FROM QUANTITY TO QUALITY: EVALUATING SCIENTIFIC WORK OF TERTIARY SCHOOL TEACHERS AND RESEARCHERS (CASE STUDY OF EUROPEAN COUNTRIES AND UKRAINE)

Iryna Izarova,[1]
Doctor of Law, Doctor of Science, Prof., Department of Justice
Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

irina.izarova@knu.ua
ORCID: 0000-0002-1909-7020

Oleksandr Bediukh,[2]
Ph.D., Senior Researcher, Research Department
Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

bediukh@knu.ua
ORCID: 0000-0001-6549-0897

Yuliia Hartman,[3]
PhD student, Department of Justice
Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

yuliia.hartman@knu.ua
ORCID: 0000-0002-5637-8358

Yuliia Baklazhenko,[4]
PhD (Pedagogics), Associate Professor, Department of Theory, Practice and Translation of the English Language
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine

yuliia.baklazhenko@gmail.com
ORCID: 0000-0002-9035-7737

Abstract. *The article is dedicated to analyzing modern approaches to evaluating the work of researchers in Europe, with a focus on qualitative indicators that serve as alternatives to traditional quantitative metrics. This research topic was selected in response to the growing number of discussions surrounding the challenges of evaluating scientific work, as well as the rise of initiatives being implemented by leading institutions and universities worldwide. The study examines the impact of initiatives such as the Leiden Manifesto, the San Francisco Declaration on Research Assessment (DORA) of 2012, the Hong Kong Principles, and the Open Science Career Evaluation Matrix (OS-CAM), as well as the European Research Area (ERA), on the development of new criteria for assessing scientific research.*

[1] Corresponding author, responsible for conceptualization, methodology, resources, investigation and writing – original draft.
[2] Co-author, responsible for data curation and formal analysis.
[3] Co-author, responsible for data curation, investigation and writing – original draft.
[4] Co-author, responsible for writing original draft, review and editing.

Special attention is given to the role of open science and inclusivity in evaluation processes. Additionally, examples of practices adopted by leading European universities and the potential for adapting these approaches in Ukraine are explored. The article emphasizes the importance and promise of qualitative evaluation of research activity, encouraging a shift away from conventional quantitative practices toward more meaningful and impactful assessment ***methods****. The empirical method was employed to collect and analyze relevant information, forming the foundation of the research. An analytical method was also used to identify the strengths and weaknesses of the proposed evaluation practices. Furthermore, a comparative method was applied to investigate the differences between the suggested practices and to assess the effectiveness of each one.* ***As a result of the study****, global and national trends in the evaluation of researchers' work were identified, and recommendations were developed for implementing best practices of qualitative evaluation in Ukraine's academic sphere. The findings can be useful for Ukrainian higher education institutions when introducing internal evaluation practices for academic staff, as well as for central executive authorities responsible for shaping state education policy and initiating relevant legislative changes.*

Keywords: *Evaluation of Tertiary School Teachers, Evaluation of Scientific Activity, Open Science, Research Integrity.*

1. INTRODUCTION

Teaching at tertiary school goes hand in hand with scientific research. Historically, universities have played the role of research centres and think tanks that produce innovative ideas, modern approaches and breakthrough achievements in science and research. According to the criteria set forth by National Agency for Higher Education Quality Assurance of Ukraine, developing research topic, publication in scholarly journals, obtaining a patent for invention are one of the criteria of licensing provisions of conducting educational activities. Professional Standard for Teachers at Tertiary School provides for a list of functions or professional competences of a tertiary school teacher that include, among others, conducting research projects, publishing their results and securing author’s rights.

It is obvious that teachers at tertiary school perform not only educational activities, but also are engaged in scientific work, that is one of the important parts of their workload. Although the pedagogical activity of teachers at tertiary school is in focus of many reseach fields, such as Pedagogy, Andragogics, Methodology, etc., their scientific work and especially its evaluation is still not discussed. In this article we address the problem of evaluating scientific work of university teachers and researchers in the context of European and Ukrainian practices.

For a long time, the idea of publishing in high-ranking journals helped interested bodies to evaluate the work of a scientist and encourage him or her to further activities. At the same time, this has led to the development of a "publish or perish" culture, within which the image of a scientist has been formed, accumulating quantitative indicators of publications, impact factors, and other rankings that often do not reflect the real value of his or her work for science.

In general, negatively assessing the negligent attitude to scientific research and imitation of scientific results, as well as realizing the negative consequences of the introduction of an evaluation system based on quantitative indicators of scientific work, this article examines the latest attempts of European universities and organizations to form new approaches to evaluating the work of scientists based on qualitative indicators, such as innovation, impact on society, interdisciplinarity of research, promotion of interdisciplinary and international collaboration, the long-term impact of research, the openness of science, and the role in mentoring and teaching.

The article consistently examines new approaches to evaluating the work of scientists in different areas: 1) Global and European initiatives; 2) Assessing Research Activity at Universities, 3) Ukrainian Context of Evaluating Scientific Work of University Teachers and Professors. Conclusions of this article summarize several recommendations for improving the procedure for evaluating the work of tertiary school teachers and professors in Ukraine.

2. METHODS

This study employs a combination of empirical, analytical, and comparative methods to explore modern approaches to evaluating the work of researchers in Europe, with a focus on qualitative indicators that serve as alternatives to traditional quantitative metrics.

The empirical method was used to collect and analyze relevant data from various sources, including scientific publications, reports, and policy documents related to research evaluation. Key initiatives such as the Leiden Manifesto, the San Francisco Declaration on Research Assessment (DORA), the Hong Kong Principles, and the Open Science Career Evaluation Matrix (OS-CAM), Coalition for Advancing Research Assessment (CoARA) were examined. The European Research Area (ERA) was also studied for its role in shaping new criteria for research assessment. This method allowed for the gathering of evidence on current evaluation practices and trends in leading European universities and institutions.

The analytical method was employed to assess the strengths and weaknesses of the identified evaluation practices. This involved critically examining the principles and guidelines proposed by the aforementioned initiatives, particularly their emphasis on qualitative metrics, open science, and inclusivity. The method facilitated an understanding of the potential benefits and challenges of moving away from traditional quantitative metrics and adopting more qualitative approaches.

The comparative method was applied to investigate differences between the research evaluation practices implemented in various European institutions. This approach helped to highlight the varying degrees of adoption and adaptation of new qualitative metrics across institutions. Moreover, it enabled an assessment of the effectiveness of different approaches in terms of promoting meaningful and fair evaluation processes. A specific focus was placed on identifying practices that could be adapted to the Ukrainian academic context.

Based on the findings of the empirical, analytical, and comparative analyses, recommendations were formulated for the implementation of best practices in qualitative research evaluation in Ukraine. These recommendations are aimed at supporting Ukrainian higher education institutions in developing internal evaluation frameworks and assisting government authorities in shaping policies that reflect modern trends in research assessment.

3. RESULTS

3.1. Global and European Initiatives for Research Evaluation

The predominant role of quantitative indicators of scholarly activity has changed lately, giving the way to alternative views on the quality of a scientific work. Among the most important initiatives to introduce systemic changes in the evaluation of the work of scientists are the following:

1. Leiden Manifesto (2015). The Leiden Manifesto was published as a reaction to the widespread use of metrics in scientific assessment. The document contains ten principles aimed at the responsible use of scientometric indicators. Among the main principles are the following: combining quantitative data with qualitative expertise, contextualization of metrics in accordance with the field of research, and transparency in the use of metrics to evaluate scientific results. This system emphasizes the responsible use of metrics, calling for quality assessment, transparency, and accountability in the evaluation of research. It supports the use of multiple indicators and the contextualization of quantitative data.

The Leiden Manifesto calls for a profound rethinking and responsible approach to the evaluation of scientific activity.

2. DORA (2012). Another initiative that plays an important role in shaping new approaches to evaluating the work of scientists is **San Francisco Declaration on Research Evaluation (DORA)**. This initiative calls for the abandonment of the traditional use of quantitative metrics, such as the impact factor, as the main indicator of research quality. Instead, DORA recommends focusing on evaluating research for its content, innovation, and impact on society. DORA also highlights the importance of open science, fostering international collaboration, and supporting the career development of scientists through mentoring and teaching. Today, DORA is signed by more than 23,000 signatories from 161 countries.

Aiming to create practical tools to improve the evaluation of scientific research, DORA initiated the **TARA (Tools to Advance Research Assessment) project**. The main goal of the project is to develop digital solutions that will allow institutions to evaluate scientific results more effectively, taking into account a wide range of criteria, and not just traditional metrics such as impact factor. TARA supports the implementation of a more responsible and transparent assessment that recognises diverse forms of scientific input. As stated in the draft: "TARA will foster a more holistic understanding of researchimpact" (DORA, 2021).

This project contributes to the development of open science by helping institutions put the principles of DORA into practice.

In a recent discussion on DORA’s approach, attention was given to both the successes and challenges in implementing FOLEC initiatives, coordinated by the Latin American Council for Social Sciences (CLACSO). The conversation focused on enhancing scientific evaluation in Latin America by promoting transparency and recognizing a broader range of scientific contributions. Emphasis was placed on the need for context-sensitive assessments that address regional specificities and needs (Donahoe, 2024).

Further implementation of DORA prinliples is reflected in its Strategic Plan for 2023-2025 which covers three main areas: Global Impact, Capacity Development, and Community Engagement:

1. Global Impact: Expanding the application of DORA principles in different countries and institutions.

2. Capacity Development: Providing resources and support for the implementation of equitable assessment practices.

3. Community Involvement: Creating a network to share best practices and innovations in research evaluation.

This plan aims to promote responsible evaluation of scientific research. The main goal of the plan is to shift the focus from quantitative metrics to more qualitative and contextual research assessments: "Our vision for 2023-2025 is to build on this momentum and expand the reach and impact of DORA's principles globally" (DORA, 2022). DORA aims to shift the focus from quantitative metrics to qualitative, contextual assessments.

3. The 2019 Hong Kong Principles were developed at the 6th World Conference on Research Integrity. They aim to uphold scientific integrity, reward open science practices, and conduct research responsibly. These principles call for evaluating scientists for their contribution to research openness, ethical standards, and quality of work, not just for the number of publications, focusing on scientific integrity. They call for the assessment of integrity and transparency of scientific processes: "We emphasize the need to reward researchers for responsible research practices, including the sharing of data, methods, and results openly and transparently" (World Conference on Research Integrity, 2019).

Five principles were articulated: to value responsible research practices, the value of complete reporting, the remuneration of open science practices, the recognition of a wide range of research activities, and the recognition of important other tasks such as peer review and mentorship.

The developers were international researchers, and the principles were supported by twenty-five scientific institutions and many scientists around the world.

4. Open Science Career Evaluation Matrix (OS-CAM) 2017: The 2017 Open Science Career Evaluation Matrix (OS-CAM) initiative, developed by the European Commission, aims to promote a more comprehensive and equitable assessment of scientists' careers. The Matrix highlights the need to evaluate a wide range of scientific findings and activities beyond traditional publications. It includes open science practices, public impact, collaboration, as well as recognition of diverse contributions from scientists, such as data sharing, mentoring, and knowledge dissemination (O'Carroll et al., 2017).

Open Science Career Assessment Matrix (OS-CAM)

Activities in the field of open science	***Possible Evaluation Criteria***
SCIENTIFIC RESULTS	
Research activity	Pushing the boundaries of open science as a topic for research
Publication	Publications in open access journals
	Self-archiving in open access repositories
Datasets and Research Results	Use of FAIR data principles
	Implementation of quality standards in the management of open data and open data sets
	Use of other researchers' open data
Open sources	Use of open source software and other open source tools
	Development of new software and tools that are open to other users
Funding	Securing funding for activities in the field of open science
RESEARCH PROCESS	
Stakeholder Engagement / citizen science	Active involvement of society and scientific users in the research process
	Sharing preliminary research results with stakeholders through open platforms (e.g., Arxiv, Figshare)
	Engaging stakeholders in peer review processes
Collaboration and Interdisciplinarity	Increasing participation in research through open collaborative projects
	Engaging in team science through diverse interdisciplinary teams
Research Integrity	Awareness of ethical and legal issues related to data sharing, privacy, attribution, and environmental impact from open science activities
	Full recognition of the contributions of others to research projects, including authors, collaborators, citizens, open data providers
Risk management	Take into account the risks associated with open science
WORK & LEADERSHIP	
Leadership	Developing a vision and strategy on how to integrate open science practices into conventional research practices
	Policy and Practice in Open Science
	To be an example to follow in the practice of open science
Academic Reputation	Development of an international or national profile for activities in the field of open science
	Participation as an editor or advisor to open science journals or bodies
Review	Fostering open peer review processes
	Examining or evaluating open-label research
Networks (networking)	Participating in national and international networks relating to open science

SCIENTIFIC IMPACT	
Communication & Dissemination	Participation in public engagement activities Sharing research results through non-academic dissemination channels Translating research into a language suitable for public understanding
IP (patents, licenses)	Be knowledgeable about legal and ethical issues related to intellectual property Transfer of intellectual property to the economy as a whole
Societal Impact	Evidence for the use of research by social groups Recognition by social groups or for social activities
Knowledge exchange	Engaging in open innovation with partners outside academia
TEACHING & SUPERVISION	
Teaching	Educating other researchers on the principles and methods of open science Development of curricula and programs on open science methods, including data management on open science Increasing awareness and understanding of Open Science in Bachelor's and Master's programs
Mentoring	Mentoring and encouraging others to develop their Open Science capabilities
Supervision	Supporting early-stage researchers in adopting an open science approach
PROFESSIONAL EXPERIENCE	
Continuing professional development	Investing in your own professional development to build the capacity of open science
Project Management	Successful implementation of open science projects with the participation of diverse research groups
Personal qualities	Demonstrating personality traits for community engagement and user research through open science Demonstrating flexibility and perseverance in responding to the challenges of conducting open science

Fig. 1. Open Science Career Assessment Matrix. Accessed from https://op.europa.eu/en/publication-detail/-/publication/47a3a330-c9cb-11e7-8e69-01aa75ed71a1

5. CoARA (Coalition for Advancing Research Assessment) is an initiative launched in 2022 that aims to reform research evaluation processes in Europe and beyond. CoARA supports the principles of inclusiveness, transparency and diversity in the evaluation of research. The initiative advocates for the recognition of a wide range of scientific outputs and activities, going beyond traditional metrics such as the impact factor, and emphasizes open science and the societal impact of research.

CoARA today has more than 400 participants representing various scientific institutions, universities and organizations from around the world. Their main task is to contribute to the reform of research evaluation in order to ensure a more equitable,

transparent and diverse approach to the evaluation of research results. They focus on the recognition of a wide range of scientific results and the implementation of the principles of open science and public impact.

The main emphasis is on qualitative aspects, including contributions to open science, innovation, interdisciplinary collaboration, research societal impact, and scientific integrity. Evaluation should be transparent, inclusive and results-oriented, contributing to the advancement of science and society.

CoARA proposes to evaluate the work of scientists based on a set of principles that go beyond traditional quantitative indicators. The main ones are:

1. Ethics and Scientific Integrity: Prioritizing ethics and integrity in research. The assessment should include verification of compliance with the highest standards of ethics and methodological rigor.

2. Freedom and autonomy: Ensuring the freedom of scientific research and the autonomy of scientific organizations while maintaining the independence of evaluation and transparency of data.

3. Quality and Impact: Focus on the quality of research, the originality of ideas, the transparency of processes and their impact on society and science. Recognising the importance of open science and interdisciplinary collaboration.

4. Diversity and Inclusion: Recognition of diversity in scientific roles, career paths, research outcomes, and gender equality and inclusion in research teams.

These principles aim to form a more balanced and equitable system for evaluating scientific performance that takes into account the diversity of scientific contributions and roles (CoARA, 2022).

The European Research Council (ERC) (2023) introduced new approaches to the evaluation of scientific proposals for grants in 2024. The main emphasis is placed on the potential scientific impact of the research, a thorough assessment of the applicant's scientific achievements, and increased attention to the quality of the research methodology. The ERC also emphasizes the importance of diversity and inclusion in the evaluation process, encouraging the participation of a wider range of scientific disciplines and research topics, which will contribute to the development of innovative and risky projects.

In general, it can be stated that there is an increase in trends at the European level to expand the criteria for evaluating the work of scientists, in particular, taking into account the quality of research, scientific influence, the diversity of methodologies and topics, as well as the importance of inclusion and interdisciplinarity.

3.2. Assessing Research Activity at Universities

The European University Alliance (EUA) pays sufficient attention to the evaluation of the work of scientists (Saenen et al., 2019; Garbuglia et al., 2022), in particular, their main focus is on the transition to open science practices, which are aimed at making scientific publications and data more openly accessible. This transition has impacted how universities assess the quality of research and the overall impact of academic work.

The EUA highlights that traditional approaches to evaluating research, which rely heavily on metrics such as publication count and journal impact factors, are increasingly being revised. The emphasis is shifting to more holistic approaches that take into account a wider range of scientific outcomes, including open data, reproducibility of outcomes, and contributions to societal impact. The transition to open science requires researchers not only to produce quality publications, but also to ensure the accessibility, transparency and reuse of their work, which is in line with broader European initiatives such as Plan S - what is it ? Give referece or details and the Horizon Europe framework.

In addition, the EUA highlights the need for collaborative efforts between universities, governments, and funding institutions to establish evaluation criteria that reward open practices, ethical research, and interdisciplinary approaches. This alignment is essential for creating an environment where academic work is judged not only on quantitative metrics, but also on its contribution to knowledge development and the public good.

These efforts are reflected in the ongoing discussions and reports published by the EUA, which seek to provide a roadmap for integrating open science into research assessment practices at European universities.

Norwegian universities have developed the NOR-CAM (Norwegian Career Assessment Matrix) toolkit for the evaluation of scientists (Universities Norway, 2021). It aims to recognize and reward various aspects of academic careers, including research, teaching, leadership, and community engagement. NOR-CAM proposes to evaluate scientists on various criteria, such as research quality, societal impact, and interdisciplinarity, which contributes to a more balanced and comprehensive approach to evaluating scientific contributions.

Developed by Norwegian universities, NOR-CAM takes into account various aspects of academic careers, including education, innovation, and collaboration alongside traditional scientific outputs. For example, this grading system also pays attention to societal impact and interdisciplinary efforts, providing a more balanced and comprehensive approach to assessing academic success.

University College London (UCL) (2018) has developed an Academic Career Framework and promotion processes to support a variety of aspects of academic careers. This framework aims to provide a transparent and inclusive approach to the evaluation and advancement of scholars. It includes criteria that take into account not only research, but also teaching, leadership, impact on society, and other academic achievements. It promotes a fair and equitable equal advancement in the academic field.

UCL provides clear criteria for career advancement, considering not only research but also teaching, knowledge sharing, and leadership. For example, the university recognizes the importance of public engagement and interdisciplinary work, allowing employees to advance their careers based on a wider range of accomplishments rather than just the number of publications. This promotes equitable and flexible career development.

Ghent University (2023) has introduced a comprehensive system for evaluating the work of scholars, which takes into account not only the number of publications, but also a wide range of other academic and professional achievements. This includes teaching, leadership, research management, innovation, and contributions to society and interdisciplinary initiatives. The evaluation of the work of the teaching staff is based on a

balance between different responsibilities and roles, which allows for a comprehensive assess their impact both within and outside the university.

In the Netherlands, the evaluation of scientists' work has undergone significant changes thanks to the initiative introduced in 2019 "Recognition and Rewards". This approach aims to rethink traditional evaluation criteria based mainly on the number of publications and grants received. Instead, the new system recognises the importance of various aspects of research, including teaching, leadership, societal impact, open science, and interdisciplinary collaboration. The goal is to creating a more balanced and stimulating academic career that takes into account the diversity of scientific contributions (Recognition & Rewards, 2019).

In 2020, Maastricht University introduced an innovative approach to evaluating the work of scientists. This initiative aims to rethink traditional approaches to evaluating scientists, in order to more equitably recognize their diverse contributions to science (Maastricht University, 2020). The new system recognises the diversity of the roles and contributions of scientists, focusing not only on research but also on teaching, societal impact, leadership, and teamwork. The approach aims to ensuring a balance between academic activities, supporting interdisciplinary projects, and promoting open science. This helps to create a more inclusive and stimulating academic career (Snackers, 2022).

In 2021, Utrecht University introduced a new concept of "Recognition & Rewards", which aims to change approaches to the evaluation of scientists. The focus is not only on research activities, but also on teaching, leadership, impact on society, and open science. The university is committed to recognizing and supporting the diverse contributions of academics, providing a more inclusive and balanced approach to career advancement. This initiative highlights the importance of interdisciplinary cooperation and provision of quality education (Utrecht University, 2021).

The evaluation of scientists is most often inextricably linked with the evaluation of scientific institutions with which they are connected by affiliation. Accordingly, the results of the scientific activities of such researchers are qualitatively reflected both in the further assessment of the scientific institution and, as a result, in the career growth of valuable researchers. For the purpose of such qualitative assessment, the Strategic Evaluation Protocol 2021-2027 (SEP) was developed in the Netherlands (Association of Universities in the Netherlands et al., 2020). This joint protocol from the Association of Universities in the Netherlands (Universities of the Netherlands), the Dutch Research Council (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW) is revised and approved every six years. The main purpose of this SEP assessment is to evaluate the work of a research association (i.e. universities, institutes, departments, research groups, multidisciplinary clusters, etc.) in the light of the relevance of their activities to their own goal and strategy, taking into account the impact on the development of science and its sufficiency. "The SEP assessments help boards and units alike to monitor and improve the quality of research conducted by the research unit as part of the ongoing quality assurance cycle." It should be noted that one of the main ideas of SEP is self-assessment by research associations of their activities, which encourages them to discipline, self-criticism and strategic development. Self-assessment is the first stage of assessment, after which a detailed report is submitted

and considered by a specially authorized committee formed of external and independent experts.

Evaluation is carried out according to three main criteria: 1) the quality of research; 2) social significance; 3) viability of the study. At the same time, the assessment of the quality of research is carried out in several contexts – international, national and, where applicable, regional, which allows foran objective and realistic assessment of research from all sides, and is mainly based on the criteria enshrined in DORA. In addition, academic reputation and leadership in a particular field of research are taken into account.

The societal relevance of the unit's research is evaluated based on its impact, public engagement, and the extent to which the research is adopted, considering economic, social, cultural, educational, or other relevant factors.

The viability of research is assessed in the context of its potential development, scientific value and impact on the development of science in a broad institutional sense, as well as on social development.

These three main criteria are evaluated through the prism of four special aspects: 1) open science; 2) PhD training and research associations' policies on them; 3) academic culture and 4) human resource policy. These four aspects relate to how a research association organizes and conducts its research, its leadership and staff structures, and its day-to-day operations. While the emphasis on each aspect may vary, they are important components of the three main evaluation criteria. For example, Open Science through practices such as open access publishing, FAIR data and codes, and public engagement, plays a key role in achieving the quality of research and its public relevance. It can also be considered critical to the overall viability of research.

Academic culture is divided into two important components: openness, (social) safety and inclusiveness on the one hand, and research integrity on the other.

In our opinion, in the context of the rapid development of the information society, research integrity should be considered one of the most important indicators of research quality. Therefore, during the evaluation, issues of integrity and ethics, the existing research culture and methods of interaction between researchers, as well as any relevant dilemmas that have arisen, such as ethical issues, and how they have been resolved, are subject to careful examination. These dilemmas may relate to issues of authorship, ethical aspects related to confidentiality, or cooperation with stakeholders.

Undoubtedly, the main driving force of any research is its performers, i.e. scientists. When evaluating research associations for SEP, special attention is paid to talent management. Therefore, a comprehensive analysis of recruitment policies, opportunities for training and development, coaching and mentoring is carried out, as well as career perspectives for researchers and research support staff in different phases of their career. This reflection includes a consideration of how the research unit ensures that researchers are properly evaluated, rewarded and incentivized (Association of Universities in the Netherlands et al., 2020).

The European Laboratory of Molecular Biology (EMBL) (2022) has introduced a modern system for evaluating scientific work that goes beyond traditional quantitative indicators such as the number of publications. EMBL focuses on research quality, impact, interdisciplinarity, collaboration, and scientific integrity. An important aspect is the openness

of science, the transparency of processes and the results that can be reproduced. The assessment also takes into account the contributions of scholars to the organization of work, teaching, and interaction with society.

A study by Felt and Fochler (2024) examines the practice of academic evaluation of the work of scholars in Austria, focusing on the tension between traditional indicators (such as publications and citations) and new criteria that emphasize open science, social impact, and research integrity. The study highlights the need for a balanced approach that recognizes a variety of academic contributions, including teaching, community engagement, and interdisciplinary work. It requires creating transparent, equitable and inclusive evaluation systems that align with the principles of Open Science and promote an enabling research environment. For example, the report emphasizes the importance of qualitative assessment alongside quantitative indicators: "Evaluation processes should not only focus on quantitative measures, such as publication and citation counts, but also consider the broader impact of research, including societal relevance and interdisciplinary collaboration." (Felt & Fochler, 2024). This underlines the desire for a more holistic approach to evaluating the work of researchers in Austria.

The report on "Research Assessment in Austria" (Steinhardt, 2020) provides a comprehensive overview of current practice and challenges in assessing academic performance in Austria. It highlights the need to move away from traditional assessment measures, such as publications and citations, to more holistic approaches that include open science, interdisciplinarity, societal impact, and research integrity. The report advocates for a balanced evaluation system that recognises the diverse contributions of researchers and complies with international standards of transparency and fairness.

At the same time, among the countries of Eastern Europe, the direct influence of the Soviet system of evaluating the work of scientists is observed. In particular, its negative impact is in the aspects of bureaucracy and focus on quantitative indicators, which are most inherited from the Soviet system, where attention was also paid to quantitative rather than qualitative results of scientific activity. This highlights the need to reform and modernize approaches to the evaluation of scientists in the modern democratic world and sustainable development.

Evaluation of scientists based on their influence in Poland (Wróblewska, 2022). This approach, borrowed from the UK, aimed to evaluate the contribution of researchers not only by the number of publications, but also by their impact on society and the economy. However, the implementation of this approach has encountered difficulties due to problems in translation and interpretation of the criteria, which has led to misunderstandings and challenges in its implementation.

Other sources discuss the system of evaluation of scientific activity in Poland and its current challenges, in particular, emphasizing the need for transparency and stability in the evaluation of scientists (Stec, 2022; Węgrzyn, 2014). Clear and understandable criteria are recognized as key to the effective evaluation of scientific work. The current Polish system evaluates scientists by the number of publications, citations, participation in projects, and other quantitative indicators. There are calls for a better approach which would take into account the impact of research on society, innovation, and interdisciplinary collaboration.

Current challenges include excessive bureaucracy, a focus on quantity rather than quality, and a lack of recognition of interdisciplinary research. It is proposed to introduce more flexible criteria that take into account the diversity of scientific disciplines and the specifics of research activities.

The sources agree – which ones? on the need to reform the evaluation system aimed at stimulating innovation, supporting young scientists and integrating Polish science into the international context.

The problem of evaluating scientists solely on the basis of quantitative indicators, such as the number of publications and citations, can lead to situations where young scientists focus on publishing as many articles as possible, sometimes to the detriment of the quality of their work. It is recommended to focus on qualitative criteria that better reflect the true contribution of a scientist to the development of science.

In Poland, there is an active discussion on improving the system of evaluation of scientific work, with an emphasis on its transparency, stability and adaptation to modern scientific realities.

Therefore, it is necessary to single out and summarize several important global trends in the evaluation of scientific activity. At the present stage of the development of science, the promotion of its openness and accessibility, it becomes obvious that the scales prevail in the opposite direction, and for research assessment, qualitative indicators of the impact of research and, accordingly, a qualitative assessment of the achievements of a particular scientist become much more important, valuable and indicative, which quite logically leads to the transition of scientific institutions to a radically different approach to evaluation. In recent years, a number of important acts and initiatives have been developed to establish this approach; they clearly define the relevant criteria for qualitative assessment and demonstrate its effectiveness. Among all the proposed criteria, it is worth highlighting and emphasizing such a key criterion as research integrity and compliance with the principles of what?

In addition, the research activity itself is important, which is qualitatively demonstrated through the methodological part of the study, because it is here that you can trace the activity, work and efforts of its author. The methodology demonstrates the research process itself, and therefore provides an important answer to the question of its compliance with the qualitative indicators discussed in this article.

This section is indicative in the fact that from a number of considered initiatives, documents and practices, there is a tendency to unify the main qualitative evaluation criteria, since each program does not consolidate new standards, but seeks to improve the previous ones. At the same time, the issue of choosing the right indicators for assessing scientific activity remains relevant. Due to the diversity of research (different fields and their specifics), which are often difficult to compare and contrast with each other, indicators of impact and outputs should be as standardized and clearly defined as possible, as well as be applicable to any research and scientists, regardless of their field of scientific interests and searches.

3.3. Ukrainian Context of Evaluating Scientific Work of University Teachers and Professors

The system of evaluation of scientists in Ukraine is going through a significant period of transformation. Historically, Ukrainian science was largely shaped by the Soviet system,

where the emphasis was on quantitative indicators such as the number of publications, defended dissertations, and citations. However, with the independence and the course towards European integration, Ukraine began to implement European approaches to the evaluation of scientific activity.

According to the information provided on the website of the Ministry of Education and Science of Ukraine (Strikha, 2017), university science is undergoing a stage of modernization and adaptation to European standards. The National Agency for Quality Assurance in Higher Education (NAQAHE) (Prihna, 2020) is actively working on the introduction of new evaluation criteria that take into account not only the number of scientific publications, but also their quality, impact on the scientific environment, international cooperation, interdisciplinarity of research and integration into international scientific community.

The National Plan for Open Science in Ukraine (Decree of the Cabinet of Ministers of Ukraine, 2022) (hereinafter referred to as the National Plan) is a key component of the development of scientific activities, in particular the evaluation of the work of scientists. It provides for the introduction of a policy of open access to scientific publications, data and research results. The plan aims to increase the transparency of scientific processes, in particular through the creation of a national repository and the introduction of mechanisms to support open scientific practices. For example, scientific institutions and universities will be obliged to provide open access to publications, which will be an important criterion in assessing the effectiveness of their activities.

These activities will contribute to a more comprehensive assessment of the work of scientists in Ukraine, ensuring integration with European and global open science standards.

An important element in this reform is the assessment according to European standards, which includes taking into account the quality of scientific research, the impact on society and the economy, as well as ethical standards. Particular attention is paid to the development of university science, attracting young scientists and increasing the competitiveness of Ukrainian science at the international level.

The National Plan defines the need to improve the system for assessing the quality of scientific and scientific-technical activities. Recognition of the problem leads to the search for ways to solve it, and therefore the Ministry of Education and Science was entrusted with the task of improving the criteria for state certification of higher education institutions and research institutions, as well as developing recommendations for higher education institutions and research institutions to improve institutional policies for evaluating scientific and scientific-pedagogical personnel, based on the principles of research evaluation defined by the San Francisco Declaration (DORA and the Open Science Matrix for Scientist Career Evaluation (OSCAM).

Provisions relating to the requirements for the evaluation of scientific activity are enshrined in various normative legal acts of Ukrainian legislation. In particular, the Licensing Conditions for the Implementation of Educational Activities, which were approved by the Resolution of the Cabinet of Ministers of Ukraine (2015), states that scientific-pedagogical, pedagogical and scientific workers who provide the educational process must have at least four achievements in professional activities over the past five years for that the applicant for

a license for educational activities has the right to conduct such activities at the appropriate level of higher education.

The Licensing Conditions provide an exhaustive list of achievements in professional activity, which includes twenty items. This list is characterized by a combination of both qualitative and quantitative indicators that are considered professional achievements. However, as already mentioned, only any four indicators out of these twenty are sufficient to comply with the requirements of the license conditions. Usually, this combination consists exclusively of quantitative indicators, such as: 1) the presence of at least five publications in periodicals included in the list of professional publications of Ukraine, in scientometric databases, in particular Scopus, Web of Science Core Collection; 2) availability of a published textbook or textbook (including electronic) or a monograph (with a total volume of at least 5 author's sheets), including those published in co-authorship (at least 1.5 author's sheets for each co-author); 3) availability of published printed educational and methodical works with a total number of three titles; 4) defense of a dissertation for a scientific degree; 5) participation in the attestation of scientific personnel as an official opponent or member of a permanent specialized academic council, or a member of at least three one-time specialized academic councils and some other criteria.

In this case, the imperfection of such an assessment and its Soviet roots are clearly traced. The number of publications indexed in recognized scientometric databases, the number of published textbooks, manuals and other educational and methodological materials does not indicate their quality and significance for the development of science, does not demonstrate the qualitative contribution of a scientist. In fact, the scientist finds himself in such conditions in which the goal is the race for the number of methodsof objectification scientific research, while the actual content and content of these studies fade into the background, lose their value. As a result, "dead" publications are becoming more and more common, which do not differ in their scientific value, novelty, relevance, impact on the development of science, social significance, interdisciplinarity, etc., are not cited or used in the scientific community, but which fulfill the purpose of replenishing the "track record" of an individual scientist in order to comply with the requirements of the law.

The orientation of Ukrainian science towards European practices and approaches, the desire for the European Research Area should become the leading banners for changes in current approaches to ranking scientists based on the results of their scientific activities. Preference should be given to the qualitative indicators of researchers' work, as this will allow assessing the real impact and success of a scientist. Moving away from past practices of purely quantitative assessment may contribute to a new impetus in development Ukrainian science, because scientists will have the opportunity to concentrate on the content of their own research, high-quality developments, active participation in scientific projects, regardless of the amount of material developed for a certain period of time, on which their career advancement depends, and without the need to imitate their own scientific activity.

On the way to Ukraine's membership in the EU and entry into the European Research Area, the Ukrainian legislator is actively working on the demanded changes. As a result, on June 6, 2024, the Verkhovna Rada of Ukraine adopted the Law "On Amendments to Certain Laws of Ukraine on Support of Scientific Work in Higher Education Institutions" (Press Service of the Verkhovna Rada of Ukraine, 2024), which is currently awaiting the President's

signature. It is expected that the adopted law will contribute to the modernization and improvement of the quality of higher education. According to the press service of the Secretariat of the Verkhovna Rada of Ukraine, this law will allow existing teachers to decide whether they will be engaged in real scientific activities along with teaching or prefer to apply their knowledge in practice without the need to imitate scientific activity.

The law proposes the concept of a pedagogical worker, which will allow scientific and pedagogical workers to engage only in pedagogical activities with a corresponding reduced workload without carrying out other scientific activities, but at the same time, teachers who have a scientific degree and/or scientific title will be credited with the experience of scientific and pedagogical work. Thus, at least a partial solution to the problem of pseudoscientific activity is proposed. Clearer conclusions can be drawn after the law comes into force and the proposed mechanism begins to operate in practice. However, there are well-founded fears that in practice such innovations will only increase the scope for abuse, as the focus continues to be on quantitative indicators, which are the key to pretend scientific activity. In particular, a scientific and pedagogical worker may, on his own initiative, increase the level of his scientific workload, the minimum limit of which is provided at the level of 30%. Thus, by publishing a larger number of papers per year, such a scientist will fulfill the specified workload, but the quality of the scientific results produced by him or her and the benefit of science and society from this remain in doubt.

The practice of reforming the evaluation of scientific activity in Ukraine again shows the need for comprehensive and fundamental changes, because targeted and unpopular solutions cannot solve the whole problem. First of all, the breakdown of consciousness and the revolution must take place by understanding the essence of the problem and why it must be solved. This will help to change the approach and transfer the assessment of scientific activity to new rails.

4. DISCUSSION

In the scientific community, there has long been a discussion about the need to shift from quantitative approaches to evaluating researchers' work, moving towards qualitative indicators (Global Young Academy et al., 2023). However, the primary challenge lies in selecting the most suitable methods for evaluation that align with the specific impact and context. Researchers note that despite efforts to identify the best approaches for qualitative assessment, there exists a certain hierarchy of evaluation methodologies that depends on specific criteria and the characteristics of the research being assessed. At the top of this hierarchy are randomized controlled trials, followed by quasi-experiments, mixed methods, and qualitative approaches. Implicit in this hierarchy is the assumption that quantitative measures are superior to qualitative ones. While this hierarchy may hold validity in certain contexts, such as when it is possible to isolate and attribute the cause of an effect (e.g., a research-based intervention), evaluating impact is more challenging in some fields than in others. The impact agenda aligns well with the norms of more applied disciplines, where researchers may be motivated to invest time and energy into producing measurable outcomes. However, evidence suggests that scholars from disciplines such as the arts, humanities, and pure sciences, whose work may not have immediate practical applications, express concern about the expectation to generate impact. They feel that academic freedom

is threatened by the growing trend towards evaluating, and particularly quantifying, research impact (Outhwaite et al., 2019; Reed et al., 2021).

Current evaluation practices in research heavily emphasize quantitative, journal-based metrics, such as the Journal Impact Factor (JIF), the number of publications, citations, h-index, and Article Influence Score (AIS). Additional indicators include grant income targets, inputs like research funding or the size of research teams, the number of registered patents, and, more recently, social media metrics (previously referred to as ‘altmetrics’), such as the number of shares or downloads on social platforms. Collectively, these metrics significantly shape the reputations of institutions, research groups, and individuals, while also influencing research agendas, career paths, and the allocation of resources. These evaluation methods have contributed to higher ambitions: improving research quality, minimizing waste and errors, promoting diversity and inclusion, enhancing research as a global public good, and fostering more open, engaged scholarship. However, without meaningful reform, the integrity, diversity, and overall value of research are at risk (Global Young Academy et al., 2023).

The publishing sector wields significant influence over research communication, with journal-based metrics often driving behavior that prioritizes publication in prestigious, commercial journals. This focus on journal reputation, rather than scientific merit, fuels a commercial market where publication quality is equated with the journal's standing. Open access, often requiring high author processing charges (APCs), can be financially burdensome, especially for researchers in resource-poor regions, creating barriers to publishing and risking a division in the global research community. The growing reliance on commercial publishers strengthens the case for not-for-profit alternatives. Moreover, as universities prioritize bibliometric indicators like impact factors and grant size, other vital contributions, such as teaching and policy work, are devalued. This system further perpetuates the ‘Matthew effect,’ where established researchers continue to gain advantages over less successful peers (Bol et al., 2018).

Research assessment should recognize and reward the full range of research contributions and activities, while encouraging best practices, reproducibility, and integrity. It is essential that evaluation methods reflect the diversity of research outputs and impacts, tailored to the specific needs and characteristics of each research discipline (Science Europe, 2022). There is a clear and urgent need to rethink how research outputs, institutions, and individuals are evaluated. The focus must shift towards maintaining research integrity, promoting diversity and inclusion, and maximizing science's global public value. This requires balanced assessment systems that integrate both quantitative and qualitative indicators, valuing diverse research outputs and activities. However, recognizing the importance of qualitative peer review alongside metrics is complex, especially as different regions are at varying stages of evaluation reform. Change is needed at all levels, from global to institutional, with all stakeholders—funders, universities, governments, and researchers—working together as partners in this transformation (Global Young Academy et al., 2023).

5. CONCLUSIONS

Studies of world practices of scientific activity evaluation indicate a strengthening of trends at the European level to expand the criteria for evaluating the work of scientists, in particular, taking into account the quality of research, scientific influence, diversity of methodologies and topics, as well as the importance of inclusion and interdisciplinarity.

Specially created initiatives and the experience of European universities demonstrate the effectiveness of using a qualitative approach in the evaluation of scientific activity, while maintaining the variability of methods for its implementation.

At the same time, it is worth noting that Ukrainian science is striving for a greater integration into the European Research Area. To achieve this goal, it is necessary to implement European practices for assessing scientific achievements, as well as to actively participate in international initiatives such as DORA, the Leiden Manifesto and the Hong Kong Principles. These initiatives contribute to the development of new approaches to evaluating the work of scientists, which are based on the quality and impact of research, ethics, openness of scientific data, and not only on quantitative indicators. The integration of such approaches will help Ukraine ensure that its scientific standards meet international requirements, increasing the competitiveness of Ukrainian science at the global level.

In conclusion, it can be summarized that the generalization of European practices of new approaches to evaluating the work of scientists allows to form a set of the following among the elaborated criteria:

1. **Publication Quality:** The impact and quality of published research, often measured by the journal's impact index or number of citations.
2. **Research Impact:** Contributions to the field, including the social and practical implications of research.
3. **Innovation and originality:** Novelty and creativity in scientific ideas and methodologies.
4. **Collaboration and leadership:** Participation in collaborative projects and leadership roles in research teams.
5. **Research Funding:** Success in obtaining grants and funding for research projects.
6. **Open Science Practices:** Participation in open access to data, publications, and transparency in research.

These criteria provide a comprehensive assessment of a scientist's contribution, going beyond publication indicators alone. These criteria can become a guideline for the continuation of the reform of higher education in Ukraine, in particular the implementation of the National Plan for Open Science in Ukraine in terms of improving the quality assessment system of scientific and scientific-technical activities.

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ВІД КІЛЬКОСТІ ДО ЯКОСТІ: ОЦІНЮВАННЯ НАУКОВОЇ ДІЯЛЬНОСТІ ВИКЛАДАЧІВ ТА ДОСЛІДНИКІВ УНІВЕРСИТЕТІВ

(НА ПРИКЛАДІ КРАЇН ЄВРОПИ ТА УКРАЇНИ)

Анотація.
Стаття присвячена аналізу сучасних підходів до оцінюванню роботи дослідників у країнах Європи з акцентом на якісні показники, які виступають альтернативою традиційним кількісним метрикам. Дослідження проводилось у відповідь на зростаючі дискусії навколо проблем оцінювання наукової діяльності, а також на хвилю ініціатив, що впроваджуються провідними закладами та університетами світу.

У роботі розглянуто вплив таких ініціатив, як Лейденський маніфест, Сан-Франциська декларація про оцінювання наукових досліджень (DORA, 2012), Гонконзькі принципи, Матриця оцінювання кар'єри у відкритій науці (OS-CAM), а також Європейський дослідницький простір (ERA), на розвиток нових критеріїв оцінювання наукових досліджень. Особлива увага приділяється ролі відкритої науки та інклюзивності в процесах оцінювання. У статті також наведено приклади практик, впроваджених провідними європейськими університетами, та досліджено можливості адаптації цих підходів в Україні.

Стаття наголошує на важливості та перспективності якісного оцінювання наукової діяльності, заохочуючи відмову від звичних кількісних підходів на користь більш змістовних та ефективних методів оцінювання. У дослідженні використано емпіричний метод для збору й аналізу відповідної інформації, що становить основу дослідження. Аналітичний метод застосовано для визначення сильних і слабких сторін запропонованих підходів до оцінювання, а порівняльний метод — для дослідження відмінностей між запропонованими практиками та оцінювання їхньої ефективності.

У результаті дослідження ідентифіковано глобальні та національні тенденції оцінювання роботи дослідників і розроблено рекомендації щодо впровадження найкращих практик якісного оцінювання в академічній сфері України. Отримані результати можуть бути корисними для українських закладів вищої освіти при запровадженні внутрішніх процедур оцінювання науково-педагогічного персоналу, а також для центральних органів виконавчої влади, які формують державну освітню політику й ініціюють відповідні законодавчі зміни.

Ключові слова: оцінювання викладачів університетів, оцінювання наукової діяльності, відкрита наука, наукова доброчесність.