



## Principles of harmonized training of specialists in the automotive industry of the Russian Federation and Finland

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### Abstract

*The territorial proximity of Finland and St. Petersburg in Russia, as well as the well-developed logistics and information infrastructure of both regions, are the forerunners of a cross-border ecosystem aimed at sharing best practices and developing innovative products. In creating an educational and entrepreneurial ecosystem, the principles of organizing the educational process, the possibility of free access to education markets, the mobility of students and labor and other opportunities for cooperation will be of particular importance. Education in the field of the automotive industry was chosen as a priority area for research.*

*Thus, the Russian-Finnish cross-border ecosystem of the automotive industry opens up wide opportunities for cooperation and improvement of educational programs in light of the demand for future specialists who develop a globally competitive product. Automotive trends such as globalization, automation, increased competition and increased complexity of control systems will lead to a significant shift in the labor market in the automotive industry.*

**Keywords:** *principles of educational process, industrial training of students, automotive industry, Finland, Russia*

The issue of harmonization of education received special attention in the context of the Bologna process, the main goal of which was the formation of unified systems of higher education standards for the member-countries of the treaty [1]. The process of unification of higher education in Europe began with the signing the Bologna Declaration in 1999. The ratification of the Declaration became one of the fundamental stages of establishing the global educational environment [2].

One of the stages in adaptation the unified educational system was the formation of cross-border universities (CBUs), representing cooperation from two or more international universities. Cooperation within the framework of transnational cooperation presupposed the possibility of free exchange of knowledges and innovations. Thus, Russia, which entered the Bologna Process, in 2003 implemented ten CBU programs in cooperation with Finland [3]. Moreover, in 2005-2009 the first programs of academic mobility for students (Finnish – Russian Student Exchange Programs) were implemented between Finland and Russia, the purpose of which were to focus on gaining practical work experience in enterprises [4].

Currently, practice-oriented training programs are becoming the most relevant in connection with digitalization, adaptation to which requires continuous training of specialists (life-long learning). In particular, as one of the fastest growing industries can be considered the automotive industry. Companies, vocational schools and universities train and retrain engineers to provide additional qualifications to employees in the automotive sector [5]. Ikävalko M. (2013) also mentions the growing role of training specialists in different industries, considering the development of Finnish-Russian business clusters such as IT, forestry, energy, tourism, etc. Thus, the issue of internal training of specialists is accompanied by increasing interest not only from industries but also from academics. Despite the fact that the harmonization of educational processes in the automotive sector has not yet been described in the scientific literature, there are a number of cross-border alliances of the automotive industry that synchronize not only technical standards, but also training methods in educating specialists [7].

Harmonization of education is a process of international cooperation in the field of education and the creation of "industry knowledge". This process, provided that it is based on the initially defined conditions of comfortable international mobility, the possibility of cross-employment, underlies the creation and development of industry clusters on the territory of neighboring states. The process is also aimed at creating a common mutually enriching educational space, taking into account the characteristics and differences of education systems. The search for a mutually satisfying model of interaction often lies on a fairly well-conducted preliminary analysis of the potential of the territories and the search for the principles of harmonization most suitable for both sides.



The elaboration of general principles, in the subsequent ones, which form the basis for the management of the "harmonization" process, are carried out in the following areas:

- comparability of degrees, diplomas and qualifications frameworks,
- quality assurance,
- creation of lifelong learning systems,
- credit transfer systems, etc. [8].

Building a coherent model in these guidelines will enable international student mobility, creating an opportunity for lifelong learning, integrating talent into the manufacturing sector, and, in the long term, strengthening the regional economies of both countries [9].

Regional integration is a powerful economic lever, since by concentrating the potential of two or more territories, industry and education, it provides access to opportunities for competition and cooperation on an international scale with large, already entrenched players. As a social or cultural lever, regional action fosters solidarity among nations with similar cultural and historical roots. Thus, the regionalization of education looks different depending on the aspects, actors and values involved in this process.

Among the key benefits, the team of authors highlights the following: increasing mobility, expanding access and choice of forms and methods of education, academic and research cooperation, accelerating the life cycle of new technical and technological solutions, strengthening cooperation in the field of investment in human capital in a rapidly changing global education landscape.

The most common and proven forms of harmonization:

1. Students from different countries study in other countries for at least a year.
2. Students in different places are offered the same quality of education regardless of educational institution.
3. Graduates from one country are hired by the employment sector in other countries.
4. Multinational workplace.
5. Close cooperation between teachers in the creation and development of new knowledge.
6. Close cooperation between education and industrial partner.

The implementation of the harmonization of education is fraught with difficulties. It is necessary to determine the following factors that play an essential role in the process of harmonization of educational programs:

- difference of cultures;
- content and composition of training programs;
- curriculum consistency;
- teaching / learning methodologies and traditions appropriate to each institution;
- assessment methods;
- organization of the learning process.

Considering the internal and external circumstances and conditions, it is necessary to find a reasonable balance for each program in terms of the above factors.

There is also a difference in the difficulty of learning. Since Russia is a participant in the Bologna process, the credit system in Russia is comparable to the ECTS (European Credit Transfer System, ECTS) credit system. One ECTS is equivalent to approximately 27 astronomical or 36 academic hours of work [9].

In Finland, credits measure the amount of work required for each course in relation to the total amount of work required to obtain a full academic degree, not in relation to the workload for a full academic year [10]. Differences in curriculum and non-workload determine the number of years of study, while in Russia the period of study is regulated by the federal state standard (FSSES). These differences must also be taken into account when harmonizing training programs.

Finland has national standards. The Finnish educational management system differs from the Russian one in that it depends on the role of educational institutions in setting actual learning goals. Finnish national laws and educational regulations enable counties to independently develop their own curriculum. In practice, districts delegate this responsibility to educational institutions.

The total labor intensity of educational programs for different levels of education in Russia and Finland is shown in the table 1.



Level of education	Total labor intensity of educational programs, term	
	Russia	Finland
College	120ZET (1 year) or 180 ZET or (2 years) 240 ZET (3 years)	180 credits
Bachelor	Undergraduate 240 ZET (4 years)	210-270 credits (from 3 to 4.5 years)
Master	120 ZET (2 years)	90 credits (2 years)
Specialty	(training program)— 300 ZET (5 years)	-

Table 1. Labor intensity of educational programs for different levels of education in Russia and Finland. Compiled on the basis of the source [11]

Another aspect of harmonization, in addition to assessing the labor intensity of educational programs, is the problem of the difference in the system of assessing knowledge, the level of mastering competencies. Comparison of the grading system on the example of higher education is shown in the table 2.

Finnish scale	ECTS scale	Explanation	Russian scale		Explanation
5	A	Erinomainen/ Excellent	85-100	5	Excellent
4	B	Erittäin hyvä / Very Good	70-85	4	Good
3	C	Hyvä / Good	55-70	3	Satisfactory
2	D	Tyydyttävä / Satisfactory	0-55	2	Unsatisfactory, need to take it again
1	E	Välttävä / Enough			
HYV.	Pass	There is no grading scale, in other words, the course is graded only on a pass / fail basis and cannot be awarded. This is mainly used for courses that only require sufficient participation in the class.			
HYL.	F	Fail (F) / Hylätty (Hyl) = additional work is required before a loan can be granted			

Table 2. Comparison of the grading system on the example of higher education. Compiled on the basis of the source [11]

Education is necessary to train a specialist at the request of the industry. Russia has a system of professional standards that defines a list of labor activities and requirements for knowledge and experience. As a rule, such a standard provides for 9 skill levels. The EQF standard applied in Finland is an 8-level learning outcomes framework for all types of qualifications, which serves as a translation tool between different national qualifications frameworks. The EQF was adopted by the European Parliament and the Council in April 2008. Since 2012, all new European qualifications have sited the appropriate EQF level.

The EQF consists of eight (8) levels. Each level of the European Qualification Framework is defined by a set of descriptors (knowledge, skills and competences) that describe learning outcomes for all qualifications at this level. Therefore, the qualifications when combined in various ways can cover a wide range of learning outcomes, including theory, practical and technical skills and social competences where the ability to work with others is of fundamental importance. Skill levels on the example of Automotive Industry in Russia and Finland is shown in the table 3.



		The Integrated Group for the Automotive Industry in Russia						Levels of the EQF	Higher Education Programs in Finland
		The Integrated Group 23.00.00	Number of programs/number of universities in the NWFD	The Integrated Group 13.00.00	Number of programs/number of universities in the NWFD	The Integrated Group 15.00.00	Number of programs/number of universities in the NWFD		
<b>Degree Programs</b>	<u>Vocational Training Programs</u>	23.01.03	1 program/10 institutions	Not implemented		Not implemented		Level 4: Completed vocational and professional training	
		23.01.08	1 program / 1 institutions						
		23.01.17							
		23.02.02							
		23.02.03							
		23.02.05							
	23.02.07								
	<u>Bachelor's programs</u>	23.03.01	1 program / 1 university	13.03.02	1 program / 1 university	Not implemented	Not implemented	Level 6: Higher education	Graduate
		23.03.02	2 programs / 1 university	13.03.03	1 program / 1 university				
	<u>Master's programs</u>	23.04.02	1 program / 1 university	Not implemented		15.04.05	1 program / 1 university	Level 7 Master's level	Graduate
		23.04.03	2 programs / 1 university						
	<u>Specialist's programs</u>	23.05.01	1 program / 3 university	Not implemented		Not implemented	Not implemented	Level 6: Higher education	Do not prepare

Table 3. Skill levels on the example of Automotive Industry in Russia and Finland.

In the Russian Federation, the employers are required to go by these professional standards, because each particular employee has to adhere to certain qualification requirements to do a particular job. The term professional standard first appeared in the Labor Code in 2012. Standard 31 was developed for and applies to the automotive industry.

Secondary vocational education for the automotive industry in Finland is provided by the education program Professional Qualifications in the Automotive Sector (Code 351301) that awards six qualifications.

Qualification (certificate) levels:

- National Qualifications Framework (nqf) 4
- European Qualifications Framework (eqf) 4

The main qualifications are the following: competence area in vehicle technology (vehicle mechanic); competence area in vehicle body repair (vehicle body repairer); competence area in vehicle painting (vehicle painter); competence area in car sales (car salesperson); competence area in parts sales (parts salesperson); competence area in small motor machinery repairs (small machinery mechanic).



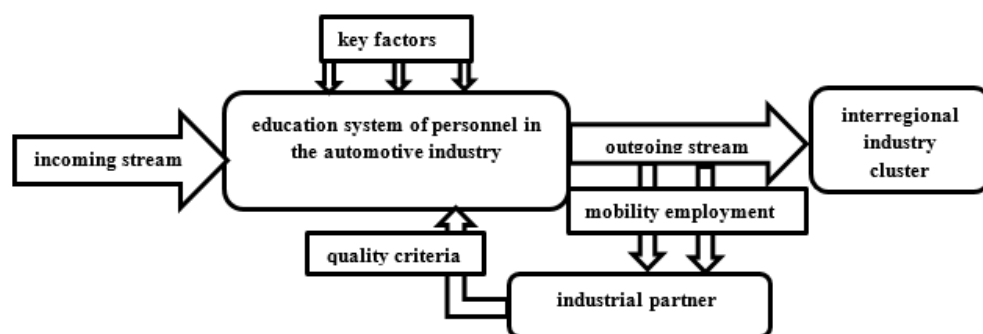


Fig 1. The harmonization model of educational programs

The basic competences are the following: maintenance and repair; electric equipment performance measurement and repair; tyre service; hydraulic and pneumatic system repair; accessory and consumable sales; spare part and inventory management; warehouse management; business planning; work-place instructor training; vehicle painting; communication and interaction skills; skills and knowledge in mathematics and science (applied mathematics, physics, chemistry, etc.); social skills and work experience, etc.

With the harmonization of educational programs, the debt quality will be ensured if the model takes into account the requirements of the industry specifics and provides the possibility of subsequent employment. This process of integration of interests becomes a platform, a growth point for the formation of an interregional industry cluster.

## Conclusion

As the technological process develops, it is necessary to resolve the issue of producing qualified personnel. This process is being carried out in the context of a significant change in the requirements for competencies, which determines the need to build new interregional education models that take into account the industry specifics and the request of industrial partners. The existing difference in educational and professional standards of Russia and Finland requires harmonization and agreement based on the description of the current procedures and requirements and the definition of the principles of harmonization.

Among the key principles in the study, the following are highlighted: the coordination of the content of disciplines, taking into account the industry specifics, the possibility of cross-border employment, the coordination of the assessment system of professional and educational modules. Speaking about Russian vocational training programs, it is worth mentioning the growing demand for advanced professional qualifications, which are not fully covered by existing vocational training programs.

Thus, the Russian-Finnish cross-border ecosystem of the automotive industry opens up wide opportunities for cooperation and improvement of educational programs in light of the demand for future specialists who develop a globally competitive product. Automotive trends such as globalization, automation, increased competition and increased complexity of control systems will lead to a significant shift in the labor market in the automotive industry.

## References

- [1] Zgaga P. The Bologna Process and its role for transition countries //Revista de la educación superior. – 2009. – T. 38. – №. 150. – C. 83-95.
- [2] Gonçalves M. J. A., Rocha Á., Cota M. P. Information management model for competencies and learning outcomes in an educational context //Information Systems Frontiers. – 2016. – T. 18. – №. 6. – C. 1051-1061.
- [3] Kallo J., Semchenko A. Translation of the UNESCO/OECD guidelines for quality provision in cross-border higher education into local policy contexts: a comparative study of Finland and Russia //Quality in HigHer education. – 2016. – T. 22. – №. 1. – C. 20-35.
- [4] Hopia H. et al. Exchanging expertise, theory and practice at Master's level healthcare education between Russia and Finland—experiences from an intensive course in St. Petersburg //Nurse education in practice. – 2011. – T. 11. – №. 1. – C. 14-19.
- [5] Ikävalko M., Rekord S. Studies of developing Finnish-Russian Business Clusters: Joint project of Finnish and Russian Master Students. – 2013.



- [6] Report: European Sector Skills Council - Automotive Industry, 2016. [http://ec.europa.eu/growth/sectors/automotive/policy-strategy/index\\_en.htm](http://ec.europa.eu/growth/sectors/automotive/policy-strategy/index_en.htm)
- [7] Shiroyama H. The harmonization of automobile environmental standards between Japan, the United States and Europe: the 'Depoliticizing strategy' by industry and the dynamics between firms and governments in a transnational context // *The Pacific Review*. – 2007. – T. 20. – №. 3. – C. 351-370.
- [8] I.A. Fedorova, Comparative Analysis of National Qualification Frameworks in Russian and EU Higher Education // *Omsk Science Journal*. 2010. No 2(86). p.143-147.
- [9] ECTS Credit System [Electronic resource]. - URL: <https://www.univaasa.fi/en/for/student/living/ects/>
- [10] The system of higher education in the Scandinavian countries on the example of Finland and Denmark: the Bologna context. [Electronic resource]. - URL: <https://articlekz.com/article/19011>
- [11] Sazonov BA Guidelines for the use of credit units in the design and implementation of OOP // Portal of Federal State Educational Standards. Federal Institute for the Development of Education. [Electronic resource]. - URL: <http://fgosvo.ru/uploadfiles/npo/20120511201121.pdf>
- [12] W. Maier, Education in the Integrated European Area: The European Qualifications Framework and National Qualification Systems // *Bulletin of the Volga Region Academy for Civil Service*. 2010. No 24. p.131-135.
- [13] N.M. Aksenova, International Practices of National Qualification System Development // *Education and Science*. 2014. No 5(114). p.23-33
- [14] V.I. Skorobogatova, Methodological Bases of National Qualifications Framework Formation in Russia // *Statistics and Economics*. 2014. No 6(2). p. 249-255.
- [15] Official Website UniPage [Electronic resource]. - URL: [https://www.unipage.net/ru/universities?country\\_id%5B0%5D=70&per-page=10](https://www.unipage.net/ru/universities?country_id%5B0%5D=70&per-page=10)
- [16] The Official Website of South-Eastern Finland University of Applied Sciences. [Electronic resource]. - URL: <https://www.xamk.fi/xamk/>
- [17] The Official Website of JAMK University of Applied Sciences. [Electronic resource]. - URL: <https://www.jamk.fi>