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To cite this article: Lina Zenkienė & Liudvika Leišytė (2024) Strengthening university capacity in regional innovation ecosystem through the participation in the European Universities initiative, European Journal of Higher Education, 14:sup1, 88-108, DOI: [10.1080/21568235.2024.2410358](https://doi.org/10.1080/21568235.2024.2410358)

To link to this article: <https://doi.org/10.1080/21568235.2024.2410358>



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Published online: 23 Oct 2024.



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# Strengthening university capacity in regional innovation ecosystem through the participation in the European Universities initiative

Lina Zenkienė  and Liudvika Leišytė 

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## ABSTRACT

In this paper, we explore how participation in the strategic partnerships of the European University Alliances (EUAs) facilitates university capacity in regional development. The study utilizes the Quadruple Helix theoretical model and contributes to the literature on transnational university alliances in regional innovation ecosystems. A qualitative analysis of policy documents, media reports on EUA developments, alliance goals, and university implementation strategies is conducted within the context of Lithuanian higher education. In Lithuania's case, the primary rationale for participating in the EU initiative is both academic and economic. Furthermore, it is framed as addressing higher education challenges such as a low internationalization level, a mismatch between human capital and labour market needs, and the attractiveness of higher education. To achieve the strategic goals of the alliances, universities build networks including cross-sectoral linkages and engage in co-creation activities. The expanded and deepened interactions among different organizational spheres (helices) aim to foster innovation in national HE policy, strengthen university capacity through organizational innovation, and re-design teaching and research to drive social and economic transformations.

## ARTICLE HISTORY



Received 6 December 2023  
Accepted 25 September 2024


## KEYWORDS

European University alliances; Lithuanian higher education; regional innovation ecosystems; Quadruple Helix

## 1. Introduction

Cross-border strategic partnerships among universities in the European Education Area are not novel (c.f. Craciun et al. 2023). Higher education institutions ‘actively pursue transnational strategic alliances at the organizational level’ (Fehrenbach and Huisman 2024, 33), however, the systemic literature review of such alliances indicates that studies lack insights into a combination of the rationales, pathways and benefits behind this pursuit. In Europe, a new wave of transnational university alliances under

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 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/21568235.2024.2410358>.

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the European Universities initiative (EUI) is gaining momentum. This form of collaboration endorsed and supported by the European Commission (EC) as well as national governments is targeted to address the global competition of knowledge economies. The vision of the EC is that among other aims, newly formed European University alliances (EUAs) will adopt ‘a challenge-based approach’ (European Commission n.d.-a) in their core tasks of teaching and research to tackle issues pertinent to Europe by engaging with external partners such as industry, government, and non-profit sector. This approach is closely connected to the so-called third mission of the university (e.g. Benneworth, Young, and Normann 2017; Compagnucci and Spigarelli 2020), emphasizing the importance of university’s role in the socioeconomic development of local communities and regions.

Higher education research indicates that universities of the twenty-first century are undergoing another transformation in regional and national innovation systems to act as key supporters and contributors to a more cohesive society and a more sustainable economy (Paleari, Donina, and Meoli 2015). Whereas university contribution to regional development has been extensively studied (e.g. Krücken, Meier, and Müller 2009; Mowery and Sampat 2006; Trencher, Yarime, and Kharrazi 2013), research on the role of collaborative alliances and societal demands is just beginning to emerge (e.g. Arnaldo Valdés and Gomez Comendador 2022; Fuchs, Cuevas-García, and Bombaerts 2023). In this article, we aim to contribute to the literature on transnational university alliances in the regional innovation ecosystem. We address the afore-mentioned literature gap on the rationales (why?), ways (how?) and benefits (to what end?) of participation in university alliances by applying the Quadruple Helix model for innovation. We also look into the relevance of Lithuanian universities’ engagement in the EUI by analysing the rationales and ways for strengthening university capacity in the regional innovation ecosystem.

Lithuania’s case features a high percentage of public university engagement in the European Universities initiative. More than a third of all universities in the country (including private, specialized, religious-based institutions) and more than half of major public universities in Lithuania (6 out of 11) having the largest share of students, academics and scientific staff are part of the EUI. This level of involvement makes an interesting reference case for other countries as the development taking place will potentially affect the whole ecosystem of HE.

We use the case of Lithuanian university participation in the EUI to study the following research questions: 1. What are the key policy and institutional rationales for participating in the European Universities initiative? 2. How do Lithuanian universities fulfil regionally relevant alliance goals? 3. What are the most pronounced cross-sectoral linkages facilitating (regional development) transformation and innovation?

The paper is structured as follows. In the following sections, we briefly discuss the concepts of HE relevance and third mission, as well as introduce the Quadruple Helix theoretical model (Carayannis and Campbell 2012) which we use as a heuristic tool to study the linkages with external stakeholders. We also briefly note the expectations for the changing university role in society. We then outline the research design and methodology and discuss the findings in relation to each research question in the subsequent sections of the paper. In section 4.1., we discuss the rationale and benefits of participation in the EU initiative, in 4.2., we overview key alliance goals and analyse how the networked universities choose to tackle those goals, especially regarding regional (local)

development issues. In 4.3, we shed light on the most pronounced inter-sectoral linkages for strengthening university capacity in the regional innovation ecosystem.

## 2. Literature review and theoretical background

Given the socioeconomic changes and the associated challenges, there are societal expectations of the expanded role and mission of universities to act at the forefront of social, economic, and cultural transformations. In other words, public authorities and policymakers use a range of policy instruments to promote higher education relevance, including funding and regulation. HE systems and universities in various countries focus on different relevance dimensions, i.e. regarding the most important stakeholder groups such as students and graduates, employers, and society at large (European Commission 2018). The literature points out that the notion of relevance in higher education is increasingly important and is tightly related to societal transformations and the role universities play in them. Gibbons and his colleagues (1994, 1998) link HE relevance to the social transformation of knowledge production and the changing role of science in society. Nedeva (2007) links the relevance to the changing university responsibilities, emphasizing third mission-related outcomes and societal usefulness.

To capture the changing role of the university in economies and societies, scholarship draws on several different university conceptualizations ‘including civic university (Goddard and Vallance, 2013; Goddard et al., 2016)..., engaged university (Benneworth, 2013), university 4.0 (Giesenbauer and Müller-Christ, 2020)..., responsible university (Sørensen et al., 2019)..., sustainable university (Beringer, 2007), third-generation university (Wissema, 2009)..., and entrepreneurial university 2.0 (Liu and Van Der Sijde, 2021)’ (Cai and Ahmad 2021, 4). Cai and Ahmad note, that ‘to varying extents, these concepts address universities’ role in meeting broader societal needs and challenges [which] ... requires universities to develop mutually beneficial engagements with their surrounding communities (2021, 14). Trencher, Yarime, and Kharrazi (2013) noted ‘a shift from the idea and standard practices of merely contributing to economic and societal development via technology transfer and entrepreneurialism of universities, to collaborating with diverse external actors to create societal transformations’ (p.41). Cai and Ahmad (2021) interpret this as a post-entrepreneurial era function of universities.

To empirically analyse such cross-sector university linkages in regional innovation ecosystems, we draw on the Quadruple Helix model proposed by Carayannis and Campbell (2012), which is an extension of the Triple Helix model of innovation (Cai and Etzkowitz 2020; Leišytė and Fochler 2018; Leydesdorff 2012). The model focuses on the dynamic relations and interactions among four institutional spheres. It builds on initially identified university, industry, and government relations in knowledge-based developments and innovation systems, which guide the reconstruction of institutional arrangements (Cai and Etzkowitz 2020). For instance, scholars found cross-sector partnerships for urban sustainability transformations to be relatively widespread trend in academia globally (Trencher, Yarime, and Kharrazi 2013). These findings confirmed Paleari, Donina, and Meoli’s (2015) observation, that universities of the twenty-first-century act as key supporters and contributors to a more cohesive society and a more sustainable economy or as exemplified in their study, in service for sustainability. The role of media, public (c.f. Carayannis and Campbell 2012), and especially citizens and other actors of

the society in regional development and regional innovation ecosystems has been increasingly emphasized. Hence, civil society has been included in the Quadruple Helix model as a fourth crucial actor for developments in regional and national innovation ecosystems. It refers to various groups of actors outside industry and government, e.g. consumers, non-governmental organizations, and the community (Cai and Etzkowitz 2020). While the Quadruple Helix model may have been criticized for lack of explanatory power, e.g. in terms of openness towards the fourth helix and its better fit for 'democratic regimes' (Cai and Lattu 2022), it has been used in a variety of contexts and helps understand the importance of linkages between different actors and the power they exert on each other. Prior research utilized the Quadruple Helix analytical framework to analyse the engagement of a broad range of actors (academia, industry, government, and society) in knowledge and technology transfer processes for regional innovation and socio-economic development (Bellandi, Donati, and Cataneo 2021; Miller et al. 2016). Engaging societal actors, especially NGOs in social innovation-driven university projects received heightened attention (e.g. Bellandi, Donati, and Cataneo 2021; Morawska-Jancelewicz 2022; Roman et al. 2020).

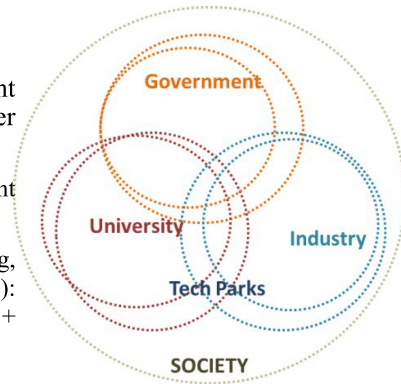
In this article, we apply the Quadruple Helix model as a heuristic tool to study university engagement with actors from other institutional spheres such as government organizations (national and regional authorities, city municipalities), industry (businesses, enterprises, chambers of commerce), and other societal stakeholders (e.g. media, cultural organizations) to determine inter-sectoral relations and the roles these linkages play in contributing to regional innovation ecosystem that universities are part of. We adopt the Quadruple helix as an extension of the Triple helix model, where according to Cai and Lattu (2022) a freely defined fourth helix allows the inclusion of, e.g. NGOs and cultural organizations. According to Etzkowitz (2008) only when the mechanism of 'taking the role of the other' exists in networks, can collaborative relations become enabling conditions fostering [particular benefits such as] innovation and entrepreneurship (quoted in Cai and Lattu 2022).

While the Quadruple helix model approach has been theorized to explain innovation in national innovation systems (Cai and Lattu 2022), its conceptualization could be further extended to the multiplicities of transnational collaboration environment (c.f. Cai, Ferrer, and Lastra 2019). We propose to view cross-sectoral relations and interactions of universities engaged in transnational partnerships as embedded in the multiple layers of helices of different institutional spheres, e.g. the government helix is scaled from local to regional, national, multi-national to supra-national. A simplified visualization is offered in Figure 1.

### **2.1. European Universities initiative**

Universities in Europe are fostered by policymakers to play a more central role in serving economies and societies across Europe. This includes their increasingly recognized importance in producing graduates for labour markets in Europe that are transforming 'due to technological development, digital and green transitions, and the restructuring of the economy' (Council of the European Union 2021, 3) as well as in tackling major societal challenges (European Commission 2022-b), e.g. the climate change or cultural diversity and inclusion.

1. Organisational innovation: Government (supra/national) + University (incl. EUA member universities)
2. National policy making: Universities + Government + Public Institutions
3. Innovation in core functions (teaching and learning, third mission for social and economic transformations): University + Industry + Government (city/regional) + Other societal actors



**Figure 1.** Quadruple Helix linkages for regional development. Source: modified from Cai and Etzkowitz (2020). The figure visualizes multiple layers of helices within a particular institutional sphere (here – circles could be added to represent local, regional, national, multi-national, and supra-national helices).

The transnational alliances under the European Universities initiative are a form of strategic partnerships of higher education institutions developing long-term structural cooperation across national and sectoral borders. The EUAs include associate members representing various external stakeholders such as enterprises, NGOs, chambers of commerce, and regional/city authorities. The first 17 EUAs started their operations in 2019. As of July 2023, there were 50 EUAs across Europe comprising 430 HEIs. Universities of applied sciences, technical universities and universities of fine arts, comprehensive and research-based universities engage in these partnerships (European Commission *n.d.-a*). The vision at the European level is that by mid-2024 some 500 higher education institutions will work together in 60 alliances.

This European policy initiative, endorsed and supported by the European Commission as well as national governments, is a financial soft policy instrument (Craciun et al. 2023) utilized by (supra)national policymakers to strengthen the role of universities in the European Education Area in building inclusive and cohesive societies through collaboration, building critical mass and mutual learning. The innovative universities receive financial means to foster their collaboration activities and structures from the EU funding mechanisms (*ibid.*). Some national governments supplement the funding provided by the EU (*ibid.*), serving as an impetus for HEIs to engage in these collaborations. Thus, the policy push for engagement in the EUAs is multi-level, including national as well as European governmental actors.

The idea of strategic transnational partnerships in higher education and research is not novel (c.f. Craciun et al. 2023; Fehrenbach and Huisman 2024), neither one of the overarching aims to address the global competition of knowledge economies. What might be novel, however, is that the development of the EUAs is primarily targeted towards organizational transformation and innovation of universities (European Commission 2023). According to Eckel (2001) transformational change is wide scope, impacting the entire organization and could involve modifications to organizational strategies, structures, practices, and culture. In the EUA context these could cut across all functions of the university and include, e.g. transformation of internal modus operandi of

university administration, new areas and ways of teaching and research, or an entirely new business model for universities, such as creating new entities, new ways of cross-sectoral engagement to accelerate change and innovation of universities to tackle issues pertinent to Europe (c.f. European Commission 2023). In this respect (organizational) innovation is fairly broad and could be viewed as a process and an outcome of a value-added novelty either in products, services, methods, management systems, etc. (c.f. Crossan and Apaydin 2010) to address societal challenges and provide innovative solutions and in our case, to address challenges of the regional innovation ecosystems.

The European Universities initiative focuses both on inward and outward-looking transformation and innovation, i.e. systemic, structural and sustainable changes within institutions and the societal outreach and impact (e.g. European Commission 2023). At the supra-national level, European universities are envisioned as a vehicle for a realization of the enhanced role of universities as key actors and change agents in regional development, thus a third university mission is re-enforced and called to action. The role of European universities is constructed to ‘address societal challenges and become true engines of development for the cities and regions’ (European Commission n.d.-b) through engagement with external partners such as industry, government, and non-profit sector. This may be achieved through innovative education and research, knowledge transfer and innovation, enhanced cooperation among universities as well as knowledge-creating teams comprised of university internal and external stakeholders (European Commission 2023). For instance, students and academics will work together with entrepreneurs, companies, local and regional actors, and civil society actors and researchers to find solutions to the challenges their regions are facing (*ibid.*). As the Council of the European Union concluded in 2021, the EUI is ‘paving the way for a new dimension in European higher education’ (Council of the European Union, 2) by bridging higher education, research, innovation, and society. Collaboration for innovation in the EUA context can be viewed as grounded in the principle and value of co-creation. For this paper, we adopt Grönroos and Voima’s (2013) conceptualization of co-creation as a collaborative creation in which stakeholders contribute cooperatively and reciprocally to the value creation process. Røiseland who studied co-creation in public sector, however, makes an observation that this normative idea in public policy may take different shapes in significantly different policy contexts and ‘is only partly about developing something new’ (2023, 7).

### 3. Design and methodology

This study employs qualitative methodology, specifically, content analysis of documents as well as data gathered via semi-structured interviews ( $N = 6$ ) following Kuckartz (2019). In our empirical investigation of Lithuanian university participation in the EU initiative, we focused on policy developments and institutional data of universities that engaged in the EUAs during the initial calls (see Table 1). In 2022 five universities in Lithuania became full members of the EUAs. These alliances together comprise over 50 universities from various European countries (see Table 2). Lithuanian universities involved in these alliances have the largest share of students and staff located in three major cities of the country. Thus, we expect that these represent well the developments related to university capacity building within the Lithuanian regional innovation ecosystem.

**Table 1.** Lithuanian universities participating in the EUAs in 2022.

University name	Profile	Size (#of students, # teaching staff)
Vilnius University	Comprehensive	19,084, 1908
Vilnius Tech	Technological	10,262, 805
Vytautas Magnus University	Liberal arts	8117, 411
Kaunas Technological University	Technological	10,520, 1078
Klaipėda University	Comprehensive	4817, 531

\* Source: institutional webpages and AIKOS dataset (National Agency for Education).

**Table 2.** Alliances (LT universities) and their associate members\*.

EUA	Partner universities			Associate members			
	Universities	Students	Staff	Government	Industry	NGO	Other
(Lithuanian University)				National / Regional authorities Local authorities	Businesses Enterprises Chambers of Commerce		
EU-Conexus (Klaipėda University)	9	65,538	9019	8	7	–	3
ARQUS (Vilnius University)	9	317,000	38,300		n.d.		
ECIU (Kaunas Technological University)	13 + 1	300,000	50,000	15	13	–	4
ATHENA (Vilnius Tech University)	9 + 3	16,000	17,500	6	15	6	13
T4E (Vytautas Magnus University)	10	116,000	18,500	2	6	3	7

Source: European Commission (n.d.-b), data available on alliance and/or Lithuanian university member webpages.

\* The actual composition of the EUA might be different, considering that more institutions and associate members join the Alliances.

Lithuanian higher education system is characterized by a rather large number of institutions relative to the number of inhabitants of 2.9 million (Leišytė 2018). In total in the academic year 2022–2023 there were 36 HEIs in Lithuania (17 universities and 19 colleges) (Official Statistics Portal 2023). Table 3 offers details on public/private institutions and student enrolment numbers. The binary system was introduced in 2000 with research-oriented universities and colleges (universities of applied science) (Leišytė, Želvys, and Zenkienė 2015). The New Public management reforms have permeated the higher education system, especially following the Law on Science and Higher Education 2009 (Republic of Lithuania Seimas 2009). Among other major reforms were the introduction of performance-based funding, increased accountability and organizational autonomy. Accountability has been fuelled by institutional performance agreements, quality assurance procedures and monitoring, e.g. through performance-based reporting (Leišytė 2018). Universities have been increasingly fostered to be entrepreneurial and compete for staff, students and other resources, such as third-party funded projects.

The study included the following data sources:

- (a) Policy-level data: this comprised key ministerial documents from the Ministry of Education, Science and Sports of the Republic of Lithuania (further – Ministry of

**Table 3.** Lithuanian higher education in 2022–2023 academic year.

	Public	Private	# of students in thousands
Universities	11	6	71.5
Colleges (Universities of applied science)	12	7	30.8
Total	23	13	102.3

Source: Official Statistics Portal (2023).

Education) and the Ministry of Finance of the Republic of Lithuania, as well as documents from the Government of the Republic of Lithuania. These documents focused on measures and support to strengthen the involvement of HEIs in European university networks before the launch of the alliance activities in the country in 2021. The national policy documents studied totalled approximately 398 pages and included, e.g. the *Economic Recovery and Resilience Facility 'New Generation Lithuania' Plan* (2021), the official correspondence to universities participating in the EUA alliances regarding the *Support for European University Initiatives under the 'New Generation Lithuania' Plan* (2021) and the *Procedure for the Implementation of Actions and Projects under the Plan for the DNA of the Future Economy. The Concept of Action Implementation* (n.d.).

- (b) Media sources: Over 50 articles from local, regional, and industry-specific news portals, as well as various higher education, public agency, science and technology, and innovation-related news portals such as *skaitmeninekoalicija.lt*, *manoukis.lt*, *erasmus-plus.lt*, *inovacijos.lt*, *bns.lt*, *delfi.lt*, etc.
- (c) Institutional data: Data from five EUAs, e.g. factsheets, strategic documents including mission and goals, news, activity data posts and related information available through the alliance and Lithuanian member university webpages, as well as European Commission pages dedicated to European higher education and specifically the EUI.
- (d) Semi-structured interviews: Six semi-structured interviews were conducted with five key local coordinators of the EUAs in Lithuania in May and June 2022, and a key government stakeholder representative from the Ministry of Education in December 2022, who was involved in promoting and implementing the EU initiative in the country. The university respondents were selected due to their roles as institutional coordinators, ambassadors or project officers with direct and active participation in alliance developments in their institutions. Four out of five university respondents were strategic-level leaders (deans or vice-rectors) involved in all processes from strategic planning to operations and oversight. These key persons had first-hand knowledge of developments, being involved from the initiation of activities and serving in strategic task forces and alliance management/executive boards preparing alliance strategic directions. One interviewee was a project officer responsible for all alliance activities at the university. The interviewed policymaker started working on the EUA issue at the Ministry of Education while the EU initiative has just been forming in Europe. In 2021 he took on a more political role, as an Adviser to the Minister.

A provisional set of questions was prepared to guide both data collection and analysis. The interview guide included questions related to the motivations and regional relevance of participation in the EUAs, the strategies employed by universities to achieve alliance goals, especially those driven by regional development, and the engagement of non-university stakeholders.

NVivo software was used for managing the corpus of data, coding, and conducting first-order analysis. Both documents and transcribed interviews were coded and analysed following Kuckartz's (2019) qualitative content analysis method which combines deductive and inductive formation of code categories. The initial coding included 18 dimensions, such as: Quadruple helices (university, government, industry, NGOs and other societal actors), rationales, alliance goals, innovation, regional development, social transformation, visibility/prestige/competitiveness, and co-creation.

## 4. Findings

### 4.1. Rationales and benefits for engaging European University Alliances (EUAs)

As the analysis of national policy documents suggests, anticipated participation in the EUAs has been linked to several rationales and benefits such as increased competitiveness and international visibility, as well as mitigating internal higher education sector issues by strengthening capacity in university performance. The notion of increased competitiveness of HEIs and the opportunity to place some Lithuanian institutions on the global map of higher education (i.e. enhancing international visibility) garnered support from national policymakers. In the early 2020s, the Ministry of Education outlined the EUA vision in a document titled 'The Concept of Action Implementation'. This document proposed financial measures and performance indicators for implementing the EU initiative. The government allocated 13.5 million Euros to invest in the preparatory work necessary for HEIs to join the alliances. This investment aimed to promote international competitiveness of higher education institutions and create conditions for strategic partnerships among higher education institutions, thereby enhancing the influence and prestige of Lithuanian HEIs as partners in European university networks (Government of the Republic of Lithuania 2021).

Strengthening capacity in university performance, its core functions of teaching, research and innovation is also reflected in national policy (Table 4). The implementation plan and the co-funding measures were primarily targeted to incentivize the involvement of Lithuanian higher education institutions in European university networks and 'enable

**Table 4.** Policy rationales and benefits for participating in the European Universities initiative.

<b>How?</b>	Promoting competitiveness, creating conditions, incentivizing (e.g. funding), enhancing quality of teaching and research through innovation (e.g. of study process, learning environment, life-long learning pathways, joint programmes), boosting mobility, engaging with partners and other spheres, peer learning and good practice sharing, know-how transfer.
<b>For what? (benefits)</b>	Competitiveness, international visibility, attractiveness of higher education, influence and prestige in networks; enhanced university performance and quality of teaching and research, managerial and strategic excellence, enhanced internationalization and cooperation (among partners, cross-sectoral), improved infrastructure, meeting labour market needs, regional and national development (equitable, smarter, higher added value).

universities to develop a greater capacity and professionalism to operate also at the European/international level: improved managerial excellence and internationalization strategy competence, enhanced cooperation with partners from other countries, other fields of education, training and youth, and other socio-economic sectors' (Ministry of Education, Science and Sports of the Republic of Lithuania n.d., 4). The university's third mission is emphasized alongside its educational function by the Lithuanian policymakers. It is perceived as contributing to regional and national development as outlined in the 2009 Law on Higher Education and Research. The latest strategic national document 'New Generation Lithuania', approved by the Council of European Union in July 2021, was drafted to ensure a breakthrough towards 'a more equitable, smarter and high added value generating country' (Ministry of Finance of the Republic of Lithuania 2021). The policymakers note that an agile innovation system needs to be built on inter-institutional and cross-sectoral cooperation (ibid.). From the ministerial perspective, university cross-sectoral cooperation could be enhanced via engagement in the EUAs: 'Universities will engage more with other spheres of education and training, youth and (or) other social and economic sector organizations' (Ministry of Education, Science and Sports of the Republic of Lithuania n.d., 4). According to the interviewed policymaker, there is a perception that the EUAs will facilitate peer learning and good practice sharing among HEIs in Lithuania and abroad, leading to know-how transfer from peer partner institutions to Lithuanian universities, especially in the area of the third mission activities (Interview f).

Furthermore, the ministerial position outlined in the previously mentioned concept document regarding the EUI explicitly pays attention to internal issues within the higher education sector. These issues include the perceived under-performance of HEIs amid growing competition, low internationalization, the mismatch between graduate skills and labour market needs, and low HE attractiveness among local high-school graduates (Ministry of Education, Science and Sports of the Republic of Lithuania n.d.). As the policy document indicates, policymakers envisioned that participation of HEIs in the EUAs could mitigate these concerns.

Financial measures for university engagement in the EU initiative thus specifically targeted the enhancement of HE internationalization and the quality of studies, innovation in the study process, and the creation of innovative learning environments. For instance, developing joint study and short-cycle programmes was envisioned to improve overall quality, flexibility, attractiveness, and access to lifelong-learning paths (Ministry of Finance of the Republic of Lithuania 2021). The EUI at local universities could thus focus on 'the introduction and expansion of virtual services, improvement of the quality of studies, development of joint study programmes, [boosting] mobility, [and] infrastructure enhancement (Ministry of Education, Science and Sports of the Republic of Lithuania n.d., 3). Simultaneously, the government has granted HEIs considerable discretion regarding how the funding can be utilized and which strategic directions the networked universities will choose in collaborative activities (Interview f). As an official from the Ministry of Education stated, the EUI in Lithuania was considered an experiment ... intended to bring new ideas, new content, and, ultimately, value to the institutions (ibid.).

The interviews with institutional coordinators reveal that university motivations to engage in the EUAs largely align with national aspirations identified in the policy documents, particularly the academic rationale. Coordinators specifically note that

engagement with foreign partners in the EUAs is driven by academic profiling both in studies and research, resource complementarity, and opportunities to share best practices and know-how. These collaborations, according to university respondents, aim for growth, efficiency, capacity building and possible innovations. Technical universities also highlighted the importance of staying abreast of higher education developments. One coordinator emphasized, ‘It is important to have a better pulse of what is going on beyond the university borders’ (Interview c). At the same time, another noted, ‘Where education is moving forward’ (Interview a). Another benefit mentioned was that ‘a deeper integration with partners and engagement from top management to operations development and career solutions makes collaboration worthwhile’ (Interview c).

Raising and maintaining ‘regional and transcontinental competitiveness’ (Interview d) and increasing university visibility in the region were also highlighted as significant motivations for a couple of universities. One university prioritizes internationalization: ‘Without a doubt, the alliances are linked with enhanced internationalization and engagement into various research and education spaces. It is a big ambition and that motivated to be among the best’ (Interview e). Conversely, a specialized regional university noted their financial dependence on external projects (Interview b), indicating an economic rationale and the importance of resource dependence.

In summary, universities are motivated to engage in EUAs for various reasons, encompassing both academic and economic rationales also found among policy-level objectives. Additionally, participation in future-oriented higher education initiatives and enhancing their institutional profile are significant factors. In the following section, we address our second research question on alliance goals and the strategies universities adopt to reach them.

**4.2. European University Alliance goal orientation**

EUA partner university activities while embedded in local ecosystems are inextricably linked to the alliance goals and objectives. As one of the respondents expressed: ‘The alliance activities are directed at the liberation of thinking, different perspectives, and innovation’ (Interview a). By analysing alliance goals (Table 5) in their key documents such as vision and mission statements and policies, we discovered that the key objectives and planned activities point both to internal and external areas for transformation and innovation.

The focus on internal university developments includes issues of access and inclusion, quality enhancement, internationalization (mobility pathways and increase), study and

**Table 5.** European University Alliance goal orientation.

Internal	External
Access, inclusion and life-long learning	Regional development
Study and Research (inter – and multi-disciplinary)	European and global issues
Internationalization and mobility	Social Transformation
Quality	Alignment with labour and market needs
University capabilities (strategic, managerial, operational)	Visibility/Attractiveness/Prestige/Competitiveness
	INNOVATION * ENTREPRENEURSHIP * SUSTAINABILITY

Source: strategic alliance documents (vision and mission statements of alliances, policies).

research interdisciplinarity, boosting university strategic, managerial, and governance capabilities. As one of the respondents says:

It is very purposeful to direct most of the changes/initiatives towards the university, as it signifies that the universities need/promise to be more innovative, creative, and even risky, and it is not so much about risking per se but about testing out and piloting the initiatives. Then you have this promise. Because maybe only 10% of your organizational activities can be shattered through the alliance, but if you bring it back to the institution, it becomes more capable. Thus the institution can use these activities to become stronger. So I think all alliances decide what balance between internal and external output there should be, which activities go to the outside world and which of them remain to improve institutional practices (Interview c).

The transformation of internal university practices is found to be necessary to better fulfil the expanding mission of universities including the role of universities in regional innovation ecosystem. The external dimension is explicitly articulated in all alliances. Alliances aim to contribute to the socioeconomic developments of regions (incl. local, regional, and global outreach), social and environmental transformations via internal and external innovation, entrepreneurship and sustainable solutions. Key strategies to strengthen local eco-systems include enhancing inter- and multi-disciplinary regional education and research, supporting start-ups, and transferring knowledge to the regions. Additionally, innovative solutions in areas such as digital and green transformation, youth employability, and transversal skills are emphasized.

#### **4.3. Lithuanian university strategies to fulfil EUA goals**

To achieve innovation-driven goals, universities build networks and adopt a co-creation model of operation. In the EUA context, *co-creation* is achieved through the following linkages and networks: (1) Inter-partner linkages involving alliance member universities' internal stakeholders such as researchers, students, administrators or communities of practice involving multiple alliances. (2) Cross-sectoral linkages involving regional external stakeholders. (3) Linkages established among university ecosystems, such as engaging industries from different European geographic areas. An example of the latter is Vilnius Tech University 'Co-Creation Hub' initiative, which 'allows FabLabs, Design Factories, and creative centres from Athena alliance members to open their creative workshops for joint projects and international collaboration' (Vilnius Tech 2023).

EUA member universities strategically identify new external partner organizations within their contexts (municipal, regional, and national) to expand communication and collaboration. For instance, the ECIU alliance that Kaunas University of Technology is part of, sees its role in 'further opening up universities by organizing education and innovation in co-creation with stakeholders (public, private, students)' (European Commission n.d.-b). Notable activities of this alliance include:

- Creating entrepreneurial knowledge with and for the regions;
- Co-creation of educational services (e.g. programmes, micro-credentials);
- Developing innovative solutions and products for industry, businesses, and societal transformations (ibid).

We specifically note that the linkages developed are designed to contribute to fulfilling the EUA's goals and are targeted towards the following:

1. Organizational/system-level innovation. Linkages are primarily targeting organizational and, to some extent, system-level innovations. For example, universities within a partnership are experimenting with new business models, i.e. establishment of new legal entities where partner universities can become shareholders, redefining university functions and deepening and broadening engagement with external stakeholders. For instance, Kaunas University of Technology together with ECIU alliance member universities is experimenting with a public-private entity model for its operations, including funding. The way forward is 'to understand how free, cost-based and for-profit services can be merged in a funding model' (ECIU n.d., 14). Partner universities within this alliance are 'moving towards a sustainable, mixed funding model in collaboration with European Union and national governments' (ibid.). Other examples of organizational innovation include the development of integrated inter-university campus functions and an ecosystem of communication, collaboration and co-creation among various stakeholder groups, both internal and external.
2. Innovation in teaching and learning. Significant efforts are being made towards changes in teaching at the studied universities. These institutions are engaged in developing innovative and flexible life-long learning pathways, experimenting with micro-credentials, challenge-based learning, academic entrepreneurship, inter- and multi-disciplinary approaches among other initiatives. For example, Vilnius University is experimenting with European degree programmes. Across the studied alliances considerable effort is being dedicated to inclusive education and research, fostering intercultural and multilingual competences, and cultivating a strong sense of European identity. For instance, Vytautas Magnus University together with Transform4Europe alliance members is developing a multilingual campus, whereas for local communities activities and events are co-organized to promote e.g. citizen science and intercultural education activities like a European Culture festival (Interview e).
3. Innovative solutions to societal problems. Universities are actively engaged in addressing societal problems to drive social and economic transformation, such as developing smart and sustainable cities and communities. They undertake teaching and research programmes, initiate open science projects for citizens, foster knowledge co-creation, and promote deliberative democracy initiatives for policymaking through Living Labs and various other formats. A challenge-based approach to innovation and entrepreneurship skills development is a common feature within the activities of alliance universities (c.f. Arqus n.d.).

#### **4.4. Quadruple Helix linkages of studied universities in the context of the EUAs**

##### **4.4.1. University-government helix**

Both document and interview data indicate that the participation of the studied Lithuanian universities has significantly enhanced relationships and communication between universities and governmental institutions. Specifically, the intra-university helix

coordination group has been instrumental in this development. Originally, a non-formal group of alliance institutional coordinators evolved into a formal structure now operating under the Ministry of Education. This formal group includes not only EUA institutional coordinators but also Ministry officials and representatives from quasi-governmental organizations active in higher education, such as the Study Quality Evaluation Center, Education Exchange Support Foundation, European Social Fund Agency. For universities represented in the coordination group, it provides a direct channel to policymakers, while government initially was focused on ‘ensuring the successful integration of [these] universities into alliances’ (Interview f). Both university representatives and policymakers recognize an urge for national legal framework developments and adjustments to implement the EU initiative, the national policy agenda, and the goals of the alliances. They expected that the proposed changes and adjustments would have broader system-wide implications for higher education sector and regional innovation ecosystem.

According to EUA institutional coordinators, Lithuanian universities engaged in the EUAs have not only conceptualized a national support mechanism but also drafted four strategic proposal packages to enhance and modernize the national legal framework. These proposals include, e.g. new models of interdisciplinary studies, joint doctorates, and mobility types.

Simultaneously, national government organizations act as intermediaries between universities and supra-national organizations (e.g. the European Commission and other EU-level bodies) in co-creating the European Education and Research Area through shaping the conception and implementation of EUAs. As noted by the interviewed Lithuanian policymaker, Lithuanian government at the EU level was actively involved in policy discussions about the EUAs (Interview f).

#### **4.4.2. University-industry-government-society helix**

We can observe that the university-industry-government-society helix is being galvanized by the EUAs. According to respondents in our study, the discourse about the third mission of the university at the national level has intensified over the last 10–15 years, gaining more prominence in the context of engaging with the EUAs. As a result, ‘universities become less closed, and understand their role in giving back to society. Consequently, partnerships with social stakeholders are increasing’ (Interview e). More specialized universities perceive the third mission as critically important to their overall activities:

... absolutely important, it is the backbone ... all of our university services for society in general. We see the city as the ‘sandbox’, because a lot of decisions we test and act upon. The city needs us, we are needed for the city at large with public bodies, businesses, and hybrid organisations such as agencies. We want to be helpful and the philosophy is doing what is needed for the country, what develops the region via an applied, meaningful, helpful, rational approach (Interview c).

In general, one of the technological universities views its third mission as creating an ‘impact on society, the region, the start-up ecosystem, and the field of innovation ... how to be proactive rather than reactive in national development and its strategic planning’ (Interview a). The respondent from a regional university also states that they ‘want to

be helpful for regional development, directing it towards more sustainable options' (Interview b). While most universities clearly articulate their role in serving society and their commitment to the third mission, there is a case of a large and comprehensive Lithuanian university within the EUA that still needs to define and align this role with its internal stakeholders. A representative from this university noted 'it is there, we carry it out, but we are unable to clearly define it and identify it within our activities' (Interview d).

Four out of the five Lithuanian universities studied are strategically integrating their third mission and regional development activities across multiple organizational levels and functions. They are expanding the networks of external stakeholders; exploring new engagement formats, and reshaping education and research on societal issues. For example, Vilnius Tech is participating in the CLIMAS project which 'aims to support the transformation towards climate resilience by providing an innovative problem-oriented climate adaptation Toolbox, co-designed with stakeholders using a value-based approach, design thinking methods, and citizen science mechanisms' (CLIMAS n.d.).

Further, looking at the linkages between universities, civil society, government and industry, our data indicates that EUA participation fosters expanded communication and collaboration between universities and external stakeholders. Universities are broadening and deepening cross-sectoral linkages at national and local levels, particularly with city and regional municipalities. Partnerships identified in alliance documents (e.g. fact-sheets) and alliance/university webpages include:

- **Science and innovation ecosystems:** science and technology parks, industry, businesses, and enterprises.
- **Government and public sector:** national policymakers, diplomatic missions, local government authorities, and quasi-governmental organizations.
- **Education and society:** schools, professional schools, third-age universities, media, the public, and agencies, associations, European/international student bodies, organizations that serve as external stakeholders.

Examples of EUA-driven collaborations locally, regionally and nationally include science communication, education, lifelong learning, open forums and targeted initiatives on the topics of European identity, climate change, and others. Sustainability and contribution to society seem to 'broaden' the view of the traditional university-industry helix, so common to a technical university, partly due to the engagement in the EUA: 'In the next phase of the strategy of our alliance that is leading towards sustainability, we included sustainability, and commitment to the ecosystem and the society. We broadened the title because we want to exit the industry borders' (Interview c).

Further, studied universities see their role in co-creating sustainable solutions for environmental and social transformations for regions in diverse multi-cultural and multi-disciplinary teams together with regional partners, e.g. municipalities, businesses and/or cultural organizations:

External stakeholders are asked to provide challenges, they are engaged in solution search, participate in international teams of students and mentors, meet business and/or public organization representatives, consult solutions and at the end evaluate/assess. A second

step is to create micro-modules together with companies so that business needs are addressed (Interview b).

Overall, the linkages among university, local/regional government, industry and society in the auspices of EUAs in studied Lithuanian universities seem to contribute to innovations in teaching and learning addressing regional needs. Among other initiatives, universities implement new course content and format as well as more flexible educational pathways (incorporating micro-credits) in the study programmes that are co-developed with input from industry, government and other societal actors. For example, Vilnius Tech University Sustainability Hub launched a Life Cycle Thinking course to deal with the actual sustainability issues (Vilnius Tech 2024), the Creativity and Innovation Centre 'LinkMenu fabrikas' connects students, developers, researchers, engineers, and business representatives and provides tools, spaces and know-how to develop creative ideas and innovative solutions (Vilnius Tech n.d.).

## 5. Discussion and conclusion

By combining the study of rationales for engagement in transnational strategic alliances, along with the pathways and benefits behind this pursuit, we made several observations. The key motivations identified in national policy and Lithuanian universities participating in the EUAs are predominantly academic and economic. These motivations are grounded in arguments for quality enhancement, competitiveness, and regional development (for a typology of rationales for internationalization in HE c.f. De Wit 2002; Kapfudzaruwa 2024). Both policymakers and universities recognize the potential for innovation within HEIs and the sector as a whole. Additionally, Lithuania's participation in the EU initiative has been a political priority, viewed as a means to address internal challenges within the national higher education system. From a national policy perspective, this involvement aims to strengthen university performance and enhance strategic, managerial, and operational capacities through the integration of universities in the EUAs.

The goals and objectives of the studied alliances also emphasize socio-cultural aspects (e.g. resilience, access, and inclusion) and political factors (e.g. addressing global challenges such as climate change and digitalization). These aspects are promoted at a supra-national level due to the mandate of the EU initiative, which encourages universities to engage more closely with external stakeholders in tackling societal challenges and leading the development of cities, regions, and beyond (European Commission 2022-a).

The variation in rationale and the multifaceted nature of alliance goals highlight the multiplicity of the environments (Zenkienė 2023) in which the EUAs and their member universities operate. Researchers argue that educational organizations, especially their international activities within multiplex environments are subject to institutional complexity (Frølich et al. 2013). In these contexts, the interests and agendas of multiple actors must be balanced and mitigated, and multifaceted aims aligned (Rensimer 2021; Zenkienė 2020, 2023). The activities of Lithuanian universities engaged in the EUAs are embedded in national, supra-, and multinational environments, resulting in inextricable interconnections among different helices in these multiplex environments (Figure 1).

To fulfil the mandate for innovation and regional development, the studied Lithuanian universities expand and intensify cross-sectoral interactions regionally and internationally and engage in co-creation activities (Røiseland 2023). One of the most significant linkages observed is between academia and the national government. The universities take on an active role in identifying national obstacles to implement EUA goals and, to the extent possible, propose solutions, which could facilitate transformation and change at the university and system levels. Universities claim not only having a political voice, but also actively engage in policy innovation and formulation of relevant regulatory adjustments, especially in the area of studies. By taking an active role in university-government helix interactions, universities are involved in shaping the legal framework to build their capacities taking it as an opportunity for transformation. National policy innovation is enabled by interactions taking place in university helix (catalysed by EUA member universities), and the work carried out by national and supra-national government helix bodies and organizations, e.g. European Commission (Figure 1).

Another significant development is observed in interactions among university-government – industry-society helices. They play an increasing role in the core functions of teaching and research. In line with some prior research findings (c.f. Nedeva 2007), teaching and research are redesigned in the context of the EUA collaboration engaging with a range of external stakeholders to enhance their relevance to society and regional economy. The key observed activities in the auspices of EUAs universities' engagement focus on local, regional and/or global societal challenges and are linked to the notions of relevance as usefulness for society and excellence (c.f. Benneworth, Pinheiro, and Sánchez-Barrioluengo 2016). Actors, e.g. from industry, local and regional government take on the roles related to teaching and research in identifying real-life challenges for student and research teams, mentoring, assessment and evaluation and course content contribute to innovation in teaching and research. The linkages, interactions, and activities among studied universities, industry and public bodies are targeting the social and economic transformations, and addressing societal problems and regional needs. In the area of third mission activities, there is an observed shift from services to society towards the co-creation with societal actors (c.f. Trencher, Yarime, and Kharrazi 2013).

This study has several limitations. First, it pays attention to a Quadruple Helix constellation in a particular geopolitical context of one country. Second, the scope of the study allowed analysing the perspectives primarily from the government, university and to some extent media. The data from other external stakeholders (e.g. local government, NGOs, industries) would have enriched our understanding of complex and intricate cross-sectoral relationships and dynamics for strengthening the capacity of universities in regional development and national innovation ecosystem.

The Quadruple Helix application in the transnational setting of HE could further be extended to include multiple helices from different organizational spheres in order to gain insights into the linkages that are multi-scalar, including local, regional, national, and supra-national linkages, which are part of parcel of the EUAs. A worthwhile research avenue could be multiplex environments in which the European University alliances and their member universities operate, focusing either on various complexities and tension points and/or multi-modal mechanisms enabling innovations either in national (regional) or transnational ecosystems. For instance, a more in-depth study could be carried out on the dynamics of interactions among EUAs as meta organizations,

supra-national organizations representing the EEA interests, national governments and member universities. This paper's contribution is to the literature on transnational university alliances in the area of regional innovation eco-system and strengthening university role as actors of change in policy development and innovation through co-creation. By utilizing the Quadruple Helix model in HE context, we also contributed to the literature on how a transnational policy initiative is fostering and changing cross-sectoral linkages at the regional and national levels.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## References

- Arnaldo Valdés, Rosa Maria, and Victor F. Gomez Comendador. 2022. "European Universities Initiative: How Universities May Contribute to a More Sustainable Society." *Sustainability* 14 (1): 471–494. <https://doi.org/10.3390/su14010471>.
- Arqus. n.d. "Linking Local Ecosystems". Accessed June 29, 2024. <https://arqus-alliance.eu/linking-local-ecosystems/>.
- Bellandi, Marco, Letizia Donati, and Alessandra Cataneo. 2021. "Social Innovation Governance and the Role of Universities: Cases of Quadruple Helix Partnerships in Italy." *Technological Forecasting and Social Change* 164:120518. <https://doi.org/10.1016/j.techfore.2020.120518>.
- Benneworth, Paul, Rómulo Pinheiro, and Mabel Sánchez-Barrioluengo. 2016. "One Size Does Not Fit Sll! New Perspectives on the University in the Social Knowledge Economy." *Science and Public Policy* 43 (6): 731–735. <https://doi.org/10.1093/scipol/scw018>.
- Benneworth, Paul, Mitchell Young, and Roger Normann. 2017. "Between Rigour and Regional Relevance? Conceptualising Tensions in University Engagement for Socio-economic Development." *Higher Education Policy* 30 (4): 443–462. <https://doi.org/10.1057/s41307-017-0061-9>.
- Cai, Yuzhuo, and Ijaz Ahmad. 2021. "From an Entrepreneurial University to a Sustainable Entrepreneurial University: Conceptualization and Evidence in the Contexts of European University Reforms." *Higher Education Policy*, <https://doi.org/10.1057/s41307-021-00243-z>.
- Cai, Yuzhuo, and Henry Etzkowitz. 2020. "Theorizing the Triple Helix Model: Past, Present, and Future." *Triple Helix* 7 (2–3): 189–226.

- Cai, Yuzhuo, Borja Ramis Ferrer, and Jose Luis Martinez Lastra. 2019. "Building University-Industry Co-Innovation Networks in Transnational Innovation Ecosystems: Towards a Transdisciplinary Approach of Integrating Social Sciences and Artificial Intelligence." *Sustainability* 11 (17): 4633. <https://doi.org/10.3390/su11174633>.
- Cai, Yuzhuo, and Annina Lattu. 2022. "Triple Helix or Quadruple Helix: Which Model of Innovation to Choose for Empirical Studies?" *Minerva* 60 (2): 257–280. <https://doi.org/10.1007/s11024-021-09453-6>.
- Carayannis, Elias G., and David F.J. Campbell, eds. 2012. "Mode 3 Knowledge Production in Quadruple Helix Innovation Systems." In *Mode 3 Knowledge Production in Quadruple Helix Innovation Systems: 21st-Century Democracy, Innovation, and Entrepreneurship for Development*, Vol. 7, 1–63. New York: Springer.
- CLIMAS. n.d. "About". Accessed July 2, 2024. <https://www.climas-project.eu/about/>.
- Compagnucci, Lorenzo, and Francesca Spigarelli. 2020. "The Third Mission of the University: A Systematic Literature Review on Potentials and Constraints." *Technological Forecasting and Social Change* 161:1–30.
- Council of the European Union. 2021. *Outcome of Proceedings. Council Conclusions on the European Universities Initiative – Bridging Higher Education, Research, Innovation and Society: Paving the Way for a New Dimension in European Higher Education*. <https://www.consilium.europa.eu/media/49659/st08658-en21.pdf>.
- Craciun, Daniela, Frans Kaiser, Andrea Kottmann, and Barend van der Meulen. 2023. *Research for CULT Committee – The European Universities Initiative, First Lessons, Main Challenges and Perspectives*. Brussels: European Parliament, Policy Department for Structural and Cohesion Policies. [https://www.europarl.europa.eu/thinktank/en/document/IPOL\\_STU\(2023\)733105](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2023)733105).
- Crossan, Mary M., and Marina Apaydin. 2010. "A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature." *Journal of Management Studies* 47:6. <https://doi.org/10.1111/j.1467-6486.2009.00880.x>.
- De Wit, Hans. 2002. *Internationalization of Higher Education in the United States of America and Europe: A Historical, Comparative, and Conceptual Analysis*. Westport: Greenwood Publishing Group.
- ECIU University. n.d. "ECIU University 2030: Connects-U-for-Life". [https://en.ktu.edu/wp-content/uploads/sites/5/2020/11/ECIU-University-2030\\_Connects-U-for-Life.pdf](https://en.ktu.edu/wp-content/uploads/sites/5/2020/11/ECIU-University-2030_Connects-U-for-Life.pdf).
- Eckel, P. 2001. "A World Apart? Higher Education Transformation in the US and South Africa." *Higher Education Policy* 14 (2): 103–115. [https://doi.org/10.1016/S0952-8733\(01\)00004-6](https://doi.org/10.1016/S0952-8733(01)00004-6).
- Etzkowit, Henry. 2008. *The Triple Helix: University-Industry-Government Innovation in Action*. New York: Routledge.
- European Commission. 2022. *European Universities Initiative Factsheet*. <https://education.ec.europa.eu/document/european-universities-initiative-factsheet>.
- European Commission. 2022. *On a European Strategy for Universities*. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Strasbourg.
- European Commission. 2023. *Erasmus+ Programme (ERASMUS) Call for Proposals*.
- European Commission, Directorate-General for Education, Youth, Sport and Culture. 2018. *Promoting the Relevance of Higher Education: Main Report*. Brussels: Publications Office. <https://data.europa.eu/doi/10.2766048735>.
- European Commission. n.d. a. *European Universities Initiative*. <https://education.ec.europa.eu/european-universities-initiative>.
- European Commission. n.d. b. *European Education Area. Factsheets on the 41 European Universities*. <https://education.ec.europa.eu/european-universities-factsheets>.
- Fehrenbach, Hana, and Jeroen Huisman. 2024. "A Systematic Literature Review of Transnational Alliances in Higher Education: The Gaps in Strategic Perspectives." *Journal of Studies in International Education* 28 (1): 33–51. <https://doi.org/10.1177/10283153221137680>.
- Frølich, Nicoline, Jeroen Huisman, Stig Slipersæter, Bjørn Stensaker, and Paulo C.P. Bótas. 2013. "A Reinterpretation of Institutional Transformations in European Higher Education:

- Strategising Pluralistic Organisations in Multiplex Environments.” *Higher Education* 65 (1): 79–93. <https://doi.org/10.1007/s10734-012-9582-8>.
- Fuchs, Lukas, Carlos Cuevas-Garcia, and Gunter Bombaerts. 2023. “The Societal Role of Universities and Their Alliances: The Case of the EuroTeQ Engineering University.” *Tertiary Education and Management*, <https://doi.org/10.1007/s11233-023-09126-x>.
- Gibbons, Michael. 1998. *Higher Education Relevance in the 21st Century*. Washington: World Bank.
- Gibbons, Michael, Camille Limoges, Helga Nowotny, Simon Schwartzman, Peter Scott, and Martin Trow. 1994. *The New Production of Knowledge: Science and Research in Contemporary Societies*. London: Sage.
- Government of the Republic of Lithuania. 2021. *Economic Recovery and Resilience Facility ‘New Generation LITHUANIA’*. <https://finmin.lrv.lt/en/news/new-generation-lithuania-the-government-plan-to-ensure-a-breakthrough#:~:text=a%20more%20equitable%2C%20smarter%20and%20high%20added%20value%20generating%20country>.
- Grönroos, Christian, and Päivi Voima. 2013. “Critical Service Logic: Making Sense of Value Creation and Co-Creation.” *Journal of the Academy of Marketing Science* 41: 133–150. <https://doi.org/10.1007/s11747-012-0308-3>.
- Kapfudzaruwa, F. 2024. “Internationalization of Higher Education and Emerging National Rationales: Comparative Analysis of the Global North and South.” *Higher Education Policy*, <https://doi.org/10.1057/s41307-024-00358-z>.
- Krücken, Georg, Frank Meier, and Andre Müller. 2009. “Linkages to the Civil Society as ‘Leisure Time Activities’? Experiences at a German University.” *Science and Public Policy* 36 (2): 139–144. <https://doi.org/10.3152/030234209X406854>.
- Kuckartz, U. 2019. “Qualitative Text Analysis: A Systematic Approach.” *Compendium for Early Career Researchers In Mathematics Education*, 181–197.
- Leišytė, Liudvika. 2018. “Higher Education Systems and Institutions, Lithuania.” In *Encyclopedia of International Higher Education Systems and Institutions (Living reference work)*, edited by P. Teixeira and J. Shin, (continuously updated edition). Dordrecht: Springer. [https://doi.org/10.1007/978-94-017-9553-1\\_384-1](https://doi.org/10.1007/978-94-017-9553-1_384-1)
- Leišytė, Liudvika, and Maximilian Fochler. 2018. “Topical Collection of the Triple Helix Journal: Agents of Change in University-Industry-Government-Society Relationships.” [Editorial]. *Triple Helix* 5 (1): 10. <https://doi.org/10.1186/s40604-018-0056-6>.
- Leišytė, Liudvika, Rimantas Želvyš, and Lina Zenkienė. 2015. “Re-contextualization of the Bologna Process in Lithuania.” *European Journal of Higher Education* 5 (1): 49–67. <https://doi.org/10.1080/21568235.2014.951669>.
- Leydesdorff, Loet. 2012. “The Triple Helix, Quadruple Helix, ... , and an N-Tuple of Helices: Explanatory Models for Analyzing the Knowledge-Based Economy?” *Journal of the Knowledge Economy* 3 (1): 25–35. <https://doi.org/10.1007/s13132-011-0049-4>.
- Miller, Kristel, Rodney McAdam, Sandra Moffett, Allen Alexander, and Pushyarag Puthusserry. 2016. “Knowledge Transfer in University Quadruple Helix Ecosystems: An Absorptive Capacity Perspective.” *R&D Management* 46 (2): 383–399. <https://doi.org/10.1111/radm.12182>.
- Ministry of Education, Science and Sports of the Republic of Lithuania. n.d. *Annex 3: Procedure for the Implementation of Actions and Projects under the Plan for the DNA of the Future Economy. The Concept of Action Implementation*. [https://finmin.lrv.lt/uploads/finmin/documents/files/LT\\_ver/DNR%20plano%20dokumentai/KONCEPCIJOS/Koncepcija\\_EUI\\_patikslinta\(1\).docx](https://finmin.lrv.lt/uploads/finmin/documents/files/LT_ver/DNR%20plano%20dokumentai/KONCEPCIJOS/Koncepcija_EUI_patikslinta(1).docx).
- Ministry of Finance of the Republic of Lithuania. 2021. “New Generation Lithuania” – the Government Plan to Ensure a Breakthrough. <https://finmin.lrv.lt/en/news/new-generation-lithuania-the-government-plan-to-ensure-a-breakthrough>.
- Morawska-Jancelewicz, Joanna. 2022. “The Role of Universities in Social Innovation within Quadruple/Quintuple Helix Model: Practical Implications from Polish Experience.” *Journal of the Knowledge Economy* 13 (3): 2230–2271. <https://doi.org/10.1007/s13132-021-00804-y>.
- Mowery, David C., and Bhaven N. Sampat. 2006. “Universities in National Innovation Systems.” In *The Oxford Handbook of Innovation*, edited by Jan Fagerberg and David C. Mowery, 209–236. Oxford: The Oxford University Press.

- National Agency for Education. AIKOS Dataset. aikos.smm.lt.
- Nedeva, Maria. 2007. "New Tricks and Old Dogs? The 'Third Mission' and the Re-production of the University." In *World Yearbook of Education 2008 Geographies of Knowledge, Geometries of Power: Framing the Future of Higher Education*, edited by Debbie Epstein, Rebecca Boden, Rosemary Deem, Fazal Rizvi, and Wright. Susan, 85–105. New York: Routledge.
- Official Statistics Portal. "Education, Culture and Sports in Lithuania." 2023. <https://osp.stat.gov.lt/lietuvos-svietimas-ir-kultura-2023/svietimas/aukstasis-mokslas>.
- Oliveira, Tiago, Helena Alves, and João Leitão. 2024. "Co-creation and Innovation in Higher Education Institutions: A Systematic Literature Review and Research Agenda." *International Journal of Educational Management* 38 (3): 839–872. <https://doi.org/10.1108/IJEM-09-2023-0456>.
- Paleari, Stefano, Davide Donina, and Michele Meoli. 2015. "The Role of the University in Twenty-first Century European Society." *The Journal of Technology Transfer* 40 (3): 369–379. <https://doi.org/10.1007/s10961-014-9348-9>.
- Partnerships for Excellence. *European Universities – ERASMUS-EDU- 2023-EUR-UNIV*. Brussels. [https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/erasmus/wp-call/2023/call-fiche\\_erasmus-edu-2023-eur-univ\\_en.pdf](https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/erasmus/wp-call/2023/call-fiche_erasmus-edu-2023-eur-univ_en.pdf).
- Rensimer, Lee. 2021. "Between Being and Becoming European Universities: Tensions and Challenges at the Midway Point." Paper presented at the SRHE Conference (Re)connecting, (Re)building: Higher Education in Transformative Times, December 2021.
- Republic of Lithuania Seimas. 2009. "Republic of Lithuania Law on Higher Education and Research", <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/548a2a30ead611e59b76f36d7fa634f8>.
- Røiseland, Asbjørn. 2023. "For All Seasons? Exploring the Policy-context for Co-creation." *Public Money & Management*. May 9:1–9.
- Roman, Mona, Henry Varga, Vladimir Cvijanović, and Alasdair Reid. 2020. "Quadruple Helix Models for Sustainable Regional Innovation: Engaging and Facilitating Civil Society Participation." *Economies* 8 (2): 1–15. <https://doi.org/10.3390/economies8020048>.
- Trencher, Gregory P., Masaru Yarime, and Ali Kharrazi. 2013. "Co-creating Sustainability: Cross-sector University Collaborations for Driving Sustainable Urban Transformations." *Journal of Cleaner Production* 50:40–55. <https://doi.org/10.1016/j.jclepro.2012.11.047>.
- Vilnius Tech. 2023. "Creating Together: ATHENA's 'Co-Creation Hub' Moves Forward with its Second Meeting in Porto." Vilnius Tech, 2023-06-30. Accessed June 28, 2024. <https://vilniustech.lt/vilnius-tech-international/athena-news/news/creating-together-athenas-co-creation-hub-moves-forward-with-its-second-meeting-in-porto/362608?nid=361177>.
- Vilnius Tech. 2024. "Life Cycle Thinking: VILNIUS TECH Sustainability HUB Launched Innovative Course". Accessed June 28, 2024. <https://vilniustech.lt/about-university/news/life-cycle-thinking-vilnius-tech-sustainability-hub-launched-innovative-course/73472?nid=366811>.
- Vilnius Tech. n.d. "LinkMenų Fabrikas: Our Story". Accessed August 5, 2024 <https://ourstory.linkmenufabrikas.lt/>.
- Zenkienė, Lina. 2020. *Institutional Work of Quality in Higher Education: A study of Cross-border Joint Programmes*. PhD diss., Vilnius: Universiteit Gent. Faculteit Politieke en Sociale Wetenschappen. <https://biblio.ugent.be/publication/8673328>.
- Zenkienė, Lina. 2023. "Joint Programme Quality Practice in the European Higher Education Area." *Quality in Higher Education*, <https://doi.org/10.1080/13538322.2023.2267722>.