

УДК 378-057.87(4)

DOI: 10.24144/2524-0609.2025.56.106-109

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## EUROPEAN PRACTICE OF EVALUATING THE EFFECTIVENESS OF RESEARCH ACTIVITIES

**Abstract.** Evaluating the effectiveness of research and scientific research activities of scientists is a topical issue nowadays. The importance of promoting responsible evaluation practices is emphasized, contributing to the improvement of the quality of scientific research, as well as recognizing of diversity of scientific results, activities, and goals. The purpose of the article is to study the European experience of evaluating the effectiveness of research and research activities of scientists. Research methods applied: analysis of scientific literature, systematization (to clarify the key concepts of research), comparative analysis (to identify the features of evaluating the effectiveness of scientific research and research activities of scientists), generalization (to form the author's conclusions). The main approaches to evaluating the research activities of scientists and studies are identified as following: economic, scientometric, problem-oriented, etc. Different systems of research evaluation in some European countries (Great Britain, the Netherlands, Norway, Sweden) are analyzed. It has been determined that a comprehensive assessment of the quality of research is carried out in a mixed format, which takes into account scientometric indicators and expert opinion. Intense global scientific competition and constantly increasing demands of educational and research institutions for high R&D performance compel researchers to adopt a functionally oriented and strategically balanced approach to planning their research and publication activities. This implies a clear understanding of the key research performance indicators that prevail in the modern scientific landscape, their evaluation criteria, and potential pathways for lifelong scientific and professional growth. Future research is to focus on identifying opportunities and strategies for implementing best practices from the European experience in assessing the research performance of academic staff in Ukraine.

**Keywords:** scientific research, research activity, European experience, higher education institutions, evaluation, effectiveness.

**Introduction.** International experience demonstrates that countries with developed economies pay considerable attention to the quality of scientific research and its social utility. States interested in preserving and strengthening their economic and foreign policy independence implement research and education policies by national interests. In particular, in the UK, Germany, and the Netherlands, scientific activity is considered an important factor of state authority. In Ukraine, the issue of increasing the efficiency of scientific research, developing clear criteria for evaluating the activities of scientists, scientific institutions and higher education institutions (HEI), as well as comprehensive reform of the system, including funding mechanisms, management and organization of labor relations in the field of science, has recently become particularly topical. The practice of evaluating the work of researchers based on the citation index of their publications in journals included in the international scientometric databases Web of Science and Scopus has become widespread.

**Analysis of recent research and publications.** The study of scientific sources demonstrates an increased

interest of domestic and foreign researchers in the problem of evaluation of research and development (R&D), in particular, research and teaching staff of HEI. In Ukrainian scientific thought this issue is studied by O.Budytska, V.Horovyi, I.Yegorov, A.Karpenko, E.Kukharchuk, K.Pavliuk, I.Revak, O.Shimon. Among foreign scientists this problem is studied by E.Archambault, A.Garzing, J.Glaser, E.Kahn, J.Oltersdorf and others. Despite the studies available on various aspects of this issue, in our opinion there is a lack of systematic scientific research on foreign experience in evaluating the performance of researchers.

The **purpose** of the article is to study the European practices of evaluating the effectiveness of the research activities of scientists. **Research methods:** analysis of scientific literature, systematization (clarification of the key concepts of the study), comparative analysis (determination of the peculiarities of the assessment of the effectiveness of scientific research and research activities of scientists), generalization (formulation of the author's conclusions).

**Results and discussion.** In Ukraine, the functioning

of the scientific sector is regulated by the Law of Ukraine «On Scientific and Scientific-Technical Activities». It states that the result of scientific activity is scientific knowledge obtained through fundamental and applied research and recorded on information carriers. The effectiveness of scientific research is assessed through the certification of scientific institutions and researchers.

The indicators are used to assess the innovative development of various sectors, including the scientific sector: statistical (number of research staff, development costs); scientometric (number of scientific publications, citation index) [1, p.52].

In 2000, European countries initiated the establishment of the European Research Area (ERA) to strengthen the competitiveness of the «pan-European institution of science», which became a key mechanism for implementing the Lisbon Strategy. This contributed to eliminating fragmentation in the European research system, creating a single market for R&D, and ensuring the free exchange of researchers, knowledge and innovation both within and outside the EU. Today, the main focus of the ERA is on reforming the foundations of the research infrastructure, strengthening cross-border scientific cooperation, increasing continental competition, and improving national research policies within the single European environment.

A summary of the national practice of evaluating the effectiveness of R&D activities has made it possible to identify different approaches that significantly affect the strategy of managing research activities in educational institutions and institutions that implement both educational and research activities [2]:

- *Economic* – the number of patents, certificates, number and qualifications of scientific staff, financial expenditures on research, labor productivity.

- *Macroeconomic* – growth in the productivity of production factors; changing the structure of the economy and exports to increase the share of high value-added activities; improving the country's ratings according to international research, etc.

- *Sectoral* – improving the quality of products and services, improving the living conditions of the population, reducing the burden on environmental systems.

- *Scientometric* – the number of scientific publications in significant periodicals and the citation index.

- *Problem-oriented* – the effectiveness of using scientific potential by the set goals.

- *Novelty approach* – novelty of the fundamental research result; scientific and technical level of applied research and development; socio-economic significance.

- *Significance for science and practice* – relevance of the issue; scale of the application of R&D results; socio-economic significance.

- *Objectivity* – fundamentally new research; improvement and modernization of existing technologies and products.

- *Evidence-based* – the theoretical validity of the decision; the degree of experimental verification of research results; the level of implementation.

- *Accuracy* – the results of research in the creation of existing models and samples of new technologies and which are included in innovation processes [1, p.53].

Domestic educational and research institutions have begun to implement an institutional and functional approach with elements of scientometrics. Scientific effectiveness implies a set of stable formal norms determining the interaction between two or more economic agents in an educational institution aimed to obtain scientific results. The structure of scientific effectiveness includes publications in domestic and

foreign journals, monographs, textbooks, conference abstracts, etc. Each achievement is awarded a certain number of points by its significance.

European countries have introduced performance-based research funding systems. Depending on the degree of focus on scientometric indicators in the process of evaluating R&D, countries can be divided into four groups:

Group 1 (UK, Italy, Lithuania, Portugal). The evaluation and allocation of funding takes place every few years and is based on peer review by independent experts in the field. Scientometrics is used as an additional source of information for the final decision.

Group 2 (Poland, Croatia, Czech Republic, Sweden). Funding is based on a number of indicators that characterize different types of R&D. At the same time, scientometric indicators are directly reflected in certain metrics that are defined annually and included in the funding formula.

Group 3 (Belgium, Denmark, Estonia, Norway, Slovakia, Finland). Similar to Group 2, however, certain aspects of the universities' goals and activities, not only research-related, are taken into account in some metrics. The focus on scientometrics is observed only in some indicators.

Group 4 (Austria, the Netherlands). Similar to Group 3, except for the complete absence of scientometric indicators in the evaluation process [3, p.2].

The main difference here is the approach to using scientometrics: as an additional source of information to support the conclusions of independent evaluation (countries in Group 1) or as the sole assessment source (countries in Groups 2 and 3). The choice depends on the two goals that countries pursue at the national level when conducting evaluation activities: assessing the level and quality of R&D or allocating funding [3]. In some cases, these objectives are inseparable from each other, while in others, one prevails over the other.

Let us examine how R&D results are assessed in European countries.

The UK is the most prominent example of Group 1. Since 1986, independent evaluations have been employed as a tool for distributing funding among universities and research institutions. Initially, selectivity in funding allocation was based purely on financial considerations. However, increasing restrictions on public funding and certain politically driven decisions in this area have led to greater accountability and selectivity in assessment processes, which brought the need to assess the quality of research conducted to the forefront. Currently, the UK has implemented the Research Excellence Framework [4], which is used to assess the effectiveness of research and development in a particular institution. The program incorporates the following key tools and criteria for assessing research performance:

1. Staff profile – the number of researchers engaged in scientific activities.

2. Research output – one article from each employee of the institution published during the year is taken into account (60% of the total assessment).

3. Case studies – an evaluation of research impact beyond the academic environment, with one case study required for every ten researchers (25% of the total assessment).

4. Research environment – assessment of institutional research strategy, researcher development initiatives, internal support mechanisms, commitment to equality and diversity, R&D-related revenue, and the number of doctoral degrees awarded (15% of the total assessment) [3; 4].

Publication activity is evaluated on a case-by-case

basis, regardless of the form (printed or electronic) or type of scientific work. The main criterion is the novelty and originality of the research [3; 4]. It is worth noting that the evaluation of R&D effectiveness in a specific HEI is carried out according to the proposed scales within each of the above tools. In 2021, five scales were used to assess the publications of researchers: unclassified article; nationally recognised article; internationally recognised article; internationally excellent article; world-leading key article [4].

The examination in the UK is differentiated, with experts considering the existing variability within and across scientific disciplines, differences in the speed at which research and researchers gain external and internal recognition, and various reputational factors. «It is noteworthy that the assessment covers a wide range of publication outputs: for example, in the social sciences and humanities, the list includes manuals, book chapters, monographs, scientific journals, published conference materials and reports, new technologies, software, codes and algorithms, standards, design and art portfolios, technical documents, databases, archives, and diagnostic tests validated through research» [4]. The UK approach in comprehensive research assessment – combining scientometric indicators with expert assessments – is highly valuable. However, this approach is labor-intensive and financially costly.

An example of a balanced approach between two methods of using and interpreting scientometric indicators can be seen in Group 2 countries. For example, Sweden has recently introduced Fokus, an assessment model similar to that of the UK, based on independent expert evaluation. However, this model is not currently used due to high financial costs and the desire of several universities to maintain institutional autonomy in the issue of assessing R&D. Some Sweden HEIs have decided to conduct self-assessments of R&D performance with the participation of an international expert group. Uppsala University implements the «Quality and Renewal» program aimed to analyze the conditions and processes underlying high-quality research and its strategically justified improvement [3, p.3].

Group 3 countries, in particular Norway, also adapt the British R&D assessment system, but they use it exclusively for resource allocation, not for funding distribution. The purpose of the evaluation procedure is to provide recommendations for improving research quality and efficiency. This, in turn, fosters greater transparency in funding allocation criteria, increases competition within public funding systems, strengthens accountability, and promotes institutional autonomy. Interestingly, the performance indicators used reflect not only scientific but also educational results. However, a complete replacement of evaluation indicators with expert assessments alone is not an option.

The Netherlands, which belongs to Group 4, also conducts research assessments. However, this process is carried out independently by universities and coordinated at the national level by the Standard Assessment Protocol. The government and universities agree that research performance indicators are not part of the evaluation and do not affect the distribution of funding.

These examples demonstrate that research assessment measures need to be considered separately in

each country's context. While research is international, funding is mostly provided at the national level with considering national specifics.

Researchers, universities, and research institutions constantly search for approaches that allow for the most objective and transparent assessment of their R&D results. This is an important aspect of the researcher's professional activity at a particular educational or scientific institution, as it often determines their career prospects, including the position they can apply for, the efficiency of the research unit, and the amount of funding allocated to it. To some extent, this issue is also a matter of values and ethics. From a technical point of view, the evaluation process is mainly reduced to discussions on the use of qualitative or quantitative indicators. The use of expert assessments allows for a qualitative assessment of the research, but, on the other hand, relying solely on subjective expert assessments is not completely reliable. Considering only quantitative indicators as objective measures is not always the best approach, as it leads to «gaming» the metrics and further distortion of real results [5]. This issue underscores the real need for responsible use of metrics today.

The search for the best ways to assess the research outcomes of scholars and scientific institutions has led to the development of the San Francisco Declaration on Research Assessment and the Leiden Manifesto for research metrics. The San Francisco Declaration, e.g., states as a general recommendation that journal metrics, such as the impact factor, should be avoided to assess the quality of individual research articles, the contribution of a particular researcher, or to make decisions on hiring, promotion, or research funding. It is advised to use a variety of metrics and indicators to evaluate the research itself, not the journal it is published in [6]. The Declaration is open for endorsement and further compliance by major stakeholders.

The Leiden Manifesto for research metrics also highlights the issue that «today, precise numbers rather than expert judgment have become the main thing, and there is a widespread misuse of indicators in assessing scientific performance. There is a strong misuse of scientometrics all over the world» [7]. The Manifesto outlines ten principles for assessing R&D based on scientometrics, with the most important ones focusing on the equal importance of qualitative expert evaluation alongside quantitative metrics and the need to account for disciplinary differences in publication and citation practices, assessing researchers' performance and impact.

**Conclusions.** Intense global scientific competition and constantly increasing demands of educational and research institutions for high R&D performance compel researchers to adopt a functionally oriented and strategically balanced approach to planning their research and publication activities. This implies a clear understanding of the key research performance indicators that prevail in the modern scientific landscape, their evaluation criteria, and potential pathways for lifelong scientific and professional growth. Future research is to focus on identifying opportunities and strategies for implementing best practices from the European experience in assessing the research performance of academic staff in Ukraine.

**Конфлікт інтересів.** Автори підтверджують відсутність фінансових, особистих чи інших інтересів, що можуть розглядатися як потенційний конфлікт інтересів щодо публікації цієї статті.

**Фінансування.** Робота виконана за відсутності фінансової підтримки з боку будь-яких організацій.

**Доступність даних.** Це теоретичне дослідження не передбачає використання додаткових наборів даних.

**Використання штучного інтелекту.** Інструменти штучного інтелекту не використовувалися при написанні цієї роботи.

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Статус статті:

Отримано: 14.03.2025 Прийнято: 19.04.2025 Опубліковано: 05.05.2025

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### ЄВРОПЕЙСЬКІ ПРАКТИКИ ОЦІНЮВАННЯ РЕЗУЛЬТАТИВНОСТІ НАУКОВО-ДОСЛІДНИЦЬКОЇ ДІЯЛЬНОСТІ

**Анотація.** Оцінювання результативності досліджень та науково-дослідницької діяльності вчених є актуальним питанням сьогодення. Мета статті – дослідити європейський досвід оцінювання результативності досліджень та науково-дослідницької діяльності вчених. Методи дослідження – аналіз наукової літератури, систематизація, компаративний аналіз, узагальнення. Виявлено основні підходи до оцінювання наукової діяльності вчених і досліджень: економічний, наукометричний, проблемно орієнтований тощо. Визначено, що оцінювання науково-дослідницької діяльності вчених у Великій Британії передбачає урахування їхньої публікаційної активності, визнання результатів їхніх досліджень у науковому середовищі. При оцінці результативності наукових досліджень використовуються такі критерії: чисельність працівників, які виконують наукові розвідки, їх ефективність, вплив досліджень на різні сфери поза академічним середовищем та на дослідницьке середовище закладу. У Швеції визначення рівня результативності наукової роботи дослідників здійснюється на основі самооцінювання закладу і залучення міжнародних експертів, що дає змогу отримати більш якісну оцінку виконаних досліджень. Метою проведення процедури оцінювання діяльності вчених у Норвегії є отримання рекомендацій щодо підвищення якості та ефективності досліджень, що суттєво мотивує до підвищення прозорості критеріїв оцінки, більшої відповідальності та збільшення рівня інституційної автономії. У Нідерландах застосовується система оцінювання досліджень, яка провадиться університетами самостійно і координується на національному рівні Стандартичним протоколом оцінки. Проаналізовано Сан-Франциську декларацію про оцінювання наукових досліджень і Лейденський маніфест щодо наукометрії. Встановлено, що всебічна оцінка якості наукових досліджень є ефективною за умови використання змішаного формату, що передбачає урахування як наукометричних показників, так і експертної думки.

**Ключові слова:** наукове дослідження, науково-дослідницька діяльність, європейський досвід, заклади вищої освіти, оцінювання, результативність.