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From science management to innovation management: New forms of science-industry relations and knowledge transfer

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ABSTRACT

There is a long tradition of research on university-industry collaboration, but recent developments—including expanded academic engagement, the rise of new intermediaries and platforms for science-industry engagement, the revitalization of corporate science, and the development of mission-oriented research policies—call for fresh investigation. These changes have raised new questions about ways to align diverse knowledge transfer practices, foster meaningful collaboration, and support evolving academic engagement and corporate science practices. The papers included in this Special Issue examine science-industry relations at three levels. At the micro level, they look at how individual motivations, identities, and engagement practices shape knowledge exchange and research productivity. At the meso level, they explore organizational structures, strategic intent, and governance mechanisms that enhance scientific development and innovation. And at the macro level, they investigate ecosystem-wide dynamics, including intermediaries, living labs, and broader policy landscapes that foster interdisciplinary co-creation and legitimacy-building. Together, these perspectives underscore the transformative potential of science-industry collaboration while illustrating the inherent complexities of the process. Reflecting on these insights, this Special Issue proposes an agenda for expanding methodological approaches, contextualizing research across diverse settings, developing novel theoretical anchors, and addressing Grand Challenges through more integrated and inclusive collaborations.

1. Introduction

This Special Issue brings together research on the rapidly shifting boundaries of science-industry interactions. Acknowledging the need for a more nuanced, systemic perspective on how universities, corporate laboratories, intermediaries, and policymakers can jointly produce and apply scientific knowledge, its contributions explore these issues on the micro, meso and macro levels. The ultimate idea is to deepen theoretical and empirical understanding in order to support the identification of evidence-based pathways to advance meaningful science and innovation in the face of global challenges (George et al., 2016; Sharma et al., 2022).

In this editorial, we first examine the pressing need for more research on science-industry interactions, followed by an overview of the relevant literature that already exists. Drawing on these insights, we outline the key theoretical and empirical contributions of the nine papers included in this Special Issue. Finally, we propose a research agenda to guide the academic community toward new and impactful research directions in this evolving field.

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2. Why do we (still) need research on science-industry relations?

Relations between science and industry and the associated opportunities and challenges relating to knowledge transfer have long been discussed in the innovation management literature (e.g., Shepard, 1956; Nelson, 1962; Mansfield, 1980; Link and Long, 1981; Gilbert and Cordey-Hayes, 1996). However, in recent years, the landscape has undergone profound changes (e.g., Arora et al., 2018; Zahra et al., 2018), which require a fresh examination of long-standing concepts.

First, academic engagement with industry—referring to scientific involvement in collaborative research, contract research, consulting, research commercialization and informal relationships for university-industry knowledge transfer—is now practiced by more scholars than ever before (Perkmann et al., 2021), and from more diverse backgrounds (including industrial Ph.D students and professors of practice), and also entails a far broader range of activities (e.g., Miller et al., 2018; Castillo Holley and Watson, 2017) and partners (e.g., on SMEs, see Johnston and Huggins, 2018; Albats et al., 2020). Furthermore, many universities now regard engagement as an essential part of the academic process (Perkmann et al., 2021; Sharma et al., 2022) and research funders are increasingly demanding science-industry collaboration and co-creation for scientific advancement.

Second, new practices are emerging in the management of science and innovation in corporate laboratories (Sheer, 2022), with a notably greater emphasis on basic science and open contributions in certain sectors (Hartmann and Henkel, 2020). More companies are seeking (and often struggling) to create stronger synergies between their internal research outcomes and their innovation processes (Zahra et al., 2018), often by forging alliances with universities (Slalvova and Jong, 2021) or third parties (Granstrand and Holgersson, 2020).

Third, new hybrid public-research organizations (Bozeman and Boardman, 2003; Perkmann et al., 2019) have gained importance, with dedicated missions to foster both science and innovation (Goldstein and Narayanamurti, 2018), including the recent debate over the establishment of new thematic Advanced Research Projects Agencies (ARPA) and the Advanced Research and Invention Agency (ARIA) in the UK,[1] as well as non-profit organizations, science-based open-labs (Paskaleva and Cooper, 2021), hospitals and clinics (Anckaert et al., 2020), and Big Science centers (Li-Ying et al., 2022; Dahlander et al., 2021).

Fourth, effective science-industry collaborations are needed to help address Grand Challenges (Jütting, 2022). Consequently, policymakers are increasingly engaged in proposing mission-oriented initiatives (Sarpong et al., 2022; Robinson and Mazzucato, 2019), and pursuing quadruple-helix perspectives and solutions (Miller et al., 2018). This requires new perspectives on how academia can implement the open innovation paradigm (e.g., Beck et al., 2022).

These developments are raising critical questions. The alignment of diverse research agendas is often neither straightforward nor automatic, as the different parties must reconcile differences in terms of time horizons, incentive structures, epistemic traditions, and so on (Beck et al., 2022; Cohen et al., 2020; Ollila and Ystrom, 2024). Balancing basic research imperatives with commercial viability is even more complex when the issues at stake have such a large societal footprint, necessitating sustained academic, industrial, and political engagement (Robinson and Mazzucato, 2019). Hence the urgent need to reexamine the boundary-spanning activities and organizational configurations that enable—or constrain—knowledge transfer, collaborative research, and the co-production of transformative innovations (Villani et al., 2017; Haddad and Bergek, 2023; abu Sa'a and Ystrom, 2024).

[1] Such movement has been inspired by the success of ARPA-Energy (US DoE) as demonstrated by Goldstein and Narayanamurti (2018), and has also inspired by the longstanding development of the Defense Advanced Research Projects Agency (DARPA).

3. Exploring the transformation of science-industry relations: from new forms of collaboration and organization to novel approaches to knowledge transfer

Existing research demonstrates that academic engagement with industry often bolsters research productivity and enriches problem-focused inquiry, yielding benefits for both individual scientists (e.g., Bikard et al., 2019; Perkmann et al., 2013, 2021) and institutions (e.g., Zhang et al., 2019). Universities have progressively institutionalized these collaborative approaches with the support of their technology transfer offices (TTOs), with a variety of business models enabling spin-offs, licensing agreements, and joint projects (Baglieri et al., 2018). However, despite the rise in academic entrepreneurship (Siegel and Wright, 2015; Klofsten and Jones-Evans, 2000), fundamental questions remain unanswered as to how university policies and structures can harness engagement without compromising fundamental research (Klofsten et al., 2019). For example, the implications of industry collaboration for junior academics' career prospects, research autonomy, and knowledge spillovers remain underexplored (Hughes et al., 2016). Similarly, although prior studies have highlighted the positive effects of industrial partnerships on publication output (e.g., Bikard et al., 2019), we still know relatively little about the specific spaces—such as collaborative labs and informal networks—where these relationships thrive and how they shape scientific breakthroughs. Evidence suggests that universities rely on TTOs and other mechanisms to manage such interactions, but frameworks to assess the quality, value, or depth of this engagement beyond the blunt measure of patenting metrics remain fragmentary. Questions also persist regarding how best to align institutional incentives with academic motivations to engage with industry, the possible role of SMEs in these collaborations, and how different kinds of engagement complement or substitute one another in fostering discovery.

Research also shows that companies are redefining the way they deal with science (e.g., Arora et al., 2018), as they often find it hard to create synergies between internal fundamental discoveries and applied inventions (Narayanamurti and Odumosu, 2016; Zahra et al., 2018). Particularly in sectors that are being propelled by rapid technological change (and particularly artificial intelligence), corporate labs are increasingly turning to open-science contributions as a means to enhance legitimacy and gain access to high-level talent (Hartmann and Henkel, 2020). These initiatives blur the conventional boundaries between open and proprietary research, requiring new managerial capabilities (Sheer, 2022). However, systematic analyses of how firms balance this dual pursuit of basic research and product-focused innovation remain scarce, as do insights into how corporate scientists navigate identity tensions when they collaborate with their university counterparts. This gap is especially pertinent given emerging empirical evidence linking corporate publication with innovation performance—raising key questions about whether and how industry should design "double-impact" models that yield both fundamental knowledge and commercial benefits (Narayanamurti and Odumosu, 2016; Plantec et al., 2023). A clearer understanding of the organizational mechanisms by which industrial R&D labs forge synergies between internal discoveries, corporate strategy and collaborative research ecosystems would contribute significantly to the development of corporate science strategies.

Concurrently, new organizational forms—ranging from hybrid public research organizations (PROs) to living labs—are proliferating in their endeavor to connect disparate research, industry, and societal stakeholders (Giannopoulou et al., 2019; Perkmann et al., 2019; Ollila and Ystrom, 2016). While these intermediaries are commonly tasked with bridging university knowledge production and industry application, their roles and governance structures vary significantly, reflecting differences in regional policy, institutional design, and sectoral context (Agogué et al., 2013). Recent studies have documented innovative practices in settings like hospitals, research and technology operations

Table 1
Summary of the papers included in the special issue.

Paper	Research Question	Data & Methods	Key Findings
Micro-level focus: Individual Academic Engagement and Identity Work in science-industry collaboration			
Nast et al. (2025), 'Sourcing insights elsewhere: The positive influence of academic engagement on scientific impact'	To what extent, if at all, does academic engagement promote the generation of research results with high scientific impact?	Quantitative analysis, Large-scale survey of scientists affiliated with Spanish universities and public research organizations (n = 11,992)	There is an overall positive relationship between scientists' interactions with non-academic actors and the production of high-impact research findings. This association is contingent on (i) the specific mode of interaction (joint-research as opposed to response-mode interaction) and (ii) the scientists' previous scientific achievements (i.e., renowned scientists).
Owusu-Kwarteng et al. (2025) 'In pursuit of the third mission: Exploring women's participation in academic engagement activities in sub-Saharan Africa'	Can women in higher education institutions in sub-Saharan Africa (SSA) participate in academic engagement activities? If so, how?	Qualitative analysis, Semi-structured interviews with 36 female academics and research scientists in six countries of SSA	Drawing on Bourdieu's practice theory and feminist perspectives, this study finds that gender plays a significant role in AE activities in SSA, encouraging these female subjects to engage in homophilous networking, embody masculinity, and enhance their competencies. There is a risk that AE activities may trap female researchers in a cycle of low wages, limited career opportunities, and poor working conditions.
Ollila, S (2025) 'In-between identity work: Transcending boundaries in university-industry collaboration'	How do individuals embrace identity tensions to thrive in university-industry collaboration (UIC)?	Qualitative analysis, Semi-structured interviews with 40 members of a research center involving academia and industry in Northern Europe	The study finds that individuals in UICs engage in identity work to navigate cognitive and behavioral boundaries, shaping their roles and contributions. Rather than resolving identity tensions at the organizational level, identity struggles can be harnessed to enhance knowledge exchange and innovation.
Meso-level focus: Processes and Mechanisms of Managing Interdisciplinary Science-Industry Collaboration			
Osorio, F., Giones, F., Dupont, L., & Camargo, M. (2025) 'Innovation labs strategy: unfolding the multifaceted role of strategic intent'	How does the enactment of strategic intent shape the evolution of an innovation lab?	Qualitative analysis, Multiple case study (3 cases) of innovation labs	Innovation labs embedded in multi-stakeholder environments may adopt forms of strategic intent that either help them to integrate disparate goals and competencies (amalgam stance) or protect the lab's core ethos and purpose (shield stance). However, a hybrid, flexible approach is most conducive to sustainability.
Lenfle and Le Masson (2025) 'Back to the Future of Corporate Research: Early Double-Impact Research at GE, ATT, and Du Pont (1902–1948)'	What can early corporate research labs teach us about fostering innovation and fundamental research?	Historical approach, 3 case studies (AT&T Bell Labs, DuPont & General Electric)	Contrary to previous analyses, corporate research labs were not isolated "ivory towers." Instead, they operated at the intersection of corporate strategy, new product development, and the scientific community, generating multidimensional effects that influenced overall company strategy.
Clauss, T., Kesting, T., & Franco, M., (2025) 'Innovation generation through formalization and fairness in university – industry collaboration'	How can University-Industry (U-I) formalization mechanisms be leveraged to boost perceptions of fairness and joint innovation outcomes?	Quantitative analysis, Survey of 415 professors in North Rhine-Westphalia (Germany)	Formalizing U–I collaborations through clear procedural guidelines and contracts that align responsibilities and expectations, leads to enhanced perceptions of fairness, trust, and joint innovation outcomes.
Macro-level focus: Co-creating and Sharing Knowledge through Science-Industry Collaboration in Ecosystems and Beyond			
Baum, C. M., Sick, N., & Bröring, S. (2025) 'Drivers for the emergence of interdisciplinary knowledge areas: An actor-level perspective on building legitimacy for the case of synthetic life sciences'	What factors drive legitimacy in interdisciplinary knowledge areas (IKAs)?	Mixed-method, Single case study of a German university specializing in synthetic life sciences using ground concept mapping	Building IKA legitimacy at the ecosystem level requires specific actors, particularly science communication experts and external specialists, to attract research sponsors and explore diverse value propositions. Additionally, institutional support, such as that of university administrations, is essential.
abi Saad and Agogué (2024). 'Living Labs in science-industry collaborations: Roles, design, and application patterns.'	How can organizations design and manage Living Labs (LLs) in science-industry collaborations?	Meta-synthesis, Literature review and validation of an empirical case study	A typology of eight design elements (e.g., stage of user involvement, membership) underlying four unique LL models in the context of science-industry collaborations: (1) technology sponsor, (2) opportunity spotter, (3) network orchestrator, and (4) community anchor.
abu Sa'a and Asplund (2025) 'University-Industry Collaboration Enabling Cross-Industry Knowledge Sharing'	How does structural social capital in UIC create relational and cognitive social capital to enable cross-industry knowledge sharing?	Qualitative research, Multiple case-study design (semi-structured interviews, observations, and document analysis)	Research-focused UIC, characterized by formal and structured interactions, utilizes cognitive social capital to abstract knowledge for dissemination across different industrial contexts. In contrast, networking-focused UIC, driven by informal and less-structured interactions, depends on relational social capital to foster direct, trust-based exchanges between firms.

(RTOs), and open labs, showcasing their unique potential for co-producing both applied and fundamental research (Fritzsche, 2020). However, comparatively less attention has been paid to how these emerging platforms adapt to different socioeconomic contexts, particularly in developing economies, or how they balance competing stakeholder expectations. Case studies of specific examples—such as Chinese research institutes (Chen et al., 2022) and cross-national networks (Cai, 2022; Dosso et al., 2023)—raise unresolved questions around the scalability and local adaptation of intermediary initiatives, and empirical evidence remains limited regarding the most effective ways to maintain new hybrid structures, balance open science with proprietary interests, and sustain long-term interdisciplinary collaborations (Villani et al., 2017; Roy, 2025).

Finally, the growing need to address Grand Challenges—from climate change to public health emergencies—places new demands on scientific discovery and science-industry collaboration (Baaden et al., 2024; Block et al., 2021). Policymakers may emphasize the potential of coordinated initiatives to solve high-stakes, system-level problems, yet the organizational and governance mechanisms enabling such wide-ranging collaborations remain poorly understood (Sarpong et al., 2022). While triple and quadruple-helix frameworks offer conceptual guidance, empirical insights are fragmented when it comes to how universities (Miller et al., 2018), firms, governments, and civic stakeholders can align to tackle large-scale societal issues. Although big-science collaborations have led to remarkable innovations, we lack clarity on the organizational designs, collaborative competencies, and policies that can most effectively channel these efforts to produce both rigorous science and viable technologies (Kohn Rådberg and Löfsten, 2023). As global challenges become more urgent, so does the need for research into how science-industry relationships can be systematically leveraged to drive large-scale impact.

To summarize, recent studies confirm that science-industry interactions are undergoing profound changes, and are at the same time gaining importance. However, we lack robust theoretical frameworks to explain how individuals, organizations, and ecosystems harness the diversity of scientific and commercial logics (for example, through alignment or hybridization) for grand-scale problem-solving (George et al., 2016; Sharma et al., 2022). Surprisingly, we know relatively little about how these shifts in science-industry relations might affect the nature and direction of the production of scientific knowledge, particularly in response to urgent global challenges that require collective, cross-cutting action (Ferraro et al., 2015; Haddad and Bergek, 2023). This Special Issue directly addresses these gaps by bringing together conceptual and empirical contributions that explore the changing landscape of science-industry relations and knowledge transfer practices.

4. Unpacking the contributions: insights from the special issue

In presenting the contributions of the nine papers included in this Special Issue, we focus on their levels of analysis, describing how they collectively offer a comprehensive, multi-level perspective on critical aspects of science-industry relations and their potential impact, particularly in relation to emerging formats such as hybrid public research organizations and living labs. Some of these papers focus on the micro-level, considering individual engagement in science-industry collaboration (Nast et al., 2025; Owusu-Kwarteng et al., 2025; Ollila, 2025), others on the meso-level, exploring the organizational processes and mechanisms (Osorio et al., 2025; Lenfle and Le Masson, 2025; Clauss et al., 2024), and others on the macro-level, exploring the ecosystemic implications of interdisciplinary and intersectoral knowledge co-creation (Baum et al., 2025; abi Saad and Agogué, 2024; abu Sa'a and Asplund, 2025). The papers are summarized in Table 1.

4.1. Micro-level focus: individual academic engagement and identity work in science-industry collaboration

The three studies with a micro-level focus emphasize the crucial role of individuals in the processes and relationships that constitute the microfoundations of science-industry collaboration. These papers explore the dynamics of identity work, the impact of academic engagement on scientific productivity, and the specific challenges faced by female researchers in sub-Saharan Africa. By examining diverse contexts through various theoretical lenses, they underscore the multifaceted nature of science-industry collaboration and its implications for co-creating innovation, achieving scientific impact, and advancing gender equity.

The articles by Ollila (2025), Nast et al. (2025), and Owusu-Kwarteng et al. (2025) illustrate the pivotal role of individual agency in bridging academic and industrial contexts. While much research on academic engagement has focused on research productivity, Nast et al. (2025) demonstrate that university-industry collaborations can also enhance research quality, a key question in the academic engagement field (Perkmann et al., 2021). However, the three studies collectively highlight that the role of academic engagement in advancing science is contingent on specific conditions and overcoming certain barriers that the literature has yet to fully identify.

Nast et al. (2025) find that only particular types of collaboration—such as joint research as opposed to response-mode interactions—enhance research quality, extending on previous work by Callaert et al. (2015) on the strategic intent of academics in collaboration. They also note that highly renowned scientists are better positioned to capitalize on these dynamics, adding to the debate on the characteristics of successfully engaged academics (Perkmann et al., 2021) and the potential difficulties for early-career researchers (Plantec et al., 2023). Owusu-Kwarteng et al. (2025) and Ollila (2025) highlight challenges that the literature has barely addressed, demonstrating that successful university-industry collaborations are embedded in profound individual-level dynamics and experiences, and that changes in practice should be followed by new theorizing. Addressing an issue that the literature has largely overlooked, Ollila (2025) notes that navigation of the tension between scientific and industrial identities to instead forge a common identity is central to successful joint research experiences. Responding to calls for greater exploration of both academic engagement in developing economies and gender-related challenges, Owusu-Kwarteng et al. (2025) provide a critical perspective on how women experience academic engagement in male-dominated industries. They explore the specific barriers women face when seeking to collaborate with industry, shedding light on entrenched stereotypes and structural constraints.

4.2. Meso-level focus: processes and mechanisms for managing interdisciplinary science-industry collaboration

The three studies with a meso-level focus look in depth at the intricate processes and mechanisms underpinning the management of interdisciplinary science-industry collaborations. They offer a nuanced understanding of how strategic intent and formalization mechanisms shape collaboration trajectories and outcomes. By examining the historical and contemporary roles of innovation labs and the importance of fairness in university-industry partnerships, these papers provide valuable insights into the organizational dynamics that drive successful innovation and collaboration, often resulting in a 'double-impact' (Plantec et al., 2023) that benefits both academic and industrial performance.

Osorio et al. (2025), Lenfle and Le Masson (2025), and Clauss et al. (2024) each explore how organizational strategies and structures influence collaborative practices and outcomes, thus addressing calls (e.g., Narayanamurti and Odumosu, 2016; Zahra et al., 2018) for clearer frameworks to align fundamental science with commercial viability.

Specifically, Osorio et al. (2025) and Lenfle and Le Masson (2025) emphasize the critical role of strategic intent in fostering both scientific advancement and product development in distinct environments. Lenfle and Le Masson (2025) illustrate how before the 1950s, successful corporate labs maintained a bidirectional relationship between scientific inquiry and corporate strategy, each influencing and nourishing the other. This mechanism was a core driver of the simultaneous discovery and invention (SDI) model (Goldstein and Narayanamurti, 2018). In a different context, Osorio et al. (2025) focus on innovation labs that bridge science and industry, showing how strategic intent plays a dual role by either amalgamating diverse academic and industrial partners or safeguarding the ethos and objectives of fostering both innovation and scientific performance. Beyond strategic considerations, Clauss et al. (2024) support these findings by identifying a key organizational-level success factor, namely how perceptions of fairness in university-industry partnerships enhance trust and joint innovation, underscoring the importance of well-calibrated research governance structures aimed at promoting both scientific progress and commercial innovation. This approach paves the way for new theoretical perspectives on science-industry collaboration.

4.3. Macro-level focus: Co-creating and sharing knowledge in ecosystems and beyond

The three papers focusing on macro-level co-creation and knowledge sharing in ecosystems highlight the pivotal role of intermediaries in bridging academic research and practical application. These intermediaries, including technology transfer offices, innovation hubs, living labs, competence centers, and science parks, facilitate the transformation of scientific discoveries into marketable products and services (abi Saad and Agogué, 2024; Good et al., 2019; Johnson et al., 2023). Operating within a broader entrepreneurial ecosystem that includes universities, research institutions, industry partners, and government agencies, intermediaries foster collaboration, provide resources, and navigate regulatory landscapes to accelerate the commercialization of academic research, thereby driving economic growth and societal advancement. These studies underscore the interconnectedness of various stakeholders and the importance of a supportive entrepreneurial ecosystem in nurturing science-based innovation.

Baum et al. (2025), abi Saad and Agogué (2024), and abu Sa'a and Asplund (2025) all demonstrate how broader ecosystems and intermediary organizations facilitate interdisciplinary knowledge co-creation and dissemination in science-industry contexts. These studies respond to the growing interest in understanding how emerging intermediary platforms—such as living labs, interdisciplinary research centers, and structured networks—support open innovation and address broader societal challenges (George et al., 2016; Sharma et al., 2022; D'Este et al., 2019). By analyzing legitimacy-building mechanisms, living lab design typologies, and configurations of social capital in cross-industry knowledge sharing, these studies shed light on the conditions under which multi-stakeholder engagements thrive. abu Sa'a and Ystrom (2024) examine different living lab models and their potential to foster cross-industry and academic communities or identify new research and application opportunities. This often involves spanning interdisciplinary knowledge areas (IKAs) to drive innovation. Baum et al. (2025) illustrate that if IKA-based partnerships are to advance science and innovation for a community, specific actors (such as science communication specialists and non-IKA experts) are needed to establish legitimacy and secure strong university engagement. Their findings contribute to the literature by emphasizing the importance of boundary conditions in interdisciplinary science-industry collaborations (D'Este et al., 2019). Similarly, abu Sa'a and Asplund (2025) stress that an ecosystemic approach requires the construction of relational and cognitive social capital to facilitate abstract knowledge dissemination and encourage trust-based exchanges among industry partners through networking initiatives.

5. Future research agenda

Collectively, the nine studies included in this Special Issue advance existing theories on science-industry relations by detailing the interplay between micro-level engagement, meso-level organizational processes, and macro-level ecosystem impact. Drawing on insights from these papers, we shall now conclude this editorial by proposing a future research agenda, detailing four areas where further exploration is needed to broaden our understanding of contemporary science-industry relations.

5.1. Greater contextualization of Science–Industry interactions

While previous research has provided a strong foundation for observing science-industry interactions from a holistic perspective (e.g., Perkmann et al., 2021), further research should address the contextual specificities that can disrupt, intensify or otherwise influence these collaborations (Welter et al., 2016). Contextualization is not merely a methodological concern, for it establishes the foundation and scope for theory-building. Indeed, a better understanding of the different partners, backgrounds, spaces and methods involved in science-industry interactions would refine our knowledge of their processes and contingencies. Acknowledgment of the undoubted diversity of science-industry relations calls for new in-depth research around groups and settings whose unique specificities have been largely ignored until now—such as the roles of citizens and end-users (Beck et al., 2022), or how specific communities, intermediaries, or spaces influence and experience these collaborations (abi Saad and Agogué, 2024; abu Sa'a and Asplund, 2025; Osorio et al., 2025). Such perspectives would deepen our understanding of the societal impact of scientific research, and would also highlight the barriers to inclusive collaboration, opening new avenues for theory-building in this field. There is also a need to examine the potential "dark side" of science–industry interactions, perhaps drawing on agnotology (e.g., Pinto, 2017) to explore conflicts of interest, power asymmetries, and unintended consequences. Gender, diversity, and inclusion also require greater attention. Building on Owusu-Kwarteng et al. (2025), studies should investigate how local cultures, institutional norms, and policy frameworks shape opportunities and challenges for diverse individuals, especially beyond Western contexts.

5.2. New theoretical anchors for understanding Science–Industry interactions

If we are to move this field forward, we need to strengthen and expand the theoretical lenses we are using. One promising avenue is the issue of identity and agency, expanding on emerging insights (e.g., Ollila, 2025) to explore how personal motivations, perceptions and feelings, including fairness (Clauss et al., 2024) and collective identities, influence the direction and outcomes of collaborations. Another critical area concerns the temporal and evolutionary dimensions of science–industry engagements, addressing how governance structures, relations and motivations evolve over time and how priorities shift as collaborations mature (abu Sa'a and Asplund, 2025). Additionally, leadership and strategic alignment in corporate science remain underexplored, especially in firms pursuing double-impact models that balance fundamental research with commercial goals (Lenfle and Le Masson, 2025).

5.3. Tackling Grand Challenges through Science–Industry collaborations

Global challenges such as climate change, public health, and socioeconomic inequality add new urgency and complexity to science–industry collaborations. Despite their importance, research in this area remains scarce. Future studies should investigate ways to design and manage long-term, interdisciplinary engagements that align diverse incentives (e.g., Baum et al., 2025) while navigating the

often-competing priorities and conflicting goals of different stakeholders. We also note that new digital tools, such as AI platforms and shared data infrastructures, can reshape collaboration dynamics which can enable or complicate coordination and trust-building across disciplines. This may require new governance models or reconfigured partnerships that combine rigorous scientific inquiry with large-scale industrial problem-solving. Ongoing changes in policy, funding mechanisms, and open-science paradigms similarly call for closer attention to the evolving role of intermediaries such as Research and Technology Organizations and living labs, as well as mission-driven research initiatives. Study of how these structures catalyze or constrain meaningful advances will help clarify how science–industry collaborations can drive transformative solutions to some of the world's most pressing and complex problems.

5.4. Broadening methodological approaches

A deeper understanding of science–industry interactions requires expanding the range of research methods used to observe and theorize these collaborations. Future studies would benefit from comparative analyses across countries, organizational forms, and environments, as well as longitudinal and ethnographic approaches that capture and contrast how motivations, research outcomes, and applications evolve over time. Such work would shed light on the long-term effects of engagement, particularly in dynamic settings such as innovation labs (Ollila, 2025). Another crucial area is the development of new evaluation metrics and frameworks (Perkmann et al., 2021), which should be extended beyond individual achievements to capture the broader organizational and societal impacts of science–industry collaborations, including the effectiveness of specific training programs and funding models (Nast et al., 2025). By integrating quantitative, qualitative, and mixed-method approaches, scholars can offer richer insights into how corporate innovation practices and scientific fields co-evolve.

Although we acknowledge the richness of existing research on science-industry relations, the ongoing transformation of these relationships, the urgency of climate challenges, and the emergence of new intermediaries and landscapes are compelling scholars to double down in their efforts to produce fresh empirical insights, thus creating fertile ground for advancing and refining existing theories. As science-industry interactions continue to grow in complexity and impact, this field remains promising for future research, offering ample opportunities for both junior and senior scholars to deepen current understanding. However, additional interdisciplinary training is also needed to build common ground and enhance collaborative skills, supporting effective and inclusive science-industry collaboration.

CRediT authorship contribution statement

Anna Yström: Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Quentin Plantec:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Michel Ferrary:** Writing – review & editing, Writing – original draft. **Kristel Miller:** Writing – review & editing, Writing – original draft. **Michael Rennings:** Writing – review & editing, Writing – original draft. **David Sarpong:** Writing – review & editing, Writing – original draft.

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No data was used for the research described in the article.

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