Governing Open Educational Resources as Sustainable Knowledge Commons: A Policy and Institutional Framework for Higher Education

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Posted Date: 10 March 2026

doi: 10.20944/preprints202603.0702.v1

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 doi:10.20944/preprints202603.0702.v1

Article

Governing Open Educational Resources as Sustainable Knowledge Commons: A Policy and Institutional Framework for Higher Education

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Abstract

Open Educational Resources (OER) are widely promoted as mechanisms for expanding access to knowledge and supporting sustainability in higher education. Yet their long-term viability remains constrained by fragmented governance, unstable funding arrangements, weak faculty incentives, policy gaps, and uneven digital infrastructure. This article develops a conceptual and policy-oriented framework that reconceptualizes OER as sustainable knowledge commons embedded within higher education systems rather than merely repositories of open content. Using an integrative review and thematic synthesis of global scholarship on OER sustainability, commons governance, and higher education policy, the study identifies four interrelated governance dimensions: institutional embedding, participatory stewardship, equitable access and inclusion, and long-term resource sustainability. The analysis shows that sustainable OER ecosystems depend not only on open licensing and technological platforms but also on coherent policy design, institutional alignment, academic recognition structures, and collaborative governance arrangements. Each dimension is associated with indicative governance mechanisms and policy indicators such as institutional OER strategies, faculty incentive programs, and shared digital infrastructure. The framework also recognizes institutional diversity, emphasizing that governance models must be adapted to different policy environments, academic cultures, and stages of OER adoption across higher education systems. By conceptualizing OER as governable knowledge commons, the article clarifies how open knowledge initiatives can contribute to social equity, educational resilience, and sustainable transformation in higher education.

Keywords: open educational resources (OER); knowledge commons; higher education governance; sustainable education; open education policy; digital learning ecosystems; educational sustainability; institutional policy; faculty incentives; open knowledge systems

1. Introduction

In recent decades, the rapid expansion of digital technologies has significantly transformed the landscape of higher education, reshaping how knowledge is produced, shared, and accessed across institutional and national boundaries [3,17,46]. Within this evolving environment, Open Educational Resources (OER) have emerged as an important mechanism for expanding access to educational materials, reducing the cost of learning, and supporting more inclusive and sustainable forms of knowledge dissemination [1,2,4,25]. OER are commonly defined as teaching, learning, and research materials that are either in the public domain or released under open licenses permitting free use, adaptation, and redistribution [4,8,25]. By enabling educators and learners to access, reuse, and modify educational content without financial or legal restrictions, OER initiatives have been widely promoted as instruments for advancing equity, innovation, and sustainability in higher education systems [2,5–7].

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The growing interest in OER has also been reinforced by broader international policy initiatives aimed at promoting open knowledge and sustainable education [8,9,25]. International organizations and policy frameworks increasingly emphasize the role of open education in expanding educational opportunities and strengthening knowledge sharing across societies [8,9]. Within this context, OER are frequently associated with wider sustainability goals in higher education, including improving affordability for students, enhancing the accessibility of learning materials, and fostering collaborative knowledge production among educators and institutions [5,10,11]. As universities continue to integrate digital learning infrastructures and open knowledge practices, OER have become a central component of contemporary discussions on sustainable and inclusive higher education systems [11,17,25].

Despite their widely recognized potential, the long-term sustainability of OER initiatives remains a persistent challenge. While early OER projects primarily focused on increasing the availability of digital learning materials, subsequent research has increasingly emphasized the institutional, financial, and governance conditions required to sustain open knowledge ecosystems over time [12,13,22]. A growing body of literature indicates that many OER initiatives struggle with fragmented governance structures, unstable funding arrangements, limited institutional integration, and insufficient incentives for academic participation [14–16,31,32]. In addition, the sustainability of OER ecosystems is often constrained by broader policy and infrastructural limitations, including weak national policy frameworks, limited legal support for open licensing, and uneven digital infrastructure across higher education systems [17–21].

Empirical studies further illustrate the scale of these challenges. Surveys in several national contexts indicate that nearly 89% of higher education institutions report inadequate legal or policy frameworks to support OER development and adoption, while more than 70% of institutions identify cultural resistance to open knowledge sharing among academic staff as a major barrier to implementation [20,31]. Moreover, global policy tracking initiatives have shown that relatively few formal OER policies existed internationally during the early phases of the open education movement, reflecting the slow institutionalization of governance frameworks capable of supporting sustainable open education ecosystems [21,25]. These findings highlight that the sustainability of OER cannot be explained solely by technological availability or open licensing models but must instead be understood within broader institutional and governance contexts [14,17,21,31].

Importantly, these challenges are not isolated obstacles but interrelated structural conditions. For example, unstable funding models can weaken institutional commitment to OER initiatives, while the absence of national policy frameworks may limit universities' ability to integrate open education into long-term strategies. Similarly, the lack of academic recognition for OER production may discourage faculty participation, which in turn undermines the sustainability of collaborative knowledge creation and sharing. Consequently, the sustainability of OER must be understood as a systemic governance issue that emerges from the interaction of institutional policies, financial arrangements, technological infrastructures, and academic incentive structures [14,15,19,22,32].

Within the scholarly literature, several approaches have been proposed to address these sustainability challenges. Some studies focus on financial and organizational models capable of supporting long-term OER initiatives, including government funding programs, institutional investment, consortium-based collaborations, and community-driven contributions [22–24]. Other research emphasizes the importance of national and institutional policy frameworks that integrate OER into broader digital education strategies and open knowledge initiatives [11,25,26,43]. Recent analyses have also identified multiple sustainability models for OER ecosystems, including hybrid arrangements combining public funding, institutional support, collaborative networks, and revenue-based services [6,23,24,27,31]. However, despite these advances, existing research often addresses specific aspects of OER sustainability—such as funding models, policy frameworks, or institutional incentives—without offering an integrated conceptual framework capable of explaining how these dimensions interact within higher education systems [6,14,15,31].

 doi:10.20944/preprints202603.0702.v1

An emerging strand of scholarship addresses this limitation by drawing on theories of knowledge commons and collective resource governance. Inspired by commons governance research, particularly institutional approaches to the management of shared resources, scholars increasingly conceptualize digital knowledge infrastructures—including open science platforms, collaborative repositories, and open education systems—as forms of knowledge commons governed through collective institutional arrangements [28–30]. From this perspective, OER ecosystems can be understood not merely as collections of freely accessible educational materials but as shared knowledge infrastructures that require coordinated governance mechanisms, community stewardship, and institutional support to remain sustainable over time [28–30].

Although the literature has proposed multiple sustainability models for OER ecosystems, the integration of insights from sustainability theory, commons governance scholarship, and higher education policy research remains limited [6,11,14,17,31]. Existing discussions frequently examine financial sustainability, institutional policies, or technological infrastructures separately, leaving the broader governance architecture of OER ecosystems insufficiently theorized [14,17,22,23]. In particular, there remains a need for conceptual frameworks that clarify how policy environments, institutional strategies, and collaborative governance arrangements interact to support sustainable open knowledge systems in higher education [11,25,31,37].

Against this background, the present study seeks to contribute to the literature by developing a conceptual and policy-oriented framework that reconceptualizes OER as sustainable knowledge commons embedded within higher education systems. The study employs an integrative review and thematic synthesis of global scholarship on OER sustainability, commons governance, and higher education policy, drawing on research published roughly between 2006 and 2025. Through this analysis, the article identifies four interrelated governance dimensions that structure sustainable OER ecosystems: institutional embedding, participatory stewardship, equitable access and inclusion, and long-term resource sustainability.

By articulating these governance dimensions, the study aims to bridge existing gaps between technological approaches to OER and broader discussions of educational sustainability and institutional governance. The proposed framework highlights the importance of aligning open education initiatives with institutional strategies, policy environments, and academic incentive systems while fostering collaborative governance arrangements among stakeholders including universities, libraries, faculty members, students, and public authorities. Through this perspective, OER initiatives are understood not merely as digital repositories but as evolving socio-institutional ecosystems whose sustainability depends on coherent governance structures and coordinated policy support [14,15,25,31,32,39].

The principal aim of this article is therefore to develop a policy- and institution-oriented framework for governing OER as sustainable knowledge commons in higher education. The analysis argues that sustainable OER ecosystems require coordinated governance arrangements that integrate institutional policy design, participatory knowledge stewardship, equitable access mechanisms, and durable resource infrastructures. By reframing OER within a knowledge commons governance perspective, the study clarifies how open knowledge initiatives can contribute to social equity, educational resilience, and the sustainable transformation of higher education systems [28–30,36,37].

2. Materials and Methods

2.1. Research Design

This study employs an integrative literature review combined with thematic synthesis to develop a conceptual governance framework for sustainable Open Educational Resources (OER) ecosystems in higher education. Integrative reviews are particularly appropriate for conceptual and policy-oriented research because they allow the synthesis of heterogeneous forms of evidence, including empirical studies, conceptual analyses, policy reports, and case studies, in order to generate new theoretical insights and analytical frameworks [31,37].

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Research on OER sustainability spans multiple disciplinary fields—including higher education policy, digital learning systems, open knowledge infrastructures, and commons governance theory—making integrative synthesis a suitable methodological approach. Rather than testing a specific hypothesis, the objective of the present study is to consolidate and critically interpret existing scholarship to identify governance mechanisms that support the long-term sustainability of OER initiatives in higher education systems.

2.2. Literature Search Strategy

A structured literature search was conducted to identify relevant studies addressing OER sustainability, governance, and policy in higher education. The search was performed across several major academic databases to ensure broad coverage of scholarly literature. The primary databases consulted were:

- Scopus
- Web of Science
- ERIC
- Google Scholar

In addition to database searches, relevant publications were identified through snowball citation tracking, including both backward reference searches and forward citation tracking of key studies [37].

Search queries combined keywords related to open education and governance. The principal search strings included combinations of the following terms:

- "Open Educational Resources" OR "OER"
- "OER sustainability"
- "open education governance"
- "open education policy"
- "knowledge commons"
- "digital learning ecosystems"
- "higher education governance"

The search focused primarily on publications released between 2006 and 2025, a period corresponding to the global expansion of the open education movement and the increasing institutionalization of OER initiatives within higher education systems.

The initial search retrieved approximately 500 publications across the selected databases. After removing duplicate records and conducting an initial screening of titles and abstracts, potentially relevant studies were selected for full-text review.

2.3. Study Selection and Screening Process

The selection of studies followed a structured multi-stage screening procedure adapted from systematic review practices in education research [37].

Stage 1: Title and Abstract Screening

Publications were first screened based on titles and abstracts to determine whether they explicitly addressed OER or open education within higher education contexts.

Stage 2: Full-Text Review

Studies that passed the initial screening were then evaluated through full-text assessment to determine their relevance to OER governance, sustainability, or institutional adoption.

After applying the inclusion and exclusion criteria described below, approximately 80 key studies were retained for thematic analysis.

Inclusion Criteria

Studies were included if they met at least one of the following conditions:

1. Examined the sustainability of OER initiatives in higher education.
2. Analyzed policy frameworks or governance mechanisms related to open education.

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3. Discussed knowledge commons governance models applicable to educational systems.
4. Presented empirical case studies or policy analyses of OER initiatives in universities or national higher education systems.

Exclusion Criteria

Studies were excluded if they:

- Focused exclusively on technical platform development without discussing governance or sustainability issues.
- Addressed open educational practices outside higher education contexts.
- Provided descriptive accounts without analytical relevance to sustainability, governance, or institutional adoption.

The final set of studies represented a diverse body of literature covering conceptual research, empirical case studies, policy analyses, and institutional reports.

2.4. Quality Assessment of Sources

Although integrative reviews permit the inclusion of heterogeneous types of evidence, an initial quality assessment was conducted to ensure the reliability and analytical relevance of the included studies [31].

Sources were evaluated according to three criteria:

1. Scholarly credibility, prioritizing peer-reviewed journal articles, academic books, and recognized international policy reports.
2. Analytical relevance, ensuring that the study explicitly addressed governance, sustainability, policy frameworks, or institutional adoption of OER.
3. Methodological transparency, assessing whether the study clearly described its research design or analytical approach.

The final corpus therefore included a combination of peer-reviewed journal articles, policy analyses, conceptual studies, and empirical case studies. This diversity reflects the interdisciplinary character of research on OER ecosystems.

2.5. Thematic Analysis Procedure

The selected literature was analyzed using thematic synthesis, a qualitative analytical approach designed to identify recurring patterns and conceptual relationships across heterogeneous sources [37].

The analysis proceeded in three stages.

Stage 1: Initial Coding

Key concepts related to OER sustainability were identified through open coding of the selected literature. These codes captured recurring governance challenges such as funding instability, policy fragmentation, institutional integration, limited academic incentives, and digital infrastructure constraints.

Stage 2: Theme Development

The coded concepts were subsequently grouped into broader thematic categories reflecting governance mechanisms and institutional conditions shaping OER sustainability.

Stage 3: Conceptual Integration

Finally, these themes were synthesized into an integrated governance framework describing the structural conditions required for sustainable OER ecosystems in higher education.

Through this synthesis, four interrelated governance dimensions were identified:

1. **Institutional embedding** – the integration of OER initiatives within university strategies, policies, and organizational structures.
2. **Participatory stewardship** – collaborative governance involving multiple stakeholders such as faculty, libraries, students, and public institutions.

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3. **Equitable access and inclusion** – mechanisms ensuring inclusive participation in open knowledge systems and equitable access to educational resources.
4. **Long-term resource sustainability** – the financial, technological, and infrastructural conditions required to sustain OER ecosystems over time.

These four dimensions form the conceptual basis of the governance framework developed in this study.

2.6. Geographic Distribution of the Literature

The studies included in the synthesis represent a broad range of geographic contexts reflecting the global development of OER initiatives. The literature covers higher education systems across Europe, North America, Asia, Africa, and Latin America, as well as cross-national comparative studies and international policy analyses. This geographical diversity strengthens the generalizability of the conceptual framework and reflects the global relevance of OER sustainability debates.

2.7. Literature Selection Process

Initial database searches identified approximately 500 publications. After removing duplicate records, 440 studies remained for title and abstract screening. Following this stage, 120 studies were selected for full-text assessment. After applying the inclusion and exclusion criteria, approximately 80 studies were retained for thematic synthesis and conceptual analysis.

2.8. Data Transparency and Availability

This study relies exclusively on publicly available academic literature and policy documents. No original datasets were generated or analyzed during the course of the research. All sources used in the analysis are cited in the reference list and can be accessed through academic databases or institutional repositories. Consequently, there are no restrictions on data availability associated with this study.

2.9. Ethical Considerations

The study does not involve human participants, animal subjects, or sensitive personal data. As the research is based entirely on the analysis of publicly available literature and policy documents, ethical approval was not required.

2.10. Use of Artificial Intelligence Tools

Generative artificial intelligence tools were not used to generate empirical data, perform analytical procedures, or produce research findings in this study. Digital tools were used only for limited assistance in language editing and formatting of the manuscript. All conceptual analysis, interpretation of the literature, and development of the governance framework were conducted by the authors.

3. Results

The integrative review analyzed approximately eighty core studies selected from an initial pool of around five hundred publications. Through thematic coding and conceptual synthesis, recurring analytical patterns were identified in the literature on Open Educational Resources (OER) governance and sustainability in higher education. The results reveal four main clusters of findings: structural challenges affecting OER sustainability, institutional and policy determinants shaping adoption, contextual variation across higher education systems, and the emergence of four interrelated governance dimensions that support sustainable OER ecosystems [6,17,31,37].

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3.1. Structural Challenges in OER Sustainability

The literature consistently identifies a set of structural constraints that hinder the long-term sustainability of OER initiatives. These constraints are not merely technical but reflect deeper governance and institutional challenges [12–16,31,32].

Several studies report that the absence of clear policy frameworks represents a major barrier to OER development. Survey evidence indicates that approximately 89% of higher education institutions report insufficient legal or policy frameworks supporting OER implementation, while over 70% identify cultural resistance among faculty members toward open knowledge sharing [18,20,31].

The most frequently reported structural challenges include:

- fragmented governance arrangements across institutional units;
- dependence on short-term project funding or external grants;
- limited academic recognition for faculty contributions to OER production;
- lack of coherent institutional strategies for open education;
- uneven digital infrastructure across national and institutional contexts [14–17,19,31].

These findings indicate that OER sustainability depends not only on technological platforms and open licensing mechanisms but also on stable governance structures, institutional commitment, and supportive policy environments [14,16,22,23].

3.2. Institutional and Policy Determinants of OER Adoption

The review demonstrates that institutional policy environments play a decisive role in shaping OER adoption and sustainability. Across the analyzed studies, universities that embed open education initiatives within broader strategic frameworks show significantly higher levels of participation and resource development [10,11,14,26].

Three institutional determinants repeatedly emerged in the thematic analysis:

1. Institutional policy frameworks supporting open education strategies;
2. Faculty incentive systems recognizing open knowledge production;
3. Coordinated digital infrastructure supporting resource creation and sharing [15,17,32,39].

The literature further suggests that national policy contexts significantly influence institutional adoption patterns. While more than eighty formal OER policies have been documented globally, their distribution remains uneven across regions, with stronger institutional adoption typically occurring in countries that integrate open education into national digital learning strategies [8,21,25,34].

3.2.1. Contextual Variation in OER Adoption

An important finding concerns the contextual diversity of OER governance models across higher education systems. The literature indicates that the effectiveness of OER initiatives often depends on the developmental stage of adoption within a given institutional or national context [17,31,33].

For example, early-stage OER initiatives frequently rely on externally funded pilot projects, while more mature ecosystems tend to adopt hybrid sustainability models combining:

- institutional funding;
- collaborative inter-university partnerships;
- publicly funded digital infrastructure;
- service-based revenue streams [22–24,36].

This variation explains the apparent tension in the literature between studies advocating strong government funding and those emphasizing decentralized or community-driven models. In practice, sustainable OER systems often emerge through adaptive governance arrangements that evolve over time [23,24,31].

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3.3. Collaborative Knowledge Ecosystems

Another major theme identified in the literature is the increasing role of collaborative networks in sustaining OER initiatives. Rather than functioning as isolated repositories of educational materials, successful OER systems increasingly operate within distributed knowledge ecosystems involving universities, libraries, digital platforms, and policy organizations [23,38,42].

These ecosystems support open knowledge production through several mechanisms:

- cross-institutional collaboration in developing open textbooks and learning resources;
- shared digital repositories enabling resource reuse and adaptation;
- open licensing frameworks facilitating knowledge circulation;
- peer-review mechanisms supporting quality assurance of open materials [7,10,41,42].

Such collaborative structures enhance the resilience of open education systems by distributing resource development and governance responsibilities across multiple institutions. For example, collaborative initiatives such as the Open Education Consortium and national open education strategies in several countries illustrate how institutional policy frameworks and inter-university partnerships can support sustainable OER ecosystems [11,26,38].

3.4. Governance Dimensions of Sustainable OER Systems

Through thematic synthesis of the reviewed literature, four interrelated governance dimensions emerged as recurring analytical themes shaping the sustainability of OER ecosystems in higher education [6,17,31,37]. These dimensions were identified through iterative coding and comparison of governance mechanisms discussed across the selected studies.

Importantly, these dimensions do not operate independently. Instead, they interact dynamically within institutional systems, where changes in one dimension often influence the others. Together, they form the conceptual basis for governing OER as sustainable knowledge commons [28–30].

The four governance dimensions and their associated mechanisms are summarized in Table 1.

Table 1. Governance dimensions of sustainable OER ecosystems in higher education.

Governance Dimension	Key Mechanisms	Governance Outcomes
Institutional Embedding	Institutional OER policies; strategic integration; dedicated support units	Alignment of OER initiatives with university strategy
Participatory Stewardship	Collaborative authorship; peer review; stakeholder engagement	Shared responsibility for knowledge production
Equitable Access and Inclusion	Open licensing; multilingual resources; inclusive education policies	Reduced barriers to educational resources
Long-Term Resource Sustainability	Hybrid funding models; institutional support; collaborative infrastructure	Stability and resilience of OER ecosystems

3.4.1. Institutional Embedding

Institutional embedding refers to the integration of OER initiatives within university governance structures and strategic planning frameworks. Studies consistently show that initiatives embedded in institutional strategies and supported by administrative leadership demonstrate greater sustainability [14,26,39].

Key mechanisms include:

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- formal institutional OER policies;
- strategic integration of open education within teaching and learning frameworks;
- dedicated organizational units supporting OER development [10,11,14].

3.4.2. Participatory Stewardship

Participatory stewardship emphasizes collaborative governance involving multiple stakeholders, including faculty members, librarians, instructional designers, and students. Such approaches encourage shared responsibility for the development and maintenance of open educational resources [23,38,42].

Common practices include:

- collaborative authorship of open textbooks;
- peer-review processes for open educational materials;
- community-based quality assurance mechanisms **[7,41,42]**.

3.4.3. Equitable Access and Inclusion

Equitable access remains a central objective of OER initiatives. Numerous studies demonstrate that open educational materials can significantly reduce the financial burden of educational resources and expand access to knowledge [2,5,36].

However, equitable access also depends on broader structural conditions, including:

- digital infrastructure availability;
- language diversity in open educational materials;
- institutional support for inclusive education policies [17,20,36].

3.4.4. Long-Term Resource Sustainability

The final governance dimension concerns the financial and organizational sustainability of OER ecosystems. The literature consistently indicates that no single funding model guarantees sustainability across all contexts [22–24,31].

Instead, many successful initiatives rely on hybrid governance models combining multiple funding sources and collaborative partnerships. These arrangements allow institutions to maintain digital infrastructure, update educational materials, and sustain academic participation in open knowledge production [23,36,37].

3.5. Integrated Governance Framework

Taken together, these findings indicate that sustainable OER systems require integrated governance arrangements linking institutional strategy, collaborative knowledge production, equitable access policies, and long-term resource sustainability [6,11,17,31,37].

Within this framework, OER initiatives are best understood not as isolated repositories of open content but as governable knowledge commons embedded within higher education systems, where policy design, institutional culture, technological infrastructure, and academic participation interact to shape the sustainability of open knowledge ecosystems [28–30].

4. Discussion

The findings of this integrative review contribute to ongoing debates on the sustainability and governance of Open Educational Resources (OER) in higher education. By synthesizing research on open education, higher education policy, and commons governance theory, the study proposes a governance-oriented interpretation of OER ecosystems. Previous scholarship has emphasized that OER initiatives expand access to knowledge and reduce the cost of learning materials [1,2,5,36]. However, the results of this study indicate that long-term sustainability depends not only on open

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licensing and technological infrastructure but also on broader institutional governance arrangements and policy environments within higher education systems [10,14,17,31].

A central implication of the results is that OER sustainability should be understood as a systemic governance challenge rather than merely a technical or pedagogical issue. Early OER research largely focused on access and affordability benefits [2,5], whereas more recent studies emphasize the importance of institutional strategies, policy frameworks, and governance mechanisms for sustaining open education initiatives [6,11,14,31]. The findings of this study reinforce this perspective by demonstrating that sustainable OER ecosystems typically emerge in institutions where open education initiatives are embedded within broader strategies for digital learning and academic innovation.

The results also confirm the growing importance of institutional policy frameworks in shaping OER adoption. Universities that develop explicit open education policies, faculty incentive systems, and institutional support structures tend to demonstrate higher levels of OER integration and collaboration [10,11,15,39]. Institutional governance therefore functions as an enabling environment for open knowledge practices, either facilitating or constraining open educational innovation. This observation aligns with previous research emphasizing that policy alignment and administrative leadership are key determinants of sustainable OER ecosystems [14,26,39].

At the same time, the literature reveals important tensions regarding the governance of OER systems. Some studies emphasize the importance of strong public funding and government-led initiatives to support open education infrastructures [25,27], whereas others highlight the sustainability of decentralized or community-driven models of open knowledge production [7,23]. Rather than representing conflicting perspectives, these approaches may reflect different stages in the development of OER ecosystems. In early stages, public funding and governmental support often play a crucial role in establishing open education infrastructures, while more mature ecosystems tend to evolve toward hybrid governance arrangements combining institutional funding, collaborative partnerships, and community-based knowledge production [22–24,31].

Another key insight concerns the collaborative nature of sustainable OER ecosystems. The literature increasingly describes OER initiatives as distributed knowledge networks involving universities, libraries, digital platforms, and policy organizations [23,38,42]. Such collaborative ecosystems facilitate resource sharing, reduce development costs, and enhance the resilience of open education systems. By distributing responsibilities for knowledge production and maintenance across multiple actors, collaborative governance arrangements help sustain open educational infrastructures over time [23,38].

The four governance dimensions identified in this study—institutional embedding, participatory stewardship, equitable access and inclusion, and long-term resource sustainability—provide a conceptual framework for understanding how OER initiatives can function as sustainable knowledge commons. Commons governance theory suggests that sustainable shared resources require institutional coordination, stakeholder participation, and stable governance arrangements [28–30]. When applied to open education systems, these principles help explain how universities can transform isolated OER initiatives into sustainable knowledge-sharing ecosystems.

4.1. Practical Implementation Challenges

Despite the growing recognition of the benefits of OER, several practical challenges continue to hinder their widespread adoption. One of the most frequently reported barriers concerns faculty resistance and lack of professional recognition for OER development. Academic reward systems in many universities continue to prioritize traditional research outputs rather than open educational contributions [15,32,39].

Financial sustainability also represents a persistent challenge. Many OER initiatives depend on short-term project funding or external grants, which may not provide stable long-term support for maintaining digital infrastructures and updating educational resources [22–24]. In addition, unequal

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digital infrastructure across higher education systems may limit the effective implementation of open education initiatives, particularly in institutions with limited technological capacity [17,20,33].

Addressing these challenges requires coordinated governance strategies that integrate policy development, faculty incentives, and institutional infrastructure investments.

4.2. Policy Implications for Sustainable OER Governance

The findings of this study also have several important implications for higher education policy and institutional governance. First, governments and higher education institutions can support OER sustainability by developing national and institutional open education strategies. Such policies may provide legal frameworks, funding mechanisms, and quality assurance standards that encourage the development and dissemination of open educational resources [8,25,34].

Second, universities may strengthen OER ecosystems by introducing faculty incentive programs recognizing contributions to open knowledge production, including open textbooks and digital learning resources. Integrating OER activities into promotion and tenure criteria could significantly increase academic participation in open education initiatives [15,32,39].

Third, public funding policies may encourage the release of educational resources produced through publicly funded research or teaching projects under open licenses. Such policies can expand access to publicly funded knowledge and contribute to more equitable global knowledge systems [8,25,27].

4.3. Limitations and Future Research

Several limitations should be acknowledged. First, this study relies on an integrative review of existing literature rather than primary empirical data. Although this approach enables the synthesis of diverse research traditions, it may not fully capture emerging institutional practices that have not yet been extensively documented in academic publications.

Second, the literature included in this review is primarily drawn from English-language sources, which may introduce a degree of language bias. In addition, the majority of existing studies originate from higher education systems in North America and Europe, potentially reflecting a degree of geographical publication bias.

Future research could address these limitations through comparative empirical studies examining OER governance across different institutional and national contexts. Longitudinal research may also help clarify how OER ecosystems evolve over time and how hybrid sustainability models develop in response to changing policy environments in higher education [31,33,37].

Overall, the results contribute to a growing body of scholarship that interprets open education not simply as a technological innovation but as part of a broader transformation toward collaborative and sustainable knowledge systems in higher education [28–30,37].

5. Conclusions

This study examined the governance and sustainability of Open Educational Resources (OER) in higher education through an integrative review of global scholarship. The findings demonstrate that the long-term viability of OER initiatives depends not only on open licensing and technological infrastructures but also on broader institutional governance arrangements and policy environments that shape open knowledge practices within universities [10,14,17,25].

The analysis identified four interrelated governance dimensions that structure sustainable OER ecosystems: institutional embedding, participatory stewardship, equitable access and inclusion, and long-term resource sustainability. Together, these dimensions provide a conceptual framework for understanding how open education initiatives can evolve from isolated repositories of digital content into sustainable knowledge commons embedded within higher education systems [6,31,37].

Importantly, the literature also suggests that the effectiveness of these governance dimensions depends on contextual adaptation. Governance strategies for OER vary across institutional and

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national contexts, particularly according to the developmental stage of open education initiatives and the policy environments in which universities operate [17,31,33]. Consequently, the framework proposed in this study should be applied flexibly, recognizing that sustainable OER systems emerge through context-sensitive governance arrangements.

Despite the growing momentum of open education initiatives, several practical challenges remain. These include faculty resistance to open knowledge practices, insufficient institutional incentives, unstable funding mechanisms, and uneven digital infrastructure across higher education systems. Addressing these challenges requires coordinated institutional leadership, supportive policy frameworks, and collaborative knowledge networks across universities and educational organizations [15,22,23,38].

From a policy perspective, the findings highlight the importance of coherent national and institutional strategies for open education. Such strategies may include the development of national OER policies, public funding mechanisms for openly licensed educational materials, and academic incentive structures that recognize open knowledge production as a valuable scholarly contribution [8,25,34].

This study also has several methodological limitations. As an integrative review, the analysis is based on previously published literature and may reflect publication biases or geographical imbalances within existing scholarship. Furthermore, the rapidly evolving nature of open education initiatives means that governance models may continue to change as digital learning ecosystems develop.

Future research may extend this framework through comparative empirical studies examining governance models for OER across diverse institutional contexts. Longitudinal research may also provide deeper insights into how hybrid sustainability models evolve over time and how governance arrangements influence the resilience of open knowledge ecosystems [31,33,37].

Overall, this study contributes to the growing recognition that open educational resources are not merely technological innovations but essential components of sustainable knowledge systems in contemporary higher education [28–30,37].

Author Contributions: Conceptualization, F.A.A. and A.O.A.; methodology, F.A.A. and A.O.A.; formal analysis, F.A.A.; investigation, F.A.A. and A.O.A.; writing—original draft preparation, F.A.A.; writing—review and editing, F.A.A. and A.O.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Acknowledgments: During the preparation of this manuscript, the author used generative artificial intelligence tools for language refinement and conceptual organization. The author reviewed, edited, and takes full responsibility for the content of this publication.

Conflicts of Interest: The author declares no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:

OER	Open Educational Resources

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