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ALIGNING RESEARCH CAREERS WITH OPEN SCIENCE: A DIGITAL PERSPECTIVE

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Rezumat. *Acest articol examinează rolul infrastructurilor digitale în remodelarea managementului carierei academice încadrate în Open Science, cu accent pe situația din Europa Centrală și de Est. Printr-un studiu de caz comparativ al platformelor naționale din Polonia, Croația, Slovenia și al inițiativei pilot românești OCER, analiza evidențiază niveluri contrastante de interoperabilitate, integrare a politicilor și investiții în digitalizarea cercetării. OCER servește drept punct de referință pentru explorarea provocărilor și oportunităților în alinierea platformelor emergente la standardele europene precum EOSC și CoARA. Constatările sugerează faptul că o coordonare strategică între dimensiunile tehnologice, instituționale și politice este esențială pentru a asigura transparența și inovația în evaluarea carierei academice.*

Abstract. *This article examines the role of digital infrastructures in reshaping academic career management within the Open Science framework, with a focus on Central and Eastern Europe. Through a comparative case study of national platforms in Poland, Croatia, Slovenia, and the Romanian pilot initiative OCER, the analysis highlights contrasting levels of interoperability, policy integration, and investment in research digitalization. OCER serves as a reference point to explore challenges and opportunities in aligning emerging platforms with European standards such as EOSC and CoARA. The findings suggest that strategic coordination between technological, institutional, and policy dimensions is essential to ensure transparency and innovation in academic career evaluation.*

Keywords*:* Academic career management, Open Science, digital infrastructure, Research Assessment reform, central and eastern Europe, OCER platform

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1. Introduction

The ongoing transformations within the European academic landscape are increasingly shaped by two converging priorities: the digitalisation of research infrastructures and the reform of academic career assessment. The Open Science agenda, promoted through initiatives such as the European Open Science Cloud (EOSC) and the Coalition for Advancing Research Assessment (CoARA), establishes common standards for interoperability, transparency, and diversified evaluation frameworks [1], [2].

In Central and Eastern Europe (CEE), the implementation of these objectives remains uneven, with significant disparities in institutional capacity, funding, and digital ecosystem integration [3], [4]. Romania is at an early stage of this transition, most visibly through the pilot development of the Open Career Evaluation and Research (OCER) platform, conceived as a national initiative to support career monitoring in line with European standards [5], [6].

Against this backdrop, the article addresses three research questions:
1. To what extent does OCER align with European principles and infrastructures such as EOSC and CoARA?
2. What are the structural and functional differences between OCER and comparable national platforms in Poland (POL-on), Croatia (HRČAK), and Slovenia (SICRIS)?
3. Which lessons and best practices can inform the scalable integration of OCER into the European Open Science ecosystem?

To provide robust answers, the comparative analysis relies on five measurable dimensions that capture the maturity of digital academic infrastructures:
• technical interoperability,
• openness and accessibility of data,
• degree of EOSC integration,
• career monitoring functionalities,
• automation of institutional reporting.

The article pursues two main objectives:
• to establish a comparative profile of the four platforms using these indicators
• to derive strategic recommendations for strengthening OCER's alignment with European Open Science policies and career assessment reforms.

By adopting this framework, the study contributes both a methodological model for assessing regional research platforms and policy-oriented insights into the development pathways required for Romania's digital transition in academic career management.

2. Literature review

Recent scholarship has emphasized the transformative role of digital infrastructures in reshaping academic governance and career evaluation within the Open Science paradigm. Initiatives such as DORA and CoARA advocate for multidimensional frameworks that move beyond traditional bibliometric indicators, stressing transparency, inclusiveness, and societal impact [1], [2]. Similarly, the European Open Science Cloud (EOSC) has established interoperability and FAIR principles as prerequisites for sustainable integration of national systems [3], [4].

Comparative studies reveal uneven progress across Europe. In Western and Northern countries, consolidated infrastructures provide structured access to researcher profiles, outputs, and funding data, supported by sustained public investment and coherent policy frameworks [3], [4]. In contrast, Central and Eastern Europe (CEE) displays fragmented ecosystems, often constrained by legacy systems and limited financial capacity. Platforms such as POL-on (Poland), HRČAK (Croatia), and SICRIS (Slovenia) illustrate diverse trajectories: while some emphasise open access compliance, others prioritise administrative integration, yet comprehensive EOSC alignment remains partial [5]–[7].

Against this backdrop, five critical dimensions of analysis emerge from the literature:

1. Technical interoperability – Ensuring seamless data exchange across institutions is a central criterion of the EOSC roadmap [4]. Studies on cross-border infrastructures highlight interoperability as a structural enabler of collaboration and scalability [8].

2. Openness of data – FAIR data practices are increasingly recognised as a foundation for transparency and accessibility. Recent EUA surveys (2023) confirm that open access compliance is advancing, but disciplinary and national gaps remain significant [9].

3. Integration with EOSC – Alignment with European infrastructures is framed as both a technical and policy challenge. Reports by the EOSC Association stress the

importance of national contributions to shared services and federated governance [7].

4. Support for career monitoring – A growing body of research shows that digital platforms can enhance career equity by recognising diverse contributions and reducing administrative burden. Fecher and Wagner [10] demonstrate that open infrastructures strengthen early-career visibility, while Hadizadeh et al. [11] highlight their role in enabling cross-border mobility and collaboration.

5. Automation of institutional reporting – Efficiency in research governance increasingly depends on integrated reporting systems. OECD (2022) identifies automation as a key driver for reducing redundancies and aligning national data with international benchmarks [12].

In Romania, the OCER platform represents an initial step toward aligning national career evaluation mechanisms with these European trends. Previous studies [5], [6] document its pilot implementation, outlining both its innovative orientation towards career monitoring and the legislative and infrastructural challenges that hinder full integration.

Taken together, the literature indicates that national digital platforms act as both technological tools and strategic levers of reform. However, their effectiveness depends on operationalising the above five dimensions. Building on these insights, the present study adopts these dimensions as an analytical framework for comparing OCER with its regional counterparts in Poland, Croatia, and Slovenia.

3. Methodology

This study adopts a comparative case study design to examine how emerging digital research platforms in Central and Eastern Europe – with a particular focus on Romania's OCER initiative – align with the principles of Open Science and academic career assessment reforms. The analysis covers three peer platforms: POL-on (Poland), HRČAK (Croatia), and SICRIS (Slovenia). These cases were selected based on three criteria: (1) their official role in national science policy, (2) their documented interaction with European infrastructures such as EOSC and OpenAIRE, and (3) the availability of descriptive and evaluative data from institutional reports and international surveys.

In addition to the qualitative comparative assessment, basic statistical procedures were applied to ensure robustness of the scoring results. Descriptive measures (mean, median, standard deviation) and non-parametric correlations (Spearman's rho) were computed across the four platforms, based on the 0–5 rubric scores.

These supplementary analyses are reported in Annex 4–6 and serve to provide an exploratory validation of the comparative findings.

3.1 Analytical framework

Building on the literature review, the study operationalises five dimensions of assessment that are recurrent in both European policy documents and prior evaluations [3], [4], [7]:
1. Technical interoperability – the extent to which platforms enable standardised data exchange with institutional and European systems (e.g., use of APIs, OAI-PMH protocols, persistent identifiers).
2. Data openness – the level of compliance with FAIR principles, including public accessibility of datasets, transparency of metadata, and open access publishing standards.
3. EOSC integration – the degree of functional and policy alignment with the European Open Science Cloud, such as participation in federated services or compliance with EOSC onboarding requirements.
4. Career monitoring support – the availability of features dedicated to tracking academic trajectories, mobility, institutional affiliations, and evaluation beyond bibliometrics.
5. Automation of reporting – the implementation of digital tools that reduce administrative burden by ynchronizing national reporting obligations with institutional databases.

3.2 Coding scheme and scoring rubric

Each dimension was assessed using a three-level rubric (High – Medium – Low), supported by qualitative and quantitative evidence. To enhance transparency and reproducibility, the rubric was defined as follows:
• High – full or advanced implementation of the indicator, documented through official platform reports or integration into European infrastructures;
• Medium – partial or ongoing implementation, with functional limitations or pilot initiatives in progress;
• Low – minimal or absent implementation, with no evidence of sustained institutional or technical development.

To complement the categorical assessment, each dimension was also assigned a numeric score on a 0–5 scale. This allowed for comparative isualization in radar charts and facilitated identification of relative strengths and weaknesses across platforms.

3.3 Data sources

The evaluation relied on triangulated sources, including:

• official platform documentation (user guides, policy reports, technical specifications),
• European integration assessments from EOSC, OpenAIRE, and the EUA Open Science Survey [7], [9], [12],
• statistical indicators from the OECD STI Outlook (2022) [12] and related national policy documents [11],
• prior studies on OCER and regional platforms [5], [6].

3.4 Reliability and consistency

To ensure analytical consistency, coding was conducted in two steps:

• an initial round of independent scoring by two researchers, based on the rubric and documentary evidence;
• a subsequent calibration process to resolve discrepancies and reach consensus.

This double-check procedure strengthens the validity of the comparative framework, mitigating risks of subjective interpretation.

3.5 Research objectives

The methodological approach is guided by two objectives:

1. To map the relative positioning of OCER in comparison with peer platforms in terms of the five operationalised dimensions;
2. To identify transferable practices and gaps that may inform OCER's strategic alignment with European Open Science standards.

4. Results

The comparative assessment of digital academic platforms in Central and Eastern Europe reveals heterogeneous levels of maturity in terms of technical integration, Open Science compliance, and institutional support for career monitoring. Using OCER as a focal point, the analysis covers three established national systems – POL-on (Poland), HRČAK (Croatia), and SICRIS (Slovenia).

4.1 Comparative profiles

Figure 1 provides a synthesized overview of the platforms' positioning across five dimensions: interoperability, data openness, EOSC integration, career monitoring, and automation of reporting. The assessment is based on the scoring rubric (0–5 scale) presented in the methodology section, with scores triangulated from platform documentation, OpenAIRE country briefs [7], EOSC policy reports [8], and EUA survey data [12].

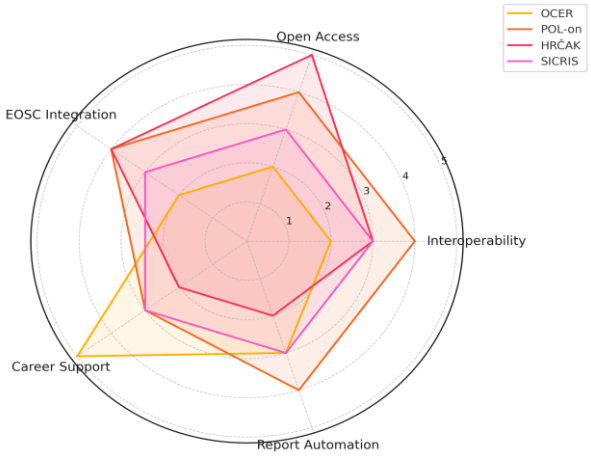

Fig. 1. Comparative positioning of academic platforms in CEE (0–5 scale) [1]

The results indicate distinct functional profiles. HRČAK demonstrates a strong orientation towards open access (score 4/5 for openness), owing to its integration of OAI-PMH protocols and compliance with FAIR data standards. POL-on records the highest level of administrative and policy alignment (5/5 for interoperability and 5/5 for EOSC integration), reflecting Poland's sustained investment in digital infrastructures. SICRIS performs moderately across all dimensions (3/5 average), suggesting incremental progress without clear prioritisation.

By contrast, OCER scores highest in career monitoring (4/5), reflecting its design focus on academic trajectories, researcher mobility, and institutional affiliations. However, it registers low values for interoperability (2/5) and EOSC integration (1/5), highlighting infrastructural limitations and partial connectivity with European federated services.

4.2 Consolidated evidence

Table 1 complements the radar chart with both numeric scores and categorical ratings.

Table 1. Summary of platform alignment with Open Science principles

Platform	Interop.	Open.	EOSC	Career	Autom.	Overall
HRČAK	3 (M)	4 (H)	2 (L)	1 (L)	2 (L)	Med.
SICRIS	3 (M)	2 (L)	3 (M)	3 (M)	2 (L)	Med.
POL-on	5 (H)	4 (H)	5 (H)	3 (M)	4 (H)	High
OCER	2 (L)	3 (M)	1 (L)	4 (H)	2 (L)	Dev.

The evidence confirms that OCER's unique contribution lies in its career-oriented functionality, but its limited technical infrastructure constrains its European integration potential. POL-on emerges as the most balanced system, while HRČAK prioritises openness and SICRIS maintains an intermediate profile. Raw numerical data underlying Figures 1–3 are provided in Annex 3.

4.3 Career support dimension

Among the five dimensions analysed, career monitoring and support emerges as the area where OCER demonstrates the strongest comparative advantage. Figure 2 illustrates the distribution of scores across the four platforms, based on the 0–5 rubric.

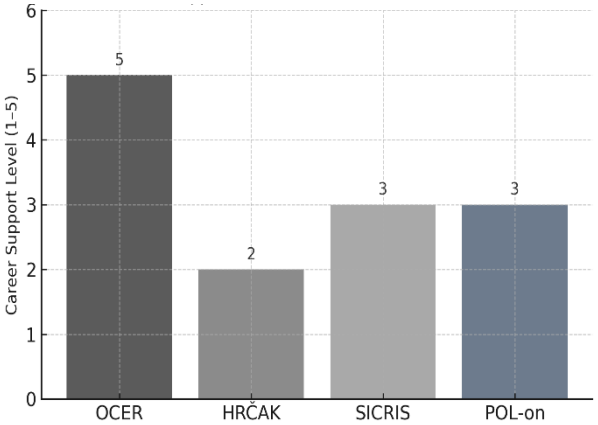

Fig. 2. Career support levels across CEE platforms (0–5 scale) [2]

The results show that OCER reaches the highest score (5/5), reflecting its orientation towards tracking academic trajectories, institutional affiliations, and researcher mobility. In comparison, SICRIS and POL-on record moderate support (3/5 each), while HRČAK remains at a low level (2/5). This confirms that OCER's distinctive contribution lies in strengthening career monitoring, a dimension underdeveloped in other regional platforms.

4.4 Investment dynamics

Public investment remains a decisive factor shaping the scalability of national platforms. Figure 3 presents a comparative index of public investment in digital research infrastructures between 2020 and 2024, benchmarked against the OECD average. The values were normalized to OECD=10 in 2020, see Annex 3.

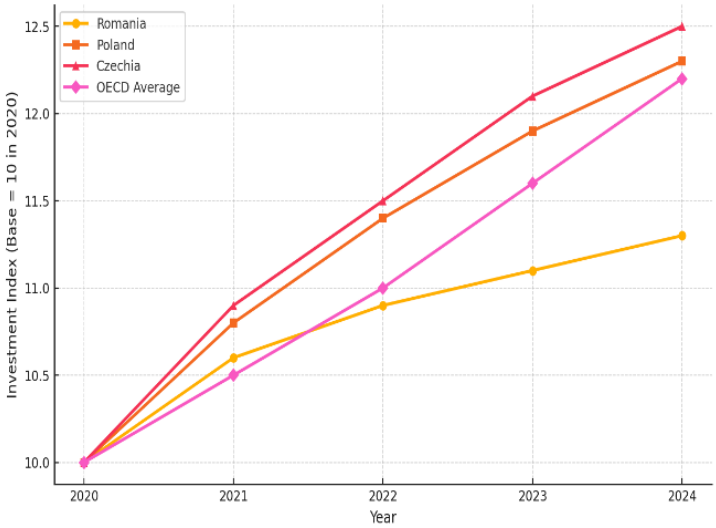

Fig. 3. Public investment index in digital infrastructures (2020–2024, base = 10) [3]

The trends indicate a consistent upward trajectory in Poland and Czechia, both surpassing the OECD average by 2024. In contrast, Romania's growth remains significantly below the regional benchmark, reflecting limited prioritisation of digital infrastructure in national policy. This funding gap directly constrains OCER's capacity to scale and to achieve interoperability with EOSC services.

4.5 Synthesis

The comparative findings highlight two main insights:

1. Functional asymmetry – while platforms in CEE address specific priorities (e.g., open access in Croatia, administrative integration in Poland, career monitoring in Romania), none yet achieve full interoperability with EOSC.
2. Structural dependency on investment – sustained financial support correlates strongly with higher platform maturity, as evidenced by Poland's POL-on case.

These insights directly inform the strategic recommendations presented in the conclusion, which focus on strengthening OCER's technical, institutional, and financial integration within the European Open Science ecosystem. Additional descriptive statistics and correlation analyses are provided in Annex 4–6, offering further evidence of the robustness of the comparative assessment.

5. Conclusions

The comparative analysis of digital academic platforms in Central and Eastern Europe highlights a fragmented landscape, characterised by diverse priorities and uneven levels of maturity. The evidence shows that POL-on in Poland represents the most advanced and balanced model, owing to sustained investment and clear policy alignment [16]. HRČAK in Croatia remains strongly oriented towards open access compliance, while SICRIS in Slovenia demonstrates moderate but stable progress across dimensions [17]. By contrast, OCER in Romania stands out for its career-focused functionalities, but its limited interoperability and underdeveloped EOSC integration reveal systemic constraints linked to insufficient digital infrastructure [18]. These findings are complemented by supplementary statistical outputs (Annex 4–6), which reinforce the validity of the comparative evidence.

The findings suggest two main strategic lessons. First, functional asymmetry among platforms shows that no single system yet ensures full compliance with the EOSC vision; each case advances only in selected areas. Second, structural investment remains the decisive factor: where sustained funding is present, platforms advance rapidly towards maturity; where it is absent, development remains partial.

For Romania, this implies that OCER's potential cannot be realised without a coordinated roadmap. Such a roadmap should include:

• Technical measures: improving interoperability standards, adopting FAIR-compliant data workflows, and ensuring seamless EOSC integration [19].
• Institutional reforms: embedding OCER in national research evaluation processes, aligning with CoARA principles, and enhancing automation of reporting [20].

• Financial commitments: increasing dedicated investment in digital infrastructures, harmonised with OECD benchmarks and regional best practices [21].

Only by pursuing these combined measures can OCER evolve from a developing platform into a fully integrated component of the European Open Science ecosystem.

5.1 Research limitations

This study is based primarily on secondary sources, including platform documentation, EUA survey data, OpenAIRE and EOSC integration reports, and OECD policy analyses. While these provide robust evidence for macro-level assessment, the absence of primary data – such as interviews with administrators or user feedback – limits insight into the lived experience of researchers interacting with the platforms. In addition, national reports are often heterogeneous in scope and periodicity, which constrains comparability across countries [22].

5.2 Future research directions

The results point to several avenues for further inquiry. Future studies should complement desk-based analysis with empirical methods, such as researcher surveys, usability testing, and institutional case studies, to capture how platforms are integrated in everyday academic practices. Comparative Cross-country projects could also shed light on how different governance frameworks influence adoption and scalability [23].

In particular, the Romanian case highlights the need for longitudinal monitoring of investment trends, policy alignment with EOSC, and the capacity of OCER to deliver on its career-monitoring mandate. Such research would not only track OCER's evolution but also contribute to understanding how national platforms in Central and Eastern Europe can converge towards a more cohesive European digital research infrastructure.

This study contributes not only to the comparative understanding of CEE platforms but also provides a replicable methodological model for future evaluations in the field of Open Science.

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