

# Certification of the workforce quality as a tool for sustainable socio-economic development in cross-border regions

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**Abstract.** The authors consider the issue of implementing the process of certification of the workforce quality, which serves as a tool for sustainable socio-economic development in cross-border regions. The definition of the specified process is formulated. The paper presents invariant (immutable) parts of the structures of passports containing a full description of the profession and workforce quality. Mathematical formalization of the process of comparison and interaction of competence sets of considered passports is proposed. The conclusion is that the development of organizational and informational mechanisms for identifying, transforming, analyzing, exchanging identifiers of the workforce quality (competences) in the digital space leads to the improvement and progressive dynamic formation of the information environment. These processes are moving towards sustainable socio-economic development regarding the functioning of cross-border regions.

**Keywords:** certification, workforce, workforce quality, labor

## 1. Introduction

To date, the process of certification of the labor quality is little a highly researchable topic. The problem seems to be quite multifaceted and open to improve the study of the workforce not only at the intergovernmental and intrastate levels, but also in the conditions of functioning of the cross-border area of the regions [1]. In our opinion, identification of the competence components of a person used in a targeted mechanism of state regulation should be implemented in the considered process. This mechanism of state regulation contributes to the effectiveness of the functioning of the labor market on a federal and regional cluster scales [2].

We propose to understand the workforce quality as the personal set of competences of an individual, which is determined by the level of professional qualification readiness for the activity and the state that drives it to perform the required work functions. These functions are necessary for a person to successfully fulfill certain professional duties [3]. Competence is the ability of an individual to make established decisions, as well as the desire for a particular type of activity, from which his ability to implement knowledge and skills to implement effective work activities in a particular professional environment [4].

## 2. Approaches

We turn to the European and U.S. experience of trying to certify the workforce. On the territory of the European Union (EU), a “europass” is used. It is believed that it is intended to provide a clear understanding of the skills and qualifications of the people throughout Europe. Europass includes a

package of documents developed at the European level and ensures the free movement of both working and studying EU citizens throughout the continent.

A CV is included in the list of these documents. A CV (curriculum vitae, or “the course of life”) is a standard template that allows one to get an idea of the existing education, professional experience, and skills of a person [5]. A portfolio (or a passport) of a professional career is issued to all graduates of higher vocational education establishments in the USA. An individual portfolio of official documents reflects the knowledge and skills of a student, which may be in demand on the labor market. The main purpose of the American passport of a career is similar to the functional target component of the europass [6].

Based on the study of foreign experience, attempts to formalize the process of certification of the workforce quality, we conclude that:

- First, the subjective competence-based definition of an individual is largely present, which does not contribute to the formation of a high level of quality of the workforce;
- Second, with a high degree of probability, the correspondence between the formalized competence set contained in the package of the above documents and the demanding competence set established by a specific employer (production) is excluded;
- Third, there is no intelligible idea of the existence of the information environment in the process of certification of the quality of the workforce.

The development strategy of the electronics industry in Russia for the period up to 2025 suggests that the expansion of the depth of penetration of nanoelectronics into the everyday life of the population should be implemented through the introduction of nanotechnology. It is understood that nanoelectronics will be able to integrate with biological objects and, as a result, maintain constant monitoring in matters of their livelihoods, improving the quality of life indicators. It will reduce social government spending. The extensive distribution of the embedded nanoelectronic wireless devices that would ensure the continuous contact of an individual with his intellectual environment is believed to be real [7]. Based on this, we can assume the development of such a phenomenon as the socio-economic identification of a person.

In a practical approach, the implementation of certification of the quality of the workforce requires the creation of an information environment with a specialized infrastructure and appropriate social and organizational mechanisms. In them, the competence is present in the format of the identification unit of the personal, professional, qualification quality characteristics of the individual [8]. First of all, this aspect must be taken into account at the initial stages of developing and implementing the necessary design decisions regarding the process under consideration at regional labor market sites. As the mentioned measures will allow to fully form and test one of the most important tools for sustainable socio-economic development, the regional cross-border certification of the quality of the workforce. This tool will contribute to the development of standardization of labor space, increasing the efficiency of economic relations of the region.

### **3. Results**

The process of the certification of the workforce quality in the functioning of cross-border regions should be considered as an instrument of polyhedral (multifaceted) formation. This tool establishes in its existence a heterogeneous communicative socio-economic feature of territorial interaction. In view of the foregoing, the authors developed the invariant (immutable) design parts of the structure of the passport of the position, profession, and directly the quality of the workforce, shown in Tables 1-3.

On the basis of the developed invariant design parts of the structure of the passport of the workforce quality, we formulated its definition – a formalized source of identification of a person in the labor process, containing his personal and competence identifiers. And the process of certification of the workforce quality is the implementation of a system aimed at a high-quality identification of an individual with his set of competences.

**Table 1.** The invariant part of the structure of the post passport.

Section wording	Content
Job title	Position wording according to the uniform qualification reference book of managers, specialists, and employees.
General characteristics	Job category (performer / leader). A level (direction) of education (for example, higher-technical, secondary-economic, etc.). The list of specialties that allow compliance with the position. The minimum work experience in the required specialty (number of full years).
A set of competencies (with a score)	Competence set with listing of its elements (competencies) and fixing the value of the minimum allowable evaluation indicator.
Structural subdivision	Name of a structural unit. Position of a direct manager. Position of a substitute employee.
Job functions	The list of job functions coming from the established set of competencies.

**Table 2.** The invariant part of the structure of the passport profession.

Section wording	Content
State professional standards	Qualification characteristics necessary for a person in the labor process for the implementation of relevant professional activities.
A competency set	Competences formed on the basis of professional standards.
Evaluation indicators of the elements of the set of competencies	Required weights of the competencies under consideration as part of the corresponding set.
Labor functions	Labor actions due to certain skills and knowledge related to a specific skill level.

**Table 3.** The invariant part of the structure of the passport quality of workforce.

Section wording	Content
The main personal social identifiers of an individual	Full name, gender, age, level (direction) of education, available specialty, work experience.
Competency set	$\sum K_{\text{ЛП}}, \sum K_{\text{ЯП}}, \sum K_{\text{ЯК}}$ is the total composition of competencies of personal, professional, and qualifying specific content, respectively.
Evaluation indicators of the elements of the set of competencies	The weight values of competencies in the corresponding set, calculated on the basis of a specific method (for example, a hierarchy analysis method).
Regulatory support	The list of current state professional standards in the form of an electronic digital database, for comparison with the requirements recorded through the profession passport in job descriptions.

Mathematical interpretation of the process of comparison and interaction of competence sets of reviewed passports is presented in the form of corresponding economic and mathematical expressions (Tables 1-3).

$$F(t) = S_{KRS} = NK_{PKRS} \leq ; \geq NK_{PD} \quad (1)$$

$$NK_{PP} \rightarrow (NK_{PKRS})_{KV} = NK_{PKRS} + V - S_{KRS} \quad (2)$$

$$NK_{PP} \rightarrow (NK_{PD})_{KV} = NK_{PD} + V - S_{KRS} \quad (3)$$

where, in the implementation of (1) and (2), the need to maintain an appropriate sequence of simulated process actions is implied;  $S_{KRS}$  is a function of time dependence (since the process flow is dynamic), which determines the value when comparing competence sets;  $NK_{PKRS}$  is a set of competencies that exists in the passport quality of workforce;  $NK_{PD}$  is a set of competencies that exists in the passport of the position;  $NK_{PP}$  is a set of competencies that exists in the passport of the profession; the “→” sign indicates the direction of the corrective action of the competence mix;  $(NK_{PKRS})_{KV} - NK_{PKRS}$  – the values obtained as a result of corrective action;  $(NK_{PD})_{KV} - NK_{PD} - the$  – a value as a result of corrective action; the expression “+ V -” implies the presence of variability (disjunction) in the implementation of the corrective action of the elements of the competence set.

#### 4. Discussion

From the analysis of multidirectional scientific, legal, mass information sources, we believe that today, in the state projection, as well as in the cross-border regional space, there are no results of the functioning of the passport system regarding the workforce quality.

In this regard, we propose to follow the path of an analogy with the implementation of the existing civil passport system, as well as various payment and control systems, taking into account the innovative component of digital solutions in the framework of the development of the information environment.

In our opinion, the passport of the workforce quality can be implemented in three basic versions, at least:

- First, in an integrated form with other sources of digital content identifiers (various official civil documents, plastic social cards, software applications for mobile electronic devices, etc.);
- Second, in an unambiguous separate representation, i.e. in the format of specialized devices designed exclusively for the implementation of the task under consideration (for example, in the form of chipped compact physical modules);
- Third, in biological and digital performance. Here the future high tech, due to the development of the information environment, is included.

In our opinion, the integrated and separate options remain one of the most preferred options for certifying the workforce quality. As we see it, this is due to the fact that the domestic sphere of information technologies is ready to give a full response to the implementation of the considered constructs.

#### 5. Conclusion

The development of organizational and informational mechanisms for identifying, processing (transforming), analyzing, and transferring (exchanging) identifiers of the labor quality the digital space leads to improvement and progressive dynamic formation of the information environment. These processes are moving towards sustainable socio-economic development regarding the functioning of cross-border regions. The competence approach allows to expand the boundaries of the known semantic content of the generally represented process of certification of the quality of an individual's workforce. This process reveals in its mission new elements of practical importance, when considering the peculiarities of the existence of human competencies in the labor process, as established units of information for modern socio-economic conditions.

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