







HEInnovate as a Self-Assessment Framework for Entrepreneurial Higher Education Institutions: A Systematic Review of Applications, Themes, and Research Gaps

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ABSTRACT

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This study presents a systematic literature review (SLR) of research on HEInnovate, a self-assessment framework developed by the European Commission and the OECD to enhance the innovative and entrepreneurial capabilities of higher education institutions (HEIs). The abstract, methodology section, results section, and study table have been revised to consistently state the review period as 2015–2025, using Scopus as the primary database, along with bibliometric mapping and content analysis. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram as an analytical tool, the findings indicate that HEInnovate is frequently employed both as an institutional diagnostic tool and as a policy instrument, with research primarily focusing on entrepreneurial performance, entrepreneurial education, and the exploration of HEInnovate's dimensions. Most research is concentrated in European settings, with fewer studies in non-EU and developing countries. Methodologically, the field is dominated by cross-sectional and case-based studies, leaving gaps in longitudinal and comparative research. Aside from methodological issues, there is significant potential for further investigation of HEInnovate, with future directions suggesting its integration to enhance entrepreneurship within key university units, such as incubators, technology transfer offices, and science parks. Additionally, integrating HEInnovate dimensions with other frameworks to develop more comprehensive, contextually grounded models offers promising recommendations for future research.

1. INTRODUCTION

HEInnovate is a self-assessment tool jointly developed by the European Commission and the OECD to evaluate and strengthen the entrepreneurial and innovative capacity of higher education institutions (HEIs). It incorporates eight dimensions: leadership and governance, organizational capacity, entrepreneurial teaching and learning, pathways for entrepreneurs, digital transformation, knowledge exchange and collaboration, internationalization, and impact measurement. These dimensions represent the fundamental components through which universities can position themselves as entrepreneurial institutions that respond effectively to economic, social, and technological change [1]. Over time, HEInnovate has been applied not only as a diagnostic instrument but also as a practical mechanism for benchmarking, institutional planning, and reforming higher education systems [1-3].

The urgency of HEInnovate has increased alongside global transitions in digital transformation and sustainability, and the

growing demand for universities to contribute more directly to innovation ecosystems. Higher education is no longer confined to teaching and research but is expected to act as an engine of entrepreneurship, regional development, and social progress. This evolution reflects the emergence of the entrepreneurial university paradigm, where universities actively contribute to innovation, knowledge commercialization, and regional economic development through interactions with industry and government stakeholders [4-6]. In this regard, HEInnovate provides a structured framework for HEIs to self-assess their entrepreneurial potential and align institutional strategies with the requirements of a knowledge-driven economy. Its multidimensional structure highlights the importance of leadership commitment, governance reform, and the integration of entrepreneurial practices to ensure the relevance of higher education in addressing societal challenges.

Despite its growing adoption, the literature on HEInnovate remains fragmented. Most contributions focus on case studies at the institutional or national level, often analyzing a limited

set of dimensions such as entrepreneurial teaching or knowledge transfer. Few studies have attempted to synthesize these findings systematically or assess the broader implications of HEInnovate across different contexts. In addition, there is a lack of longitudinal perspectives that evaluate the tool's long-term impact, and limited efforts to connect HEInnovate with established theoretical frameworks, such as the Resource-Based View (RBV), dynamic capabilities, or institutional theory. These gaps indicate the need for a systematic, evidence-based review that consolidates current knowledge and identifies new directions for research.

Based on this consideration, the present study applies a systematic literature review (SLR) to examine the state of research on HEInnovate. The guiding questions are: What thematic areas have emerged in studies of HEInnovate? How has HEInnovate been adopted and applied in different institutional and policy contexts? Which theoretical perspectives have been employed in existing research, and what opportunities remain for further exploration?

This study examines themes that have used HEInnovate as a framework for assessing entrepreneurial readiness in HEIs. Furthermore, it also examines themes that have not been analyzed using this framework. Finally, recommendations for future research are presented. To address this research objective, the following chapter presents a literature review of the main concepts of HEInnovate, followed by the research method, results, discussion, and conclusion.

2. LITERATURE REVIEW

2.1 Main dimension of HEInnovate

HEInnovate is an instrument for strengthening the entrepreneurial ecosystem in higher education, designed by the European Commission and the OECD. This framework provides a comprehensive approach to developing innovative, entrepreneurial-oriented universities across eight strategic dimensions, including leadership, digital transformation, entrepreneurial teaching, and knowledge exchange and collaboration. In developed countries, HEInnovate has been used as an evaluation and strategy development tool for universities to strengthen their innovation ecosystems [2]. It has also been piloted and implemented more widely. Studies indicate that HEInnovate can serve as a model for conducting in-depth evaluations of the readiness of higher education ecosystems for entrepreneurship and innovation in developing contexts.

HEInnovate positions eight key dimensions—leadership and governance, organizational capacity, entrepreneurship, teaching and learning, entrepreneurial pathways, industry and community engagement, internationalization, digital transformation, and impact measurement—as interconnected pillars in building an entrepreneurial university. The main strength of this approach lies in its holistic and processual nature: HEInnovate assesses not only outputs, such as the number of startups or patents, but also the organizational and cultural prerequisites that enable sustainable growth in entrepreneurship. However, the literature also points to several limitations. First, the self-assessment nature of the approach can lead to internal perceptual biases and requires strong facilitation to enable truly critical institutional reflection [7]. Second, although the HEInnovate dimensions are comprehensive, the causal relationships between them—for

example, between leadership, entrepreneurial learning, and graduate performance—have not been fully quantitatively tested across national contexts. Recent studies have shown that not all dimensions carry equal weight in graduate entrepreneurship, with entrepreneurship teaching, entrepreneurial support, and digital capabilities often perceived as most relevant, whereas other dimensions function more as structural enablers [8]. Thus, HEInnovate excels as a strategic reflection and organizational learning tool, but its effectiveness as a performance evaluation instrument will increase when combined with external indicators and empirically grounded analysis.

2.2 Comparing HEInnovate with other assessment frameworks

Several frameworks have been developed to assess entrepreneurship, innovation, and performance in HEIs. The growing entrepreneurial university movement has stimulated the development of various assessment approaches designed to evaluate institutional readiness, innovation capacity, knowledge transfer activities, and entrepreneurial outcomes [4, 6]. Some frameworks emphasize measurable outputs, such as patents, spin-offs, start-up creation, licensing activities, industry collaboration, and commercialization outcomes. Others focus on broader ecosystem relationships, including university-industry-government interaction, regional innovation capacity, and entrepreneurial culture. These frameworks are useful for evaluating institutional performance and comparing universities across contexts. However, output-oriented indicators often capture the visible results of entrepreneurial activity without fully explaining the internal organizational conditions that enable such results to emerge.

HEInnovate differs from many performance-oriented frameworks because it is designed primarily as a self-assessment and developmental tool. Rather than ranking universities or measuring entrepreneurial outcomes directly, HEInnovate helps institutions reflect on their entrepreneurial and innovative capacity across eight dimensions: leadership and governance, organizational capacity, entrepreneurial teaching and learning, pathways for entrepreneurs, digital transformation, knowledge exchange and collaboration, internationalization, and impact measurement. Its value lies in supporting institutional reflection, strategic planning, and stakeholder dialogue. In this sense, HEInnovate is particularly useful for identifying strengths, weaknesses, and areas for improvement within HEIs.

Compared with output-based assessment models, HEInnovate provides a more process-oriented perspective. It examines whether an institution has the leadership commitment, organizational resources, entrepreneurial learning environment, digital capability, and external engagement mechanisms needed to support entrepreneurial transformation. This makes the framework relevant for universities that are still developing their entrepreneurial ecosystem and may not yet produce high levels of measurable outputs such as patents or spin-offs. For this reason, HEInnovate is often more appropriate as a diagnostic framework than as a direct performance measurement instrument.

Nevertheless, HEInnovate also has limitations. Because it relies largely on self-assessment, the results may be influenced by institutional perceptions, internal bias, or uneven stakeholder participation. In addition, the framework does not

provide standardized external benchmarks for comparing entrepreneurial performance across universities or countries. Therefore, when HEInnovate is used to discuss entrepreneurial performance, it should be complemented with objective indicators such as graduate start-up rates, commercialization revenue, patent activity, university-industry partnerships, and regional innovation outcomes. Combining HEInnovate with external performance indicators and theoretical perspectives such as the RBV, dynamic capabilities, institutional theory, or innovation ecosystem approaches may provide a stronger basis for explaining how institutional capabilities contribute to entrepreneurial outcomes.

Overall, HEInnovate should be positioned as a reflective and capacity-oriented framework rather than a standalone performance evaluation model. Its main contribution lies in helping HEIs understand and improve the internal conditions that support entrepreneurial and innovative development. This distinction is important for avoiding conceptual overstatement and for clarifying how HEInnovate can be integrated with other assessment frameworks in future research.

Numerous evaluation frameworks examine university entrepreneurship, accompanied by a variety of critiques. One might consider, for example, the Entrepreneurial University Index (EUI) or GEM-Edu. Their critique presents a mix: patents, metrics focusing on output, and even spin-offs—all possibly misplaced in context. Simultaneously, there exist comparison models that, while not inherently problematic, appear to be more of a grey area than a source of clarity and that leverage Fuzzy Set Qualitative Comparative Analysis (fsQCA) in collaboration with expert judgment. A differentiating factor in these eclectic frameworks is perhaps their proficiency in comparing universities globally; universities are set against one another in a manner that bizarrely establishes connections between variables. Think of actioning business startups correlating with results from entrepreneurship courses; in contrast, fuzzier correlations are neglected. However, an external observer may note a bias. Most frameworks emphasize outcomes and rely heavily on expert judgments or numerical data, which can lead to overlooking a vital element. The intricacies of internal environments and decision-making processes in universities' specific settings define the unobserved citizens influencing university entrepreneurs. Spotting them internally is indeed a challenge. Then, there are the computational issues, which make it unclear how to mirror the evolving impact of this entrepreneurial spirit in academia, which continues to shift markedly [9-11].

The HEInnovate framework is both pragmatic and theoretical, offering numerous benefits. The OECD, alongside the European Commission, is the architect of HEInnovate, displaying its expertise. A self-evaluation mechanism is employed to examine the self across eight distinct dimensions. For instance, the following are included: entrepreneurial learning, startup support, leadership, and digital transformation. It's not sculpted to judge performances on the end line, but what HEInnovate conducts, striking strategic cognition and orchestrating organizational education, is. In the universe of institutions, stakeholders converse with it and are enabled. More of a development tool rather than a ranking-oriented one, that's its use. There are empirical studies, perhaps, that validate such evidence. The dimensions of HEInnovate align closely with the genuine needs of entrepreneurial ex-university graduates [8]. Perhaps there is some relation to the dynamics touted as the Triple Helix.

Perhaps due to this, HEInnovate bears a metaphorical correspondence to national contexts and to the phases through which a university attains maturity, as noted by Ramalho et al. [7] and Patrício and Ferreira [8]. Exactness relative to established reference frameworks is not the only notable feature of HEInnovate; it is also linked to a strategy that undergoes continual modification, and university examination is notable for its potential influence on entrepreneurial productivity. However, what HEInnovate somehow does is establish this connection.

3. METHOD

This research employs a SLR approach to ensure transparency, replicability, and rigor in synthesizing existing studies related to HEInnovate. The process follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which provide a structured framework for identifying, screening, and including relevant literature [12]. To enhance efficiency and minimize potential bias in the screening process, we utilised the AI-based platform Rayyan.ai, which supports collaborative screening and facilitates the inclusion and exclusion of articles based on predefined criteria [13]. This methodological choice reflects the increasing integration of digital tools into systematic reviews, particularly in the social sciences and higher education.

The data source for this study is the Scopus database, which is widely recognised for its extensive coverage and reliability in academic research. The initial Scopus search identified 102 records. After duplicate removal and preliminary record checking, 95 records were retained for title and abstract screening. Based on the screening of titles and abstracts, 63 records were excluded because they did not sufficiently address HEInnovate or were not relevant to the objectives of the review. The remaining 32 reports were sought for full-text assessment. Of these, 18 reports explicitly discussed HEInnovate in relation to higher education entrepreneurship, innovation, or institutional development. After applying the final eligibility criteria, 10 studies were included for in-depth synthesis. The selected studies were further examined using CiteSpace, a bibliometric analysis tool that allows visualisation of research trends, keyword co-occurrence, and intellectual structures in the field [14]. In addition, ChatGPT was employed to support the synthesis and writing process, ensuring clarity and coherence in articulating the findings while maintaining the standards of academic integrity. This combination of traditional systematic review protocols with AI-based support tools provides both methodological rigour and innovative practice in conducting this review.

PRISMA is a systematic review reporting guideline that aims to ensure transparency, completeness, and accuracy in explaining the rationale, methods, and findings of a systematic review [15]. The latest version, PRISMA 2020, comprises a 27-item checklist and an updated flow diagram that reflect developments in methods for study identification, selection, quality assessment, and synthesis. One of the key elements of PRISMA is the flow diagram, which illustrates the systematic process for study selection. The four main stages in PRISMA include: (1) Identification, which is the process of searching and collecting records from various databases, registries, and other sources; (2) Screening, which is the initial screening based on titles and abstracts to exclude duplicates and

irrelevant articles; (3) Eligibility, which is the assessment of eligibility through full-text reading to ensure compliance with the inclusion-exclusion criteria; and (4) Data abstraction and analysis, which is the stage of extracting data from selected studies and analyzing and synthesizing the results (e.g., through meta-analysis or narrative synthesis). These four stages ensure that the literature selection process is transparent and replicable.

The literature search was conducted in the Scopus database. Scopus was selected because it provides broad coverage of peer-reviewed journals in higher education, entrepreneurship, innovation studies, and management. The search was conducted in the TITLE-ABS-KEY fields using the following search string:

TITLE-ABS-KEY (“HEInnovate” OR “HEInnovate framework” OR “entrepreneurial higher education institution” OR “entrepreneurial university self-assessment”)

The search was limited to journal articles published in English between 2015 and 2025. The year 2015 was selected because it represents the earliest HEInnovate-related publication identified in the dataset, while 2025 represents the latest publication year available at the time of the search.

The inclusion criteria were: (1) journal articles indexed in Scopus; (2) publications written in English; (3) studies published between 2015 and 2025; (4) studies that explicitly discussed HEInnovate as a framework, tool, or conceptual reference; and (5) studies related to higher education entrepreneurship, innovation capacity, entrepreneurial universities, or institutional development.

The exclusion criteria were: (1) conference papers, book

chapters, editorials, notes, or non-peer-reviewed documents; (2) studies that mentioned entrepreneurship in higher education but did not discuss HEInnovate; (3) studies that were not related to HEIs; (4) studies without sufficient methodological or conceptual relevance to the research questions; and (5) inaccessible or incomplete full-text articles.

Although the final sample consisted of only 10 studies, this number reflects the still-emerging and highly specific nature of HEInnovate-focused scholarship. Rather than aiming to provide broad bibliometric generalization, this review seeks to synthesize how HEInnovate has been applied, interpreted, and methodologically operationalized in the existing literature. Therefore, the small sample is treated as a boundary of the review and is addressed through transparent screening, quality appraisal, and narrative thematic synthesis.

To strengthen the rigor of the review, a quality appraisal was conducted for all included studies. Because the final sample contained diverse study types, including conceptual, qualitative, quantitative, and case-based studies, a flexible appraisal rubric was developed. Each study was assessed using five criteria: relevance to HEInnovate, clarity of research aim, methodological transparency, adequacy of data or argumentation, and contribution to understanding HEInnovate in higher education. Each criterion was scored from 0 to 2, where 0 indicated weak or not reported, 1 indicated partially addressed, and 2 indicated clearly addressed. Studies scoring 8–10 were categorized as high quality, 5–7 as moderate quality, and 0–4 as low quality (Table 1). The quality appraisal was not used to exclude studies but to support interpretation of the strength and limitations of the evidence base.

Table 1. Table quality assessment

No.	Study	Relevance to HEInnovate	Aim Clarity	Method Transparency	Data/Argument Adequacy	Contribution	Total	Quality
1	[16]	2	2	1	1	2	8	High
2	[17]	1	2	2	2	1	8	High
3	[18]	2	2	2	1	2	9	High
4	[7]	2	2	2	2	2	10	High
5	[8]	2	2	2	2	2	10	High
6	[10]	2	2	2	2	2	10	High
7	[19]	2	2	2	2	2	10	High
8	[20]	2	2	2	2	2	10	High
9	[11]	1	2	1	1	1	6	Moderate
10	[21]	2	2	2	2	2	10	High

4. RESULT AND DISCUSSION

4.1 Result

Based on the final set of 10 included studies, the HEInnovate literature remains relatively limited and emerging. The reviewed studies indicate that HEInnovate has been used mainly as a self-assessment and diagnostic framework for examining entrepreneurial and innovative capacity in HEIs. Within this limited sample, studies published after 2021 show increasing attention to institutional strategy, entrepreneurial education, digital transformation, and university innovation capacity. However, because the sample is small and the review does not aim to conduct a full bibliometric analysis, these patterns are interpreted as descriptive tendencies rather than generalizable bibliometric trends. Post-2021 work shifts from generic entrepreneurship education toward institutional strategy, performance, and alignment. For instance, studies link HEInnovate to regional

competitiveness and university strategy [18], interrogate entrepreneurial performance using fsQCA [10], and examine whether HEInnovate dimensions truly reflect graduate entrepreneurs’ needs [8]. In parallel, a 2024 Technovation article situates intrapreneurship within the entrepreneurial university debate, showing HEInnovate being mobilized not only as an audit tool but also as a lens on institutional change [20]. The dataset’s author keywords corroborate this thematic shift: “HEInnovate” and “entrepreneurial university” predominate, and “Triple Helix” appears repeatedly, indicating a stronger emphasis on ecosystem and mission-oriented perspectives.

A second, unmistakable trend is the coupling of HEInnovate with digital transformation. Several recent papers explicitly connect HEInnovate dimensions with a university’s digital capacity, governance, and reconfiguration needs [8, 19]. This “digital turn” reframes HEInnovate from a static self-assessment toward a dynamic capability agenda, in which

leadership, organizational capacity, teaching/learning, and knowledge exchange are assessed amid rapid technological change. Relatedly, the micro-level literature on students and self-efficacy [7] complements institution-level studies by showing how entrepreneurial intention is conditioned by pedagogical and cultural factors—implying a multi-level reading of the HEInnovate framework that spans the student, program, and institutional layers.

The geographical coverage of the included studies suggests that HEInnovate research remains largely concentrated in European or EU-influenced higher education contexts. Nevertheless, recent studies have begun to extend the discussion to non-EU and developing-country settings, including Kazakhstan, Indonesia, Malaysia, and Timor-Leste. This indicates a gradual broadening of interest, although the evidence remains too limited to support strong claims about global diffusion.

The included studies are mostly situated in European or EU-influenced contexts, although a small number of studies have begun to examine non-EU and developing-country settings, but there is encouraging diversification. Papers with affiliations in Kazakhstan, Malaysia, Indonesia, and Timor-Leste suggest a gradual extension of the HEInnovate discourse into emerging and non-EU systems, often framed around capability building and institutional readiness [18, 21]. This is promising but, as a trend, still nascent: much of the evidence remains either EU-based or EU-influenced, and cross-national comparatives beyond Europe are scarce. Moreover, although the 2015 paper is highly cited in this small set, given the small number of included studies, the reviewed literature should be interpreted as an emerging and still developing research stream rather than as a mature bibliometric field relative to the broader entrepreneurial-university literature. Methodologically, most studies are cross-sectional, case-based, or configurational (fsQCA), with relatively few longitudinal designs or quasi-experimental evaluations that could establish causal effects of HEInnovate-guided interventions.

Methodologically, the reviewed studies are dominated by cross-sectional, case-based, qualitative, and configurational approaches. This suggests that the field is still primarily exploratory. Few studies provide longitudinal evidence or systematically link HEInnovate dimensions to objective entrepreneurial outcomes, such as spin-offs, patents, commercialization revenue, graduate start-up formation, or regional economic contribution.

Figure 1 illustrates the PRISMA 2020 study selection process used in this review. The initial search in the Scopus database identified 102 records. After duplicate removal and screening procedures, 10 studies met the inclusion criteria and were retained for the final synthesis. The study selection process followed the PRISMA 2020 flow diagram to ensure transparency in identifying, screening, and selecting relevant studies. The initial search in the Scopus database identified 102 records. After removing 7 duplicate records, 95 records were screened based on their titles and abstracts. At this stage, 63 records were excluded because they did not sufficiently address HEInnovate or were not relevant to the objectives of the review. The remaining 32 reports were sought for retrieval and assessed for eligibility through full-text review. After the eligibility assessment, 22 reports were excluded because they did not use HEInnovate as the main analytical framework, were not focused on entrepreneurial or innovative HEIs, had inappropriate publication types, or showed limited relevance

to the research questions. Finally, 10 studies met the inclusion criteria and were included in the systematic review.

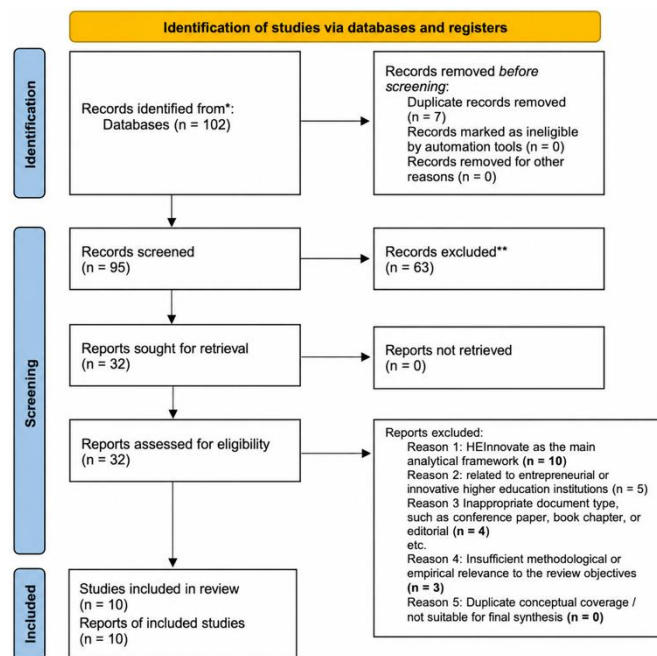


Figure 1. Flow diagram of reference included for analysis

Critically, three gaps emerge from these trends. First, operationalization varies across studies: many studies “use” HEInnovate but select only a subset of its dimensions, which makes synthesis difficult and limits external validity. Without common measurement strategies (e.g., consistent item pools, inter-rater procedures, and triangulation with performance indicators), cumulative knowledge is hard to build. Second, the framework’s policy-instrument role is under-examined outside Europe. The dataset includes strategic and alignment perspectives (e.g., policy-relevant strategy in the EU context and regional competitiveness), yet robust evidence on how HEInnovate shapes funding, governance incentives, or ecosystem partnerships across different regulatory regimes remains thin [18, 20]. Third, while digital transformation is now frequently invoked, there is limited theory-driven testing of how digital capacity interacts with other HEInnovate dimensions (e.g., knowledge exchange, internationalisation, impact measurement) to produce institutional outcomes over time [8, 10, 19].

Taken together, the field appears to be transitioning from “HEInnovate as checklist” to “HEInnovate as theory-informed change architecture,” but it needs stronger designs and broader contexts. A next wave of studies could (i) standardize measurement across all eight dimensions and report reliability/validity explicitly; (ii) test causal pathways via longitudinal panels or natural experiments (e.g., staged roll-outs of HEInnovate-guided reforms); (iii) integrate HEInnovate with ecosystem indicators (Triple/Quadruple Helix metrics), graduate outcomes, and digital maturity indices; and (iv) expand comparative work in non-EU systems to examine how policy instruments, resource endowments, and institutional logics condition adoption and impact. That agenda would move the literature beyond descriptive alignment toward explanatory, actionable evidence on how HEInnovate catalyzes entrepreneurial transformation in higher education.

4.2 Discussion

As shown in Table 2, HEInnovate is used as a framework to measure university entrepreneurial performance through a comprehensive, multidimensional self-assessment approach. Several studies have shown that HEInnovate serves not only as a diagnostic tool but also as a strategic instrument to reflect organizational readiness, entrepreneurial strategy, and institutional capacity in driving regional economic contributions [18]. In comparative contexts, such as Indonesia and Timor-Leste and Kazakhstan and several other countries [11], HEInnovate is positioned as an evaluative framework for identifying universities' levels of entrepreneurial maturity and for providing policy recommendations. However, some studies still focus on measuring activity (engagement) or intrapreneurial tendencies rather than evaluating tangible performance outcomes such as spin-offs, commercialization,

or economic impact [20], indicating a gap between perceptual measures and objective performance.

Furthermore, integrating HEInnovate with other dimensions, such as digital transformation [8], enhances the framework's analytical capacity to capture the dynamics of organizational change in the digital era. However, the reviewed literature indicates that the use of HEInnovate remains predominantly descriptive and exploratory, with little development of quantitative models that examine causal relationships between dimensions or their links to more measurable commercialization performance indicators. This indicates that HEInnovate has the potential to serve as a cross-country reflective and benchmarking tool, but it still requires methodological strengthening to function as an outcome-based, evidence-driven performance evaluation instrument for entrepreneurial universities.

Table 2. A simplified table of studies included in the systematic review

No.	Source	Main Findings	Methods	Main Topic
1	[21]	- Focus on entrepreneurial performance at universities using the HEI framework - Context of Indonesia and Timor Leste using comparative study	Qualitative research using indepth-interview	General entrepreneurial performance of universities
2	[16]	- Evaluation of Entrepreneurship Education - Using extant Entrepreneurial Education evaluation framework	Conceptual/literature paper	Performance of entrepreneurship education at universities
3	[7]	- Measuring the link between the university's entrepreneurial agenda (from its programs) and students' intentions. - HEInnovate is used as a survey assessment tool.	Quantitative approach using survey	Measuring student intentions in university entrepreneurial programs
4	[18]	- HEInnovate as an assessment tool - Turan University as a case study - Entrepreneurship strategy to support the local economy	Quantitative approach using survey	Measuring the level of entrepreneurial activity of universities in supporting the local economy
5	[8]	- Explore how HEInnovate and digital transformation dimensions effectively reflect the characteristics of an entrepreneurial university - Interviews with Triple Helix actors (single case study) - HEInnovate digital transformation and capability dimensions—Opportunities and challenges - Portugal context	Qualitative exploratory research discourse analysis using semi-structured interview	Measuring the entrepreneurial level of universities by combining HEInnovate with the digital transformation dimension
6	[10]	- How entrepreneurial teaching and learning influence the development of graduates' entrepreneurial activities. - Graduate entrepreneur approaches to the HEInnovate dimensions. - Portugal context	Interview with 13 graduate entrepreneurs	Measuring the level of entrepreneurship education by linking it to the entrepreneurial activities of its graduates.
7	[20]	- Five HEIs in Finland, Germany, Ireland, Portugal, and Spain - Explore what kinds of activities HEIs engage in entrepreneurial activities. Isn't that more intrapreneurial than entrepreneurial? - To explore the benefits of university entrepreneurial metrics, analysing HEInnovate Entrepreneurial Performance (HEIEP) as a discriminant function of the HEInnovate dimensions complemented with a qualitative approach using Fuzzy Set Qualitative Comparative Analysis (fsQCA).	Quantitative approach using survey	Looking at the tendency of higher education engagement in entrepreneurial activities
8	[19]	- Portugal context - to measure to what extent the effect of entrepreneurial education is direct or indirect in their entrepreneurial intention, evaluating the role of entrepreneurial motivation of students in this relationship.	Quantitative approach using survey	Exploring the HEInnovate dimensions to see the entrepreneurial performance of a university
9	[17]	- Portugal context - To set universal criteria that define an entrepreneurial university	Using survey for 966 HEI students	Looking at the influence of entrepreneurial education on students' intentions to undertake entrepreneurial activities
10	[11]	- Kazakhstan, the USA, Germany and India context - Comparative analysis - Used for Kazakhstan government recommendation	Quantitative approach using survey	Measuring the entrepreneurial performance of a university

HEInnovate was used as an evaluative framework to assess the success of university entrepreneurship education by linking the entrepreneurial teaching and learning dimensions to student outcomes, particularly entrepreneurial intentions and activities. A study by Ramalho et al. [7] utilized HEInnovate as a survey-based assessment tool to examine the relationship between a university's entrepreneurial agenda and student intentions, while Patrício and Ferreira [8] demonstrated that the entrepreneurial teaching and learning dimensions within HEInnovate contributed to the development of graduates' entrepreneurial activities. On the other hand, Mónico et al. [17] emphasized that the influence of entrepreneurship education on students' intentions is both direct and indirect, mediated by entrepreneurial motivation. Therefore, the success of entrepreneurship education is measured not only by curriculum design but also by changes in students' attitudes and behaviors. However, most studies still focus on perceptual and intentional indicators, not comprehensively linking HEInnovate dimensions to long-term performance, such as real business creation or economic impact, so methodological strengthening is needed to make HEInnovate an outcome-based evaluation instrument for the success of entrepreneurship education [7, 8, 10, 16, 17].

Moreover, a critical exploration of the HEInnovate dimensions indicates that this framework has the analytical capacity to differentiate universities' levels of entrepreneurial performance through a multidimensional approach, but it still faces conceptual and methodological challenges. Patrício and Ferreira's [10] study used fsQCA to analyze HEInnovate Entrepreneurial Performance (HEIEP) as a discriminant function of HEInnovate dimensions, thereby confirming that no single dimension is dominant; rather, a combination of dimensions determines performance. These findings enrich the literature by demonstrating the non-linear and configurational nature of dimensions such as entrepreneurial leadership, teaching and learning, and knowledge exchange. However, this study also highlights the limitations of HEInnovate as an instrument, which remains largely reliant on self-assessment and institutional perceptions. Therefore, its external validity and its linkage to objective performance indicators (e.g., spin-offs or economic impact) still need to be strengthened. Thus, it can be concluded that, although the HEInnovate dimensions are comprehensive and flexible across contexts, their development toward an outcome-based evaluation model and cross-country quantitative testing constitute important agendas for further research [10].

Future studies should also examine how HEInnovate dimensions interact with broader innovation ecosystem frameworks such as the Triple Helix model, which emphasizes collaboration among universities, industry, and government in generating entrepreneurial and innovation outcomes [22]. While measuring entrepreneurial maturity levels has provided important initial insight, future research should explore the mechanisms and processes that produce tangible entrepreneurial outcomes. Furthermore, HEInnovate studies still tend to focus on the entrepreneurship education dimension, while strategic entities within universities, such as business incubators, technology transfer institutions (TTOs), and science parks—which play a key role in commercialization and startup formation have not been thoroughly analyzed as an integral part of the HEInnovate dimension configuration. Therefore, future research is recommended to integrate the HEInnovate dimensions with other theoretical perspectives, such as the RBV, dynamic

capabilities, and the innovation ecosystem approach, to build a more comprehensive and contextual framework for entrepreneurial higher education that is able to explain the relationship between institutional capabilities, governance, and the economic impact generated by universities.

5. CONCLUSION

This study systematically reviews the body of knowledge on HEInnovate, a framework developed by the European Commission and the OECD to support HEIs in enhancing their innovative and entrepreneurial potential. The findings show that while HEInnovate has been applied across multiple contexts, most studies remain fragmented, often focusing on individual dimensions such as governance, entrepreneurship education, or digital transformation. Despite its relevance as both a self-assessment and a policy instrument, the literature has not yet provided a comprehensive synthesis of how the eight HEInnovate dimensions jointly contribute to institutional transformation and long-term impact.

The review highlights several research gaps that open promising avenues for future inquiry. First, it is necessary to broaden the analytical scope beyond isolated dimensions. Future studies should adopt a holistic approach that examines the interdependence among leadership, organizational capacity, knowledge exchange, digital transformation, internationalization, pathways for entrepreneurs, impact measurement, and teaching and learning. Understanding how these dimensions reinforce one another will provide richer insights into how HEInnovate supports institutional change. Second, the evidence base is geographically concentrated in Europe, limiting transferability to other contexts. Future research should extend the application of HEInnovate to non-EU and developing countries, where universities operate under different policy regimes, face resource constraints, and exhibit varying ecosystem maturity. As demonstrated in studies of technology commercialization in developing countries, examining diverse contexts can generate new conceptual insights and refine existing frameworks to capture regional specificities.

Third, the literature would benefit from methodological advancement. Current studies rely heavily on cross-sectional case studies or survey-based assessments. Future research should employ longitudinal and comparative designs to capture the evolution of HEInnovate implementation over time, linking adoption with measurable outcomes such as graduate entrepreneurship rates, patent activity, university-industry partnerships, and contributions to regional development. Mixed-method approaches that combine bibliometric mapping, institutional self-assessments, and stakeholder interviews could strengthen validity and provide more comprehensive evidence. Fourth, there is scope to deepen the theoretical foundation of HEInnovate studies. While the entrepreneurial university and Triple Helix models are commonly cited, few studies systematically apply management theories. Drawing on the technology commercialisation literature, perspectives such as the RBV, dynamic capabilities, resource orchestration, and institutional theory offer useful lenses for explaining how HEIs mobilise resources, adapt to institutional pressures, and respond to dynamic environments. Integrating these theories can elevate HEInnovate research from descriptive applications to more explanatory and predictive analyses.

Finally, the increasing emphasis on digitalisation, sustainability, and societal impact calls for future research that situates HEInnovate within broader policy frameworks, such as the Sustainable Development Goals (SDGs) and environmental, social, and governance (ESG) agendas. Investigating how HEInnovate aligns with digital strategies, sustainability goals, and regional innovation ecosystems will strengthen its role as both a self-assessment tool and a strategic driver of higher education transformation. In sum, HEInnovate research is moving from early-stage adoption studies toward a more strategic and policy-relevant agenda. By addressing the identified gaps, future scholarship can deepen understanding of how HEInnovate can enhance entrepreneurial universities and foster innovation-driven growth across diverse educational and regional contexts.

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