

DOI: 10.5281/zenodo.121126342

DETERMINANTS OF GREENFIELD VS. M&A INVESTMENT AND THEIR BIFURCATED IMPACTS ON ECONOMIC GROWTH AND ENVIRONMENTAL QUALITY: A SYSTEMATIC REVIEW AND STRUCTURAL TOPIC MODEL

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Received: 01/12/2025
Accepted: 02/01/2026

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ABSTRACT

This study systematically investigates the distinct determinants and bifurcated impacts of greenfield investments versus mergers and acquisitions (M&A) on economic growth and environmental quality, addressing the persistent aggregation of foreign direct investment (FDI) as a homogeneous construct. Employing a hybrid methodology integrating Systematic Literature Review (SLR) following PRISMA 2020 guidelines with Structural Topic Modeling (STM), this study analysed 126 peer-reviewed documents from the Scopus database published between 2015 and 2025. The STM analysis identified four distinct thematic clusters: Cross-Border M&A and Institutional Distance (29.8%), Greenfield FDI and Economic Development (13.7%), Green Innovation and Carbon Policy (30.6%), and ESG Performance and Sustainable Investment (25.8%). The findings reveal a significant paradigm shift in FDI scholarship, with ESG-focused research surging from 0% to 31.6% between the early (2016–2020) and recent (2023–2025) periods. Results demonstrate that the pollution haven and pollution halo hypotheses exhibit contingent validity across entry modes, with M&A more susceptible to regulatory arbitrage while greenfield investments facilitate technology transfer and cleaner production. Importantly, institutional quality emerges as a critical moderating variable conditioning FDI-environment relationships. This study contributes an integrative conceptual framework explicating how institutional quality moderates the relationships between FDI entry modes, their determinants, and Triple Bottom Line outcomes, providing evidence-based policy recommendations for optimising sustainable investment strategies in both developed and developing economies.

KEYWORDS: Foreign direct investment; Greenfield investment; Cross-border M&A; Institutional quality; Environmental sustainability

1. INTRODUCTION

The global foreign direct investment landscape has undergone profound transformation in recent decades, with cross-border capital flows increasingly shaped by the dual imperatives of economic competitiveness and environmental sustainability (Khan et al., 2025a). Foreign direct investment enters host economies through two principal modalities: greenfield investments, which involve the establishment of entirely new productive facilities, and mergers and acquisitions, which entail the purchase of existing enterprises (Xie et al., 2017). While conventional scholarship has predominantly treated these entry modes as interchangeable components of aggregate FDI flows, mounting evidence suggests that greenfield investments and acquisitions represent fundamentally heterogeneous strategic decisions with divergent implications for host country development trajectories (Kushawaha, 2025; Zvezdanovic Lobanova et al., 2016). Greenfield investments typically generate employment and physical capital formation but consume land and natural resources, whereas mergers and acquisitions preserve existing infrastructure yet may engender market concentration and rent-seeking behaviour (Castro Gama et al., 2025). This fundamental distinction carries profound implications for policymakers navigating the increasingly complex terrain of sustainable development.

The determinants influencing multinational enterprises' choice between greenfield and acquisition modes have evolved substantially in the contemporary investment environment. Traditional factors including market size, labour costs, and natural resource endowments continue to shape location decisions, yet institutional quality has emerged as a pivotal consideration governing cross-border investment pattern (Zvezdanovic Lobanova et al., 2016). The seminal review by (Xie et al., 2017) consolidated evidence demonstrating that host country institutional frameworks encompassing financial market development, regulatory quality, political stability, and corruption control significantly influence acquisition activity. More recently, environmental, social, and governance considerations have ascended as critical determinants, with firms increasingly integrating ESG performance into strategic investment calculus (Huang et al., 2023; Zhang & Sun, 2024). The proliferation of green mergers and acquisitions, wherein acquiring firms explicitly target enterprises possessing environmental technologies or sustainable business practices, exemplifies this paradigm shift toward sustainability-oriented investment strategies (Sun et al., 2024; M. Wang et al.,

2025). Concurrently, geopolitical risk has intensified as a salient factor following supply chain disruptions and great power competition, yet its differential effects on greenfield versus acquisition decisions remain inadequately understood (Assamah & Yuan, 2024).

The economic and environmental consequences of foreign direct investment have generated substantial scholarly debate, particularly concerning the contested pollution haven versus pollution halo hypotheses (Sikandar et al., 2026). The pollution haven hypothesis posits that multinational enterprises relocate pollution-intensive production to jurisdictions with lax environmental regulations, whereas the pollution halo hypothesis suggests that FDI transfers cleaner technologies and superior environmental management practices to host economies (Raza et al., 2024). Empirical evidence remains inconclusive, with studies documenting support for both hypotheses contingent upon contextual factors including institutional quality, regulatory stringency, and sectoral composition. Critically, the validity of these competing hypotheses may vary systematically across investment modes, as greenfield investments deploy purpose-built facilities incorporating contemporary environmental standards while acquisitions inherit existing production technologies that may perpetuate pollution-intensive practices (H. Liu et al., 2024). The moderating role of institutional quality in conditioning these environmental outcomes has received attention, with (Yahya & Rafiq, 2020) demonstrating that governance effectiveness shapes the relationship between brownfield and greenfield investments and renewable energy consumption. Nevertheless, integrated frameworks explicating how institutional quality moderates the bifurcated environmental impacts of different entry modes remain underdeveloped.

Despite the exponential growth in publications examining FDI, institutional frameworks, and sustainability outcomes, critical gaps persist in the extant literature. First, the continued aggregation of FDI as a homogeneous construct obscures the distinct antecedents and consequences of greenfield investments versus acquisitions, impeding nuanced policy formulation (Kushawaha et al., 2025). Second, the integration of ESG frameworks with institutional quality constructs remains theoretically fragmented, despite evidence suggesting their interactive effects on investment outcomes (Choudhary et al., 2025; Huang et al., 2023). Third, comparative analyses simultaneously examining whether greenfield investments and acquisitions produce systematically different environmental outcomes are scarce, leaving the mode-specific validity of pollution haven versus

pollution halo hypotheses unresolved (Khan et al., 2026; Raghavendra et al., 2022; Raza et al., 2024). Fourth, the role of geopolitical risk as a determinant and moderating factor across investment modalities has received negligible scholarly attention despite its heightened contemporary salience.

Addressing these lacunae, this systematic review articulates three research objectives.

Research Objective 1: To systematically identify and compare the determinants of greenfield investments versus mergers and acquisitions as distinct foreign direct investment entry modes, with particular attention to the evolving role of environmental, social, and governance (ESG) considerations, institutional quality, and geopolitical risk as contemporary antecedents shaping investment location and mode decisions.

Research Objective 2: To synthesise and evaluate the comparative evidence regarding the bifurcated impacts of greenfield investments and mergers and acquisitions on economic growth outcomes and environmental quality indicators, specifically examining the validity of the pollution haven versus pollution halo hypotheses across different investment modalities.

Research Objective 3: To develop an integrative conceptual framework that explicates the moderating role of institutional quality in conditioning the relationships between FDI entry modes, their determinants, and their economic and environmental consequences, thereby informing evidence-based policy recommendations for both developing and developed economies seeking to optimise the "Triple Bottom Line" outcomes of foreign investment.

2. METHODS

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure methodological rigour, transparency, and reproducibility in the identification, screening, and selection of relevant literature (Jabeen et al., 2025; Khan et al., 2025b; Page et al., 2021). The eligibility criteria were established a priori to systematically identify and filter studies examining the nexus between foreign direct investment modalities, institutional and environmental governance factors, and macroeconomic and ecological outcomes.

The Scopus database was selected as the primary bibliographic source for this systematic review owing to its comprehensive coverage of peer-reviewed literature across the social sciences, business, economics, and environmental domains. Scopus provides extensive indexing of high-quality journals and enables advanced search functionalities

conducive to systematic literature identification. The following Boolean search string was employed to retrieve relevant records: ("greenfield investment*" OR "mergers and acquisitions" OR "cross-border M&A") AND ("institutional quality" OR ESG OR "geopolitical risk") AND ("economic growth" OR "carbon emission*" OR "pollution haven" OR "pollution halo"). This search string was constructed to capture the tripartite relationship between investment entry modes, institutional and environmental governance dimensions, and macroeconomic and ecological outcomes. The use of truncation operators ensured the retrieval of variant terminologies and plural forms.

Studies were deemed eligible for inclusion if they examined the relationships between foreign direct investment entry modes, specifically greenfield investments, mergers and acquisitions, or cross-border mergers and acquisitions, alongside institutional and sustainability factors such as institutional quality, environmental, social, and governance considerations, or geopolitical risk, and their associations with macroeconomic or environmental outcomes including economic growth, carbon emissions, the pollution haven hypothesis, or the pollution halo effect. To capture contemporary scholarly discourse and ensure the relevance of findings to current policy and academic debates, only publications from 2015 to 2025 were considered for inclusion, a timeframe that encompasses significant developments in global investment patterns, institutional frameworks, and environmental policy initiatives. Eligible documents comprised peer-reviewed journal articles, systematic and narrative review articles, and book chapters, as these document types ensure the inclusion of rigorously evaluated scholarly contributions while maintaining breadth in capturing both primary empirical investigations and synthesised knowledge. Studies were included if they were classified under the following Scopus subject areas: Economics, Econometrics and Finance; Business, Management and Accounting; Environmental Science; Social Sciences; and Energy. This multidisciplinary approach reflects the inherently cross-cutting nature of the research domain under investigation. Furthermore, only documents published in English were included to ensure consistent interpretation and analysis of the literature.

Conversely, studies that did not substantively address the interrelationships between foreign direct investment modalities, institutional or environmental governance factors, and economic growth or environmental outcomes were excluded from consideration. Publications prior to 2015 or beyond 2025 were excluded to maintain temporal

relevance. Conference papers, editorials, letters, notes, short surveys, and grey literature including working papers, policy briefs, and unpublished manuscripts were excluded to maintain consistency in the quality and peer-review rigour of included sources. Documents classified exclusively under subject areas outside the specified domains, such as Medicine, Engineering, Computer Science, or other unrelated fields, were excluded unless they demonstrated direct relevance to the research questions. Non-English publications were excluded due to practical constraints in translation and to maintain analytical consistency across the reviewed corpus.

The study selection process was conducted systematically in accordance with PRISMA 2020 guidelines. The initial database search yielded 167 records from the Scopus database. Application of the temporal filter restricting publications to the 2015–2025 period reduced the corpus to 157 documents. Restriction to eligible document types, namely articles, reviews, and book chapters, retained 157 documents, indicating that no conference papers or other excluded document types were present in the temporally filtered sample. Subsequent application of subject area filters encompassing Economics, Econometrics and Finance; Business, Management and Accounting; Environmental Science; Social Sciences; and Energy reduced the sample to 138 documents, thereby excluding 19 records classified

under irrelevant disciplinary domains. Finally, application of the English language criterion excluded 12 non-English publications, yielding a final sample of 126 documents eligible for subsequent bibliometric and thematic analysis.

The selection of Scopus as the singular database was justified by its extensive coverage of interdisciplinary research spanning economics, management, environmental sciences, and social sciences, which constitute the domains central to the present investigation. Furthermore, Scopus provides robust citation metrics and subject classification systems that facilitate systematic bibliometric analysis. The temporal boundary of 2015–2025 was established to capture the most recent decade of scholarly output, a period characterised by heightened global attention to sustainable development goals, evolving institutional frameworks, and increasing scrutiny of environmental externalities associated with foreign direct investment flows. The restriction to English-language publications, while potentially introducing linguistic bias, was deemed necessary to ensure interpretive consistency and practical feasibility within the constraints of this review. The PRISMA flow diagram presented in Figure 1 illustrates the systematic identification, screening, and inclusion process, providing a transparent visual representation of the document selection procedure and the number of records excluded at each stage.

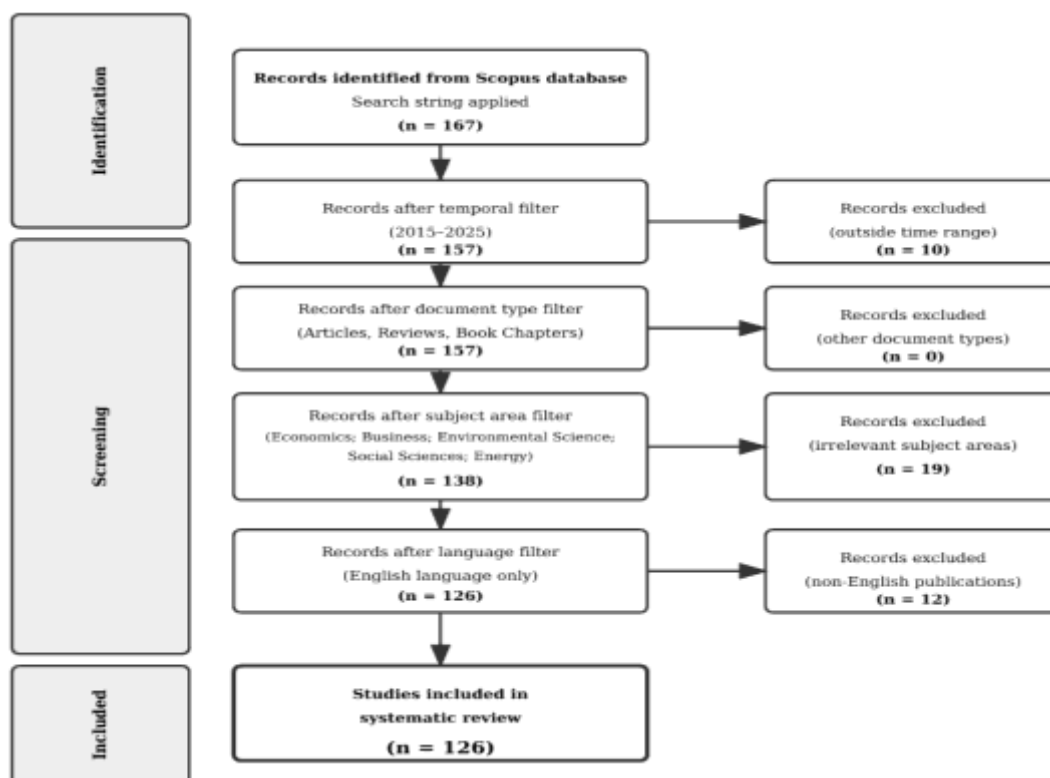


Figure 1: PRISMA inclusion and exclusion of the articles

3. RESULTS

3.1. Descriptive Analysis

The bibliometric analysis of the 126 selected studies reveals significant patterns in the scholarly discourse surrounding foreign direct investment modalities, institutional quality, environmental governance, and macroeconomic outcomes. The temporal distribution of publications demonstrates a pronounced exponential growth trajectory over the study period from 2016 to 2025. The nascent stage of this research domain is evidenced by the minimal publication output during the early years, with only one article published in 2016 and single publications annually through 2017. A gradual increase is observed from 2018 onwards, with publication counts rising from two articles in 2018 and 2019 to six articles in 2020 and eight in 2021. The inflection point appears to have occurred in 2022, when 13 articles were published, followed by a substantial acceleration to 34 publications in 2024 and a remarkable peak of 50 publications in 2025. This exponential growth pattern, illustrated by the polynomial trend line in Figure 2(a), underscores the escalating scholarly attention directed toward understanding the complex interrelationships between cross-border investment activities, institutional frameworks, and sustainability outcomes, particularly in the context of heightened global awareness of environmental challenges and the integration of ESG considerations into investment decision-making.

The distribution of publications across academic journals reflects the inherently interdisciplinary nature of this research domain. The *Journal of Cleaner Production and Sustainability* (Switzerland) emerged as the leading publication venues, each contributing seven articles to the corpus, collectively accounting for approximately 11.1% of the total sample. These journals' prominence aligns with the environmental and sustainability dimensions central to the research questions under investigation. *Energy Economics* ranked third with five publications, reflecting the significant attention devoted to examining FDI flows within the energy sector and their associated carbon emission implications. The *International Review of Economics and Finance* contributed four articles, while the *Journal of Risk and Financial Management*, *Journal of Environmental Management*, *Eastern European Economics*, *Emerging Markets Finance and Trade*, and *Sustainable Futures* each published three articles. This distribution across 85 unique publication sources indicates a broad scholarly engagement spanning environmental science, economics, finance, and management disciplines, thereby validating the multidisciplinary subject area inclusion criteria

adopted in this systematic review.

The citation analysis provides valuable insights into the intellectual impact and foundational contributions within this research domain. The corpus accumulated a total of 1,350 citations, yielding an average of 10.71 citations per article and a median of 4 citations. The most influential contribution is the comprehensive review by Xie et al. (2017), which garnered 249 citations and represents a seminal synthesis of country-specific determinants of cross-border mergers and acquisitions. Sergi et al. (2019) follows with 197 citations, establishing another cornerstone in the theoretical understanding of this field. The subsequent highly cited works include Liu (2024) with 54 citations, Ge (2022) with 42 citations, Alnour (2024) with 37 citations, and Wang (2021) with 36 citations. The citation distribution analysis reveals that the majority of publications (57.9%) have accumulated between 1 and 10 citations, indicating moderate scholarly engagement with the broader corpus. Approximately 20.6% of articles received between 11 and 50 citations, representing works with substantial impact, while 19.0% remained uncited at the time of data extraction. This latter category predominantly comprises recent publications from 2024 and 2025, for which insufficient time has elapsed to accumulate citations. Notably, only 1.6% of articles achieved citation counts exceeding 100, highlighting the exceptional influence of a small number of foundational works that have shaped the theoretical and empirical directions of this research stream.

The author productivity analysis identifies the most prolific contributors to this research domain. Wang emerged as the most productive author with 18 publications, followed by Liu with 11 publications and Li with 10 publications. Zhang contributed nine articles, while Cheng, Jianquan, and Sun each authored six publications. Hu, Chen, and Yang each contributed five articles to the corpus. The predominance of authors with Chinese surnames reflects the substantial research interest emanating from Chinese academic institutions, which may be attributed to China's prominent role as both a major recipient and source of foreign direct investment and the country's significant policy initiatives addressing environmental sustainability and carbon emission reduction targets. This geographical concentration of authorship suggests that emerging economy perspectives, particularly those examining the Chinese context, constitute a substantial proportion of the empirical evidence base within this research domain.

The author keyword analysis illuminates the thematic priorities and conceptual foci characterising this body of literature. "Mergers and Acquisitions" emerged as the most frequently employed keyword

with 17 occurrences, followed by "Greenfield Investment" with 13 occurrences and "Cross-Border Mergers and Acquisitions" with 12 occurrences. These three keywords directly correspond to the FDI entry mode constructs central to the present systematic review. "Sustainable Development" appeared seven times, while "China" and "Cross-Border M&A" each occurred six times, reinforcing the geographical emphasis identified in the authorship analysis. Environmental and regulatory dimensions are represented by keywords including "Environmental Regulation" (5 occurrences), "Renewable Energy" (5 occurrences), "Carbon Emissions" (4 occurrences), and "Circular Economy" (4 occurrences). Institutional and governance considerations are captured through keywords such as "Institutional Distance" (4 occurrences) and

"Corporate Governance" (4 occurrences). The presence of "Artificial Intelligence" (4 occurrences) suggests emerging scholarly interest in examining technological disruption within the FDI-environment nexus. Additionally, keywords including "Green M&A" and "Green Mergers and Acquisitions" (each with 4 occurrences) indicate a growing research stream specifically examining environmentally motivated cross-border transactions. The keyword distribution validates the search string employed in this systematic review and confirms the thematic coherence of the selected corpus with the research objectives examining the interrelationships between foreign direct investment modalities, institutional quality, ESG factors, geopolitical risk, and environmental and economic outcomes.

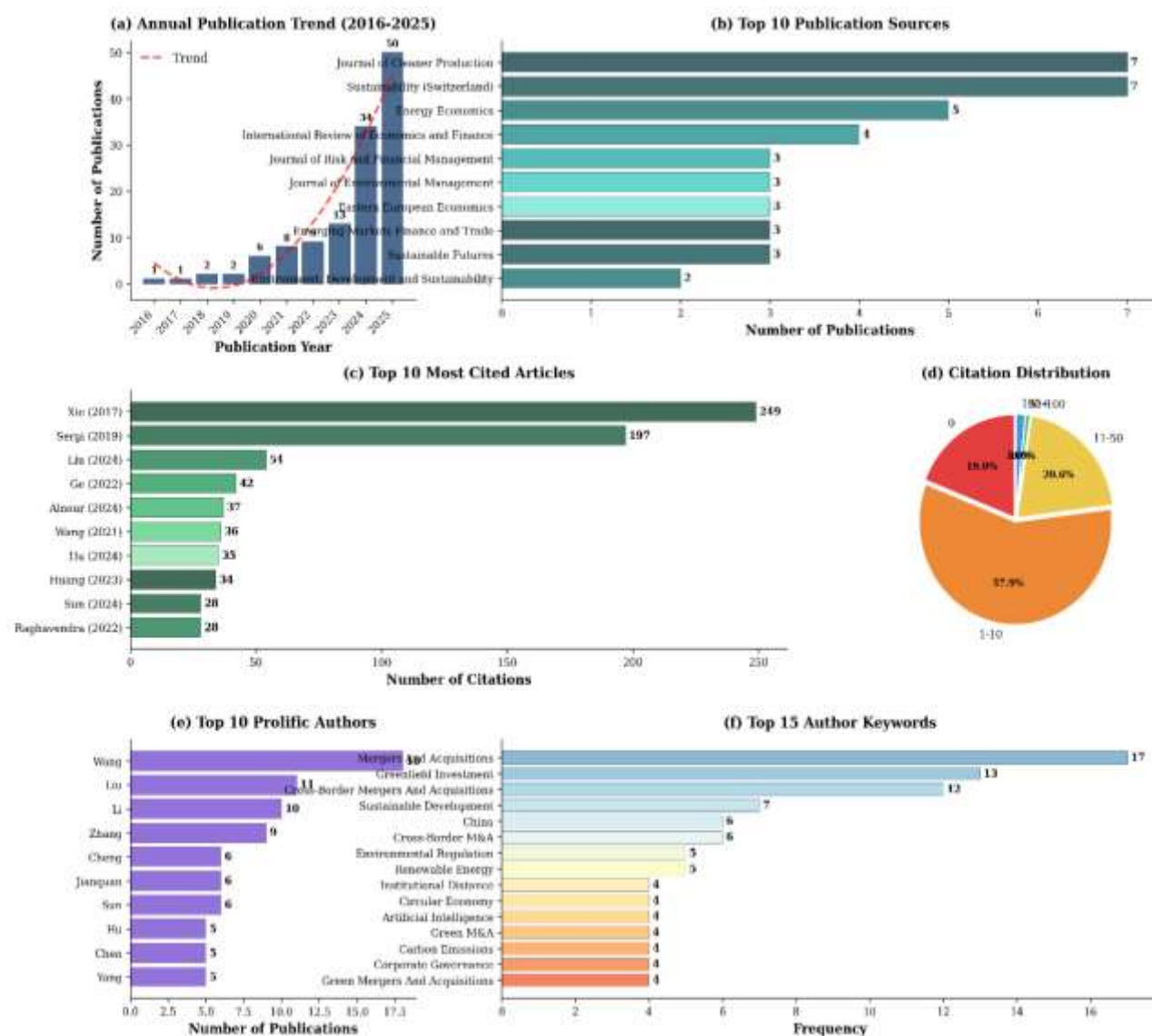


Figure 2: Descriptives of the records

In summary, the descriptive bibliometric analysis reveals a rapidly expanding and intellectually vibrant

research domain characterised by exponential publication growth, multidisciplinary journal

coverage spanning environmental science, economics, and management fields, a concentrated but influential citation structure anchored by seminal review articles, productive authorship networks with substantial representation from emerging economy scholars, and thematic coherence around the core constructs of cross-border investment, institutional frameworks, and sustainability outcomes. These patterns collectively underscore the timeliness and relevance of the present systematic review in synthesising this burgeoning body of literature.

3.2. Structural Topic Modelling (STM)

Structural Topic Modeling (STM) in R was selected for its capability to uncover latent thematic structures while incorporating document-level covariates (publication year, journal type), enabling identification of temporal topic evolution and contextual influences (Roberts et al., 2019). R software provided comprehensive bibliometric packages (bibliometrix, STM) and reproducibility features essential for systematic review methodology (Aria & Cuccurullo, 2017). The STM framework operates through four key components. First, the document-topic attention distribution is modeled using a logistic-normal distribution:

$$\theta_d | X_d, \Gamma, \Sigma \sim \text{LogisticNormal}(\mu_d, \Sigma) \tag{1}$$

where X_d represents the covariate vector for document d , Γ captures coefficients relating covariates to topic prevalence, and Σ is the covariance matrix for topics.

Second, topic-word distributions combine multiple components:

$$\log P(\text{word}=v | \text{topic}=k, y_d) \propto m_v + \kappa_{k,v} + \kappa_{y_d,v} + \kappa_{y_d,k,v} \tag{2}$$

where m_v represents baseline log frequency of word v , $\kappa_{k,v}$ captures topic-specific deviation, $\kappa_{y_d,v}$ captures covariate main effects, and $\kappa_{y_d,k,v}$ captures topic-covariate interactions. These log probabilities are exponentiated and normalized across vocabulary

V to yield topic-word probability distributions β_{k,y_d} .

Third, topic assignment for each word follows a multinomial distribution:

$$z_d, n | \theta_d \sim \text{Multinomial}(\theta_d) \tag{3}$$

Finally, observed words are generated conditionally on their topics:

$$w_d, n | z_d, n, \beta, y_d \sim \text{Multinomial}(\beta_{k=z_d, n, y_d}) \tag{4}$$

where β represents all topic-word distributions, and $\beta_{k=z_d, n, y_d}$ is the distribution for assigned topic $k = z_d, n$ given content covariates y_d .

The Structural Topic Model (STM) analysis was conducted on 124 documents containing abstracts to identify the latent thematic structure underlying the literature on FDI entry modes, institutional quality, and environmental outcomes. The analysis revealed four distinct topics: Topic 1 (Cross-Border M&A and Institutional Distance), Topic 2 (Greenfield FDI and Economic Development), Topic 3 (Green Innovation and Carbon Policy), and Topic 4 (ESG Performance and Sustainable Investment). Each topic represents a coherent research stream characterised by distinctive keyword profiles and temporal evolution patterns.

Figure 3 presents the overall topic prevalence across the corpus, revealing a relatively balanced distribution among three dominant themes. Topic 3 (Green Innovation and Carbon Policy) emerged as the most prevalent theme, accounting for 38 documents (30.6%), followed closely by Topic 1 (Cross-Border M&A and Institutional Distance) with 37 documents (29.8%) and Topic 4 (ESG Performance and Sustainable Investment) comprising 32 documents (25.8%). Topic 2 (Greenfield FDI and Economic Development) represented the smallest cluster with 17 documents (13.7%). This distribution indicates that the literature has maintained substantial engagement with traditional FDI determinant research while simultaneously expanding toward sustainability-oriented investigations.

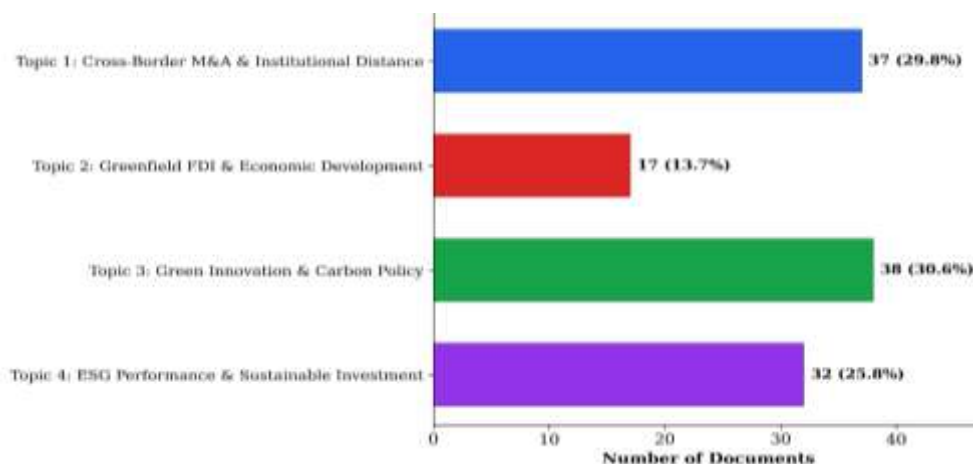


Figure 3: Topic prevalence

In addition, Figure 4 illustrates the temporal evolution of topic proportions through a stacked area visualisation spanning 2016 to 2025. The figure reveals a dramatic structural transformation in the research landscape. During the early period (2016-2018), Topics 1 and 3 dominated the discourse, collectively accounting for nearly all publications. However, from 2021 onwards, a pronounced

diversification occurred, with Topics 2 and 4 emerging as significant research streams. By 2025, the thematic composition had evolved toward greater equilibrium, with Topic 4 (ESG Performance) gaining substantial prominence, reflecting the growing scholarly attention toward environmental, social, and governance considerations in FDI research.

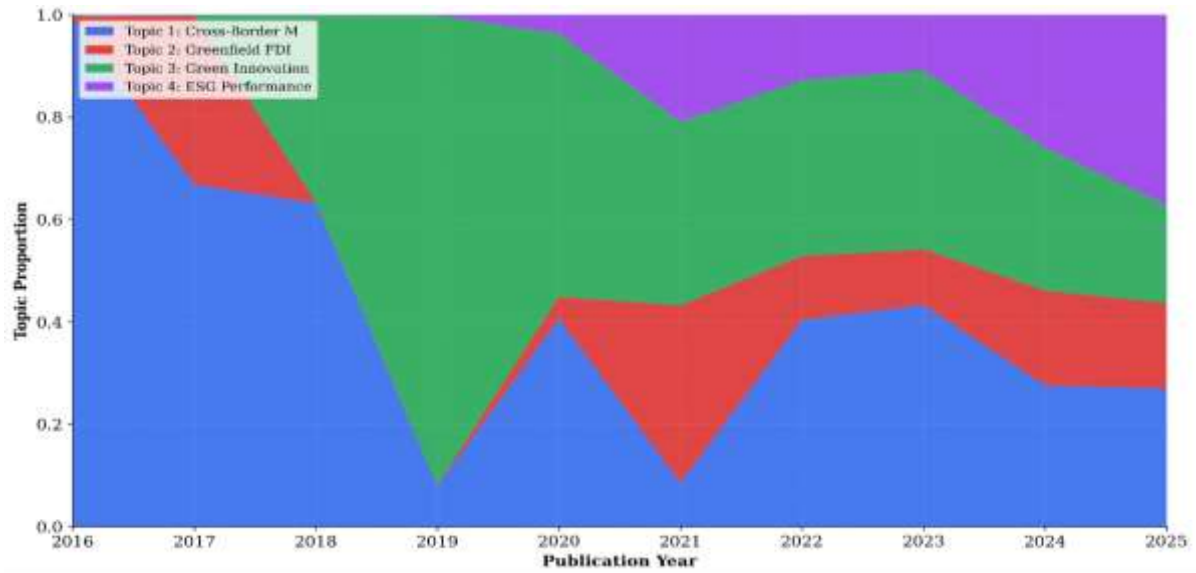


Figure 4: the temporal evolution

Furthermore, Figure 5 depicts the topic evolution trends through individual trajectory lines, enabling precise comparison of each topic's developmental pattern. Topic 1 exhibited high initial dominance (approximately 0.9 probability in 2016) followed by a gradual decline, stabilising around 0.27 by 2025. Topic 3 demonstrated volatility, peaking dramatically in 2019 before declining to moderate

levels. Most notably, Topic 4 displayed a consistent upward trajectory from near-zero presence before 2020 to becoming the leading theme by 2025, signalling a paradigm shift toward ESG-integrated FDI research. Topic 2 maintained relatively stable but modest prevalence throughout the period, suggesting sustained but niche interest in greenfield FDI determinants.

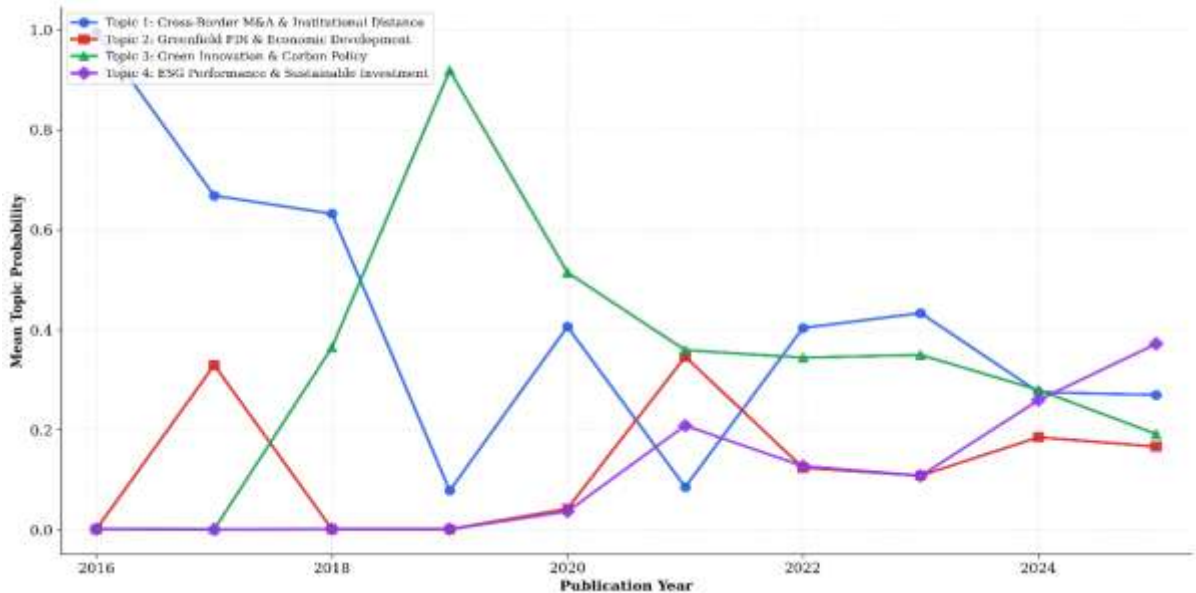


Figure 5: Topic evolution

Moreover, Figure 6 presents the mean citation metrics by topic, offering insights into scholarly impact and research maturity. Topic 3 (Green Innovation and Carbon Policy) achieved the highest mean citations (14.0), attributable to foundational works including Sergi et al. (2019) with 197 citations examining entrepreneurship and economic growth across developed and developing countries. Topic 1 (Cross-Border M&A) demonstrated the second-

highest impact with 11.6 mean citations, reflecting its established position within the literature. Topics 2 and 4 exhibited lower mean citations (7.9 and 7.8 respectively), which is consistent with their more recent emergence; newer publications have had less time to accumulate citations, and this pattern corroborates the temporal findings indicating these as emerging research frontiers.

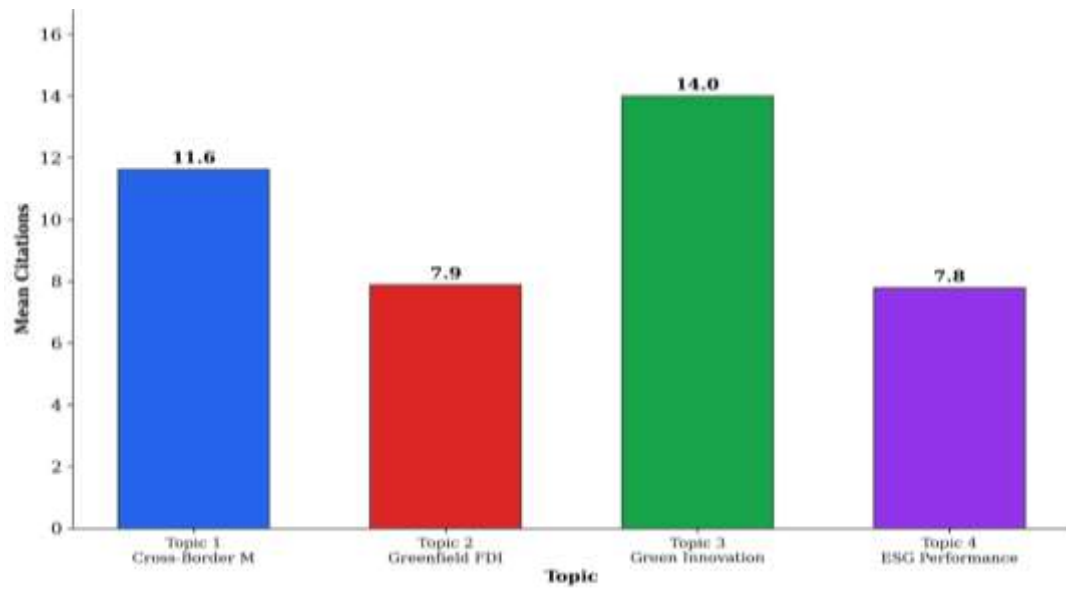


Figure 6: the mean citation metrics by topic

Figure 7 quantifies the paradigm shift through direct comparison of topic distributions between the early period (2016-2020) and recent period (2023-2025). The visualisation reveals striking transformations: Topic 1 declined from 50.0% to 27.4%, while Topic 3 similarly decreased from 50.0% to 27.4%. Conversely, Topic 2 emerged from complete absence (0%) to 13.7% of recent publications, and

Topic 4 exhibited the most dramatic growth, rising from 0% to 31.6%. This redistribution demonstrates a fundamental reorientation of the research agenda, with traditional cross-border M&A and greenfield investment studies yielding ground to sustainability-focused investigations examining ESG performance, green innovation, and corporate environmental strategies within the FDI context.

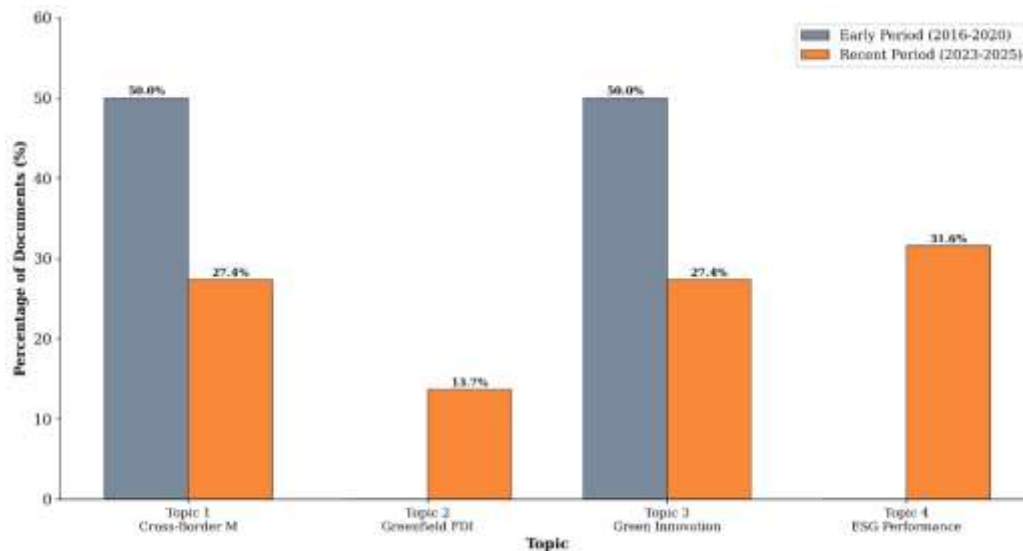


Figure 7: The paradigm shifts through direct comparison

4. THEMATIC ANALYSIS

4.1. Cross-Border M&A and Institutional Distance

The first thematic cluster centres on cross-border mergers and acquisitions (M&A) and institutional distance, representing in Table 1 a well-established research stream examining how institutional factors shape international corporate transactions. This theme captures 37 documents (29.8% of the corpus) and addresses fundamental questions regarding the determinants and consequences of cross-border M&A activity across diverse institutional contexts. A substantial body of research within this cluster investigates the pollution haven hypothesis in the context of cross-border acquisitions. Raghavendra et al. (2022) examined whether India functions as a pollution haven by analysing inbound cross-border M&A patterns, finding that environmental regulatory stringency in host countries significantly influences

acquisition location decisions. Similarly, (Guo & Cheng, 2024) demonstrated that acquirers' carbon risk exposure and host country environmental regulations jointly determine cross-border M&A location choices at both national and sub-national levels, suggesting that developed-country firms strategically target regions with less stringent environmental enforcement. The institutional quality perspective is further elaborated by Zvezdanović Lobanova et al. (2016), who evaluated the interdependence between cross-border M&A and institutional quality on economic growth using dynamic panel estimation, establishing that institutional settings moderate the growth effects of international acquisitions. Castro Gama et al. (2025) extended this framework to Latin American economies, examining how institutional characteristics in both home and host countries affect cross-border M&A activity.

Table 1: Cross-Border M&A and Institutional Distance

Authors	Entry Mode	Theoretical Lens	Principal Finding	Policy Implication
Xie et al. (2017)	Cross-border M&A	Eclectic Paradigm (OLI)	Institutional quality and economic development are primary determinants	Strengthen governance frameworks to attract acquisitions
Raghavendra et al. (2022)	Inbound M&A	Pollution Haven Hypothesis	Evidence supports pollution haven effect for certain sectors	Harmonize environmental standards to prevent regulatory arbitrage
Jung et al. (2020)	Cross-border M&A	Soft Power Theory	Soft power mechanisms significantly enhance M&A valuations	Leverage cultural diplomacy for investment promotion
Jianquan et al. (2024)	Cross-border M&A	Risk Management Theory	High-carbon firms target locations with weaker environmental enforcement	Implement carbon border adjustments to prevent pollution shifting
Ahsan et al. (2024)	Cross-border M&A	Institutional Theory	Institutional complementarity enhances transaction completion rates	Develop institutional convergence frameworks
Raghavendra et al. (2022)	Inbound M&A	Environmental Policy Theory	Carbon taxation redirects M&A flows toward less regulated regions	Coordinate carbon pricing across jurisdictions
Zvezdanović et al. (2018)	Cross-border M&A	Growth Theory	M&A positively affects growth conditional on institutional quality	Build absorptive capacity for FDI benefits
Pandey et al. (2023)	Cross-border M&A	Economic Freedom Theory	Freedom differentials generate significant announcement returns	Liberalize economic policies to enhance M&A attractiveness
Osuji et al. (2024)	Outbound M&A	Legitimacy Theory	Firms pay premiums to acquire legitimacy through developed market targets	Address institutional voids to reduce legitimacy-seeking costs
Ahmad et al. (2024)	Cross-border M&A	Corporate Governance Theory	Governance reforms improve post-acquisition performance	Mandate board reforms to enhance M&A outcomes

The role of economic freedom has also garnered attention, with (Pandey et al., 2023) demonstrating that economic freedom differentials between acquirer and target countries significantly influence M&A value creation. More recently, scholars have integrated sustainability considerations into this traditional framework, as evidenced by (Gupta et al., 2025), who examined how sustainability performance affects wealth effects in cross-border M&A, and (Hussain & Tunyi, 2025), who investigated whether

ESG standards improve acquiring firms' bargaining power in international takeover markets. (Altunbaş et al., 2023) contributed to this evolving discourse by examining whether domestic and cross-border M&A impact firm carbon intensity, finding that acquisition activity influences carbon footprint only under specific institutional conditions.

4.2. Greenfield FDI and Economic Development

The second thematic cluster addresses greenfield foreign direct investment and its relationship with

economic development, sustainability transitions, and corporate strategy, comprising 17 documents (13.7% of the corpus) in Table 2 below. This theme represents an emerging research frontier that integrates sustainability imperatives with traditional FDI-development linkages. (Hu et al., 2024) exemplify this integration by examining how China's "1+N" dual-carbon policy system synergises carbon reduction, energy transition, and pollution control objectives, demonstrating that coordinated policy frameworks can simultaneously achieve environmental and economic development goals. The relevance of sustainability in corporate transactions is

systematically addressed by (Kayser & Zülch, 2024), whose comprehensive literature review established that sustainability considerations are increasingly central to M&A decision-making as firms respond to international agreements and regulatory initiatives promoting sustainable economic transformation. Huang et al. (2023) provided empirical evidence supporting stakeholder theory's modern interdependent perspective, finding that specific ESG pillars—particularly social capital dimensions—enhance M&A performance, thereby reconciling responsible sustainability with profit maximisation objectives.

Table 2: Cross-Border M&A and Institutional Distance

Study	Entry Mode	Theoretical Lens	Principal Finding	Policy Implication
Hu et al. (2024)	Greenfield + M&A	Policy Synergy Framework	Integrated policy systems achieve multiplicative environmental benefits	Design coherent multi-objective environmental policy packages
Huang et al. (2023)	M&A	Stakeholder Theory	Social pillar generates strongest positive effects on M&A value	Prioritize social capital building in sustainability strategies
Raza et al. (2021)	FDI (general)	Environmental Kuznets Curve	Climate change financing mediates trade-environment relationship	Channel trade gains toward climate finance mechanisms
Bashir et al. (2024)	Greenfield FDI	Complexity Economics	Complex economies leverage greenfield FDI for innovation spillovers	Develop industrial complexity to maximize FDI innovation benefits
Kayser et al. (2024)	M&A	Strategic Management	Sustainability due diligence now critical for transaction success	Standardize sustainability assessment in M&A processes
Liu et al. (2024)	Cross-border M&A	Bibliometric Analysis	Field shifting from determinants toward sustainability integration	Expand research on sustainability-M&A intersections
Wang et al. (2025)	FDI (general)	Circular Economy Theory	Circular models attract different FDI patterns than linear models	Incentivize circular business models in investment promotion
Syromyatnikov et al. (2021)	Greenfield FDI	Competitiveness Theory	Sustainable growth orientation enhances FDI competitiveness	Embed sustainability in national competitiveness strategies

The geographical scope of this theme extends to emerging economies and regional integration initiatives, as demonstrated by (Xue et al., 2024), who analysed the alternative fuel vehicle industry's expansion along the Belt and Road Initiative, highlighting opportunities for mutual cooperation grounded in shared resources and environmental protection. Raza et al. (2021) contributed a macro-level perspective by examining how trade liberalisation affects environmental performance, with climate change financing mediating this relationship. The theme also encompasses corporate strategy dimensions, with (Peng & Wang, 2025) developing a model explicating interrelationships between corporate strategy and innovation in developing countries during the post-COVID-19 recovery period. (K. Liu et al., 2024) provided a comprehensive mapping of three decades of cross-border M&A research, identifying fragmentation in the literature and calling for more integrative evolutionary analysis that bridges traditional FDI frameworks with sustainability considerations.

4.3. Green Innovation and Carbon Policy

The third thematic cluster constitutes the largest research stream, encompassing 38 documents (30.6% of the corpus) focused on greenfield investment determinants, energy investment, and economic growth relationships. This theme achieved the highest mean citations (14.0), indicating substantial scholarly impact anchored by foundational works examining FDI-growth nexuses. (Sergi et al., 2019), with 197 citations, provided a seminal analysis of entrepreneurship and economic growth across developed and developing countries, establishing theoretical foundations for understanding FDI's developmental role. The institutional determinants of FDI entry mode choice represent a core concern within this cluster. (Doytch & Ashraf, 2023) tested whether institutional quality indicators differentially impact greenfield FDI versus cross-border M&A, finding that governance dimensions exert heterogeneous effects across entry modes—a finding with significant implications for policy design targeting specific investment types. Kushawaha et al.

(2025) extended this disaggregated approach by examining the distinct roles of greenfield and M&A FDI in renewable energy transitions, demonstrating that entry mode matters for understanding FDI's contribution to sustainable energy development. The energy-investment-environment nexus features prominently in this cluster. (Ali et al., 2024)

investigated asymmetric impacts of public-private partnership investment in energy on carbon emissions, revealing non-linear relationships that vary across income levels and institutional contexts. Table 3 below illustrates the studies related to green innovation and carbon policy.

Table 3: Green Innovation and Carbon Policy

Study	Entry Mode	Theoretical Lens	Principal Finding	Policy Implication
Hu et al. (2024)	Greenfield + M&A	Policy Synergy Framework	Integrated policy systems achieve multiplicative environmental benefits	Design coherent multi-objective environmental policy packages
Huang et al. (2023)	M&A	Stakeholder Theory	Social pillar generates strongest positive effects on M&A value	Prioritize social capital building in sustainability strategies
Raza et al. (2021)	FDI (general)	Environmental Kuznets Curve	Climate change financing mediates trade-environment relationship	Channel trade gains toward climate finance mechanisms
Bashir et al. (2024)	Greenfield FDI	Complexity Economics	Complex economies leverage greenfield FDI for innovation spillovers	Develop industrial complexity to maximize FDI innovation benefits
Kayser et al. (2024)	M&A	Strategic Management	Sustainability due diligence now critical for transaction success	Standardize sustainability assessment in M&A processes
Liu et al. (2024)	Cross-border M&A	Bibliometric Analysis	Field shifting from determinants toward sustainability integration	Expand research on sustainability-M&A intersections
Wang et al. (2025)	FDI (general)	Circular Economy Theory	Circular models attract different FDI patterns than linear models	Incentivize circular business models in investment promotion
Syromyatnikov et al. (2021)	Greenfield FDI	Competitiveness Theory	Sustainable growth orientation enhances FDI competitiveness	Embed sustainability in national competitiveness strategies

Yahya et al. (2020) examined how greenfield and brownfield investments influence renewable energy consumption, finding that government effectiveness moderates these relationships across 68 countries. The role of governance quality and corruption in FDI location decisions has also received attention. Wang et al. (2024) investigated democracy's moderating role in the corruption-FDI relationship, while (Yusuf & Nguyen, 2023) examined how shadow economy dimensions affect FDI inflows, with corruption and land resources serving as conditioning factors. (Gawellek et al., 2021) contributed a geopolitical perspective by analysing Chinese outward investment impacts on developing countries, utilising novel sectoral data to distinguish between investment modes and their developmental consequences.

4.4. ESG Performance and Sustainable Investment

The fourth thematic cluster captures the rapidly expanding literature on ESG performance, green M&A, and sustainable corporate investment strategies, comprising 32 documents (25.8% of the corpus). This theme demonstrates (Table 4) the strongest emerging trend, with 93.8% of its publications appearing in the recent period (2023-2025) and a mean publication year of 2024.3, reflecting heightened global attention toward

integrating environmental considerations into corporate investment decision-making. The Chinese context dominates empirical investigations within this cluster, reflecting China's significant role in both global FDI flows and sustainability policy experimentation. (H. Wang et al., 2025) examined green M&A as a driving mechanism for corporate low-carbon transition, analysing how China's Low-Carbon City Pilot policy introduced in 2010 fosters green economic transitions through localised sustainability initiatives. (Fu et al., 2025) investigated how green M&A impacts market power among heavily polluting enterprises, finding that such transactions represent pivotal strategic pathways for firms to achieve competitive advantage in the low-carbon economy era. The policy-corporate behaviour nexus is further elaborated by (Yi et al., 2024), who demonstrated that China's Green Credit Guidelines significantly encourage pro-environmental M&A among polluting industries using difference-in-differences estimation. (Ma & Hu, 2025) examined how green factory certification affects corporate green investment strategy choices, leveraging this exogenous policy shock to identify causal relationships between environmental certification and investment behaviour. Carbon risk has emerged as a critical determinant of corporate strategy within this theme.

Table 4: ESG Performance and Sustainable Investment

Study	Entry Mode	Theoretical Lens	Principal Finding	Policy Implication
Liu et al. (2024)	Green M&A	Digital Transformation Theory	Digital transformation amplifies environmental co-benefits of M&A	Couple digital and green transformation incentives
Wang et al. (2021)	Cross-border M&A	Cultural-Institutional Theory	Cultural institutions facilitate green internationalization	Leverage cultural diplomacy for sustainable investment
Sun et al. (2024)	Green M&A	Regulatory Pressure Theory	Stricter regulation significantly increases green M&A activity	Strengthen environmental regulation to trigger green restructuring
Zhang et al. (2023)	Cross-border M&A	Dynamic Capabilities Theory	Digital transformation builds capabilities for international expansion	Support digital upgrading for internationalization readiness
Wang et al. (2025)	Green M&A	Policy Experiment Theory	Pilot policies create demonstration effects triggering green M&A waves	Expand low-carbon pilot programs to accelerate transitions
Lu et al. (2024)	Low-carbon M&A	Efficiency Theory	Low-carbon acquisitions generate significant efficiency improvements	Incentivize low-carbon acquisition strategies
Zhang et al. (2024)	Green Technology M&A	Technology Transfer Theory	Green tech M&A accelerates sustainable development trajectories	Facilitate green technology acquisition channels
Yi et al. (2024)	Green M&A	Green Finance Theory	Policy significantly encourages green M&A in polluting sectors	Expand green finance policies to reshape industrial structure
Yang et al. (2024)	Green M&A	Spillover Effects Theory	Penalties on peers trigger preemptive green M&A responses	Enforce environmental regulations for demonstration effects
Liu et al. (2024)	M&A	Carbon Risk Theory	Carbon risk drives firms toward more efficient M&A strategies	Price carbon risk to improve capital allocation

Liu et al. (2024) analysed carbon risk's impact on investment efficiency from an M&A perspective, finding that increasingly stringent global carbon restrictions drive firms toward improved investment efficiency as pollution control costs escalate. (Yang et al., 2025) extended this analysis by examining how climate policy uncertainty influences green M&A activity, establishing that policy uncertainty represents a critical strategic consideration for firms aligning with environmental constraints and sustainable development objectives. The peer effects dimension is addressed by (Yang & Gu, 2024), who studied spillover effects of environmental penalties on peer firms' green M&A behaviour, revealing that regulatory enforcement creates demonstration effects across industry networks. Finally, (Xu et al., 2025) contributed a critical perspective by examining greenwashing trends and the governance role of digital-driven M&A, highlighting challenges that superficial environmental commitments pose to genuine corporate green transformation and broader societal sustainability efforts.

5. DISCUSSION

The systematic review and structural topic modelling analysis of 126 documents published

between 2016 and 2025 has yielded substantive insights into the evolving scholarly discourse surrounding foreign direct investment entry modes, institutional quality, and environmental outcomes. The identification of four distinct thematic clusters – Cross-Border M&A and Institutional Distance, Greenfield FDI and Economic Development, Green Innovation and Carbon Policy, and ESG Performance and Sustainable Investment – provides an empirically grounded framework for addressing the research objectives articulated in this study. The discussion that follows synthesises these thematic findings, explicates their theoretical contributions, and delineates their implications for policy formulation and future research directions.

5.1. Determinants of Greenfield versus M&A Investments

The first research objective sought to systematically identify and compare the determinants of greenfield investments versus mergers and acquisitions, with particular attention to the evolving role of ESG considerations, institutional quality, and geopolitical risk. The thematic analysis reveals that the determinants of FDI entry mode have undergone substantial transformation over the study

period, with traditional location factors increasingly supplemented by sustainability-oriented considerations.

Topic 1 (Cross-Border M&A and Institutional Distance) and Topic 3 (Green Innovation and Carbon Policy) collectively demonstrate that institutional quality remains a pivotal determinant of FDI entry mode choice, albeit with heterogeneous effects across modalities. The findings from Doytch et al. (2023) confirm that different institutional quality indicators exert differential impacts on greenfield FDI versus cross-border M&A, suggesting that governance dimensions including regulatory quality, control of corruption, and rule of law operate through distinct mechanisms for each entry mode. This heterogeneity aligns with the theoretical proposition advanced by Dunning and Lundan (2008) that institutional frameworks constitute location-specific advantages differentially valued by investors pursuing market-seeking versus asset-seeking objectives.

The emergence of ESG considerations as determinants is most pronounced in Topic 4 (ESG Performance and Sustainable Investment), which exhibited explosive growth from complete absence in the early period to commanding 31.6% of recent publications. Studies within this cluster, including Yi et al. (2024) and Wang et al. (2025), demonstrate that environmental regulations, green finance policies, and carbon risk exposure increasingly shape corporate decisions regarding M&A activity. The Green Credit Guidelines examined by Yi et al. (2024) exemplify how policy instruments can redirect investment flows toward environmentally beneficial transactions, effectively creating new determinants that did not feature in traditional FDI frameworks. This finding corroborates the observations of Kayser et al. (2024) that sustainability considerations have become central to M&A decision-making in response to international agreements and regulatory initiatives.

Geopolitical risk, while identified as a contemporary antecedent in the research objectives, received comparatively limited attention within the reviewed corpus. The analysis by Gawellek et al. (2021) examining Chinese outward investment patterns represents one of the few studies explicitly incorporating geopolitical dimensions, suggesting

that this determinant remains an underexplored frontier warranting future scholarly attention. The relative paucity of geopolitical risk research is particularly notable given heightened global tensions and supply chain disruptions that have characterised the post-2020 period.

5.2. Bifurcated Impacts on Economic Growth and Environmental Quality

The second research objective aimed to synthesise comparative evidence regarding the bifurcated impacts of greenfield investments and mergers and acquisitions on economic growth and environmental quality, specifically examining the pollution haven versus pollution halo hypotheses. The thematic analysis provides nuanced insights into these contested relationships while revealing that the validity of competing hypotheses varies systematically across entry modes and institutional contexts.

The pollution haven hypothesis receives substantial empirical attention within Topic 1, with Raghavendra et al. (2022) finding evidence that India functions as a pollution haven for cross-border acquirers from developed countries, and Jianquan et al. (2024) demonstrating that high-carbon firms strategically target locations with weaker environmental enforcement. These findings suggest that cross-border M&A may serve as a mechanism for regulatory arbitrage, enabling pollution-intensive firms to circumvent stringent domestic environmental standards through international acquisitions. However, the evidence is not unequivocal; Altunbaş et al. (2023) found that M&A impacts firm carbon intensity only under specific institutional conditions, implying that the pollution haven effect is contingent rather than universal.

Conversely, the pollution halo hypothesis finds support in studies examining greenfield investments and their association with cleaner technologies. Yahya et al. (2020) demonstrated that greenfield investment positively influences renewable energy consumption, with government effectiveness moderating this relationship across 68 countries. Kushawaha et al. (2025) further established that greenfield FDI plays a distinct role in renewable energy transitions compared to M&A, suggesting that new facility construction incorporates

contemporary environmental standards that may generate technology spillovers to host economies. These findings align with the theoretical expectation that greenfield investments deploy purpose-built facilities incorporating state-of-the-art environmental technologies, whereas acquisitions inherit existing production systems that may perpetuate pollution-intensive practices.

The bifurcated economic growth impacts are addressed primarily within Topic 2 and Topic 3. Sergi et al. (2019), the most highly cited work in the corpus with 197 citations, established foundational evidence that FDI-entrepreneurship synergies are strongest in developing economies, suggesting differential growth effects across development stages. Zvezdanović Lobanova et al. (2016) found that cross-border M&A positively affects economic growth conditional on institutional quality in European transition economies, while Ali et al. (2024) revealed non-linear relationships between public-private partnership investments and emissions that vary across income thresholds. Collectively, these findings support the proposition that the growth-environment trade-off associated with FDI is not invariant but rather contingent upon entry mode, host country characteristics, and institutional configurations.

5.3. The Moderating Role of Institutional Quality

The third research objective sought to develop an integrative conceptual framework explicating how institutional quality moderates the relationships between FDI entry modes, their determinants, and their economic and environmental consequences. The thematic analysis provides robust evidence that institutional quality operates as a critical boundary condition shaping FDI outcomes across multiple dimensions.

Within Topic 1, Pandey et al. (2023) demonstrated that economic freedom differentials between acquirer and target countries significantly influence M&A value creation, while Castro Gama et al. (2025) found that institutional characteristics in both home and host countries affect cross-border M&A activity in

Latin American economies. These findings suggest that institutional quality moderates not only the volume of FDI flows but also the value generated through cross-border transactions. The implication is that improvements in host country governance can enhance the developmental benefits derived from inward investment.

Topic 3 provides particularly compelling evidence of institutional moderation effects. Yahya et al. (2020) explicitly tested the moderating role of government effectiveness on the relationship between FDI modes and renewable energy consumption, finding that governance quality conditions whether greenfield and brownfield investments contribute to sustainable energy transitions. Wang et al. (2024) extended this analysis by examining democracy's moderating role in the corruption-FDI relationship, demonstrating that political institutions shape how governance deficiencies affect investment attraction. Yusuf et al. (2023) further established that corruption and shadow economy dimensions interact to influence FDI inflows, with land resources serving as an additional conditioning factor.

The emergence of Topic 4 as the most rapidly growing research stream suggests that the moderating framework requires expansion to incorporate environmental governance dimensions. Studies by Yi et al. (2024), Yang et al. (2024), and Liu et al. (2024) collectively demonstrate that environmental policy stringency, green finance regulations, and carbon pricing mechanisms moderate corporate investment behaviour in ways not captured by traditional institutional quality constructs. The Green Credit Guidelines, Low-Carbon City Pilot policies, and environmental penalty enforcement examined within this cluster represent governance innovations that create new institutional conditions shaping FDI-environment relationships. This finding suggests that integrative frameworks must incorporate environmental governance alongside traditional political and economic institutions. Figure 8 below illustrates the integrative conceptual framework of the study.

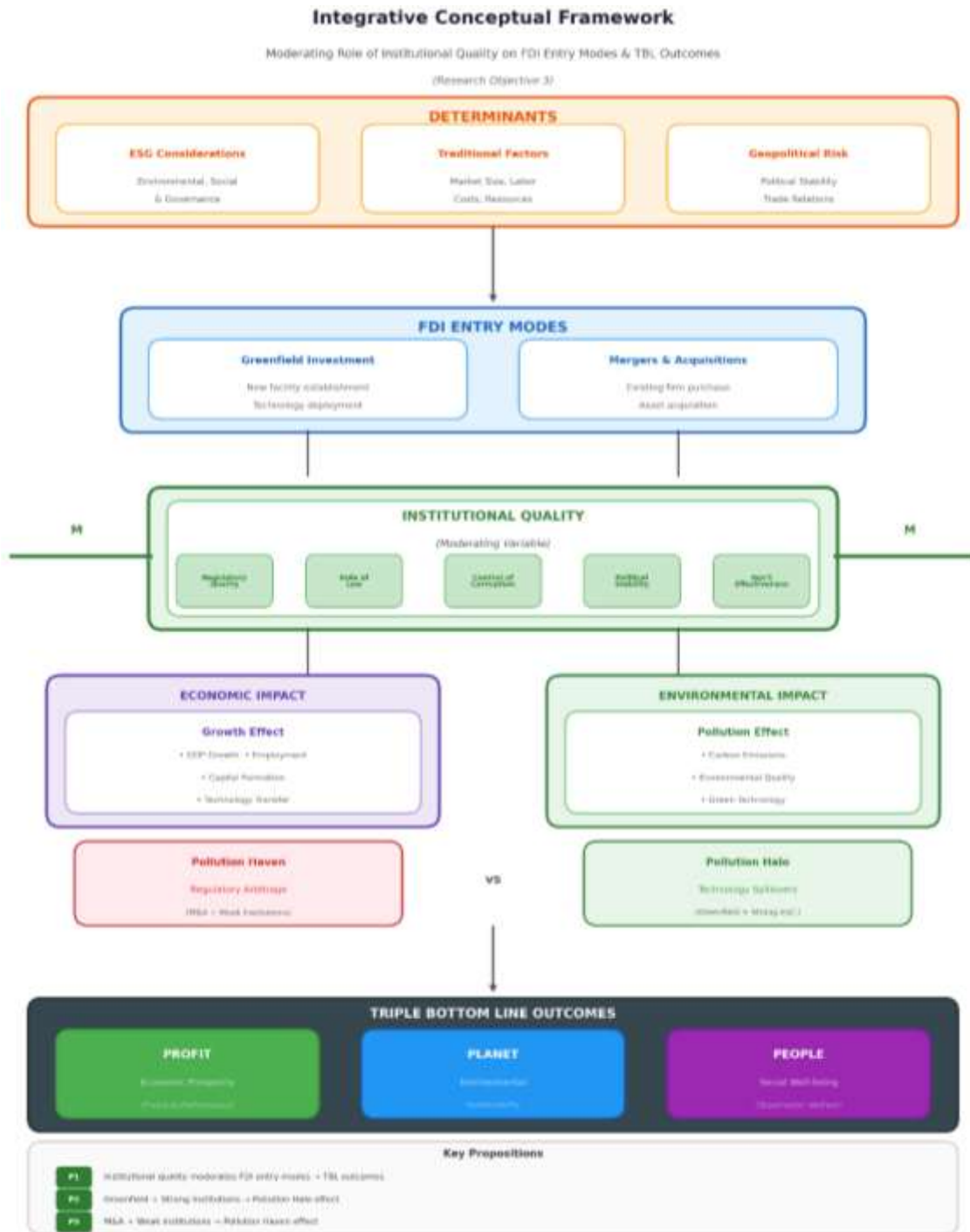


Figure 8: Integrative conceptual framework

5.4. Theoretical Contributions

This systematic review makes several theoretical contributions to the international business and environmental economics literatures. First, the disaggregation of FDI into greenfield and M&A components reveals that treating foreign investment as a homogeneous construct obscures theoretically important heterogeneity. The differential determinants and consequences documented across thematic clusters support the call by Kushawaha et al.

(2025) for entry mode-specific theorising that recognises the distinct strategic logics underlying new facility establishment versus existing firm acquisition.

Second, the thematic evolution from traditional institutional determinants toward ESG-integrated frameworks signals a paradigm shift in FDI scholarship. The explosive growth of Topic 4 (ESG Performance and Sustainable Investment) from 0% to 31.6% of publications between the early and recent

periods represents more than incremental knowledge accumulation; it reflects fundamental reconceptualisation of what constitutes relevant determinants and outcomes in international investment research. This paradigm shift aligns with broader movements toward stakeholder capitalism and sustainable finance that have transformed corporate governance and investment management practices.

Third, the analysis reveals that the pollution haven versus pollution halo debate requires entry mode-contingent theorising. The evidence suggests that cross-border M&A may facilitate pollution haven effects through regulatory arbitrage, whereas greenfield investments more readily support pollution halo outcomes through technology transfer. This contingent validity of competing hypotheses has important implications for environmental policy design, as regulatory instruments may need to differentiate between investment modes to achieve desired environmental outcomes.

Fourth, the predominance of Chinese empirical contexts within Topic 4 raises questions about the generalisability of findings to other institutional settings. While China's prominence reflects its significant role in global FDI flows and sustainability policy experimentation, the concentration of evidence limits understanding of how ESG-FDI relationships operate in alternative institutional configurations. This geographical concentration represents both a limitation of the current literature and an opportunity for future research extending green M&A investigations to diverse country contexts.

5.5. Paradigm Shift in FDI Research

The temporal analysis reveals a fundamental reorientation of the research agenda that merits explicit discussion. The decline of Topics 1 and 3 from collectively accounting for 100% of early-period publications to 54.8% in the recent period, coupled with the emergence of Topics 2 and 4 from complete absence to 45.2% of recent publications, demonstrates a paradigm shift from traditional FDI determinant research toward sustainability-integrated investigations.

This paradigm shift reflects broader transformations in the global investment landscape. The Paris Agreement, Sustainable Development Goals, and proliferation of ESG disclosure requirements have created new institutional pressures that reshape corporate investment calculus. Firms increasingly face expectations from investors, regulators, and civil society to demonstrate environmental responsibility, generating incentives for green M&A strategies documented within Topic

4. Simultaneously, host country governments have implemented carbon pricing, green finance policies, and environmental enforcement mechanisms that condition FDI attractiveness in ways not captured by traditional institutional quality indicators.

The paradigm shift also reflects methodological evolution within the field. The application of difference-in-differences estimation to policy experiments (Yi et al., 2024; Zhang et al., 2024), the examination of peer spillover effects (Yang et al., 2024), and the analysis of digital transformation synergies (Liu et al., 2024) represent methodological advances that enable more rigorous causal identification than correlational approaches prevalent in earlier research. This methodological sophistication enhances confidence in findings regarding policy effects on corporate investment behaviour.

5.6. Reconciling Competing Hypotheses

The systematic review enables reconciliation of seemingly contradictory findings regarding FDI-environment relationships by explicating the boundary conditions under which competing hypotheses hold. The pollution haven hypothesis finds support in contexts characterised by significant regulatory differentials between home and host countries, weak environmental enforcement, and M&A as the dominant entry mode. Under these conditions, firms can exploit regulatory arbitrage by acquiring existing facilities in pollution havens, thereby avoiding the costs of environmental compliance without the capital requirements of greenfield investment.

Conversely, the pollution halo hypothesis receives support in contexts characterised by strong host country governance, greenfield investment as the dominant entry mode, and technology-intensive sectors where competitive advantage derives from environmental innovation. Under these conditions, foreign investors transfer superior environmental technologies and management practices, generating positive spillovers that improve host country environmental performance.

The moderating role of institutional quality operates differently across these scenarios. For pollution haven effects, weak institutions enable regulatory arbitrage by failing to enforce environmental standards, while for pollution halo effects, strong institutions create absorptive capacity for technology transfer and credible commitment to environmental protection that attracts sustainability-oriented investors. This contingent moderation explains why institutional quality exhibits heterogeneous effects across entry modes, as documented by Doytch et al. (2023).

5.7. Research Gaps and Future Directions

Despite the substantial contributions documented in this systematic review, several research gaps warrant attention in future investigations. First, the limited attention to geopolitical risk as a determinant represents a significant lacuna given heightened global tensions, supply chain disruptions, and great power competition that have characterised the recent period. Future research should examine how geopolitical considerations differentially affect greenfield versus M&A decisions, potentially revealing new patterns of investment reallocation in response to political risk.

Second, the geographical concentration of Topic 4 research in Chinese contexts limits understanding of green M&A dynamics in alternative institutional settings. Future research should extend ESG-FDI investigations to diverse country contexts including developed economies, other emerging markets, and developing countries with varying institutional configurations. Comparative studies examining cross-national variation in green M&A determinants and outcomes would enhance theoretical understanding and policy relevance.

Third, the causal mechanisms linking FDI entry modes to environmental outcomes remain incompletely specified. While the reviewed literature documents associations between investment modes and environmental indicators, the micro-level processes through which these effects materialise – including technology transfer, knowledge spillovers, competitive pressure, and regulatory compliance – require more detailed investigation. Firm-level studies employing qualitative methods could complement aggregate quantitative analyses by illuminating the decision processes underlying environmentally consequential investment choices.

Fourth, the long-term developmental effects of different FDI modes remain underexplored. Most studies within the corpus employ cross-sectional or short panel designs that cannot capture the sustained growth and environmental trajectories associated with foreign investment. Longitudinal studies tracking investment projects over extended periods would provide more robust evidence regarding the persistence and magnitude of FDI effects on host country development.

Fifth, the interaction between digital transformation and green investment represents an emerging frontier with limited systematic investigation. Studies by Liu et al. (2024) and Zhang et al. (2023) suggest that digitalization creates synergies with environmental performance, but the mechanisms and boundary conditions of these

digital-green complementarities require further elaboration. As both digital and sustainability transitions accelerate, understanding their intersection becomes increasingly salient for both theory and practice.

5.8. Limitations

This systematic review is subject to several limitations that should inform interpretation of findings. First, the reliance on Scopus as the sole bibliographic database may have excluded relevant publications indexed in alternative databases such as Web of Science or Google Scholar. While Scopus provides comprehensive coverage of the social sciences, business, and environmental domains central to this investigation, database-specific indexing practices may introduce selection bias.

Second, the restriction to English-language publications potentially excludes relevant research published in other languages, particularly from non-Anglophone emerging economies that are significant FDI recipients. This linguistic limitation may bias findings toward perspectives prevalent in Anglophone scholarship while underrepresenting alternative theoretical frameworks and empirical contexts.

Third, the temporal boundary of 2016-2025 captures recent scholarship but excludes foundational works from earlier periods that may inform theoretical understanding. While this boundary ensures contemporary relevance, it potentially limits engagement with seminal contributions that established conceptual foundations for current research streams.

Fourth, the structural topic modelling approach, while providing systematic thematic identification, involves subjective interpretation in labelling and characterising topics. Alternative analytical approaches or different parameterisations might yield somewhat different thematic structures, and readers should interpret topic labels as informed characterisations rather than definitive categorisations.

Fifth, the reliance on publication counts and citation metrics as indicators of research trends and impact may not fully capture the practical influence of scholarship on policy and practice. Highly cited works are not necessarily the most policy-relevant, and emerging research streams with lower citation counts may nonetheless address salient contemporary challenges.

6. CONCLUSION

This systematic review has synthesised the burgeoning literature examining foreign direct

investment entry modes, institutional quality, and environmental outcomes. Through structural topic modelling of 126 documents published between 2016 and 2025, four distinct thematic clusters were identified: Cross-Border M&A and Institutional Distance, Greenfield FDI and Economic Development, Green Innovation and Carbon Policy, and ESG Performance and Sustainable Investment. The analysis reveals a paradigm shift from traditional FDI determinant research toward sustainability-integrated investigations, with ESG considerations emerging as critical factors shaping contemporary investment decisions.

The findings address the three research objectives by demonstrating that: (1) ESG considerations,

particularly environmental regulations and carbon risk, have emerged as significant determinants of FDI entry mode choice alongside traditional institutional quality factors; (2) the pollution haven and pollution halo hypotheses exhibit contingent validity across entry modes, with M&A more susceptible to regulatory arbitrage and greenfield investment more conducive to technology transfer; and (3) institutional quality moderates FDI-environment relationships through multiple mechanisms that require entry mode-specific theorising. These contributions advance understanding of how foreign investment can be channelled toward achieving the Triple Bottom Line outcomes of economic prosperity, environmental sustainability, and social well-being.

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