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Bridging innovation strategies and intellectual property: A systematic review-based conceptual framework and a roadmap for future research

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ABSTRACT

Understanding the connection between innovation strategies and intellectual property (IP) is crucial for academia, policymakers, and managers. This topic has gained interest from the scientific community. However, the literature is fragmented and dispersed due to increasing knowledge, and earlier literature reviews do not provide a holistic assessment of the existing research on how innovation strategies are connected to IP. This study aims to address this gap by answering the following questions: What is the status of the art on innovation strategies and IP regarding theoretical and methodological approaches, contextual elements, and key research themes? How can this research be advanced and developed further? To this purpose, we undertake a comprehensive review and synthesis of existing knowledge in this field based on the content analysis of 144 articles indexed in the Web of Science database. Findings indicate that (i) the knowledge-based and resource-based views are the main theoretical foundations, (ii) the empirical-quantitative approach is the main methodology, (iii) the Asian, European, and North American countries are the main geographical scopes explored, and (iv) there are six major research themes addressing innovation strategies, IP protection mechanisms, determinants of innovation strategies and IP, learning and knowledge, interorganizational collaboration, and value creation and appropriation outcomes. Therefore, this study contributes to the literature on innovation and IP strategies by systematically reviewing and analyzing the existing knowledge, proposing an integrative framework highlighting the interconnections among the major research themes, and setting a roadmap for future research.

1. Introduction

In today's fast-changing and competitive environment, pursuing competitive advantage is a top priority for many organizations (Caputo et al., 2021; Nayak et al., 2022; Obradović et al., 2021). Innovation, often hailed as a critical source of competitive advantage (Agostini et al., 2015; Hannah et al., 2019; Hermundsdottir and Aspelund, 2021; Khanra et al., 2022), has now taken center stage in organizations' strategies (Byun et al., 2018; Ma and Jin, 2019). The literature underscores the critical role of distinct innovation strategies in determining the success or failure of organizations (Agostino et al., 2022; Lee and Kim, 2010) and economic growth and development (Dobrzanski et al., 2021; Proksch et al., 2017). These strategies encompass a range of strategic choices for conducting research and development (R&D) and fostering, introducing, and protecting innovation (Agostino et al., 2022).

The existing literature has classified innovation strategies considering indicators of openness: closed, semi-open, and open (Barge-Gil, 2010); distinctions between organizational exploration and exploitation: exploratory and exploitative (Amdaoud et al., 2023; Balsmeier et al., 2017; Malen and Marcus, 2019); and distinct innovation types: technological and non-technological (Corona et al., 2017; Dawid and Reimann, 2011; Kong et al., 2022; Poon and MacPherson, 2005). This body of research emphasizes the crucial role of intellectual property (IP) in promoting or hindering innovation and influencing how innovators profit from it (Abdin et al., 2024; Ching et al., 2024; Teece, 1986). IP is also essential for safeguarding knowledge against leakage and misappropriation (Kang and Lee, 2022; Qian et al., 2015). For these purposes, organizations rely on IP protection mechanisms that scholars classify into two categories: formal mechanisms comprising patents, trademarks, and copyrights; and informal mechanisms including secrecy, lead time, and design complexity (Agostini et al., 2015; Ali and Tang, 2023; Ayerbe et al., 2024; Telg et al., 2023; Yacoub et al., 2020).

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Research on the connection between innovation strategies and IP protection mechanisms has proliferated over the last few decades (Bercovitz and Feldman, 2007; Chatterji and Fabrizio, 2014; Hu et al., 2025; Kang and Lee, 2022; Saksupapchon et al., 2024; Stuart, 2000; Yu, 2023), being now a well-established academic domain. This body of work has investigated the connection between closed/open, exploratory/explorative, radical/incremental, and technological/non-technological innovation strategies and both formal and informal IP protection mechanisms (Amdaoud and Le Bas, 2021; Ching et al., 2024; Hou et al., 2022; Peeters and De La Potterie, 2006; Telg et al., 2023), including its determinants and outcomes (Abdin et al., 2024; Ayerbe et al., 2023; Balsmeier et al., 2017; Lichtenthaler, 2009; Xu et al., 2021; Yu et al., 2024). Understanding the interplay between innovation strategies and IP is crucial for academic purposes, policymakers, and managers. Policymakers influence the allocation of resources for R&D and play a key role in creating and enforcing laws that protect IP. In turn, managers are entrusted with implementing and overseeing innovation and IP strategies within their organizations.

Despite substantial research efforts, the literature on this topic remains highly fragmented (Bhatnagar et al., 2023; Huang et al., 2023; Righi et al., 2023). To move this research domain forward, a comprehensive and systematic understanding of the connection between innovation strategies and IP is essential. A systematic literature review (SLR) may be an effective way to assess the current state of knowledge in a field and identify potential opportunities for future research (Kraus et al., 2022; Sauer and Seuring, 2023; Silva et al., 2024; Spanuth and Urbano, 2024). While earlier SLRs have already focused on innovation issues (Cheng et al., 2023; Corbo et al., 2023; Hermundsdottir and Aspelund, 2021; Khanra et al., 2022; Obradović et al., 2021; Sá et al., 2025), and IP issues (Ali and Tang, 2023; Bonnet and Teuteberg, 2022; Cao et al., 2022; Hannah et al., 2019; Hurmelinna-Laukkanen and Yang, 2022; Ozcan et al., 2024), only the recent literature review by Ayerbe et al. (2024) addresses the intricate landscape of IP protection mechanisms within the scope of closed and open innovation models.

Although the study by Ayerbe et al. (2024) offers valuable and insightful findings, revealing four distinct configurations of formal and informal IP protection mechanisms within closed and open innovation models, it does not explore innovation outcomes, thus presenting a relevant gap. First, it focused specifically on closed and open innovation models and did not assess the publications timeline, leading journals, prominent authors, and influential works, features commonly examined in SLRs (Cao et al., 2022; Heubeck, 2024; Khanra et al., 2022; Kujala et al., 2022). This analysis facilitates the appraisal of publications over time and enables an understanding of past evolution and potential future research trajectories due to the influence of leading journals, authors, and studies in every research field (Furrer et al., 2008). Second, that review did not explore the theories and methodologies employed and the contextual elements examined, which are critical features for systematizing and presenting the state of the art of a research field (Corbo et al., 2023; Obradović et al., 2021). Researchers have employed various theoretical and methodological approaches and investigated distinct contexts, which may lead to the fragmentation and dispersion of the literature, hindering the field's progress (Heubeck, 2024). Bringing together the various findings can help eliminate or at least reduce fragmentation. Third, Ayerbe et al. (2024) did not unveil and integrate research themes and sub-themes from the existing literature and how these influence each other.

This research addresses these gaps and outlines the research landscape concerning innovation strategies and IP by conducting a SLR. Starting from this purpose, we aim to address the following research questions (RQs): (RQ1) How has the literature on this research domain evolved over time? (RQ2) What are the most influential outlets, authors, and publications? (RQ3) Which theoretical and methodological approaches are used to study innovation strategies and IP? (RQ4) Which contextual elements (i.e., geographical scopes and industries)? are researched? (RQ5) What are the current efforts and major research themes on innovation strategies and IP? (RQ6) Where and how can the literature on this research domain be advanced?

This study makes several new contributions. First, we offer a comprehensive and up-to-date understanding of the knowledge structure that relates innovation strategies to IP by presenting a systematic and holistic assessment based on the content analysis of 144 articles published between 1996 and 2023. We synthesize the features of the research domain in terms of time frame, journal publication, prolific authors, impactful articles, theoretical and methodological approaches employed, contextual elements (i.e., geographical scopes and industries) examined, and major research themes investigated. Second, we provide an appraisal of the existing research and propose an integrative helpful framework to understand the phenomenon under study, which integrates the six major research themes revealed and systematized: (i) innovation strategies, (ii) IP protection mechanisms, (iii) determinants of innovation strategies and IP, (iv) learning and knowledge, (v) inter-organizational collaboration, and (vi) value creation and appropriation outcomes. The framework integrates the existing knowledge and can be beneficial for further research. Third, based on the research gaps identified, we highlight future research opportunities and propose corresponding research questions that seek to advance the research on innovation strategies and IP.

The article is structured as follows: Section 2 presents the theoretical background on innovation strategies and IP protection mechanisms. Section 3 details the methodology used to select and analyze the relevant articles for the research. Section 4 provides the descriptive analysis of the publications included in the SLR. This is followed in Section 5 by the synthesis of the current efforts and major research themes on innovation strategies and IP. Section 6 presents an integrative framework and offers an agenda for future research. Finally, Section 7 concludes the article, answering RQs, raising theoretical and practical implications, and acknowledging limitations.

2. Theoretical background

Innovation strategies comprise a range of organizational strategic decisions related to knowledge acquisition sources (in-house development versus external acquisition), the degree of collaboration with other organizations, the extent (incremental or radical), and the type (technological and non-technological) of innovation, as well as funding sources and mechanisms for protecting IP (Agostino et al., 2022). The existing literature presents various classifications of innovation strategies that organizations can adopt (Barge-Gil, 2010; Cassiman and Veugelers, 2006; Chesbrough, 2003) and applicable IP protection mechanisms to safeguard innovations (Ali and Tang, 2023; Ayerbe et al., 2024).

Considering the potential use of internal and external knowledge sources, Cassiman and Veugelers (2006) established four innovation strategies: *no make and buy* when there is not a formal innovation strategy; *make only* when organizations create innovation performing only in-house R&D; *buy only* when organizations acquire innovation externally; and *make and buy* when organizations combine both strategies, in-house R&D and external knowledge acquisition. Barge-Gil (2010), based on indicators of openness, distinguished three innovation strategies: *closed* strategies entail in-house R&D without cooperating with or acquiring external knowledge; *semi-open* strategies imply the development of innovation combining internal R&D and absorption of external knowledge; and *open* strategies entail the development of innovation through collaboration or external linkages with other organizations, or by other organizations (Barge-Gil, 2010; Chesbrough, 2003). These open innovation strategies can be realized through three distinct processes: *outside-in*, *inside-out*, and *coupled* (Enkel et al., 2009). In turn, following March (1991) organizational learning theory, innovation strategies can be *exploratory* when they require new knowledge that the organization has not previously used to spur discoveries or *exploitative* when they are built on existing knowledge that the

organization is already familiar with (Bercovitz and Feldman, 2007; Gao et al., 2018; Malen and Marcus, 2019). Literature also distinguishes between *incremental* innovation strategies when they focus on the improvement of current product/service offerings of other types of innovation, and *radical* innovation strategies when they concentrate on disrupting, destroying, and making obsolete current product/service offerings or other types of innovation, entailing a high degree of new knowledge (Amdaoud et al., 2023; Dewar and Dutton, 1986). Despite the classifications mentioned above being widely used in literature, some studies classify innovation strategies based on innovation types (e.g., technological and non-technological; product/service, process, organizational, managerial, marketing innovation) (Amdaoud et al., 2023; Dawid and Reimann, 2011; Kong et al., 2022; lo Storto, 2006).

Innovation strategies also encompass concerns about IP protection. Organizations make use of formal (e.g., patents, trademarks, industrial designs, and copyrights) and informal (e.g., secrecy, lead time, and design complexity) IP protection mechanisms (Agostini et al., 2015; Ali and Tang, 2023; Rochina-Barrachina and Rodríguez, 2019; Yacoub et al., 2020) to protect their innovations. While the former mechanisms involve direct legal rights, which can be obtained through a register or contract, the latter may not involve direct or sufficient legal rights (Ali and Tang, 2023). Notwithstanding, since much valuable knowledge, such as tacit knowledge, might persist without sufficient formal protection, organizations protect it by using informal protection mechanisms (Ali and Tang, 2023).

Researchers have increasingly investigated the connection between innovation strategies and IP protection mechanisms. Existing literature indicates that organizations use formal and informal IP protection mechanisms to protect innovation resulting from distinct innovation strategies. For instance, Amdaoud et al. (2023) observed that firms tend to patent (a formal mechanism) more product and process innovations resulting from radical than incremental innovation strategies. Scholars also highlighted the complementarity of closed and open innovation strategies to increase the probability of patenting (a formal mechanism) (Schmiedeberg, 2008) and the complementary use of formal and informal protection mechanisms to protect technological and non-technological innovations (Corona et al., 2017). Moreover, some research outlines that the types of collaborations and innovation partners influence innovation strategies and IP protection mechanisms organizations use to safeguard innovations (Lazzarotti et al., 2017; Xiao and Bao, 2022). Literature also indicates the potential influence of innovation and IP strategies on performance. For instance, Agostini et al. (2015) found that firms relying more on informal than formal mechanisms register superior performance. Yacoub et al. (2020) observed that service firms, particularly knowledge-intensive service firms, benefit more from informal than formal protection mechanisms while manufacturing firms benefit from formal and informal ones. This also suggests that organizational factors (e.g., industry) influence the relationship between IP strategies and performance.

This increasing literature makes it challenging for researchers to acquire a clear view and understanding of this relevant domain. Several authors have assessed findings on innovation strategies and IP management research underlying the need for additional explorations. For instance, Obradović et al. (2021) organized findings on the application of open innovation strategy in the manufacturing setting, highlighting theoretical foundations, methodologies, geographical scopes, industries, and research trends, including sustainability, commitment-based human resource practices, IP, and performance. Sá et al. (2025) developed a framework that integrates six research themes on open innovation strategy focusing on the open business model, innovation, knowledge management, IP, performance, and culture. Corbo et al. (2023) contributed to innovation-related coopetition strategy, revealing the theoretical and methodological approaches, geographical scopes, industries, and research themes focused on strategy, innovativeness, value creation, appropriation and performance, appropriability and protection, and organizational culture. In turn, Bonnet and Teuteberg (2022) organized findings on the effect of distributed ledger technology on IP management using a PESTEL framework. Ali and Tang (2023) contributed to understanding how formal and informal IP mechanisms provide potential ways to protect knowledge, thereby offering a conceptual framework. Recently, Ayerbe et al. (2024) developed a configurational framework comprising four distinct configurations of IP protection mechanisms within both open and closed innovation strategies – formal/closed, informal/closed, formal/open, and informal/closed – considering influencing factors for IP strategic choices such as industry sector, product/process innovation, and legal system. The configurations proposed do not consider the associated innovation outcomes.

Overall, these scholars contributed to the development of the field. However, there remains a need to address the following RQs to provide a comprehensive status of the art on innovation strategies and IP research: (RQ1) How has the literature on this research domain evolved over time? (RQ2) What are the most influential outlets, authors, and publications? (RQ3) Which theoretical and methodological approaches are used to study innovation strategies and IP? (RQ4) Which contextual elements (i.e., geographical scopes and industries)? are researched? (RQ5) What are the current efforts and major research themes on innovation strategies and IP? (RQ6) Where and how can the literature on this research domain be advanced? This article seeks to address these questions.

3. Methodology

We performed a SLR following the guidelines for SLRs in management research (Kraus et al., 2022; Linnenluecke et al., 2020; Sauer and Seuring, 2023) and the best practices used in the business and management fields (Cheng et al., 2023; Henao-García and Cardona Montoya, 2024; Latino et al., 2024; Obradović et al., 2021; Sá et al., 2025; Silva et al., 2024). The SLR approach follows a structured, transparent, and replicable process, introducing rigor and consistency to literature reviews (Linnenluecke et al., 2020). As such, a SLR allows the creation of a valid map of the currently available knowledge and unveils extant knowledge gaps that can guide future research (Kraus et al., 2022; Sauer and Seuring, 2023).

We carried out a process with distinct steps (and decisions) in line with Sauer and Seuring (2023). Considering the study's purpose and the research questions expressed in the previous sections, we defined the search strategy, the inclusion and exclusion criteria for document identification, screening, and refinement, and the steps for the analysis. To ensure transparency, Fig. 1 shows the SRL procedure (Cheng et al., 2023) for sample selection and data analysis. The following subsections explain the SLR procedure in more detail.

3.1. Search strategy and sample selection

We began by establishing our data collection and sampling process, identifying the search terms, and defining the inclusion and exclusion criteria (see Table 1). In the first step, we determined the search terms most readily associated with the research domain under study by reviewing previous related SRLs (Bonnet and Teuteberg, 2022; Holgersson and Aaboen, 2019; Lopes et al., 2019; Ozcan et al., 2024). Accordingly, we summarized the search string as: ("innovat* strateg*") AND ("intellectual propert*" OR "patent*" OR "trademark*" OR "trade secre*" OR "royalt*" OR "copyright*" OR "industrial design"). We used an asterisk to assure completeness since it can be replaced by the absence of a character, a single character, or multiple characters in a term. For example, "innovat* strateg*" can be innovativeness strategy, innovativeness strategies, innovation strategy, or innovation strategies. In line with Caputo et al. (2021), Cheng et al. (2023), and Spanuth and Urbano (2024), the terms were searched in the title, abstract, and keywords of the publications indexed in the WoS database. WoS is recognized as one of the world's leading and most reputable bibliographic databases for having high-quality standards (Sauer and Seuring, 2023),

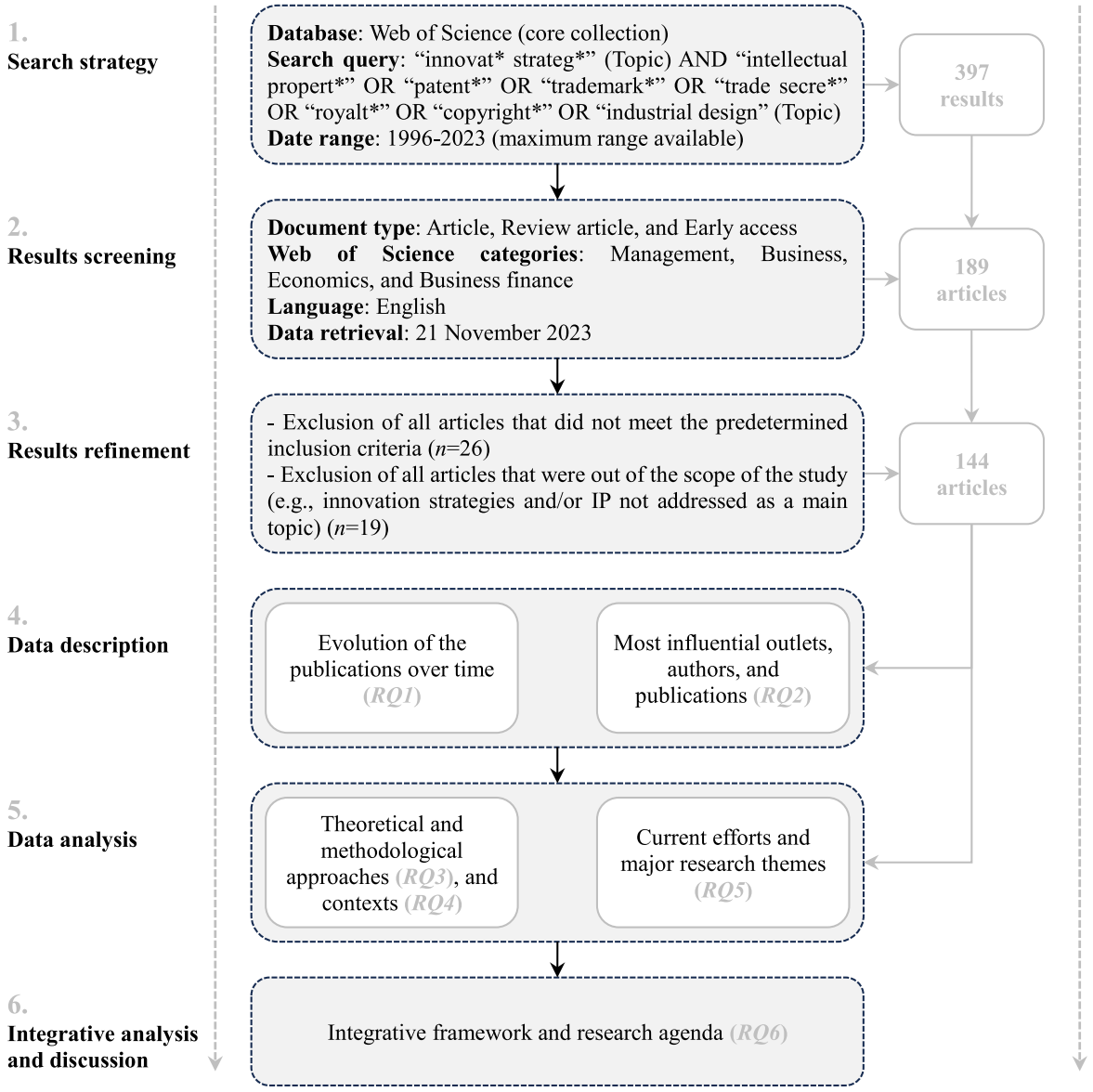

Fig. 1. SLR procedure for sample selection and data analysis.

which ensures the identification and selection of highly relevant and quality publications. No time constraint was imposed. This initial search yielded 397 results.

The second step involved screening results. Following best practices (Corbo et al., 2023; Latino et al., 2024; Ozcan et al., 2024; Sá et al., 2025; Silva et al., 2024), we refined the initial search by document type, WoS category, and language. The inclusion of only articles and reviews published in peer-reviewed journals written in English ensures the robustness of the data (Corbo et al., 2023) since articles published in peer-reviewed journals contain the most reliable and validated knowledge (Caputo et al., 2021) and English language represents the academic lingua franca (Latino et al., 2024). The selection of publications allocated to management, business, and economics categories is consistent with the best practices and the nature of our study. The screening decreased the number of publications to 189 articles.

The third step comprised reading all articles' titles, abstracts, and keywords and, when necessary, the full text, removing those that did not match the predetermined inclusion criteria (Table 1). We performed this step independently and discussed the results at the end of the process to mitigate any bias. All the articles that did not meet all the inclusion criteria in terms of search terms, document type, subject area, and language were removed from the sample (26 articles). For instance, some articles included the term "copyright" at the end of the abstract, referring to the publishing copyright, without including any search term

Table 1
Inclusion and exclusion criteria.

Criteria	Inclusion criteria	Exclusion criteria
Search terms	Combination of search terms on innovation strategies and IP in the title, abstract, and keywords	No combination of search terms on innovation strategies and IP in the title, abstract, and keywords
Document type	Peer-reviewed journal articles, review articles, and early access	Books, book chapters, conference proceedings, and other document types
Subject category	Articles in the categories of Business, Business Finance, Economics, and Management	Articles in any other subject category
Language	Articles published in the English language	Articles published in any language other than English
Research scope	Studies that address the combination of innovation strategies and IP as a main topic	Studies whose focus is not innovation strategies in combination with IP

related to IP in the title, abstract defined by authors, and keywords. Moreover, 19 articles were excluded, either because they were out of the scope of the study or because they did not address innovation strategies and/or IP as the main topic. Although the search terms were mentioned in their titles, abstracts, and/or keywords, some articles dealt with different issues. This led to a final sample of 144 articles (see the list of articles in the supplementary material). The exclusion of a large proportion of articles previously selected is in line with the guidelines for SRLs (Kraus et al., 2022) and other SLRs in the business and management fields (Corbo et al., 2023; Latino et al., 2024; Ozcan et al., 2024; Spanuth and Urbano, 2024). Data were downloaded in Excel for analysis.

3.2. Process of data description and analysis

This phase was devoted to the characterization of the sample and content analysis of the articles. Two steps were carried out. First, to answer RQ1, we analyzed the evolution of the publications over time through the number of articles published each year. Furthermore, to respond to RQ2, we examined the most influential outlets, authors, and publications, considering the number of articles published by the journal, the number of articles published by the author, and the number of citations by article, respectively. This type of analysis is usual in SLRs (Cao et al., 2022; Heubeck, 2024; Khanra et al., 2022).

Second, to identify the main theoretical and methodological approaches applied (answer to RQ3), the contextual elements (i.e., geographical scope and industry) researched (respond to RQ4), as well as to identify and synthesize the main research themes on innovation strategies and IP (answer to RQ5), we followed the procedures of previous SLRs (Heubeck, 2024; Kujala et al., 2022; Sá et al., 2025). We performed a detailed content analysis of each article and codified all articles considering an adaptation, when possible, of the codebooks used by Corbo et al. (2023), Kujala et al. (2022), Henao-García and Cardona Montoya (2024), Obradović et al. (2021), and Sá et al. (2025). We described the articles based on (i) author(s) and publication year, (ii) journal, (iii) focus (main purpose), (iv) theoretical approach(es), (v) methodological approach, (vi) (additional) methodological features, (vii) contextual elements (i.e., geographical scope and industry(ies)), (viii) variables, and (ix) key findings.

We carried out an independent coding procedure to ensure accuracy and completeness. After that, we cross-checked the results and discussed them, particularly in cases of discrepancies, to build a reliable and independent dataset. Theoretical approaches were identified, when possible, through the content analysis of each article. Concerning the methodological approach, we classified the articles as theoretical or empirical, as Sá et al. (2025) and similarly to Kujala et al. (2022). Empirical studies were classified as empirical-qualitative, empirical-quantitative, or empirical-mixed. When applicable, additional methodological features were identified (e.g., data source and sample). Regarding contextual elements, as Corbo et al. (2023) and Obradović et al. (2021), we classified the articles considering two categories: geographical scope and industry(ies). In line with Obradović et al. (2021) and for better transparency, empirical articles were classified based on two groups of industries regarding technological intensity (i.e., medium-low-tech, which includes low-tech and medium-low-tech industries; and medium-high-tech, which includes medium-high-tech and high-tech industries) considering the Statistical Classification of Economic Activities in the European Community. Some articles, however, examined mixed samples with medium-low-tech and medium-high-tech industries or did not specify the industries investigated. For empirical-quantitative or empirical-mixed studies, we also identified independent and dependent variables and, when applicable, mediating and/or moderating variables. Table A1 in the Appendix lists the categories and descriptors used in the codification, and some sources used to define them.

Through the content analysis and codification of the articles, we identified six major research themes (see Tables S2–S7 available in the supplementary material). These research themes were then systematized, highlighting the main insights and gaps. Based on these findings, a holistic framework and research agenda emerged. The following sections present and discuss the results.

4. Descriptive analysis

To answer RQ1 (How has the literature on this research domain evolved over time?), we started to examine the number of publications by year. The results show that the 144 articles included in the SLR were published between 1996 and 2023, with the following distribution: 5.56 % from 1996 to 2005, 25.69 % from 2006 to 2014, and 68.75 % from 2015 to 2023. This distribution reveals a growing interest among researchers in innovation strategies and IP research. Fig. 2 displays the evolution of those publications per year and shows that 2019 was the most productive year, with 14 published articles.

To respond to RQ2 (What are the most influential outlets, authors, and publications?), we analyzed the number of articles published by journal and author and the number of citations by article. Table 2 highlights the top ten journals (main outlets) according to the number of published articles (three or more) out of 76 journals. They include some of the most renowned journals in innovation, technology, and strategic management, such as *Research Policy*, *Technological Forecasting & Social Change*, *Strategic Management Journal*, and *Technovation*. The journal with the most publications is *Research Policy* (15 articles). All the top ten journals have an Impact Factor (2023) higher than 1.39. *Journal of Business Research*, *Technological Forecasting & Social Change*, and *Technovation* stand out with an Impact Factor (2023) higher than 10.49. Therefore, these journals represent the primary outlets for publishing articles on the connection between innovation strategies and IP. Scholars should consider them when choosing where to publish studies on this research topic.

The following descriptive analysis centers on identifying the authors and articles with the most significant influence. This analysis is relevant to understanding the past evolution of the research topic and the potential future research avenues, given the impact of the most productive authors and the seminal roles of some publications in every research domain (Furrer et al., 2008). The study analyzed 144 articles in total, which involved 337 authors. However, there were no authors that stood out as particularly influential. The most productive author was Po-Hsuan Hsu, who was associated with four articles and affiliated with the National Tsing Hua University in Taiwan.

Concerning the most influential articles, Table 3 highlights the top ten most cited. The study of Stuart (2000) stands out with a total of 1093 citations and an annual average of 54.65 citations, followed by the study of West and Gallagher (2006) with a total of 533 citations and an annual average of 29.61 citations and the study of Dushnitsky and Lenox (2005) with a total of 325 citations and an annual average of 17.11 citations. The top ten most cited articles focused on research themes such as open innovation strategies (Lichtenthaler, 2009; Parker and Van Alstyne, 2018; West and Gallagher, 2006), interorganizational collaboration for innovation (Baba et al., 2009; Bercovitz and Feldman, 2007; Stuart, 2000), determinants of innovation strategies (Balsmeier et al., 2017), and innovation performance (Rodriguez-Pose and di Cataldo, 2015).

To systematize the research on innovation strategies and IP, it is essential to explore some of its main features, in line with the content analysis and categorization performed: major research themes and subthemes, contextual elements (i.e., geographical scopes and industries), and theoretical and methodological approaches. This systematization helps us to answer RQ3 (Which theoretical and methodological approaches are used to study innovation strategies and IP?), RQ4 (Which contextual elements (i.e., geographical scopes and industries) are researched?), and RQ5 (What are the current efforts and major research themes on innovation strategies and IP?). Following the same approach as Obradović et al. (2021), Fig. 3 displays those features' division,

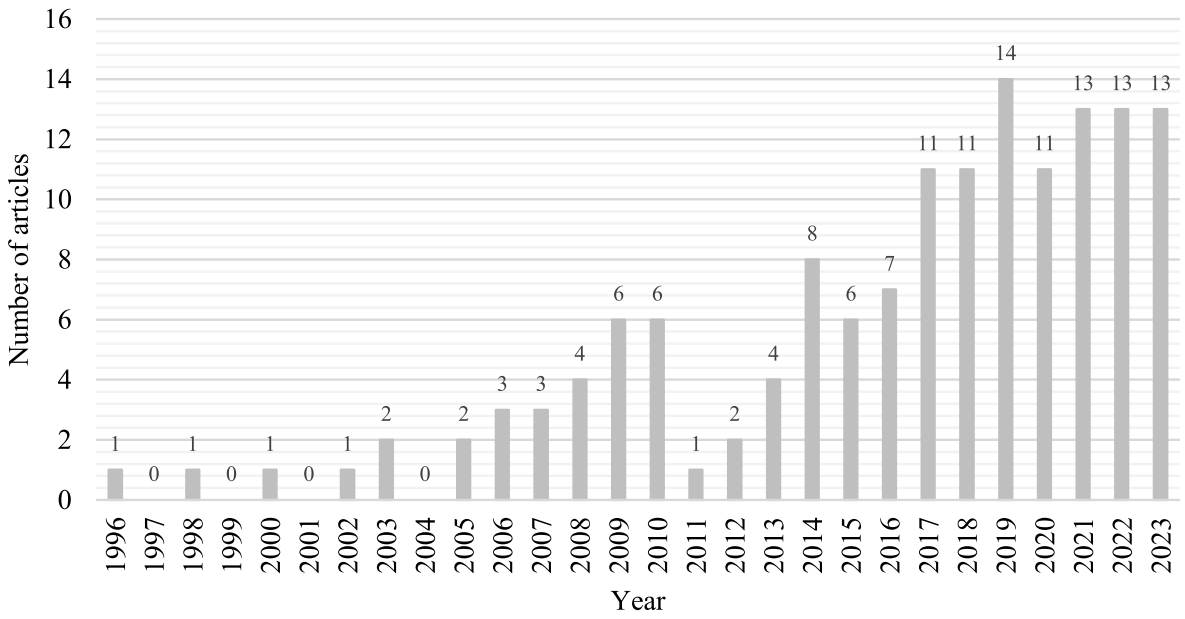

Fig. 2. Evolution of the published articles per year (1996–2023).

Table 2
Top ten journals based on the number of published articles (three or more).

Publication title	No. of articles	No. of citations	Impact Factor 2023
Research Policy	15	1528	7.50
Technological Forecasting & Social Change	9	398	12.90
Strategic Management Journal	8	1737	6.50
International Journal of Technology Management	7	25	1.40
Technology Analysis & Strategic Management	6	155	2.90
Journal of Business Research	5	14	10.50
R&D Management	5	763	6.70
Industrial and Corporate Change	4	110	2.80
Management Decision	3	57	4.10
Technovation	3	137	11.10

Table 3
Top ten most cited articles.

Author(s) (year)	Title	Publication title	Citations
Stuart (2000)	Interorganizational alliances and performance of firms: A study of growth and innovation rates in a high-technology industry	Strategic Management Journal	1093
West and Gallagher (2006)	Challenges of open innovation: The paradox of firm investment in open-source software	R&D Management	533
Dushnitsky and Lenox (2005)	When do incumbents learn from entrepreneurial ventures? Corporate venture capital and investing firm innovation rates	Research Policy	325
Balsmeier et al. (2017)	Independent boards and innovation	Journal of Financial Economics	291
Spencer (2003)	Firms' knowledge-sharing strategies in the global innovation system: Empirical evidence from the flat panel display industry	Strategic Management Journal	239
Bercovitz and Feldman (2007)	Fishing upstream: Firm innovation strategy and university research alliances	Research Policy	230
Parker and Van Alstyne (2018)	Innovation, openness, and platform control	Management Science	225
Rodriguez-Pose and di Cataldo (2015)	Quality of government and innovative performance in the regions of Europe	Journal of Economic Geography	210
Lichtenthaler (2009)	Outbound open innovation and its effect on firm performance: Examining environmental influences	R&D Management	174
Baba et al. (2009)	How do collaborations with universities affect firms' innovative performance? The role of "Pasteur scientists" in the advanced materials field	Research Policy	163

presenting illustrative references. It should be noted that Fig. 3 presents the major research themes and sub-themes, the main theoretical and methodological approaches used, and the main geographical scopes and industries researched (see Table S1 available in the supplementary material for additional information on the main descriptors and their frequencies).

The reviewed articles were organized into six major research themes addressing innovation strategies, IP protection mechanisms, determinants of innovation strategies and IP, learning and knowledge, interorganizational collaboration, and value creation and appropriation outcomes (see Tables S2–S7 available in the supplementary material). Although some articles have been included only in one research theme, they may address more than one of the themes identified. For instance, Lazzarotti et al. (2017) investigated the relationships among contextual factors, open innovation strategy, and innovation performance, issues related to innovation strategies, their determinants, and value creation and appropriation outcomes. The six research themes are synthesized in the next section.

Regarding RQ3, the findings show the application of several theoretical perspectives to shed light on innovation strategies and IP. We identified four theoretical foundations most frequently employed (see Table 4): the knowledge-based view (Hsu et al., 2021; Kang et al., 2019; Zhao et al., 2021), the resource-based view (Allred and Park, 2007; Ozcan et al., 2024; Zulfiqar et al., 2020), the agency theory (Bianchini

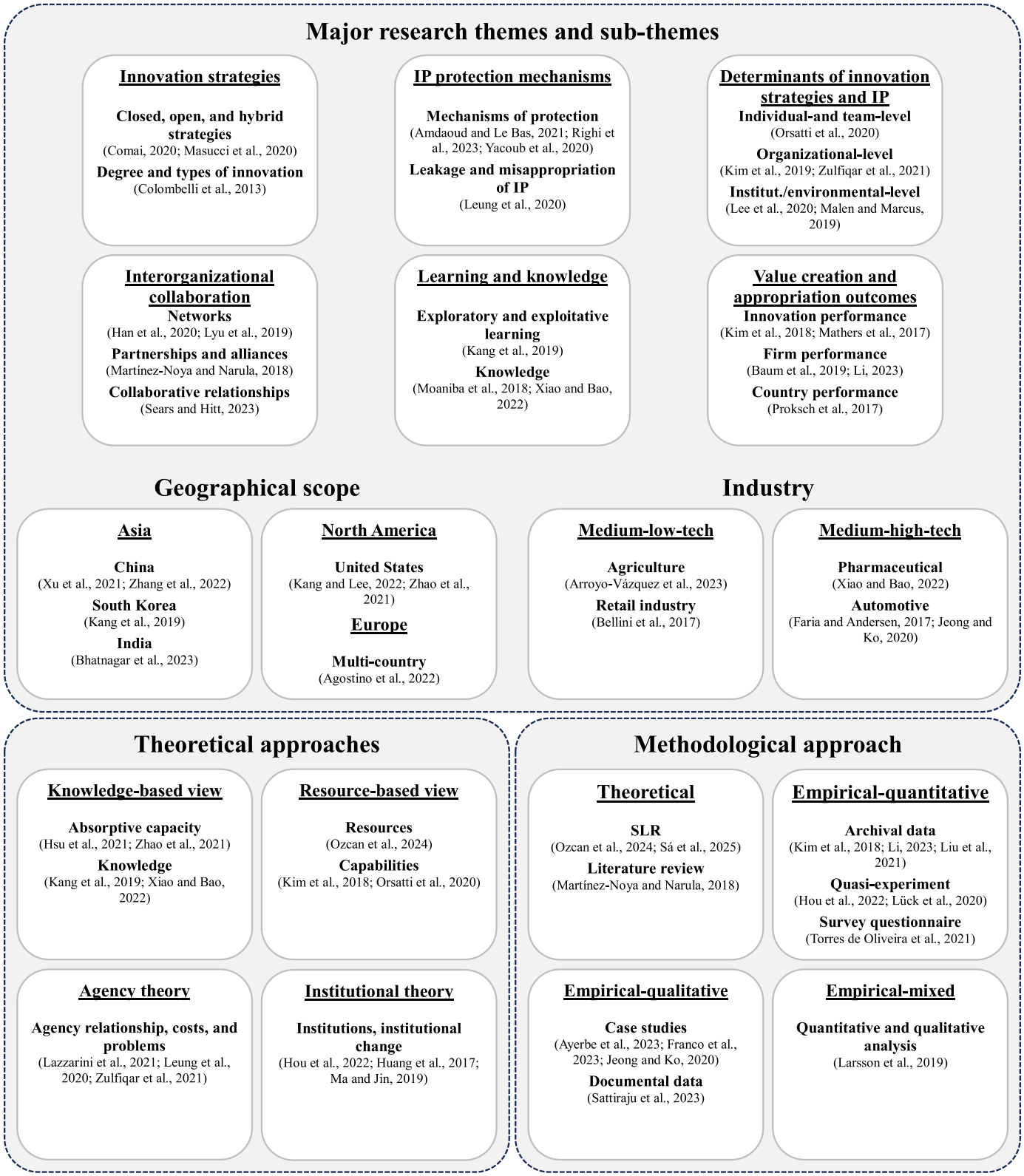

Fig. 3. Research trends on innovation strategies and IP and main geographical scopes, industries, and theoretical and methodological approaches with illustrative references.

et al., 2018; Lazzarini et al., 2021; Leung et al., 2020), and the institutional theory (Huang et al., 2017; Ma and Jin, 2019). However, the reviewed studies also use, albeit punctually, other theoretical approaches, including the game theory (An et al., 2022), the imprinting theory (Huang et al., 2023), the social capital theory (Larsson et al., 2019), the stakeholder theory (Mbanyele, 2022), and the stewardship theory (Zulfiqar et al., 2021). Some research combines two or more theoretical approaches when investigating innovation and IP strategies and their determinants, outcomes, and directly related issues (An et al., 2022; Balsmeier et al., 2017; Zhang et al., 2022; Zhao et al., 2021). For

Table 4
Main theoretical perspectives in innovation strategies and IP.

Theoretical perspectives	Foundational concepts	Main focus	Main researched areas
Knowledge-based view (Grant, 1996)	Knowledge, organizational learning	Knowledge, knowledge sources, and learning components shape innovation and IP strategies.	Internal and external knowledge, absorptive capacity, knowledge accumulation, knowledge recombination, knowledge sharing, learning.
Resource-based view (Barney, 1991; Teece et al., 1997)	Strategic resources, capabilities, sustained competitive advantage	Resources and capabilities support innovation strategies and IP, which, in turn, influence performance.	Resources, (dynamic) capabilities, recombinant capabilities, competitive advantage, performance.
Agency theory (Jensen and Meckling, 1976)	Agency relationship, agency costs, agency conflicts and problems	Agency features affect innovation and IP strategies.	Principal's problem, agency costs, agency problems.
Institutional theory (Aksom and Tymchenko, 2020; Zucker, 1987)	Institutional demands, isomorphism, homogenization, decoupling, institutional change	The institutional setting shapes and changes innovation and IP protection mechanisms.	Institutions, institutional embeddedness, institutional change (e.g., IP legal system change and innovation strategy change).

instance, Zhao et al. (2021) drew on the knowledge-based view, the stakeholder theory, and the social capital theory to explore the influence of exploration and exploitation on firm performance and the moderating role of firm-stakeholder relationships. Knowledge-based and resource-based views are the perspectives most frequently used together (Li, 2023; Ray and Ray, 2021; Spencer, 2003; Yacoub et al., 2020).

Earlier reviews of innovation research have also revealed the predominant use of knowledge-based and resource-based views to study innovation issues (Corbo et al., 2023; Obradović et al., 2021). The knowledge-based view is the theoretical perspective most usually applied in studying innovation strategies and IP. Highly influenced by the resource-based view, it posits that knowledge is the primary firm's strategic resource that frequently constitutes a firm's sustained competitive advantage, and creating, acquiring, storing, and developing knowledge are vital activities (Grant, 1996). Some studies rely on this perspective to examine the relevance and influence of internal and external knowledge (Baum et al., 2019; Corsino et al., 2019), knowledge accumulation through experience and experimentation (Kang et al., 2019), knowledge recombination (Moaniba et al., 2018), and the risk of knowledge leakage (Kang and Lee, 2022) in shaping innovation and IP strategies, as well as their effect on performance. Other studies focus on the absorptive capacity of external knowledge accessed, for instance, through entrepreneurial ventures (Dushnitsky and Lenox, 2005) and cross-border mergers and acquisitions (Hsu et al., 2021), highlighting how it improves innovation performance (Zhao et al., 2019). Therefore, the knowledge-based view is relevant for understanding how knowledge and learning components shape innovation and IP strategies.

The resource-based view postulates that the heterogeneity and immobility of resources simultaneously valuable, rare, inimitable, and non-substitutable possessed by a firm represent its primary source of sustained competitive advantage (Barney, 1991). The resource-based view and its extension, the dynamic capabilities perspective (Teece et al., 1997), are prominent frameworks for understanding innovation and IP strategies and their determinants and outcomes. Drawing upon these perspectives, some studies have investigated how resources and (dynamic) capabilities (Ozcan et al., 2024; Zulfiqar et al., 2021), including R&D capabilities (Kim et al., 2018) and recombinant capabilities of inventor's teams (Orsatti et al., 2020), support the development and implementation of innovation and IP strategies, and their influence on value creation and appropriation outcomes (Bergek et al., 2009; Torres de Oliveira et al., 2021).

Scholarly literature on innovation strategies and IP also relies on agency and institutional theories. The agency theory focuses on the establishment of an efficient agency contract between the principal (owner) and the agent (manager) to regulate the relationship and reduce divergences (agency problems) between them in maximizing utility since the agent can engage in self-interest seeking or opportunistic behaviors (Jensen and Meckling, 1976). Using this framework, studies have investigated the principal's problem when a subsidiary fails to perform as expected by headquarters in innovation strategies based on customer cocreation of new products (Leung et al., 2020), agency "liabilities" that may benefit state-owned firms in some types of invention outputs (Lazzarini et al., 2021), and the influence of corporate governance, which can reduce agency costs, on R&D and patenting strategy (Bianchini et al., 2018). In turn, the institutional theory posits that the institutional setting in which organizations operate can strongly influence the structure and behavior in and of organizations (Aksom and Tymchenko, 2020; Zucker, 1987) and, thus, can play a key role in shaping innovation and IP strategies. Using this approach, studies have examined the influence of environmental constraints (Ma and Jin, 2019), institutions (e.g., innovation policies and legal system), and institutional change, such as the change in the legal system for IP rights, on innovation and IP strategies (Hou et al., 2022; Huang et al., 2017; Ray and Ray, 2021). Some studies also address the relevance of institutional convergence-divergence (Van Wijk and Ramanna, 2007) and institutional embeddedness (Huang et al., 2017). In this sense, agency and institutional theories are relevant approaches for investigating the phenomenon of innovation and IP strategies and their determinants and outcomes. Table 4 summarizes the focus and research areas of the four main theoretical lenses employed to investigate the connection between innovation strategies and IP.

Still answering RQ3 and concerning methodological approaches, our assessment reveals that researchers have focused mainly on empirical analyses (n = 132, 91.67 %). Previous research reviews on innovation issues have also shown the predominance of empirical studies (Corbo et al., 2023; Obradović et al., 2021; Sá et al., 2025), while (Bonnet and Teuteberg, 2022) unveiled that most studies on blockchain-based management of IP have developed theoretical frameworks. As with other innovation research, studies on the connection between innovation strategies and IP have devoted special attention to empirical validation.

The majority of the reviewed studies have employed empirical-quantitative methodologies (n = 116, 80.56 %) (Almeida et al., 2021; Cheng et al., 2017; Kang and Lee, 2022; Lück et al., 2020; Righi et al., 2023; Su, 2018) and very few use empirical-qualitative approaches (n = 15, 10.42 %) (Ayerbe et al., 2023; Masucci et al., 2020). Empirical-quantitative studies rely primarily on archival data on patents obtained, for instance, from the Chinese National Intellectual Property Office database (Hou et al., 2022; Li, 2023), Derwent Innovation Index database (Han et al., 2020; Xiao and Bao, 2022), European Patent Office database (Baum et al., 2019; Comai, 2020), and United States Patent and Trademark Office database (Byun et al., 2018; Righi et al., 2023). Only a few studies are based on primary data collected through survey questionnaires (Lazzarotti et al., 2017; Leung et al., 2020). Empirical-qualitative studies use single (Ayerbe et al., 2023; Franco et al., 2023) or multiple case studies (Bhatnagar et al., 2023; Masucci et al., 2020), interviews (West and Gallagher, 2006), or documental methods (Sattiraju et al., 2023).

About contextual elements and answering RQ4, our review of the

field shows that studies have explored mostly Asian countries ($n = 32$, 22.22 %), such as China (Leung et al., 2020; Li, 2023; Yu, 2023; Zhang et al., 2022) and South Korea (Choi and Jung, 2021; Kang et al., 2019); European countries ($n = 30$, 20.83 %), such as the Netherlands (Da Rin and Penas, 2017), Spain (Arroyo-Vázquez et al., 2023; Sandulli et al., 2012), Sweeden (Baum et al., 2019), and United Kingdom (Yacoub et al., 2020); and North American countries ($n = 28$, 19.44 %), mainly United States (Gao et al., 2018; Kang and Lee, 2022; Kim et al., 2019). Research also focuses on multiple geographical scopes (Hsu et al., 2021; Liu et al., 2021; Orsatti et al., 2020; Spencer, 2003; Su, 2018). The predominance of research in these countries is unsurprising since they have devoted particular attention to innovation and IP. Moreover, in such countries, there is access to databases about innovation (e.g., Community Innovation Surveys) and IP (e.g., European Patent Office database). However, we need more studies focusing on under-researched geographical areas to understand the phenomenon in various settings.

Finally, concerning technological intensity, findings reveal that most of the literature has examined mixed samples with medium-low-tech and medium-high-tech industries (Amdaoud et al., 2023; Ervits, 2018; Hsu et al., 2021; Kubota and Takehara, 2019; Yu, 2023). Studies focused on medium-high-tech industries research the automotive (Faria and Andersen, 2017; Jeong and Ko, 2020), electronic (Forti et al., 2021; Stuart, 2000), information technology (Kim et al., 2016; Larsson et al., 2019), and pharmaceutical industries (Keijl et al., 2016; Ray and Ray, 2021; Xiao and Bao, 2022). Only a few studies focus on medium-low-tech industries (Bellini et al., 2017). Investigating these industry environments may lead to new insights.

5. Research themes on innovation strategies and IP

The content analysis and categorization of all articles allowed us, as aforementioned, to organize the literature on innovation strategies and IP into six main research themes and corresponding sub-themes. Table 5 synthesizes these themes and sub-themes, answering RQ5 concisely (What are the current efforts and major research themes on innovation strategies and IP?). The following subsections provide an overview of these research themes and sub-themes, highlighting the main insights and identifying research gaps.

5.1. Innovation strategies

The research on innovation strategies (see Table S2 available in the supplementary material) has addressed distinct strategies considering the degree of organizations' openness (Bhatnagar et al., 2023; Comai, 2020; Hsu et al., 2021) and the degree and types of innovation (Byun et al., 2018; Colombelli et al., 2013; Evangelista and Sirilli, 1998). More recent studies have focused mainly on open innovation strategies (Bhatnagar et al., 2023; Cammarano et al., 2022; Lazzarotti et al., 2017), although some also analyze closed and hybrid innovation strategies (Comai, 2020), and the complementarities between strategies (Schmiedeberg, 2008). Previous studies, however, tended to typify innovation strategies as exploratory and exploitative (Colombelli et al., 2013; lo Storto, 2006) and/or as technological and non-technological (Evangelista and Sirilli, 1998; Poon and MacPherson, 2005). Research on how organizations integrate innovation strategies while considering indicators of openness and the degrees and types of innovation warrants further attention.

While traditional innovation results from internal knowledge (in-house R&D or closed innovation) (Sandulli et al., 2012), open innovation strategies make use of external knowledge sources aiming to value and complement internal knowledge and to improve the effectiveness of R&D expenditures and innovation processes (Belussi et al., 2010; Schmiedeberg, 2008). With this in view, organizations develop networks of interactions with suppliers, customers, consultants, competitors, and universities, among other scientific and business partners (Franco et al., 2023; Lazzarotti et al., 2017). They also obtain external

Table 5
Major research themes and sub-themes in innovation strategies and IP.

Major themes	Sub-themes	Time span	Main focus
Innovation strategies ($n = 26$, 18.06 %)	Closed, open, and hybrid strategies	2006:2023	To explore closed, open, and hybrid innovation strategies and their connections with the IP mechanisms.
	Degree and types of innovation	1998:2020	To examine distinct degrees and types of innovation strategies and their combination.
IP protection mechanisms ($n = 29$, 20.14 %)	Mechanisms of protection	1996:2023	To analyze the legal specifics and application of formal and informal IP mechanisms and their connection with innovation strategies.
	Leakage and misappropriation of IP	2012:2022	To investigate firms' strategies for leading with leakage and misappropriation of IP.
Determinants of innovation strategies and IP ($n = 29$, 20.14 %)	Individual-and team-level determinants	2017:2023	To explore the influence of individual and team-level factors on innovation strategies and IP mechanisms.
	Organizational-level determinants	2016:2023	To research the effect of organizational factors on innovation strategies and IP.
	Institutional/ environmental-level determinants	2009:2022	To examine how institutional and environmental settings shape innovation strategies and IP.
Interorganizational collaboration ($n = 14$, 9.72 %)	Networks	2002:2020	To analyze the influence of collaboration through networks on innovation and IP strategies.
	Partnerships and alliances	2000:2018	To investigate the features of partnerships and alliances and their influence on innovation and IP.
	Collaborative relationships	2009:2023	To study the benefits and harms of collaborative relationships for innovation and IP.
Learning and knowledge ($n = 17$, 11.81 %)	Exploratory and exploitative learning	2016:2022	To explore complex processes of exploratory and exploitative learning.
	Knowledge	2003:2022	To research the sources of knowledge and their use in performing innovation strategies and creating IP.
Value creation and appropriation outcomes ($n = 29$, 20.14 %)	Innovation performance	2016:2021	To explore the effect of incentives, innovation, and IP strategies on

(continued on next page)

Table 5 (*continued*)

Major themes	Sub-themes	Time span	Main focus
			innovation performance.
	Firm performance	2008:2023	To examine the setting, innovation strategies, and IP mechanisms that improve firm performance.
	Country performance	2008:2022	To analyze policy and innovation initiatives that influence a country's performance.

knowledge, for instance, purchasing innovative components (Cammarano et al., 2022) and undertaking (cross-border) mergers and acquisitions (M&As) (Hsu et al., 2021). In this sense, in open innovation, knowledge flows across organizations' and regional and countries' boundaries (Belussi et al., 2010; Hsu et al., 2021). Open innovation includes inbound knowledge flows through acquiring knowledge (Cammarano et al., 2022; Hsu et al., 2021), and outbound knowledge flows through sharing knowledge (Lichtenthaler, 2010; Masucci et al., 2020). The latter enables the removal of bottlenecks in business ecosystems that hinder value creation (Masucci et al., 2020) and capture additional value through technology licensing activities (Lichtenthaler, 2010).

Despite the vast benefits of open innovation strategies, organizations face some risks when undertaking these strategies, such as becoming dependent on technologies and related services provided by external actors (Franco et al., 2023). Furthermore, open innovation also causes tensions regarding IP protection, which literature labels as open innovation paradox (Bhatnagar et al., 2023). Thus, organizations should undertake initiatives to deal with such risks. They can complement innovation strategies by combining in-house R&D (closed innovation) and R&D cooperation (open innovation), which enhances the propensity to patent (Schmiedeberg, 2008).

Organizations can also adopt exploratory innovation strategies to explore new knowledge or exploitative innovation strategies to reuse existing knowledge, regardless of the degree of openness and direction of knowledge flow (Colombelli et al., 2013; Joo et al., 2016). The generation and use of own technologies, instead of existing technologies (existing knowledge), can be more effective for successful technological catch-up strategies (Joo et al., 2016). New knowledge generation is essential for organizational growth. High-growth firms usually adopt exploratory rather than exploitative strategies, as the former generates new knowledge, even based on familiar knowledge (Colombelli et al., 2013). It is worth noting that technological and non-technological innovations can stem from both exploratory or exploitative strategies or the combination of both (ambidexterity innovation). Nevertheless, the existing literature has focused mainly on more traditional product and process innovation issues. Future research should consider recent developments in innovation research, including digital and sustainable innovations (Cheng et al., 2023; Hermundsdottir and Aspelund, 2021).

5.2. IP protection mechanisms

Studies related to the IP protection mechanisms (see Table S3 available in the supplementary material) have examined the institutional change and strengthening of them (Hou et al., 2022; Huang et al., 2017; Ray and Ray, 2021), the use of formal and informal mechanisms (Kang and Lee, 2022; Ozcan et al., 2024; Righi et al., 2023), as well as forms of leakage, misappropriation, and infringement (Leung et al., 2020; Qian et al., 2015). They show that public authorities adjust legislation regarding IP protection to align with international standards, as advocated by global entities, while also diverging from these standards to meet the needs of domestic stakeholders (Van Wijk and Ramanna, 2007). Furthermore, formal institutional changes for IP do not affect firms from different regions, such as Western and Asian firms, in the same way when operating within a country due to their distinct embeddedness to existing informal institutions (Huang et al., 2017).

IP protection mechanisms (e.g., patents) and the transition from weak to strong appropriability regimes enhance organizations' willingness to invest in innovation (Allred and Park, 2007). This transition also influences organizations to change their innovation strategies, encouraging them to adopt exploratory strategies and to develop their human capital and explicit or codified knowledge (Ray and Ray, 2021). Strengthening the patent examination system also regulates organizations' innovation strategies, fostering substantive innovations and corresponding invention patents related to new technologies that can promote long-term competitive advantage and improve financial performance (Hou et al., 2022). Consolidated protection mechanisms support the generation of high-quality IP, creating value (Sattiraju et al., 2023). As such, organizations should integrate their innovation and IP strategies to build successful patent (IP) portfolios (Germeraad, 2010).

The use of formal and informal mechanisms to protect IP is related to organizational and institutional settings, innovation strategies, and types of innovation. For instance, firms from Latin American and Caribbean countries tend to patent more for technological innovations (i.e., product and process innovations) new to the market than for technological innovations new to the firm (Amdaoud et al., 2023). Small and medium enterprises (SMEs) that undertake radical, complex, and product innovations also patent more than SMEs that undertake incremental, single, and process innovations (Amdaoud and Le Bas, 2021). Manufacturing and service firms benefit from formal (e.g., patents, industrial design, trademarks, and copyrights) and informal (e.g., secrecy, complex designs, and lead time) protection mechanisms. However, service firms benefit more from informal protection mechanisms (Yacoub et al., 2020). In some settings, as in the video game industry, organizations use patents and trademarks in a complementary way (i.e., IP hybrid strategies based on formal protection mechanisms) to protect their technological and non-technological innovations (Corona et al., 2017). Nevertheless, it should be noted that firms with higher innovation capabilities that rely on informal mechanisms such as time-to-market and unique skills of employees to protect their IP can reach higher profitability than firms that rely more on patents and secrecy (i.e., IP hybrid strategies based on formal and informal protection mechanisms) (Agostini et al., 2015). Continuing applications, which are filed to higher value technologies, also increase private value (Righi et al., 2023), like exclusive licenses that promote subsequent innovation inputs and subsequent patents, inventions, and new products (Zhang et al., 2022). So far, scholars have focused mainly on formal mechanisms, particularly patents, which leave space for further research addressing the use of other formal and informal mechanisms and the combination of mechanisms.

Leakage, misappropriation, and infringement of IP represent potential damage for organizations, which implies adopting protection and defense mechanisms (Kang and Lee, 2022; Leung et al., 2020; Qian, 2014). When organizations face a more significant threat of worker departure and risk of knowledge leakage, they increasingly rely on patents for knowledge protection rather than secrecy, which is more vulnerable to leakage in case of worker departure to another organization (Kang and Lee, 2022). Organizations with high sales of innovative products (i.e., original and new-to-the-market innovations) have more propensity to become plaintiffs in court over infringement of their IP. In contrast, organizations with high sales of imitative and incremental products have more propensity to become defendants in court and negotiate settlements outside of court (Czarnitzki and Van Criekingen, 2019). In addition, to deal with counterfeits entry, organizations undertake self-corrective mechanisms such as introducing new products, raising prices, and investing in self-enforcement (Qian, 2014; Qian et al., 2015). Nevertheless, to date, we have a limited understanding of the

initiatives and strategies employed by organizations to deal with leakage, misappropriation, and infringement of IP.

5.3. Determinants of innovation strategies and IP

The literature on determinants of innovation strategies and IP appeared and developed mainly in the last few years (see Table S4 available in the supplementary material). Although few studies have explored individual-and team-level determinants (Corvello et al., 2023; Orsatti et al., 2020), the influence of organizational-level (Ayerbe et al., 2023; Bianchini et al., 2018; Lazzarini et al., 2021; Mbanyele, 2022) and institutional/environmental-level determinants (Chatterji and Fabrizio, 2016; Guo et al., 2019; Kong et al., 2022) has been more widely investigated.

Attributes of owners and boards, resource human diversity, and team capabilities influence innovation strategies and outputs, including adopting formal IP protection mechanisms (e.g., patents). Attributes of owners, such as gender diversity and formation level, influence digital innovation and increase patenting activity in digital areas (Corvello et al., 2023). Likewise, diverse employee experiences enhance organizational ambidexterity strategies and patenting activities (Solheim and Herstad, 2018). Furthermore, inventor teams' capabilities and board independence foster innovation strategies and outputs (Balsmeier et al., 2017; Orsatti et al., 2020). While inventor teams' recombinant creation capabilities (i.e., explorative behavior involves inventing new ideas by combining knowledge in innovative ways) promote green inventions, independent boards enhance the exploitation of firms' prior areas of expertise and the number of patents, claims, and forward citations from incremental patents. Nevertheless, the scarcity of research on individual and team-level determinants should encourage scholars to address this gap further.

Ownership (e.g., private and state-owned firms; family and non-family-owned firms), financing alternatives, and other organizational features and factors also influence innovation strategies and IP. State-owned firms' inventions are more pioneering (i.e., based on new knowledge) and frequent (i.e., file more patents) than those of private-owned firms (Lazzarini et al., 2021). Family-owned firms have a higher propensity to invest in R&D, pursue lean innovation strategies, and patent applications, although founder/descendant chief executive officers (CEOs) and executives' compensation might moderate those effects (Kubota and Takehara, 2019; Zulfiqar et al., 2020, 2021). In addition, publicly listed firms, when compared with unlisted firms, file more patents, specifically patents more exploitative than explorative (Gao et al., 2018). That is, their patents are more based on existing than on new knowledge. Concerning financing, literature shows that different financing alternatives may have distinct effects on innovation strategies and IP. Despite loans secured by patents enabling the funding of technological firms, they encourage firms to focus on short-term innovation strategies based on litigation and monetization of patents rather than on long-term innovation developed internally, which is riskier (Ayerbe et al., 2023). In turn, firms that receive public funds tend to generate only in-house R&D, while venture-backed firms more frequently develop in-house R&D and acquire external knowledge, protecting their IP through formal mechanisms (Da Rin and Penas, 2017).

Similarly, institutional and environmental settings significantly influence innovation strategies and IP. National innovation policies that establish R&D funding initiatives, along with specific taxation, IP, and antitrust policies, encourage innovation and enhance R&D performance (Eltham, 2009; Hemphill, 2013). In turn, industry concentration and technology maturity discourage open innovation strategies, while technology uncertainty and complexity promote adopting such strategies (Sandulli et al., 2012). Open innovation strategies help firms access external sources of knowledge critical to deal with uncertainty and complexity. Moreover, industry tournament incentives improve product innovation strategies, particularly those focused on short-term innovation (Kong et al., 2022). When CEOs are likely to move up to the industry's leading firm, tournament incentives' effect on product innovation strategies is greater. Additionally, financial analysts' coverage reduces in-house R&D expenses and encourages acquiring more innovative firms and investing in corporate venture capital as a means of external innovation (Guo et al., 2019). In some contexts, as is the case of pollution reduction technology, environmental externalities (i.e., externalities associated with knowledge spillovers and the share of the benefits of addressing environmental problems with society as a whole) weaken appropriability, which leads firms to change their innovation strategies focusing on organizational exploration rather exploitation and incremental instead radical technologies (Malen and Marcus, 2019). They change their innovation strategies to compensate for the increased difficulty of appropriating value from such technology.

Although extensive research has been conducted on organizational and institutional or environmental determinants, most studies have focused on direct effects. Further research should also explore some of these determinants' intervening role in the connection between innovation strategies and IP.

5.4. Interorganizational collaboration

The research on interorganizational collaboration (see Table S5 available in the supplementary material) has investigated the role, relevance, and types of cooperation for innovation. Such research has addressed interorganizational collaboration based on networks (Bekkers et al., 2002; Han et al., 2020; Lyu et al., 2019), partnerships and alliances (Martínez-Noya and Narula, 2018; Mindruta, 2013; Stuart, 2000), and collaborative relationships (Baba et al., 2009; Sears and Hitt, 2023). Network embeddedness is a key feature of interorganizational collaboration that influences innovation strategies (Han et al., 2020; Lyu et al., 2019). While structural embeddedness, defined as an organization's specific position within the innovation network and the presence or absence of social connections, enhances the capability for incremental innovation, relational embeddedness, which refers to the quality of relationships within the innovation network, negatively impacts this capability (Han et al., 2020). Furthermore, an organization's centrality within the innovation network improves inbound open innovation during the initial and growth development stages; during the stable development stage, such centrality can hinder open innovation (Lyu et al., 2019). Ownership of IP rights is also a crucial issue within innovation networks. Organizations with strong positions regarding essential IP rights also hold central roles within networks, illustrating the mutual influence between ownership of IP rights and networks (Bekkers et al., 2002).

Innovation strategies and IP concerns influence partner interactions (Bercovitz and Feldman, 2007). In turn, innovation partnerships and alliances can affect technological convergence (Lee et al., 2008) and performance (Stuart, 2000). Leading firms engage in new vertical integration or partnerships to maintain technological leadership, which fosters co-patents with foreign inventors and strategic alliances (Lee et al., 2008). Organizations that prioritize exploratory innovation strategies and are concerned about the appropriability of their innovations tend to favor alliances with universities rather than other external partners (Bercovitz and Feldman, 2007). On the other hand, organizations that form alliances with large and innovative partners tend to perform better, making these alliances especially beneficial for young and small organizations (Stuart, 2000). Nevertheless, the benefits gained from interorganizational collaboration can be compromised when there is a significant disparity in the quality of the technological capabilities of the knowledge workers between the target and the acquirer (Sears and Hitt, 2023).

Finally, it should be noted that the benefits derived from alliances and collaborative relationships with universities depend on the heterogeneity within organizations' human capital and their R&D focus and collaborations (Soh and Subramanian, 2014; Subramanian et al., 2013). Alliances and collaborations with universities can enhance a firm's

patent performance, mainly when there is a complementary relationship (e.g., internal R&D that focuses on technological recombination strengthens university-industry collaboration and enhances a firm patent performance) (Soh and Subramanian, 2014; Subramanian et al., 2013). However, without a complementary relationship, the university-industry collaboration weakens, and the firm's R&D productivity is not enhanced (Baba et al., 2009; Soh and Subramanian, 2014).

While prior research provides insightful evidence on the role and relevance of distinct interorganizational collaborations for innovation and IP strategies, we currently have a limited understanding of the organization and partner features that ensure better performance. Furthermore, there is insufficient evidence of the mechanisms employed to manage collaborations to foster innovation and their specific effects on the IP protection mechanisms employed.

5.5. Learning and knowledge

Studies on learning and knowledge (see Table S6 available in the supplementary material) have assessed the organizational processes involved in both exploratory and exploitative learning (An et al., 2022; Kang et al., 2019; Zhao et al., 2021) and the acquisition and use of knowledge, particularly external knowledge, to implement innovation and IP strategies (Corsino et al., 2019; Spencer, 2003; Xiao and Bao, 2022). They provide evidence that dual (exploratory and exploitative) learning is a complex process influenced by transaction costs, demand elasticity, and a heterogeneous market environment (An et al., 2022). Existing evidence also underlines the potential and significant (negative or positive) effects of exploration and exploitation learning on performance (Kang et al., 2019; Zhao et al., 2021). Persistent experience in a specific knowledge area enhances organizational growth. However, new ways of learning or experimentation are required when the depth of experience is higher (Kang et al., 2019). Furthermore, exploration and exploitation seem to have an inverted U-shaped effect on firm performance, which a better firm-employee relationship can strengthen (Zhao et al., 2021).

Organizations utilize various sources to acquire the knowledge necessary to drive innovation strategies, create IP, and enhance performance. These sources include partnerships and networks (Jeong and Ko, 2020; Xiao and Bao, 2022), corporate venture capital investments (Dushnitsky and Lenox, 2005), and insights from product users (Chatterji and Fabrizio, 2014). Partners' knowledge utilization exhibits an inverted U-shaped influence on exploratory innovations, highlighting the need to enhance coordination efforts to maintain control over the innovation process (Xiao and Bao, 2022). In turn, organizations that obtain knowledge from entrepreneurial ventures enhance their innovation rate, particularly in weaker IP regimes, when they possess greater absorptive capacity (Dushnitsky and Lenox, 2005). Collaboration with product users also enhances innovation performance, mainly in emerging technologies and radical innovations (Chatterji and Fabrizio, 2014). Moreover, cross-disciplinary knowledge (i.e., knowledge that results from recombining knowledge across several technological domains) increases the value of inventions (Moaniba et al., 2018). Similarly, sharing knowledge in the firms' global innovation system by publishing and presenting papers at conferences enhances organizations' innovative performance (Spencer, 2003).

The relevance of internal and external knowledge and learning components in shaping innovation and IP strategies has been well documented. Nevertheless, our understanding of how organizational learning and knowledge processes influence innovation outcomes remains limited, especially concerning open and hybrid innovation strategies.

5.6. Value creation and appropriation outcomes

The literature on value creation and appropriation outcomes has been developed over the period of the review (see Table S7 available in the supplementary material). However, some outcomes have been explored only more recently. Studies have addressed the influence of innovation and IP strategies on innovation performance (Forti et al., 2021; Kim et al., 2018; Mathers et al., 2017; Xu et al., 2021), firm performance (Agostino et al., 2022; Huang et al., 2023; Li, 2023), and regional or country performance (Lee et al., 2020; Proksch et al., 2017; Zhu and Xu, 2022). They report that government initiatives, such as innovation programs and subsidies, stimulate innovation performance (e.g., the number of patents and invention patents) by increasing R&D inputs and absorptive capability (Xu et al., 2021; Zhao et al., 2019). R&D capability is crucial for increasing patent registrations and applications, as well as developing new products that are both innovative and improved (Kim et al., 2018). Moreover, the IP protection mechanisms and their potential use influence innovation performance. The perceived risk of patent litigation after an initial public offering (IPO) increases the growth of patent productivity (Forti et al., 2021).

Similarly, a firm's performance can be affected by its innovation and IP strategies. Outbound open innovation strategies improve firm performance (Lichtenthaler, 2009), and explorative and collaborative innovation strategies affect financial performance (Li, 2023). In SMEs, adopting closed innovation strategies and a closed governance structure can also enhance financial performance (Lee et al., 2009). Innovative organizations focusing on in-house innovation strategies tend to experience greater employment growth (Zuniga and Crespi, 2013). Combining innovation strategy, knowledge diversity, and foundation teams' diversity boosts short-term and sustained revenue for new ventures (Huang et al., 2023). However, organizations can only benefit from external knowledge if their innovation strategies are effective, as external knowledge enhances productivity growth primarily for those that maintain consistent innovation efforts (Baum et al., 2019). Nevertheless, the influence of innovation and IP strategies on firm performance can be more complex than mentioned above. R&D activities can increase the propensity of firms' default, although product or process innovation has the potential to decrease such propensity (Agostino et al., 2022). In addition, greater levels of appropriability and revealing also decrease value capture (Torres de Oliveira et al., 2021).

Regarding regional or country performance, literature shows that government intervention through R&D subsidies enhances regional innovation performance; such influence is boosted by regional innovation agents' geographical and organizational proximity (Zhu and Xu, 2022). Additionally, the financialization of the economy and the unique innovation strategies implemented by different countries also affect innovation performance (Lee et al., 2020; Proksch et al., 2017). At the regional level, the quality of government influences a region's capacity to innovate and its overall innovation performance, which can be hindered by ineffective and corrupt government institutions (Rodriguez-Pose and di Cataldo, 2015).

Research increasingly highlights the importance of innovation and IP strategies for enhancing firm and regional or country performance. However, most studies focus only on the effect on short-term performance.

6. Integrative framework and research agenda

We propose a holistic and integrative framework based on insights from the systematization of existing knowledge on innovation strategies and IP performed above (Fig. 4). It integrates the six identified research themes and their corresponding sub-themes. The integrative framework illustrates the connection between innovation strategies and IP, its determinants and outcomes, and the significance of interorganizational collaboration and learning and knowledge components.

Fig. 4 shows a close connection between innovation strategies and IP protection mechanisms, which influence each other. On the one hand, organizations can develop and implement innovation strategies that vary in terms of openness (i.e., open, closed, and hybrid innovation

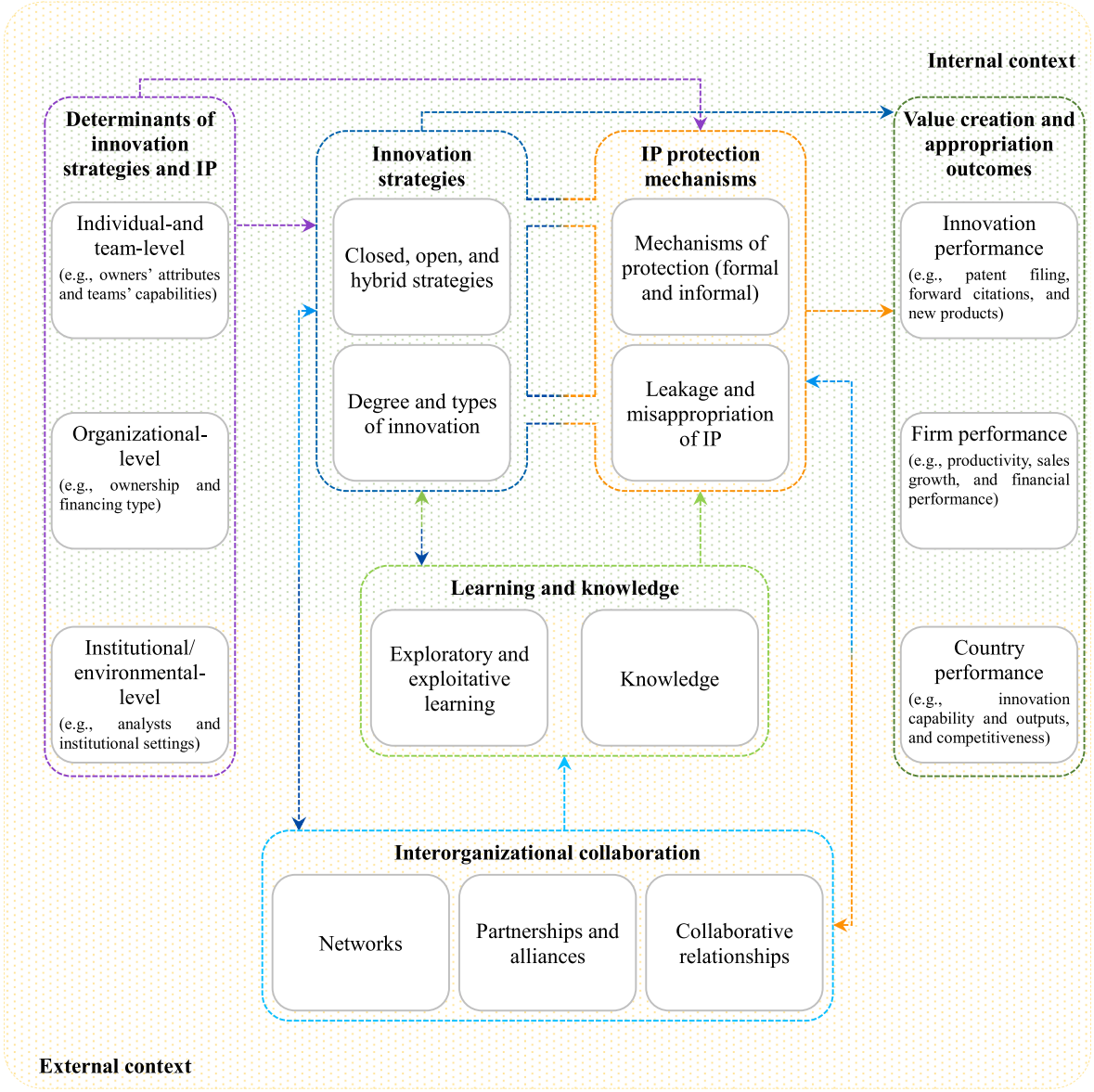

Fig. 4. Integrative framework.

strategies) (Hsu et al., 2021; Lazzarotti et al., 2017; Masucci et al., 2020) and degrees (i.e., exploratory and exploitative) and types (i.e., technological and non-technological) of innovation (Colombelli et al., 2013; Evangelista and Sirilli, 1998; Poon and MacPherson, 2005) that influence IP protection. Open innovation presents challenges in balancing openness and IP protection, known as the open innovation paradox. Organizations adopt varying degrees of openness and utilize distinct formal and informal IP mechanisms for managing innovation and effectively protecting IP (Bhatnagar et al., 2023). Internal R&D (i.e., in-house or closed innovation strategy) and R&D cooperation strategies complement each other, increasing the propensity to patent (Schmiedeberg, 2008). Additionally, outward-oriented innovation strategies positively affect patent portfolios, and product-oriented innovators tend to patent more than process-oriented innovators (Peeters and De La Potterie, 2006). On the other hand, organizations use both formal and informal mechanisms to safeguard their innovations. The likelihood of organizations patenting their innovations is higher for products and processes new to the market than those new to the firm (Amdaoud et al., 2023). Complex innovators tend to patent more than single innovators (Amdaoud and Le Bas, 2021). Moreover, patent protection and changes in patent protection increase organizations' propensity to invest in innovation (Allred and Park, 2007). The transition from a weak to a tight appropriability regime encourages organizations to change their innovation strategies (Ray and Ray, 2021). Therefore, integrating the IP strategy with the innovation strategy is essential for managing patent portfolios effectively (Germeraad, 2010). To sum up, organizations should effectively combine distinct models, degrees, and types of innovation with formal and informal IP mechanisms, alongside the IP legal systems and their changes, to enhance innovation and IP strategies.

To perform innovation and IP strategies, organizations use exploratory and/or exploitative learning processes (Du and Feng, 2024; Kang et al., 2019) and internal and external knowledge sources (Chatterji and Fabrizio, 2014; Corsino et al., 2019; Xiao and Bao, 2022). Knowledge obtained from partners, including universities, product users, and entrepreneurial venture investments, shapes exploratory innovation strategies (Xiao and Bao, 2022) and enhances innovation performance (Chatterji and Fabrizio, 2014), especially in weak IP regimes (Dushnitsky and Lenox, 2005). In turn, organizations' innovation strategies affect the types of collaborations they prefer (Bercovitz and

Feldman, 2007). In open and hybrid innovation strategies, collaboration between organizations through networks, partnerships, and collaborative relationships significantly influences the creation and protection of inventions. For instance, an organization's network centrality can promote/damage inbound open innovation during development stages (Lyu et al., 2019). Furthermore, collaborations between firms and universities are valuable when both parties complement each other's strengths, potentially enhancing patenting capabilities and performance (Baba et al., 2009; Subramanian et al., 2013). It should also be noted that a bidirectional influence can exist between IP rights ownership and alliance networks (Bekkers et al., 2002). In short, collaboration types, learning processes, sources, and knowledge types significantly shape innovation and IP strategies, subsequently affecting organizations' collaborations and the knowledge sources they utilize.

Finally, various individual, organizational, and institutional/environmental factors influence innovation strategies and IP, subsequently influencing value creation and appropriation outcomes. On the one hand, factors such as the attributes of owners and boards and resource human diversity increase innovation engagement and patenting activities (Corvello et al., 2023; Solheim and Herstad, 2018). Similarly, family ownership boosts R&D investments and patent applications (Zulfiqar et al., 2020). Competition encourages in-house R&D (Kim et al., 2016), while industry concentration and technology maturity hinder the adoption of open innovation strategies (Sandulli et al., 2012). On the other hand, innovation and IP strategies affect innovation performance, firm performance, and the performance of regions or countries. R&D capability and investment enhance innovation performance, including new product development, total number of patents, and invention patents (Kim et al., 2018; Xu et al., 2021). Furthermore, under certain circumstances, innovation strategies can enhance productivity growth and the revenue growth of new ventures and improve financial performance (Baum et al., 2019; Huang et al., 2023; Li, 2023). These strategies also enhance regional innovation performance, fostering innovation-driven growth and development (Dobrzanski et al., 2021; Zhu and Xu, 2022).

Despite the considerable effort that the scientific community has made to shed light on the phenomenon of innovation strategies and IP, there remain several gaps in the literature that could present valuable opportunities for further research. By organizing these opportunities, we can effectively answer RQ6 (Where and how can the literature on this research domain be advanced?). Due to the broad scope of this research domain, the several themes, sub-themes, and their interconnections, future studies should investigate them in greater depth. These studies should integrate and combine various theories, employ diverse methodologies and methods, explore lesser-studied geographical scopes and industries, and consider new determinants and outcomes, as well as new relationships, to expand the boundaries of current research.

Our review shows a frequent use of knowledge-based and resource-based views, often combined, even though research applies various theoretical foundations. Future research should employ these theories more extensively and integrate other theoretical approaches. For instance, the upper echelons theory (Hambrick, 2007) has the potential to provide a detailed understanding of how managers' experiences, values, and personalities influence the development and implementation of innovation and IP strategies. The strategy-as-practice approach can aid in understanding the (re)formulation of innovation and IP strategies and the role of various actors involved in this process (Seidl et al., 2024).

From a methodological standpoint, our findings indicate that empirical studies dominate the literature, primarily employing quantitative approaches focused on archival data. However, the connection between innovation strategies and IP is complex. This complexity, along with the influence of interorganizational collaborations and knowledge creation and appropriation dynamics, can be better understood through qualitative and mixed studies that utilize extensive and longitudinal case studies and combine multiple data sources (Lyu et al., 2019; Masucci et al., 2020; Torres de Oliveira et al., 2021). In other words, future research may benefit from using a variety of methodologies and methods. Furthermore, we have limited evidence from African and Latin American countries and evidence from medium-low-tech industries. Investigating the settings of these countries and industries could lead to new theoretical developments.

The research domain can also be advanced by broadening the focus of future studies, incorporating emerging innovation and IP issues, investigating interorganizational collaborations and knowledge dynamics, and examining new determinants and outcomes. Only a few studies have focused on recent digital and sustainable innovations (Corvello et al., 2023; Orsatti et al., 2020). Hence, we encourage scholars to explore how these aspects affect the development and implementation of innovation and IP strategies. Moreover, our current understanding of the use and drivers/barriers of continuing applications in IP protection is still limited. Similarly, there is insufficient evidence regarding organizations' strategies to address IP leakage and infringement. It would be interesting to gain more detailed knowledge of these initiatives and strategies and explore the strategic resources and capabilities that support them (Ozcan et al., 2024; Saksupapchon et al., 2024). Additionally, our findings show that the research themes of interorganizational collaboration and learning and knowledge are less studied. We urge researchers to investigate how collaboration between organizations and knowledge dynamics affect innovation and IP strategies and, in turn, overall performance. For instance, researchers may find it fruitful to examine the mechanisms used to manage interorganizational collaborations that enhance innovation performance and how they affect the choice of formal and/or informal mechanisms to protect IP. Also, future research could explore how knowledge creation, sharing, and accumulation dynamics in interorganizational collaborations shape innovation and IP strategies and their effects on performance (Leung et al., 2020).

Finally, our review shows that research has only explored the determinants and outcomes of innovation and IP strategies in recent years. It would be fruitful to investigate how new determinants influence these strategies, such as owners and top team characteristics, corporate governance, organizational culture, leadership styles, and national culture. Previous reviews have identified these as relevant factors influencing innovation (Corbo et al., 2023; Sá et al., 2025). Future research should examine not only the direct effects but also the moderating and mediating effects. Moreover, scholars may find exploring how innovation and IP strategies affect sustainable development goals and long-term performance fruitful.

Table 6 summarizes potential future research directions based on the discussion above.

7. Conclusions, implications, and limitations

This study sought to review and synthesize existing research on the connection between innovation strategies and IP. Building upon a SLR and content analysis of 144 articles indexed in the WoS database, we found an answer to six RQs set in the introduction. In response to RQ1 (How has the literature on this research domain evolved over time?), the field's evolution over the past three decades was marked by a rising trend of publications from 1996 to 2023, with 2019 being the most productive year. Some research themes, including innovation strategies and IP protection mechanisms, were addressed consistently throughout this period. Other research themes and sub-themes have emerged recently, focusing, for instance, on individual and organizational determinants and innovation performance outcomes.

With regards to RQ2 (What are the most influential outlets, authors, and publications?), we derived Table 2 to highlight the leading journals, noting that *Research Policy*, *Technological Forecasting & Social Change*, and *Strategic Management Journal* are three journals that published more articles on innovation strategies and IP, which makes them leading outlets for publishing research in the field. No author stood out in terms

Table 6
Overview of future research opportunities and research questions.

Research theme	Future research opportunities	Research questions
Innovation strategies	- Deepen the research on organizations' innovation strategies by combining distinct typologies/ classifications. - Explore how innovation strategies are applied to generate and/or integrate digital and sustainable innovations. - Investigate innovation strategies used by organizations based in Africa and South America.	- How do organizations combine closed, open, or hybrid strategies with exploratory and exploitative strategies to develop technological and non-technological innovations? Which IP protection mechanisms are adopted in such combinations? - What innovation strategies are more effective for generating and/or integrating digital and sustainable innovations? How are they developed and implemented? Which IP mechanisms are applied to protect such innovations? - What innovation strategies are used by organizations based in Africa and South America? Are there substantial differences between these organizations' innovation strategies and those based on other geographical scopes?
IP protection mechanisms	- Broaden and deepen the research on formal and informal protection mechanisms of IP. - Study organizations' initiatives to cope with leakage, misappropriation, infringements, and/or counterfeits.	- What, how, and why do organizations use formal and informal protection mechanisms of IP other than patents? - What combinations of formal and informal protection mechanisms are more effective to protect IP? Which combinations best fit distinct innovation strategies? - What are the main drivers and barriers to continuing patent applications? - What are the benefits/ risks of artificial intelligence for protecting IP? - What initiatives are carried out to cope with leakage, misappropriation, infringements, and/or counterfeits? What strategic resources and dynamic capabilities enable these initiatives?
Determinants of innovation strategies and IP	- Broaden the research on the influence of individual- and team-level determinants on innovation strategies and IP protection mechanisms. - Examine in depth the direct, mediated, and moderated relationships between determinants, innovation strategies, protection mechanisms of IP, and (potential) outcomes.	- How do managers' traits influence the development and implementation of innovation strategies and the choice of IP protection mechanisms? - What is the influence of team creativity and team homogeneity/ heterogeneity on innovation strategies and IP? - How does corporate governance affect innovation strategies and IP? - How do organizational culture and leadership styles affect innovation strategies and IP? - How do owners, top team characteristics, and family/non-family ownership influence innovation strategies and continuing patent applications? - What are the direct, mediated, and moderated effects among determinants, innovation strategies, IP, and outcomes? - What are the interactive effects of institutional settings and individual, team, and organizational-level determinants on innovation strategies and IP? - How does national culture influence the relationship between innovation strategies and IP? - How does financialization influence closed, open, and hybrid innovation strategies?
Interorganizational collaboration	- Investigate in depth the mechanisms used to manage interorganizational collaboration for innovation. - Analyze the organization and its partners' features that ensure better interorganizational collaboration performance.	- What mechanisms are used to manage interorganizational collaboration for innovation? How do these mechanisms influence IP, innovation, and firm performance? - What features of the organization and its partners improve interorganizational collaboration performance? - Which formal and informal protection mechanisms of IP are more effective in distinct interorganizational collaboration forms?
Learning and knowledge	- Explore the organizational learning processes and knowledge management mechanisms that improve innovation outputs in depth.	- How does knowledge accumulation occur in contexts of open and hybrid innovation strategies? - How do innovation strategies and IP benefit from absorptive capacity across industries? How does it enhance performance? - How do recombinant creation (explorative) and recombinant reuse (exploitative) influence

(*continued on next page*)

Table 6 (*continued*)

Research theme	Future research opportunities	Research questions
		innovation strategies, IP, and firm performance? - What are the knowledge-sharing outcomes within interorganizational collaboration networks?
Value creation and appropriation outcomes	- Investigate the influence of innovation strategies and IP on sustainable competitive advantage and long-term financial performance.	- How do innovation strategies and IP influence sustainable competitive advantage and long-term financial performance? - How do leakage, misappropriation, infringements, and/or counterfeits harm firm performance? - What is the potential influence of innovation strategies and IP on sustainable development goals? - How does historic financial performance influence innovation strategies and IP?

of publications. We also derived Table 3 to emphasize the most cited contributions to the field, noting how the study of Stuart (2000) appears to be the most cited overall. It should be noted, however, that our findings provide a significant snapshot only in time of the current state of the art.

In response to RQ3 (Which theoretical and methodological approaches are used to study innovation strategies and IP?), we revealed and synthesized four theoretical foundations most often employed to explain the phenomenon of innovation strategies and IP: knowledge-based view, resource-based view, agency theory, and institutional theory. Knowledge-based and resource-based views, the most employed, are frequently used together to shed light on innovation and IP strategies, their determinants, knowledge and learning components, interorganizational collaboration, and value creation and appropriation outcomes. Concerning methodological approaches, the results show that most studies apply an empirical-quantitative methodology relying mainly on archival data of patents.

Regarding RQ4 (Which contextual elements (i.e., geographical scopes and industries) are researched?), findings show that the geographical scopes most investigated are Asia (e.g., China and South Korea), Europe (e.g., Spain, Sweeden, and Multi-country), and North America (e.g., United States). Furthermore, concerning industries, results show that most studies examine industries with several technological intensities (mixed). Some studies focused only on medium-high-tech industries (e.g., pharmaceutical and automotive).

In response to RQ5 (What are the current efforts and major research themes on innovation strategies and IP?), we provided scholars with a comprehensive understanding of six main themes and corresponding sub-themes extracted from innovation and IP strategies literature: (i) innovation strategies (i.e., closed, open, and hybrid strategies; and degree and types of innovation) (ii) IP protection mechanisms (i.e., mechanisms of protection; and leakage and misappropriation of IP), (iii) determinants, of innovation strategies and IP (i.e., individual-and team-level; organizational-level; and institutional/environmental-level), (iv) learning and knowledge (i.e., exploratory and exploitative learning; and knowledge), (v) interorganizational collaboration (i.e., networks; partnerships and alliances; and collaborative relationships), and (vi) value creation and appropriation outcomes (i.e., innovation performance; firm performance; and country performance). Our analysis shows these research themes are interlinked, as highlighted in the proposed integrative framework. This helps scholars grasp current knowledge and identify promising research directions.

In response to RQ6 (Where and how can the literature on this research domain be advanced?), we assessed the existing research to unveil theoretical and empirical research gaps representing potential opportunities for further research. Future studies should incorporate and promote combinations of other theoretical perspectives, foster methodological pluralism, explore new contexts, combine other themes, and establish new relationships to broaden and deepen the research on the interplay between innovation strategies and IP. We derived Table 6 to display future research opportunities, which are briefly summarized as follows. First, future studies should deepen field research by exploring new combinations of innovation strategies, integrating emerging topics related to digital and sustainable innovations, and investigating how these issues influence the IP protection mechanisms employed. Second, scholars should broaden and deepen research on other formal and informal IP mechanisms than patents. Exploring the potential benefits and risks of emerging technologies, such as artificial intelligence, in protecting IP would also be interesting. Moreover, future research could further study organizations' strategies to deal with leakage and misappropriation and how they mobilize strategic resources and capabilities for such purposes. Third, future studies should strengthen and deepen research on individual and team-level determinants of innovation and IP strategies, exploring the influence of managers' and teams' traits. Furthermore, we strongly encourage scholars to explore the intervening effects of individual, organizational, and institutional factors on the connection between innovation strategies and IP. Fourth, future research could examine the mechanisms for establishing and managing interorganizational collaborations, the partners' characteristics, and their effects on innovation and IP strategies and overall performance. Fifth, future studies should explore how learning processes and knowledge management mechanisms influence the interplay between distinct innovation strategies and IP protection mechanisms. Sixth, we encourage scholars to investigate the effect of innovation strategies and IP protection mechanisms on sustainable and long-term performance.

Therefore, the study's first main contribution is its assessment of the current research status on innovation and IP strategies by answering RQ1, RQ2, RQ3, RQ4, and RQ5. The second main contribution is synthesizing existing knowledge into a comprehensive and integrative framework. The third main contribution of the study is to provide a foundation for future research (RQ6) aimed at progressing innovation strategies and IP research.

7.1. Theoretical implications

This SLR provides some theoretical implications for advancing research. First, it extends previous literature reviews focused on innovation strategies (Khanra et al., 2022; Lopes et al., 2019; Sá et al., 2025) and IP (Holgersson and Aaboen, 2019; Hurmelinna-Laukkanen and Yang, 2022). It also complements a recent review by Ayerbe et al. (2024) focused on the link between formal and informal IP protection mechanisms and closed and open innovation models. Our research differs significantly from this since it adopts a holistic and integrative approach, addressing the evolution and guiding forces of the field (e.g., leading journals and studies), theoretical underpinnings, methodologies, research trends, and future research trajectories. Therefore, our study enhances researchers' understanding of the field by systematizing the existing knowledge without time constraints and defining the current scope and boundaries of research. Scholars can leverage our study's results to understand better the past, present, and future of innovation and IP strategies research.

Second, through content analysis and systematic codification of the studies reviewed, our research reveals prominent journals and articles, key theoretical and methodological approaches, contextual elements, and major research trends. To advance the field of innovation and IP

strategies, researchers can exploit our findings to identify suitable publication outlets for their studies. Moreover, they can pinpoint the most influential and impactful articles, which represent relevant foundations of this field and can be used as references for their future work. Our study's findings also emphasize knowledge-based and resource-based views as key theoretical perspectives for understanding innovation and IP strategies, making them appropriate for researchers to develop their studies further. Finally, our thematic analysis and synthesis allow researchers to discern the field's intellectual structure thoroughly.

Third, our proposed framework integrates the six research themes on innovation strategies and IP. It highlights their interconnections, enabling the holistic understanding of this field needed not only for scholars to position their current studies but also to foster the involvement of new researchers and the discovery of potentially fruitful avenues for further research. We identify gaps in the existing literature and suggest opportunities for advancing research, proposing a future research agenda. We believe implementing this agenda will enhance our collective knowledge, guiding organizations to make informed strategic decisions regarding innovation strategies and IP protection.

7.2. Practical implications

This study offers practical implications for policymakers, public authorities, and managers. It gives practitioners an overview of current knowledge on innovation and IP strategies, including their determinants and outcomes. Therefore, our study's findings and proposed integrative framework guide policymakers and public authorities on how innovation public policies and the IP legal system can be reinforced through legislative and policy initiatives to enhance innovation and IP strategies. They can influence organizations' innovation strategies by establishing incentives such as government subsidies for innovation (Xu et al., 2021) and strengthening the IP legal system to improve innovation protection (Huang et al., 2017; Sattiraju et al., 2023; Zhang et al., 2022). Reinforcing IP protection mechanisms encourages firms to engage in innovation (Abdin et al., 2024) and stimulates invention or substantive patents (Hou et al., 2022), which improves the potential to create value (Sattiraju et al., 2023). Moreover, as the integrative framework highlights, ownership influences innovation and IP strategies. Public authorities can also influence firms' innovation strategies by acquiring company shares from strategic industries (Lazzarini et al., 2021). Finally, our findings underline the effect of innovation and IP strategies on innovation, firm, and country performance (Lee et al., 2020; Rodriguez-Pose and di Cataldo, 2015; Zhu and Xu, 2022). Public authorities and policymakers must consider this when making political choices and defining public policies and legislative initiatives related to innovation and IP.

The integrative framework developed by synthesizing and assessing the identified research themes may serve as a crucial tool for management practice. It highlights the connection between innovation strategies and IP, the various factors that influence this relationship, the knowledge and learning components, the interorganizational collaborations that help realize innovation and IP strategies, and the outcomes they produce. Therefore, our study's findings assist managers in selecting the most suitable IP protection mechanisms for their innovation strategies, considering the specific individual, team, organizational, and environmental/institutional factors that influence them. In addition, this review may also support managers in identifying the interorganizational collaborations that complement their organizations and managing the knowledge and learning process to execute innovation strategies. Overall, our findings and integrative framework expand the capacity of managers to develop and implement innovation and IP strategies that fit internal and external contexts for improving innovation and firm performance. Finally, managers may recognize additional value in the synthesis provided to manage innovation and IP strategies effectively.

7.3. Limitations and future research

This article has some limitations that should be acknowledged. First, our study focused only on publications indexed in WoS. Although this is one of the world's leading and most reputable bibliographic databases (Sauer and Seuring, 2023), it might have left other relevant publications out of the SLR. Second, our study reviewed only scientific articles and reviews. The inclusion of only articles and reviews published in peer-reviewed English-language journals aimed to ensure the homogeneity of the sample and the quality of findings (Caputo et al., 2021). While this procedure is in line with best practices in performing SLRs (Cheng et al., 2023; Corbo et al., 2023; Obradović et al., 2021), it is possible that some publications were not included in the analysis. Future studies could examine other publication types, such as conference proceedings and books, and publications written in non-English to complement the above findings. In future SLRs, researchers could add more recently published documents (i.e., articles and other publications) to update the findings achieved. Moreover, further studies could use bibliometric methods and bibliometric software tools to provide additional insights into the research on innovation strategies and IP and strengthen the findings presented in this article.

Despite the limitations mentioned and discussed above, we believe the insights provided in this article are relevant to the scientific community, policymakers, and managers. This SLR contributes to understanding the link between innovation and IP strategies and their interconnections with individual, team, organizational, and institutional/environmental-level determinants, learning and knowledge, interorganizational collaborations, and value creation and appropriation outcomes. Moreover, it provides several opportunities for further research to broaden and deepen this research domain.

CRediT authorship contribution statement

Rui Alexandre R. Pires: Writing – original draft, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **João J. Ferreira:** Writing – review & editing, Writing – original draft, Validation, Methodology, Data curation, Conceptualization.

Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Appendix

Table A1
Categories and descriptors used to describe the articles

Category	Descriptors	Sources
Author(s) and publication year	List of authors and year of publication (final or early access)	–
Journal	Publication title in which the article was published	–
Focus (main purpose)	Main purpose of the article	–
Theoretical approach(es)	Theory(ies) applied in the article when identifiable	Henao-García and Cardona Montoya (2024), Kujala et al. (2022), and Obradović et al. (2021)
Methodological approach	The methodological approach used in the article: Theoretical, empirical-quantitative, empirical-qualitative, or empirical-mixed	Kujala et al. (2022) and Sá et al. (2025)
(Additional) methodological features	Data source (archival data, case study, survey, mixed-methods, or other), sample, and (statistical) analysis used in the article	Heubeck (2024) and Kujala et al. (2022)
Contextual element: Geographical scope	Continent(s) (i.e., Africa, Asia, Europe, North America, Oceania, South America, and Multi-geographical scope for two or more continents) and country(ies) from which the data were collected when specified	Corbo et al. (2023), Kujala et al. (2022), and Obradović et al. (2021)
Contextual element: Industry(ies)	Sector's technological intensity (i.e., medium-low-tech, medium-high-tech, or mixed), considering the Statistical Classification of Economic Activities in the European Community, and industry(ies) from which the data were collected when specified	Corbo et al. (2023) and Obradović et al. (2021)
Variables	Dependent, independent, and mediating and/or moderating variables of the article when applicable	–
Key findings	Key findings stated in the article	–

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.technovation.2025.103243.

Data availability

Data will be made available on request.

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