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Guide and roadmap for setting up e-Competence Framework
in Ukraine, Georgia and Belarus

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INFOPARK
НАУЧНО-ТЕХНОЛОГИЧЕСКАЯ АССОЦИАЦИЯ

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Introduction

The nature of work and the requirements to competencies are changing rapidly in the modern world due to transition to digital technologies in all sectors of the national economy. The demand of enterprises for digital technologies and competencies in their development, implementation and use is constantly growing. The specialization and differentiation of ICT related professions is deepening; there is an increasing need to highlight the components of knowledge and skills that are characteristic of new types of work in the digital economy.

Requirements to enterprise leaders are growing - they cannot delegate business savviness, strategic management and a vision of an enterprise's place in the digital economy to others, but they must have knowledge of modern digital technologies and apply them strategically.

Educational institutions are forced to take these economic requirements into account in their educational programs. It becomes necessary to integrate advanced international standards and approaches to measuring and development of the competencies of specialists and business leaders in the digital economy by creating uniformly understood framework approaches (as a reference to electronic competencies) that can be used for search, assessment, training in the wide European market.

The main purpose of this guide is to present a consolidated opinion of competent stakeholders on the need and recommended roadmap for the actions necessary to implement the standard of electronic competencies and a system of professional roles in the field of ICT in the context of the development of digital skills in the Eastern Partnership countries covered by the project.

This guide was developed by informing of key stakeholders, organizing expert discussions, forming a consolidated opinion of the professional community within individual countries, and supplementing it with the results of empirical observations. Target stakeholders are:

1. Representatives of national and local authorities of Ukraine, Georgia and Belarus related to digital skills and competencies - for them the guide can deliver a methodological support in achieving Ukraine's commitments on digital skills under the Eastern Partnership policy declared by the Joint Staff Working Document "Eastern Partnership - 20 Deliverables for 2020. Focusing on key priorities and tangible results".
2. Representatives of the ICT businesses and industry sectors that use ICT in Ukraine, Georgia and Belarus, to whom this guide may be useful by informing them about European competency standards for their adaptation in the future.
3. Education and training providers, representatives of employment services in Ukraine, Georgia and Belarus to whom this guide may be useful by informing them how to adapt existing educational and employment programs to satisfy e-skills needs in the society.
4. Civil society representatives (CSOs and citizens) of Ukraine, Georgia and Belarus who will have the opportunity to contribute to the processes of improving digital skills and competencies in their society by participating in project activities and thematic working groups on digital skills and job opportunities in the future.

Guide development methodology

The basis for the development of this guide was:

1. an in-depth study of primary documents describing the structure and content of two tools:

    a. European Electronic Competency System (e-CF) version 3.0 (e-CF standard EN 16234-1);

    b. 30 professional roles of ICT specialists based on the European system of electronic competencies;

2. EU countries experience in implementing the instruments in question,

3. various factors affecting the ability to implement these tools in three countries: Belarus, Georgia, Ukraine.

The study of country factors was based on informing key stakeholders, organizing expert discussions, forming a consolidated opinion of the professional community within individual countries, and supplementing with the results of empirical observations.

In particular, the project prepared a translation into Russian of the main documents describing the European standard of electronic competencies and 30 profiles of professional roles of ICT specialists (Appendix 1 and Appendix 2).

In accordance with the methodological requirements for organizing a focus group as a research method, a representative sample of stakeholders from various sectors of the economy was compiled whose professional activities are directly or potentially closely related to the implementation and use of these tools (including government bodies; leading universities; specialized centers for additional training and professional development; business associations and IT companies and traditional sectors of the economy).

A translation of the aforementioned documents was transmitted to a sample of stakeholders for the purpose of prior information. Based on the results of familiarization with the documents, the stakeholders made a decision on the interest in participating in the focus group.

The project organized three special events for the discussing of the considered tools by the focus group method. This method provides the maximum opportunity for participants to discuss opinions that contradict at first glance and form a systematic picture of problems and solutions. Thus, the focus group was used as a tool of the scientific approach to developing a roadmap for the implementation of the considered tools, since it takes into account the assessment of the impact on various types of stakeholders.

It is important to note that the chosen research method relies on the formation of a sample of the expert community with relevant professional experience (which is reflected in the professional status of experts), however, it does *not involve collecting the opinions of participants as official positions of organizations, but as professional opinions of experts*.

It is also important to note that sample size was limited by project conditions and methodology requirements. Thus, not all experts could have been involved in the discussion at the focus group stage, and not all opinions could have been taken into account in the Guide.

Further project activities open up the possibility of a broader discussion.

Focus groups participants

Country	Participants
Belarus	• Alekseenko Liliya - Scientific Secretary, Research Institute of Labor of the Ministry of Labor and Social Protection • Apanasovich Vladimir - First Vice-Rector, IBA Institute • Astreiko Svetlana - Senior Researcher, Scientific and Methodological Center for the Development of Professional Qualifications, Scientific Research Institute of Labor of the Ministry of Labor and Social Protection • Vladimir Basko - Chairman, Confederation of Digital Business • Basko Stanislav - Director, Distributed Registry Technologies Association • Belikov Sergey - Deputy Head of the Department for Coordination of Industry Informatization Projects, Ministry of Communications and Informatization • Lebedev Vladimir - Head of Marketing and Administration Development Department, High Technology Park • Marushko Dmitry - Dean of the Faculty of Digital Economics, BNTU • Mikhalevsky Mark - Head of Department, Institute “Industry Personnel” • Shvaiko Valentina - Head of the Training Center for Continuing Professional Education, Republican Institute of Higher Education • Sheko Andrey - Director, Association “Robotics and Artificial Intelligence” • Shimanskaya Julia - Junior Researcher at the Scientific and Methodological Center for the Development of Professional Qualifications, Research Institute of Labor of the Ministry of Labor and Social Protection
Georgia	• David Tsiskaridze – Coordinator of the project in Georgia-International Business and Economic Development Center (IBEDC) • Vladimeri Nafetvaridze-Expert of the project in Georgia-International Business and Economic Development Center (IBEDC) • Merab Labadze – N(N)LE Innovative Education Foundation • Zurab Magradze-United Georgian Technology (UGT) LLC • David Kurdgelaidze-Information Technology Systems (ITS) LLC • Givi Kochoradze - European Commission H2020 NCP for ICT in Georgia, • Director of the International Center for Advancement of Research, Technology & Innovation (ICARTI). • Irakli Tkemaladze – Flash Studio Ltd • Elene Toidze – “Creative Georgia” LEPL – Creative Business Development • Giorgi Rukhadze – Orient Logic LLC • Konstantine Kevlishvili – Orient Logic LLC • Jaba Shelia-Gt Group LLC • Zurab Kumsiashvili-Public Service Development Agency-PSDA LEPL
Ukraine	• Alexandra Tkachenko - Senior Manager, Epson Europe B.V Representative Office in Ukraine; Member of the Board of the Association of Information Technology Enterprises of Ukraine, Chairman of the APITU Committee on Education; Member of the Expert Advisory Committee on Digital Technologies in Education under the Ministry of Education and Science of Ukraine. • Yekaterina Suprun - state expert of the Expert Group on Analytics, Financing and International Relations of the Directorate of Higher Education and Adult Education and the Main Directorate of Higher Education of the Ministry of Education and Science of Ukraine. • Dmitry Gryaznov - Technical Director of the Global International Group. • Volodymyr Nochvay - Senior Researcher at the Institute for Problems of Mathematical Machines and Systems (Research Department No. 215 "Environmental Informatics") of the National Academy of Sciences of Ukraine.

	• Elena Kornienko - project manager, strategic development director of Hi-Tech Office Ukraine. • Elena Tchaikovskaya - Head of the Department of Computer Science, Associate Professor of Kiev National University of Culture and Arts; Chairman of the Working Group "Information Technologies in the Educational and Cultural Environment" of the Committee on Education of the Ukrainian Federation of Informatics. • Tatyana Nanaeva - head of the expert advisory committee on digital technologies in education under the Ministry of Education and Science of Ukraine; Coordinator of the EU4Digital Digital Skills Expert Group in Ukraine. • Valery Tsyupa - Chief Executive Officer of the International Cyber Academy. • Alexey Dyshlevy - Educational Program Manager at EPAM Systems. • Mikhail Sorokin - Director of Vostok Engineering Company LLC. • Lyudmila Korniychuk - communications director of Hi-Tech Office Ukraine.

Introduction to the European standard of electronic competencies and 30 profiles of ICT specialists

The **European E-Competency System (e-CF)** version 3.0[1] contains a description of 40 competencies required and applied at the workplace in the field of information and communication technologies (ICT). As the first industry-wide implementation of the **European Qualifications System (EQF)**, e-CF was created for use by ICT companies, managers and human resources departments (HR), educational institutions, including higher education, decision makers and other organizations in the public and private sectors.

Practical steps in the development of e-CF were initiated in 2006 by Airbus, BITKOM, CIGREF, e-Skills UK, Fondazione Politecnico di Milano, IG Metall and Michelin, with the support of the European Commission and the support of the community of ICT experts of the European Committee for Standardization CEN[2]. Representatives of a number of organizations and individual experts have collectively contributed over 10 years to the development of e-CF, bringing technical knowledge, political awareness and constructive feedback. E-CF 3.0 was published as CEN Workshop Agreement (CWA) 16234 in 2014. After consultation with Member States, CEN e-CF 3.0 was transformed into a European standard and reissued in 2016 as European Norm (EN) 16234.

Based on the European system of e-competencies, in 2018 a seminar of the European Committee for Standardization CEN developed a profile description of **30 professional roles of ICT specialists**[3].

Using the competency descriptions of the European E-Competence Framework (e-CF, EN 16234-1) as the main component of profile descriptions, 30 profiles of professional roles in the field of ICT provide a common set of typical roles performed by ICT specialists in any organization covering a complete business process ICT.

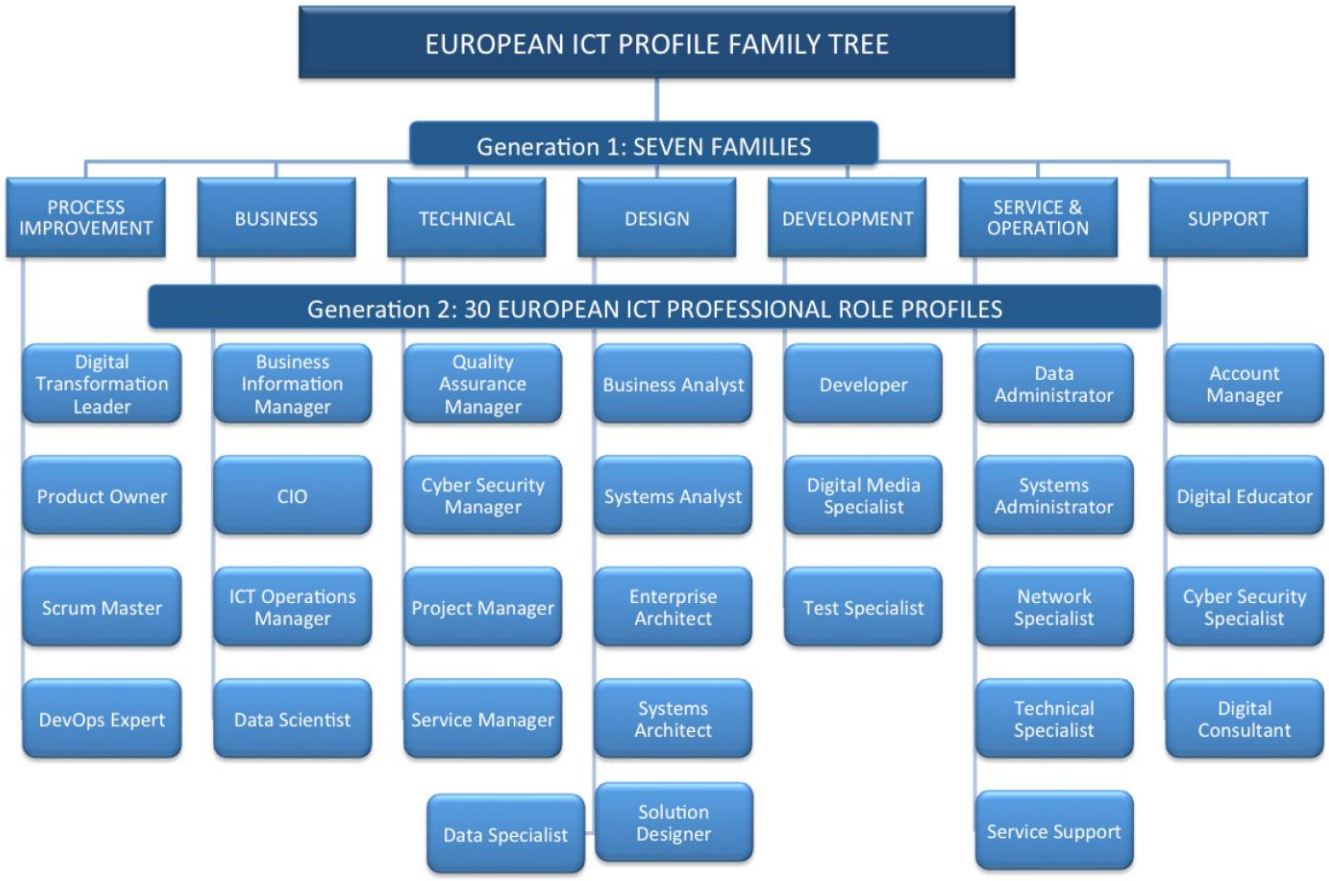
In addition to e-CF, European profiles of ICT professional roles contribute to the development of a common European reference language for the development, planning and management of the needs of ICT professionals in the long term and for the overall development of the ICT profession.

Profiles are a flexible tool for professional development in the field of ICT. They are not intended to become a strict standard. Role profiles were created as the basis and inspiration from an organizational point of view for the flexible creation of more context-specific profiles in a wide range of areas (for example, job descriptions, training programs). By implementing e-CF's competencies in terms of profile building, ICT European professional role profiles provide a tool and a starting point for e-CF to individuals and organizations working with e-CF EN 16234-1.

[1] The source document is available at: http://ecompetences.eu/wp-content/uploads/2014/02/European-e-Competence-Framework-3.0_CEN_CWA_16234-1_2014.pdf.

[2] CEN members are the national standardization bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, the Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta , Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

[3] The source document is available at: http://www.ecompetences.eu/wp-content/uploads/2018/05/CWA_Part_1_EU_ICT_PROFESSIONAL_ROLE_PROFILES.pdf



Source: http://www.ecompetences.eu/wp-content/uploads/2018/05/CWA_Part_1_EU_ICT_PROFESSIONAL_ROLE_PROFILES.pdf.

The goal of European ICT professional ICT profiles is to offer users the structure and clarity for developing or identifying and clustering the many activities that are needed to support an organization's digital strategy. They are less detailed and less specific than job descriptions, and offer a simple but flexible starting point. They also represent a common European point of view and a common reference language and communication tool to support mutual understanding, for example, both between countries and stakeholders, and within organizations, for example, between human resources and ICT. Although profiles focus on professional competency and ICT productivity, the ultimate goal is to influence organizations' ability to use ICTs to increase productivity.

Possible applications for e-CF and ICT professional roles include:

- *Organizations with a demand for ICT*
    - Job profile specification
    - Internal development of ICT staff
    - Common language with partner companies (including cross-border)
- *ICT service providers*
    - Professionals who want to position their qualifications
    - Identification of training needs and vocationally oriented training
- *Small and medium-sized enterprises*
    - Linking business strategy and competency development
    - Development or purchase of electronic competencies
    - Assessment of external staff / consultants
- *Educational Institutions*

    - Curriculum development and continuing education in line with market needs
    - Student motivation through a competency-based approach
- *Government bodies*
    - Specification of public procurement contracts in the field of ICT
    - Common language of communication between the state and ICT business
    - Development of the education system.

Basic questions about the feasibility and possibilities of using the European standard of e-competencies and the system of ICT professional roles in Belarus, Georgia and Ukraine

In the course of the work, the focus group on the feasibility and possibilities of using the European standard of electronic competencies in Belarus, Georgia and Ukraine raised a number of issues for discussion:

1. Is *there a sufficient degree of differentiation of competencies and professional roles, or is it necessary to highlight additional competencies and roles and describe them*? How useful and sufficient is the existing approach to describing competencies and professional roles in order to use it in the existing legislative environment of the country?

2. *What are the risks of introducing ICT roles, and how to mitigate these risks?*

3. Who are the key stakeholders in the qualifiers of competencies, qualifications and professional roles?

4. What is the management approach for the development of the considered tools will be more effective:

a. from top to bottom - from the development of the national education system through state strategy and regulation at the level of the Ministry of Education and the Ministry of Labor and Social Protection, relying on the best international experience - to prepare a range of specialists for the world market,

b. or leave this process to the practical discretion of companies that can take the tools they need and use them for themselves (depending on which customers they work with), and stop there?

What practical approach to mastering the considered tools will be more effective:

c. to work with the whole range of competencies and roles;

d. to identify the priority professional roles and competencies required in the country, and, depending on the demand of enterprises for specific types of professions, educational institutions to develop training programs for these professions?

What is the role of additional (continuing) education in this process?

5. What is the role of coordination and cooperation of various stakeholders in the development of digital skills and competencies? Between the moment when the Ministry of Labor approves specific qualification profiles, and the moment when educational institutions really implement them, a large amount of work should be carried out. The question is what exactly and how should happen in order for educational institutions to be able to train their personnel, who will be able to teach, so that enterprises can modernize their processes and re-train their own personnel. Is there any need for coordination and cooperation, or will each stakeholder act independently and it will not be possible to establish cooperation?

6. What is the role of e-Leadership in digital transformation?

Analytical conclusions on the feasibility and possibilities of using the European standard of e-competencies and the system of ICT professional roles in Belarus, Georgia and Ukraine

1. Is the current degree of differentiation in competencies and professional roles sufficient?

All interviewed experts note the need to adopt a certain framework of digital competencies, citing the fact that Belarus, Georgia, Ukraine is part of Europe and the implementation of documents and standards developed in the EU in the context of digital competencies is appropriate.

It is noted that e-CF very well systematizes the entire evolutionary experience of IT-specialists in various fields. The adoption of standards based on e-CF at the state level is necessary (according to some experts, they should be of a recommendatory nature) in order for specialists who graduate from universities to understand what level of competence (including European level) they have . Heads of enterprises and departments will also be able to determine what competencies they want to see from their employees. Today very often, specialists and recruiters do not understand how much tasks are invested in one or another competency, which often causes misunderstanding between the employer and the candidate for the workplace. e-CF and professional ICT roles can become, in essence, service documents that will form a set of standards for industry 4.0.

But at the same time, there is concern related to the “flexibility” of the framework - the possibility of its timely updating in accordance with the requirements of the business, as technologies are changing rapidly. At the same time, the probability of changes in professional roles in the field of ICT is assessed as insignificant (their spectrum can be expanded), but experts note that the set of competencies for ICT roles can dramatically change.

If e-CF is formalized only for the needs of education and a continuing education system, complications may arise with the speed of reaction to business needs. To avoid this, experts suggest several options:

- Establish constant feedback from the business to obtain the necessary information.
- create a basic dynamic e-CF structure for Ukraine (updating the framework, its basic simplification may occur separately every three years).
- detailing of the framework and professional roles in the field of ICT should take place separately for each industry, which will better help users to understand the framework and description of roles when choosing a profession or advanced training, but it should be noted that with more detail, the process of updating the mentioned documents becomes more complicated. In this regard, it is necessary to find a balance.

Experts agree that the adoption of e-CF at the country level over time will help make this country a part of the global digital world.

At the same time, experts note that information technologies are developing very quickly, and new positions and professions in the IT field appear as functions become more specialized, as well as at the junction of various industries. So, the position of IT auditor, which is not on the list, is already used in Georgia. There are also cases where Georgian IT companies use the Traffic Manager position to control and monitor developer resources. In Ukraine, the emphasis is placed on the need to include / strengthen the cyber security segment in the adaptation and implementation of e-CF and professional roles in the field of ICT.

Theoretically, this means that you need to highlight additional competencies and roles and deal with their description. In practice, the implementation of this work would require the identification of specific organizations and experts who are ready to work on the description of new role competencies. This can be done in the framework of large companies that see the need and practical value for

themselves; small companies are unlikely to be able to describe such profiles competently and comprehensively enough to make these descriptions become de facto standards.

Therefore, the conclusion of the experts was that it is worth starting with the development of the existing version of eCF, and within one year of using the structure, additional needs, skills, knowledge, competencies and profiles can be identified.

Any adaptation of eCF to national specifics may require a huge amount of work, so it is recommended to start working with the existing framework.

2. *What are the risks of implementing the instruments in question, and how to mitigate these risks?*

The first significant risk is associated with the fact that countries that train specialists according to the European standard will train specialists who will begin to leave the country. There will be more brain drain than now, because it will be easier for professionals to find work in Europe.

How can these risks be mitigated?

Refusal to train specialists is not an option, it is only a deprivation of the competitive workforce of one's own country. It is necessary to train specialists who are needed by the market, who are ready to work with customers, and the customer is able to assess their competencies, but at the same time create a good platform for them so that all these people work from our country without going abroad. In parallel with the introduction of eCF, the organization must take care of developing its target market in order to provide highly qualified personnel with suitable salaries and working conditions. It may be possible to create such a competitive training system that includes all these 30 and even more profiles, and thus attract students from other countries.

Training specialists to work in international projects is important for countries with small economies and narrow domestic markets.

When training specialists with international qualifications, you need to understand what competencies such experts should possess, what professional roles they can fulfill in specific projects in the IT field. The wording of competencies and their contents should be understood internationally. Due to the high complexity of developing classifiers and the need for their frequent adjustment as technology develops, it is more advisable for small countries to adopt one of the international classifiers.

The second significant risk is that in the case of the introduction of eCF for small companies it will be difficult to adjust their organizational structure. Risk reduction will consist in adapting the part of eCF that is most important for the future development of companies, rather than following each line of the document.

The experts also listed the following risks and challenges in implementing e-CF and professional ICT roles in Ukraine:

1) Risks associated with the harmonization of e-CF with the national qualifications framework due to possible incompatibility;

2) The risk of changes to e-CF after merging at the EU level with the Lifelong learning framework (or other complementary or alternative tools like SFIA) after the introduction of e-CF in Ukraine.

3) At the level of the formal education system, there are practically no market mechanisms in the educational services market - this can significantly slow down the adoption of the proposed system of electronic competencies, while it will be easier to do at the level of non-formal education and the system of advanced training.

4) There is a likelihood of a lack of perception of the framework by the business, which will affect its relevance.

5) The relevance of the set of competencies for professional ICT roles may be lost due to rapidly developing technologies.

6) The implementation of all necessary standards based on e-CF can entail significant financial costs.

7) The underdeveloped sphere of public-private partnerships in Ukraine can become a global challenge on the way of introducing e-CF in the country.

8) In Ukraine, digital consciousness in society is not sufficiently developed, which can affect the speed of implementation of standards based on e-CF and professional European-style ICT roles, as a result of which the digital environment can quickly change before the frame is implemented.

9) An obstacle to the implementation of the framework may be existing problems in communication between different sectors of society (government, business, civil society).

10) There is a risk of lack of perception of the changes caused by the introduction of e-CF and professional ICT roles at the level of performers.

Possible ways to overcome challenges, reduce risks in the implementation of e-CF and professional ICT roles and the necessary specific steps:

1) It is imperative to involve the business in all stages of the implementation of e-CF and professional ICT roles.

2) The system of standardization of electronic competencies in Ukraine (a set of documents implementing e-CF and professional ICT roles) needs to be made flexible (readiness for constant changes), while relying on the opinion and recommendations of the business when making changes to it.

3) It is necessary to study the experience of more developed digital communities (not only the EU, but also Japan, South Korea, Singapore, USA).

4) It is necessary to develop an understanding of which subjects will put into practice subsequently developed NLAs and other documents (especially with regard to the education system, where teachers need to be prepared for this).

5) It is necessary to carry out an extensive information campaign regarding the positive effects of the implementation and use of e-CF and professional ICT roles.

6) One of the methods to ensure the flexibility of standards based on e-CF can be the creation of operational technical committees aimed at constant work with updates, which include.

3. Who are the key stakeholders of the standards of competencies, qualifications and professional roles?

Various spheres of e-CF application were mentioned, including for public authorities: for example, the framework can be useful for developing a strategy for developing digital competencies in the country (it can become the basis for developing strategy indicators), including for preparing civil servants for digital project management transformations.

In Ukraine, it was noted that this framework will bring great practical benefits to the education system. For informal (including independent) education, e-CF should be introduced in a simplified form so that users of the framework can evaluate their level of competence. In a more complicated form, the frame can be used by universities to develop educational programs.

Experts agree that standardization based on e-CF is necessary, as it will positively affect several levels:

- create a common basis for understanding digital competencies between EaP countries, Europe and the global environment;
- systematizes the skills that educational institutions form (very often educational institutions do not provide the set of competency skills necessary for a particular specialty).

A preliminary review of eCF tools and professional ICT roles in the focus group showed that the primary task is to understand what sectors of the economy these tools can be in the first place to identify, stakeholders who are interested in using these tools in their professional activities.

During the discussion, it became clear that an *understanding of the roles and competencies in the ICT field is important primarily for employers and employees*. It doesn't matter if the employer is an ICT company, a company in the traditional sector of the economy, or a government body - it is the employer who determines which specialists he needs to work in the market.

The *education system should adapt to the requirements of the market* and prepare for the companies the specialists they need, offer the programs on the market that satisfy and actually realize the level of competency that a person will need.

Today, in many sectors, fundamental knowledge is not enough - it is necessary to constantly update practical skills in connection with the development of new technologies (lifelong learning), which is possible due to the combination of a higher education system and additional education. The emphasis on the labor market is shifting in favor of practical skills, and this raises the question of choosing effective sources and forms of education.

The need for an eCF of IT sector

IT companies come to the need to structure competencies as they grow. When the company is small, roles are distributed generally, new employees are hired to meet specific needs. Only at a certain level does the company address the need for some restructuring. Moreover, the presence of established traditions and business processes is an obstacle to the transition to new schemes. The use of the considered tools can be especially useful for an IT company at the stage of transition to the structuring of its competencies.

Currently, each *large company* in Belarus has its own internal system for determining qualifications, needs, competencies, and roles. For *small companies*, a common tool will provide guidance in developing the competencies of its employees. The use of these tools in assessing differences in competencies and differentiation of salaries would also be a good argument for integration into your practice. As a result of different development speeds, today IT companies, universities, regulators, in their own way, classify their knowledge of competencies in the IT field. The same roles and competencies are called completely differently. Because of this, we find ourselves in a situation of incomparability and opacity of the labor market in the IT sector. The use of a common classification would significantly reduce transaction costs in the ICT labor market and increase transparency and competition in this market.

The need for eCF of traditional industries

The focus group participants noted as an advantage of the presented tools an approach to classification, competencies and responsibility, *focused on the needs of various sectors of the economy*, not only IT. Usually, most people understand professional activities in the field of ICT as the work of programmers. Within the framework of the approaches considered, only three are assigned to programmers from 30 different areas of responsibility; the rest are related to the implementation, use of ICT in business, services and other areas[4].

The demand for ICT competencies is high not only in IT companies, but also in the real sector of the economy (mechanical engineering, instrument making, energy, and others). If in the country there is a difference in the level of salaries in the IT sector and in traditional industries, then the need for ICT competencies is quite difficult to close - there is no excessive supply of labor, there are no

[4] The concept of an electronic leader reflects that at the level of government bodies and innovative sectors of the economy, there must be managers who have competencies in both conducting business and digital technologies. There is a specific description of at least 6 types of leaders for which the competencies that they should possess.

opportunities for experimenting with hiring IT staff, and it is important to clearly understand which competencies should possess an ICT specialist hired by a company from a non-IT sector. The development of these tools would be important for *managers of enterprises and organizations of traditional sectors of the economy undergoing digital transformation*, who do not have time to monitor progress in the field of IT, would help them understand what kind of specialists are needed not only today, but also in the future as the enterprise develops and deepening its digital base. Provided that the content of the European system of electronic competencies and / or professional roles is regularly updated by the expert community, the use of international classifiers would be a real help to ensure that company executives are at the level of understanding the demand and fullness of competencies, a good criterion for evaluating specialists by the employer.

At the same time, you need to *remember the need to adapt and maintain digital competencies in traditional industries*. There are sectors of the economy with their own specifics: industry, banks, transport - digital specialists to work in these areas must, in addition to those described in European classifiers, have an understanding of the specific business processes (production, support, management) of these industries.

The problem concerns not only the competencies of enterprises in the real sector of the economy, but also *state administration, agriculture, and construction*. It is necessary to give managers in all areas specific digital competencies, because now any small transformation in business processes is the introduction of IT.

For example, the Ministry of Communications and Informatization today, as part of the implementation of the agenda for creating a digital economy and building an IT country, is working on the issues of advanced training for government employees regarding e-government and digital skills. At the same time, a frequently observed problem is a lack of understanding of the issues of implementing information technologies and implementing projects at the level of government, especially given the strong washing out of personnel from the public administration. Often, the implementation of informatization events, which take place both within the framework of state programs for the development of the digital economy and other initiatives, is necessary for people who are "far" from information technology. This problem is especially acute in the regions. The level of competence of personnel implementing regional digitalization measures requires development. Therefore, the international classifiers of competencies in the field of ICT are interesting in terms of highlighting the competencies that a public administration employee must have in order to understand the specifics of the IT sphere, determine the direction of government bodies and the implementation of the digital agenda, and implement projects based on ICT.

Selection of a reference classification

The world is changing, both in the West and in the East (within the framework of the EAEU): Russia is actively developing its framework of digital competence. North America and China are more advanced in many competencies than the European Union.

As part of previous work, in consultation with companies, analyzing world experience, the HTP chose a model for describing ICT competencies that could work effectively in the Park - the SFIA model (Skills Framework for the Information Age). The model belongs to the SFIA fund, it is a consortium that includes five professional organizations. The decision to choose a ready-made model is due to the fact that the Park companies are export-oriented and work with Western customers, and the use of Western competency models for them allows you to speak the same language with the customer. The second argument is that everything changes rapidly in IT, it is impossible to develop a system for a small country, for its constant modernization a whole institute of qualified specialists is required, therefore it is more efficient for a small country to use ready-made models. This model for describing

ICT competencies was offered to HTP companies for review and is an alternative to the eCF tool[5]. Over the past period, active implementation of this tool by Belarusian companies has not yet occurred.

There are several more approaches. Their viability, quality, like any system, needs to be evaluated. In any case, the sectoral council of qualifications in the field of ICT should be familiarized with various tools, all world experience should be studied.

4. What managerial and practical approaches to mastering the considered tools will be more effective? What is the role of continuing education in this process?

Typical process of educational system development

The standard process of training by a classical education system of a specialist with the competencies required by the employer is based on such a tool as a *professional standard*. It describes generalized functions of a specialist. Within the framework of generalized functions, labor functions are distinguished, and requirements for knowledge, skills and abilities are presented for each labor function (you can call it competence). A professional standard is developed by the sectoral council and put up for public discussion[6]. Everyone who is interested in those professions and positions that are part of the standard carefully looks at how much their requirements for the labor functions that are used in their organizations are covered by this professional standard. If there is a discrepancy, then those interested can give recommendations to the sectoral council on the inclusion of new labor functions, determining the level of qualifications, etc. This professional standard is being finalized and sent to the Ministry of Labor for approval. The country has developed guidelines for the development of professional standards, which indicate how much it is necessary to determine generalized functions, labor functions, how to determine the level of qualification, and it is stipulated that the professional standard, if necessary, is finalized, processed, supplemented. Since the requirements for competencies are changing very quickly in the field of IT technologies, it is possible to constantly make changes, and the Ministry of Education will prepare an educational standard on the basis of a professional standard, which should be designed to teach all the requirements, knowledge, and skills of the specialist requested employer.

The potential way to develop e-CF in *Ukraine* from the side of the traditional educational process is presented as follows:

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[5] SFIA Foundation has developed and supports the classification of IT skills since 2000. The EU has been working on e-CF since about 2005. Both structures have similar goals, much in common, and some differences. As part of the SFIA collaboration program, discussions were held to establish a closer working relationship with e-CF. In March 2016, e-CF representatives met with the SFIA to discuss a solution to their core skills issues. In particular, the e-CF team wanted to know, given the very high costs of maintaining skill classifiers and the problems associated with the use of classifiers such as the SFIA, have been able to carry out several major updates since 2000 and create a global user base. At the end of this meeting, the e-CF team unanimously decided that there should be a work program to merge the two structures, and the SFIA agreed. This made sense to the global community, especially because both platforms were about to enter their update cycles. A detailed study was conducted to compare both approaches and the possibility of merging them (SFIA - e-CF Comparison & Mapping Report). This comparison is based on SFIA 6 and e-CF (V3). A merger plan was also proposed. Despite the support of the merger logic by both parties, no further action was taken, and the SFIA Community could no longer delay its update, so it initiated the development of the SFIA 7 update, and this report served as a contribution. Since all proposed changes to the SFIA and all discussions are public domain and available, this report and all discussions of SFIA changes were available for updating e-CF. Movement closer to each other is still possible, but is currently not controlled or coordinated. SFIA 7 was published in June 2018, e-CF V4 is expected. A source: https://www.sfia-online.org/en/tools-and-resources/sfia-e-cf.

[6] The tasks of sectoral councils are to provide the economy sector with the necessary personnel of the appropriate skill level. They determine the priority directions for the development of this sector, taking into account new technologies, the needs of sectors in professions and qualifications for new technologies, and in accordance with this develop professional standards. The sectoral council can create several working groups for each direction, each task, each standard.

1) the process of implementing the framework should go through strategic sessions to create horizontal communications with the involvement of relevant institutions from the state, educational, civil and business sectors;

2) on the basis of the framework, simplified professional standards are developed (based on the 30 proposed professional roles in the field of ICT), which are sent for consideration by the business sector;

3) after approval, the standards can be transferred to the institutes of the education system for the implementation and development of educational programs (the argument: it is almost difficult to develop such a number of professional standards only with the help of educational institutions). The development of educational programs in Ukraine is based on professional and educational standards. When forming curricula and programs, the set of competencies specified in the standards should be taken into account.

4) when adapting the framework and professional roles, it is necessary to observe a correlation with programming languages and software, but do not detail the documents themselves in order to leave the system flexible.

At the moment in Ukraine there is not a single officially approved professional standard in the field of IT[7]. At the same time, universities do not have the right to indicate professional qualifications in the diplomas of their graduates, as there are no officially approved professional standards (only educational qualifications are indicated for today).

In *Belarus*, the Research Institute of Labor of the Ministry of Labor and Social Protection is the leading organization for the modernization of the existing qualification system. The Institute has already developed a strategy for improving the national qualification system, which was approved in 2018 by a resolution of the Council of Ministers.

All documents and all professional standards for specialists, for managers who are involved in the field of information technology, will be developed and considered in the information technology sector. And the prepared documents, if these are professional standards, will be approved by the sectoral council created in the framework of information technology, and approved by the decree of the Ministry of Labor and Social Protection.

Belarus has a Unified Qualification Guide for Employee Positions and a Unified Tariff Qualification Guide for Work and Occupations of Workers. They provide a description of all labor functions performed by employees, workers and employees. Also in these characteristics qualification requirements are described: what an employee in this position or in this profession must be able to know and know in order to carry out the scope of work provided for in this characteristic. They are also used to develop professional standards in order to preserve to some extent the continuity of the current system and not to lose what has been developed in the new system. Indeed, in the current system, all professions and positions are ranked according to the complexity of the work performed and the timing of preparation for performing these works.

The complexity of integrating eCF and ICT professional roles in a typical process

There is one problem on the existing path. Developing an educational standard for a new specialty from scratch is a very lengthy process.

Even longer than the way of preparing and making changes to the educational standard, the way of training a specialist is long - and the employer needs a specialist today or tomorrow.

[7] In Ukraine, 5 standards have been developed in the field of IT education based on the previous version of e-CF: “Product Manager in the field of informative technologies”; "Project Manager in the field of information technology"; “Information Resources Specialist”; "Information Systems Specialist"; "Software Development Specialist." But, unfortunately, none of these standards has been approved. The Federation of Employers of Ukraine has already filed for official consideration one of the mentioned standards.

One of the conditions for the development of professional standards is the existence of a working sectoral council that keeps up with the best educational standards, maintaining its regular effective work. Such a council (or a working group within the framework of the council) is difficult to assemble, and it is even more difficult to maintain their dynamic work.

Moreover, the IT market today is characterized by an extremely high speed of development. By the time the educational standard is developed, the professional standard, functional content and the requirements for the competencies of such a specialist in the market are very much evolving. It is quite difficult to meet these rates of change in the modern system of higher education.

Today's IT education system is not adequate to practice, and this is confirmed by the state. Since the regulatory barriers in the education system turned out to be insurmountable, now there is a discussion about going beyond the legal regulation of the traditional education system by creating a new university (or other educational structure). More and more EPAM models will appear when an enterprise trains personnel for itself, or IBA models that train personnel not only for itself, but for the economy as a whole. These are natural adaptation mechanisms when a certain society or system as a whole adapts to the situation as it is.

Until the basic problems of the faculty are resolved, the higher education system, in principle, will not be able to turn into a tool for quick adaptation to market needs. Today, universities have a curriculum, there are training courses, but the system for delivering these competencies, as well as assessing the competencies received by students upon completion of training for a particular training course, is imperfect, since the teacher does not have resources for his own ongoing practical training, mastering advanced teaching methods and knowledge packages on the application of modern competency assessment tools in practice. Universities need to radically revise their approach to teachers and their professional development, because the university buys a service from a teacher, but the teachers themselves must learn the knowledge; to the practical base used for training (dual education method); to prepare students for self-employment instead of self-employment (entrepreneurial university).

Today, teachers are developing training complexes in all disciplines for free, although this is the hardest work and, of course, if you need practice-oriented courses (and in IT these are practice-oriented courses), you need to do this in conjunction with representatives of the IT industry. However, our IT industry is not focused on cooperation with the university in terms of discussing specific strategic issues. Only rare representatives, very motivated, can take part in the educational process. And in general, no one takes part in the discussion of curricula. Until the approaches are reviewed, until the status of the teacher, the content of his work, the level of payment — the introduction of a new competency framework, requiring a sharp upgrading of the qualifications of teachers and equipping them with new tools for developing competencies — is not possible in traditional universities.

It is important that this problem of the complexity of using the traditional higher education system to quickly adapt to the needs of the market also faces other countries. So, in the development of tools of the European system of electronic competencies and ICT professions, it was mainly corporations that participated, and not educational organizations, and especially not universities.

“Universities are the most non-flexible link. University education and innovative industrial companies and IT companies are two different worlds that each live their own lives. Therefore, large IT companies train their specialists within the company”. The need for specialists is growing much faster than the speed with which the higher education system produces specialists. Graduates of higher education institutions are not important as such, their presence of higher education is not important, their skills and competencies are important.

The proposed approach (some requirements for the IT education system)

Thus, these tools are useful for the IT sector, and even more so for other sectors of the economy undergoing digital transformation, and government. However, the effectiveness of the development of these tools through only the formation on their basis of national standards and through the traditional system of higher education is doubtful.

The discussion in the focus group led to the conclusion that changes in the education system (including the introduction of classifiers of ICT competencies and professional roles) require work from two sides:

a) from primary, secondary and higher education (long-term strategy for the evolution of fundamental education):

Justification:

o In sectors where there is a demand for a certain type of specialists to solve a specific problem that will affect a long period of time — like smart cities, smart regions — subject experts are needed for a long period, they need to be trained systematically, and not just by emergency methods; relevant requirements for their competencies should be formed, which higher and professional education systems should be able to nurture.

o Improving the education system should begin even earlier - from early school education. Universities cannot prepare good mathematicians now, because they do not receive suitable graduates from school. There is a real radical decline in the quality of school graduates, in particular mathematicians and other exact sciences. This undermines the possibility of training specialists who are able to work with high technologies and create a breakthrough intellectual product.

o Higher education, continuing education courses, retraining for work in the field of IT do not guarantee success for life in any country today. Lifelong learning becomes an imperative, the only self-defense tool against structural unemployment. However, many people do not want hard work, are not motivated, do not want to study. It is not enough to have knowledge, skills, you still need to have it, to have inner curiosity and an open, hardworking mind - and this is laid before the school, at the level of preschool education.

b) from the market side (users and the system of additional education and advanced training):

Justification:

o The country cannot wait for the education system to prepare people for the digital economy from scratch and they will accumulate practical experience (average term of 10 years). For management, the first priority now is to begin to work with those who are, very precisely and quickly increase their competencies and the ability to make decisions in the digital economy. Based on this, to build additional education courses, improve the qualifications of thousands of civil servants, and for this to build an understanding of exactly what competencies are needed in the sectors - lawyers, economists, human resources, and specialists in the real sector.

o A more realistic (fast) scenario for successful integration of such tools into practice is an initiative of a business from within the market. This may be mediated by the OEM or an association of IT companies. The largest industry companies (like EPAM) could accept this standard for themselves as internal. Gradually, this practice could spread to the labor market as a de facto standard (through the list of vacancies and requirements on labor exchanges and through the list and description of specialists who are directly trained by IT companies to level the problems of the personnel market).

Moreover, an integrated approach to the development of the labor market is important in close connection with the capital market and the institutional conditions for the development of private business in the country. Today, the education system educates specialists, primarily for neighboring markets, which are much better developed than Belarus. Question - where will the qualified specialists find application? In the real sector of the economy, in HTP, or will they be exploited by the economies

of neighboring countries, and will these workers create added value in neighboring countries, and not in their own country? These issues should be considered at a high level of economic policy.

Possible first decision from the market. It would be useful to create *a platform (marketplace), on which professional roles would be provided as a framework, and there would be an opportunity for everyone who registered to evaluate their competencies*. At the same time, this would be an opportunity for an IT company to find the right employee; show what kind of specialists they have, and, accordingly, help companies find a counterparty (IT company and / or a specific specialist freelancer). Today, in the case of the organization's IT infrastructure modernization, a gap analysis of existing and required systems is usually done, but no competency analysis and structuring is carried out, which several hundreds of IT specialists should have, who must create and maintain these systems - independently or when interacting with external IT specialists.

A gap arises: we know which systems we need, but we don't know which specialists are needed to create and maintain them, we do not structure their competencies. And when a marketplace appears where structured competencies and roles are exposed, the consumer cannot compare them with what he needs - he does not know how to do it. But *this work needs to be done for most IT companies*. Where the work model differs from the artel model, that is, when the transition to the industrial work model is carried out, companies must learn to structure the competencies that they need and then compare them with what is on the market with the frame. It would be very useful, but it must be mastered. *Popularization work should be carried out* to show how it is presented now, what you can use in this marketplace.

If companies are willing to adjust, let them adapt to the developed effective scheme.

The focus group participants proposed to implement the marketplace according to the philosophy: "Let's give the opportunity to the professional to get the missing competencies and skills, where possible." It can be a university, it can be an additional education, it can just be some kind of distance learning course. It is possible to highlight a specific segment, to clarify the needs of specific sectors of the economy, specific tasks of economic development. Anyone who is ready to give the necessary new skill or competency (for example, the institution of continuing education, a university through the MBA program) will be able to use this framework to identify gaps and position themselves in a heterogeneous system of educational services.

Development of company employees to use digital technologies and tools.

Very often, a business seeks to hire fully-formed specialists who do not need to increase the level of electronic competencies so as not to incur additional costs. This is more true for SMEs, as often they lack resources. An additional reason for this situation is the fears of business leaders that a recently trained employee will leave the workplace immediately after graduation at the company's expense - in this case, the business suffers direct losses. In large companies, there are cases of having their own training programs and retraining programs.

In this regard, training agencies in Ukraine that provide services for the development of digital skills and competencies of employees who are not able to improve their qualifications within their companies are of considerable popularity in Ukraine.

Most large Ukrainian companies use basic software that is maintained by a support company. However, it is best to choose software with a strong support company. Support company specialists perform an explanatory function for the personnel of customer companies if there are any changes or updates to the software. The function of e-leaders here is manifested in decision-making regarding the choice of software, the need for updates and changes to the system of work, constant monitoring of the situation in this regard. All internal standards regarding the level of electronic competencies are usually set by electronic leaders and senior management of companies. But, theoretically, such standards could be adopted at the state level (at least in the form of methodological recommendations).

In Ukraine, in the context of the development of digital competencies, it would be advisable to create at universities special courses / training centers (e-competence centers) for training specialists that would focus on the needs of the business. If necessary, SMEs could contact such centers in case of lack of electronic competencies to solve their problems. Today, universities in the country have sufficient autonomy to do this.

It may also be good practice to create special platforms based on the largest companies, within the framework of which sets of special standards will be created for general use / study by other market players. Such industry platforms could work on a server basis and provide access (on a paid and free basis) for business entities to standards and tools for their implementation (training programs, relevant information, software).

5. *What is the role of coordination and cooperation of various stakeholders in the development of digital skills and competencies? What will be the mechanism for further work?*

We have experience in implementing initiatives in the field of digital skills, collegiate work, which is being suspended. It can happen again. Dividing the task of introducing digital skills into sectoral initiatives, such as “smart territory”, “smart city”, will make it possible to simplify the solution, since there will be an understanding of which stakeholders and why it is necessary to master specific competencies and roles.

However, the question of further work remains open.

Do you think that we are able to move on each by itself, separately, or do we need some kind of collaboration, cooperation and in what form?

Collaboration is definitely needed.

We need to understand - is it necessary to consolidate those interested in some organizational forms, as is done at the level of the Ministry of Economy for the development of industry 4.0 - to form a community of people interested in the typical transformation of industry? Do you need a similar community in the development of digital skills? The European Union has such a tool as the formation of coalitions of digital skills and jobs (Digital Skills and Jobs Coalition[8]) and its national chambers in the EU countries, which any organization that supports the idea of the need to develop digital competencies in all areas of the economy can join on a voluntary basis.

Opinion: the model for creating a viable society can only be this: a community appears and the ministry concerned can support it. If the ministry creates a community, it will not survive, it will die very soon and will not be capable. That is, a community should appear, come to the ministry and offer to cooperate.

Who will create this community? Anyone willing to join. Community - these are people who themselves want to move in one specific direction.

The community is not created for the sake of mastering the tools that are in the EU. What has been done in the European Union is an opportunity for us to satisfy our needs in terms of what our regulators need now, what the sectors of the economy, robotics, instrument engineering, and machine building need. The presented tools are just help, the experience that we can adapt and use, but we can refuse it, we can restore another experience, or both. We build on goals, our staff shortages.

According to experts in Ukraine, the interaction and coordination of stakeholders in the implementation of e-CF and professional ICT roles in Ukraine could be implemented as follows. At the initial stage, each stakeholder should inform the remaining groups of stakeholders about their needs and opportunities: for example, business - about what competencies he lacks. To do this, you need to create open areas for communication (events or online). When introducing e-CF and professional ICT roles, you need to rely primarily on the opinion of the business.

[8] The experience of their creation and work is discussed at Round tables held in Belarus, Georgia and Ukraine as part of this project.

All stakeholders (especially those from the business sector) should popularize e-CF and professional European-style ICT roles, as well as subsequently developed standards.

To establish interaction and coordination between sectors of the society when introducing e-CF and professional ICT roles, it is necessary first to develop a strategy for the development of digital competencies in the country. Professional standards developed on the basis of 30 professional roles in the field of ICT should become mandatory for universities in the formal education system.

The first step in the implementation of e-CF should be the popularization of e-CF and professional ICT roles of the European standard. Business has many forms and varieties and many of the business entities may not understand what benefits this framework can bring.

The education system should become a center of competence where business can go. At the same time, it is important that educational institutions are involved in business processes (solving problems for businesses on a paid basis), for example, in the format of business incubators inside universities.

One of the simplified ways of introducing e-CF and professional ICT roles in Ukraine may be the dual education system - this is a new, more flexible form of organizing vocational training. Duality as a methodological characteristic of vocational education provides for the coordinated interaction of the educational and industrial sectors in the preparation of qualified personnel of a certain profile within the framework of organizationally excellent forms of training. Pilot projects in this area are already being implemented in Ukraine. Unfortunately, the IT industry is poorly represented in them. But an attempt to test e-CF in Ukraine using dual education can be an effective way to implement the bottom-up principle. It should be noted that the regulatory framework of the dual education system in Ukraine is imperfect.

Among the proposed ideas from experts, the idea was voiced that the process of introducing e-CF and professional ICT roles should occur on a bottom-up basis. One way might be to create tips.

6. E-Leadership as a driver of digital transformation

Leadership means “the act of leading a group of people or an organization, or the ability to do it” (Oxford English Dictionary).

E-leadership implies "the ability to initiate and stimulate innovation processes, convincing others to collaborate and apply the entrepreneurial spirit in support of transformation processes driven by digital technology." “Electronic” is used as a comprehensive abbreviation for the combination of ICT and business, including all areas of technical ICT, all areas of business and the activities of enterprises or people in the development, use, delivery, maintenance, etc., and refers to all competencies, at all levels. The role of electronic leaders on the way to the fourth industrial revolution (4.0) is big: it is **the leader who is responsible for identifying strategic business opportunities and creating a culture of innovation**.

Electronic competencies in the standard distinguish two levels of competencies (e-4 and e-5), at which a professional has the ability to "provide leadership." This means that his competencies include not only the possession of relevant knowledge and skills, but also the ability to inspire others to follow in the field of competence (responsibility for people and influence on others).

Description of the abilities of electronic leaders at levels e-CF e-4 и e-5

e-CF	e-CF Levels descriptions	Typical Tasks	Comp-lexity	Autonomy	Behaviour
e-5	**Principal** Overall accountability and responsibility; recognised inside and outside the organisation for innovative solutions and for shaping the future using outstanding leading edge thinking and knowledge.	IS strategy or programme management	Unpredictable – unstructured	Demonstrates substantial leadership and independence in contexts which are novel requiring the solving of issues that involve many interacting factors.	Conceiving, transforming, innovating, finding creative solutions by application of a wide range of technical and / or management principles.
e-4	**Lead Professional / Senior Manager** Extensive scope of responsibilities deploying specialised integration capability in complex environments; full responsibility for strategic development of staff working in unfamiliar and unpredictable situations.	IS strategy/ holistic solutions		Demonstrates leadership and innovation in unfamiliar, complex and unpredictable environments. Addresses issues involving many interacting factors.	

Source: http://ecompetences.eu/wp-content/uploads/2014/02/European-e-Competence-Framework-3.0_CEN_CWA_16234-1_2014.pdf.

There are 6 roles of e-leaders:

- Chief IT Officer;
- Enterprise Architect;
- Information Security Manager;
- Business Information Manager;
- Data Scientist;
- Digital Transformation Leader.

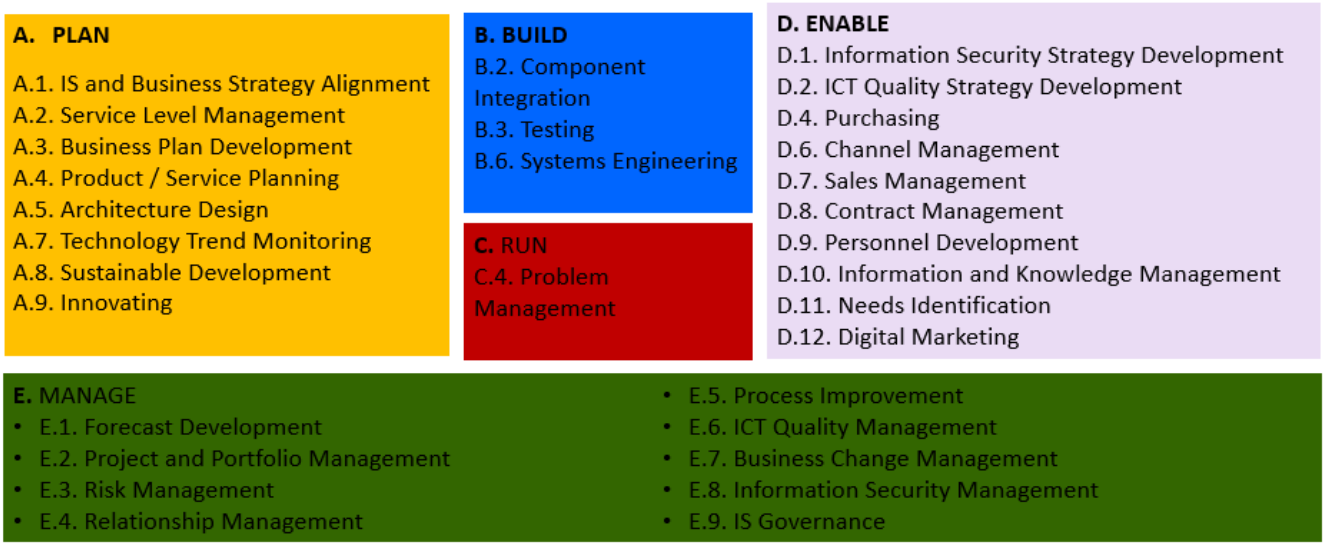
6 roles of e-leaders

BUSINESS INFORMATION MANAGER: E.9. IS Governance A.1. IS and Business Strategy Alignment A.3. Business Plan Development E.4. Relationship Management E.7. Business Change Management	**CHIEF INFORMATION OFFICER (CIO):** A.1. IS and Business Strategy Alignment A.3. Business Plan Development E.2. Project and Portfolio Management E.9. IS Governance E.4. Relationship Management	**ENTERPRISE ARCHITECT:** A.1. IS and Business Strategy Alignment A.7. Technology Trend Monitoring A.3. Business Plan Development A.5. Architecture Design E.8. Information Security Management
INFORMATION SECURITY MANAGER: D.1. Information Security Strategy Development E.9. IS Governance A.7. Technology Trend Monitoring E.3. Risk Management E.8. Information Security Management	**DIGITAL TRANSFORMATION LEADER:** A.3. Business Plan Development A.5. Architecture Design A.9. Innovations E.7. Business Change Management E.9. IS Governance	**DATA SCIENTIST:** A.7. Technology Trend Monitoring D.10. Information and Knowledge Management A.9. Innovations D.11. Needs Identification E.1. Forecast Development

Source: based on http://www.ecompetences.eu/wp-content/uploads/2018/05/CWA_Part_1_EU_ICT_PROFESSIONAL_ROLE_PROFILES.pdf

An aggregated list of their electronic competencies of leaders is as follows.

Aggregated list of competencies of e-leaders



Source: based on http://www.ecompetences.eu/wp-content/uploads/2018/05/CWA_Part_1_EU_ICT_PROFESSIONAL_ROLE_PROFILES.pdf.

For example, a digital transformation leader profile includes the following knowledge and skills..

	DIGITAL TRANSFORMATION LEADER ROLE		
Summary statement	Provides leadership for the implementation of the digital transformation strategy of the organisation		
Mission	Drives cultural change and builds digital capability to deliver innovative business models and processes		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	Digital Transformation Roadmap	Digital Transformation Strategy	Solution and Critical Business Process Integration Proposal
Main task/s	• Shape and deliver a digital strategy • Develop awareness and education to improve digital capability • Demonstrate the benefits of digital transformation implementation • Advise and support on a 'digital by design' approach • Lead cultural change required to facilitate digital strategy • Lead and mobilise key organisation influencers to implement digital transformation		
e-Competences *(from e-CF)*	A.3. Business Plan Development A.5. Architecture Design A.9. Innovating E.7. Business Change Management E.9. IS Governance		Level 5
KPI	Successful strategy implementation		

Source: http://www.ecompetences.eu/wp-content/uploads/2018/05/CWA_Part_1_EU_ICT_PROFESSIONAL_ROLE_PROFILES.pdf.

Respondents came to the general conclusion that electronic leaders should understand and realize what digital transformation is, as well as be prepared for it. Today in Ukraine, the digital sphere is often perceived separately from many other areas. The e-leader must be aware that digital transformation can bring his business to the forefront. Very often business executives in Ukraine lack such awareness. Only after the formation of the correct consciousness will the e-leader be able to assemble the appropriate team (chief digital officers) and find the necessary resources.

In large companies, there are cases of having their own training programs and retraining programs. Such programs should be as flexible as possible to correlate with the external requirements of a rapidly changing digital world. In addition to this, it would be advisable to create common programs by several companies.

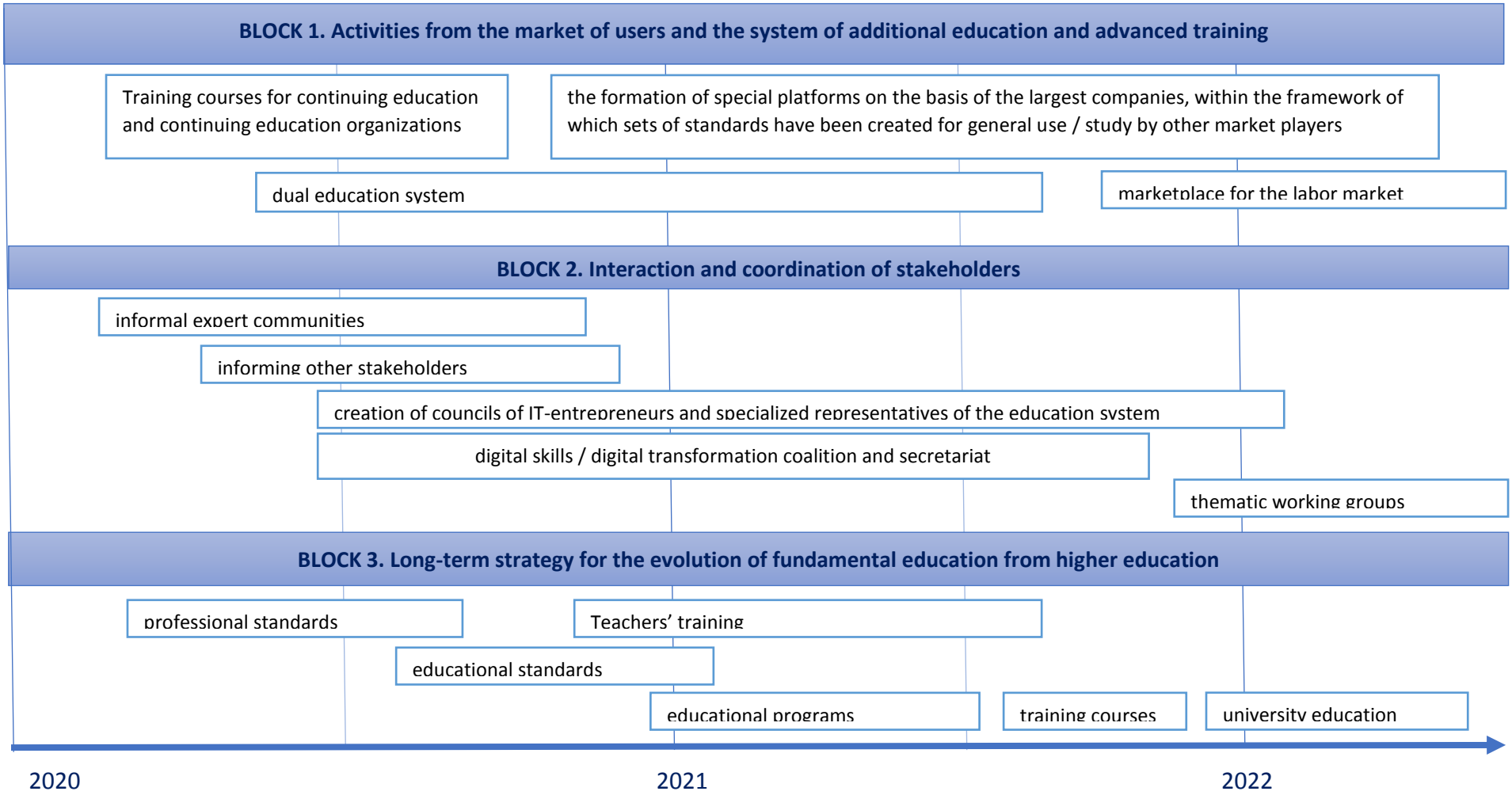
At the same time, without a culture of innovation, it will be impossible for the company to exist in the long run. The electronic leader should first of all have a value system for uniting people. At the next stages (from the point of view of professionalism), electronic competencies should be layered to help him formulate company policies and strategies. It is also important to establish a system of vertical and horizontal communications inside and outside the company, including using ICT.

If the electronic leader does not have the competencies specified in e-CF, then his company has few prospects. Very often, the electronic leaders of Ukraine do not have a holistic methodological understanding of how to formulate requirements and lead to the availability of electronic competencies among staff. Also in Ukraine (both at the business and state levels), there is often a lack of understanding that competition is now global in nature (outside of one country) due to the influence of ICT.

One of the main roles of the electronic leader noted by experts is monitoring and communication with state policy subjects: company representation in legislative and executive authorities, lobby.

E-business leaders must also realize that the 4.0 industrial revolution is inevitable and that its challenges will need to be addressed in any case. E-leaders should thoroughly study this issue and consider ways to overcome possible problems. E-leaders must be aware that they are competing globally (not only domestically, but also far beyond its borders), since ICT has long led to such globalization.

Roadmap for the implementation of the European standard of electronic competencies and the system of professional roles in Belarus, Georgia and Ukraine



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