

**S. I. BUKHKALO, A. O. AGEICHEVA, S. P. IGLIN, Yu. N. HLAVCHEVA,
N. N. MIROSHNICHENKO, O. I. OLKHOVSKA, V. O. OLKHOVSKA,**

INNOVATIVE COMPLEX PROJECTS'2018/2019 REALIZATION IN THE EXAMPLES AND TASKS

The materials presented of innovative development complex projects for the master class XVI International School-seminar "Modern pedagogical technologies in Education". The materials are devoted to the results of researches of properties of technical and technological innovations of modern systems'2018/2019 as object intellectual property and distance learning, and also to the methods, models and systems of their mathematical description in the power studies and baseness. In this, phase of work in NTU KhPI" – studies the possibility of complex properties of intellectual property objects in the competency development system increasing the economic efficiency of new alternative energy sources. A review of the literature and the necessary articles written on the subject: as technologies and economies develop and become more complex, energy needs increase greatly; types and evidence-based methods of new energy and material resours, as well as the possibility of calculating the basic set of main economic indicators are classified; identified possible areas of work in obtaining the necessary information and results. Energy is a fundamental input for economic ecological safety systems. It is determined that technical means should provide a program of students' work on the content of the educational material (program of its learning process), a combination of training and education functions, strengthening the control and self-control of the process and its results of the process of learning knowledge, assistance in implementing the ideas of differential and problem learning.

Keywords: intellectual property; distance learning; integrated technologies; evidence-based methods; ecological safety.

**С. І. БУХКАЛО, А. О. АГЕЙЧЕВА, С. П. ІГЛІН, Ю. М. ГЛАВЧЕВА, Н. М. МІРОШНІЧЕНКО,
О. І. ОЛЬХОВСЬКА, М. М. ЗІПУННІКОВ, В. О. ОЛЬХОВСЬКА**
ИННОВАЦИЙНІ КОМПЛЕКСНІ ПРОЕКТИ'2018/2019 У ПРИКЛАДАХ І ЗАДАЧАХ

У матеріалах статті розглянуті можливості для визначення цілей подальшої розробки складових комплексних проектів'2018/2019 у вигляді прикладів об'єктів інтелектуальної власності. Розробки проведені з метою вибору сучасних високоєфективних науково-обґрунтованих технологій використання: 1) різновидів сировини; 2) полімерної тари та упаковки на різних стадіях експлуатації та утилізації. Представлені приклади і деякі особливості можливих рішень, які засновані на експериментальних даних розробки механізмів ідентифікації-класифікації процесів і їх наукового обґрунтування у вигляді об'єктів інтелектуальної власності. Проблема утилізації відходів розглядається у вигляді складних комплексних процесів, їх досліджень і аналізу енерго- і ресурсозберігаючих складових для відходів різного походження. Результати досліджень по утилізації полімерної тари та упаковки можуть бути використані для вибору методів повторної її переробки – модифікації або утилізації.

Ключові слова: інтелектуальна власність; дистанційна освіта; комплексні інноваційні проекти; науково обґрунтовані методи; екологічна безпека.

**С. И. БУХКАЛО, А. О. АГЕЙЧЕВА, С. П. ИГЛИН, Ю. Н. ГЛАВЧЕВА, Н. Н. МИРОШНИЧЕНКО, О. И.
ОЛЬХОВСКАЯ, Н. Н. ЗИПУННИКОВ, В. О. ОЛЬХОВСКАЯ**
ИННОВАЦИОННЫЕ КОМПЛЕКСНЫЕ ПРОЕКТЫ'2018/2019 В ПРИМЕРАХ И ЗАДАЧАХ

В материалах статьи рассмотрены возможности для определения целей дальнейшей разработки составляющих комплексных проектов'2018/2019 в виде примеров объектов интеллектуальной собственности. Разработки проведенные с целью выбора современных высокоэффективных научно-обоснованных технологий использования: 1) разновидностей сырья; 2) полимерной тары и упаковки на различных стадиях эксплуатации и утилизации. Представлены примеры и некоторые особенности возможных решений, которые основаны на экспериментальных данных разработки механизмов идентификации-классификации процессов и их научного обоснования в виде объектов интеллектуальной собственности. Проблема утилизации отходов рассматривается в виде сложных комплексных процессов, их исследований и анализа энерго- и ресурсосберегающих составляющих для отходов различного происхождения. Результаты исследований по утилизации полимерной тары и упаковки могут быть использованы для выбора методов повторной ее переработки – модификации или утилизации.

Ключевые слова: интеллектуальная собственность; дистанционное образование; комплексные инновационные проекты; научно обоснованные методы; экологическая безопасность.

Introduction. General issues of innovative development complex projects for the master class XVI International School-seminar "Modern pedagogical technologies in Education" January 30 - February 1, 2019 p. were presented and investigated jointly with the seminar audience in the presentations form with the general theme "Definition and formation of intellectual

property complex competency development objects» [1-4]. The presentation was consisted of the main parts:

1) Complex Properties of Intellectual Property Objects in the Competency Development System – prof. Bukhkalo Svitlana Ivanivna, National Technical University «KhPI», Kharkiv;

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2) Intellectual property peculiarities in education competence system – docent Ageicheva Anna Oleksandrivna, Poltava National Technical Yuri Kondratyuk University, Poltava.

The presented materials are combined with a common theme technology in education, education technology and educational technology.

Master class general problem issues [1] include the notion of "educational technology", which is broader than "pedagogical technology" (for pedagogical processes).

Education includes, apart from pedagogical, a variety of social, socio-political, managerial, cultural, psychological and pedagogical, economic and other related aspects. On the other hand, the concept of "educational technology" refers to all sections of pedagogy, taking into account technology in education and technology of education.

At implementation of our complex projects development in the educational process we have obtained practical results promoting the development of intellectual and organizational skills of students who form the skills of independent, organizational and collective activities is competence, communication skills, creativity and personality of the head who generally contribute to the intensive development of scientific and technical creativity of graduates, as well as raising the general cultural level of students.

These are also developments in the field of:

1) detection and development of students' profile creative abilities, taking into account motivation to research and development activities;

2) creating the necessary conditions for supporting talented students; development the criteria for the quality of training, corresponding to the tasks and requirements of students scientific research;

3) the development of various forms of educational technology and the organization of activities aimed at the development of young athletic skills;

4) building relations with a "clean sheet";

5) research scientific novelty;

6) horizons expansion;

7) different sources usage;

8) applications preparation for international funds and programs related to the implementation of scientific developments and university patents;

9) assisting in project applications preparation, business plans and other documents in the scientific and technical field;

10) projects, programs, funds, grants monitoring and studying the possibility of participating at the university;

11) participation in the creation of partners network of international organizations on the implementation of scientific innovation projects;

12) scientists and creative teams attraction for realization scientific and technical and innovative developments;

13) interaction with representatives of the authorities in the field of program and project activity;

14) participation of the university in scientific and technical exhibitions organization, sharing information related to carried out projects, innovative developments, technical and scientific achievements in the mass media [1–3].

The presented work is based on the foundations choice and the concept methods of complex innovative projects (Table 1) with the aim of continuous implementation of the competences system in the educational process by types:

1) the discipline scope, which is taught at one department (on the basis of a course project or research work);

2) several special disciplines scope, which are taught at one department (based on course papers and bachelors projects – figure 1);

3) several special disciplines scopes, which are taught at different departments (based on course papers and projects of bachelors and masters – figure 2).

If you're an excellent communicator who wants to work with projects and are ready to enter a highly competitive industry, it could be your perfect job.

The main factors in the organization of student training, for example, in complex innovative projects, are the updating of their components intellectual property objects.

For example to submit the problem of wastes utilization and recycling is present as complex research and analysis of energy- and resource saving processes for treatment of polymer wastes of various origin [1–5].

Table 1. Fundamentals of complex innovative projects

№	Stages of the functional scheme of the project
1	Understanding and analysis – innovative technologies
2	Analysis of the status of the scientific problem
3	Search for possible options – investment strategy
4	Study of accumulated results
5	Analysis of general and basic regularities
6	Determination of settlement dependencies
7	Realization of necessary calculations
8	Analysis of the results
9	Entering results into project components
10	Assessment of technical support capabilities
11	Development of innovative technology

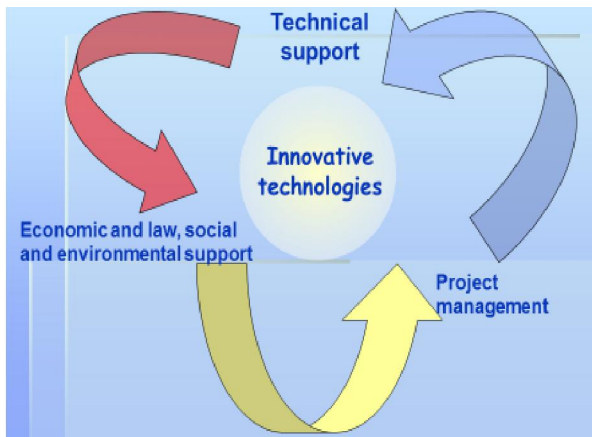


Figure 1. Design technology improvement areas

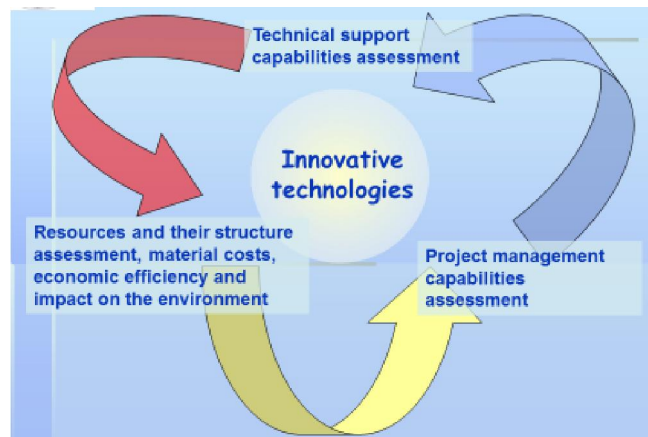


Figure 2. Techniques for improving design technology

It is necessary to determine the possibilities for further development of complex innovative projects:

- 1) updating of identification and analysis methods,
- 2) devices and equipment for research within the framework of complex innovative projects, which is the main factor determining,
- 3) the volume and type of intellectual property objects for the realization of the experimental results, taking into account the algorithms determined by us.

When implementing the latest development in the educational process, the practical results obtained – the promotion of the intellectual development and organizational students` capacity, forming the independent skills, organizational and collective activities – is the competence, communication skills, creativity and personality of the manager, which generally contribute to the intensive development of scientific- technical creativity of graduates. [6].

Table 2. General conclusions and recommendations of innovative complex projects

№	Stages of the functional scheme of the project
1	Access to the market of innovative offers and expansion of the sales market
2	Development of the concept of innovation and execution of research works
3	Search for optimal components of objects and justification of optimal process parameters
4	Assessment of technical support capabilities
5	Assessment of resources and their structure, material costs, economic efficiency and impact on the environment
6	Investigation of the features of the developed task processes
7	Investment strategy for innovative technologies
8	Project management
9	Economic-law, social and environmental support

Table 3. The effect of process parameters on secondary polymer properties in foaming

Characteristic	Function
Y_1	$Y_1 = 2987,50 + 237,50x_1 + 362,50x_2 + 337,50x_3 + 12,50x_1x_2 + 37,50x_1x_3 - 187,50x_2x_3 + 12,50x_1x_2x_3$
Y_2	$Y_2 = 44,91 + 6,58x_1 + 7,27x_2 + 9,45x_3 - 0,28x_1x_2 + 1,82x_1x_3 - 5,12x_2x_3 - 5,22x_1x_2x_3$
Y_3	$Y_3 = 0,17 + 0,0004x_1 + 0,0007x_2 + 0,0009x_3 + 0,0001x_1x_2 + 0,00013x_1x_3 - 0,0004x_2x_3 - 0,0009x_1x_2x_3$
Y_4	$Y_4 = 0,280 - 0,083x_1 - 0,120x_2 - 0,130x_3 - 0,002x_1x_2 - 0,007x_1x_3 + 0,050x_2x_3 + 0,073x_1x_2x_3$

The problem of wastes utilization and recycling is present as complex research and analysis of energy- and resource saving processes for treatment of polymer wastes of various origin [1–5].

Reserves of cooperation for the further identification and formation intellectual property objects of complex competency development are connected with the introduction into the educational process of partner

interuniversity relations which enable to obtain positive results: types growth, quality and quantity of intellectual innovative products in higher educational establishments; quality and quantity of innovations developed and implemented in practice in the field of new design and technological solutions.

Examples of innovative complex projects are developed based on directions and methods of design technology improvement, taking into account the conducted complex experiment and calculations in the course of performing laboratory and practical disciplines. The implementation of innovative complex projects was carried out within the range of disciplines in accordance with the curricula for students of different faculties and universities [1, 2].

As an example of synergetic approach to polymer utilization the chemical foaming method of the polyethylene waste is developed. The experiments to determine the influence of process parameters on the characteristics of polyethylene obtained after recycling process were performed. As the controlling parameters (factors) are taken: X_1 is the relative amount of foaming chemicals, %; X_2 is the temperature of foaming, °C; X_3 is the time of treatment at foaming temperature, min. The characteristics of the obtained polymer are: Y_1 is the number of created cells per 1 sm^2 of the obtained

polymer cross section; Y_2 is the relative volume of gas phase in a process of secondary polymer production, %; Y_3 is average diameter of cells; Y_4 is the density of secondary polymer.

The experiments with two level factorial design are performed at following range of factors: $X_{10} = 3\%$, $\Delta X_1 = 1\%$; $X_{20} = 170\text{ °C}$, $\Delta X_2 = 10\text{ °C}$; $X_{30} = 10\text{ min}$, $\Delta X_3 = 5\text{ min}$.

The resulting functions are presented in Table 3 and Figure 3, 4 for

$$Y_4 = 0,280 - 0,083x_1 - 0,120x_2 - 0,130x_3 - 0,002x_1x_2 - 0,007x_1x_3 + 0,050x_2x_3 + 0,073x_1x_2x_3$$

The investigation are focused in researching such problems as organization of waste collection, transportation and identification of wastes according to adapted polymers classification (Figure 5 and 6); selection of scientific based methods of wastes to be utilized or recycled; the development of appropriated process flow sheets and choice of modifications additives and equipment for polymers waste recycling as renewable energy sources.

The choice of appropriate plants with selected energy resources is very important for projects realization [6–11].

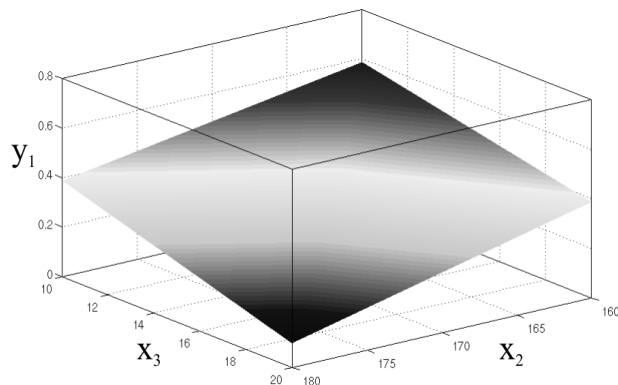


Figure 3: $X_1=4$

$$Y_4 = 0,280 - 0,083x_1 - 0,120x_2 - 0,130x_3 - 0,002x_1x_2 - 0,007x_1x_3 + 0,050x_2x_3 + 0,073x_1x_2x_3$$

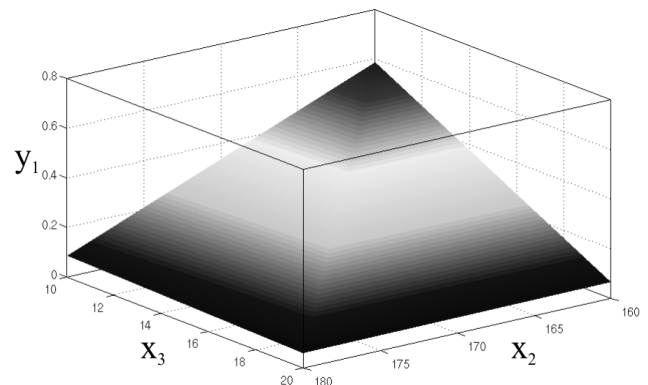


Figure 4: $X_1=2$

$$Y_4 = 0,280 - 0,083x_1 - 0,120x_2 - 0,130x_3 - 0,002x_1x_2 - 0,007x_1x_3 + 0,050x_2x_3 + 0,073x_1x_2x_3$$

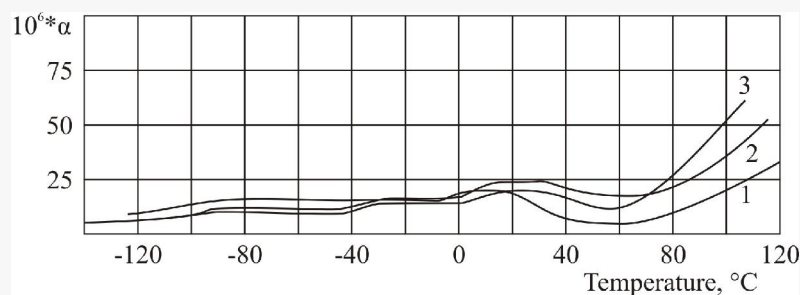


Figure 5. Functions $\alpha_T = f(T)$ dependence and recycled polyethylene with different amounts of gel fraction, %:

1 – 17; 2 – 34; 3 – 42

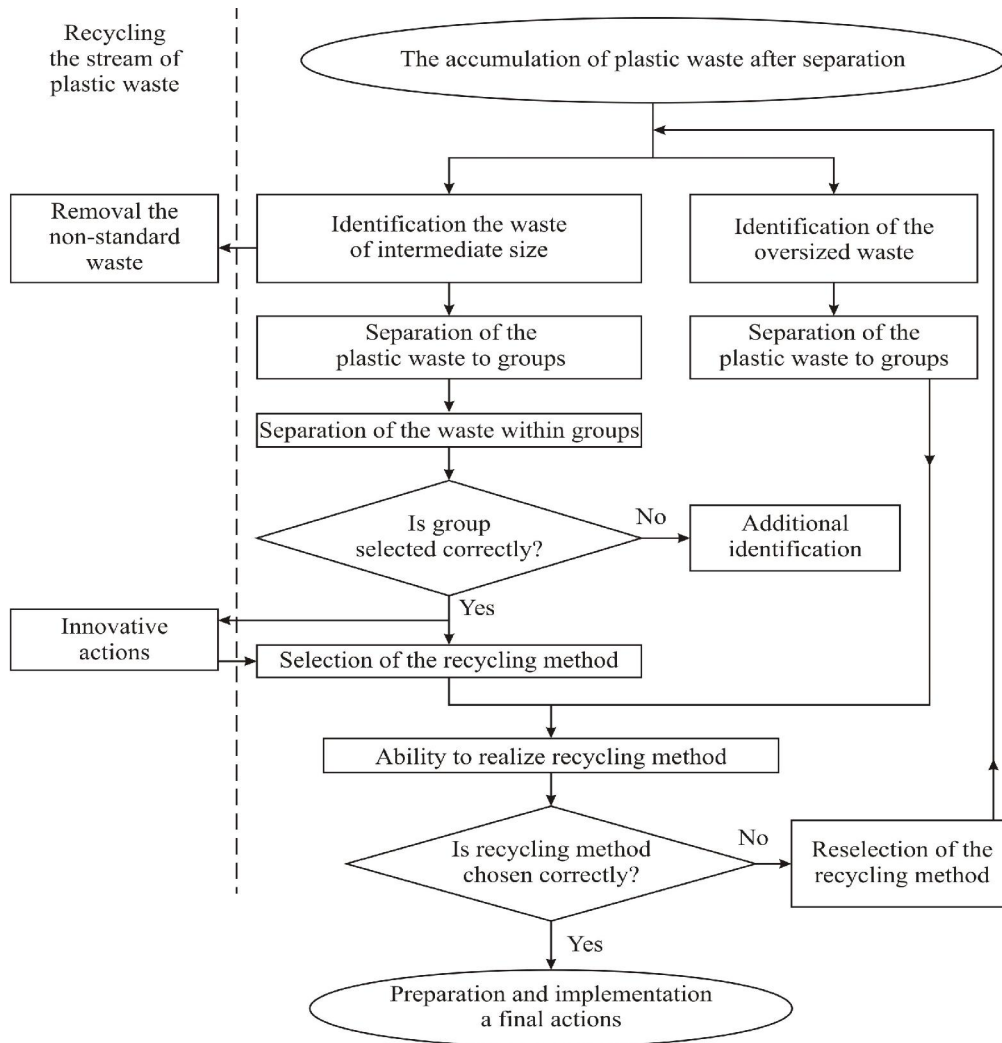


Figure 6. Study and analysis of identification



Figure 7. Study and analysis of identification



Figure 8. Editions samples for integrated technology

Dough refers to structured disperse systems, its rheological properties (Figure 7) depend on the structure nature, due to the chemical composition, dispersion of particles and other factors, and determine the technology features of production of various products. The structural and mechanical characteristics, in particular, the viscosity of the conditional resistance, arising in the product during its machining, and are the initial data in the equipment design, devices for transportation and the optimal conditions choice for the processing of masses: the dough is divided into classes rheological bodies, which requires the choice of the corresponding calculation equation for describing the flow in technological machines and apparatuses. The rheological properties of disperse systems are characterized by a number of constants: the elastic modulus; strength; plastic viscosity, effective, differential, etc.

Comprehensive determination of the raw materials properties by students of participants in innovation course projects can be presented, for example, by rheological research to ensure the competitiveness of raw materials and products in Ukraine and in the world in accordance with the requirements of international standards and Ukrainian standards [1, 2]. Thus, the requirements for innovative course projects have been developed: experimental researches and complex analysis of a high-quality flour of four producers previously investigated by us (Figure 8).

Over 9 years of complex design application in the series "Innovative researches in students' scientific works" of the Bulletin of NTU "KhPI" on innovative themes of projects published more than 50 articles as project leaders and compatible articles with students from different universities, courses and faculties [1-3], as well as more than 10 tutorials and textbooks with a stamp of the Ministry of Education and Science of Ukraine (Figure 8).

Let us go forth and cooperate accurately, confidentially, completely, with integrity and professionalism. Projects build bridges between landscapes, people and history, reveals stories behind the scenery; and creates memorable and inspiring experiences.

Conclusions and recommendations.

The main result of the implemented innovation - the development of new educational technologies for the organization, execution and implementation of integrated inter-university innovation design to enhance the technical creativity of students. The pedagogical workshop contains the main methodological provisions of the project:

- 1) the variability of the task and the operation results of integrated innovation projects;
- 2) taking into account technological and other processes that depend on a large number of factors;
- 3) key competencies, features of the infrastructure,

type and status of all project components. A significant feature of the new educational technology is the presence of the main specific components of an optimally organized integrated innovation project as a new form of learning: a high degree of competence in the problem of faculty-organizers and, as a rule, there is sufficient practical and theoretical experience and interest in the issues solving unusual student problems during project development; professional methodological training of lecturers-organizers for the management of a comprehensive project, a rather high level of improvisation on the part of students, which necessitates the teacher's control over the process of obtaining the final result of the project; The main goals of the teacher's corrective actions are identification, allocation and elimination of the real reasons for the discrepancy of the results obtained in order to refer to the innovative result in the development of a comprehensive project in general.

Recommendations for further application are related to the availability in a higher educational institution:

- professional and creative decision of scientific, technical and organizational tasks;
- the possibility of expanding the educational provision and methodological literature and the application of technologies for the education integration and science;
- acquiring practical skills in real patent development;
- development of directions and technology of integrated game design;
- selection of modern complex objects for implementation of innovative technology;
- availability of testing and results dissemination in the form of articles, manuals, patent and licensed materials in magazines, exhibitions, international scientific and technical conferences on innovative methods of teaching and technical creativity of students;
- improvement of moral and material encouragement of students and teachers, etc.

The results are implemented in the technologies of modern high-efficiency methods for the processing of polymer solid wastes into products in the industry. Synergy for the formation of secondary polymer raw materials in the process of utilization-modification can be considered as the use of the features of chemical transformations in the polymer, taking into account that the main segmental movements, diffusion processes and chemical interactions occur in the amorphous phase of the polymer.

In complex systems development, project management is a key factor for innovation, for bringing together system capabilities to actually working systems and taking them to the customer. The critical question then is: How can successful project management in this field be conce

ptualized, practiced, and understood? In the extant literature, there is a plethora of suggested tools for advanced planning and scheduling, for system decomposition and modularization, and for reducing interdependencies and avoiding errors. There is also a growing criticism of these “planning approaches,” suggesting various contingency and flexibility approaches, to reflect and adapt to complexity and change. This critique, however, tends to lack grounded suggestions for effective managerial practices and does not distinguish between general flexibility needs and specific project structures required to make complex systems development at all possible [20].

We live in a world of constant changes. Decision making in public administration is influenced by many factors – demographic change, climate change, constraints of public finances, demand for better public services and bigger social benefits or technological transformation are just some of them. Many public administrations have come to the point where there is no easy solution to the problems, and moving on means structural reforms. We have to make decisions about whether a public administration has to continue to deliver services itself directly, should delegate them to the private sector or simply no longer take responsibility for them. The development of technology is much faster today than it was yesterday. People demand better public services that are digitalised, personal and user-friendly at the same time. It is a major challenge for public administration to keep up with the pace. In order to do that we need to be innovative and open to new ideas [21].

If you're an excellent communicator who wants to work with projects and are ready to enter a highly competitive industry, it could be your perfect job.

Projects builds bridges between landscapes, people and history, reveals stories behind the scenery; and creates memorable and inspiring experiences. Let us go forth and cooperate accurately, confidentially, completely, with integrity and professionalism. [17–21].

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Відомості про авторів / Сведения об авторах / About the Authors

Бухкало Світлана Іванівна (Bukhhalo Svetlana Ivanovna) – кандидат технічних наук, професор кафедри інтегрованих технологій, процесів та апаратів, Національний технічний університет «Харківський політехнічний інститут», м. Харків, Україна;

ORCID: <http://orcid.org/0000-0002-1389-6921>; e-mail: bis.khr@gmail.com

Іглін Сергій Петрович (Iglin Sergii Petrovich) – кандидат технічних наук, професор кафедри прикладної математики, Національний технічний університет «Харківський політехнічний інститут», м. Харків, Україна;

ORCID: <http://orcid.org/0000-0002-9144-7427>; e-mail: bis.khr@gmail.com

Главчева Юлія Миколаївна (Glavcheva Yuliia) – заступник директора науково-технічної бібліотеки, Національний технічний університет «Харківський політехнічний інститут», м. Харків, Україна;

ORCID: <http://orcid.org/0000-0001-7991-5411>; e-mail: glavcheva@khpi.edu.ua

Мірошніченко Наталія Миколаївна (Miroshnichenko Nataliia) – кандидат технічних наук, доцент кафедри інтегрованих технологій, процесів та апаратів, Національний технічний університет «Харківський політехнічний інститут», м. Харків, Україна;

ORCID: <http://orcid.org/0000-0002-0561-4138>; e-mail: d_tasha@ukr.net

Ольховська Оксана Ігорівна (Olkhovska Oksana Igorivna) – ст. викладач, кафедра менеджменту і опадаткування, Національний технічний університет «Харківський політехнічний інститут», м. Харків, Україна.

Зіпунніков Микола Миколаєвич (Zipunnikov Mykola Mykolaevich) – кандидат технічних наук, старший науковий співробітник, відділ водневої енергетики, Інститут проблем машинобудування ім. А.М. Підгорного НАН України, м. Харків, Україна;

ORCID: <http://orcid.org/0000-0002-0579-2962>; e-mail: zipunnikov_n@ukr.net

Ольховська Вікторія Олегівна (Olkhovska Victoria Olegovna) – студентка ХНУРЕ, м. Харків, Україна.

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