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Governance of university industry research and development collaboration for innovation in transition economies

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Abstract

University–industry collaboration (UIC) in research and development (R&D) is increasingly recognized as a critical driver of innovation, competitiveness, and sustainable development. Yet, in transition economies shaped by post-conflict or authoritarian legacies, such collaboration often remains fragmented, weakly institutionalized, and constrained by limited trust and governance capacity. Focusing on Kosovo and Albania as illustrative contexts for countries with transition economies, this study examines how governance conditions shape the development and sustainability of university–industry R&D collaboration and identifies the institutional factors that distinguish transitional settings from more established innovation systems.

Drawing on a structured review of 57 peer-reviewed studies and integrating insights from the Triple Helix Model, National Innovation Systems, and Governance Theory, the study finds that the effectiveness of UIC in transitional economies depends not simply on the presence of universities, firms, and public institutions, but on the quality of the governance relationships connecting them. The evidence identifies weak institutional coordination, fragmented policy frameworks, limited mutual trust, insufficient university autonomy and research capacity, misaligned academic and industrial incentives, and historically embedded institutional legacies as mutually reinforcing barriers to sustained R&D collaboration. These constraints limit the capacity of conventional university–industry collaboration models to explain or support innovation in post-conflict and post-authoritarian environments.

Conceptually, the paper advances a context-sensitive collaborative governance perspective on UIC, arguing that governance in transitional economies should be understood as a dynamic process of institutional coordination, trust-building, policy alignment, and progressive consolidation of relationships among universities, industry, and government. Rather than assuming mature innovation institutions as a starting condition, the proposed perspective recognizes institutional fragility and historical legacies as integral dimensions of the collaboration process. It therefore extends established Triple Helix and innovation-system approaches by foregrounding the governance mechanisms required for university–industry relationships to emerge, stabilize, and generate sustainable R&D outcomes in transitional contexts.

The study contributes to the literature by connecting previously fragmented insights on institutional governance, innovation systems, and university–industry relations and by establishing a conceptual foundation

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for future empirical investigation in Kosovo, Albania, and comparable transition economies. It also provides practical implications for policymakers, universities, and industry stakeholders seeking to strengthen innovation ecosystems through more coherent policies, trust-based partnerships, institutional capacity-building, and better alignment of academic and industrial priorities. In doing so, the study positions well-governed university–industry R&D collaboration as an important mechanism for advancing SDGs 4, 8, 9, and 17 and supporting innovation-led sustainable development.

Keywords Structured literature review · Academia–industry collaboration · R&D governance · Innovation systems · Transitional economies · Co-creation · Sustainable development goals · Albania · Kosovo

1 Introduction

University–industry collaboration (UIC) is widely recognized as an important mechanism for strengthening research, innovation, and economic development; however, considerably less is known about how such collaborations should be governed in transitional economies shaped by post-conflict and post-authoritarian legacies. Existing research has largely examined the benefits, forms, and determinants of university–industry relationships, while the governance mechanisms that determine their effectiveness and sustainability, particularly in institutionally fragile contexts, remain insufficiently explored. This gap is especially relevant to Kosovo and Albania, where weak institutional coordination, limited trust, fragmented innovation policies, and distinct historical legacies continue to influence relationships between universities, industry, and government. Addressing this gap, the present study examines governance as a central factor shaping university–industry R&D collaboration and contributes to the literature by bringing together perspectives from the Triple Helix Model, National Innovation Systems, and Governance Theory to develop a more context-sensitive understanding of collaborative governance in transitional economies.

This study presents an in-depth examination of the literature concerning the role of governance in academia–industry R&D collaboration, its influence on innovation, and its broader relevance to economic development. The review is organized around five key themes: (1) the contribution of R&D and innovation to economic growth, (2) the types and motivating factors behind academia–industry partnerships, (3) governance frameworks that enable and shape these collaborations, (4) the impact of historical and institutional legacies in transitional economies, and (5) the theoretical frameworks underpinning the study.

UICs have emerged as central to national innovation strategies, especially in developing countries where aligning academic expertise with industrial needs is critical for addressing social, economic, and environmental challenges. UICs foster a platform for knowledge exchange, technical advancement, and sustainable growth, enabling universities to offer advanced research capabilities and industries to bring real-world applications [1]. This synergy allows both sectors to tackle complex problems more effectively, promoting breakthroughs in research and rapid knowledge transfer, which lead to new marketable technologies and processes [2].

In developing countries and transition economies, UICs are essential for economic and social progress, where limitations in funding, research infrastructure, and skilled workforce restrict R&D potential. By bridging academia and industry, UICs provide access to resources that may otherwise be unattainable, enabling regions to build local resilience and technological capabilities critical for participation in the global economy [3].

Furthermore, UICs contribute to sustainable development, especially in areas with acute environmental challenges. Collaborations can yield locally tailored solutions, such as resource-efficient agricultural practices and renewable energy technologies, which align with national sustainability goals [4]. This study examines academia–industry R&D collaboration as a driver for innovation and sustainable economic growth in Albania and Kosovo. Both countries, emerging from transitional economies, face significant challenges in maintaining sustainable economic growth, addressing high unemployment rates, and fostering innovation. Albania, shaped by

post-communist authoritarianism, and Kosovo, reconstructing after the 1998–1999 war, represent distinct yet comparable post-transition settings where governance of UICs remains underdeveloped.

Understanding how these themes intersect is essential to analyze how collaborative research and innovation partnerships can be effectively governed, especially in fragile and post-transition environments such as Kosovo and Albania.

These countries, emerging from war and authoritarianism respectively, face challenges related to institutional capacity, trust, and policy alignment that directly affect the functioning and outcomes of university–industry collaboration [5]. While there is an extensive body of literature exploring university–industry linkages and their benefits [6], fewer studies explore how governance mechanisms, such as decision-making structures, incentive systems, and accountability frameworks, shape collaboration outcomes [7]. Even less attention is given to how such governance structures operate in transition economies or adapt to historical institutional legacies [8].

Theoretical models such as the Triple Helix [9], National Innovation Systems [10], and Open Innovation [11] serve as the conceptual backbone. The main research question is: How do governance models in University–Industry R&D collaborations drive innovation and sustainability in post-conflict countries vs. post-communist countries?

Three sub-questions focus the study: (1) How do different governance models shape the effectiveness of UICs in transitional economies? (2) In what ways do historical and institutional legacies influence governance in post-conflict (Kosovo) and post-communist (Albania) contexts? (3) How do governance models in UICs contribute to innovation capacity, sustainability, and inclusive economic development in resource-constrained environments? This sets the theoretical and empirical foundation for the research by synthesizing existing literature, identifying key gaps, and justifying the focus on governance in post-war and post-dictatorship contexts. It positions the research within ongoing academic debates while highlighting the need for comparative empirical analysis of how R&D collaboration is governed and operationalized in Kosovo and Albania.

Governance structures are critical to the success of UICs, particularly in resource-constrained environments. Effective governance frameworks provide guidance on intellectual property (IP) rights, funding mechanisms, and accountability, ensuring that partnerships remain equitable and productive [12]. Institutional support is particularly important in developing regions, where regulatory and funding environments may be underdeveloped. Government policies and incentives, such as public–private partnerships, further enhance UIC success by mitigating financial and operational risks [13]. The final purpose of this study is to explore how UICs can support sustainable innovation and economic growth in developing countries through the right governance models.

By critically analyzing existing literature, this study aims to understand how governance structures and strategic growth models can best facilitate UICs that drive both technological advancement and environmental stewardship. Through this exploration, the paper seeks to provide insights into effective policy frameworks and institutional practices, offering guidance for stakeholders in developing regions to foster UICs that support long-term sustainability and inclusive economic growth.

2 Methodology

This study provides a comprehensive review of the literature relevant to the role of governance in academia–industry R&D collaboration, its impact on innovation, and the broader implications for economic development. The literature review is structured around five core thematic areas: (1) the role of R&D and innovation in economic development, (2) the forms and drivers of academia–industry collaboration, (3) governance models that support and structure such collaboration, (4) the influence of historical and institutional legacies in transition economies, and (5) the theoretical foundations that inform this study.

2.1 Stage one: identification

The initial search was conducted across three databases: Scopus, Web of Science, and Google Scholar, using the search string: ("university-industry collaboration" OR "academia-industry R&D" OR "UIC") AND ("governance" OR "innovation systems" OR "transition economy" OR "post-conflict" OR "post-communist"). Additional key-words included "R&D partnerships," "sustainable development," "knowledge transfer," and "governance models." Searches were run from December 2025 to 12 March 2026 by Dardane Nuka. The search was not restricted to a fixed ten-year window; foundational theoretical works were included regardless of publication date, while empirical studies were prioritised from 2000 onwards. The search returned for a combined total of approximately 150 records before de-duplication from records from Scopus, Web of Science, and Google Scholar. Records were exported to Excel, where 93 duplicate or similar records were identified and removed, leaving 57 unique records for screening.

2.2 Stage two: screening and selection

Screening was conducted in two sequential stages against the inclusion and exclusion criteria presented in Table 1. In the first stage, the titles and abstracts of all identified unique records were screened by the first author (Dardane Nuka) to assess their relevance to the scope of the review. Records were excluded where they addressed university–industry collaboration purely from a technical perspective without engaging with governance, institutional, or policy dimensions, or where they focused exclusively on advanced-economy contexts without providing transferable insights for transition settings. In the second stage, the full texts of potentially eligible records were assessed against the same inclusion and exclusion criteria. The screening decisions and final set of eligible studies were subsequently cross-checked by Ines Troshani and Ketrina Cabiri Mijo. Any uncertainties concerning eligibility or interpretation of the inclusion and exclusion criteria were discussed among the three authors and resolved by consensus (Fig. 1).

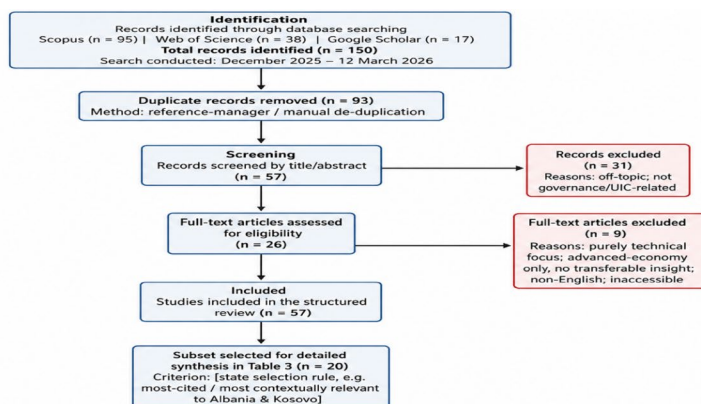
2.2.1 Stage three: synthesis and data extraction

Data from the 57 selected studies were extracted and organised thematically into a literature review matrix recording: research purpose, geographic and institutional context, governance or collaboration focus, key findings, and identified research gaps. The extracted information was synthesised across five thematic areas to identify patterns, tensions, and opportunities. Table 2 presents a structured synthesis of 20 representative studies drawn from the full corpus, selected to illustrate the breadth of governance approaches, theoretical frameworks, and geographic contexts covered. The full corpus covers 40 journals spanning innovation management, public policy, higher education, and development economics, with publications ranging from 1990 to 2026.

Table 1 Inclusion and exclusion criteria applied during the screening and selection process

Criterion	Inclusion	Exclusion
Language	English only	Non-English publications
Publication type	Peer-reviewed journal articles and book chapters from established publishers	Theses, conference abstracts, blog posts, or grey literature without peer review
Time period	1990–2026; foundational theoretical works included regardless of date	Publications before 1990 unless of foundational theoretical significance
Topic focus	University-industry R&D collaboration; governance of UICs; innovation systems; transition or developing economies	Studies purely technical in focus with no governance, institutional, or policy dimension
Geographic scope	Global; priority to transition, post-conflict, and post-authoritarian contexts	Studies exclusively focused on advanced-economy UICs with no transferable insights
Accessibility	Full text available via Scopus, Web of Science, or Google Scholar	Abstracts only; inaccessible full texts

Fig. 1 PRISMA-style flow diagram of the identification, screening, and inclusion process. Values indicate the number of records at each stage



2.3 Quality appraisal

Because the corpus combines conceptual, theoretical, and empirical studies, a simplified quality-appraisal checklist adapted from the Critical Appraisal Skills Programme (CASP) framework was applied to each of the 57 included studies rather than a design-specific tool such as the Mixed Methods Appraisal Tool. Each study was rated on the six criteria in Table 4 using a three-point scale (2 = criterion clearly met; 1 = partially met; 0 = not met), producing a quality score between 0 and 12. Studies scoring below 6 were retained in the corpus but flagged as lower-confidence sources and interpreted with additional caution during synthesis; no study was excluded on quality grounds alone. Quality appraisal was carried out by Dardane Nuka and cross-checked by Ines Troshani and Ketrina Cabiri Mijo. Any uncertainties in the application of the appraisal criteria were discussed and resolved by consensus among the three authors. Scores for all 57 studies are available on request (see Data Availability).

2.4 Coding framework, data extraction, and synthesis

Data from the 57 included studies were extracted into a structured coding framework recording six dimensions for each study: (1) research purpose, (2) geographic and institutional context, (3) governance or collaboration focus, (4) theoretical lens applied, (5) key findings, and (6) identified research gaps. Coding was carried out by Dardane Nuka and cross-checked by Ines Troshani and Ketrina Cabiri Mijo for consistency. The coded corpus was then mapped onto the five thematic areas structuring the literature review in Sect. 3 (R&D and innovation for economic development; academia-industry collaboration forms, benefits, and challenges; governance of academia-industry collaboration; historical and institutional legacies in transition economies; and innovation-systems theoretical foundations), allowing patterns, tensions, and gaps to be identified both within and across themes.

Table 2 presents a structured synthesis of 20 studies selected from the most frequently cited and conceptually central this subset is illustrative of the corpus rather than a separate sample, and all 57 studies informed the synthesis reported in Sect. 3. Table 3 shows a simplified CASP-based quality appraisal checklist applied to the 57 included studies. Table 4 presents an overview of the resulting coding framework and the full 57-study corpus. The full corpus covers 40 journals spanning innovation management, public policy, higher education, and development economics, with publications ranging from 1990 to 2026.

The development of thematic categories followed a hybrid deductive-inductive process typical of structured literature reviews. An initial set of coding categories was derived deductively from the five theoretical frameworks underpinning the review (NIS/RIS, the Triple Helix Model, Open Innovation, the Knowledge-Based View, and Governance Theory; see Sect. 3.5), which supplied provisional governance-related constructs such as coordination mechanisms, trust, institutional legacy, and knowledge-transfer channels.

Table 2 Synthesis matrix of reviewed studies: author, context, focus, key finding, and gap addressed

Author(s) & Year	Title (abbreviated)	Country / Context	Collaboration / Governance Focus	Key Finding	Gap Identified
Awasthy et al. (2020)	A Framework to Improve UIC	Australia (ACT)	Holistic UIC framework; stakeholder engagement; IP and technology transfer	Proposes comprehensive framework consolidating fragmented best practices across all collaboration dimensions	UIC best-practice literature is fragmented; no prior holistic framework integrating all key dimensions
Hou et al. (2019)	Academia-Industry Collaboration, Government Funding and Innovation Efficiency	China (panel 2009–2015)	Government funding and UIC effects on innovation efficiency; university vs. research institute roles	UIC and RIC have distinct effects on innovation efficiency; government funding impact varies by regional capacity	Prior studies treat universities and research institutes as single entity; government funding effects inconclusive
Rossoni et al. (2024)	Barriers and Facilitators of UIC for RD&I	Global (86 articles reviewed)	Barriers and facilitators across Triple Helix, social capital and technology transfer frameworks	Fragmented literature systematically categorised; strategies for overcoming collaboration barriers proposed	No prior study integrated multiple theoretical frameworks to analyse both barriers and facilitators together
Wallin et al. (2014)	Bridging the Gap: Three Mechanisms for Innovation Efficiency	Sweden (aerospace industry)	Strategic, tactical and operational collaboration mechanisms; designedly approach to UIC	TRL tool, co-creation workshops and prototyping improve communication and alignment between partners	Lack of practical mechanisms to reconcile differing time horizons and objectives between academia and industry
Alpaydin & Fitjar [2]	How do UICs Benefit Innovation? Direct and Indirect Outcomes	Norway (national innovation system)	Formal, informal and education-oriented UIC types; proximity development between firms and universities	Different UIC types produce distinct innovation outcomes; informal UICs build trust and cognitive proximity	Informal and education-oriented collaborations overlooked; indirect proximity benefits underexplored
Warshaw & Hearn [54]	Leveraging University Research for Economic Development	USA (Georgia, Missouri, Texas)	Triple-helix policy dynamics; stakeholder roles in university-industry-government collaboration	State-level policy variation shapes UIC governance; stakeholder boundary perceptions affect collaboration design	Empirical stakeholder perspectives on UIC governance underexplored; regional policy variation rarely studied
Cohen et al. [17]	Measuring the Impacts of UIC: A Systematic Review	Global (92 articles, 2000–2022)	Multidimensional UIC impact measurement; tangible and intangible, direct and indirect outcomes	UIC impacts are multidimensional; intangible and long-term impacts remain poorly captured by existing metrics	Prior work focuses on economic/technological outcomes; societal and environmental UIC impacts neglected
Teng et al. [51]	Modern Design Methods and Industry-Academia Collaboration	China (design industries)	Integration of design thinking and agile methods into UIC; knowledge transfer and talent development	Modern design methods enhance collaboration efficiency and innovation when structurally integrated into UIC	No prior framework systematically integrates modern design methods into UIC governance models
Mineiro et al. [38]	Quadruple and Quintuple Helix in Incubators and STPs	Brazil / Global review	QQH models in innovation environments; civil society and environmental actors as innovation drivers	QQH models underrepresented in incubator/STP literature; sustainability actors rarely formally integrated	Limited empirical analysis of QQH beyond Triple Helix; sustainability role in innovation environments underexplored
Ahmed et al. [1]	Strengthening the Bridge via the AICP Design Model	Pakistan (engineering and technology)	Structured Academia-Industry Collaboration Plan; curriculum-industry alignment processes and tools	AICP model bridges curriculum-industry gap; structured roadmap improves collaboration and graduate readiness	No prior structured collaboration model with explicit processes, methods and tools for practical implementation
Ankrah & Al-Tabbaa [4]	Universities-Industry Collaboration: A Systematic Review	Multi-country (global review)	Forms, motivations, processes and outcomes of UIC; process framework integrating five key UIC themes	Governance clarity and strategic alignment are key success factors; five themes integrated into unified framework	UIC literature fragmented; prior studies address one or two aspects only; balanced perspectives absent
Belderbos et al. [8]	Technological Activities and Financial Performance	Japan, USA, Europe (R&D-intensive firms)	Explorative vs. exploitative R&D; solo vs. collaborative technology strategies and firm financial performance	Explorative collaboration negatively affects market value; exploitative collaboration improves firm performance	Financial performance outcomes of exploration–exploitation balance and collaborative strategies underexplored

Table 2 (continued)

Author(s) & Year	Title (abbreviated)	Country / Context	Collaboration / Governance Focus	Key Finding	Gap Identified
Bstieler et al. [12]	Trust Formation in UI Collaborations in US Biotechnology	USA (biotechnology sector)	IP policies, shared governance and champions as trust formation mechanisms in UICs	Shared governance and champions mitigate IP-related trust barriers; trust drives knowledge transfer and innovation performance	Trust formation dynamics and role of champions in UICs underexplored; prior studies lack industry perspective
De Silva et al. [23]	Innovation Intermediaries and Collaboration: Knowledge-Based Practices	Europe (RTOs in EU-funded projects)	Knowledge-based practices of intermediaries; internal value creation in collaborative R&D projects	Innovation intermediaries generate financial and non-financial internal value through collaborative knowledge practices	Literature focuses on value for clients only; internal value creation mechanisms of intermediaries ignored
Rybníček & Konigsgruber (2018)	What Makes Industry-University Collaboration Succeed?	Multi-country (systematic review)	Critical success factors for UICs; relationship management; governance structures and mutual trust	Governance clarity, strategic alignment and mutual trust are primary determinants of UIC success	UIC success factors fragmented across studies; no comprehensive framework previously synthesised
Rauter et al. [53]	Open Innovation and Economic/Sustainability Performance	Europe (industrial firms survey)	Open innovation partner range including NGOs and intermediaries; economic vs. sustainability trade-offs	Broader partner range improves sustainability performance; no inherent trade-off between economic and sustainability goals	Role of NGOs and intermediaries in open innovation ignored; economic-sustainability goal relationship unclear
Rossi & Rosli [47]	Indicators of University-Industry KT Performance	United Kingdom	KT performance measurement; HE-BCI survey indicators; university knowledge transfer activities	Current KT indicators inadequate; non-monetary outcomes and discipline-specific differences not captured	No theoretical analysis of KT performance metrics; no alternative measurement frameworks proposed
Miotti & Sachwald [39]	Co-operative R&D: Why and With Whom?	France (CIS-2 survey)	Partner choice in R&D collaboration; resource-based perspective; university vs. industry vs. competitor partners	Partner type determines R&D cooperation outcomes; universities contribute to exploratory R&D, suppliers to applied	No integrated framework connecting why firms cooperate, with whom, and what outcomes result
Love et al. [33]	Learning from Openness: Breadth in External Innovation Linkages	Ireland (manufacturing firms)	Learning effects from external innovation linkages over time; open innovation breadth and dynamic capability	Experience with external linkages improves ability to benefit from future collaborations; learning is cumulative	Dynamic learning effects of external linkages under-realized; longitudinal open innovation benefits ignored
Kafourous et al. (2015)	Academic Collaborations and Firm Innovation in China: Regional Institutions	China (emerging market enterprises)	Sub-national institutional variations; IPR enforcement; international openness; university research quality	Regional institutional quality moderates academic collaboration benefits; IPR enforcement critical for innovation outcomes	Sub-national institutional heterogeneity in emerging markets ignored; most studies assume uniform institutional environments

Table 3 Simplified CASP-based quality appraisal checklist applied to the 57 included studies

Criterion	Guiding question
Clarity of aims	Are the study's research aims or objectives clearly stated?
Appropriateness of methodology	Is the research design (conceptual, qualitative, quantitative, or mixed) appropriate to the aims?
Rigour of theoretical or empirical grounding	Is the argument grounded in a clearly specified theoretical framework or in transparently reported empirical evidence?
Clarity of findings	Are the findings clearly presented and adequately supported by the evidence or argument offered?
Contextual relevance	Does the study offer insight transferable to transition, post-conflict, or post-authoritarian settings?
Contribution to knowledge	Does the study make an identifiable contribution to the governance, innovation-systems, or UIC literature?

Table 4 Overview of the structured literature review matrix (coding framework applied to the 57 included studies)

Category	Details
Total Number of Papers Reviewed	57
Number of Journals	40
Topics Covered	Frameworks & Mechanisms; Barriers & Facilitators; Innovation Outcomes; Government & Policy Role; Sustainability; Knowledge Transfer; Success Factors; Types of Collaboration; Impact Measurement; University Role in Entrepreneurship
Research Contexts	Regional and National Innovation Systems (Australia, China, USA); Sector-Specific Collaborations; Emerging Markets and Developing Economies; Government and Policy Influences; Knowledge Economies and Global Knowledge Transfer; Triple, Quadruple, and Quintuple Helix Models
Time Frame of Publications	Last 30 years (1990–2026)

These provisional categories were then applied to the coded corpus and refined inductively through a constant-comparison process: codes that recurred consistently across multiple studies within a thematic area were retained and consolidated into the five thematic areas structuring Sect. 3, while codes that appeared across several thematic areas rather than within a single one were flagged separately as candidate cross-cutting patterns. This second set of cross-cutting codes, once consolidated and checked against the full corpus, forms the analytical basis for the five research gaps presented in Sect. 4. Coding and theme development were led by Dardane Nuka across two iterative rounds, with the resulting thematic categories cross-checked by Ines Troshani and Ketrina Cabiri Mijo. Where ambiguities concerning category boundaries arose, these were discussed among all three authors and resolved by consensus. Data extraction and coding were managed using Microsoft Excel.

The reviewed literature demonstrates that university–industry collaboration (UIC) has evolved from a narrow focus on technology transfer toward more comprehensive governance and innovation ecosystem models. Across diverse contexts, studies consistently highlight governance clarity, strategic alignment, stakeholder engagement, trust, and effective communication as critical determinants of successful collaboration. Several authors emphasize that UIC generates multidimensional benefits, including innovation efficiency, knowledge transfer, talent development, sustainability performance, and regional economic growth.

The review also reveals the growing importance of broader innovation frameworks such as the Triple, Quadruple, and Quintuple Helix models, which incorporate government, civil society, and environmental actors into collaborative ecosystems. At the same time, significant gaps remain in the literature.

Existing research is often fragmented, focusing on isolated aspects of collaboration rather than providing integrated frameworks that connect governance, processes, outcomes, and contextual factors. Important dimensions such as informal collaborations, trust-building mechanisms, societal and environmental impacts, intermediary organizations, regional institutional differences, and practical implementation tools remain underexplored.

Furthermore, current measurement approaches tend to prioritize economic and technological outputs while inadequately capturing long-term, non-monetary, and sustainability-related outcomes. Collectively, these studies indicate a need for more holistic, context-sensitive, and multidisciplinary models that better explain how university–industry collaborations can contribute to innovation, sustainability, and regional development.

The 20 studies presented in Table 2 were selected as the most frequently cited and conceptually central works within each of the five thematic areas listed above. This subset is intended to illustrate the coding framework in depth and to ground the thematic synthesis in Sect. 3 in specific, traceable sources; it is not a separate sample, and conclusions in this review draw on the full 57-study corpus.

3 Main research question

The literature review of this research paper has identified research gaps that underscore the need for further investigation into how UICs can foster long-term sustainability and inclusive growth in developing regions. Specifically, there is limited understanding of the impact of various governance models on the success of UICs, especially in resource-constrained environments.

More research is required to explore how different governance structures influence the effectiveness of UICs in supporting local innovation and addressing sustainability objectives. Furthermore, while government policies are recognized as pivotal in enabling these collaborations, there remains a gap in understanding how specific policy interventions shape the outcomes of UICs, particularly with respect to sustainability and economic development [14].

The research question of this paper focuses on understanding how academia-industry collaborations in research and development can drive innovation and sustainable economic growth in transitional economies, specifically in Albania and Kosovo. The study aims to answer how these collaborations bridge the gap between academic research and industrial needs, and how they contribute to addressing economic challenges, boosting competitiveness, and fostering sustainable socio-economic development within these regions.

Therefore, the main research question derived from this review, therefore, is: "How do governance models in University-Industry R&D collaborations drive innovation and sustainability in post conflicts countries vs post communism countries?".

While three sub questions that lead the focus of this study are: while keeping the scope focused and meaningful are:

- How do different governance models shape the effectiveness of university–industry R&D collaborations in transitional economies?
- In what ways do historical and institutional legacies influence the design and implementation of governance structures in post-conflict (Kosovo) and post-communist (Albania) contexts?
- How do governance models in UICs contribute to innovation capacity, sustainability, and inclusive economic development in resource-constrained environments?

By addressing this question, future research can contribute valuable insights into the mechanisms by which UICs can become more impactful in fostering sustainable growth, offering guidance for policymakers and stakeholders seeking to maximize the benefits of UICs in developing regions.

4 Literature review

4.1 R&D and innovation for economic development

Research and development (R&D) has long been recognized as a cornerstone of innovation and a key driver of long-term economic development. It enables the creation of new knowledge, technologies, and processes that enhance productivity, competitiveness, and sustainable growth [15]. In both developed and developing economies, R&D activities—particularly when embedded in strong institutions and supported by coherent policies—play a catalytic role in transforming knowledge into socio-economic value [16].

The relationship between R&D investment and economic performance is well-documented. For instance, the innovation-led growth model emphasizes how technological change and knowledge creation contribute to economic transformation, particularly through knowledge spillovers, increased firm-level productivity, and the emergence of new industries [17]. In transition economies, where institutional and market structures are still evolving, the potential of R&D to accelerate economic development is especially significant, provided that the necessary support systems are in place [18].

National and regional innovation systems (NIS/RIS) frameworks have provided useful insights into the systemic nature of innovation and the role of institutions in shaping R&D outcomes [19]. These models highlight the importance of linkages among actors—universities, industry, and government—as well as the quality of governance and policy instruments that sustain collaboration and knowledge flows [20].

However, in the specific contexts of Kosovo and Albania, R&D remains underfunded and underutilized. According to OECD and World Bank reports, these countries invest significantly less in R&D compared to EU averages, and suffer from fragmented innovation systems, weak research infrastructure, and low levels of private sector engagement. The role of R&D in fostering economic development in such settings, therefore, depends not only on investment but also on the capacity to build effective institutional arrangements that support innovation-oriented collaboration between academia and industry.

In this light, understanding how R&D is governed and embedded in broader innovation systems is critical. It lays the groundwork for exploring how universities and businesses interact, how knowledge is transferred and commercialized, and how institutional and governance frameworks shape the developmental potential of research in transition economies.

4.2 Academia–industry collaboration: forms, benefits, and challenges

Academia–industry collaboration has become a central feature of modern innovation systems, where the exchange of knowledge, expertise, and resources between universities and firms supports both technological advancement and economic competitiveness [21]. The nature of these collaborations varies widely, ranging from informal interactions and consultancy to more formalized joint research projects, technology transfer agreements, commercialization of academic research, and the formation of academic spin-offs [22].

Universities contribute to these collaborations by offering research expertise, infrastructure, and access to skilled graduates, while industry partners provide practical insights, market orientation, and funding [23]. This mutual exchange enhances innovation capacity on both sides, enabling universities to align research with societal needs and businesses to access cutting-edge knowledge [24]. In regions with limited R&D infrastructure, such as Kosovo and Albania, these partnerships hold even greater potential for addressing systemic innovation gaps and building local technological capabilities.

However, the effectiveness of academia–industry collaboration is influenced by a variety of factors, including institutional culture, incentive systems, intellectual property (IP) regulations, and governance structures [25]. A significant body of literature has identified trust and communication as core enablers of collaboration, particularly in environments where historical or institutional legacies may hinder cooperation [26]. In transition economies, the lack of formalized systems for collaboration and weak technology transfer mechanisms often result in fragmented efforts and missed opportunities for innovation [27].

The governance of these collaborations plays a critical role in shaping outcomes. Governance refers to the frameworks through which universities and industry actors negotiate roles, share responsibilities, resolve conflicts, and align strategic objectives [28]. Effective governance includes not only formal agreements and organizational policies but also informal norms, relational trust, and third-party mediation [29]. In contexts like Albania and Kosovo, where institutions are still evolving, governance mechanisms must balance flexibility with structure, ensuring that collaborations are both adaptive and accountable.

Several models of collaboration governance have been discussed in the literature, ranging from centralized, top-down approaches to more distributed, network-based systems [30]. While centralized models may provide clear authority and oversight, network governance allows for greater participation, innovation, and responsiveness, critical attributes in dynamic or uncertain environments. In the Western Balkans, where post-conflict and post-authoritarian legacies have left a complex institutional landscape, identifying suitable governance approaches is crucial for sustaining long-term collaboration.

Another challenge frequently discussed is the misalignment of expectations and timelines. Industry often seeks rapid, market-oriented solutions, while academic institutions prioritize fundamental research and long-term

impact [31]. Bridging this gap requires mechanisms for ongoing dialogue, co-creation of research agendas, and capacity-building, areas that are still underdeveloped in many transition economies.

Finally, structural support mechanisms such as Technology Transfer Offices (TTOs), innovation hubs, and intermediary organizations can play a catalytic role in facilitating collaboration [32]. These entities help translate academic research into industry-relevant outcomes by managing IP, matchmaking partners, and guiding commercialization. However, in Kosovo and Albania, such support systems are often nascent or under-resourced, necessitating targeted investment and capacity development.

In sum, academia–industry collaboration represents a vital lever for innovation and economic development, particularly in settings where other sources of innovation are scarce. Yet the success of these collaborations hinges on the presence of robust governance structures, shared goals, mutual trust, and institutional mechanisms that support knowledge exchange. In the following sections, this study explores how these factors play out in the specific institutional and historical contexts of Albania and Kosovo, where the legacies of war and authoritarianism continue to shape the trajectories of innovation and collaboration.

4.3 Governance of academia–industry collaboration

Effective governance is central to the success of academia–industry R&D collaboration. Governance in this context refers to the structures, processes, and mechanisms that regulate, coordinate, and facilitate collaboration between academic and industrial actors. These mechanisms determine how decisions are made, how responsibilities are distributed, and how resources, knowledge, and risks are shared across institutional boundaries [7].

In developed economies, governance structures for R&D collaboration are often institutionalized through formal policies, strategic frameworks, and dedicated intermediaries such as technology transfer offices, innovation agencies, and research consortia [33]. These structures help mitigate the cultural and operational differences between universities and firms by providing standardized procedures for contract negotiation, intellectual property management, and research funding allocation. However, in transition economies such as Albania and Kosovo, governance models are typically fragmented or underdeveloped, limiting the potential for sustained and impactful collaboration [27].

Governance approaches vary widely. Centralized models, often driven by government or university leadership, offer clear strategic direction and resource control but may lack responsiveness and flexibility. Decentralized or network-based models, on the other hand, rely on shared norms, joint decision-making, and distributed accountability, making them more adaptive to complex, multi-actor environments [30]. The effectiveness of each model depends on contextual factors such as institutional maturity, policy alignment, and stakeholder trust.

The literature emphasizes that governance is not only about structure but also about relational dynamics. High levels of trust and transparency among partners often determine whether collaboration extends beyond short-term contracts into longer-term strategic alliances [26]. In post-conflict and post-authoritarian contexts, where public trust in institutions is often low, governance must also address the legacy of institutional fragility and political interference [34].

Another important dimension of governance is the role of intermediaries. Innovation hubs, incubators, and consortia can act as bridges between academia and industry, helping to structure partnerships, provide legal and administrative support, and align goals between divergent institutional cultures [35]. In environments with limited innovation infrastructure, intermediaries can play a transformative role in formalizing and scaling collaborative activities.

Governance also intersects with policy instruments. National innovation strategies, public–private partnership frameworks, and research funding schemes all shape how collaboration is initiated and sustained [36]. In the absence of clear policy support, universities and firms in Kosovo and Albania often rely on donor-driven or project-based collaboration, which may lack long-term sustainability or systemic integration.

Finally, governance affects not just collaboration processes but also outcomes. Studies have shown that effective governance correlates with higher levels of innovation outputs such as patents, spin-offs, and joint publications

[37]. Poorly governed collaborations, by contrast, often fail due to misaligned expectations, lack of accountability, or disputes over intellectual property.

In conclusion, governance is a critical, yet often overlooked, factor in determining the effectiveness of academia–industry R&D collaboration. As this review demonstrates, the specific governance models adopted in Kosovo and Albania are shaped by their historical trajectories and institutional capacities. Understanding these governance arrangements—and their impact on innovation—is essential for informing policy and practice in post-transition settings.

4.3.1 Centralized and decentralized governance models

Two primary governance models have emerged in the literature on UICs: centralized and decentralized governance. Centralized models are characterized by a strong regulatory role by government agencies, which manage funding allocation, set strategic priorities, and oversee compliance with national innovation policies. This model is often preferred in developing countries, where government intervention helps bridge gaps in research funding and supports institutions with limited resources [2]. For instance, centralized governance frameworks enable governments to provide targeted financial incentives, such as grants and subsidies, that encourage private-sector participation in collaborative R&D, while aligning research priorities with national economic goals [38].

In contrast, decentralized governance models emphasize flexibility, with decision-making power shared among universities, industries, and, in some cases, intermediary organizations. This model allows for dynamic, adaptable partnerships that can be tailored to the specific needs of each project or region. Decentralized governance fosters a collaborative environment where partners negotiate terms directly, often resulting in more efficient IP management and a greater sense of ownership and trust among stakeholders [39]. Decentralized models are also conducive to industries that operate on global scales and can leverage their own resources and research priorities without heavy reliance on public funds.

4.3.2 The role of government policies and institutions in governance

Government policies and institutional support are critical in shaping UIC governance, especially in developing countries where public support is often needed to catalyze innovation. Governments play a crucial role in setting up frameworks that address regulatory, financial, and operational aspects of collaboration, which helps streamline processes and reduce barriers to entry for private-sector participants. For example, policies that offer tax incentives or provide R&D grants are instrumental in encouraging companies to invest in collaborative projects with universities, thereby reducing the financial risks associated with these partnerships [12]. Additionally, government-led initiatives, such as science parks and innovation hubs, create spaces that facilitate interaction and resource sharing between academic and industrial actors [40].

In countries with emerging economies, governments can also support UICs by establishing dedicated technology transfer offices (TTOs) or knowledge transfer offices (KTOs), which play a key role in managing IP and guiding partnerships through the commercialization process [14]. These offices help navigate the complexities of IP laws and provide legal support, ensuring that both universities and industries can benefit from the research outputs. In doing so, TTOs and KTOs act as intermediaries that mitigate the risks associated with IP disputes and enhance the trust between academic and industrial collaborators [41].

Effective governance frameworks are fundamental to the success of University-Industry Collaborations (UIC), establishing guidelines for managing shared resources, intellectual property, and research outcomes. Several governance frameworks have been explored in UIC literature, from centralized models—where a central agency or government body manages UIC initiatives—to decentralized models that allow universities and industries to negotiate terms directly. Centralized governance frameworks are often effective in regions where government intervention supports large-scale projects, providing oversight and ensuring alignment with national priorities [42]. Conversely, decentralized models offer flexibility, allowing individual collaborations to cater to the unique

needs of each party and fostering a culture of mutual respect and understanding between universities and industries [39].

Further, government policies and institutions play a pivotal role in shaping and facilitating UICs, especially in developing countries. Policies that offer incentives such as grants, tax breaks, and intellectual property protection encourage industries to partner with academic institutions, reducing the financial and operational risks associated with R&D. Governments can also influence UICs by creating supportive environments through innovation hubs, incubators, and science parks that bridge the gap between academia and industry [43]. Additionally, regulatory frameworks that address issues of intellectual property (IP) rights and knowledge sharing are crucial for protecting the interests of both parties. Effective IP laws and dispute resolution mechanisms are particularly valuable in developing nations where legal systems may lack sophistication in handling complex IP matters, helping to ensure that collaborative innovations are commercially viable and legally protected.

4.3.3 Intellectual property management within governance frameworks

Effective IP management is central to UIC governance, as it determines how research outcomes are protected, shared, and commercialized. IP issues are often a source of contention in UICs, particularly in projects involving sensitive or proprietary information. Governance models that incorporate clear IP guidelines are essential for safeguarding the interests of both academic and industrial partners, promoting a balance of rights and obligations that foster innovation. For instance, IP frameworks that allow universities to retain rights to academic publications while granting industries access to commercialization rights are often successful in fostering long-term partnerships [44].

In many developing countries, IP protection is complicated by varying levels of legal infrastructure and regulatory clarity. Here, centralized governance models offer an advantage, as government agencies can provide a standardized approach to IP rights, making it easier for industries and universities to engage in collaboration without fearing infringement or loss of proprietary knowledge [45]. On the other hand, decentralized models may enable greater flexibility, allowing universities and industries to negotiate IP agreements based on the specific needs of each project. This flexibility, however, may require robust institutional support to navigate legal complexities, especially when IP laws are less developed or inconsistently applied.

4.4 Historical and institutional legacies in transition economies

Kosovo's rapid institutional reconstruction under international oversight has produced formally established universities and ministries, yet the system remains fragile characterised by low administrative capacity, political volatility, and limited R&D funding [46]. Many collaborative efforts between universities and businesses are externally funded and project-based, lacking continuity or strategic integration into national innovation policy [47]. This temporary nature weakens incentives for long-term partnerships and limits the institutionalisation of governance mechanisms for collaboration.

Albania presents a different yet equally complex case. Decades of centralised authoritarian rule prior to the 1990s produced a rigid, state-controlled education and economic system with limited room for academic autonomy or market-driven research. The legacy of institutional centralisation and bureaucratic inertia persists [48]. Universities continue to grapple with underfunding, low research output, and weak linkages to industry. Many industrial actors, predominantly small or informal enterprises, lack the absorptive capacity to engage in collaborative R&D [49]. Past experiences of top-down control have left institutional actors wary of centralised governance, creating additional barriers to trust-based cooperation and open innovation [50].

4.5 Innovation systems and theoretical foundations

Five theoretical frameworks underpin this study. (1) National and Regional Innovation Systems (NIS/RIS) describe the network of institutions, policies, and actors that influence innovation capacity, stressing knowledge flows, institutional alignment, and policy coherence [51]. (2) The Triple Helix Model analyses dynamic interaction between university, industry, and government, proposing that innovation emerges from overlapping roles and evolving partnerships [27]. (3) Open Innovation argues that firms must actively engage with external knowledge sources, framing collaboration as not just desirable but necessary, especially in resource-constrained environments like Kosovo and Albania [16]. (4) The Knowledge-Based View (KBV) of the Firm asserts that knowledge is the most strategically important resource a firm can possess, explaining firms' motivations and absorptive capacity in R&D collaboration [52]. (5) Governance Theory provides a framework for analysing the mechanisms and processes that coordinate interactions between multiple stakeholders, which can take hierarchical, market-based, or network-based forms [50].

4.5.1 Kosovo: a post-war innovation landscape

Kosovo, emerging from the 1998 to 1999 war, has undergone a process of rapid institutional reconstruction under international oversight. While this has led to the formal establishment of universities, ministries, and innovation-related bodies, the system remains fragile. Institutions are often characterized by low administrative capacity, political volatility, and limited funding for R&D [46]. The war's aftermath has also left a trust deficit between the public and institutional actors, making sustained collaboration between universities and industry more difficult [53].

The development of innovation ecosystems in Kosovo is further constrained by a reliance on donor-driven initiatives. Many collaborative efforts between universities and businesses are externally funded and project-based, which means they often lack continuity or strategic integration into national innovation policy [47]. This temporary nature weakens the incentives for long-term partnerships and limits the institutionalization of governance mechanisms for collaboration.

4.5.2 Albania: from dictatorship to market transition

Albania presents a different, yet equally complex, case. Decades of centralized authoritarian rule prior to the 1990s produced a rigid, state-controlled education and economic system, with limited room for academic autonomy, innovation, or market-driven research. Although major reforms were undertaken during the transition to democracy and a market economy, the legacy of institutional centralization and bureaucratic inertia persists [48].

Universities in Albania continue to grapple with underfunding, low research output, and weak linkages to industry. Industrial actors, many of which are small or informal enterprises, often lack the absorptive capacity to engage in collaborative R&D [49]. Moreover, past experiences of top-down control have left institutional actors wary of centralized governance, creating additional barriers to trust-based cooperation and open innovation [50].

4.5.3 Shared challenges and diverging trajectories

Despite their different histories, Kosovo shaped by post-conflict reconstruction and Albania by post-authoritarian transformation, both countries face common challenges: weak institutional capacity, limited funding, fragmented innovation systems, and underdeveloped governance for R&D collaboration. Yet their trajectories differ. Kosovo's university–industry collaboration is more dependent on international actors, while Albania's system reflects a slow adaptation of legacy institutions to market demands.

These historical legacies directly impact the design and functionality of governance models in academia–industry collaboration. In Kosovo, the absence of a pre-war innovation tradition necessitates institution-building

from the ground up, often without the benefit of embedded norms or practices. In contrast, Albania's legacy institutions must be reformed, reoriented, and re-incentivized to engage meaningfully with the private sector.

As this review demonstrates, recognizing and accounting for these historical and institutional influences is essential for evaluating governance models and collaboration strategies. It also provides the foundation for formulating context-sensitive policy recommendations that promote sustainable and effective R&D partnerships in transition economies.

4.6 Innovation systems and theoretical foundations

The study of academia–industry R&D collaboration and its governance is deeply rooted in the broader field of innovation systems and institutional theory. Several key theoretical frameworks provide the conceptual lens for analyzing how universities, industries, and governments interact to foster innovation and economic development. This section outlines the foundational theories that inform this research: the National and Regional Innovation Systems approach, the Triple Helix model, Open Innovation theory, the Knowledge-Based View of the Firm, and Governance Theory.

4.6.1 National and regional innovation systems (NIS/RIS)

The concept of National Innovation Systems (NIS) was first introduced by Freeman [30] and further developed by Lundvall [34] and Nelson [40], to describe the network of institutions, policies, and actors that influence the innovation capacity of a country. According to this framework, innovation does not occur in isolation but is embedded within a system of relationships among firms, universities, government agencies, and supporting institutions.

Regional Innovation Systems (RIS) extend this perspective to the sub-national level, emphasizing the role of regional institutions, local governance structures, and proximity in fostering innovation [51]. These models are especially relevant in fragmented or decentralized environments, such as those in transition economies, where innovation capabilities are often unevenly distributed across regions.

Both NIS and RIS theories stress the importance of knowledge flows, institutional alignment, and policy coherence, all of which are deeply influenced by the quality of governance. In the context of Kosovo and Albania, these frameworks help explain why innovation performance remains limited: the systems are either incomplete, poorly coordinated, or constrained by historical legacies [18].

4.6.2 Triple helix model

The Triple Helix Model developed by Etzkowitz and Leydesdorff [27] introduces a dynamic interaction between three institutional spheres: university, industry, and government. It proposes that innovation emerges from overlapping roles and evolving partnerships among these actors, rather than from linear, one-directional processes.

The model is particularly useful for studying academia–industry collaboration in developing and transitional contexts, where institutional boundaries are often blurred, and roles are still being negotiated. In the Western Balkans, for example, governments often act both as regulators and funders of research, while universities may simultaneously serve as knowledge producers and economic development agents. The Triple Helix framework helps to analyze how these roles are formalized—or contested—through governance arrangements.

4.6.3 Open innovation

The Open Innovation paradigm, as proposed by Chesbrough [16], argues that firms can no longer rely solely on internal R&D but must actively engage with external knowledge sources, including universities. This approach

highlights the permeability of institutional boundaries and the value of collaboration, licensing, spin-offs, and joint ventures in accelerating innovation.

Open Innovation theory complements the Triple Helix by emphasizing firm behavior and strategic knowledge management. It is particularly relevant for this study because it frames collaboration as not just desirable but necessary for firms, especially in resource-constrained environments like Kosovo and Albania, where internal innovation capacity may be limited.

4.6.4 Knowledge-based view of the firm

The Knowledge-Based View (KBV) of the firm builds on resource-based theories to assert that knowledge is the most strategically important resource a firm can possess [52]. In this view, firms engage in R&D collaboration to access, absorb, and apply external knowledge to their own innovation processes.

KBV is essential for understanding the motivations and absorptive capacity of industry partners in academia–industry collaboration. It also explains why firms in developing or transition economies may face challenges in deriving value from partnerships with universities, particularly if they lack the organizational routines or human capital to internalize new knowledge [54].

4.6.5 Governance theory

Finally, Governance Theory provides a framework for analyzing the mechanisms and processes that coordinate interactions between multiple stakeholders. In the context of R&D collaboration, governance refers to how universities and firms negotiate objectives, allocate resources, manage intellectual property, and resolve conflicts [50].

Governance can take many forms, hierarchical, market-based, or network-based, and may be formal or informal. In transition economies, hybrid models are common, often shaped by historical legacies, political pressures, and international influences. Governance Theory helps this study unpack the institutional arrangements, accountability structures, and relational dynamics that shape collaboration between academia and industry.

4.7 Gaps in the literature

The literature on innovation systems, academia–industry collaboration, and R&D governance has expanded significantly over the past two decades. Foundational theories such as National and Regional Innovation Systems [55], the Triple Helix model [9], and Open Innovation [11] have provided robust analytical tools to examine how knowledge flows between institutional actors to generate innovation. However, a closer examination of this body of work reveals several gaps, particularly when applied to transition economies such as Kosovo and Albania.

4.7.1 Under-theorization of governance in R&D collaboration

While numerous studies address the importance of academia–industry partnerships [57], far fewer focus specifically on the governance mechanisms that structure and sustain these collaborations. Governance is often treated as a background factor or administrative function, rather than as a dynamic and strategic component that determines the success or failure of partnerships [7]. This limits our understanding of how decision-making, trust-building, incentive alignment, and accountability are managed within collaborative environments—especially in fragile institutional contexts.

The effectiveness of University-Industry Collaborations (UICs) is significantly influenced by governance models, which establish the foundational policies, regulations, and institutional frameworks that drive these partnerships. Governance, in the context of UICs, involves the strategic alignment of academic and industry interests, the creation of policies to facilitate knowledge exchange, and the implementation of mechanisms to manage

intellectual property (IP). Effective governance structures are essential for determining the scope of control, the role of each stakeholder, and the pathways for commercialization and innovation derived from these partnerships [58].

In post conflict and post communism countries, where challenges such as limited funding and infrastructural constraints are prevalent, governance frameworks often need to be adapted to local economic and social contexts to ensure successful collaboration [59].

4.7.2 Lack of contextualized studies in post-conflict and post-authoritarian settings

Much of the empirical literature on innovation systems and collaboration is based on data from developed economies with mature institutional infrastructures [60]. The applicability of these findings to post-conflict or post-authoritarian countries is questionable. In regions like the Western Balkans, where institutions are still evolving and historical legacies weigh heavily on institutional behavior, the mechanisms that enable or hinder collaboration are likely to differ significantly [27]. Yet there is a noticeable lack of empirical research focusing on how these historical and institutional contexts shape the governance of R&D collaboration.

4.7.3 Limited comparative research between transition economies

There is also a scarcity of comparative studies that analyze how different types of transitions (e.g., post-war vs. post-dictatorship) influence the development of innovation systems and collaborative governance models. Most existing work tends to either generalize all transition economies or focus on a single country case. A comparative perspective—such as that between Kosovo and Albania—offers valuable insights into how specific historical trajectories affect institutional capacity, collaboration culture, and policy implementation. This gap is especially important considering that both countries aim to integrate into the EU's innovation ecosystem, yet their starting points and challenges vary significantly.

4.7.4 Insufficient attention to firm-level absorptive capacity in low-innovation environments

While the Knowledge-Based View [52] and absorptive capacity theory [54] provide useful frameworks for understanding how firms engage with external knowledge, there is limited empirical work exploring these dynamics in low-innovation or resource-constrained environments. In the Western Balkans, many firms are small, informal, or lack R&D departments altogether, making it unclear how they can meaningfully participate in and benefit from collaboration with universities. This raises critical questions about firm readiness, capacity-building needs, and the role of intermediaries in bridging the gap.

4.7.5 Fragmented policy and weak implementation in innovation governance

Finally, the literature frequently points to the importance of policy alignment and institutional coordination in building effective innovation systems [61]. However, in many transition economies, including Kosovo and Albania, national innovation strategies are often disconnected from institutional practices and lack effective implementation mechanisms. Few studies explore how policy fragmentation and weak governance capacity affect the operationalization of academia–industry collaboration at the ground level.

5 Analytical synthesis: thematic patterns and research gaps

Whereas Sect. 3 presents the reviewed literature descriptively within the five thematic areas used to organise the corpus, this section moves to the analytical level: it draws on the cross-cutting patterns identified through the coding process described in Sect. 2.4 to identify where the literature converges, where it diverges, and where it is silent. Five key gaps emerge from this synthesis.

First, governance is frequently treated as a background factor rather than a dynamic strategic component, limiting understanding of decision-making, trust-building, incentive alignment, and accountability in collaborative environments [7].

Second, much empirical literature is based on data from developed economies with mature institutional infrastructures, and its applicability to post-conflict or post-authoritarian countries is questionable [60].

Third, there is a scarcity of comparative studies analysing how different types of transitions, post-war versus post-dictatorship, influence the development of innovation systems and collaborative governance models.

Fourth, while the KBV and absorptive capacity theory provide useful frameworks, there is limited empirical work exploring these dynamics in low-innovation or resource-constrained environments such as the Western Balkans [54].

Fifth, national innovation strategies in Kosovo and Albania are often disconnected from institutional practices and lack effective implementation mechanisms; few studies explore how policy fragmentation and weak governance capacity affect the operationalisation of academia-industry collaboration at the ground level [48].

Taken together, these five gaps converge on a single analytical proposition, developed into the conceptual framework in Sect. 5: that governance functions as the mediating mechanism connecting institutional context to collaboration effectiveness and innovation outcomes, and that this mechanism remains under-theorised and under-researched in transition, post-conflict, and post-authoritarian settings.

6 Conceptual framework

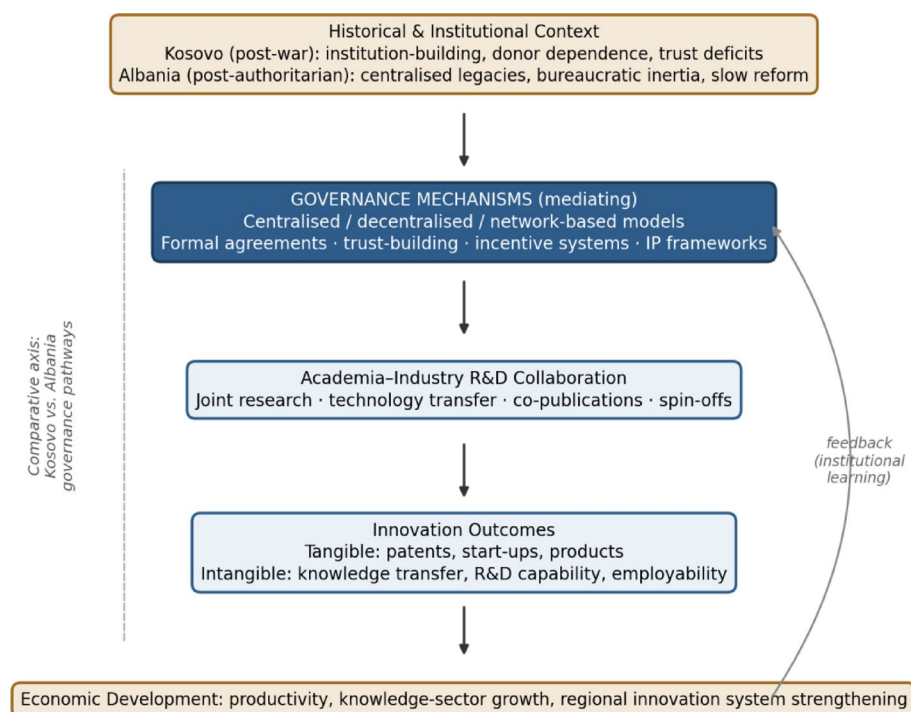
Building on the analytical synthesis in Sect. 4, this section sets out the paper's own conceptual contribution: an original integrative framework, rather than a restatement of the five theories reviewed individually, that specifies how these theories combine to explain governance's role in academia-industry R&D collaboration in transition economies.

The framework integrates insights from NIS/RIS, the Triple Helix Model, Open Innovation, KBV, and Governance Theory around a single mediating construct. At its centre lies the premise that effective governance is the key enabler of successful academia-industry collaboration, determining how roles are assigned, decisions made, conflicts resolved, and resources distributed. These governance mechanisms shape the collaboration process, which in turn affects innovation outcomes (patents, spin-offs, publications, prototypes), and ultimately contributes to economic development at regional or national levels.

As shown in Fig. 2, the framework positions governance as a mediating mechanism connecting institutional context with collaboration effectiveness and innovation performance, allowing comparative investigation into: how governance structures differ between Kosovo and Albania; how these differences affect R&D collaboration quality; and how collaboration outcomes contribute to broader development goals.

Its five components are: (1) Historical and Institutional Context, Kosovo (post-war: rebuilding institutions, donor-dependence, trust deficits) and Albania (post-authoritarian: bureaucratic inertia, centralised legacies, slow reform); (2) Governance Mechanisms, centralised, decentralised, or network-based models, operating through formal agreements, trust-building, and incentive systems; (3) Academia-Industry R&D Collaboration, forms such as joint research, tech transfer, co-publications, and spin-offs; (4) Innovation Outcomes, tangible (patents, start-ups, products) and intangible (knowledge transfer, R&D capabilities, employability); and (5) Economic Development, enhanced productivity, knowledge-sector growth, and regional innovation system strengthening.

Fig. 2 Conceptual framework linking institutional context, governance mechanisms, academia-industry collaborations, and innovation outcomes



A feedback pathway from innovation and economic outcomes back to governance mechanisms is also proposed, reflecting institutional learning over time.

7 Results and conclusions

7.1 Summary of key finding

Returning to the study's research questions, the synthesis suggests that governance should be understood not as a background condition of university–industry collaboration (UIC), but as a central mediating mechanism through which institutional conditions are translated into collaborative and innovation outcomes. This interpretation extends existing UIC literature by emphasizing that the effectiveness of collaboration depends not merely on the participation of universities and industry, but on the capacity of governance arrangements to clarify roles, coordinate decision-making, manage competing interests, allocate resources, and establish trust between actors. The study therefore shifts attention from the existence of university–industry relationships toward the institutional conditions that determine whether such relationships can become stable, productive, and sustainable.

A further contribution concerns the role of historical and institutional path dependence in shaping collaborative governance. The comparison between Kosovo and Albania suggests that transitional economies should not be treated as institutionally homogeneous. Kosovo's post-conflict institution-building trajectory and Albania's post-authoritarian transition represent different pathways through which governance capacity, institutional trust, autonomy, and patterns of coordination may develop. This distinction adds an important contextual dimension to established approaches such as the Triple Helix and National Innovation Systems, which may insufficiently account for how historical trajectories condition the capacity of university, industry, and government actors to collaborate effectively.

More broadly, the study advances a context-sensitive understanding of UIC governance in which governance clarity, trust-building, institutional autonomy, and policy coordination are viewed as interconnected mechanisms rather than independent enabling factors. This perspective contributes to the literature by suggesting that, in

transitional settings, effective UIC requires not only mechanisms for facilitating knowledge exchange but also the progressive development of the institutional conditions necessary to sustain collaboration. Accordingly, governance becomes part of the innovation-building process itself rather than simply an external framework within which innovation occurs.

These conclusions should nevertheless be interpreted as conceptually grounded propositions rather than empirically established causal relationships for Kosovo and Albania. The contribution of the present study is therefore primarily theoretical and integrative: it provides a framework for understanding how governance and institutional legacies may interact to shape UIC outcomes and establishes propositions that can be tested through subsequent comparative empirical research. Future studies can build on this framework to examine whether different governance configurations produce systematically different outcomes in terms of innovation capacity, sustainability, and economic development across post-conflict, post-authoritarian, and other transitional economies.

7.2 Limitations of the review

As a structured literature review rather than a primary empirical study, this paper is subject to several limitations.

First, as noted in Sect. 2.1, the inclusion of Google Scholar alongside Scopus and Web of Science introduces a degree of search irreproducibility, since Google Scholar's index is not fixed or versioned; this was mitigated by treating Scopus and Web of Science as the primary sources and archiving Google Scholar results at the time of search, but cannot be fully eliminated.

Second, the review is limited to English-language, peer-reviewed publications, which may exclude relevant Albanian- or Kosovar-language policy literature, grey literature, and non-indexed regional research, introducing a possible language and publication bias.

Third, database coverage itself introduces selection bias: subscription and indexing differences across Scopus, Web of Science, and Google Scholar mean that some relevant studies, particularly from regional or lower-visibility outlets, may not have been captured.

Fourth, [insert if applicable: "screening and quality appraisal were conducted by a single reviewer, and no formal inter-coder reliability statistic was computed" / "quality appraisal scores were not used to exclude studies, meaning lower-confidence sources are represented in the synthesis alongside higher-confidence ones"].

Finally, and most fundamentally, the review synthesises secondary literature rather than collecting primary data from Albania or Kosovo; the governance-innovation relationships proposed in the conceptual framework (Sect. 5) should therefore be read as literature-derived propositions requiring empirical testing, not as confirmed causal findings for either country.

7.3 Future research directions

Future research should prioritise primary data collection through surveys and interviews with UIC stakeholders in Albania and Kosovo to test the propositions set out in the conceptual framework; comparative empirical analysis between post-war (Kosovo) and post-authoritarian (Albania) governance pathways; and investigation of firm-level absorptive capacity in low-innovation environments. Studies incorporating non-English and regional sources would also help address the language and database limitations noted above.

7.4 Concluding remarks

This study ultimately suggests that the challenge for Albania and Kosovo is not simply to increase university–industry collaboration, but to create the governance conditions that enable such collaboration to become effective, trusted, and sustainable. Its central conceptual contribution is to position governance as the mechanism through which historical legacies, institutional capacities, and relationships among universities, industry, and government are translated into collaborative outcomes.

From this perspective, strengthening UIC in transitional economies requires more than transferring models developed in mature innovation systems; it requires governance arrangements that respond to institutional context, build trust and autonomy, align incentives, and progressively strengthen coordination among actors.

By bringing these dimensions together, the study provides a context-sensitive foundation for understanding UIC in post-conflict and post-authoritarian settings and establishes a basis for future empirical testing in Albania, Kosovo, and comparable transitional economies.

Author contributions D.N. conceived the study, conducted the main analysis, and wrote the original manuscript draft. I.T. contributed to the conceptual development and critical revision of the manuscript. K.C. contributed to data collection, literature review, and manuscript editing. All authors reviewed and approved the final version of the manuscript.

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Declarations Ethical approval

Ethical approval was not required for this study because it is based exclusively on a structured review and analysis of previously published literature and does not involve human participants, personal data, clinical data, or experimental procedures.

Consent to participate Not applicable. The study did not involve human participants, interviews, surveys, or any other form of primary data collection requiring informed consent.

Consent to publish Not applicable. The manuscript does not contain any individual participant data, identifiable personal information, images, or other materials requiring consent for publication.

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