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Academic Entrepreneurship in Higher Education: A Scoping Study

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Abstract

Academic entrepreneurship (AE) in higher education institutions (HEIs) has a significant function in driving innovation and fostering economic development. By bridging the gap between academia and the business world, AE research advances theoretical understanding and offers practical implications for economic development through innovation, new venture creation, and enhanced regional and national economic performance. Therefore, this study aims to explore the landscape of AE research conducted in HEIs indexed in the Web of Science (WOS) in the past decade. A scoping review was performed on the eligible publications between 2013 and 2023 to explore the characteristics of AE research in HEIs. Of the 77 documents obtained at the initial screening, 21 articles on AE in HEIs were included in the review after the inclusion criteria were applied to the selected documents. These studies were evaluated in terms of publication year, WOS category, country, research focus, methodologies, outcomes, and implications. Based on the results, AE studies reached a peak in 2020 and the highest number of records were identified in the categories of Business and Management. Iran, Italy, China, Sweden, and the USA were the leading countries contributing significantly to the AE studies with various methodologies on diverse focuses. The prominent areas were detected as the success of AE initiatives, faculty performance, institutional support mechanisms, motivational factors, student/faculty experiences, organizational learning, and AE dynamics in the research outcomes and implications.

Keywords: academic entrepreneurship, higher education, entrepreneurial university, entrepreneurial practices, university innovations

1. Introduction

Academic entrepreneurship (AE) is defined as the process of commercializing university research through business activities, creating economic value, and promoting technology transfer (Fithri et al., 2023). AE has currently evolved into a broader concept of the entrepreneurial university, which significantly influences governmental decisions and regional economic development (Syed et al., 2023). Evidence from multiple countries has

been collected to understand the extent and nature of AE worldwide (Davey & Galan-Muros, 2020). Recognized as a crucial catalyst of technological development and economic growth for both developed and developing countries (Meng et al., 2019), AE is increasingly emphasized in research because the changing landscape of AE necessitates the reconsideration of theoretical and empirical research to improve the rigor and relevance of future studies (Siegel & Wright, 2015).

Higher education institutions (HEIs) struggle with escalating challenges such as reduced resources and increased operational costs; in addition, the rates of student enrolment decline, but HEIs are expected to stimulate regional development and economic growth (Toyin Ojo et al., 2023). These challenges force HEIs to operate in a more complicated environment that requires strategic interventions and other creative solutions for coping with AE complexities within current environmental conditions. In this respect, HEIs need to focus on commercializing higher education as an alternative source of income to meet the cost of its operations (Fithri et al., 2023). In other words, academic institutions should be viewed as a means of collecting funds to cover administrative costs in addition to an educational experience. Consequently, it is fundamental that academics take on entrepreneurial endeavors along with their regular positions as researchers and lecturers. Some of these attempts may include research-based initiatives such as contract research and consultancy, and joint R&D projects; or teaching-based ones like supervising students' internships and public lectures (Davey & Galan-Muros, 2020; Yu et al., 2023).

AE contributes to the knowledge economy and regional development through nurturing innovation and technology transfer. Innovation can be cultivated with new business opportunities identified by academics engaged in entrepreneurial activities, which directly supports the economic sustainability of HEIs (Davey & Galan-Muros, 2020; Toyin Ojo et al., 2023). Entrepreneurial activities can facilitate the commercialization of knowledge and create an environment conducive to innovative practices in HEIs. In such contexts, it is essential to thoroughly recognize and utilize potential opportunities emerging from the findings of scientific research conducted in universities, which makes knowledge and technology transfer possible as indicated in the knowledge spillover theory of entrepreneurship (Acs et al., 2013). In other words, as proposed in this theory, entrepreneurial resources utilize opportunities arising from university innovations to cultivate competencies and ultimately result in the commercialization of knowledge and technology; thus, it can be feasible to achieve value creation in knowledge-based economies (Szulczewska-Remi, 2022). Notably, AE enables scientists with the capability to actively influence the development of commercial opportunities, especially during the initial stages of formal establishment; subsequently, leads to improvements in its effectiveness and significantly contributes to addressing the demands of society (Park et al., 2022; Syed et al., 2023). AE encourages researchers to strategically navigate the complexities of transitioning their innovations into marketable products or services and ultimately fosters a culture of innovation and entrepreneurship within the scientific community.

HEIs can play a role in building local entrepreneurial ecosystems when they generate start-ups based on academic research, which positively influences industrial contexts and economic performance (Sciarelli et al., 2021). In this particular context, AE serves a critically fundamental role in stimulating innovative concepts and promoting economic development, thereby operating as a key connection that bridges academic research and practical business applications. Accordingly, HEIs must proactively engage in AE practices, which encompass the integration of research, teaching, and outreach activities, because these practices are essential for universities to establish themselves as credible sources of knowledge within their respective geographic areas where ongoing collaboration and interaction are provided with

various stakeholders (Johannisson, 2023). Consequently, the investigation on AE is strategically significant to increase its benefits for both HEIs and industry, particularly because AE research can advance its theoretical understanding with recommended practical implications for regional and national economic development through innovation and new venture creation. Therefore, this study aims to explore the landscape of AE research in HEIs indexed in the Web of Science (WOS) in the past decade.

2. Methodology

2.1 Research design

In this study, the characteristics of AE research in HEIs were investigated in terms of publication year, WOS category, country, research focus, methodologies, outcomes, and implications through a scoping review conducted on the selected eligible publications indexed in the WOS database between 2013 and 2023. Scoping reviews are used to identify and categorize diverse methods, typologies, and taxonomies, and to effectively structure the broad array of approaches utilized in varied disciplines; ultimately, these reviews contribute to advancing methodological transparency and precision in academic studies (Munn et al., 2023). Accordingly, the following research questions (RQs) were examined in the eligible AE studies in HEIs:

RQ-1: How is AE research in HEIs distributed over the period of 2013-2023?

RQ-2: How is AE research in HEIs classified by the WOS category?

RQ-3: Which countries conduct AE research in HEIs?

RQ-4: What is the research focus in AE studies in HEIs?

RQ-5: What methodologies are employed in AE studies in HEIs?

RQ-6: What are the overall research outcomes obtained from AE studies in HEIs?

RQ-7: What are the overall research implications made in AE studies in HEIs?

2.2 Identification of the AE Studies in HEIs

To identify the eligible publications, first, the keywords “academic entrepreneurship” and “higher education” were selected and an appropriate search string was formulated with their equivalences by using Boolean operators. Second, the inclusion/exclusion criteria were defined based on publication year [2013-2023], document type [article], micro-level citation topics [academic entrepreneurship], and language [English]. Of the 77 documents obtained at the initial screening, 21 eligible articles on AE in HEIs were identified to be included in the review.

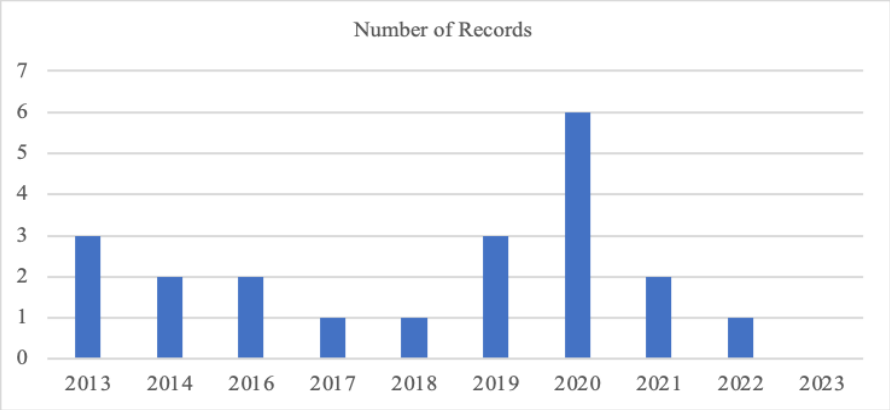
2.3 Analysis of the Eligible AE Studies in HEIs

To address RQ-1, RQ-2, and RQ-3, descriptive analyses were carried out to explore the distribution of the AE research in HEIs by publication year, WOS category, and country. Regarding RQ-4, RQ-5, RQ-6, and RQ-7, the scope of the eligible publications was qualitatively analyzed for their research focus, methodologies, overall outcomes, and implications.

3. Results

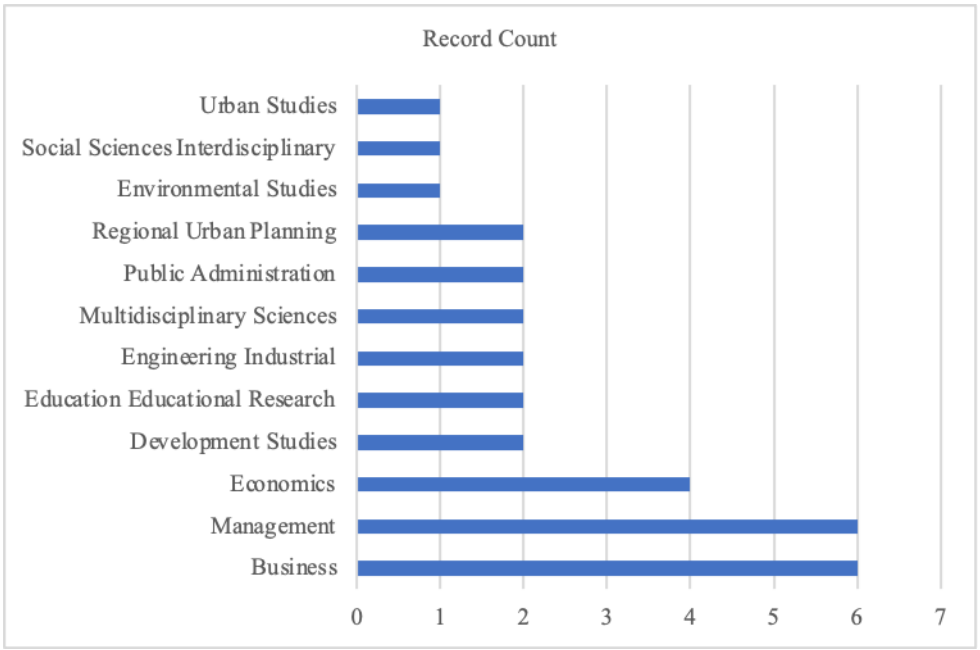
The distribution of the eligible AE studies in HEIs between 2013 and 2023 is presented in Figure 1 with a total of 21 records (RQ-1). There were no records found for the year 2023 in the WOS database meeting the inclusion criteria. The highest number of records was identified in 2020 with six records, which represented 28.571% of the total. In 2019 and 2013, three studies were detected, which constituted 14.286% each. In the years 2021, 2016, and 2014, two records were found with the representation of 9.524% each. In 2022, 2018, and 2017, there was only one record, which accounted for 4.762% each.

Figure 1: Distribution of the eligible AE studies in HEIs by publication year



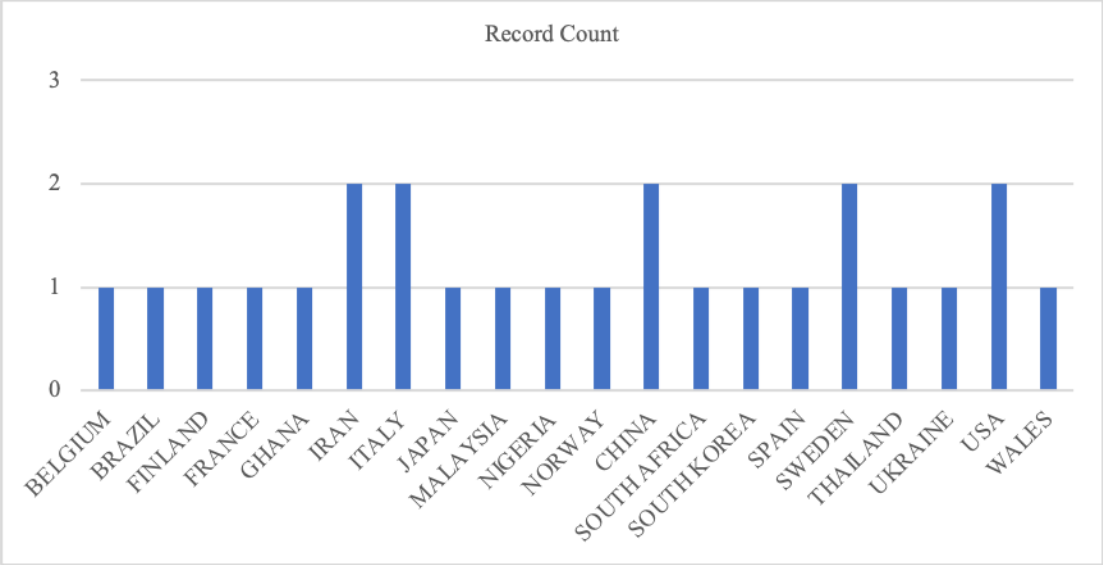
The distribution of the studies on AE in HEIs across different WOS categories is shown in Figure 2 (RQ-2). The categories with the highest number of records were found in Business and Management, each with six records, accounting for 28.571% of the total. Economics follows with four records that made up 19.048%. The categories of Development Studies, Education Educational Research, Engineering Industrial, Multidisciplinary Sciences, Public Administration, and Regional Urban Planning had two records, which represented 9.524% each. Finally, Environmental Studies, Social Sciences Interdisciplinary, and Urban Studies had only one study with 4.762% of the total

Figure 2: Distribution of the eligible AE studies in HEIs by WOS categories



The distribution of the studies on AE in HEIs across different countries is presented in Figure 3, with a total of 21 records (RQ-3). The countries with two records were identified as Iran, Italy, China, Sweden, and the USA, which made up 9.524% of the total. The remaining countries; namely, Belgium, Brazil, Finland, France, Ghana, Japan, Malaysia, Nigeria, Norway, South Africa, South Korea, Spain, Thailand, Ukraine, and Wales, had only one record, which accounted for 4.762% of the total each.

Figure 3: Distribution of the eligible AE studies in HEIs by country



To address RQ-4 and RQ-5, the eligible AE studies in HEIs were qualitatively analyzed, and the summarized results are presented in Table 1. Accordingly, the studies covered a range of topics including faculty commitment, the impact of government policy, university support for student entrepreneurship, the importance of research collaboration, the impact of motivation on academic spinoff success, and the role of university entrepreneurial activities. As for the methodologies employed in these studies, a wide variety of research designs was detected such as quantitative, qualitative, and mixed-methods research including literature reviews, econometric analysis, case studies, social network analysis, and fuzzy-set qualitative comparative analysis.

Table 1: Research focus and methodologies in the eligible AE studies in HEIs

Publications	Research Focus	Methodology
Adelowo and Surujlal (2020)	Faculty commitment & AE	Quantitative research
Alias and Musa (2014)	Impact of government policy on Islamic religious schools	Qualitative research (descriptive and argumentative approaches)
Bienkowska et al. (2016)	University support for student entrepreneurship	Quantitative research
Bozeman et al. (2013)	Importance of research collaboration in science and technology	Literature review
Civera et al. (2020)	Impact of motivation on academic spinoff success	Quantitative research
Crow et al. (2020)	The role of the university's entrepreneurial activities	Literature review
Doh et al. (2022)	Patterns of entrepreneurship within African universities	Mixed-methods approach
Fischer et al. (2019)	Impact of university environment on faculty involvement in AE	Econometric analysis

Publications	Research Focus	Methodology
Kang et al. (2021)	Institutional environment and individual motivations for AE	Mixed-methods approach
Lundqvist and Williams Middleton (2013)	The influence of university initiatives on scientists' involvement in venture creation	Qualitative case study
Meng et al. (2019)	Knowledge transfer from industry to university (I-U) in the AE ecosystem	Case study
Novikova et al. (2020)	Promoting AE in Ukrainian universities to increase the commercialization of research and innovation	A combination of economic analysis methods (PEST, SWOT) and logical reasoning techniques
Prokop (2022)	Impact of university entrepreneurial ecosystems on academic spinoff creation	Social network analysis (SNA)
Schaeffer and Matt (2016)	Integration of universities and Technology Transfer Offices (TTOs) to stimulate AE in emerging entrepreneurial ecosystems	Case study
Sciarelli et al. (2021)	Impact of AE on the economic performance of university spin-offs (USOs)	Quantitative research (Cross-sectional analysis)
Sooampon and Igel (2014)	Individual researchers' perception of the environment as a factor influencing AE within universities (The micro-level factors shaping a researcher's decision to pursue entrepreneurial ventures)	Comparative case studies
Tabaghdehi et al. (2018)	Relationship between organizational learning, university entrepreneurship, and intellectual capital	Quantitative research
Tofighi et al. (2017)	The dynamics of AE in a medical university of a developing country	Quantitative research (Cross impact analysis)
Urbano and Guerrero (2013)	Socioeconomic impacts of entrepreneurial universities in the knowledge economy	Case study
Wang et al. (2022)	Factors influencing academic scientists' intentions to engage in various commercialization activities	Fuzzy-set Qualitative Comparative Analysis (fs-QCA)
Yoshioka-Kobayashi (2019)	The role of institutional factors in promoting university spin-offs in the context of state-controlled universities	Case study

Finally, RQ-5 and RQ-6 were analyzed through a critical evaluation of the eligible publications. The overall research outcomes and implications identified in the AE studies contextualized in HEIs are summarized in Table 2.

Table 2: Overall outcomes and implications in the eligible AE studies in HEIs

Publications	Outcomes	Implications
Adelowo and Surujlal (2020)	- Faculty externship experiences (working outside the university) have a beneficial effect on faculty performance in both publishing and teaching. - In contrast, involvement in entrepreneurial activities within the university appears to have a negative impact on faculty performance.	- HEIs can enhance faculty performance by providing more support for AE initiatives.
Alias and Musa (2014)	- The potential mismatch is highlighted between the skills of graduates from Islamic religious schools and the needs of the Islamic sector and AE. - The perceived conflict between federal and state authority negatively affects human resource development in Syariah and legal studies.	- Current government policies may be hindering graduate employment prospects. - The collaboration between Islamic religious schools and other educational institutions should be increased to ensure graduates possess the skills necessary for success in the Islamic sector and academia.

Publications	Outcomes	Implications
Bienkowska et al. (2016)	- Higher support leads to more student startup creation. - Boundary spanning by faculty is crucial.	HEIs should prioritize support mechanisms for student entrepreneurship. - Entrepreneurial engagement should be promoted through faculty-specific norms and cultures.
Bozeman et al. (2013)	- Collaboration is the norm for successful research endeavors.	- Collaboration should be promoted across different levels (individual, team, institutional) and types (knowledge-focused, property-focused).
Civera et al. (2020)	- Necessity-driven academic spinoffs have higher survival rates. - Opportunity-driven academic spinoffs experience higher growth rates after establishment.	- Policymakers should consider the motivations behind academic spinoff creation when designing support systems. - Survival rates of necessity-driven spinoffs should be boosted. - Growth potential of opportunity-driven spinoffs should be enhanced.
Crow et al. (2020)	- A university that prioritizes and supports entrepreneurial activities will have a more entrepreneurial environment for its faculty and students.	- Understanding university context (logic) is crucial for promoting AE. - The academic enterprise logic suggests a shift towards a more entrepreneurial university model.
Doh et al. (2022)	- Nine distinct patterns of entrepreneurship within African universities were identified. - A holistic framework was developed to analyze these patterns and their potential for transformation.	- Universities can evaluate their current entrepreneurial efforts. - The framework helps develop a plan to become an entrepreneurial university. - The framework can be used to justify requests for funding to support entrepreneurial activities.
Fischer et al. (2019)	- No significant correlation was found between most aspects of the university environment and faculty involvement in AE. - Current initiatives to promote AE in Brazilian universities may be ineffective.	- Strategies for promoting AE developed in other countries may not be directly applicable to the Brazilian context. - Universities in Brazil need to develop approaches that consider the specific characteristics of their own environment.
Kang et al. (2021)	- Misaligned interests and attention priorities among key stakeholders (e.g., faculty, administration, government) hinder AE. - Even with favorable national and university incentives, these discrepancies can lead to problems in planning and execution.	- A shift in focus should be made from just creating incentives to aligning stakeholder interests and attention priorities. - Strategies for communication, collaboration, and negotiation are required among different stakeholders involved in AE.
Lundqvist and Williams Middleton (2013)	- Venture creation can be compatible with the traditional role of a university scientist, especially when supported by university initiatives. - University resources like entrepreneurship centers and action-based education programs facilitate scientist involvement without requiring them to become the lead entrepreneur.	- HEIs can promote collective entrepreneurial activity to make venture creation more attractive to scientists. - Scientists can play various entrepreneurial roles beyond being the lead venture creator, such as collaborating with students. - Student involvement in venture creation is important alongside scientists.

Publications	Outcomes	Implications
Meng et al. (2019)	- Personal industry experiences of academic entrepreneurs, commercialization partner firms, and leading customers were identified as the key sources of U-I.	- HEIs and policymakers should pay more attention to facilitating I-U knowledge transfer to enhance the success of AE.
Novikova et al. (2020)	- Strategic approaches were defined for universities as commercializing research products, increasing non-budgetary funding for research and innovation activities, raising profitability of intellectual property, and creating small innovative enterprises.	- International AE education should be integrated into universities to develop a high-tech, export-oriented, and socially responsible economic model in Ukraine.
Prokop (2022)	- Universities located in better-developed entrepreneurial ecosystems create a higher number of academic spinoff companies. - The Greater South East region of the UK has the most productive ecosystems for academic spinoff formation.	- University entrepreneurial ecosystems are important for AE. - Policymakers should consider the composition of these ecosystems when developing strategies to promote academic spinoffs.
Schaeffer and Matt (2016)	- The university, through its TTO, played a key role in developing a mature entrepreneurial ecosystem by creating innovation intermediaries, coordinating local actors involved in startup creation, acting as a boundary spanner between the university and the external environment, and building and orchestrating a network of stakeholders. - The TTO's role evolved from revenue maximization to considering social and economic development.	- Universities and TTOs in emerging ecosystems can learn to promote academic AE, foster a more mature entrepreneurial environment, collaborate effectively with local players, and consider social and economic impact alongside revenue generation.
Sciarelli et al. (2021)	- Governance and ownership structure can influence the economic performance of USOs in different ways. - The specific success metric being used determines which aspects of the founding team are most important.	- Managers and policymakers should consider the composition of the founding team and the specific economic performance indicators being used.
Sooampon and Igel (2014)	- The perceived social environment is important alongside individual characteristics in understanding researchers' decisions to become entrepreneurs. - This approach complements existing macro-level perspectives on the entrepreneurial university.	- HEIs should consider not just broad institutional factors but also individual researchers' perceptions when promoting AE. - By understanding these perceptions, HEIs can develop more targeted support systems to encourage researchers to pursue entrepreneurial ventures with social impact.
Tabaghdehi et al. (2018)	- Organizational learning has a direct positive effect on intellectual capital. - Organizational learning also has a direct positive effect on university entrepreneurship. - University entrepreneurship does not fully mediate the relationship between organizational learning and intellectual capital because of the significant direct effect of organizational learning on intellectual capital even after accounting for university entrepreneurship.	- Promoting organizational learning within universities can enhance their intellectual capital. - University entrepreneurship can also play a role in boosting intellectual capital although it may not be the sole mechanism through which organizational learning exerts its influence. - Universities should focus on developing a culture of continuous learning and supporting entrepreneurial initiatives to strengthen their intellectual capital base.

Publications	Outcomes	Implications
Tofighi et al. (2017)	- While the entrepreneurial ecosystem is developing in the country, there are still challenges hindering the growth of AE within the medical university.	- Targeted policies are necessary to address the specific challenges faced by the medical university in promoting AE. - By using a system dynamics approach, a comprehensive framework can be provided for understanding the dynamics of AE and evaluating the potential effects of different policy interventions.
Urbano and Guerrero (2013)	- Knowledge creation and exploitation were found as entrepreneurial opportunities in the knowledge economy. - Entrepreneurial opportunities have a fragmented nature.	- HEIs can contribute more effectively to the development of the modern knowledge economy by fostering university entrepreneurship.
Wang et al. (2022)	- There is no single recipe for high entrepreneurial intention. - Different combinations of factors can lead to high entrepreneurial intention depending on the type of commercialization activity (spin-off creation, patenting, etc.).	- Policymakers should consider the interplay between different factors when designing strategies to promote AE.
Yoshioka-Kobayashi (2019)	- Success factors for universities include establishing incubators and early-stage investment resources, offering entrepreneurship education programs, and balancing traditional academic goals with entrepreneurial pursuits (bicultural system).	- State-controlled universities can address regulatory challenges by adopting innovative approaches and balancing academic and commercial endeavors.

Consequently, several key findings can be inferred from Table 2. Firstly, external entrepreneurial experiences significantly enhance faculty performance whereas internal entrepreneurial activities may have a detrimental effect (Adelowo & Surujlal, 2020). Additionally, current government policies often restrict the employability of graduates in specific sectors, and it is necessary to establish better alignment between educational outcomes and industry requirements (Alias & Musa, 2014). Besides, institutional support plays a crucial role in fostering student start-ups (Bienkowska et al., 2016), and successful research endeavors are frequently underpinned by collaborative efforts (Bozeman et al., 2013). The motivational factors for spinoff ventures, whether necessity-driven or opportunity-driven, significantly influence their survival and growth rates (Civera et al., 2020). Furthermore, the effectiveness of AE is shaped by holistic frameworks and the specific environments of universities (Crow et al., 2020; Doh et al., 2022). Particularly, personal experiences in industry can enhance knowledge transfer between academia and industry (Meng et al., 2019), and researchers' perceptions of their environment significantly influence their entrepreneurial decisions (Sooampon & Igel, 2014). Furthermore, the promotion of organizational learning directly enhances intellectual capital within universities and supports university entrepreneurship (Tabaghdehi et al., 2018); therefore, robust entrepreneurial ecosystems are associated with higher rates of spinoff creation (Prokop, 2022). Finally, the development of targeted policies along with a thorough understanding of the AE dynamics is indispensable for its effective promotion and support (Tofighi et al., 2017).

4. Discussion

This scoping study explored the characteristics of AE research in HEIs indexed in the WOS in the past decade in terms of publication year, WOS category, country, research focus,

methodologies, outcomes, and implications via a scoping review. Accordingly, it was revealed that AE research between 2013 and 2023 reached a peak in 2020 with six records followed by a steady distribution in other years. The rise in 2020 reflects a growing interest in how universities can contribute to innovation and commercialization, especially in response to global challenges like the COVID-19 pandemic, which may indicate the crucial role of academic institutions in driving progress and solving real-world problems. The highest number of records were detected in the categories of Business and Management, which is quite expected because these disciplines inherently focus on entrepreneurship, innovation, and organizational behavior. Iran, Italy, China, Sweden, and the USA were indicated as the leading countries contributing significantly to the AE studies in the context of HEIs, which highlights the global nature of AE research.

A diversity in research focus was identified among the eligible studies such as the impact of government policies, university support for student entrepreneurship, and the role of motivation in academic spinoff success (Adelowo & Surujlal, 2020; Alias & Musa, 2014; Bienkowska et al., 2016; Bozeman et al., 2013; Civera et al., 2020). As indicated, AE research has a broad and varied approach to understanding the factors influencing AE at different levels including governmental, institutional, and individual contexts. Regarding the methodologies applied in these studies, quantitative, qualitative, and mixed-method designs were observed including literature reviews, econometric analysis, case studies, social network analysis, and fuzzy-set qualitative comparative analysis. The diversity identified in methodological designs demonstrates the multidimensional nature of AE studies conducted in HEIs.

The overall research outcomes and implications were critically evaluated in the eligible AE studies, and some significant key findings were found notable for effective AE practices. Accordingly, the relationship between internal and external factors determines the success of AE initiatives. External entrepreneurial experiences often enhance faculty performance whereas internal activities may require better alignment with institutional goals to avoid negative impacts (Adelowo & Surujlal, 2020). Institutional support mechanisms are also essential for successful AE practices such as fostering a collaborative research environment and encouraging student start-ups (Bozeman et al., 2013; Bienkowska et al., 2016). Finally, the motivational factors for entrepreneurial ventures, whether they are necessity-driven or opportunity-driven, significantly influence their outcomes; hence, tailored support strategies are necessary (Civera et al., 2020), and AE practices should provide continuous engagement with stakeholders (Johannisson, 2023).

5. Conclusion

There are several key implications for policymakers and practitioners in HEIs resulting from the findings of this scoping review. Faculty performance and graduate employability can be enhanced when external entrepreneurial experiences are encouraged and educational outcomes are aligned with industrial needs. Moreover, robust institutional support should be provided and a collaborative research environment should be created to foster AE practices within HEIs. For future research, AE dynamics should be investigated in different contexts to develop targeted policies supporting the effectiveness of AE practices. This study is limited to the publications obtained from the WOS database, which may not fully capture the scope of AE research, and the studies published outside the time period of 2013-2023 were not included in the review, which may also indicate some possible significant outcomes and

implications not found in this study. For future considerations, the scope can be expanded with the inclusion of other databases and more publications to provide a more comprehensive understanding of AE in HEIs.

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