



Co-funded by the
Erasmus+ Programme
of the European Union



Survey of employers in the field of industrial automatization and robotics in Kazakhstan

ACTIVITY PERIOD 03/2020-12/2020

Contacts: Zhanat Jabassova, Kostanay Engineering and Economics University
named after M. Dulatov, projectcenter@kineu.kz

Project acronym:	DIARKAZ
Project full title:	Dual Education for Industrial Automatization and Robotics in Kazakhstan
Project No:	609757-EPP-1-2019-1-RS-EPPKA2-CBHE-JP
Funding scheme:	ERASMUS+
Project start date:	January 15, 2020
Project duration:	36 months

Abstract	This is a narrative report on a study conducted in companies in Kazakhstan on the current state of human resources in the field of industrial automation and robotics and the necessary skills and competencies of professionals in this area.
----------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Title of document:	Survey of employers in the field of industrial automatization and robotics in Kazakhstan
Work package:	WP 1: Development of dual study program in IAR
Activity:	1.1 Analysis of best practise and comparative analysis
Last version date:	09/03/2021
File name:	1.1.4 Survey on Stakeholders in Kazakhstan (report)
Number of pages:	12
Dissemination level:	Consortium

VERSIONING AND CONTRIBUTION HISTORY

Version	Date	Revision description	Partner responsible
1.0	09/03/2021	First draft	KEEU

DISCLAIMER

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

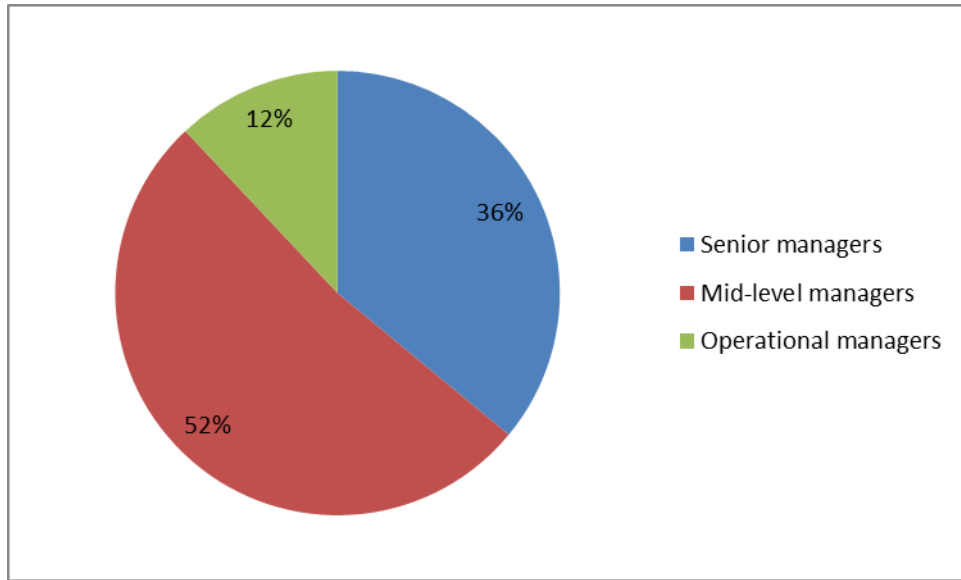
Activity Report

In the period 03/2020 - 12/2020, one of the activities of Kazakhstani partner universities within the framework of the project was a study of companies in the Republic of Kazakhstan in order to find out the current state of human resources in the field of industrial automation and robotics and the necessary skills and competencies of professionals in this area. The survey was conducted in electronic (using the Survio resource, link to the survey - <https://www.survio.com/survey/d/D7O3A1E3W2X2I5M2V>) and paper formats.

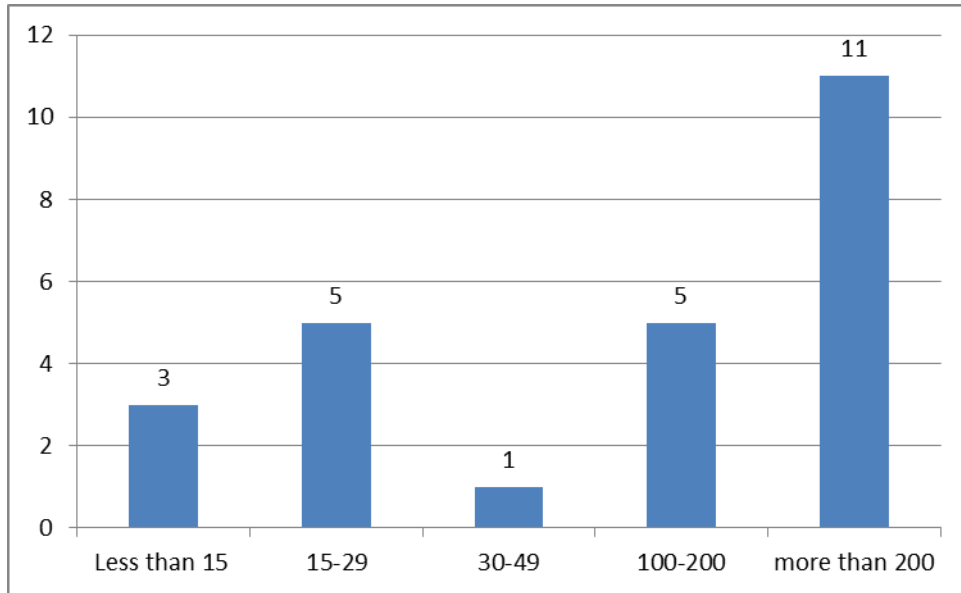
The survey was sent to partner employers of KEnEU, InEU and WKATU, as well as to members of the Kazakhstan Association of Automation and Robotics, of which 25 enterprises were surveyed:

1. Kazminerals, TechnipFMC,
2. JSC "PAVLODARENERGO" CHPP-3,
3. JSC "PREK",
4. JSC "Transtelecom" in the city of Kostanay - "Kostanaytranstelecom",
5. JSC "Kostanay minerals",
6. Public Foundation "Kazakhstan Institute of Project Management",
7. Pavlodar Aluminium Smelter,
8. Pavlodar Machine Building Factory,
9. PF LLP "Steel",
10. LLP "SmaryCom",
11. LLP "SNK GazTexСервис",
12. JSC "Astana-REC",
13. LLP "Kompaniya Neftehim LTD",
14. LLP "Comstar",
15. LLP "SaryarkaAvtoProm",
16. LLP "City Trade-PV",
17. LLP Data Science Academy,
18. LLP GPS Control,
19. LLP Raiting,
20. Schlumberger,
21. LLP Corrugated packaging factory,
22. LLP KOSTANAYENERGO,
23. LLP TMK-Kazrubprom,
24. Branch of JSC "Transtelecom" in Pavlodar - "Pavlodartranstelecom",
25. Ekibastuzteploenergo.

The level of management of the respondents varied as follows: 9 senior managers, 13 mid-level managers, 3 operational managers.



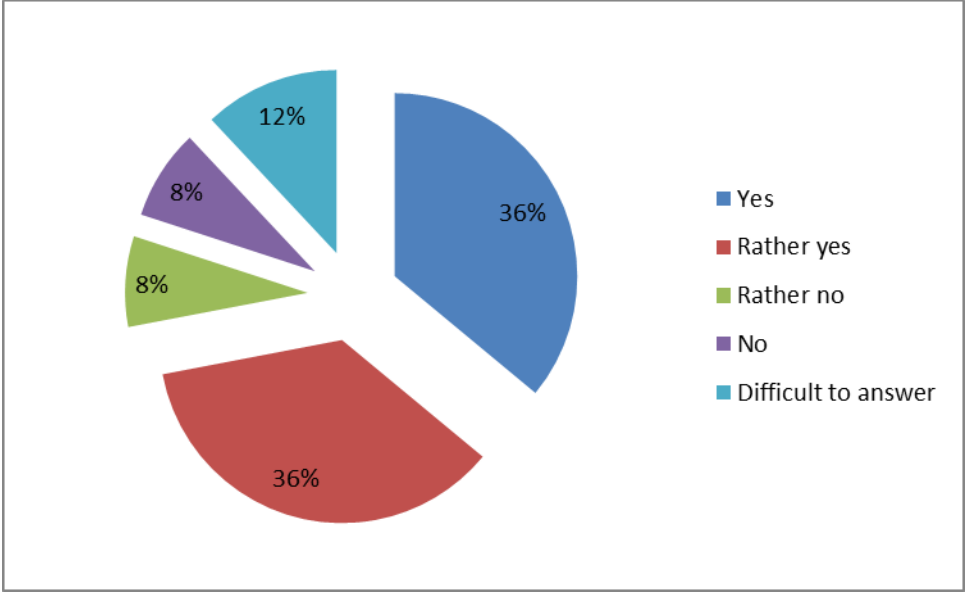
The number of employees in the 25 enterprises is shown on the following slide.



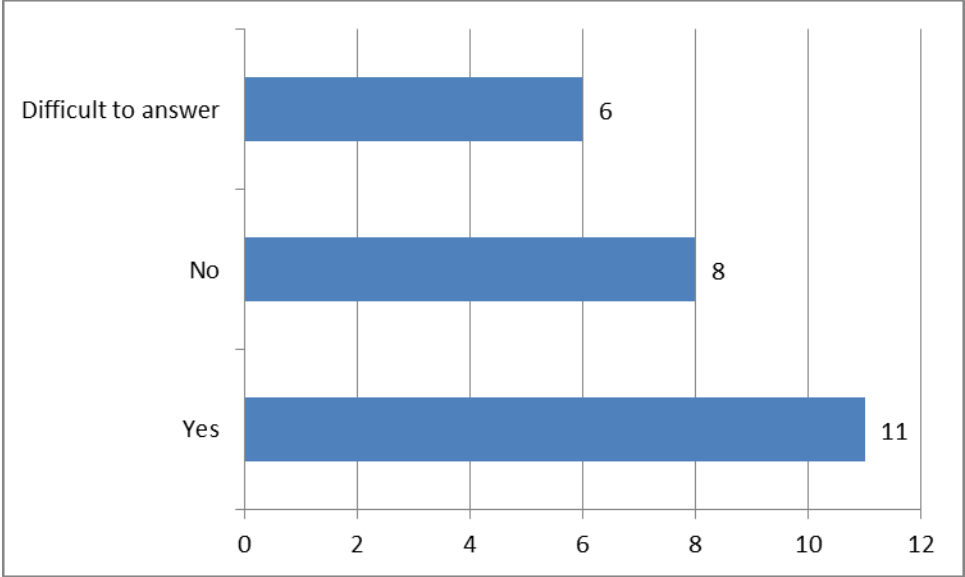
The survey consisted of 18 questions relating to the current challenges and needs of companies in the field of industrial automation and robotics, the necessary skills and competencies of professionals in this field, the types of equipment operated in companies, the willingness to participate in the practical training of future professionals.

Key findings of the Survey

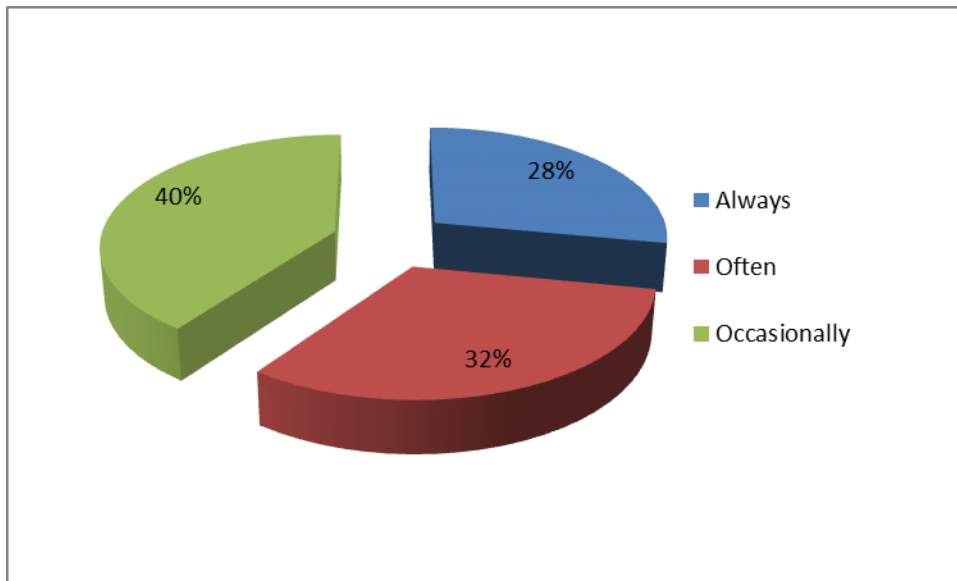
72% of respondents indicated that there is a shortage of qualified staff in the automation and robotics industry.



11 companies plan to increase the number of staff in the automation and robotics sector in the future, 6 companies find it difficult to answer, and 8 companies have no plans.



To the question "Have you ever had to complete the training of accepted young specialists in the field of automation and robotics at the workplace?" not a single respondent answered negatively. At the same time, 28% of employers answered that it is always necessary to complete the training of young specialists, 32% - often, 40% - occasionally.



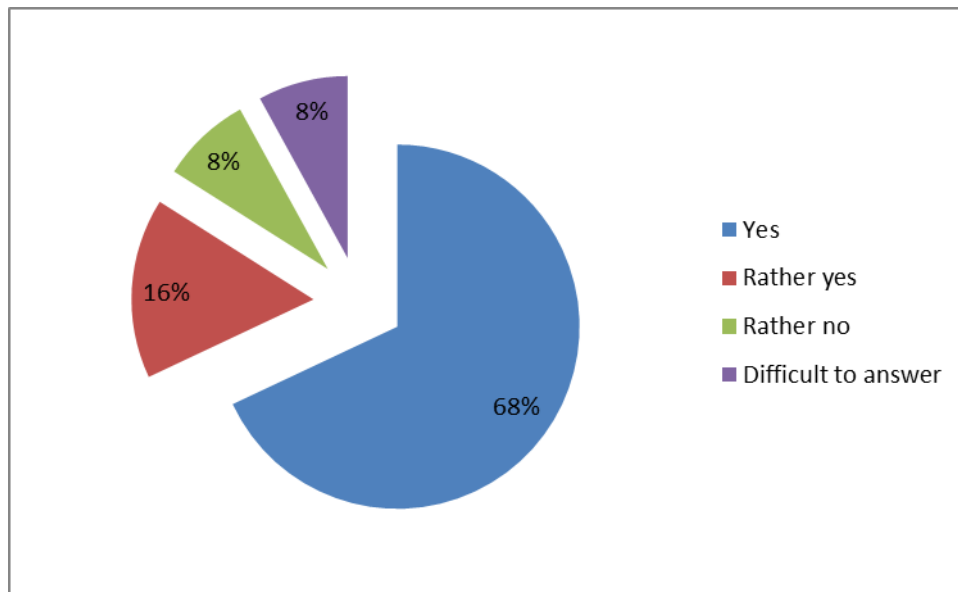
The main types of equipment at enterprises that employees of the automation and robotics profile have to deal with are diverse and include the following: a coordinate punching press with a CNC; Si3000; MS-240; CATS; VOLS; air conditioning refueling stations; an unmanned aerial vehicle (UAV); a geographic information system GIS "K-MINE"; mining and transport equipment-excavators, dump trucks, railway transport; equipment of the enrichment shop - storage bins, conveyors, crushers, packaging and sorting complexes; satellite transport monitoring systems; readers; terminals; virtual reality glasses; industrial printers; injection pump; lifting equipment; relay protection units, SCADA systems; cardboard packaging production lines; Q,P,t,L control devices; pneumatics; PLC; DCS; scanning and positioning systems; sintering furnaces, thread cutting machines; point of thermal nodes, etc.

When asked about the knowledge and skills that a specialist in the automation and robotics profile should have, the most frequent answers included:

- Modelling, material selection for robotics and similar systems;
- Programming and adjusting robots in the lab or production environment;
- Supervising the installation of equipment, participating in the acceptance and commissioning of equipment;

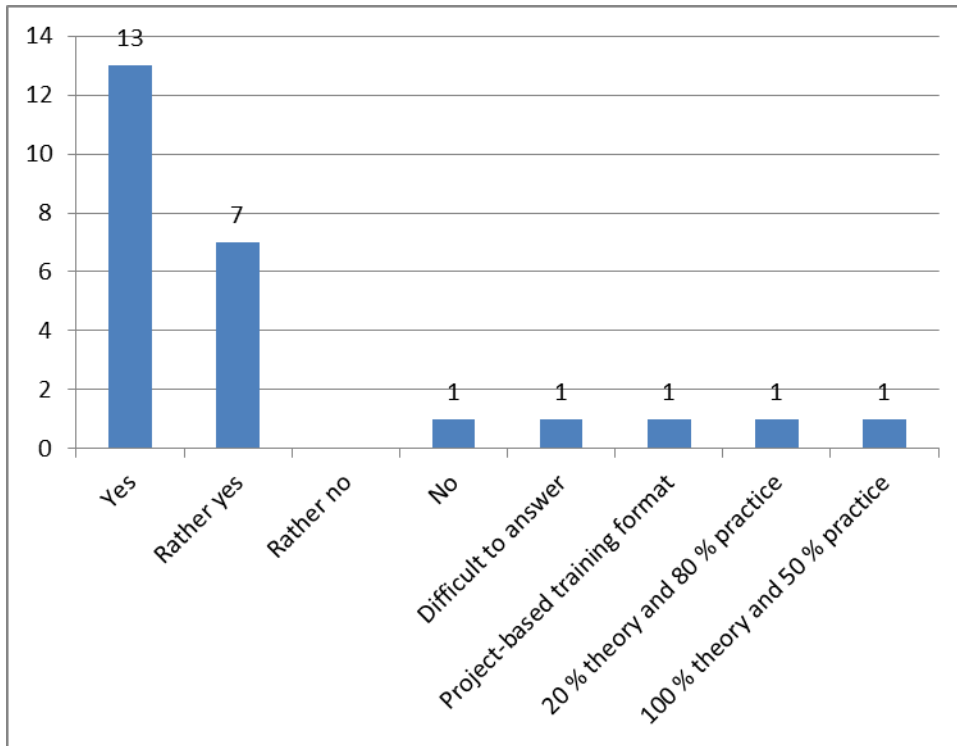
- Organisation and supervision of repair and maintenance work on robotic equipment and similar systems;
- Development of automated systems, development of virtual reality systems;
- Adjustment of equipment automation system, elimination of failures and errors in equipment operation;
- Knowledge of the principles of parameter measurement, regulation, maintenance and basic programming of control systems, skills of working with pneumatics;
- Carrying out of works on designing and introduction of the automated control systems of manufacture (ACS) on the basis of application of set of economic and mathematical methods, modern means of computer facilities, communications and connections, elements of the theory of economic cybernetics;
- Development of technological schemes for the processing of information on the established tasks of the ACS, taking into account the organizational and technical support for all subsystems.

84% of respondents believe that it is reasonable to have direct contacts with educational institutions that train specialists in core professions for the company, 8% answered "rather not", and 8% found it difficult to answer. At the same time, not a single company representative gave a negative answer.

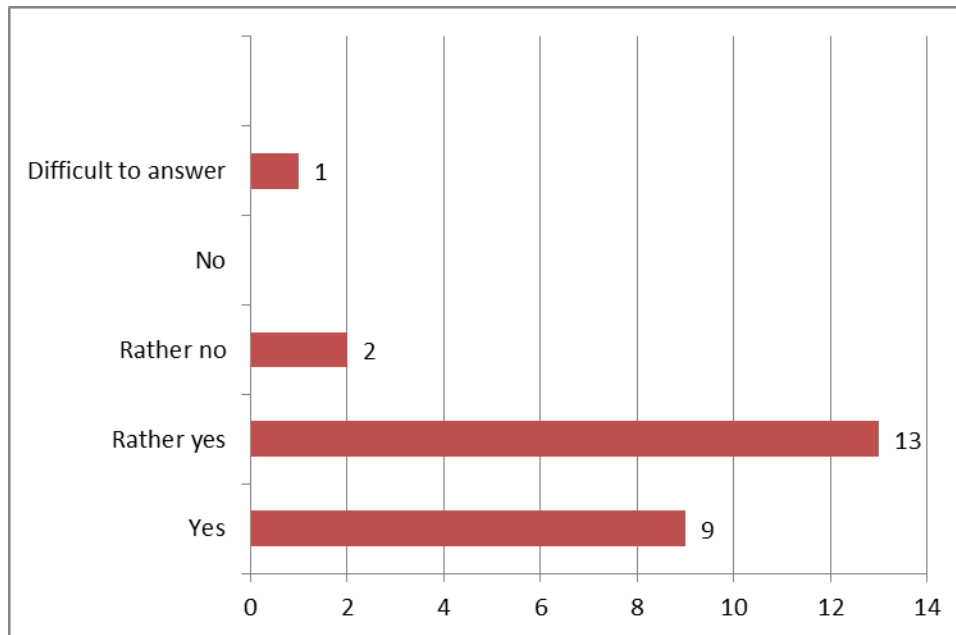


13 employers consider student training to be more effective based on the following combination: 50% of the curriculum is theoretical training (at university) and 50% is practical training at the workplace (at the enterprise). 7 responded "rather yes", 1 did not consider such training to be

effective, 1 found it difficult to answer. Two respondents also offered their options: 20% theory and 80% practice; 100% theory and 50% practice.



92% of respondents agree to take part in the practical training of future professionals and to provide them with jobs in the company.

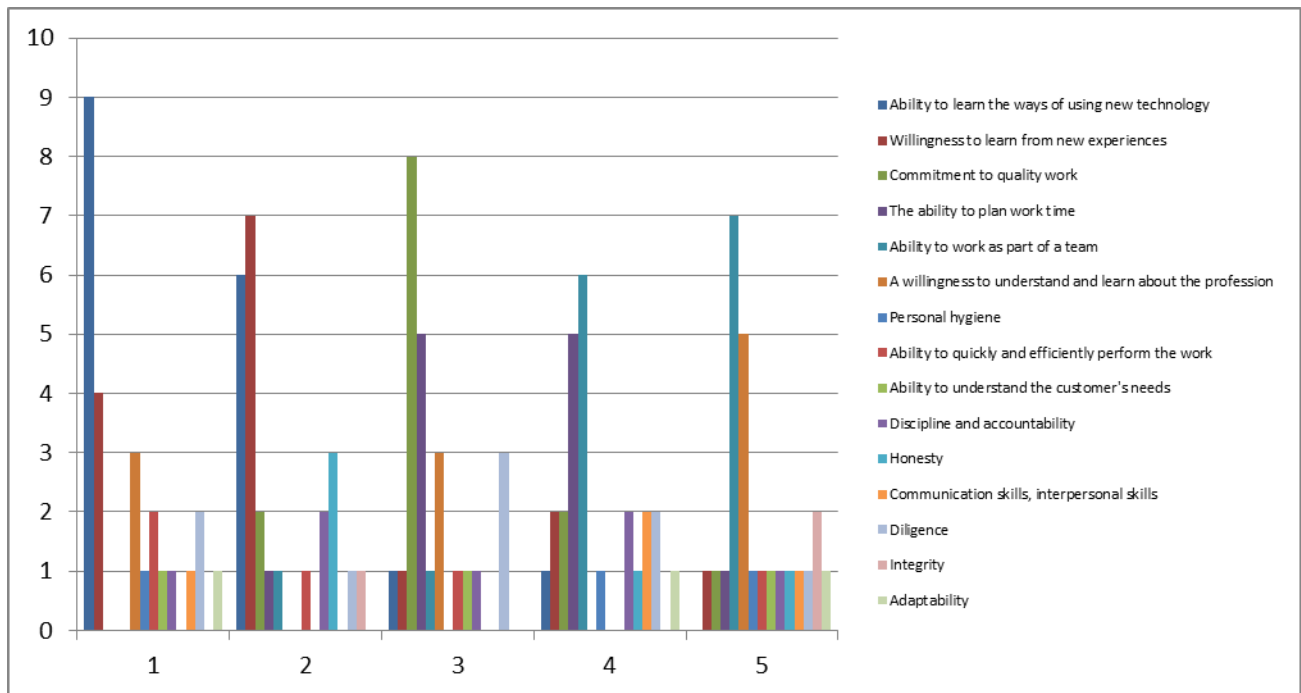


To the question "What knowledge, skills and abilities could you teach a student specifically at your company?" the respondents answered the following

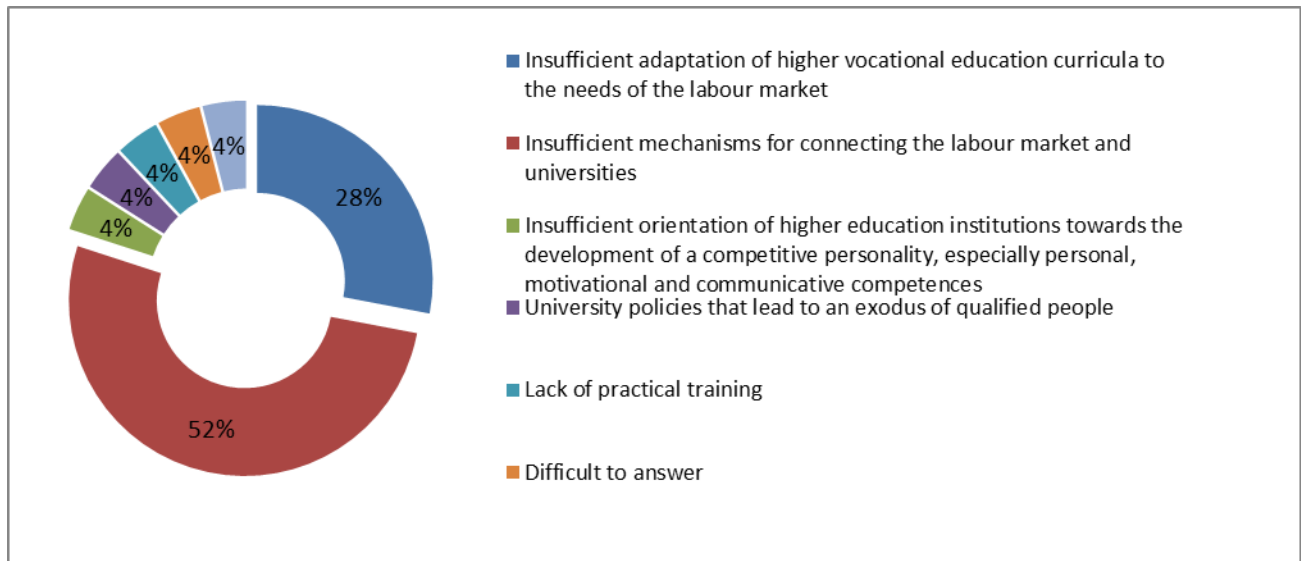
- setting up, adjusting equipment, measuring batteries, equipment maintenance setting up equipment of subscriber gateways and sip-terminals to connect new clients;
- knowledge of work with CATS, SIT, FOCL;
- diagnosis and repair of equipment;
- ability to work with programs;
- mastery of computer graphics;
- technical skills in the operation and maintenance of automation systems;
- basics of automation of technological processes;
- adjustment and programming of automation systems "SIEMENS";
- analytics;
- management (TRIZ, MBA, lean production);
- ability to master new technology (application of unmanned equipment);
- the ability to adopt experience;
- design, adjustment, maintenance of the system of satellite monitoring of transport;
- teamwork;
- setting tasks for automation and cooperative development of methods for solving them;
- general concepts in automation of power equipment operation, emergency automation, work with monitoring and control systems;

- familiarisation with modern production automation systems, study of system components and their operation on real equipment;
- system approach to solving production problems;
- electronics from schematic circuit design to practical production of both printed circuit boards and complete devices, including microprocessor-based devices with programming in Assembler, C, etc.

The most important personal qualities (soft skills) needed for graduates to work successfully in a company are the ability to learn new technologies, the willingness to adopt new experiences and the desire to work with quality.



The most important problematic aspects of the higher education system that hinder the competitiveness of higher education graduates in the labor market, according to employers, are imperfect mechanisms to ensure the relationship between the labor market and higher education institutions (52%) and insufficient adaptation of higher professional education curricula to the needs of the labor market (28%).



To the last question about the wishes regarding cooperation with universities, the representatives of companies responded that when developing educational programmes universities should: take into account trends and needs of the labour market; focus on intellectual assets, respectively, on commercial recruitment, not on state grants; increase the share of practical training; develop dual training.

Having analyzed the results of the employers' survey, the following conclusions can be made:

1. there is a shortage of qualified personnel in automation and robotics profile in the labour market of the Republic of Kazakhstan;
2. the employers need to train the accepted young specialists in automation and robotics profile;
3. university graduates are vulnerable in terms of employment due to lack of practical work experience
4. graduates in automation and robotics must have theoretic and practical knowledge of automation and robotics devices and their programming; have knowledge and skills in subjects related to information technologies, electronics, methods of industrial process control, measurement systems, modern industrial control systems; have skills in CAD, motion control systems, sensors and components
5. the ability to master new technology, the willingness to adopt new experience and the desire to work of high quality are the most important personal qualities (soft skills) needed for graduates to work successfully in a company;
6. 6. it is necessary to modernise the mechanisms ensuring the relationship between the labour market and higher education institutions and to adapt university curricula to the needs of the labour market;

7. 7. employers recognise the effectiveness of dual training and are willing to participate in the practical training of future specialists and to provide them with jobs at the enterprise.