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Open Innovation Adoption Barriers: A Multidimensional Meta-Synthesis and Contextual Prioritization Framework

ABSTRACT

The objective of this study was to systematically identify, synthesize, classify, and prioritize the barriers to open innovation adoption by developing an integrated multidimensional framework that explains the interrelated organizational, behavioral, structural, capability-based, inter-organizational, and institutional obstacles that hinder effective implementation of open innovation across diverse organizational contexts. This study employed a qualitative meta-synthesis design following the seven-step procedure proposed by Sandelowski and Barroso. A systematic search was conducted across Web of Science, Scopus, ScienceDirect, Google Scholar, and specialized innovation management journals. The search covered studies published between 2003 and 2025 and used combinations of keywords related to open innovation barriers, challenges, and resistance. An initial pool of 312 studies was identified and subjected to relevance screening, conceptual boundary assessment, and quality appraisal. Ultimately, 24 peer-reviewed empirical studies were retained for analysis. Data extraction and synthesis were performed through open coding, axial coding, and selective coding procedures. A qualitative prioritization matrix based on frequency of occurrence and depth of emphasis across studies was subsequently applied to determine the relative significance of identified barriers. The meta-synthesis revealed a comprehensive taxonomy consisting of six major dimensions and 26 subcategories of barriers to open innovation adoption. The six dimensions included cultural-behavioral, organizational-managerial, knowledge and capability, structural-process, inter-organizational and network, and institutional-environmental barriers. Qualitative prioritization demonstrated that the most critical barriers were resistance to external ideas (Not-Invented-Here syndrome), organizational risk aversion, structural rigidity, misaligned incentive systems, and weak absorptive capacity. The findings further indicated that barriers are highly interdependent and operate as a systemic configuration rather than as isolated constraints. Contextual analysis showed substantial variation across organizational settings: bureaucratic constraints dominated public organizations, resource limitations and skill deficits were particularly salient in SMEs, structural inertia and cultural resistance characterized large firms, and ecosystem weakness and inter-organizational mistrust were especially prominent in emerging economies. Overall, cultural and structural barriers emerged as the most influential constraints on successful open innovation adoption, exceeding the relative importance of technological factors. The study concludes that the successful adoption of open innovation depends primarily on overcoming deeply embedded cultural, organizational, and governance-related barriers rather than merely addressing technological challenges. The proposed multidimensional framework advances understanding of how barriers interact across organizational levels and provides a practical basis for prioritizing interventions.

Keywords: Open innovation; Adoption barriers; Meta-synthesis; Innovation management; Absorptive capacity; Organizational resistance

Introduction

Open innovation has become one of the most influential paradigms in contemporary innovation management because it challenges the traditional assumption that firms must rely primarily on internally generated ideas, technologies, and

capabilities. In contrast to closed innovation, open innovation emphasizes purposive knowledge flows across organizational boundaries and assumes that organizations can improve innovation outcomes by combining internal resources with external ideas, partners, technologies, and market opportunities. This shift has changed the way scholars and practitioners understand innovation strategy, because the organization is no longer viewed as a self-contained system but as part of a wider innovation ecosystem composed of customers, suppliers, competitors, universities, startups, public institutions, and digital platforms. The literature has therefore moved from treating openness as a peripheral managerial practice to recognizing it as a central strategic logic for value creation, competitiveness, and long-term adaptation [1-3]. Within this evolving research landscape, open innovation has been examined across multiple levels of analysis, including the individual, organizational, inter-organizational, ecosystem, and policy levels, which indicates both the richness of the field and the growing complexity of its implementation challenges [2].

The rise of open innovation has been accelerated by profound changes in the technological and competitive environment. Organizations increasingly face shorter product life cycles, more complex knowledge domains, rising research and development costs, and rapidly changing customer expectations. These pressures make it difficult for even large and resource-rich firms to rely entirely on internal innovation processes. Digital transformation has further intensified this shift by creating new channels for distributed collaboration, platform-based innovation, data-driven experimentation, and ecosystem-level value co-creation. Digital technologies have altered not only the tools used for innovation but also the structure of innovation itself, enabling more fluid interactions among heterogeneous actors and expanding the possibilities for external knowledge search and integration [4, 5]. Recent scholarship has also shown that open innovation and digital transformation are increasingly interconnected research streams, as digital platforms, artificial intelligence, big data, and networked infrastructures reshape how organizations access, share, and commercialize knowledge [6]. This interconnection is particularly visible in small and medium-sized enterprises, where digitalization can enhance openness, ambidexterity, and green innovation, while simultaneously introducing new capability demands and managerial tensions [7].

The strategic value of open innovation has been supported by studies linking openness to firm performance, competitive advantage, and innovation outcomes. Open innovation can improve organizational performance by expanding access to external knowledge, reducing internal development limitations, and creating opportunities for collaborative problem-solving. Evidence suggests that firms that are able to use open innovation effectively may strengthen their innovation performance and improve their market position, particularly when external knowledge is combined with internal knowledge management capabilities [8]. Knowledge management plays a decisive role in this relationship because external knowledge does not automatically generate value; it must be identified, acquired, interpreted, transferred, and applied within the organization. Studies on big data analytics capabilities and knowledge management show that firms benefit from data-driven and knowledge-based capabilities when these capabilities are aligned with performance objectives and organizational learning routines [9]. Similarly, research on multinational subsidiaries indicates that external sources can improve innovative performance when supported by knowledge management capabilities that enable organizations to absorb and exploit externally generated knowledge [10]. More recent work has further emphasized the role of strategic foresight and knowledge management in linking open innovation to new product development success, suggesting that openness must be accompanied by anticipatory thinking and structured knowledge processes [11]. In this sense, open innovation is not merely

an external search activity but a strategic capability that depends on the coordination of external relationships, internal learning, and performance-oriented innovation systems [12].

Despite its promise, open innovation is not automatically adopted or successfully implemented. A major paradox in the literature is that organizations often endorse the logic of openness while continuing to operate through closed innovation routines. Large firms may formally adopt open innovation practices, establish partnership programs, and declare openness as part of their innovation strategy, yet still fail to embed openness into decision-making structures, incentive systems, and everyday organizational behavior. This distinction between symbolic adoption and substantive implementation is important because open innovation can become a managerial label rather than a functioning organizational practice [13]. One of the most persistent behavioral barriers in this regard is the Not-Invented-Here syndrome, which reflects the tendency of individuals and groups to undervalue or reject knowledge that originates outside the organization. This syndrome is not simply a technical problem but a cognitive and behavioral pattern shaped by identity, professional pride, decision biases, and organizational routines [14]. The human side of open innovation is therefore central to understanding why some organizations remain resistant to external ideas even when such ideas are strategically valuable [15]. Recent research on silent resistance in organizational communication also suggests that resistance to openness may not always be explicit; it can be embedded in subtle communication patterns, delayed responses, passive opposition, and hidden reluctance to engage with external knowledge flows [16].

Another major challenge concerns the capabilities required to manage openness effectively. Open innovation requires more than willingness to collaborate; it requires the ability to sense external opportunities, select appropriate partners, manage inter-organizational relationships, and integrate external knowledge into internal innovation processes. From a dynamic capabilities perspective, open innovation depends on the firm's ability to sense, seize, and reconfigure resources across organizational boundaries [17]. Absorptive capacity is particularly important because organizations must be able to recognize the value of external knowledge, assimilate it, and apply it commercially or operationally. Without sufficient absorptive capacity, organizations may engage in partnerships without gaining meaningful innovation value. Absorptive capacity also operates as a microfoundation of organizational resilience, because organizations that can learn from external knowledge are better positioned to adapt to uncertainty, disruption, and environmental change [18]. In collaborative inbound open innovation, knowledge matching and project management are essential because organizations must not only find relevant external knowledge but also align that knowledge with internal needs, resources, and development processes [19]. These capability-related barriers show that openness is not a substitute for internal competence; rather, it increases the need for advanced internal learning, coordination, and integration mechanisms.

The adoption of open innovation is also shaped by broader technological, organizational, and sustainability-related transformation pressures. For example, the adoption of Industry 4.0 technologies in manufacturing faces multiple barriers, including technological uncertainty, resource limitations, organizational resistance, skill deficits, and institutional constraints [20]. These barriers are relevant to open innovation because Industry 4.0 environments often depend on collaboration among technology providers, manufacturers, data platforms, supply chain partners, and public institutions. Similarly, the integration of circular economy principles with Industry 4.0-enabled smart city systems demonstrates that innovation increasingly occurs within complex, multi-actor systems where technological, environmental, regulatory, and organizational factors interact [21]. Sustainability-oriented innovation adds further complexity, as organizations must align openness with environmental goals,

stakeholder expectations, and long-term value creation. Research on green supply chain management shows that sustainability transitions require organizational commitment, supplier collaboration, technological capability, and supportive institutional conditions [22]. These insights imply that barriers to open innovation cannot be understood only at the level of the individual firm; they must also be examined within broader systems of production, regulation, sustainability, and technological change.

The contemporary relevance of open innovation is also reflected in its growing connection to corporate social responsibility, green innovation, renewable energy transitions, and inclusive economic development. Open innovation can improve corporate social responsibility performance by enabling firms to access diverse external knowledge, collaborate with stakeholders, and develop solutions that respond to social and environmental challenges [23]. In this respect, open innovation has moved beyond a narrow focus on product development and has become part of wider debates on responsible innovation, sustainability, and societal value creation. At the same time, the relationship between technological innovation and broader socioeconomic outcomes is complex. Research on renewable energy and technological innovation in the South African economy shows that innovation processes are embedded in labor market structures and may have differentiated effects across gender-specific employment patterns [24]. This reinforces the need to examine the institutional and social conditions under which open innovation is adopted and implemented. When open innovation is connected to green transformation, digitalization, and inclusive development, barriers such as weak ecosystems, low trust, inadequate capabilities, and institutional uncertainty become even more consequential.

Although the open innovation literature has grown substantially, research on the barriers to open innovation adoption remains fragmented. Existing studies have identified diverse obstacles, including cultural resistance, weak absorptive capacity, inter-organizational mistrust, intellectual property concerns, structural rigidity, lack of managerial support, resource constraints, and institutional uncertainty. However, these barriers are often examined separately, within specific sectors, organizational types, or national contexts. As a result, the literature lacks an integrated framework that classifies barriers systematically and distinguishes between barriers that are frequently mentioned and those that are strategically consequential. This gap is important because managers and policymakers cannot address all barriers with equal urgency. They need a prioritized understanding of which barriers most strongly obstruct adoption and how these barriers interact across cultural, managerial, structural, capability-based, relational, and institutional levels. The continued expansion of open innovation research, especially in relation to digital transformation and ecosystem-based innovation, makes such synthesis increasingly necessary [3, 6].

A multidimensional synthesis is particularly needed because open innovation barriers rarely operate in isolation. Cultural resistance may reinforce structural rigidity; weak absorptive capacity may increase mistrust of external partners; unclear intellectual property arrangements may intensify risk aversion; and misaligned incentive systems may prevent employees from engaging in boundary-spanning activities. Therefore, the adoption of open innovation should be understood as a systemic organizational and institutional challenge rather than a simple matter of accessing external ideas. A comprehensive framework must capture the interaction between internal culture, managerial systems, knowledge capabilities, organizational processes, network relationships, and external institutional conditions. Such a framework can help explain why some organizations move from symbolic openness to substantive open innovation, while others remain trapped in closed

routines despite formal commitments to collaboration. It can also support more effective managerial and policy interventions by identifying the barriers that should be prioritized in different organizational and institutional contexts.

Therefore, the aim of this study is to systematically identify, synthesize, classify, and prioritize the barriers to open innovation adoption through a multidimensional meta-synthesis and qualitative prioritization framework.

Methodology

This study employed a qualitative meta-synthesis design to systematically identify, synthesize, classify, and prioritize the barriers to open innovation adoption reported in the scholarly literature. Meta-synthesis was selected because it enables the integration of findings from diverse qualitative and mixed-method studies into a higher-order conceptual framework while preserving the contextual richness of the original research. The study followed the seven-step meta-synthesis procedure proposed by Sandelowski and Barroso, which provides a rigorous methodological approach for synthesizing qualitative evidence and generating theoretically meaningful interpretations from previously published studies. The temporal scope of the review extended from 2003, corresponding to the publication of Chesbrough's foundational work on open innovation, through 2025, thereby capturing the complete evolution of scholarly discussions regarding barriers to open innovation adoption.

The sample consisted of peer-reviewed empirical studies examining obstacles, challenges, resistance factors, or barriers associated with the implementation of open innovation practices. A systematic search strategy was conducted across the Web of Science, Scopus, and ScienceDirect databases. To ensure comprehensive coverage of the literature, supplementary searches were performed through Google Scholar and leading innovation management journals. Search terms included combinations of "open innovation" with keywords such as "barrier," "challenge," and "resistance." The initial search yielded 312 studies. Following the removal of studies that focused exclusively on open innovation outcomes, benefits, or enabling factors without explicitly examining barriers, a second screening stage was conducted to exclude studies that were not conceptually grounded within the open innovation paradigm. The remaining studies were subjected to a quality appraisal process that evaluated methodological transparency, analytical rigor, and conceptual coherence. This multi-stage selection procedure resulted in a final sample of 24 studies, which constituted the analytical corpus for the meta-synthesis.

Data collection was performed through a structured literature review protocol and qualitative evidence extraction framework. The primary source of data consisted of published empirical studies addressing barriers to open innovation adoption across different organizational settings, including small and medium-sized enterprises, large corporations, public organizations, and institutions operating in both developed and emerging economies. Rather than collecting primary survey or interview data, the study treated the findings of previously published research as the unit of analysis. This approach allowed the synthesis of accumulated scholarly knowledge across diverse contexts and methodological traditions.

A standardized extraction framework was developed to ensure consistency during the collection of qualitative evidence from the selected studies. Information related to organizational, behavioral, managerial, structural, relational, and institutional barriers was systematically extracted from each article. The extraction process focused on explicit descriptions of barriers as well as implicit references to challenges that hindered open innovation implementation. Particular attention was given to identifying recurring concepts, contextual conditions, and explanatory mechanisms discussed by the original authors. Extracted data were organized and documented in an evidence matrix that facilitated cross-study comparison and

thematic integration. The framework enabled the researchers to preserve the conceptual meaning of each barrier while allowing the development of higher-level analytical categories through iterative interpretation and synthesis.

Data analysis was conducted using a three-stage coding process consisting of open coding, axial coding, and selective coding. During the open coding stage, all statements, concepts, and findings related to barriers to open innovation adoption were extracted verbatim from the selected studies. This initial phase generated a broad pool of codes representing the diverse ways in which barriers were described across the literature. The objective of this stage was to maximize conceptual sensitivity and avoid imposing predefined categories on the data.

In the axial coding stage, the extracted codes were systematically compared and grouped according to conceptual similarities and relationships. Through constant comparison and iterative refinement, related codes were clustered into broader thematic categories. This analytical process resulted in the identification of six overarching dimensions of barriers: cultural-behavioral barriers, organizational-managerial barriers, knowledge and capability barriers, structural-process barriers, inter-organizational and network barriers, and institutional-environmental barriers. The categorization process facilitated the development of a coherent and comprehensive framework that captured both the diversity and interconnectedness of barriers reported across the literature.

The final stage involved selective coding, during which relationships among the six dimensions were examined to develop a systemic understanding of barrier interdependencies. This stage focused on identifying how barriers reinforced one another and how conditions at one level of analysis influenced barriers at other levels. To complement the thematic synthesis, a qualitative prioritization procedure was employed. Each identified barrier was evaluated according to its frequency of occurrence across the selected studies and the depth of emphasis assigned to it by original authors. Barriers that appeared consistently and were described as critical impediments received higher priority rankings. The prioritization process enabled the identification of the most consequential barriers to open innovation adoption while maintaining consistency with the interpretive nature of qualitative meta-synthesis. The final analysis produced an integrated framework comprising six major dimensions and twenty-six subcategories of barriers, together with a qualitative hierarchy reflecting their relative importance across organizational contexts.

Findings and Results

Before presenting the thematic findings, the profile of the reviewed studies was examined to clarify the scope and composition of the evidence base. Since this research was conducted as a qualitative meta-synthesis, the “sample” did not consist of individual participants but of previously published empirical studies that investigated barriers to the adoption and implementation of open innovation. The initial literature search yielded 312 records from Web of Science, Scopus, ScienceDirect, Google Scholar, and specialized innovation management journals. After the first screening stage, studies that focused only on the benefits, outcomes, or drivers of open innovation without directly examining barriers were excluded, leaving 227 studies. In the second screening stage, studies that were not explicitly grounded in the open innovation paradigm or were more accurately related to adjacent fields such as strategic alliances or general inter-firm collaboration were removed, reducing the corpus to 89 studies. The remaining studies were subjected to methodological and conceptual quality appraisal based on data transparency, analytical coherence, and relevance to the research question. This process resulted in a final analytical sample of 24 studies. The reviewed studies covered a wide range of organizational contexts, including small

and medium-sized enterprises, large corporations, public organizations, and firms operating in developed and emerging economies. This diversity enabled the study to identify both general barriers that appear across organizational settings and context-sensitive barriers that become more salient under specific institutional, structural, or resource conditions.

Table 1

Final Classification of Barriers to Open Innovation Adoption

Dimension	Subcategory of Barrier	Conceptual Description
Cultural-Behavioral Barriers	Not-Invented-Here syndrome	A tendency to reject or undervalue external ideas because they originate outside the organization, even when such ideas are relevant, useful, or superior to internal alternatives.
Cultural-Behavioral Barriers	Organizational risk aversion	A reluctance to engage in open collaboration due to uncertainty, perceived vulnerability, and fear of losing control over innovation outcomes.
Cultural-Behavioral Barriers	Fear of losing intellectual control	Concern that external collaboration may expose proprietary knowledge, weaken ownership over ideas, or reduce the organization's control over innovation outputs.
Cultural-Behavioral Barriers	Weak collaboration culture	The absence of shared norms, values, and behavioral expectations that support cooperation with external actors.
Cultural-Behavioral Barriers	Internal knowledge bias	A systematic preference for internally generated knowledge, capabilities, and solutions over externally sourced knowledge.
Organizational-Managerial Barriers	Lack of sustained top-management support	Inconsistent or weak commitment from senior leadership, resulting in insufficient strategic guidance, resources, and legitimacy for open innovation initiatives.
Organizational-Managerial Barriers	Strategic misalignment	Poor integration of open innovation activities with the broader organizational strategy, innovation objectives, and competitive priorities.
Organizational-Managerial Barriers	Misaligned incentive systems	Reward and evaluation systems that continue to prioritize internal innovation outputs while failing to encourage external knowledge search, collaboration, and boundary-spanning work.
Organizational-Managerial Barriers	Weak boundary-spanning leadership	Limited managerial capacity to identify, approach, coordinate, and sustain productive relationships with external partners.
Knowledge and Capability Barriers	Weak absorptive capacity	Insufficient ability to recognize, assimilate, transform, and exploit external knowledge for organizational innovation purposes.
Knowledge and Capability Barriers	Poor partner evaluation capability	Limited ability to assess the relevance, reliability, strategic fit, and knowledge value of potential external partners.
Knowledge and Capability Barriers	Weak knowledge management	Inadequate systems, routines, and processes for capturing, codifying, transferring, and applying knowledge obtained through external collaboration.
Knowledge and Capability Barriers	Skill gaps	Deficiencies in technical, managerial, relational, or communication skills needed to manage open innovation effectively.
Knowledge and Capability Barriers	Digital literacy deficits	Limited capacity to participate in digitally mediated open innovation platforms, data-sharing systems, and technology-enabled innovation ecosystems.
Structural-Process Barriers	Structural rigidity	Hierarchical, siloed, or inflexible organizational structures that restrict rapid decision-making, cross-unit coordination, and adaptive collaboration.
Structural-Process Barriers	Process complexity and slowness	Lengthy approval, contracting, procurement, legal, or administrative procedures that delay or discourage external collaboration.
Structural-Process Barriers	Lack of formal open innovation mechanisms	Absence of defined roles, procedures, protocols, governance structures, or institutionalized routines for managing open innovation activities.
Structural-Process Barriers	Resource constraints	Limited financial, human, technological, or time resources available to support open innovation processes and partnerships.
Inter-Organizational and Network Barriers	Inter-organizational mistrust	Lack of confidence in external partners' intentions, reliability, fairness, or commitment to shared innovation goals.
Inter-Organizational and Network Barriers	Misalignment of goals between partners	Divergence in innovation objectives, commercialization expectations, time horizons, risk tolerance, or strategic interests among collaborating organizations.
Inter-Organizational and Network Barriers	Weak collaboration governance	Insufficient rules, accountability mechanisms, decision rights, conflict-resolution procedures, and coordination structures for managing inter-organizational collaboration.
Inter-Organizational and Network Barriers	Network coordination difficulty	Challenges in aligning multiple actors, resources, expectations, and activities within complex innovation networks or ecosystems.
Inter-Organizational and Network Barriers	Intellectual property sharing concerns	Concerns regarding ownership, appropriation, leakage, or misuse of knowledge and intellectual property in collaborative innovation arrangements.
Institutional-Environmental Barriers	Ambiguous intellectual property regimes	Unclear, inconsistent, or weak legal frameworks governing ownership, protection, and commercialization of jointly developed knowledge.
Institutional-Environmental Barriers	Bureaucratic and legal constraints	Regulatory, administrative, procurement, and compliance requirements that restrict flexibility and increase the burden of open innovation implementation.
Institutional-Environmental Barriers	Weak ecosystem support	Underdeveloped intermediary institutions, innovation hubs, technology-transfer mechanisms, industry associations, and public support systems needed to facilitate open innovation.

Table 1 presents the final classification of barriers to open innovation adoption derived from the meta-synthesis. The analysis resulted in six major dimensions and 26 subcategories. The largest and most conceptually prominent group of barriers was the cultural-behavioral dimension, which included Not-Invented-Here syndrome, risk aversion, fear of losing

intellectual control, weak collaboration culture, and internal knowledge bias. These barriers show that resistance to open innovation is deeply embedded in organizational mindsets, professional identities, and informal norms. The organizational-managerial dimension revealed that leadership commitment, strategic alignment, incentive systems, and boundary-spanning capabilities are essential for translating openness from a strategic slogan into an operational practice. The knowledge and capability dimension demonstrated that organizations cannot benefit from external knowledge unless they possess the internal capacity to recognize, interpret, absorb, and apply that knowledge. The structural-process dimension showed that rigid hierarchies, slow administrative routines, lack of formal open innovation mechanisms, and resource constraints can obstruct collaboration even when the organization is willing to engage externally. The inter-organizational and network dimension emphasized that open innovation depends not only on internal readiness but also on trust, goal alignment, collaboration governance, coordination capacity, and intellectual property arrangements between partners. Finally, the institutional-environmental dimension indicated that organizations are influenced by the broader legal, regulatory, and ecosystem conditions in which they operate. Overall, the table demonstrates that open innovation adoption is constrained by a multilayered system of barriers rather than by a single managerial, technical, or structural problem.

Table 2

Qualitative Prioritization Matrix of Open Innovation Adoption Barriers

Barrier	Dominant Dimension	Frequency Across Reviewed Studies	Severity of Impact	Overall Qualitative Priority
Not-Invented-Here syndrome	Cultural-Behavioral	Very high	Very high	Critical
Organizational risk aversion	Cultural-Behavioral	Very high	Very high	Critical
Structural rigidity	Structural-Process	High	Very high	Critical
Misaligned incentive systems	Organizational-Managerial	High	Very high	Critical
Weak absorptive capacity	Knowledge and Capability	High	Very high	Critical
Lack of sustained top-management support	Organizational-Managerial	High	High	High
Weak collaboration culture	Cultural-Behavioral	High	High	High
Fear of losing intellectual control	Cultural-Behavioral	High	High	High
Inter-organizational mistrust	Inter-Organizational and Network	High	High	High
Intellectual property sharing concerns	Inter-Organizational and Network	High	High	High
Weak knowledge management	Knowledge and Capability	Moderate to high	High	High
Resource constraints	Structural-Process	Moderate to high	High	High
Strategic misalignment	Organizational-Managerial	Moderate	High	Moderate to high
Poor partner evaluation capability	Knowledge and Capability	Moderate	High	Moderate to high
Process complexity and slowness	Structural-Process	Moderate	High	Moderate to high
Lack of formal open innovation mechanisms	Structural-Process	Moderate	High	Moderate to high
Misalignment of goals between partners	Inter-Organizational and Network	Moderate	High	Moderate to high
Weak collaboration governance	Inter-Organizational and Network	Moderate	High	Moderate to high
Ambiguous intellectual property regimes	Institutional-Environmental	Moderate	High	Moderate to high
Bureaucratic and legal constraints	Institutional-Environmental	Moderate	Moderate to high	Moderate
Weak ecosystem support	Institutional-Environmental	Moderate	Moderate to high	Moderate
Weak boundary-spanning leadership	Organizational-Managerial	Moderate	Moderate	Moderate
Internal knowledge bias	Cultural-Behavioral	Moderate	Moderate	Moderate
Skill gaps	Knowledge and Capability	Moderate	Moderate	Moderate
Network coordination difficulty	Inter-Organizational and Network	Context-specific	Moderate to high	Context-specific
Digital literacy deficits	Knowledge and Capability	Context-specific	Moderate	Context-specific

Table 2 presents the qualitative prioritization matrix, which was developed by considering both the frequency with which each barrier appeared across the reviewed studies and the depth of emphasis given to that barrier in the original literature. The results show that the most critical barriers were Not-Invented-Here syndrome, organizational risk aversion, structural rigidity, misaligned incentive systems, and weak absorptive capacity. These five barriers were positioned at the highest level

because they appeared consistently across the reviewed literature and were repeatedly described as foundational constraints on the adoption of open innovation. Their critical position indicates that the most severe obstacles are not primarily technological. Instead, they are rooted in culture, cognition, internal governance, organizational architecture, and learning capability. Not-Invented-Here syndrome and risk aversion restrict openness at the behavioral and attitudinal level by shaping how organizational members perceive external knowledge. Structural rigidity and misaligned incentives transform this resistance into organizational routines by maintaining closed patterns of decision-making, evaluation, and reward. Weak absorptive capacity then limits the organization's ability to benefit from external knowledge even when collaboration formally occurs. Barriers classified as high priority, such as lack of sustained top-management support, weak collaboration culture, fear of losing intellectual control, inter-organizational mistrust, intellectual property concerns, weak knowledge management, and resource constraints, were also influential but appeared either with slightly less centrality or with stronger contextual dependence. Moderate and context-specific barriers were still important, but their influence varied more strongly according to organizational type, sector, size, and institutional environment. Overall, the prioritization matrix demonstrates that effective open innovation adoption requires a sequenced intervention strategy that first addresses cultural resistance, incentive alignment, structural flexibility, and absorptive capacity before focusing on more specialized relational, procedural, or technological barriers.

Discussion and Conclusion

The present study aimed to systematize the barriers to open innovation adoption by synthesizing, classifying, and prioritizing evidence from the literature through a multidimensional meta-synthesis framework. The findings showed that barriers to open innovation are not isolated, linear, or merely technical obstacles; rather, they form a complex configuration of cultural-behavioral, organizational-managerial, knowledge and capability, structural-process, inter-organizational and network, and institutional-environmental constraints. The final classification identified six major dimensions and 26 subcategories, demonstrating that open innovation adoption is shaped by interacting forces at multiple levels of analysis. This result is consistent with the broader evolution of open innovation research, which has increasingly emphasized that openness is not a single practice but a multidimensional strategic orientation involving people, knowledge flows, governance mechanisms, ecosystems, and institutional conditions [1-3]. The findings also align with the view that open innovation has matured from a relatively narrow model of external knowledge sourcing into a broader strategic and organizational phenomenon that requires coordinated capabilities, managerial alignment, and contextual sensitivity [13, 17].

The first major finding was that cultural-behavioral barriers emerged as one of the most central and frequently emphasized dimensions. In particular, the Not-Invented-Here syndrome, organizational risk aversion, fear of losing intellectual control, weak collaboration culture, and internal knowledge bias were identified as persistent barriers to open innovation adoption. This finding indicates that one of the most powerful constraints on openness is not the absence of external knowledge but the unwillingness or inability of organizational actors to recognize its value. The prominence of Not-Invented-Here syndrome is strongly supported by previous research showing that internal attitudes, decision biases, and professional identities can lead employees and managers to reject externally generated knowledge even when it is relevant and potentially valuable [14]. Similarly, the finding that collaboration culture and employee-level openness are central to adoption is consistent with evidence that the human side of open innovation, including employee diversity, motivation, and internal attitudes toward

external knowledge, plays a decisive role in firm-level openness [15]. Therefore, open innovation should not be understood merely as a strategic decision made by top management; it must also be internalized as a behavioral and cultural orientation throughout the organization.

The second important finding concerned organizational-managerial barriers, particularly lack of sustained top-management support, strategic misalignment, misaligned incentive systems, and weak boundary-spanning leadership. These barriers explain why organizations may formally adopt open innovation but fail to implement it substantively. When leadership commitment is episodic, when open innovation is disconnected from competitive strategy, or when employees are rewarded primarily for internally generated outcomes, openness remains symbolic rather than operational. This result supports earlier findings that large firms may adopt open innovation practices in formal terms while still struggling to embed them deeply into organizational routines and governance systems [13]. It also aligns with the dynamic capabilities perspective, which argues that open innovation requires managerial capacity to sense external opportunities, seize them through appropriate organizational arrangements, and reconfigure internal structures and processes to exploit them effectively [17]. From this perspective, misaligned incentives and weak leadership are not secondary administrative problems; they are central implementation barriers because they determine whether external collaboration becomes an institutionalized organizational practice or remains a fragmented initiative.

The third major finding showed that knowledge and capability barriers, especially weak absorptive capacity, poor partner evaluation capability, weak knowledge management, skill gaps, and digital literacy deficits, are critical in explaining why access to external knowledge does not automatically translate into innovation value. Weak absorptive capacity was among the highest-priority barriers in the qualitative prioritization matrix. This finding confirms that open innovation depends on internal learning capability as much as external collaboration. Organizations must be able to identify useful external knowledge, evaluate its relevance, integrate it into internal processes, and apply it to innovation outcomes. This result is consistent with the argument that absorptive capacity constitutes a microfoundation of organizational resilience because it allows organizations to learn from external sources and adapt to environmental uncertainty [18]. It is also supported by research on collaborative inbound open innovation, which shows that knowledge matching and project management are essential for integrating external knowledge into internal innovation processes [19]. In addition, studies on knowledge management and firm performance show that organizations require structured knowledge management capabilities to transform data, information, and external knowledge into performance outcomes [9, 10]. Therefore, openness without absorptive and knowledge management capability may increase coordination costs without generating meaningful innovation returns.

The fourth major finding was that structural-process barriers, including structural rigidity, process complexity and slowness, lack of formal open innovation mechanisms, and resource constraints, substantially limit open innovation adoption. Structural rigidity was one of the most critical barriers identified in the prioritization analysis, indicating that open innovation cannot be successfully implemented in organizations whose structures are designed for closed, hierarchical, and siloed knowledge management. This result is consistent with the digital transformation literature, which shows that organizational change requires not only technological adoption but also structural adaptation, process redesign, and strategic transformation [5]. Similar patterns are visible in studies of Industry 4.0 adoption, where barriers are not limited to technology but include organizational inertia, resource constraints, skills shortages, and institutional difficulties [20]. These parallels

suggest that open innovation adoption, like digital transformation, requires reconfiguration of organizational processes and decision structures. Without flexible procedures, cross-functional communication, and formal mechanisms for managing collaboration, organizations may be unable to respond quickly to external opportunities or sustain productive partnerships.

The fifth major finding related to inter-organizational and network barriers. Inter-organizational mistrust, misalignment of goals between partners, weak collaboration governance, network coordination difficulty, and intellectual property sharing concerns were identified as major constraints on open innovation adoption. This result demonstrates that open innovation is inherently relational: its success depends not only on the focal organization's internal readiness but also on the quality of interaction among partners. Goal misalignment and mistrust can reduce knowledge sharing, increase transaction costs, and weaken the durability of collaborative relationships. This finding is consistent with research emphasizing that open innovation involves multiple actors and levels of analysis, including networks, platforms, and ecosystems [2, 4]. It also aligns with recent studies linking open innovation to digital transformation, where platform-based and ecosystem-based collaboration creates new opportunities but also intensifies governance complexity, coordination demands, and data-related uncertainty [6, 7]. In this sense, inter-organizational barriers should be interpreted as governance barriers: they arise when organizations lack the relational architecture required to coordinate knowledge exchange, protect shared interests, and maintain trust across organizational boundaries.

The sixth finding concerned institutional-environmental barriers, including ambiguous intellectual property regimes, bureaucratic and legal constraints, and weak ecosystem support. These barriers were especially salient in contexts where legal protections, innovation intermediaries, technology-transfer mechanisms, and ecosystem infrastructures were underdeveloped. This finding is consistent with research showing that open innovation increasingly unfolds within broader systems of digital transformation, sustainability, and socio-economic development rather than within isolated firm boundaries [4, 6]. It also resonates with studies on circular economy, smart cities, and green supply chain management, which show that complex innovation systems require coordination among multiple actors, supportive institutions, regulatory clarity, and sustainability-oriented collaboration [21, 22]. In addition, the connection between open innovation and corporate social responsibility indicates that organizations increasingly use external collaboration to address social and environmental objectives, making institutional conditions and stakeholder ecosystems more important than ever [23]. The finding that weak ecosystem support constrains adoption therefore confirms that open innovation is not simply a firm-level capability; it is also an ecosystem-level phenomenon shaped by policy, regulation, trust, infrastructure, and institutional maturity.

The prioritization results further showed that the most consequential barriers were Not-Invented-Here syndrome, organizational risk aversion, structural rigidity, misaligned incentive systems, and weak absorptive capacity. This hierarchy has important theoretical and practical implications. It shows that the most binding constraints on open innovation are cultural, structural, and capability-based rather than purely technological. This result aligns with prior research demonstrating that successful innovation and competitive advantage depend on the integration of strategy, performance systems, innovation capability, and organizational learning [12]. It also supports the argument that strategic foresight and knowledge management are essential drivers of new product development success in open innovation contexts [11]. The high priority assigned to risk aversion and silent resistance also corresponds with recent work showing that resistance in organizational communication may remain hidden, indirect, and difficult to detect, yet still strongly affect open innovation dynamics [16]. Thus, the prioritization findings suggest that managers should not begin open innovation implementation only by investing

in digital platforms or external partnerships; they must first diagnose whether internal attitudes, incentive structures, organizational routines, and absorptive capacities are capable of supporting openness.

The contextual findings showed that barrier profiles differ across public organizations, SMEs, large firms, emerging economies, developed economies, and digitally mediated innovation ecosystems. Public organizations were more strongly affected by bureaucratic constraints and procedural slowness, SMEs by resource limitations and skill gaps, large firms by structural inertia and cultural resistance, emerging economies by weak ecosystem support and mistrust, and digital ecosystems by digital capability, data governance, and coordination challenges. These results are consistent with the broader literature showing that innovation barriers are context-dependent and shaped by organizational size, sectoral characteristics, technological intensity, and institutional environment [5, 20]. The findings also align with studies showing that digitalization, open innovation, ambidexterity, and green innovation interact differently across SMEs depending on their resources, capabilities, and ecosystem conditions [7]. Furthermore, research on technological innovation and renewable energy in the South African economy illustrates that innovation processes are embedded in wider social and labor-market structures, reinforcing the importance of context-sensitive analysis [24]. Therefore, a universal list of barriers is insufficient; organizations need a diagnostic framework that identifies which barriers are most binding in their specific setting.

Overall, the results of this study contribute to the open innovation literature by moving beyond fragmented lists of barriers toward an integrated and prioritized framework. The study confirms that open innovation adoption is a systemic challenge involving cultural readiness, leadership alignment, knowledge capability, structural flexibility, relational governance, and institutional support. This interpretation is consistent with the established open innovation literature, which has increasingly called for multilevel, dynamic, and ecosystem-oriented perspectives [1-3]. The findings also extend this literature by showing that the most critical adoption barriers are mutually reinforcing. For example, weak intellectual property regimes can intensify risk aversion; risk aversion can strengthen Not-Invented-Here attitudes; misaligned incentives can reproduce structural rigidity; and weak absorptive capacity can deepen mistrust by reducing the organization's ability to evaluate partners effectively. Therefore, successful open innovation adoption requires systemic intervention rather than isolated corrective actions. Organizations must simultaneously reshape culture, align incentives, build absorptive capacity, redesign processes, and develop external governance mechanisms if they seek to move from symbolic openness to substantive innovation collaboration.

This study has several limitations that should be considered when interpreting its findings. First, the study was based on a qualitative meta-synthesis of previously published research; therefore, its conclusions are dependent on the scope, quality, and availability of the studies included in the final corpus. Although the search and screening procedures were systematic, publication bias may have affected the evidence base, as studies reporting significant or highly visible barriers are more likely to be published than studies reporting weak, inconsistent, or context-specific findings. Second, the prioritization framework was qualitative rather than statistical. While this approach was appropriate for synthesizing heterogeneous qualitative and mixed-method evidence, it does not produce numerical weights that can be generalized across all sectors or national contexts. Third, the included studies varied in design, sample characteristics, sectoral focus, and geographical setting, which may have influenced how barriers were reported and emphasized. Finally, because the study synthesized existing evidence rather than collecting longitudinal primary data, it could identify relationships and interdependencies among barriers but could not directly test causal pathways or temporal changes in barrier salience.

Future research should empirically validate the proposed multidimensional classification and prioritization framework using primary data from different organizational and institutional contexts. Quantitative studies could test the relative influence of the identified barriers on open innovation adoption, innovation performance, and collaboration outcomes across sectors and countries. Multi-criteria decision-making methods such as AHP, DEMATEL, ISM, or structural equation modeling could be used to assign weights to the barriers and examine causal relationships among them. Longitudinal studies are also needed to investigate how barriers evolve as organizations gain experience with open innovation, develop absorptive capacity, or undergo digital transformation. Comparative studies between SMEs and large firms, public and private organizations, developed and emerging economies, and traditional and digitally mediated innovation ecosystems would help clarify how contextual conditions shape barrier profiles. Future research should also examine hidden and informal forms of resistance, including passive non-cooperation, communication avoidance, and symbolic compliance, because such mechanisms may explain why formally adopted open innovation initiatives often fail to produce substantive organizational change.

Managers should approach open innovation adoption as a systemic organizational transformation rather than as a discrete partnership or technology initiative. Before launching open innovation programs, organizations should assess cultural readiness, internal attitudes toward external knowledge, incentive structures, leadership commitment, absorptive capacity, and collaboration governance mechanisms. Particular attention should be given to reducing Not-Invented-Here attitudes, improving tolerance for external uncertainty, and aligning performance evaluation systems with collaborative behaviors. Organizations should invest in knowledge management systems, partner evaluation routines, boundary-spanning roles, and training programs that strengthen the ability to identify, absorb, and apply external knowledge. SMEs should be supported through shared platforms, intermediary institutions, and capability-building programs, while large firms should prioritize structural flexibility and cultural change. Public organizations and policymakers should reduce unnecessary bureaucratic complexity, clarify intellectual property rules, and strengthen innovation ecosystems through technology-transfer offices, innovation hubs, and trusted collaboration platforms. Most importantly, practitioners should recognize that open innovation succeeds when openness is embedded in culture, structure, capability, and governance at the same time.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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