups: of young people under 35 years old, who have some achievement strategies; and in the group of respondents over 71 years old, representatives of which have realized themselves in terms of carrier.

Professional carrier of higher education institution's teacher is mainly the academic carrier that can be coincided with administrative (management) carrier. Academic carrier is characterized with the fact that teacher in the process of his professional activity passes different stages of development: professional studying, employment, professional growth, development of individual professional skills and consummation of professional carrier (retirement). These stages can be passed successively in the frameworks of one higher education institution or in different universities. Administrative carrier is the taking of separate professional posts in administrative hierarchy of higher education institution (rector's office, administrations of faculties, line management, etc.).

Academic carrier is realized by means of passing of steps of career ladder from the posts of assistant/teacher to the post of professor. Such a carrier path implies availability of academic degree and upon this in Russian higher education institutions as opposed to western ones there are two grades - candidate of sciences and doctor of sciences. Availability of the degree of candidate of sciences implies holding posts of senior teacher or associated professor, while the degree of doctor of sciences means one can hold a post of professor. The academic degree of doctor of sciences due to existing high barriers for achieving this status still remains of rare occurrence in national higher school (the accreditation indicator for universities makes 10% of doctors in staff composition). Such a situation excludes actual competitiveness in holding the post. Poor prospect of inflow of young people to higher school on the one hand and reduction of number of workers on the other hand do not promote positive forecast of staff renewal in the near term.

Structural constants of higher school teachers' carrier orientations are closely interrelated between each other and integrated into entire system based mainly on the complex of social and professional values. Integration of all the structural elements of carrier orientations leads to formation of life and professional prospects of person.

As the results of sociological researches show the most important subjective imperatives of carrier of higher school teacher are represented in two directions. The objectives of social activity of individual are presented with such dominants as high level of education, professionalism, social status, recognition. The means for achievement of these objectives are, above all, personal abilities and qualities, higher and postgraduate education, less frequently - auspices and support of important persons. The first-mentioned imperatives are being preferred by teachers of higher education institutions. The peculiarities of teacher's attitude towards his carrier orientation are defined by such factors as gender, age, official and qualification status.

In such a way, one of the most important tasks of higher education institution policy is the formation of favourable conditions and impetuses for coming to science for talented young people adhered to research work.

Use of multiple correspondence analysis for the purpose of research of scientific-pedagogical personnel structure of research university allowed us to identify quite variegated in its structure pedagogical environment differentiated by the level of social and professional capital and readiness to further development. Application of the method in the process of teaching personnel monitoring will promote evaluation of success of realization of strategic tasks for development of human capital of higher education institution and effectiveness of changes in its management system. As a result we can make the following conclusions:

- on the basis of multiple correspondence analysis we have revealed two-dimensional social space, the key axes of which are social and professional capital and social comfort;
- in the revealed social space there are 4 clusters of teachers characterized firstly by the axis of social and professional capital: from doctors of sciences of older age groups to young teachers without academic degree;
- there is social-statistical interrelation between revealed clusters of teachers and plans of their professional activity: doctors of sciences achieved definite status in higher education institution and “disappointed” group of teachers do not associate their future work with neither type of activity; candidates of sciences generally satisfied with their earnings, as a rule, are aimed at management activity (at the same time, those of them, who are not satisfied with their current earnings, are generally aimed at scientific carrier and plan working on doctor’s dissertation); representatives of group of young teachers possessing no academic degree are appearingly in the situation of high degree of uncertainty in regard of their carrier plans and the necessity of making of candidate’s dissertation;
- differentiated personnel structure of higher education institution requires realization of various tasks concerning human resources management in their strategic and system context and combines different directions of university policy supported in financial and organizational terms.

References

- Adamov, S. (1991), “System of analysis of non-numerical information - SANI”, *Sociology*: 4M. No. 2, p 86-104.
- Ayvazyan, S.A., Bukhshtaber, V.M., Enykov, I.S., Meshalkin, L.D. (1989), “Applied statistics: Classification and reduction of dimension”, Moscow, Finances and statistics.
- Bell, D. (1973), “The coming of post-industrial society: A venture of social forecasting”, N.Y.: Basic Books.
- Benzecri, J.-P. (1969), “Philosophie thomiste et connaissance mathématique de la nature”, *La Pensee Catholique*, n. 118, p 11-24.
- Bolshakov, A.A., Karimov R.N. (2007), *Methods of processing of multivariable data and time series*. Moscow, Hot line – Telecom, p 522.
- Bourdieu, P. (1983), “Okonomisches Kapital, kulturelles Kapital, soziales Kapital, in: Kreckel, Reinhard (ed.) *Soziale Ungeichheiten (Soziale Welt, Sonderheft 2)*”, Goettingen: Otto Schwartz & Co., p 183-198.
- Eric, J. Beh, Lombardo, R. (2014), “Correspondence Analysis: Theory, Practice and New Strategies”, John Wiley & Sons, p 592.
- Fadeeva, I.M. (2004), “The higher school in modern Russian society”, Saransk, Publishing house of State University of Mordovia.
- Glinsky, V.V., Makaridina E.V. (2011), “Of model of life cycle of higher professional education of Russia”, *National interests: priorities and safety*, No. 3, p 12-18.
- Innovative Russia – 2020 (2011), “Strategy of innovative development of the Russian Federation for the period up to 2020”, Retrieved from: <http://innovation.gov.ru/sites/default/files/documents/2014/5636/1238.pdf>

- Jorg Blasius, Michael Greenacre, 2014, *Visualization and Verbalization of Data*, CRC Press, p 392.
- Kutpaliev, A., Popov, A. (2005), "Effectiveness of advertisement", Moscow: EKSMO.
- Kuzminov, Y.I., Yudkevich, M.M. (2007), "Academic freedoms and behaviour standards", *Matters of economy*, No. 6, p 80-93.
- Nishisato, S. (1980), "Analysis of categorical data: Dual scaling and its applications", Toronto: University of Toronto Press.
- Osburg, T., Schmidpeter R. (2013), "Social Innovation: Solutions for a Sustainable Future", NY, Springer Science & Business Media, p 354.
- Radaev, V. (2005), "Economic sociology", Moscow, State University - Higher School of Economy.
- Saraliev, Z., Balabanov, S.S. (2002), "Reproduction of scientific-pedagogical personnel", *Sociological researches – 2002*, No. 11.
- Shafir, M.A. (2009), Correspondence analysis: representation of the method. *Sociology: 4M.*, No. 28, p 29-44.
- Sonin, K., Khovanskaya, I. 2009, "Informational theory of research university", *Matters of economy*, No. 7, p 132-143.
- Strikhanov, M., Rubetkov, D., Koronovsky, A., Khramov, A. (2003), "Analysis and forecast of changes of scientific and pedagogical potential of higher school", *Higher education in Russia*. No. 3, p 3-17.
- Toffler, A. (1970), "Future Shock", Random House.
- Toward knowledge societies (2005), Report of UNESCO. Retrieved from: <http://unesdoc.unesco.org/images/0014/001418/141843r.pdf>