Professional Qualifications’ Recognition and Megascience Projects

T S Zaplatina
Kutafin Moscow State Law University (MSAL), Moscow, 125993, Russian Federation
tatianazaplatina@yandex.ru

Abstract. The article is devoted to the analyzes of the issues of legal regulation of mutual recognition of professional qualifications in the context of increasing cross-border scientific cooperation, the emergence of new forms of cooperation and exchange of workforce, in particular in the framework of megascience class projects i.e. great science. The EU was the first integrational organization among the other organizations existing in Europe and the world that recognized the need to develop special legal mechanisms to ensure cross-border mobility of qualified specialists, and also adopted acts to conduct research within megascience (both at the EU and individual states level). The participation of scientists from various countries in megascience projects involves the integration of states not only to create structural units (cross-border associations) for the implementation of large-scale research, but also the integration of the economic and educational space, free movement of scientists.

1. Introduction
In conditions of growing cross-border scientific cooperation, emerging of new forms of cooperation and exchanging of workforce, the role of qualified scientific workforce has great importance. The importance of this process should be emphasized in the framework of the integration of states in the field of education, conducting cross-border scientific research, and the development of large-scale scientific projects. The state integration development in the field of education or educational integration [1] has given rise to the expansion of various forms of cooperation in this field. The large research infrastructures are important feature of public life. Such infrastructures are called megascience i.e. great science. The large-scale nature of megascience objects that distinguishes them from other research infrastructures is expressed primarily in the scale of the objects of research, in terms of the complexity of their creation, the complexity of operation, as well as the exchange of workforce in the process of research exercising [2].

Considering the issue of personnel exchange in the framework of large-scale research, it is necessary to focus not only on conducting the research in the framework of megascience, but also on legal regulation of professional qualifications recognition. It should be noted that there are varieties of megascience legal organization, the first one is through the conclusion of an international treaty. In this case, an international treaty secures the relevant constituent documents of a legal entity. The second method is without concluding an international treaty. In this case, the scientific organizations of the participating states approve the constituent documents of a legal entity within the framework of the institutional and financial autonomy provided to them by their states. In the third case, an
international treaty commits the development of the constituent documents of a legal entity to authorized scientific organizations of the member states. So, the integration of states in the field of megascience is implemented in the international legal form, in the form for transnational and supranational legal entities, in the form of European consortia. In this regard, it is appropriate to consider the exchange of workforce in such a supranational structure as the European Union (EU), as well as the process of conducting research in the framework of megascience.

2. Mutual recognition of professional qualifications

2.1. European Union legislation

The EU was the first integrational organization among the other organizations existing in Europe and the world that recognized the need to develop special legal mechanisms to ensure cross-border mobility of qualified specialists, and also adopted acts to conduct research within megascience (both at the EU and individual states level).

The main act establishing regimens of professional qualification recognition in the EU is the Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications [6] (hereinafter the Directive 2005/36/EC) amended by the Directive 2013/55/EU of the European Parliament and of the Council of 20 November 2013 amending Directive 2005/36/EC on the recognition of professional qualifications and Regulation (EU) No 1024/2012 on administrative cooperation through the Internal Market Information System [7]. This act establishes a general (non-automatic) and automatic mode (regimen) of professional recognition.

The general regimen of professional recognition is based on the recognition of educational documents and professional experience. In accordance with art. 12 of the Directive 2005/36 / EC, education documents must indicate the successful completion of studies in one of the EU Member States in the framework of the official programs that are recognized as equivalent to the programs of the host state. This non-automatic regimen provides EU citizens with the appropriate regulated profession to exercise the right practicing their own activities in one of the EU Member States if this profession meets the criteria defined in Directive 2005/36/EC. In order to ensure that the qualifications of the EU citizens are considered equivalent in the EU, Directive 2005/36 / EC has established rules that promote the mutual recognition of professional qualifications. Such rules constitute the general regimen for the mutual recognition of professional qualifications.

The automatic recognition of professional qualifications is based on coordination of minimum training conditions. This mode is set by chap. III of the Directive 2005/36 / EC and applies to the professions where the minimum training conditions have been set at the EU level: doctors of medicine, nurses, dental practitioners, veterinary surgeons, midwives, pharmacist and architect. In addition to the requirements for skills and competencies (material requirements) and the establishment of the lists of documents to be recognized (formal requirements), Directive 2005/36 / EC establishes the necessary conditions for the duration of training for these professions and the conditions for its implementation.

2.2. Case law

Regarding the necessary training conditions for the professions recognizing automatically according to the Directive 2005/36 / EC, the EU Court of Justice in the Hannes Preindl [11] case specified that “recognition of evidence of formal qualifications, including a degree in medicine with basic training and a degree in dentistry, is automatic and unconditional, in that it obliges Member States to accept the equivalence of evidence of formal qualifications covered by Directive 2005/36 and cannot require the persons concerned to comply with requirements other than those laid down by that directive. That recognition is based on the Member States’ mutual trust in the adequacy of the evidence of formal qualifications issued by other Member States, such trust being based on a training system the standards of which were determined by mutual agreement”. Thus, Member State whose requiring in the legislation full-time study and prohibiting admission to two courses has to automatically recognize a certificate of formal qualification falling within the scope of the Directive 2005/36 / EC.
Establishing the principle of mutual recognition of professional qualifications and the regimens of this recognition, the EU facilitates the exchange of employment or self-employment qualified specialists on its territory. The qualified specialists mobility, the involvement of scientists from various countries are an important criterion for large-scale research.

3. Institut Laue-Langevin as one of the forms of megascience institutions

3.1. Collaborating Research Groups (CRGs)
Institut Laue-Langevin (ILL) as an international research centre based in Grenoble, France there is a possibility to create provides a framework in which Collaborating Research Groups (CRGs) can build and manage instruments on ILL beamlines to carry out their own research programmes. CRGs represent a particularly successful form of long-term international scientific collaboration.

CRGs are composed of scientists from one or two research disciplines, and often multinational, carrying out a joint research programme centred around a specific instrument. CRGs build and manage their own private instruments on ILL beamlines to carry out their own research programmes. They enjoy exclusive access to these instruments for at least half of the beamtime available.

The CRGs provide their own scientific and technical support and cover the general operating costs of these instruments. If there is demand from the user community and the resources are available, the beamtime reserved for ILL can be made accessible to users via the subcommittees.

There are currently three different categories of CRG instrument:

- CRG-A category: the external group leases an instrument owned by ILL. They have access to 50% of the beamtime; for the remaining 50% the instrument is made available for the ILL’s scientific user programme;
- CRG-B category: the external group owns its instrument and retains 70% of the available beamtime, supporting the ILL programme for the other 30%;
- CRG-C category: the instrument is used full time for specific research programmes by the external group, which has exclusive use of the beam [4].

3.2. Institut Laue-Langevin
ILL operates the most intense steady state neutron sources in the world, feeding beams of neutrons to a suite of 40 high performance instruments that are continually upgraded. The European Photon and Neutron (epn) science campus is an international science hub, host to the Institute Laue Langevin, the European Synchrotron Radiation Facility (ESRF) and an outstation of the European Molecular Biology Laboratory (EMBL). These major European institutes carry out groundbreaking experiments at the very frontier of research spanning structural biology, fundamental physics, material science and environmental studies. To maintain their world-leading status, these institutes build synergies and scientific partnerships at every level; new support facilities set up in the past few years include the Partnership for Structural Biology, the Materials Science Support Laboratory, and the Partnership for Soft-Condensed Matter [15].

The physicists Max von Laue and Paul Langevin, the ILL was founded in 1967 by France and Germany, with the United Kingdom becoming the third major partner in 1973. These partner states provide, through Research Councils, the bulk of its funding. Ten other countries have since become partners.

Scientists of institutions in the member states may apply to use the ILL facilities, and may invite scientists from other countries to participate. Experimental time is allocated by a scientific council involving ILL users. The use of the facility and travel costs for researchers are paid for by the institute. Commercial use, for which a fee is charged, is not subject to the scientific council review process. Over 750 experiments are completed every year, in fields including magnetism, superconductivity, materials engineering, and the study of liquids, colloids and biological substances.

Whilst some are working on engine designs, fuels, plastics and household products, others are looking at biological processes at cellular and molecular level. Still others may be elucidating the
physics that could contribute to the electronic devices of the future. The ILL also collaborates closely and at different levels of confidentiality with the R&D departments of industrial enterprises. All the scientists at the ILL - chemists, physicists, biologists, crystallographers, specialists in magnetism and nuclear physics - are also experts in neutron research and technology and their combined know-how is made available to the scientific community.

The ILL is governed by its Associates, the founding countries: France, Germany and United Kingdom in association with its Scientific Member countries (listed below by chronological order of accession): Spain, Switzerland, Austria, Italy, Czech Republic, Sweden, Belgium, Slovakia, Poland and Denmark.

The ILL shares its site, the “epn science campus”, with other institutions including the European Synchrotron Radiation Facility (ESRF) and the European Molecular Biology Laboratory (EMBL) and the Unit for Viral Host Cell Interactions (UVHCI). The French Institut de Biologie Structurale (IBS) has joined the campus in 2013.

3.3. Institut Laue-Langevin Cooperation Models

The ILL’s Industry group provides a single and specialised point of contact. Industrial clients may choose specific modes of access, depending on the level of confidentiality they require:

1. Proprietary research. This is an option providing rapid access to the instruments on a commercial basis. This solution is ideal for tight timeline projects. The ILL and its staff observe the strictest confidentiality as regards all information received from or communicated to our industrial clients. The intellectual property rights for the commercial exploitation of the results remain with the client and there is no obligation to publish. ILL’s round-the-clock technical support is guaranteed. Basic rates can be obtained on request.

2. Cooperative solutions for industry. This is a combination of proprietary and academic access - an option ensuring that the finest academic research matches the requirements of industrial innovation. The resources invested by the partners vary with the characteristics of the project, as do the level of access to the facilities and the distribution of IPR income.

3. Academic research services. This is ILL’s principal activity. The clients may also access beamtime through the six-monthly peer-review selection rounds. This implies an obligation to report to the ILL and to publish the results in a scientific journal [12].

There are different ways of submitting a proposal to the ILL:

1. External peer review:
   - Standard. Standard applications for beamtime should be submitted electronically using Electronic Proposal Submission system (EPS), via the ILL User Club. Proposals can be submitted all year, with deadlines in February and September. If user is new to ILL it is advisable to register as a new user via the User Club to have access to the EPS system [10].
   - BAGs. Block Allocation Group (BAG) proposals can be submitted by groups of at least three teams (maximum of eight), preferably including teams with previous ILL experience. Each BAG should have a nominated coordinator.
     The subcommittee may add or remove groups or change the size of the block allocations. The scheduling of BAG beamtime is grouped, allowing greater flexibility in the choice of projects and samples to be studied at a given time.
     BAG proposals will be evaluated for one-year period (two scheduling periods); they can be renewed for another term (additional one year) through the normal proposal procedure [3].
   - D-Lab. The deuteration, partial or full, of biological molecules, proteins, nucleic acids, lipids, sugars, is essential to exploit fully the techniques of neutron scattering. As part of its strategy for the expansion of the life sciences program in neutron scattering the ILL, in collaboration with EMBL, has set up a laboratory for the deuteration of biological molecules. A molecular biologist experienced in macromolecular deuteration runs this laboratory, which is located in the new PSB laboratory complex. A major EU grant is coordinated by ILL with collaborators from EMBL Grenoble, Institut de Biologie Structurale (IBS), the Max Planck Institute in
Munich, Oxford University and EMBL Heidelberg. The aim of this grant is to develop deuteration protocols and procedures both for neutron scattering and NMR studies. A UK (EPSRC)-funded consortium led by Keele University includes collaborators from Oxford, Glasgow, Cambridge, Reading, Portsmouth, Southampton, King's College. This consortium is involved in the specific UK-driven project activity exploiting deuteration for neutron scattering and NMR [5].

2. Internal peer review:
   - DDT. 5% of ILL beam time is reserved for proposals that do not fall within the usual rules of proposal submission. Primarily these proposals concern urgent experiments that cannot wait for the twice-yearly proposal rounds. Proposals can be submitted at any time and they will be reviewed by the chair and relevant members of the proposal sub-committee concerned and the ILL science director. If successful, beam time will then be awarded on the requested instrument as soon as possible.
   DDT may also be used to award beam time to excellent proposals which do not satisfy the rule in which two-thirds of the proposers must come from ILL’s Associate and Scientific Member countries. These proposals can therefore be submitted by any team with an excellent idea for an experiment and this must be done through the usual proposal rounds so that the level of excellence can be judged by comparison with other proposals [8].
   - EASY. The Easy Access SYstem (EASY) grants diffraction beamtime to scientists from ILL member countries, who need a small amount of beamtime, to perform rapidly some measurements (not a full experiment). Access is open all year long, and it is not necessary to go through the ILL standard proposal round and consequent peer review system.
   The EASY route has been used to grant limited beamtime on the diffractometer D2B, for short measurements at room temperature. In 2018, EASY access will be extended to all instruments, except those in the NPP group, with an increased range of sample environments. EASY could, for example, be used for: testing samples, completing experiments and performing one-off measurements to contribute to publications [9].
   - LTP. ILL users from member countries may apply for long-term beamtime, by submitting a Long Term Proposal (LTP). Both ILL Scientific Council and the ILL management believe that LTP could be beneficial to the ILL community as a whole. The LTP scheme was introduced for the first time at the proposal deadline on 16 September 2008 and will be available once a year, on each Autumn deadline. LTP are granted to ILL users for projects that extend over several cycles if it can be demonstrated that they bring extra resources or capabilities that are of benefit to users in general. About 10% of the total available beamtime can be allocated to LTP.
   Scientific excellence is the primary criterion for the acceptance of such a Long-Term Proposal (LTP). Further criteria are:
   a) commitment from the proposing User group concerning the contribution of financial, technical and/or human resources during the implementation of the LTP.
   b) an identifiable benefit to the ILL User community (such as a new technique, a new instrument or new possibilities for an existing instrument) expected to result from the successful accomplishment of the goals for the LTP.
   Each LTP must be identified with a spokesperson, who should be affiliated to a scientific institution of an ILL member country [14].

3. No peer review:
   - TEST. TEST is the way of submitting a proposal to the ILL, this way isn't paid by ILL for travel and subsistence.
   - INDU. The ILL mission is to provide neutrons for both public and industrial research. Our Industrial Liaison and Consultancy Group (ILC) ensure rapid access and total confidentiality
to industrial companies and provide a specialised staff. All industrial research programmes are confidential and can be organized at short notice [13].

4. Conclusion
Based on the foregoing, it is advisable to conclude that the participation of scientists from various countries in megascience projects involves the integration of states not only to create structural units (cross-border associations) for the implementation of large-scale research, but also the integration of the economic and educational space, free movement of scientists.

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