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A typology approach to understanding the diversity of Science Parks

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A R T I C L E I N F O

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A B S T R A C T

Science Parks play a crucial role in fostering entrepreneurship and innovation, acting as hubs for knowledge transfer, technology commercialization, and business development. Despite their growing importance, existing classifications fail to adequately capture their diversity. This study addresses this gap by proposing a novel typology based on two key dimensions: ownership and strategic orientation. We categorize them into four types—*Research Parks*, *Technology Parks*, *Industrial Parks*, and *Traditional Parks*—providing a framework that enhances understanding, strategic planning, and policymaking. To empirically validate this typology, we analyse 180 Science Parks worldwide, all full members of the International Association of Science Parks and Areas of Innovation (IASP). The classification relies on data from multiple institutional sources, including IASP directories, reports from national Science Park associations, and individual park websites. Our approach introduces a three-tier classification: i) typology, which establishes the overarching structure; ii) types, representing specific categories within the typology; and iii) clusters, further categorize the types into subsets, adding depth to the classification system. Clusters are the results of the practical application of the model to IASP's full members. By categorizing Science Parks into four types and nine clusters, this study provides insights into their distinct needs and challenges, informing more effective policy and management strategies. Ultimately, this research contributes to the broader discourse on Science Parks by offering a refined classification system that improves understanding of their diversity and strategic roles.

1. Introduction

In recent decades, Science Parks have not only drawn considerable research attention, but have also become pivotal policy instruments, playing a distinct role in nurturing innovative new ventures and entrepreneurial ecosystems (Albahari et al., 2019; Germain et al., 2023; Ng et al., 2019). The attractiveness of Science Parks for governments as tools of innovation and local development policy is evident. Amirahmadi and Saff (1993) identified diverse motivations for government support of Science Parks, with a common thread being the belief that Science Parks could stimulate economic growth at both regional and national levels. As their significance has grown, responding to evolving needs in global economies, particularly in the current era characterized by low or lower growth, there is a broad understanding that Science Parks play a vital role within entrepreneurial ecosystems, fostering diverse stakeholder relationships with universities, businesses, governmental agencies, incubators, and other parks (Cadorin et al., 2021). Clark (2003) emphasized that as Science Parks evolved from practical necessities to more institutionalized practices, the need for theoretical concepts became evident.

Researchers over the years have employed different terms to describe this non-spontaneous agglomeration of knowledge-based businesses with the potential for rapid growth and socially beneficial innovative solutions, often right from their inception (Ng et al., 2019), reflecting their multifaceted nature and the challenge of defining them uniformly. This acknowledgment echoes with Link and Scott (2003) observation that the term 'Science Park' has evolved into a generic term adaptable to changing economic conditions over time. In this paper, we identify a challenge arising from the fact that, despite extensive research on Science Parks, few studies have recognized their heterogeneity concerning *strategic orientation* and *ownership*. The strategic orientation and ownership of Science Parks are fundamental for understanding their differences, management, and overall performance. A strategic orientation defines the park's role in fostering innovation and entrepreneurship, ensuring that its environment aligns with the real needs of firms within the park (Chen and Altantsetseg, 2017). Likewise,

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ownership is crucial, as it shapes governance structures, funding mechanisms, decision-making processes, and long-term strategic direction. It also determines whether the park prioritises firm incubation or supports the growth of tenant firms, influencing how resources are allocated and how entrepreneurial ecosystems develop (Westhead, 2021; Germain et al., 2023). Together, these dimensions provide a meaningful framework for classifying Science Parks globally, capturing key variations in their strategic orientation and operational priorities.

Many previous studies have underlined a lack of theoretical understanding of the concept and nature of Science Parks. Phan et al. (2005), critically assesses the existing literature's shortcomings, emphasizing the absence of a systematic framework, a failure to comprehend the dynamic nature, and a lack of clarity in understanding Science Parks. With a focus on delineating the diverse roles and distinct characteristics of Science Parks, the study by Ng et al. (2019) employs a survey-based approach that yields valuable insights for academic discourse and establishes a foundation for the comparison of Science Parks. However, ongoing discussions emphasize the necessity for clear categorizations, recognizing the need for further research to understand and address the differences within Science Parks, and to guide future studies and policies aimed at fostering their development effectively. Similar reasoning can be found in McCarthy et al.'s (2018) study on University Research Parks, where they contend that the inconsistency in results arises from a lack of theoretical guidance on the variations in these parks' strategies and activities, emphasizing differences in both actions and approaches in serving tenant firms, universities, and regions.

Recognizing the need for region-specific strategies, the authors propose a classification and related theory on these parks' strategies, underscoring the importance of understanding their heterogeneity to determine a suitable strategic fit through a theoretical framework for describing, explaining, and predicting the effects of diversity. They argue that future research should prioritize the development of conceptual and methodological approaches for Science Parks to specify the classifications and strategies of university-related entities, consider causal effects more comprehensively, and contribute to a clearer understanding of the impact of these entities (ibid).

One notable gap in prior research is the limited attention given to strategic orientation (Zhou et al., 2021; Löfsten and Klofsten, 2024). While studies have explored Science Parks' role in fostering innovation (Berbegal-Mirabent et al., 2020), they often fail to differentiate between parks that emphasize research and technology development and those that prioritize business operations. This omission results in an incomplete understanding of how Science Parks function, which in turn affects policymaking and strategic planning. Our study addresses this gap by explicitly incorporating strategic orientation as a core dimension, providing a more nuanced classification framework that captures variations in Science Park objectives and their implications for stakeholders. Additionally, we offer a critical perspective on the assumption that all Science Parks operate under similar models.

This paper examines the existing body of studies on Science Parks, with a specific focus on the oversight of crucial differences among them when treated as a singular entity in various studies, impacting both research and policy implications. To better grasp these distinctions, the development of a typology is proposed, systematically classifying these organizations based on shared characteristics, features, or attributes. Our study builds upon previous classifications by introducing a typology that explicitly integrates governance and strategic orientation. Unlike prior studies that focused on geographical or sectoral classifications, our approach provides a universally applicable framework that enables comparative analysis across different contexts. Other potential dimensions, such as size, age, or geographical scope, while relevant, were found to be less central in differentiating the fundamental nature of Science Parks. Previous studies (e.g., McCarthy et al., 2018; Albahari et al., 2017) have underscored the importance of these two dimensions in shaping Science Park outcomes, reinforcing their suitability for our typology.

The paper further refines the typology using empirical data. This categorization aims to enhance understanding, analysis, and communication by organizing Science Parks into distinct categories. Creating such a typology facilitates the identification of patterns, differences, and similarities among various Science Parks, aiding researchers, policymakers, and practitioners in understanding their diversity. Therefore, the primary aim of the paper is to construct a typology that incorporates different types of Science Parks, emphasizing significant heterogeneity within these organizations. An exploration is vital for gaining a deeper understanding of the role that Science Parks play in promoting innovation and driving economic development and addressing the following research questions.

1) What typology could be used to differentiate between Science Parks?
2) What types of Science Parks could be categorized within this typology? and
3) What implications for policies does the Science Park typology have?

Such a typology could enhance understanding of Science Parks and play a crucial role in developing improved policies for future research agendas to support their development. Addressing these research questions, the paper examines the definition of Science Park types, explores the role of typologies in addressing dynamic challenges, and understands their contribution to practical policymaking. The structure of this paper unfolds as follows: Section 2 comprehensively reviews the existing literature, offering insights into the contextual background. Following this, Section 3 contains the method and sample of Science Parks. Section 4 introduces the typology that facilitates the classification of Science Parks and 180 parks, full members of IASP, the International Association of Science Parks and Areas of Innovation, have also been classified. Finally, Section 5 encapsulates the assumptions drawn from the research findings and elucidates their implications and future research directions for the field.

2. Literature review

2.1. *Science Parks – characteristics and effects*

In the literature, various terms such as Science Parks, Science and Technology Parks, Research Parks, University Research Parks, Technopoles, and Technoparks are used interchangeably to describe these areas (Albahari et al., 2023; Pike and Charles, 1995). Despite the diversity in labels, these initiatives share common characteristics. In particular, over the past three decades, there has been a proliferation of Science Parks globally and, accordingly, a growing interest in the scientific literature (Monck et al., 1988; Quintas et al., 1992; Phan et al., 2005; Löfsten and Lindelöf, 2002; Löfsten and Lindelöf, 2005; Lindelöf and Löfsten, 2006). Despite the diversity in labels, these initiatives share common characteristics: they are policy-driven areas fostering knowledge-based businesses onsite, with management facilitating technology and business skill transfer. By tailoring policies to leverage the strengths of different types, policymakers can foster a conducive entrepreneurial ecosystem for science and technology-driven growth and development (Autio et al., 2018). A large body of work has analysed the impact of Science Parks on tenants across three main dimensions: economic performance, innovation performance, and cooperation patterns (Albahari et al., 2023). Location plays a crucial role—whether in the form of industrial clusters or districts, incubators and Science Parks, or proximity to universities—particularly for technology-based scaleups (Löfsten, 2024).

While policymakers strongly advocate for the significant contribution of Science Parks to regional economic ecosystems (Lecluyse et al., 2019; Poonjan and Tanner, 2020; Rappert et al., 1999), skepticism arises among researchers questioning whether the available evidence sufficiently supports the attributed benefits of these parks (Gwebu et al., 2019). Empirical findings on the effects of Science Parks on tenants remain mixed across nearly all analysed variables (Albahari et al., 2023;

Hobbs et al., 2017; Lecluyse et al., 2019). One possible explanation for this conflicting evidence is the small sample sizes used in quantitative studies. Albahari et al. (2023), in their meta-analysis, found that the likelihood of identifying a positive and statistically significant park effect on tenants increases substantially with larger sample sizes. Another explanation relates to the assumption that Science Parks are homogenous entities, despite variations in missions and objectives that may influence their impact on tenants (Albahari, 2019; Anton-Tejon et al., 2024; Berbegal-Mirabent et al., 2020). There is a call for more theoretical exploration into how and why park strategies vary and the implications of these differences (Chan and Lau, 2005).

2.2. Earlier approaches in differentiating Science Parks

The recent evolution of the literature on Science Parks has acknowledged the importance of recognizing the heterogeneity of these entities (Albahari et al., 2018). Various attempts have been made to classify parks based on different characteristics, aiming to better understand their diverse dynamics and roles within their regional innovation ecosystems. As early as 1994, the (European Commission, 1994) European Commission, through the Science Park Consultancy Scheme – a project funded by the EU's Strategic Programme for Innovation and Technology Transfer (SPRINT) 1989 to 1994 – differentiated between Science Parks, Research Parks, Technology Parks, and Business Parks. The primary distinguishing feature among the various categories is the strategic orientation of the park: Science Parks focus on promoting and encouraging the growth of knowledge-based companies by facilitating research exploitation and technology transfer from academic institutions. Research Parks emphasize the link between academic and applied research, prioritizing research over development. Technology Parks concentrate on the commercial applications of high technology, with an emphasis on production rather than academic collaboration. Business Parks provide a versatile environment for a variety of entrepreneurial activities without necessitating proximity to academic institutions.

Link and Scott (2003) proposed a taxonomy deriving from analyzing US Science Parks. They suggest that Science Parks fall into three categories: i) real estate parks with no university affiliation; ii) university research parks with tenant criteria; iii) research parks with no tenant criteria. Some universities, considering themselves as semi-private, engage in park ownership much like private entities (c.f. Etzkowitz, 2003) directly influencing operations. Escorsa and Valls (1996) suggested a classification based on the different strategies and roles played by the park. They identify 7 types of parks as the results of the interaction between three dimensions: coordination and promotion of regional development, company location, and R&D activities.

The importance of considering the varying strategies of Science Parks is also shared by McCarthy et al. (2018), who argue for a more in-depth conceptual examination of university research parks. They address the limitations of treating university research parks uniformly by introducing a conceptual framework based on park specialization and development services, proposing a typology with four distinct types: Matchmaker, Gardener, Landlord, and Coach. This model highlights significant differences in strategies among university research parks, contributing to strategic alignment both internally and externally. The authors advocate for region-specific strategies, emphasizing the importance of understanding park heterogeneity for determining suitable strategic fits. They suggest future research should focus on developing conceptual and methodological approaches to specify University Research Parks' typologies and strategies, consider causal effects more comprehensively, and contribute to a clearer understanding of their impact. Łobejko and Sosnowska (2015) proposed four management models for STPs, considering the ownership of the park. The four models are University Science Park, Independent organization, Corporate Park, and Network Park.

Albahari et al. (2017) highlight the different levels of university involvement as a significant source of heterogeneity among parks. They categorize parks into four types based on this involvement: Pure Science Parks (wholly or partly owned and managed by a university), Mixed Parks (where a university is a minority shareholder), Technology Parks with University (where a university has research facilities but is not a shareholder), and Pure Technology Parks (no formal university links). Their findings show that greater university involvement in a park correlates positively with the number of patent applications but negatively with tenants' innovation sales. These results are likely due, at least to some extent, to the differing objectives, strategies, and practices that the various types of parks follow. Finally, Ng et al. (2019) employed cluster analysis to categorize European Science Parks into Research, Cooperative, and Incubator types based on structural and managerial characteristics. All these efforts, as suggested by Ng et al. (2019), emphasize the need to understand "what Science Parks are" before determining "what they do." Instead, a more comprehensive approach may involve examining specific aspects of management, such as ownership and strategic orientation, to better understand Science Park dynamics and their impact on regional development.

In emphasizing the need for deeper understanding and analysis, many prior approaches have treated Science Parks as homogeneous entities, often overlooking how varying ownership structures and strategic orientations influence outcomes. This gap in the literature, particularly regarding the impact of these variables on Science Park dynamics, has motivated the focus of this study. By considering the diversity of ownership and strategy in Science Parks, this work responds to existing oversights, offering valuable insights into the role these factors play in Science Park performance and their contribution to regional development.

2.3. Ownership and strategic orientation dimensions in Science Park typologies

In the domain of Science Parks, comprehending how *ownership* and *strategic orientation* interact is crucial for understanding their operational dynamics and potential impact on regional innovation ecosystems. With this goal in mind, we introduce a typology that categorizes Science Parks based on two key dimensions: ownership and strategic orientation. Table 1 outlines the two dimensions, their definitions, and their significance.

The first dimension, ownership, can vary, encompassing public, private, or mixed models (Ng et al., 2019). Public Science Parks may be owned and operated by government entities, public universities or research institutions and private Science Parks may be owned by real estate developers, corporations, or investment groups. Each of these entities has distinct goals (Saublens et al., 2008), which may be reflected in how Science Parks operate, including their strategic orientation. Ownership affects how the park is managed, funded, and directed, and can impact the park's mission and objectives (Bigliardi et al., 2006), influences the level of collaboration and interaction between owners within the park, and affects the park's accessibility and openness (Vásquez-Urriago et al., 2016). The second dimension, strategic orientation, is crucial, particularly in fostering partnerships with academic institutions, government agencies, industry associations, and venture capital firms to support innovation, facilitate technology transfer, and enhance business operations (McCarthy et al., 2018).

The relationship between ownership and strategic orientation is crucial because ownership structures often shape the decision-making processes, goals, and resource allocations of Science Parks. The interaction between ownership and strategic orientation suggests that classifications need to account for this relationship explicitly. For instance, Science Parks with similar strategic goals, but different ownership types might operate and perform differently, necessitating subcategories or nuanced classifications. Ownership and strategic orientation are not entirely independent; they dynamically interact. For example, a publicly owned park transitioning to a private model might shift its strategic

Table 1
Key dimensions and their impact on Science Park typologies.

Dimension	Definition	Why important?	References
Ownership			
Private ownership or public ownership	Ownership models and their impact on park goals and activities.	Provides insights into park governance, management, funding, decision-making, mission impact, owner collaboration, accessibility, inclusivity, strategic direction, values, and impact.	Albahari et al. (2017); Cadorin et al. (2021); Colombo and Delmastro, (2002); Le Tellier et al. (2019); Liberati et al. (2016); Wagner and Sternberg (2004); Weng et al. (2019); Westhead, (1997) Zhang (2002).
Strategic orientation			
Research and technology or Business operations	Primary focus indicating key objectives and priorities, managed by teams overseeing research, technology, or business support strategies.	Facilitates thorough analysis for impact assessments, policy formulation, resource allocation, and long-term planning to foster innovation and business. Essential for understanding organizational structure, leadership dynamics, operational capabilities, and mission achievement insights.	Albahari et al. (2017); Berbegal-Mirabent et al. (2020); Bonacina-Roldan et al. (2018); Cheba and Holub-Iwan (2014); Escorsa and Valls (1996); Feldman (2007); Felsenstein, (1994); Hogan (1996); Holland et al. (2007); Le Tellier et al. (2019); Łobejko and Sosnowska (2015); McCarthy et al. (2018); Ng et al. (2019); Quintas et al. (1992); Siegel et al. (1993))

orientation toward market-driven goals. Typologies should recognize and accommodate such fluidity.

2.3.1. Ownership

The ownership structure of a Science Park is determined by the distribution of shares among managing entities. Despite all parks aiming to facilitate triple-helix-based interactions in theory (Ferreira de Faria et al., 2019), as the concept of linkage among universities, academic research, and firms is central to the Science Park model (Autio and Klofsten, 1998), parks' ownership can vary significantly depending on factors such as foundation, funding sources, and operational models (Albahari et al., 2017). In our analysis, we categorize Science Parks into *public* and *private ownership* models. Public ownership occurs when public entities hold most shares, while private ownership involves majority ownership by private actors. The ownership model significantly influences the objectives, strategic priorities, operations, and overall impact of a Science Park on its tenants and the surrounding region. Publicly owned parks typically prioritize societal benefit and returning public investment, whereas privately owned Science Parks focus on generating value for investors, often emphasizing financial returns and profitability (Weng et al., 2019). This dichotomy presents both advantages and disadvantages that shape the park's trajectory. Publicly owned parks, supported by public funding, can offer services and space at subsidized rates or even for free, while also enforcing stricter admission criteria to ensure alignment with the park's strategic objectives. However, public Science Parks are susceptible to disruptions caused by political cycles and budget cuts, which may affect their stability and long-term planning, ultimately impacting the support available to tenant companies.

There are several arguments in this paper supporting the use of ownership as a dimension in the typology of Science Parks. Ownership simplifies the categorization of Science Parks by clearly distinguishing between different ownership structures, reducing ambiguity, and facilitating a straight understanding of management and operations. By focusing on ownership, the typology can encompass a wide range of things, including government organizations, public universities, and research institutions, providing a holistic view of the park's ecosystem. Ownership also allows for the discussion of parks with mixed ownership models, reflecting the reality of shared control among various stakeholders. Highlighting ownership emphasizes the role of public entities in governance and strategic decisions, adding depth to the analysis by acknowledging their influence on park operations and strategic direction, while also helping to relate to specific aspects such as management, funding, and strategic priorities.

2.3.2. Strategic orientation

Strategic orientation refers to the overarching priorities that shape the activities, resource allocation, and objectives of Science Parks. It captures the underlying approach that Science Parks adopt—whether they emphasize *research and technology development* or *business operations*. Furthermore, strategic orientation integrates seamlessly with ownership as a defining factor of Science Parks and offers flexibility for future research, such as assessing the performance implications of different strategic orientations. For instance, private Science Parks prioritize generating cash flow, which can lead to higher rental costs and service fees. While this may attract motivated companies aligned with the park's goals, it could also result in more relaxed admission criteria, potentially diluting the park's strategic orientation.

Research suggests that the effectiveness of a specific strategy, as highlighted by McCarthy et al. (2018), may vary in its impact on different stakeholder groups. Rowley and Moldoveanu (2003) underscore the importance of aligning strategies with the needs of key stakeholders, arguing that such strategies are more likely to be adopted efficiently and endure over time. Consequently, variations in park strategies, as identified by research, significantly influence factors such as strategy effectiveness, stakeholder management, related outcomes, the longevity of strategies, and the speed of their adoption and diffusion. The strategic orientation of Science Parks, determined by their overarching goals, profoundly influences their operational strategies, extending to the criteria used in selecting tenant companies. These criteria not only consider the potential growth and viability of a company's business idea, but also its alignment with the park's target industry sectors and permitted operations. Some parks restrict manufacturing activities on their premises, and their strategic orientation also determines the nature and extent of collaborations with organizations like universities, shaping the support provided to tenant companies accordingly.

In this context, we delineate two primary dimensions of strategic orientation. Firstly, a focus on *research and technology*, which emphasizes the advancement of scientific knowledge and technological innovation. Secondly, a focus on *business operations*, aimed at enhancing the commercial viability and growth of tenant companies. These distinct strategic orientations represent differing approaches to fostering innovation and economic development, with one prioritizing technological advancements and academic partnerships, and the other emphasizing entrepreneurial success and operational efficiency. Incorporating this dimension into Science Parks' typology enhances the relevance by directing resources to targeted innovations, supporting collaborations, and aligning tenant selection with park leadership (Pike and Charles, 1995).

3. Method and data

3.1. Methodological approaches

The methodologies employed in this study are twofold. First, the proposed classification model is developed based on a comprehensive literature review and observations of Science Parks. This approach ensures that the typology reflects both theoretical insights and practical realities. In the second part of the paper, we rely on secondary data sources to conduct the empirical application of the model. By leveraging existing institutional reports, official directories, and publicly available data, we systematically classify Science Parks according to the proposed framework, validating its applicability and relevance.

In this study, potential issues with secondary data collection have been addressed in various ways to ensure the data has been used properly and it is valid, utilizing data from a highly reputable and globally recognized organization managed by experts in science and technology parks and areas of innovation, which further enhances the data's reliability by ensuring the accuracy and relevance of the information provided. A structured approach was followed to evaluate the data, including verification of each Science Park's operational status, firm hosting capabilities, and accurate classification according to IASP and additional sources. By implementing inclusion criteria to classify entities as Science Parks, including only fully operational parks that host firms and excluding entities like business incubators or projects under construction, the data collected is ensured to be both relevant and precise. Potential biases in data representation, such as the underrepresentation of certain countries, were acknowledged and addressed by clustering parks and discussing the sample's representativeness in Section 4. Criteria and procedures for data inclusion and exclusion are transparently documented, ensuring reproducibility and enabling reviewers to assess the methodology.

3.2. Selected Science Parks

The Science Parks in this study are full members of IASP. IASP's mission is to serve as the global network for Science Parks and areas of innovation, aiming to drive growth, internationalization, and effectiveness for its members. The organization coordinates a network of managers overseeing science/technology/research parks, innovation districts, and other areas of innovation. It strives to enhance new business opportunities for its members and their firms, increase their visibility, and foster global connections. Additionally, IASP represents parks and areas of innovation at international forums and institutions while aiding in the development of new parks and innovation areas. It operates as an independent, non-profit, non-governmental organization. IASP operates as a global network for Science Parks, with a structured membership model. Full membership is granted to operational Science Parks that meet defined criteria, including providing physical space for firms, offering innovation-related services, and maintaining formal governance structures. Affiliate members include Science Parks under construction, while associate members encompass entities with an interest in Science Parks but without direct operation. This structured membership ensures a degree of standardization in the dataset while also introducing potential selection biases, which we acknowledge and address in our study.

The database from IASP include 192 full members. Not all of them are Science Parks: if the IASP record indicates that it is not a Science Park (could be for instance a business incubator, an area of innovation, etc.), then it is not categorized as a Science Park and, thus, not included in our sample. However, if IASP confirms that it is indeed a Science Park, then several criteria are considered: for instance, if it does not host firms, it is not considered as a Science Park. In cases where there is a lack of information available, both from the IASP record and the park webpage, it is not classified as a Science Park. Additionally, if it operates exclusively as a business incubator, where firms must leave after a certain period, it is not considered as a Science Park (see, for instance, La Salle Technova Barcelona). Of the 192 parks that are full members of IASP, 12 were excluded after a thorough review because they could not be clearly classified as Science Parks, despite their full membership: two parks were categorized as innovation centers, three parks did not meet the criteria for Science Parks, three parks lacked a website, three parks were classified as innovation districts, and one park solely provided infrastructure. Consequently, the final count included 180 parks. The most prevalent sectors among the Science Parks in our study encompass ICT and Communications, Health and Pharmaceuticals, Energy, Biotechnology, and Manufacturing and Automation Technologies.

Table A.1 in Appendix provides a summary of the 180 Science Parks included in this study across 56 countries, detailing the distribution of parks per country, with Spain (19), China (15), Brazil (14), Türkiye (11), and Sweden (9) having the highest representation. Fig. 1 presents a frequency map of the countries included in the study, shaded according to the number of parks (See Table A.2 in Appendix for countries and number of parks).

From Fig. 1 above, it is evident that certain countries significantly outnumber others in terms of the number of parks included in the study. Conversely, countries like the US (two parks), India (two parks), the UK (six parks), Germany (four parks), and Japan (one park) appear to be notably underrepresented, suggesting that some qualifying Science Parks in these countries might not be affiliated with IASP. This underrepresentation may be due to varying levels of engagement with international networks or differences in national Science Park policies. Some parks may prioritize regional or national affiliations over global organizations like IASP. Since IASP membership is not mandatory for all Science Parks, our dataset may reflect a bias toward parks with greater international exposure and resources to join global networks. This could result in an underrepresentation of smaller, regionally focused parks. While our sample remains comprehensive, covering a diverse range of parks, we recognize that non-IASP-affiliated Science Parks may have different characteristics. Therefore, when interpreting the findings, it's important to exercise caution regarding the sample's representativeness, as further discussed in Section 4 where parks are also initially categorized into different clusters. Nevertheless, it is important to emphasize that the empirical exercise aims to demonstrate the applicability of the proposed classification model rather than draw conclusions regarding the world distribution of Science Parks according to our typology. While this does not invalidate our typology, we recognize that broader representation could strengthen the generalizability of our findings and recommend future research to extend our framework to other datasets.

3.3. Ensuring accuracy in Science Park classification and data characteristics

To enhance the accuracy of the classification process, we adopted a systematic approach, gathering information from multiple sources, including IASP directories, individual park websites, and other online resources, to establish a robust foundation for classification. Our analytical approach incorporated a multi-step verification process, cross-referencing data from IASP records, park websites, and national Science Park associations to ensure consistency and reliability. Relying solely on publicly available sources poses of course challenges, as not all parks may have detailed information readily accessible, and the classification process faces complexities with parks having mixed ownership or a dual strategic orientation, requiring thorough analysis and interpretation for accurate positioning within classification quadrants to ensure nuanced characteristics are represented. These challenges were anticipated, and to address them, thorough reviews of available data sources were conducted, with information cross-referenced across multiple platforms to minimize the impact of incomplete or outdated data.

To ensure the robustness of our classification, we excluded Science Parks where ownership or strategic orientation information was unclear. Excluding parks lacking sufficient information on these dimensions was crucial to preserve the accuracy and reliability of the classification process, avoiding potential inaccuracies from incomplete data by focusing on parks with well-documented ownership structures and strategic orientations. Parks that function primarily as business incubators or industrial zones without clear innovation mandates were also omitted. For parks with both private and public ownership, they

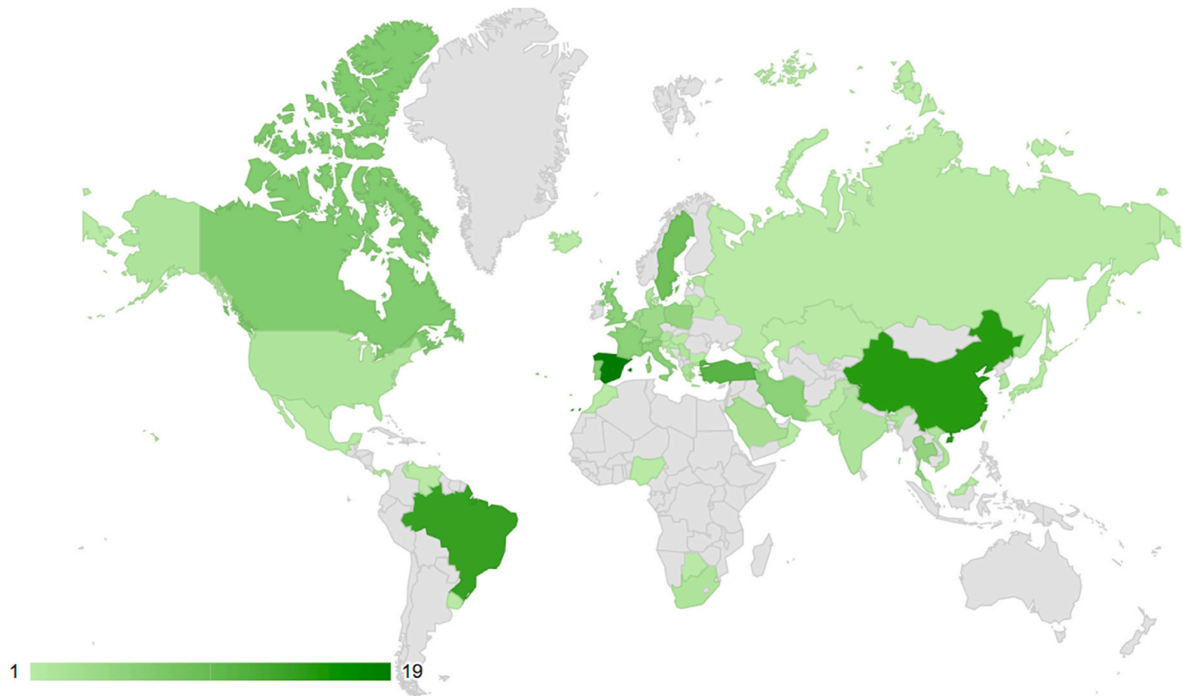

Fig. 1. Countries and parks included in the study.

were classified as mixed and positioned on the x-axis. Similarly, parks with a strategic orientation on both business operations and research and technology were categorized as mixed and placed in the middle of the y-axis. This typology approach acknowledged the dual nature of these parks and provided a clear representation of their characteristics. The classification of parks into the middle of the quadrants, representing the four park types, based on combinations of ownership and strategic orientation facilitated a nuanced understanding of the diverse range of parks included in the analysis. In this context, there are three classifications: *typology, type*, and *cluster*. Typology serves as the overarching structure, providing a systematic classification system. Types represent specific categories within the typology, offering more detailed classifications and clusters further categorize the types into subsets, adding depth to the classification system.

4. Analysing Science Park typology for categorizing parks

4.1. Science Park typology and types

The categorization of the two dimensions ownership and strategic orientation generates a Science Park typology. In our examination of Science Parks, we utilized a typology created from these two dimensions—ownership (public vs. private) and strategic orientation (research and technology vs. business operations)—to classify parks based on shared characteristics or attributes within a structured classification system. Additionally, we may identify types as specific categories or subsets within the typology. The relationship between typologies and types is hierarchical: typologies define broader categories for classification, while types represent specific subcategories within each typology, offering more detailed classifications based on specific characteristics or attributes. For example, Research Parks are characterized by public ownership and a strategic orientation on research and technology. Technology Parks, on the other hand, are a type of Science Park characterized by private ownership and a strategic emphasis on research and technology. Industrial Parks prioritize business operations and are typically privately owned, while Traditional Parks, historically owned by public entities, prioritize business operations over research and technology transfer activities.

Fig. 2 illustrates the Science Park typology, consisting of four *types* of parks, one park type within each quadrant (Research Park, Technology Park, Industrial Park and Traditional Park). On the x-axis, extreme left denotes solely private ownership, while extreme right represents solely public ownership. The origin reflects an even 50-50 blend of these extremes. On the y-axis, the top signifies a strategic orientation on research and technology, while the bottom represents a focus on specific business operations. The origin depicts an equal balance between these two strategic emphases. Each box within the typology encompasses various combinations depending on where a park falls along these coordinates. Parks located at the origin exhibit an equal mix of private and public ownership, as well as an equal emphasis on research and technology, and on business operations.

4.1.1. Research Park

In our typology, *Research Park* is primarily oriented towards research and technology as its strategic orientation, with most of the ownership held by public entities. Public ownership ensures that the development and dissemination of knowledge remain central priorities, serving the public interest rather than purely commercial objectives. Publicly owned Research Parks frequently result in a coordinated approach to economic development, particularly in sectors such as biotechnology, IT, and electronics. These industries are often critical to a nation's long-term economic health, technological leadership, and global competitiveness. In countries such as China and Taiwan, where the government has a strong influence on economic planning, it is essential for these Research Parks to align with national innovation objectives. The strategic orientation in these contexts extends beyond merely selecting promising industries; Research Parks are essential for advancing national innovation strategies, particularly in countries prioritizing technology and R&D. This involves ensuring these sectors are supported by a comprehensive infrastructure encompassing R&D, talent development, and global market access. Additionally, these types of Science Parks can engage in long-term planning, which is often not feasible in privately owned parks. Government-owned parks can prioritize national interests, such as job creation, sustainable development, and technological sovereignty, with a long-term perspective. This is particularly crucial for industries like biotechnology, where returns on investment often require

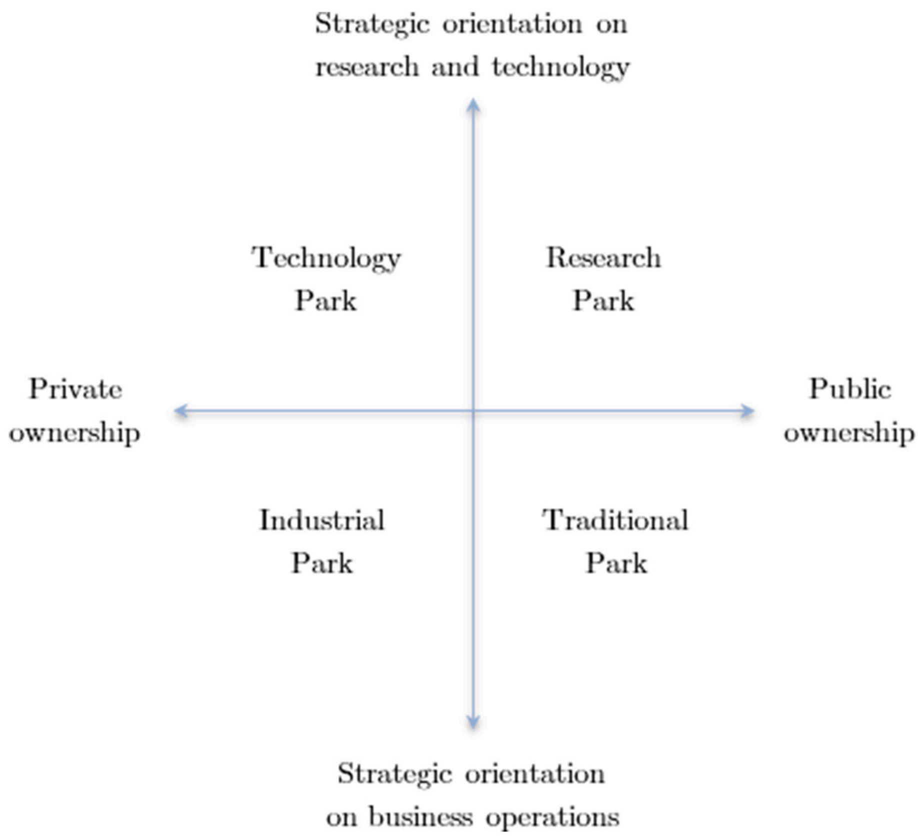

Fig. 2. Science Park typology and types.

extended time horizons. Integration into national innovation strategies ensures that these parks receive consistent support in terms of policy, funding, and infrastructure development. Thus, the synergy between public ownership and strategic orientation on research and technology creates an environment for innovation.

4.1.2. Technology Park

A *Technology Park* is a type of Science Park characterized by private ownership and a strategic emphasis on research and technology. With private ownership, Technology Parks operate under a market-driven logic, aiming to bridge the gap between academic research and industrial application. By focusing on commercially viable research and technology, these parks facilitate closer alignment with industry needs, thereby accelerating the transfer of innovations from theoretical research to practical, market-ready applications. For instance, Lindholmen Science Park in Sweden has a strong emphasis on automotive and transportation technologies due to Sweden's automotive industry. These parks are typically located in developed economies, with strong existing foundation for technology and innovation. For example, Singapore's emphasis on becoming a global biotech hub influences the industry focus of its Technology Parks. These parks often have national significance, contributing to the country's overall innovation ecosystem. While parks in this category focus on high-tech industries, the specific sectors can vary widely depending on regional strengths and the strategic goals of the private owners. Collaboration is a key feature of these parks, with strong partnerships between private companies, universities, and research institutions. These parks are also critical for driving innovation in high-tech sectors. Technology Parks are crucial for driving industry-specific innovation and commercialization. They are more agile and better equipped to cater to market demands, often leading in global competitiveness. Their ability to quickly adapt to market needs makes them valuable assets for fostering industry-driven innovation.

4.1.3. Industrial Park

Industrial Parks with private ownership and a strategic orientation on business operations are designed to support manufacturing, logistics, and other operationally intensive industries. An Industrial Park diverges from the research-focused approach of other Science Parks by placing primary emphasis on business operations, with major owners represented by private entities (e.g., Bilkent Cyberpark, Türkiye and Techno-Z Network, Austria). There is notable variation in the specific industries supported by these parks. While all focus on business operations, some are more aligned with traditional manufacturing and logistics, while others integrate advanced technology into business processes, particularly in developed economies. The location of these parks plays a significant role in their operational focus. Parks in developed countries often have access to advanced infrastructure, which allows them to support high-tech business operations, while those in developing countries may focus more on traditional industries and capacity building to enhance local manufacturing capabilities. Parks in developing countries may rely heavily on partnerships with government agencies and international firms to build capacity and expand market access, while those in developed countries focus on optimizing existing operations through collaboration with local industries.

4.1.4. Traditional Park

Finally, *Traditional Parks*, owned by public entities, historically focused on business operations rather than research and technology transfer activities. While these parks were initially developed with political impetus and limited involvement from universities, there has been a gradual evolution towards greater collaboration with research institutions in recent decades. However, some public parks still prioritize commercial and production activities over technology-based research and development, reflecting their traditional focus on business efficiency rather than knowledge transfer. The industry focus can vary widely depending on regional economic strengths and needs.

Traditional parks often have a significant presence of tech startups and multinational corporations. An example is Sophia Antipolis (France) with a strong existing infrastructure, allowing it to attract high-tech industries and global companies. Another example of Traditional Park is Innovation and Training Park Prizren (Kosovo) located in a developing region, focusing on regional economic development and supporting local industries. The scope and scale of partnerships can vary widely. There is significant variation in industry focus depending on the region's economic strengths. Parks in developed countries may focus on high-tech industries, while those in developing regions may support a broader range of industries to drive local economic growth. Table 2 shows the inter-type variations of the four types of Science Parks proposed, focusing on industry, regional and national significance, and collaborations/partnerships.

4.2. Empirical classification of park types

This section extends our typology by examining the distribution of Science Parks within and beyond the four types we identify: Research Parks, Technology Parks, Industrial Parks, and Traditional Parks. While our typology provides a structured framework for categorizing parks, the additional classifications reflect variations within these types, highlighting the dynamic nature of Science Parks. For example, mixed ownership and mixed strategic orientation parks exhibit hybrid characteristics, blending public and private governance structures with dual strategic orientations. These classifications further validate the relevance of our typology, as they indicate the fluidity in Science Park governance and operational objectives.

In Fig. 3, an illustration of the 180 parks included in the study is presented. In the four types of parks, 102 parks have been placed, representing 56.7 percent of all parks. The remaining parks have been placed on either the x-axis or the y-axis and are thus 'mixed' in different ways. In this way, we have nine different *clusters* within the Science Park typology, where five out of nine clusters are placed outside the four Science Park types.

The sample of 180 parks is distribuited across each Science Park type. Of the four types, the Traditional Park is the largest type, with 45 parks, while the Technology Park is the least represented, with only 6 parks. Most parks (142, 78.9 %) are publicly owned. Mixed ownership is found in 15 parks (8.3 %), while 23 (12.8 %) parks are privately owned. Regarding strategic orientation, 66 parks (36.7 %) have a mixed focus on research and technology and business operations, while 56 (31.1 %) have a clear focus on research and technology and 58 parks (32.2 %) on business operations. Additionally, 82 parks (45.5 %) are owned or operated in collaboration with one or more universities. The three largest clusters, comprising 142 parks, are exclusively publicly owned and evenly distributed between parks with a mixed strategic orientation and those focused solely on research and technology or business operations. The remaining three clusters are relatively small, each containing between three and nine parks. To summarize, the results are as follows.

- Cluster 1 (N = 54/180). Public ownership and a mixed strategic orientation.
- Cluster 2: (N = 45/180). Public ownership and a strategic orientation on business operations (type: Traditional Park).
- Cluster 3 (N = 43/180). Public ownership and a strategic orientation on research and technology (type: Research Park).
- Cluster 4 (N = 9/180). Private ownership and a mixed strategic orientation.
- Cluster 5 (N = 8/180). Private ownership and a strategic orientation on business operations (type: Industrial Park).
- Cluster 6 (N = 7/180). Mixed ownership and a strategic orientation on research and technology.
- Cluster 7 (N = 6/180). Private ownership and a strategic orientation on research and technology (type: Technology Park).
- Cluster 8 (N = 5/180). Mixed ownership and a strategic orientation on business operations.
- Cluster 9 (N = 3/180). Mixed ownership and a mixed strategic orientation.

5. Discussion

This paper enhances our understanding of Science Parks by (i) establishing a typology based on ownership and strategic orientation, (ii) providing analytical frameworks, (iii) improving function assessments for managers and policymakers, and (iv) examining interconnections among park types to inform policy. The typology clarifies the distinct needs and challenges of different Science Parks, supporting more effective policies and development strategies for regional and national innovation. Importantly, the classification enables targeted policy interventions. Public research-focused parks may benefit from increased R&D funding, while private parks might require incentives for industry partnerships. Each type serves distinct stakeholder roles, making direct comparisons impractical.

A key contribution of this study is the introduction of a systematic typology, which challenges assumptions about Science Park homogeneity and provides a framework for governance and strategic priorities (RQ1). Past research has categorized Science Parks by university

Table 2
Inter-type variations.

Dimension	***Research Parks*** *Public ownership and Strategic orientation on research and technology*	***Technology Parks*** *Private ownership and Strategic orientation on research and technology*	***Industrial Parks*** *Private ownership and Strategic orientation on business operations*	***Traditional Parks*** *Public ownership and Strategic orientation on business operations*
Industry	Variation: These parks often focus on high-tech industries, but the specific industry focus can vary significantly based on regional strengths (e.g., biotechnology vs. electronics). IT, Biotechnology (e.g., TusPark, China) Semiconductors, Electronics (e.g., Central Taiwan Science Park)	Variation: Industry focus varies widely based on the park's origins and the founding companies' sectors. IT, Biotechnology (e.g., Singapore Science Park) Automotive, Transport Technology (e.g., Lindholmen Science Park, Sweden)	Variation: These parks tend to focus on industries with strong commercial potential, though the specific industries can differ depending on the market and investor interests. Manufacturing, Logistics (e.g., East London IDZ SOC, South Africa) IT, Digital Technologies (e.g., Techno-Z Network, Austria)	Variation: Parks under this type may support a diverse range of industries, often depending on the local business environment and regional needs. ICT, Life Sciences (e.g., Sophia Antipolis, France) SME Support, Varied Industries (e. g., Innovation and Training Park Prizren)
Regional/ National Significance	National innovation leaders (e.g., TusPark)	Globally connected, high national impact (e.g., Singapore Science Park	Regionally focused, supports local economy (e.g., East London IDZ SOC)	Internationally recognized (e.g., Sophia Antipolis)
Partnerships	University collaborations (e.g., Tsinghua University for TusPark) Industry-academia partnerships	Global tech firms, universities (e.g., Singapore Science Park)	Local industry partnerships (e.g., Techno-Z Network)	International tech firms (e.g., Sophia Antipolis)

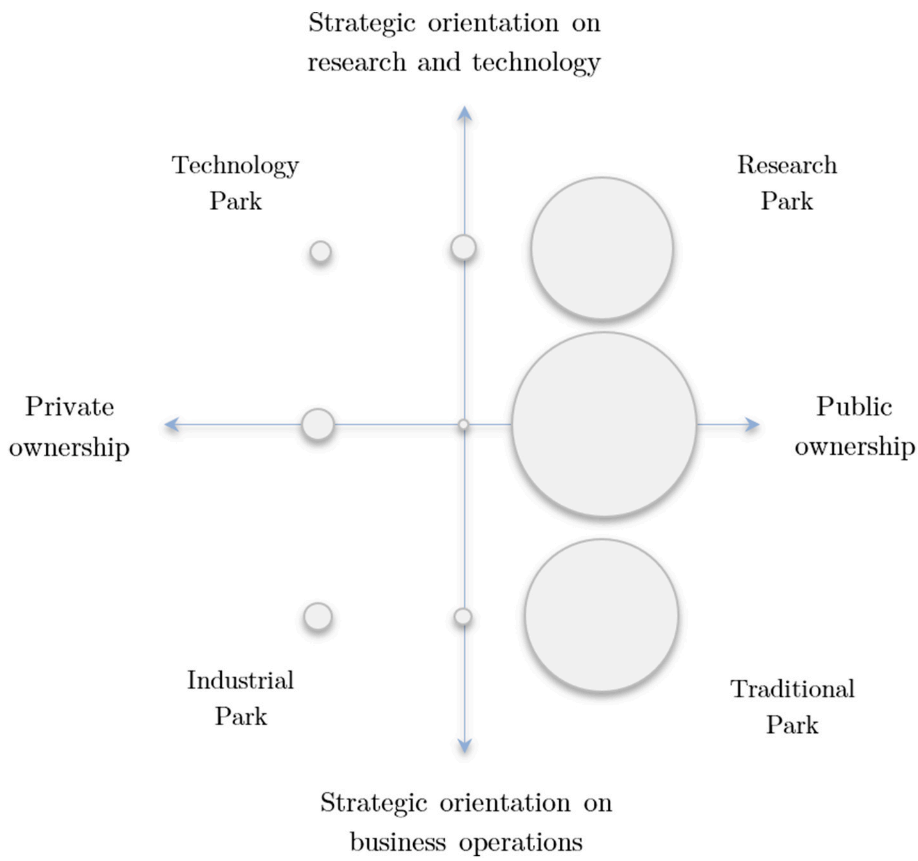

Fig. 3. Science Parks, types and clusters.

engagement (Albahari et al., 2017), managerial characteristics (Ng et al., 2019), corporate models near technical universities (Łobejko and Sosnowska, 2015), and regional policies on technology transfer (Escorsa and Valls, 1996). However, these classifications often overlook internal diversity in governance structures and fail to systematically link ownership models to strategic goals. Integrating ownership and strategic orientation into a single model, this paper contributes to a more nuanced understanding of Science Park functions and their broader impact.

Ownership structures—whether public, private, or mixed—fundamentally shape a Science Park's strategic direction, governance, and tenant support mechanisms (Bigliardi et al., 2006; Vásquez-Urriago et al., 2016; Weng et al., 2019). Publicly owned parks often align with broader societal objectives, prioritizing regional development and innovation diffusion (Germain et al., 2023). University-owned parks, on the other hand, focus on research commercialization and incubation services, facilitating knowledge spillovers between academia and industry. Private parks, driven by market forces, typically emphasize commercial objectives, industry partnerships, and tenant financial sustainability (Liberati et al., 2016; Le Tellier et al., 2019). Mixed ownership models attempt to balance these competing priorities, incorporating both public-interest goals and commercial imperatives.

Strategic orientation, the second dimension of our typology, distinguishes between Science Parks focused on R&D/technology and those prioritizing business operations. R&D-oriented parks concentrate on advanced technological development and university collaborations, attracting firms engaged in cutting-edge research. By contrast, business-oriented parks prioritize applied innovation, supporting firms in market expansion, access to venture capital, and scaling operations. These orientations influence tenant firm dynamics, knowledge exchange, and the overall effectiveness of Science Parks in fostering innovation.

The intersection of ownership and strategic orientation results in four distinct Science Park types (RQ2). Technology Parks are innovation hubs that support high-tech industries, including biotechnology, information technology, and nanotechnology. Their success hinges on strong research collaborations and access to funding for advanced technology development. Research Parks, by contrast, facilitate research activities and the commercialization of scientific discoveries, often featuring incubation services and specialized research facilities. Industrial Parks primarily support manufacturing clusters, fostering supply chain integration and operational efficiency. Finally, Traditional Parks encompass a diverse mix of technology, research, and industrial tenants, providing a flexible environment for varied innovation activities.

Both public and private Science Parks with a strategic orientation on research and technology share a strong emphasis on forming partnerships with universities and industry to drive innovation. These collaborations are crucial for fostering technological advancements and ensuring the commercialization of new ideas. Similarly, when it comes to a strategic orientation on business operations, parks under both ownership types prioritize commercial success, with a particular focus on supporting SMEs and fostering business growth. However, key differences emerge between public and private ownership. Publicly owned parks generally have broader national significance and are often closely aligned with government policies. These parks typically play a vital role in advancing national innovation strategies and regional development. On the other hand, privately owned parks are more commercially driven, with a focus on profitability and serving international markets. While private parks may be more agile and responsive to market demands, especially in business operations, their impact on national policy is often less pronounced compared to their public counterparts.

This study advances our understanding of how ownership and strategic orientation interact to shape Science Park functions. Science Parks with strong university linkages may exhibit greater research intensity but require policies that sustain long-term R&D investments. Industrial

Parks, conversely, benefit from policies that enhance infrastructure and supply chain integration. The effectiveness of a Science Park is thus contingent on its alignment with regional economic characteristics and its capacity to foster an entrepreneurial ecosystem. Policymakers play a critical role in maximising the impact of Science Parks. Recognizing the strategic orientation of each park type allows for the design of policies that align with tenant firms' needs and innovation objectives. A mismatch between policy support and a park's strategic orientation can lead to inefficiencies, underutilisation of resources, and missed opportunities for economic growth (RQ3). For instance, public funding targeted at R&D may be ineffective in a business-oriented park that requires venture capital access and industry collaboration initiatives. Conversely, industrial policies aimed at business scaling might not adequately support a research-intensive park's innovation activities. Tailored policies that consider ownership and strategic orientation can ensure that Science Parks fulfil their intended roles within regional and national innovation systems.

6. Conclusions

6.1. Main conclusions and contributions

This paper deepens the understanding of Science Parks by introducing a systematic typology based on ownership and strategic orientation. This classification enhances analysis, communication, and policy formulation by clarifying the distinct needs and challenges of different park types. The proposed framework provides a structured approach for evaluating Science Park functions, helping managers and policymakers refine their strategies for regional and national innovation. The typology enables targeted policy interventions. For instance, publicly owned parks with a research focus may benefit from increased R&D funding to strengthen their role in innovation ecosystems, while private parks may require incentives for industry partnerships to enhance commercial success and global integration. Since each park type serves distinct stakeholder needs, they require tailored evaluation criteria rather than direct comparisons. Applying this classification to Science Parks affiliated with IASP highlights the prevalence of public ownership and the associated societal and institutional responsibilities.

This study makes three key contributions. First, it offers a refined categorization that moves beyond traditional classifications focused on university involvement or industry specialization, providing a more comprehensive framework for governance and strategic priorities. Second, it advances the understanding of Science Parks' varied roles by distinguishing ownership structures and strategic orientations, enabling more precise analysis of their functions. Finally, it facilitates a nuanced discussion on policy implications, helping tailor support mechanisms based on the specific characteristics of different park types.

6.2. Implications for policy

Analyzing how different types of Science Parks can contribute to shaping policies for their advancement involves understanding the characteristics and functions of each type and how they align with broader policy objectives. By understanding the distinct characteristics and roles of each type, policymakers can tailor their strategies to leverage the strengths of different types of Science Parks in driving economic development, innovation, and knowledge creation within their respective regions. This may involve a combination of financial incentives, regulatory reforms, infrastructure investments, and capacity-building initiatives designed to support the growth and success of Science Parks in alignment with broader policy objectives. Each type of Science Park—Technology Park, Research Park, Industrial Park, and Traditional Park—has distinct characteristics and functions that can influence the shaping of policies for advancing Science Parks. Overall, each type of Science Park offers unique opportunities for driving economic development, innovation, and knowledge creation within its respective context. Policies for advancing Science Parks should consider the specific characteristics and objectives of each type, as well as the broader socio-economic and environmental considerations of the regions in which they are located.

Evaluating different types of Science Parks requires a nuanced approach that considers their specific objectives, owners, and functions. Therefore, it's essential to consider these distinctions when assessing performance. Evaluating different types of Science Parks, whether privately or publicly owned, and strategic orientation, involves assessing various dimensions related to their objectives, performance, impact, and sustainability. Private parks may focus on metrics like financial performance, tenant satisfaction, occupancy rates, and the commercial success of tenant companies when gauging success. Publicly owned parks could evaluate success by looking at indicators such as economic impact, job creation, contracts with universities for research, and their contributions to the local entrepreneurial ecosystem, all of which align with governmental objectives.

6.3. Limitations of the study

Despite our contribution to the state of the art on SPs, our study has some critical aspects and limitations regarding our method and data that we want to put forward. First, using ownership as a dimension in categorizing Science Parks poses risks. Unlike typical stakeholders who lack ownership but play central roles, some public universities, via holding companies, may own land and businesses, challenging their non-profit, public mission. Additionally, research universities, driven by competitive funding dynamics, increasingly resemble private firms, blurring the traditional distinction between public and private entities.

Second, a challenge emerged in the empirical classification of parks into specific types. We encountered difficulties in determining whether certain parks fit neatly into predefined categories. Consequently, in instances where these aspects were ambiguous, parks were often classified as mixed. This approach, while expedient, may have led to a loss of nuance in our analysis, potentially obscuring important variations between parks. That said, this concerns only a small percentage of the parks analysed.

Third, the method involved the exclusion of parks that did not meet the criteria of being Science Parks. While this criterion was fundamental to our study, its application presented its own set of challenges. While some parks clearly fell outside the scope of Science Parks and could be easily eliminated (for instance, because they were industrial districts, or business incubators), others required more thorough examination. Deciding whether a park should be classified as a Science Park often involved a nuanced assessment of its characteristics and activities. This process was inherently subjective and may have introduced bias into our dataset. Finally, our reliance on IASP database, poses a limitation to the empirical application of our classification model. The accuracy and completeness of the data contained in this database depends on several factors, including the thoroughness of data collection efforts and the transparency of reporting practices by the parks themselves. In addition, membership in IASP is not free, and parks with specific characteristics—such as being more mature or having greater international exposure—may be more inclined to join, which could introduce a selection bias into the sample.

6.4. Future research

Further research could enhance the differentiation of each cluster more accurately by examining intra-type variations and exploring factors beyond the variables used in our model, considering the heterogeneity within each type. For example, assessing whether a park focuses on emerging technologies or mature industries could yield deeper insights into its strategic needs and potential. Parks focusing on emerging technologies might require different support mechanisms compared to those engaged with established industries. Additionally, analyzing the extent of international collaboration and market reach could further differentiate parks, especially in terms of their global impact and innovation networks. Parks with a higher degree of global integration may have greater influence on international innovation landscapes, offering additional opportunities for collaboration and growth. Furthermore, the degree of university involvement in the park's ownership and management could shape its strategic direction. Clusters could also be characterized from an ecological perspective, considering the unique composition of on-park organizations. By exploring how ownership significantly influences strategic priorities, the typology can better reflect the real-world diversity of Science Parks and provide a robust framework for both academic study and practical application. The empirical testing of typologies should examine whether ownership consistently shapes strategic priorities across different contexts.

A suggestion for another future research area is to conduct research to establish a comprehensive set of performance metrics and evaluation criteria for park types, examine different governance and management models for park types and assess their effectiveness and investigate the policy implications, including the impact of government funding, private funding, regulatory frameworks, and incentives on their success. This could involve comparing university-led parks with privately managed ones or exploring hybrid models. Another interesting area is to study the processes of technology transfer and intellectual property management within different types of parks, including how they facilitate the commercialization of university research and explore opportunities for parks to collaborate with various sectors, including health and clean energy to address global challenges.

CRediT authorship contribution statement

Magnus Klofsten: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Hans Löfsten:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Alberto Albahari:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of conflict of interest

The authors declare that they have no competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Table A.1
IASP full members included in the study (ordered by country) (n = 180).

Name	City, country
Lakeside Science & Technology Park	Klagenfurt, Austria
Techno-Z Network Company - The Salzburg Enterprise Network	Salzburg, Austria
Innovation and Digital Development Agency - Pirallahi High-tech Park	Baku, Azerbaijan
Minsk City Technopark	Minks, Belarus
Limburg DC	Diepenbeek, Belgium
Science Park University of Antwerp	Niel, Belgium
Botswana Innovation Hub	Gaborone, Botswana
Biopark	Toledo, Brazil
Feevale Techpark	Campo Bom, Brazil
Fundação PTI	Foz do Iguaçu, Brazil
InovaTec UFSM Parque Tecnológico	Santa Maria - RS, Brazil
Parque Científico e Tecnológico da Unicamp	Campinas, Brazil
Parque de Ciência e Tecnologia Guamá	Belém, Brazil
Parque Metrópole	Natal, Brazil
Parque Tecnológico do Rio/UFRJ	Rio de Janeiro, Brazil
PIT, Parque de Inovação Tecnológico - São José dos Campos	São José Dos Campos, Brazil
Porto Digital Technology Park	Recife, Brazil
tecnoPARQ (Technology Park of Viçosa)	Viçosa, Brazil
TECNOPUC - Parque Científico e Tecnológico da PUCRS	Porto Alegre, Brazil
TECNOSINOS - Parque Tecnológico de São Leopoldo	São Leopoldo, Brazil
Tecnovates	Lajeado, Brazil
Sofia Tech Park	Sofia, Bulgaria
Bromont Science Park	Bromont, Canada
David Johnston Research + Technology Park	Waterloo, Canada
Innovation Saskatchewan	Saskatoon, Canada
Parc Micro Sciences de Trois Rivières	Québec, Canada
Saint-Hyacinthe Technopole - St-Hyacinthe Science Park	Saint-Hyacinthe, Canada
Technoparc Montréal	Montréal, Canada
Western Research Parks	London, Canada
Guizhou China-Australia Property Development Company Ltd. (China West Technology Park)	Guiyang, China
Luoyang National University Science Park	Luoyang, China
Nanjing University National Science Park	Nanjing, China
Shanghai Zizhu Science-based Industrial Park	Shanghai, China
Sun Yat-sen University Science Park	Guangzhou, China
Tiankai Higher Education Innovation Park	Tianjin, China
Tsinghua University Science Park - TusPark	Beijing, China
Tus China-Germany Park Operation & Management Company	Beijing, China
Tus-Caohejing Science Park	Shanghai, China
TusPark (Jiangsu) Innovation Research Institute	Nanjing, China
Tuspark (Ningbo)	Ningbo, China
Weiguang Life Science Park	Shenzhen, China

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Table A.1 (*continued*)

Name	City, country
ZGC Software Park	Beijing, China
Zhongguancun Fengtai Science Park	Beijing, China
Zhongke New Economy Science and Technology Innovation Park	Jinan, China
Hsinchu Science Park	Hsinchu, Chinese Taipei
Technology Park Varazdin Ltd	Varazdin, Croatia
Technology Park Brno	Brno, Czech Republic
INCUBA	Aarhus N., Denmark
NOVI Science Park	Aalborg, Denmark
Tartu Science Park	Tartu, Estonia
TEHNOPOL Tallinn Science Park	Tallinn, Estonia
Ester Limoges Technopole	Limoges, France
Sophia Antipolis Science & Technology Park	Valbonne Sophia Antipolis, France
Technopole de la Reunion	Sainte Clotilde, France
Technopole de l'Aube en Champagne	Rosières-près-Troyes, France
Technopôle Marseille Provence Château-Gombert	Marseille, France
Technopôle Transalley	Famars, France
Potsdam Science Park	Potsdam, Germany
Technologiepark Heidelberg GmbH	Heidelberg, Germany
Technologiepark Ostfalen	Barleben bei Magdeburg, Germany
Wista-Management GmbH Berlin Adlershof	Berlin, Germany
Attica Technology Park "Lefkippos"	Athens, Greece
Science and Technology Park of Crete (STEP-C)	Heraklio, Greece
ZalaZONE park	Zalaegerszeg, Hungary
The University of Iceland Science Park	Reykjavík, Iceland
Andhra Pradesh MedTech Zone Limited	Visakhapatnam, India
IKP Knowledge Park	Secunderabad, India
Isfahan Science & Technology Town (ISTT)	Isfahan, Iran
Mazandaran STP	Sari, Iran
Pardis Technology Park	Pardis, Iran
Semnan Science & Technology Park	Shahrood, Iran
University of Tehran Science & Technology Park (UTSTP)	Tehran, Iran
Yazd Science & Technology Park (YSTP)	Yazd, Iran
Area Science Park	Trieste, Italy
Bioindustry Park Silvano Fumero SpA	Colleretto Giacosa, Italy
ComoNExT – Innovation Hub	Lomazzo, Italy
Kilometro Rosso Science Park	Bergamo, Italy
NOI Techpark Südtirol/Alto Adige	Bolzano, Italy
Openzone SPA	BRESSO, Italy
Kyoto Research Park	Kyoto, Japan
Innovation and Training Park Prizren	Prizren, Kosovo
Tech-Park Kaunas	Kaunas, Lithuania
House of Biohealth	Esch/Alzette, Luxembourg
MRANTI Park	Bukit Jalil, Malaysia
PIIT Parque de Investigación e Innovación Tecnológica (Research Park)	Apodaca, Mexico
Technopark Morocco	Casablanca, Marocco
High Tech Campus Eindhoven	Eindhoven, Netherlands
Kennispark Twente	Enschede, Netherlands
Novio Tech Campus	Nijmegen, Netherlands
Utrecht Science Park	Utrecht, Netherlands
Abuja Technology Village Free Zone Company	Abuja, Nigeria
Knowledge Oasis Muscat	Rusayl (Muscat), Oman
National Science and Technology Park (NSTP)	Islamabad, Pakistan
Ciudad del Saber - Panama	Ciudad de Panamá, Panama
City of Gdynia - Pomeranian Science and Technology Park Gdynia	Gdynia, Poland
Gdańsk Science and Technology Park	Gdańsk, Poland
Krakow Technology Park	Krakow, Poland
Płocki Park Przemysłowo-Technologiczny S.A.	Płock, Poland
Poznan Science and Technology Park	Poznan, Poland
Associação Parque de Ciência e Tecnologia Almada/Setúbal - Madan Parque	Caparica, Portugal
Brigantia Ecopark	Bragança, Portugal
Creative Science Park - Aveiro Region	Ílhavo, Portugal
LISPOLIS - Polo Tecnologico de Lisboa	Lisboa, Portugal
Science and Technology Park of the University of Porto	Porto, Portugal
TECMAIA - Parque de Ciência e Tecnologia da Maia	Maia, Portugal
Qatar Science & Technology Park	Doha, Qatar
Technopark NURIS Cluster	Nur-Sultan, Qazaqstan
MSU Science Park	Moscow, Russia
Dhahran Techno Valley Company	Dhahran, Saudi Arabia
KACST Science and Technology Parks	Riyadh, Saudi Arabia
KAUST Research and Technology Park (KRTP)	Thuwal, Saudi Arabia
Science Technology Park Belgrade	Belgrade, Serbia
Science Technology Park Nis	Nis, Serbia
Singapore Science Park Ltd.	Singapore, Singapore
Technology Park Ljubljana	Ljubljana, Slovenia
East London IDZ SOC	East London, South Africa
The Innovation Hub	Pretoria, South Africa

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Table A.1 (*continued*)

Name	City, country
INNOPOLIS - Korea Innovation Foundation	Daejeon, South Korea
Jeju Science Park (Jeju Free International City Development Center)	Jeju City, South Korea
Fundación de la Comunitat Valenciana Ciudad Politécnica de la Innovación	Valencia, Spain
Fundación PTS Granada	Granada, Spain
Garaia Parque Tecnológico S.Coop.	Arrasate, Spain
GEOLIT. Parque Científico y Tecnológico	Mengíbar, Spain
Málaga TechPark; Parque Tecnológico de Andalucía	Campanillas, Spain
ParcBit - Balearic Innovation Technology Park	Palma de Mallorca, Spain
Parque Cientifico de Alicante	Alicante, Spain
Parque Científico Tecnológico de Gijón	Cabueñes - Gijón, Spain
Parque Científico y Tecnológico Cartuja	Seville, Spain
Parque Científico y Tecnológico de Bizkaia – Bizkaiko Zientzia eta Teknologia Parkea	Zamudio, Spain
Parque Científico y Tecnológico de Extremadura	Badajoz, Spain
Parque Científico y Tecnológico de Gipuzkoa - Gipuzkoako Zientzia eta Teknologia Parkea	San Sebastian, Spain
Parque Científico y Tecnológico de Tenerife	La Laguna, Spain
Parque TecnoCampus Mataró-Maresme	Mataró, Spain
Parque Tecnológico de Álava – Arabako Teknologia Parkea	Miñano, Spain
Parque Tecnológico de Asturias	Llanera, Spain
PITA, Parque Científico-Tecnológico de Almería	Almería, Spain
TECNÓPOLE	San Cibrao das Viñas, Spain
UC3M Parque Científico	Leganes, Spain
Dalarna Science Park	Borlänge, Sweden
Ideon Science Park	Lund (Skane), Sweden
Lindholmen Science Park AB	Göteborg, Sweden
Linköping Science Park	Linköping, Sweden
Luleå Science Park	Luleå, Sweden
Medeon Science Park	Malmö, Sweden
Sahlgrenska Science Park	Gothenburg, Sweden
Sandbacka Science Park	Sandviken, Sweden
Umeå Science Park and Uminova Innovation	Umeå, Sweden
Switzerland Innovation Park Zurich	Duebendorf, Switzerland
TECHNOPARK®-Allianz	Zurich, Switzerland
Central Taiwan Science Park, National Science and Technology Council	Taichung City, Chinese Taipei
Southern Taiwan Science Park Bureau, National Science and Technology Council	Tainan City, Chinese Taipei
Khon Kaen University Science Park	Khonkaen, Thailand
Prince of Songkla University Science Park	Thungyai Hatyai, Thailand
Science and Technology Park, Chiang Mai University	Muang, Thailand
Technopolis Suranaree University of Technology	Nakhon Ratchasima, Thailand
Thailand Science Park	Pathumthani, Thailand
Ari Teknokent - Istanbul Technical University's Technopark	Maslak, Türkiye
ATAP	Eskisehir, Türkiye
Bilişim Vadisi	Gebze/Kocaeli, Türkiye
Bilkent Cyberpark	Ankara, Türkiye
Çanakkale Teknopark	Saricaeli, Türkiye
Istanbul Teknokent Entertech	Istanbul, Türkiye
Marmara Teknokent Inc.	Kocaeli, Türkiye
ODTÜ Teknokent Yonetim A.S.	Ankara, Türkiye
Ostim Teknopark	Ankara, Türkiye
Teknopark Istanbul	Istanbul, Türkiye
Yildiz Teknoloji Gelistirme Bölgesi Teknopark A.S.	Esenler, Türkiye
Sharjah Research Technology and Innovation Park	Sharjah, United Arab Emirates
Coventry University Enterprises Ltd.	Coventry, United Kingdom
NETPark	Co-Durham, United Kingdom
Norwich Research Park	Norwich, United Kingdom
The Surrey Research Park	Guildford, United Kingdom
University of Nottingham Innovation Park	Nottingham, United Kingdom
University of Warwick Science Park, Ltd	Coventry, United Kingdom
Research Triangle Park	Research Triangle Park, United States
Tech Parks Arizona	Tucson, United States
Parque Científico Tecnológico de Pando	Pando, Uruguay
Corporación Parque Tecnológico Sartenejas - PTS	Caracas, Venezuela
Hoa Lac Hi-Tech Park Management Board	Hanoi, Vietnam
Quang T rung Software City Development	Ho Chi Minh, Vietnam

Table A.2
Countries and number of IASP parks (full members) in each country.

Austria	2	Iran	6	Saudi Arabia	3
Azerbaijan	1	Italy	6	Serbia	2
Belarus	1	Japan	1	Singapore	1
Belgium	2	Kosovo	1	Slovenia	1
Botswana	1	Lithuania	1	South Africa	2
Brazil	14	Luxembourg	1	South Korea	2

(*continued on next page*)

Table A.2 (*continued*)

Bulgaria	1	Malaysia	1	Spain	19
Canada	7	Morocco	1	Sweden	9
China	15	Mexico	1	Switzerland	2
Croatia	1	Netherlands	4	Chinese Taipei (Taiwan)	3
Czechia	1	Nigeria	1	Thailand	5
Denmark	2	Oman	1	Türkiye	11
Estonia	2	Pakistan	1	Arab Emirates	1
France	6	Panama	1	United Kingdom	6
Germany	4	Poland	5	United States	2
Greece	2	Portugal	6	Uruguay	1
Hungary	1	Qatar	1	Venezuela	1
Iceland	1	Kazakhstan	1	Vietnam	2
India	2	Russia	1		

Data availability

Data will be made available on request.

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