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## Survey for employers

### **BENEFIT Boosting the telecommunications engineering profile to meet modern society and industry needs**

BENEFIT is an ERASMUS+ KA2 project that focuses on three main pillars:

- 1) the cooperation between Higher Education Institutions (HEIs) and industry to modernize the study program in telecommunication engineering in the Western Balkans region;
- 2) the adoption of modern teaching methodologies and tools, the upgrade of the infrastructure, and the creation of several joint university-industry labs;
- 3) the training of both teachers and students.

This survey has been prepared to collect information on job market/needs and to map skills and knowledge areas required from ICT engineers and specialists in the ICT sector so that study programs in telecommunications engineering can be modernized.

More information on the project can be found at: <https://www.project-benefit.eu>

## Privacy and data consent

Information presented in this questionnaire is strictly confidential. Please check the boxes below, you do not have to tick all of them, we will protect your personal information according to your choices below, then sign and date the form where shown.

Checking the boxes, I confirm:

- I have been informed about the objective of the project and my role and involvement in it. I understand that my participation is voluntary.
  - I agree to take part in the above research study.
  - I understand that relevant sections of any of the information I am providing, may be looked at by responsible individuals and under the supervision of the principal investigator of this study or for contributing to the understanding of the matter.
  - I agree that my data gathered in this study may be shared by the partners of the Erasmus+ project 585716-EPP-1-2017-1-AT-EPPKA2-CBHE-JP and the European Commission.
  - I agree that the name of the company can be mentioned in the acknowledgements of the project at the project website, in reports and in publications.
  - I agree that I agree that my data gathered in this study may be stored (after they have been anonymized) in a specialist data centre and may be used for future research.
  - I agree to the use of anonymized quotes in publications.
  - I wish to be contacted again by the research team to be informed about the state of development of the project.
- 

Region, municipality: \_\_\_\_\_

Business entity (Company): \_\_\_\_\_

Representative of the business entity: \_\_\_\_\_  
(name, surname)

Function: Owner/Director/HR Manager/Other \_\_\_\_\_

Contact telephone/e-mail: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## A. General data

<b>A.1. Full name of the business entity</b>							
<b>A.2. Register code of the business entity</b>							
<b>A.3. Registration date</b>							
<b>A.4. Juridical address</b>							
<b>A.5. City and country</b>							
<b>A.6. Telephone/fax/e-mail</b>							
<b>A.7. Organizational type</b>	<input type="checkbox"/> Limited liability company	<input type="checkbox"/> Stock company		<input type="checkbox"/> Other			_____
<b>A.8. Ownership</b>	<input type="checkbox"/> Private		<input type="checkbox"/> Public		<input type="checkbox"/> Other		_____
<b>A.9. Origin of capital</b>	<input type="checkbox"/> Domestic	<input type="checkbox"/> Foreign	<input type="checkbox"/> Mixed		<input type="checkbox"/> Other		_____
<b>A.10. Type of core business activity</b>	<b>Market sector</b>			<b>Core business</b>			
	<input type="checkbox"/> Energy			[please specify your core business]  _____			
	<input type="checkbox"/> Materials						
	<input type="checkbox"/> Industrials and manufacture						
	<input type="checkbox"/> Consumer						
	<input type="checkbox"/> Healthcare						
	<input type="checkbox"/> Financial						
	<input type="checkbox"/> Information technology						
	<input type="checkbox"/> Telecommunication services						
	<input type="checkbox"/> Utilities						
<input type="checkbox"/> Real estate							
<b>A.11. Business model</b>	<input type="checkbox"/> Internal product/service development		<input type="checkbox"/> Outsourcing		<input type="checkbox"/> Other		_____
<b>A.12. Size by number of employees</b>	<input type="checkbox"/> Micro (up to 9 employees)		<input type="checkbox"/> Small (10-49)	<input type="checkbox"/> Medium (50-249)		<input type="checkbox"/> Large (250 plus)	

## B. Self-assessment of the skills of those currently employed

**B.1. Does your company have problems with ensuring adequate skills of employees?** [Mark appropriate selection with X]

Yes	No

**B.2. Has your company experienced difficulties in filling vacancies in the last 12 months?** [Mark appropriate selection with X]

Yes	No

**B.3. According to your experience what are the obstacles which cause difficulties in filling vacancies for each of the following occupational groups?** [Mark appropriate selection with X. Multiple answers are allowed]

Difficulties in filling vacancies	ICT specialists, developers, researchers	Managers	Marketing and sales	Other (please specify)
Insufficient supply of qualified candidates who poses adequate skills				
Candidates do not have work experience				
Candidates do not possess positive attitudes towards learning, working hard and career development				
Candidates do not favour occasional/short-term jobs				
Wages are not high enough to attract qualified candidates				
Do not know				
There are no difficulties in filling vacancies for this type of profession				

**B.4. What are your expectations regarding the changes in the number of employees in the next 12 months?** [Please mark with X only ONE answer for each occupational group]

Occupations	Increase	Remain unchanged	Reduce	Do not know
ICT specialists				
Managers				
Marketing and sales				
Other				

**B.5. Please list the professionals (up to 10) which your company currently lacks.** [Please insert level of education from 1-5 in the first column and a number of professionals needed in the second column. Please write-in other occupations not specified in the list.]

List occupations [Job title]	Level of education (1 – any level of education 2 – VET secondary 3 – general secondary 4 – post secondary 5 - tertiary) [Please insert the code]	Number of professionals
ICT specialists		
Developers		
Researchers		
Marketing and sales		
Other [please write-in below]:		

\* VET (vocational education and training)

**B.6. Indicate the sources for the recruitment of professionals used by your company.**

[Mark appropriate selection with X or write-in. Multiple answers are allowed]

National employment job matching services	
Private employment agencies, etc.	
Announcement on the company's website	
Collaboration with secondary vocational schools and universities	
Recruiting employees from other companies	
Word of mouth	
Other sources [please specify] _____	

**B.7. Which skills are the most important for your employees to fulfil their assignments but are currently insufficient?** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

Skills	ICT specialists, developers, researchers	Managers	Marketing and sales	Other
Professional (technical) skills, according to the job description				
Knowledge of foreign languages				
Possession of professional ethics				
Skills in organizing and managing a team				
Communication and team spirit				
Ability to work with clients				
Ability to identify and solve problems				
Passion for new knowledge, ambition to learn and excel				
Other specific technical skills _____				
There is no lack of skills				

**B.8 Which professional skills are most important for your company in reference to the ICT specialists?**

[Mark appropriate selection with X or write-in. Multiple answers are allowed]

Skill\job title	Software specialist	Hardware specialist	System and security specialist	Quality, test and certification specialist	Operations and maintenance specialist	Project management
Hardware components						
Hardware integration						
Firmware						
Middleware						
Software and Applications						
Other specific technical skills						

**B.9 Which professional skills does your company currently lack in reference to the ICT specialists?** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

[Mark appropriate selection with X or write-in. Multiple answers are allowed]

Skill\job title	Software specialist	Hardware specialist	System and security specialist	Quality, test and certification specialist	Operations and maintenance specialist	Project management
Hardware components						
Hardware integration						
Firmware						
Middleware						
Software and Applications						
Other specific technical skills						

**B.10** The table below reports a list of macro knowledge areas covered by study programs in telecommunications engineering. Please grade the importance of each of them for the ICT specialists in your company. [Mark appropriate selection with X. 1 – Not important, 2 – Slightly important, 3 – Moderately important, 4 – Important, 5 – Very important. Write-in additional information.]

Knowledge areas [see below for descriptions]	1 Not important	2 Slightly important	3 Moderately important	4 Important	5 Very important
Mathematics					
Physics					
Fundamentals of electrical engineering					
Measuring and instrumentation					
Electronics engineering					
Radio communications					
Information theory					
Communication networks					
Communication systems					
Signal processing					
Software engineering					
Computer engineering					
Information and data management					
Other engineering courses					
Multimedia					
Communication and presentation skills, foreign languages					
Business economics, management and organization					
Applications of telecommunications (e.g., in energy, health, robotics, automotive, etc): [please specify]					
Other knowledge areas: [please specify]					

### Description of Knowledge Areas

1. **Mathematics:** number systems, matrices, linear algebra, analysis of continuous functions, differential equations, probability, statistics, etc.
2. **Physics:** mechanics, thermodynamics, atomics, optics fluid statics and dynamics, thermodynamics, nuclear physics, etc.
3. **Fundamentals of electrical engineering:** circuit analysis, semiconductors, frequency and time domain, Maxwell equations, transmission lines.
4. **Measuring and instrumentation:** metrology, measuring accuracy and uncertainty, instrumentation, standards, etc.
5. **Electronics engineering:** microelectronics, operational amplifiers, integrated circuits, combinational and sequential circuits, etc.
6. **Radio communications:** radio-communication concepts, propagation of EM waves, radio systems design, antennas and propagation, etc.
7. **Information theory:** source coding, channel coding, statistical theory in telecommunications.
8. **Communication networks:** communication network technologies, OSI layers, TCP/IP, protocols, network management, network security, etc.
9. **Communication systems:** analog and digital data transmission, communication theory, channel modelling, multiple access schemes, etc.
10. **Signal processing:** signal analysis, s-domain, z-domain, digital signal processing, audio processing, transforms, Fourier analysis, filters.
11. **Software engineering:** programming principles, programming languages, object-oriented programming, operating systems.
12. **Computer engineering:** computer system architecture, microprocessor, memory, input-outputs, embedded systems.
13. **Information and data management:** information and knowledge, data storage, maintaining data, markup languages, etc.
14. **Other engineering courses:** courses from other departments not directly related to telecommunications.
15. **Multimedia:** Multimedia systems and services, image processing, audio and video technologies, multimedia production, etc.

**B.11. In your opinion, what are the reasons that cause the lack of skills, observed by the occupational groups?** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

Reason	ICT specialists, developers, researchers	Managers	Marketing and sales	Other
High fluctuation of employees				
Market requirements				
Lack of newly employed				
Technological change				
No possibility to organize in-company training				
No financial resources for off-site training				
Lack of time due to project deadlines				
Other causes: [please specify]				
There are no problems				

**B.12. Does your company collaborate with secondary vocational schools and universities (in terms of hiring graduates, providing work experience, scholarships, internships, and so on)?** [Mark appropriate selection with X]

	Secondary schools	Universities/faculties
Yes		
No		
Do not know		

**B.13. To what extent are you satisfied with the skills and competences acquired during the process of formal education?** [Mark appropriate selection with X]

	Secondary schools	Universities/faculties
Very satisfied		
Somewhat satisfied		
Neither satisfied nor dissatisfied		
Somewhat dissatisfied		
Very dissatisfied		

**B.14. Do you know the qualifications offered by the national education and training system?** [Mark appropriate selection with X]

Yes	No	Partly, depends on the profile



**B.15. In your opinion, what changes are necessary in the vocational education and higher education institutions in order for the skills and competences of the graduates to meet the job requirements of your company?** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

Readiness to review and change curricula in order to align them with technological change	
Openness to new methodologies of teaching	
Focus on practical training, organisation of practice, internships at the company, etc.	
Joint projects between companies and education institutions	
Define and update educational profiles in line with labour market needs	
Involve the representatives of the social partners (employers, trade unions, public employment service, other public and non-public relevant actors) in planning and developing the educational profiles	
Create the skills and competences that will be applicable in the company without more time being spent on additional trainings	
Introduce additional foreign language courses (professional language)	
Provide career guidance services to future graduates	
Harmonise the training programmed with international standards in order to improve the supply of ICT and other professionals	
Other [please specify] _____	
Do not know	
Nothing	

## C. Assessment of the continuing training process of employees

**C.1. Does your company practice continuing training and development of employees in order to meet the job requirements?** [Mark appropriate selection with X. If the answer is NO or DO NOT KNOW go to question C.7]

Yes	No	Do not know

**C.2. If YES, please indicate what specialists (up to 10) were trained at your company in the last 12 months.** [Please insert occupations/professional profiles and number]

List occupations [Job title]	Number of specialists

**C.3. Please specify the most common training topics by specialists trained.**

[Please insert occupations, training topics and number]

List occupations [Job title]	Specialized training	
	Topics	Number of specialists

**C.4. Does your company evaluate the impact of training on the efficiency of employees who attended?** [Mark appropriate selection with X]

Yes	No	Rarely	Do not know

**C.5. Who are the providers of training for your company?** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

Your company	
ICT Cluster Academy	
National Employment Service	
State educational or training institutions	
Private educational or training institutions	
The manufacturer of equipment	
Other [please specify] _____	
Do not know	

**C.6. To what extent are you satisfied with the current level of training available for your employees?** [Mark appropriate selection with X]

Very satisfied	
Somewhat satisfied	
Neither satisfied nor dissatisfied	
Somewhat dissatisfied	
Very dissatisfied	

**C.7. Does your company plan to hold or pay for training for your employees in the next 12 months?** [Mark appropriate selection with X]

Yes	No	Do not know

## D. Education and business cooperation

**D.1. Is information on needed skills communicated to the education trainings in the ICT sector?** [Mark appropriate selection with X]

Yes	No	Do not know

**D.2. If YES, through** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

Communication between the ICT companies and education/training institutions locally	
Communication between the ICT sector and the education/training authorities at local level	
Communication between the ICT sector and the education/training authorities at provincial level	
Communication between the sector and the education/training authorities at national level	
Other [please specify] _____	

**D.3. If NO, why?** [Mark appropriate selection with X or write-in. Multiple answers are allowed]

There is no mechanism that functions at present	
Other [please specify] _____	