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PROFESSIONAL AND SOCIAL PROBLEMS OF YOUNG RESEARCHERS AND LECTURERS BASED ON THE OPINION POLL RESULTS (CASE STUDY OF IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE)

The research contains analysis of the on-line sociological study of young lecturers from Igor Sikorsky Kyiv Polytechnic Institute conducted in 2016. This study is a continuation and development of public opinion polls of young researchers of the NAS of Ukraine initiated in 2015. The analyzed data covers young researcher responses regarding patenting, publication activity, participation in international scientific cooperation, academic mobility, availability of technical facilities, equipment and materials at job places, satisfaction with monthly salary, satisfaction with research work and intentions regarding the future research carrier. The authors have compared the reported results with the previous studies of problems of young researchers from academic sector. The main problems are the lack of professional equipment and materials for research on a global level. Among the social problems, the most frequently mentioned ones are low salaries and no housing provision. It has been concluded that the creation of favorable conditions for professional research and educational activities of youth should be a priority of HR policy at both the government and the agency levels to preserve the young reserve of Ukraine's science.

Keywords: brainpower, science in universities, sociological research, young lecturers, young researchers, Igor Sikorsky Kyiv Polytechnic Institute, and National Academy of Sciences of Ukraine.

Pressing problems of the present-day science in Ukraine are a downward trend in the inflow of young researchers and the fact that a significant part of them, having acquired the qualification, is forced to leave science searching for a higher salary. The problem of capacity reproduction remains in the focus of researchers and experts on scientific policy. In recent years, the studies have been concentrated on the analysis of the age structure of personnel and its influence on the general state of the academic sphere of the country [1—7]. Moreover, the problem of aging of research personnel is inherent not only in Ukraine.

The problem of youth inflow is a concern of the National Academy of Sciences of Ukraine (NAS of Ukraine) that considers the aging of research staff as one of the most pressing problems. For a long time, the NAS of Ukraine has been using the system of targeted financial support for young scholars created in the state, which is implemented in the form of grants, awards, and scholarships. The NAS of Ukraine also has introduced its own various forms of support for young researchers, in particular, the creation of councils of young researchers at all 14 departments of the NAS of Ukraine.

However, in spite of all measures, in the last four years there has been a disappointing downward trend in the number of young researcher coming to the academic sector. For a radical solution to this problem, urgent measures to raise the prestige of scientific activity and to improve the social protection of researchers [8, 6—7] must be taken at the government level.

For the formation of innovative model of economic development, the integration of all components of the national innovation system becomes extremely important. Integration of education and science contributes to improving the quality of training of masters and high-skilled staff. The cooperation of academic and university science positively influences the reproduction of research staff and the productivity of research works. The NAS in various forms maintains links with many universities in Ukraine. National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» is an important partner of institutions of the NAS of Ukraine for scientific and innovative cooperation.

The importance of education as a factor of social development is growing worldwide. The number of higher education institutions increases. In fact, today higher education is perceived as crucial for the career growth of young people as full secondary education half a century ago. The role of universities with a sharp growth in the number of students has increased significantly. Their traditional vocational education role gradually spread to socio-cultural and economic spheres.

Researchers have distinguished the following features of modern universities: autonomy of research and teaching activities, integration of science and education, international standards of quality, increase in the number of students (as new categories, «mega-university» with a million students and attendees and «on-line university», have appeared), which exacerbates the «quantity-quality» dilemma, growing need to use IT technologies in the learning process (openness and transparency of knowledge transfer and distance or e-learning), multiculturalism, growing flexibility and mobility of the educational process, and enhancement of pedagogic role for young people [9, 3; 10]. Thus, the problem of the quality and development of higher education becomes strategic in terms of economic and cultural development of Ukraine.

National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» (Igor Sikorsky Kyiv Polytechnic Institute) is a higher educational institution of engineering profile and a research university founded in Kyiv, in 1898. Today, it is the largest university in Ukraine by the number of students with a wide spectrum of majors and specializations for the training of specialists in engineering and humanitarian sciences.

The Full and Correspondent Members of the NAS of Ukraine are engaged in teaching at the university. There are the following forms of cooperation with the institutions of the NAS of Ukraine: joint laboratories, departments, branches of the university departments, educational and research centers, etc. In particular, within the framework of the *Materials Science and Special Electrometallurgy* Educational and Research Association, Paton Institute of Electric Welding, Frantsevych Institute of Materials Science, Bakul Institute of Superhard Materials, Physics and Technology Institute of Metals and Alloys, and Kurdiumov Institute of Metal Physics, on behalf of the NAS of Ukraine, successfully cooperate with the Faculty of Engineering and Physics of the University.

The researchers from the NAS institutions and the Igor Sikorsky Kyiv Polytechnic Institute effectively collaborate within the framework of the Institute for Applied Systems Analysis (IASA) as an institution with dual subordination, to the MES and to the NAS of Ukraine. IASA trains specialists at all educational and scientific levels in the field of interdisciplinary systemic research. The institute students are sent to do practical training and to work at the institutes of the NAS of Ukraine. The researchers of the Faculty of Chemical Engineering, the Faculty of Chemical Technology, the Institute of Energy Saving and Energy Management, the Heat Power Engineering Faculty, the Institute of Physics and Technology, the Institute of Tele-

Table 1

Positions of Respondents

Respondents	Postgraduate	Postdoctoral student	Assistant	Teacher	Senior teacher	Assistant Professor	Chairman of Department	Junior researcher	Researcher	Engineer
Number	69	2	28	4	9	13	1	2	1	2
%	52.7	1.5	21.4	3.0	6.9	10.0	0.8	1.5	0.8	1.5

Source: poll results.

communication Systems, and the Institute of Mechanical Engineering cooperate actively with the academic institutes. For example, the Institute of Telecommunication Systems collaborates with some academic institutions — the Institute of Cybernetics, the Institute for Information Registration Problems, the Institute for R&D and Economic Information, and the Vernadsky Library of the NAS of Ukraine [11]. In April 2007, the Collegium of the Ministry of Education and Science of Ukraine approved decision to give Igor Sikorsky Kyiv Polytechnic Institute the status of research university.

The study **is aimed** at analyzing the professional and social problems of young teachers and researchers at HEI and to generalize the recommendations on creating favorable conditions for the professional activity of young researchers by example of Igor Sikorsky Kyiv Polytechnic Institute.

Research methodology. The survey was conducted in April—May 2016 by the Igor Sikorsky Kyiv Polytechnic Institute Council of Young Researchers via mailing out an electronic questionnaire. It continued the survey that started in 2015 at the NAS of Ukraine [12]. One hundred and thirty-one respondents among teachers and research staff of 26 departments of the educational establishment (faculties and institutes) were interviewed (Table 1).

It should be noted that in the previous study embraced also young engineers, despite the fact that according to clauses 9-10.1.1.3 of the Law of Ukraine on R&D Activities only leading and chief engineers are referred to as research staff [12, 66; 13].

The respondents answered 33 questions selecting only one answer from several suggested, marking several answers from the list or writing a reply in the dialog box. The responses were given anonymously.

To analyze the results, the sociological survey methodology was used.

As of December 1, 2015, in total, 735 young researchers worked at Igor Sikorsky Kyiv Polytechnic Institute[1]. Out of which 680 belonged to the pedagogical staff and 55 to research staff (the R&D Department). The postgraduate program was attended by 550 postgraduate students studied, and the postdoctoral one by 39. There is a probability that not all postgraduate and postdoctoral students were under 35 and 40 years, respectively. Thus, in December 2015, at the Igor Sikorsky Kyiv Polytechnic Institute, the number of young teachers and researchers was 1324 people (engineers excluded). It is important to note that, formally, the number of positions to be occupied by young researchers at the mentioned educational institution is only 7.48%.

The poll 9.89% of young researchers (engineers excluded) working at the Igor Sikorsky Kyiv Polytechnic Institute meets the general requirement for sociological surveys on interviewing, at least, 1% of the social group.

It should also be noted that although the number of young teachers at the educational institution in recent years has not varied it grew only in 2012), a rather high staff turnover is reported. Those who completed postgraduate course stay with the university but only for several years, and their number fell by 23.2% over 5 years (Table 2).

[1] Based on data of HR Department and Archive of Igor Sikorsky Kyiv Polytechnic Institute.

In the course of survey, a sample method was used. The sample population should be representative in term of Igor Sikorsky Kyiv Polytechnic Institute structural units. It was made based on the stratification principle, with faculties and institutes as strata. The general population was 1,324 people. Within the stratum, the sample size was divided proportionally. The effective sample was 298, which provided a non-sampling error of 5% with a confidence probability of 95%. However, 131 people were interviewed, which leads to a larger non-sampling error of 8.2%. Thus, the generalized indicators calculated based on respondent answers are less accurate [14]. The statistical distribution of young teachers/researchers among Igor Sikorsky Kyiv Polytechnic Institute structural units is given in Table 3.

From the given data it is clear that out of 26 structural units 12 ones gave a sufficient number of respondents. An insufficient engagement of staff from the social and humanitarian faculties indicates that the representatives of engineering and natural sciences dominate among respondents.

According to the Malitskyi theory on the phase pattern of researcher activity, the interviewees correspond to the first phase (up to 32 years) characterized by the mastery of new knowledge and to the second phase (32—42 years) when the researcher while continuing active learning to master new knowledge shows a sharp increase in individual creative productivity and shifts to work in a team with average economic costs (that is why, the facilities and resources are so important for young researchers) and return [15, 90—101].

Below, the comparison of general statistics of answers of Igor Sikorsky Kyiv Polytechnic Institute respondents (2016) with those of their counterparts from the academic institutes (totally, 428 persons, including 99 postgraduates, 2015) is given. Mainly senior postgraduate students were interviewed.

Table 2

Changes in the Number and Turnover of Young Researchers at Igor Sikorsky Kyiv Polytechnic Institute in 2011—2015

Year	Young researchers working at Igor Sikorsky Kyiv Polytechnic Institute	Young researchers who stay with Igor Sikorsky Kyiv Polytechnic Institute after the completion of postgraduate study, %
2011	638	68.2
2012	724	63.0
2013	730	61.0
2014	736	58.0
2015	735	45.0

Source: data of HR Department and Archive of Igor Sikorsky Kyiv Polytechnic Institute.

BASIC CONTENT

The Igor Sikorsky Kyiv Polytechnic Institute respondents gave an approximate ratio of their pedagogical and research load (Table 4), which shows that despite the position ratio (680 pedagogical vs 55 research), the majority of interviewed young researchers (54.9%) has the research component prevailing over the pedagogical one, while 20.6% has a parity distribution by the components, with 45.8% of respondents being satisfied with pedagogic load, 22.9% wishing to increase it, and 11.5% expressing a desire to decrease it. This means more than a third part of respondents (34.4%) would wish to change the pedagogical to research ratio.

Also, it should be noted the lion's share of respondents does not hold an academic rank (93.1%), 72.5% does not have DSc status, and 27.5% has CSc status. Among the candidates, about a third part (33.3%) is assistants and junior researchers and 22% is senior teachers. It is a well-known fact that career promotion after obtaining a CSc or DSc diploma or academic rank is a very good motivator for the researchers and teachers. Conversely, a prolonged stay at a lower inadequate position leads to a search for a new job.

The Igor Sikorsky Kyiv Polytechnic Institute respondents showed a fairly strong interaction with NGOs (38.2%), with almost one third (29.8%) having experience in student councils. This meant an active youth was involved in the survey (Table 5).

Table 3

Statistical Distribution of Young Teachers/Researchers Among Igor Sikorsky Kyiv Polytechnic Institute Structural Units

Igor Sikorsky Kyiv Polytechnic Institute Structural Units	Young scientists (pedagogical staff + researchers of R&D Department) in the structural unit (postgraduates, postdoctoral students, and engineers excluded)	Expected number of filled questionnaires	Interviewed (postgraduates, postdoctoral students, and engineers included)	Share of respondents (n = 131), %
Institute of Publishing and Printing	30	7	2	1.53
Faculty of Welding	10	2	1	0.76
Faculty of Physical Engineering	16	4	1	0.76
Faculty of Chemical Engineering	18	4	4	3.05
Institute of Energy Saving and Energy Management	30	7	5	3.82
Institute for Applied System Analysis	21	5	6	4.58
Institute of Special Communication and Information Security	15	3	0	0
Institute of Telecommunication Systems	15	3	3	2.29
Institute of Mechanical Engineering	33	7	10	7.63
Faculty of Instrumentation Engineering	26	6	7	5.34
Radioengineering Faculty	21	5	6	4.58
Thesis R&D Center for Engineering Means of Information Protection	2	—	—	—
Faculty of Heat Power Engineering	33	7	2	1.53
Faculty of Aerospace Systems	11	2	5	3.82
Faculty of Biomedical Engineering	29	6	10	7.63
Faculty of Biotechnology and Biotechnics	10	2	2	1.53
Faculty of Electric Power Engineering and Automatics	30	7	5	3.82
Faculty of Electronics	35	8	28	21.37
R&D Institute for Applied Electronics	2	—	—	—
Faculty of Informatics and Computer Science	33	7	4	3.05
R&D Institute for Information Processes	1	—	—	—
R&D Institute for System Technology	1	—	—	—
Faculty of Linguistics	119	26	0	0
Faculty of Management and Marketing	45	10	4	3.05
Faculty of Applied Mathematics	12	3	1	0.76
Faculty of Sociology and Law	52	12	9	6.87
Faculty of Physics and Mathematics	37	8	8	6.11
Institute of Physics and Technology	13	3	4	3.05
Storm Design Office	3	—	—	—
Faculty of Chemical Technology	33	7	4	3.05
R&D Department	1	—	—	—
Total	735	163	131	100

Source: data of the Igor Sikorsky Kyiv Polytechnic Institute HR Department and Archive and poll results.

The answers to the questions concerning research activity and its results showed a spectrum of problems and a high capacity of young teachers and researchers of Igor Sikorsky Kyiv Polytechnic Institute, which was practically the same as that of young researchers from the academic sector (Table 6).

The young scientists of the NAS of Ukraine have slightly higher scores in writing the monographs, participation in the grant competitions and joint projects with foreign colleagues; and their colleagues from Igor Sikorsky Kyiv Polytechnic Institute much more patent their developments, this figure being even higher in the group of post-graduate students. Patenting of own developments is a characteristic feature of Igor Sikorsky Kyiv Polytechnic Institute, because this institute is a leader in the field of innovation. In general, this indicator is not significant for the higher educational institutions of the country. Rather it is a characteristic feature of a separate educational institution. Also the post-graduate students of Igor Sikorsky Kyiv Polytechnic Institute show better knowledge of foreign colleagues' works and more experience in implementing the joint projects.

Table 4

Pedagogical and Research Activity Ratio for Young Researchers of Igor Sikorsky Kyiv Polytechnic Institute

Pedagogical activity, %	Research activity, %	Share of Igor Sikorsky Kyiv Polytechnic Institute respondents, %
10	90	30.5
30	70	24.4
50	50	20.6
70	30	22.1
90	10	2.3

Source: the poll results.

Table 5

Experience of Public Activity and Comparison of Results with Poll Results for the NAS of Ukraine

Respondent groups	Council of Young Scientists, %	Student councils, %	NGOs, %	Other, %	No experience, %
Young researchers of Igor Sikorsky Kyiv Polytechnic Institute, 2016	13.7	29.8	38.2	3.1	26.7
Respondents of NAS of Ukraine, 2015	44.4	26.2	30.4	5.1	15.7

Source: the poll results.

Respondents of Igor Sikorsky Kyiv Polytechnic Institute have demonstrated their proficiency in English, which is a prerequisite for the international cooperation in science today: 28.2% of respondents read and communicate fluently, 52.7% well read and can communicate and 16.8% have an initial level of language knowledge, sufficient for correspondence and reading with a dictionary. Also, 26.7% of respondents have satisfactory knowledge of other foreign languages, except English and Russian.

In the context of reduction of R&D sphere in Ukraine and worsening of the socio-economic situation, the importance of getting the foreign grants and participation in the joint research projects for the Ukrainian scientists is growing rapidly and, therefore, the urgency is growing with respect to studying the reasons that prevent the young researchers from applying for foreign grants (Table 7). The urgency lies not only in earning the extra money because of the low wages, but also in the ability to conduct an experimental part on the modern equipment that is not available in our country. Also an important point is the recognition of the Ukrainian inventions and developments by the world scientific community.

So, the respondents (like everyone and a part of those who have experience) have not singled out one global reason that prevents the absolute majority from realizing their potential in the international cooperation, but almost everyone has noted that there are barriers in reality. There are four interrelated negative factors (a share of which being approximately 30—40%, greater precision is impossible because of error of represen-

Table 6

Comparison of Research Activity Indicators of Young Researchers from Igor Sikorsky Kyiv Polytechnic Institute (2016) and the NAS of Ukraine (2015)

Indicator	Young researchers of Igor Sikorsky Kyiv Polytechnic Institute, %	Young researchers of NAS of Ukraine, %	Postgraduates of Igor Sikorsky Kyiv Polytechnic Institute, %	Postgraduates of NAS of Ukraine, %
Authorship and co-authorship of monographs	24.4	32.5	26.1	23
Participation in competitions for grants	18.3	47.2	23.2	20.3
Inventor's certificates and patents	40	31.3	34.8	17.6
Professional publications in foreign journals included into the world scientometrical databases	46.6	47.4	59.4	45.9
Communication with foreign colleagues (aware of their works)	26	31.3	52.2	32.3
Communication with foreign colleagues (at conferences)	10	16.1	18.8	20.2
Communication with foreign colleagues (information exchange)	9.2	22.9	13	18.2
Communication with foreign colleagues (joint publications)	7.7	9.1	5.8	8.1
Communication with foreign colleagues (joint projects)	9.2	17.5	14.5	9.1
Second higher education	16	17.5	17.39	16.1
Satisfaction with research activity	85.5	91.4	84.1	88.9

Source: the poll results.

Table 7

Analysis of the Reasons That Prevent from Applying for Foreign Grants

Respondents	Reasons						
	Nothing prevents, %	Lack of information on grants, %	Economic reasons, %	No consultant/ assistant, %	Language barrier, %	Cultural, psychological barrier, %	Other (bureaucracy, lack of time, lack of experience etc., %
With experience	4.2	41.6	37.5	37.5	37.5	0	8.3
All respond-ents	0.8	37.4	35.1	35.9	25.2	9.2	13.7

Source: the poll results.

tativeness of 8.2%), which require a complex solution; and the fifth, psychological factor with a share of 12.3% which may be characterized as fear of the first step in the new investigations. This barrier is absent in the answers of young scientists with experience.

Based on the results and the own experience the authors single out the economic effect as dominating over the others. Firstly, lack of even short-term paid trips to the conferences in other countries results in the lack of publications in the foreign journals, on-the-job training, participa-

tion in the scientific competitions and projects. Note that in other European scientific programs there is a requirement of long-term residence of foreign scientists in the country of grantor. Secondly, the lack of sufficient funding denudes the proper software. A scientist has no a real motivation to seek for his/her collective the information on grants and to help them to draw up documents in addition to his/her main duties.

Today, submission of documents for participation in the competition requires not only knowledge of one's profession, experience, scientific idea, knowledge of English terminology of scientific area, but also specific skills and preparing the requests in a foreign language. The processing of requests also is complicated because of combination of paper and electronic forms of documentation. The language barrier (25.2%) is objectively higher than the percentage of respondents with an initial level of English (16.8%) and those who lack knowledge of English (2.3%).

The mentioned problems should be solved by creating a network of contact points with the participation of scientists. So, on December 20, 2013, the National Contact Point (NCP) «Horizon 2020» was established at Igor Sikorsky Kyiv Polytechnic Institute. According to the Regulations, its main tasks are as follows: information, counseling, training, assistance in finding the partners, interaction with other NCPs and the European Commission. The authors believe that the functions of the NCP should be supplemented with services for scientific translation (taking into account the language barrier) and legal assistance in the drawing up of documents [16]. If the proposed functions are beyond the scope of the NCP (for example, even from the financial point of view such services are, of course, paid), then the question arises about creating a special post in the research institutions and subdivisions of research universities. The main activity of such specialists should be the search and systematization of information about grants and competitions, communication with scientific institutions of other countries, registration and support of the request, beginning from a scientific idea to the stage of the competition with the submission of documents.

The transition from the basic science financing to the grant is an integral part of Ukraine's movement into the European scientific space. However, such a transition cannot happen instantly. The analysis of the responses of respondents indicates that the main reason for the low level of participation in the competitions is the lack of experience of the collective work in this area. The young scientists must acquire the real experience in the scientific collectives, where they begin their carriers as scientists. If the scientific supervisor works under the grant programs, he is constantly involved in the search for grant programs, the registration and filing of applications, then a young scientist also participates in this process, and at the time of obtaining a degree he has already had some experience in this field. Today, only a small part of scientific supervisors is working on the grant topics, most receive only budget funding, the procedure for obtaining of which is also little known to the young scientists.

Since 2016, on the initiative of the Council of Young Scientists at the Ministry of Education and Science of Ukraine, a competition has been initiated for the projects of scientific works and (experimental) R&D of young scientists who work (study) at the higher educational institutions and scientific institutions belonging to the sphere of management of the Ministry, and further execution of these works and developments is carried out at the expense of general fund of the state budget and their management. Also, for young scientists there is an annual grant competition of the President of Ukraine from the State Fund for Fundamental Research. Information distribution about participation in these competitions is carried out by the R&D Department of Igor Sikorsky Kyiv Polytechnic Institute, the information is provided in a sufficient amount. These two tools have already allowed the young scientists to master the basic principles of obtaining the grant funding independently, but the

problem of participation in the international grants programs remains unsolved.

Participation in the international grants programs is more complex. It should be noted that it is rarely possible to obtain funding for the work exclusively in Ukraine. Granting countries are interested in spending money on the development of science in their countries, therefore specialists must either move abroad for the duration of the grant or do research with their foreign colleagues. Hence, a new problem arises: where do the young scientists can find the foreign partners? Participation in the international conferences, where new contacts are established, involves a payment of organizational fee, accommodation and transport costs. Often the amount of business trip can reach EUR 200—500, which can be compared to several salaries of the Ukrainian scientist. There is no mechanism for compensating such expenses at Igor Sikorsky Kyiv Polytechnic Institute. In turn, the participation of foreign experts in domestic conferences is extremely low.

The departure of young specialists abroad for a long time does not look attractive enough. Young scientists usually go abroad to work there because they are not satisfied with the state of science in Ukraine. It is difficult to imagine a young scientist who will go to Europe to work for 3—6 months only for establishing the new relationships, and then will return to participate in the grant. In opinion of the authors, in order to create a stable system of grant funding at Igor Sikorsky Kyiv Polytechnic Institute, every young scientist, at least once a year, should be given a financial assistance for the participation in the world scientific conferences on the subjects of their own research. This approach will promote the development of scientific communication among the young scientists and will become a solid basis for the development of grant funding through the creation of system of scientific relations.

Lastly, let's consider the question of having a consultant/assistant. In our opinion, this problem can arise only when there is already both a scientific idea and a team for its realization, and it remains to decide only organizational issues. It is expedient to attract the employees who have already had a successful experience in obtaining the grant funding in order to assist in drawing up of documents, translation or legal support. Their work in this area should be encouraged financially. Creating the additional tools or departments whose employees have not yet participated in the grant programs will not lead to significant changes in this area.

In their answers the respondents pointed to insufficient logistical support for the scientific activity of the young scientists. More than half (53.4%) of the young scientists of Igor Sikorsky Kyiv Polytechnic Institute indicated their own housing as one of the options for the workplace (Table 8).

Only 20.6% of the respondents indicated that they had everything they needed at the workplace. Fig. 1 shows the distribution of variants of answers as to provision of the workplace, and one can see that the lack of equipment and appliances, office equipment and the required scientific literature are the most acute problems for the respondents.

Table 8

Workplace of Young Scientists and Teachers of Igor Sikorsky Kyiv Polytechnic Institute in Comparison with the Scientific Youth of the NAS of Ukraine (several answers)

Workplace option	Young scientists of Igor Sikorsky Kyiv Polytechnic Institute, %	Young scientists of the NAS of Ukraine, %
At home	53.4	34.8
Lecture room	35.9	–
Workplace in the institute	89.3	79.2
Laboratory	27.5	29.7
Library (archive)	6.1	7.9
Other	1.5	3.9

Source: the poll results.

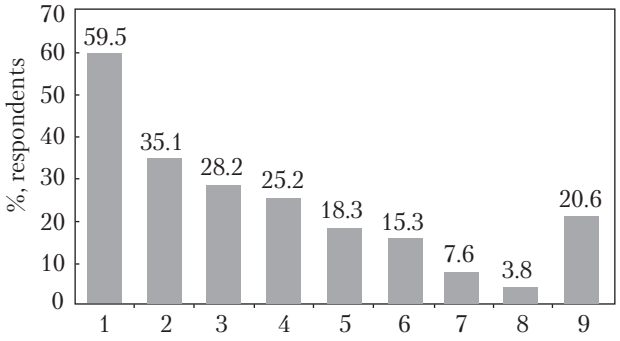

Fig. 1. Respondent answers to the question «What are you short of at your work place?» Give up to 5 options. 1 — equipment (devices, expandable materials, reagents); 2 — computer; 3 — scholarly research literature; 4 — printer; 5 — access to Internet; 6 — assistant; 7 — office telephone; 8 — other stuff; 9 — I have everything I need
Source: the poll results.

Data on the business trips to other countries are also unsatisfactory. In general, 67.9% of the respondents did not have business trips. Most of the business trips indicated in the questionnaire are participation in the international conferences (20.6%) and on-the-job training (12.2%). Only 3.8% of the respondents had contracts for common research projects in another country. Indicators of business trips of the NAS of Ukraine youth for 2015 are higher, and make up 39.7%, 16.1% and 10%, respectively.

The survey showed a low level of socio-economic support for the young scientists at Igor Sikorsky Kyiv Polytechnic Institute. The overwhelming majority (68%) of young scientists (46.4% in the NAS of Ukraine, in 2015) indicated that they had other sources of income, while only 10% additionally taught in their home university and in other higher educational institutions, and additional work in the research institutes made up 15.3%. Many of them worked in the commercial structures (33.6%) and 19.1% worked remotely on the Internet. Thirteen percent of respondents did not point definitely to another area of part-time work, so, we can assume that the case in point was tutoring and a sphere of service. At that, 19.9% of respondents indicated several sources of additional income.

Ukraine is experiencing a deep socio-economic crisis. In December 2014, inflation amounted to 24.9% (in 2015, 43.3%) compared with 0.1% in December 2013 [17; 18]. According to the NBU's inflation report, the basic consumer price index (CPI) (usually used as an indicator of the general level of inflation in the economy), as of January 2016, increased by 34.7%, and for 2016 it was predicted to decrease to 12% [19; 20, p. 13]. As of May 2015, the young scientists of the NAS of Ukraine identified their financial needs at UAH 6004.42 per month, on average, their financial needs of the family being UAH 11714.89 [12, 71]. A general personal financial need of a young scientist of Igor Sikorsky Kyiv Polytechnic Institute accounted for UAH 7851.16 per month, on average (as of April—May, 2016), while the financial need of the family per month was estimated by the respondents at UAH 15084.55, on average, that is, the financial needs of young scientists and their families increased by 23.5% and 22.3%, respectively, by the end of May 2016, which did not correspond to the projected 12%. The data have been given before the introduction in autumn and winter of new tariffs for the utility services.

The survey has also confirmed the thesis that people with higher education are inclined to create a family in a more mature age. An absolute majority (79.4%) of respondents are at the age of 4—29 (mainly the graduate students), and 17.6% belong to the age group from 30 to 35 years old.

The majority of the respondents were unmarried (56.5%) and only 20.6% have children, almost all have one child in the family, which does not correspond to the necessary indicator of natural reproduction of the population.

Responses as to housing at Igor Sikorsky Kyiv Polytechnic Institute (Table 9) as a whole, do not differ from the data of the survey of young scientists of the NAS of Ukraine, but they demonstrate a better housing provision (own and rented accommodation).

On the other hand, we should make two important assumptions, also bearing in mind the

lack of accuracy of the survey: 1) with a decrease in the number of young teachers and scholars in the budget sphere, people, who have no significant housing problems, remain to work; 2) In Ukraine, there is a tradition of «nominal» rent of accommodation by young people from relatives, only with full payment of utility services, that is, the «living with parents» category may be larger than indicated in Table 9.

Indicators of satisfaction with scientific work (85.5% of respondents) and the desire to work in the future at Igor Sikorsky Kyiv Polytechnic Institute (67.9%), in principle, correspond to each other, unlike academic indicators (91.4% and 55.1%, respectively). It is also positive that 81.5% of respondents of the age group from thirty years intend to continue working at Igor Sikorsky Kyiv Polytechnic Institute. However, it should be noted that only 22.9% of respondents wrote without hesitation only this educational institution as a future place of work, without any other options. Traditionally high (Fig. 2) are options for the employment in the commercial structures (45.8%) and travel abroad (35.1%), which is in line with the general tendencies of the youth life movement in Ukraine. For comparison, the survey data of young scientists of the NAS of Ukraine for 2015 have been presented (Fig. 3).

As can be seen, in a whole, the trends are similar, but the differences are that the young scientists of Igor Sikorsky Kyiv Polytechnic Institute

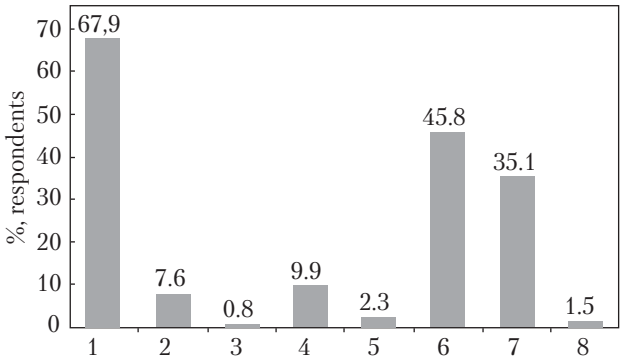

Fig. 2. Answers to the question «Where are you going to work in the future?. Give several options». Respondents from Kyiv Polytechnic Institute, 131 young researchers: 1 — Kyiv Polytechnic Institute; 2 — the NAS of Ukraine; 3 — industrial institutes; 4 — other HEE; 5 — public service; 6 — business; 7 — abroad; 8 — not decided yet
Source: the poll results.

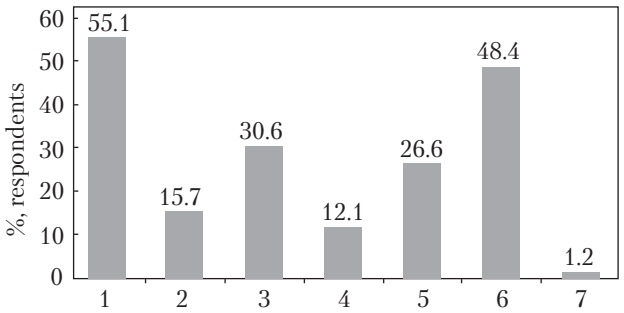

Fig. 3. Answers to the question «Where are you going to work in the future?. Give several options». Respondents from the NAS of Ukraine, 428 young researchers: 1 — the NAS of Ukraine; 2 — industrial institutes; 3 — other HEE; 4 — public service; 5 — business; 6 — abroad; 7 — not decided yet
Source: the poll results.

Table 9

Housing Provision of Young Scientists and Teachers of Igor Sikorsky Kyiv Polytechnic Institute in Comparison with the NAS of Ukraine

Type of housing	Young scientists of Igor Sikorsky Kyiv Polytechnic Institute, %	PhD students of Igor Sikorsky Kyiv Polytechnic Institute, %	Young scientists of the NAS of Ukraine, %	PhD students of the NAS of Ukraine, %
Own	28.2	23.2	21	14.1
Rented	26.0	24.6	22	24.2
Hostel	28.2	33.3	28.7	37.3
With parents	17.6	18.8	28.3	24.2

Source: the poll results.

are more confident in the future, alternatives of the future employment are less pronounced, the young teachers, compared with the academic youth, are less willing to go abroad, work in the commercial structures is the most likely alternative, and this does not mean a complete cessation of scientific and teaching activities at the university.

It should be noted that several respondents, answering to open questions about the possible changes, recommended the involvement in reading the lectures and carrying out seminars of specialists from the industry and business organizations with a significant practical experience and current knowledge in the industry.

The knowledge of the scientific youth of Igor Sikorsky Kyiv Polytechnic Institute as regards the legislation on the scientific and R&D activity (46.6%) was insignificant, and 9.9% of respondents qualified their knowledge as «superficial» or «partial». In the NAS of Ukraine, the rate of awareness of the respondents in 2015 was 49.5%, of which 17.2% qualified their knowledge as «superficial».

An absolute majority of the respondents (77.9%, and 8.4% did not take a decision) reasoned that Igor Sikorsky Kyiv Polytechnic Institute should be reformed. The indicators of answers to the questions on the reform of higher education in Ukraine were even higher: 86.3% considered that this reform was necessary, 5.3% answered negatively, and 8.4% did not decide on the answer. Probably 8.4% were afraid to express their opinion on the reforms in the scientific and educational sphere, even anonymously. A very high indicator of the desire for the reforms contrasts with the fact that for several years there have already been the new laws on the academic activities and higher education, that is, the respondents' answers indicate that the new norms in the scientific and educational sphere have being implemented slowly.

The responses to the questionnaire on the probable reform directions contained proposals of both very radical (for example, the dismissal of retirement age employees from the managerial positions, which is also the result of the influence of discussions in the press and on the Internet) and moderate measures (increase in funding). A number of concrete proposals were received regarding the improvement of the current legislation and the organization of the educational process at Igor Sikorsky Kyiv Polytechnic Institute and higher educational institutions of Ukraine. Also, the survey organizers identified 17.6% of «radical» responses. However, in our opinion, the most interesting are some proposals, which will be commented on.

SUMMARY OF RESPONDENTS' PROPOSALS WITH COMMENTS

1. Increased funding of science, wages, expansion of the grant and scholarship system, the purchase of new equipment, the introduction of new technologies and the European standards, including grants for the research of students and teachers, support funds for business trips to the foreign conferences.

According to the calculations of specialists of Dobrov Institute for Research of R&D Capacity and History of Science of the NAS of Ukraine, so that the science will fulfill an economic function, its funding (both academic and university levels) should be at least 1.7% of GDP, or otherwise it remains a costly sphere [22, 9]. Therefore, it is necessary to really increase the expenditures so that they can not only cover the labor costs, but also can constantly modernize the scientific equipment in accordance with the world standards.

This wish also raises question of not only about the amount of funding, but also about the transparency of the distribution system. Today, there are numerous laws and regulations that require the public financial reporting of business entities of all forms of ownership.

2. Prohibition of the policy «The number of students determines the amount of funding». After each session more students should be expelled,

which will increase competition and stimulate the acquisition of education. The number of higher education institutions in Ukraine should be decreased and the vocational schools in the form of colleges should be revived.

Today, the main problem is the excessive number of universities since the 1990s—2000s, and therefore, the poor quality of educational services. It is necessary to radically reduce the number of universities, transforming them into colleges or centers of advanced training. The general public comes to the idea that most of the modern workplaces do not require the knowledge acquired over 6 years. This is especially true of social and humanitarian specialties. Higher education gives not just knowledge, but a way of thinking, approach to things. This is necessary for 10% of people in the society, who will later become either directors or scholars. The main problem of reducing the number of universities is the selection criteria. Here you should pay attention to each individual employee. It is necessary to create conditions for the new employment of talented teachers and scientists from the disbanded universities. In other words, the case in point is not about selection among the universities (although it is just their number should be reduced), but about the selection of specialists (a kind of re-certification, as in the police).

4. The legislation of Ukraine in the field of education in some cases is declarative, while in others it is too bureaucratized, even the list of literature should be prepared in accordance with the complex requirements.

Indeed, in the foreign publications the list of literature is not so complicated, as the Ukrainian one. For example, you need to provide the authors' list twice. On the other hand, there is a sufficient amount of electronic resources that greatly simplifies the citation process: Mendeley, EndNote, VAK.in.ua.

This question concerns the legislation of Ukraine, in general, and possible changes in the scientific and educational spheres depend on the changes in the entire legislative process.

5. Introducing the practice of funds compensation for the publication of articles in the foreign authoritative scientific publications.

There are paid and free publications in magazines. Publication in the self-reporting journals is usually free. Only if the article is openly accessible, the publication should be paid. There are also loyalty programs for Ukraine, where the discount reaches 100% [23]. On the other hand, the practice of stimulation in the form of state awards of the best scientific publications is known in the world, but this brings us back to the issue of state funding of scientific activities.

6. The necessity of real autonomy of higher educational institutions, especially in the context of curriculum development.

Regarding the independence in the curriculum, we should remember about the system of correlation of prestige and reputation of universities with the control of the central executive body. None of the opposite poles, namely: full control, complete independence is not desirable in Ukraine under the current conditions.

7. The need to receive an assignment for on-the-job training abroad, as in most cases the employees of education and scientific sphere do not have the direct opportunities. Increase in the practical part of the programs, including the long-term probation on- the job training in the industrial and scientific institutions, involving the subject specialists in the educational process.

Formally, the possibility of overseas business trips exists and the point in case is not about their complete absence [24]. However, the problem will exist, until the majority of young scientists in Ukraine can afford the trip abroad on a regular basis.

Involving the best subject specialists with good practical experience in the educational process brings us to the topic of improving the financing of teacher salaries and the transparent competitive system.

8. State guaranteeing of employment for the graduates of the state educational institutions.

This thesis is a remnant of the Soviet era, on the one hand, and public (oral or written) promises to entrants during their joining the institutions of higher education, on the other hand. The problem should be solved by eliminating the contradictions. Either the universities should be legally prohibited from giving the similar promises (including in a hidden form), or it is necessary to strengthen the social protection of the universities graduates.

9. Granting of the right to the students to choose training courses.

The authors agree with this thesis. It is a norm for the European system of higher education and one of the principles of academic mobility. Students of the 4th year have the right to choose 20% of the disciplines to study. The positive changes will increase competition between the teachers.

10. Ban on the unlicensed software (SW) on the computers of higher educational institutions.

Just a ban is not enough, and it already exists. Obviously, the level of funding for a university is not sufficient for the purchase of licensed software. The problem can only be solved through an increase in funding. On the other hand, the unlicensed software affects the outlook of teachers and future specialists.

11. Reduction of bureaucracy through the transition to the electronic forms.

The university should introduce a single electronic database for all types of administration and support of work. The base should support the activities of all units and it will free up the time of the employees, which is spent on the preparation of reports (today, it takes about 1 month per year).

At Igor Sikorsky Kyiv Polytechnic Institute there is an informatization of the educational process. However, presently there are several electronic resources, but clear terms and conditions for their integration are not defined: http://campus.kpi.ua, http://rozklad.kpi.ua.

In addition, in the transition period, electronic and paper documents are duplicated (they exist in parallel), a large percentage of workers do not support the transition to the electronic document circulation.

It is also important to remember that, even with 100% solution of this question, the influence of the external factor remains. The paper documents in Ukraine neutralize the positive effects of the electronic document circulation of separate organizations.

12. The necessity to have an own path of reformation with the preservation of scientific schools.

Those who are interested in this subject can deepen their knowledge of the monographs of Doctor of Physics and Mathematics, Professor Yu. Khramov «Scientific Schools in Physics» and «History of Formation and Development of Physics Schools in Ukraine», which describe the theory and practical application of this phenomenon of science. Within the framework of the same article we propose the thesis that the dynamics of the emergence, development and decline of scientific schools is a vivid indicator of the state of science, in general. In modern Ukraine, new real scientific schools are rarely formed, and we consider it to be a negative symptom.

13. Increase in funding the chairs by way of redistribution of funds of contract students in the ratio of 80% for the purchase of facilities and 20% for the main building of the university.

The authors believe that the autonomy is not required for the chairs, and the department level requires more autonomy in terms of funding allocation and a transparent administration system, including the financial reporting. The administration must submit its plan of action annually: namely: what is planned and who is responsible, and at the end of the year to report on the work done. This information should be constantly available on-line, with the opportunity to ask questions and make suggestions.

14. Access to the paid foreign publications.

The library of Igor Sikorsky Kyiv Polytechnic Institute has a subscription to SCOPUS, but it should be acknowledged that reading a foreign

magazine in a paper format is easier and subscribing to the world scientific journals is a topical issue.

15. The necessity to replace the old methods of teaching and submission of information that are not relevant today. The material should be in line with the current market demands of the relevant field.

The thought is right. It is difficult to create and control a mechanism of updating. However, it is a matter of balance of labor in teaching, practice, and research, rather than control. If you take the western model of the university, then you need to create the independent laboratories in the universities, whose employers will teach less part of the time, but to truly teach the modern knowledge and attract the best students to scientific activity at the world level.

CONCLUSIONS AND PERSPECTIVES FOR FURTHER STUDIES

The research that the authors plan to do as the annual monitoring of the state of young scientists at Igor Sikorsky Kyiv Polytechnic Institute has confirmed the well-known hot issues in the Ukrainian science.

1. The unsatisfactory social and economic state of young scientists: the total financial need of a young scientist of Igor Sikorsky Kyiv Polytechnic Institute significantly exceeds the average wage on the background of inflation and the rapid growth of tariffs for the utilities.

2. Acute shortage of equipment, materials and office equipment for the world-class researches. Taking into account the insufficient funding, this problem may be solved with a help of donors and at the expense of grantees.

The main problems of young scientists of Igor Sikorsky Kyiv Polytechnic Institute were identified and divided into social and professional ones. The professional issues were as follows:

1. Difficulties in the system of rotation of staff, the need for clear criteria for career development: 1.1) a large number of interviewed Candidates of Sciences work at inappropriate positions; 1.2) decrease in the percentage of postgraduate students who remain to work at the university; 1.3) young teachers of Igor Sikorsky Kyiv Polytechnic Institute tend to leave the university after several years of work.

2. There are certain barriers (mainly economic) for the participation of young scholars in the foreign grants competitions.

3. Lack of scientific mobility.

4. Bureaucracy, the lack of proper electronic document circulation and the need to create a unified information system. To date, there are several electronic resources, but clear terms and conditions for their integration are still not defined (http://campus.kpi.ua, http://rozklad.kpi.ua).

5. Obsolete methods of teaching the educational disciplines, the gap between the theoretical and practical parts of the educational process.

6. More than 50% of the polled young teachers and scientists additionally work part-time.

There are the following social problems in the country, as a whole:

1. The housing issue has not been solved.

2. Although the youth of Igor Sikorsky Kyiv Polytechnic Institute has somewhat better social security than the academic youth, and more confident in the future, but the number of experienced young scientists who plan to stay at the university has continued to drop.

3. Very high indicators of the desire for reforms of education and science with significantly less awareness of the relevant legislation.

The indicators of scientific activity of the youth of Igor Sikorsky Kyiv Polytechnic Institute and the NAS of Ukraine are similar. The difference between the young scientists of the University and the National Academy of Sciences of Ukraine, above all, is in the teaching activity for the majority of respondents, despite the fact that in the scientific activity and cooperation the youth of Kyiv Polytechnic Institute almost does not concede to the young scientists of the National Academy of Sciences of Ukraine. And young teachers of polytechnics are more accus-

tomed to the work part-time than their colleagues from the National Academy of Sciences.

The young scientists from the National Academy of Sciences of Ukraine have somewhat higher indicators for writing the monographs, participating in the grant competitions and joint projects with foreign colleagues and their colleagues from Igor Sikorsky Kyiv Polytechnic Institute more often patent their developments; this indicator is even higher for the graduate students. The patenting of own developments is a characteristic feature of Igor Sikorsky Kyiv Polytechnic Institute, because it is just this university that takes leading positions in the field of innovation. This indicator is not indicative for the country's universities, as a whole, it is rather a characteristic feature of the field of engineering.

However, the low socio-economic support of young scientists of Igor Sikorsky Kyiv Polytechnic Institute practically does not affect their desire to study science, although it reduces the effectiveness of their work, makes them change the place of work in the adulthood, and also contributes to the radicalization of their views on the reform of the educational and scientific system in the country, in general, and at Igor Sikorsky Kyiv Polytechnic Institute, in particular, despite the lack of knowledge of legislation in the field of science and R&D.

Consequently, the creation of favorable conditions for the professional activity of scientific and educational youth should become the priority of the personnel policy of the institutions administration and government in order to preserve the young scientific reserve of Ukraine.

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ПРОФЕСІЙНІ ТА СОЦІАЛЬНІ ПРОБЛЕМИ НАУКОВО-ОСВІТЯНСЬКОЇ МОЛОДІ ЗА РЕЗУЛЬТАТАМИ СОЦІОЛОГІЧНОГО ОПИТУВАННЯ (НА ПРИКЛАДІ НТУУ «КПІ ІМЕНІ ІГОРЯ СІКОРСЬКОГО»)

Статтю присвячено проблемі збереження молоді у складі науково-кадрового потенціалу вищої школи. На базі результатів он-лайн анкетування, яке було проведено у 2016 році у НТУУ «КПІ імені Ігоря Сікорського», проведено аналіз професійних і соціальних проблем молодих викладачів та науковців. Дослідження охоплює дані стосовно патентування, публікаційної активності, участі в міжнародному науковому співробітництві, академічної мобільності, матеріально-технічного забезпечення робочих місць, задоволеності заробітною платнею, планів щодо майбутньої кар'єри. Проведено порівняння з результатами попереднього дослідження проблем наукової молоді НАН України. Основними професійними проблемами визначено нестачу обладнання та матеріалів для проведення наукових досліджень на світовому рівні. Серед соціальних проблем виділено низький рівень оплати праці та невирішене питання житлового забезпечення. Було узагальнено пропозиції респондентів щодо покращення умов праці. Зроблено висновок, що створення сприятливих умов для професійної діяльності науково-освітянської молоді має стати пріоритетом кадрової політики керівництва установ та уряду задля збереження молодого резерву науки України.

Ключові слова: наукові кадри, наука ВНЗ, соціологічне дослідження, молоді викладачі, молоді вчені, НТУУ «КПІ імені Ігоря Сікорського», НАН України.

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ПРОФЕССИОНАЛЬНЫЕ И СОЦИАЛЬНЫЕ ПРОБЛЕМЫ НАУЧНО-ОБРАЗОВАТЕЛЬНОЙ МОЛОДЕЖИ ПО РЕЗУЛЬТАТАМ СОЦИОЛОГИЧЕСКОГО ОПРОСА (НА ПРИМЕРЕ НТУУ «КПИ ИМЕНИ ИГОРЯ СИКОРСКОГО»)

Статья посвящена проблеме сохранения молодежи в составе научно-кадрового потенциала высшей школы. На базе результатов он-лайн анкетирования, проведен-

ного в 2016 году в НТУУ «КПИ имени Игоря Сикорского» проведен анализ профессиональных и социальных проблем молодых преподавателей и ученых. Исследование охватывает данные о патентовании, публикационной активности, участии в международном научном сотрудничестве, академической мобильности, материально-техническом обеспечении рабочих мест, удовлетворенности заработной платой, планов относительно будущей карьеры. Проведено сравнение с результатами предыдущего исследования проблем среди научной молодежи НАН Украины. Основными профессиональными проблемами определено нехватку оборудования и материалов для проведения научных исследований на мировом уровне. Среди социальных проблем выделено низкий уровень оплаты труда и нерешенный вопрос жилищного обеспечения. Были обобщены предложения респондентов по улучшению условий труда. Сделан вывод, что создание благоприятных условий для профессиональной деятельности научно-образовательной молодежи должно стать приоритетом кадровой политики руководства учреждений и правительства для сохранения молодого резерва науки Украины.

Ключевые слова: научные кадры, наука вузов, социологическое исследование, молодые преподаватели, молодые ученые, НТУУ «КПИ имени Игоря Сикорского», НАН Украины.