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DIGITAL GREENWASHING IN QUICK COMMERCE: A BIBLIOMETRIC ANALYSIS AND SYSTEMATIC REVIEW OF LITERATURE

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Abstract

Purpose: Quick commerce (q-commerce) compresses delivery into minutes and decision time into seconds, yet little is known about how green claims are communicated, perceived and verified inside q-commerce apps. This study maps and synthesizes the evidence on digital greenwashing in quick commerce between 2015 and 2026. Furthermore, the study aligns with the United Nations Sustainable Development Goals (SDGs), specifically *SDG 12 (Responsible Consumption and Production)* by addressing deceptive sustainability marketing and consumer decision-making, and *SDG 13 (Climate Action)* by scrutinizing the authenticity of environmental and low-emission delivery claims.

Design/methodology/approach: A bibliometric analysis of a Scopus export (n=35 screened records) was combined with a PRISMA 2020-style systematic literature review to 122 studies drawn from the Scopus export and an author-curated database of 138 records (after removal of 7 duplicates and 51 ineligible records). Performance analysis, keyword co-occurrence, co-citation and reference-year analyze is run in Python; the review corpus was coded and thematically synthesized.

Findings: The literature is very young and fragmented: 72% of the 122 reviewed studies appeared in 2025–2026, no author in the bibliometric corpus has more than one document, and the intellectual base rests on a few general greenwashing works. Six themes emerge: firm-level drivers and consequences, consumer response, digital and AI-mediated communication, interface design and dark patterns, the quick-commerce context, and mitigation. Only one study examines green claims in quick commerce directly, and none examines sustainability cues in q-commerce app interfaces. Surveys dominate (38%), while platform-level and field evidence is scarce.

Originality/value: The paper offers the first bibliometric and systematic synthesis that joins green washing, dark-pattern and quick-commerce research, proposes an integrative framework linking platform-side stimuli, consumer cognition, trust and outcomes, and sets out a prioritized research agenda. By mitigating deceptive digital cues and fostering transparent sustainability reporting, the proposed framework also provides actionable pathways for platforms and policymakers to advance SDG 12 (Target 12.6 and 12.8) and SDG 9 (Industry, Innovation and Infrastructure) toward ethical digital ecosystems.

Keywords: digital greenwashing; quick commerce; green claims; green trust; dark patterns; bibliometric analysis; systematic literature review; PRISMA

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Introduction

Quick commerce promises groceries, personal-care items and household essentials at the door within minutes. The model rests on dense networks of dark stores, app-based ordering and gig-based last-mile delivery. Researchers working on the sector have noted that such rapid delivery can compromise sustainability through carbon emissions and rapid-shipping practices (Choubeyetal., 2025). In exact time, platforms and brands compete on the same small screen to appear responsible: eco-labels, —sustainable filters, green badges and sponsored placements all compete for a few seconds of attention.

This setting is where green washing, broadly gap between what a firm communicates about as environmental performance and what it actually does (Delmas & Burbano, 2011; Lyon&Montgomery, 2015)s, becomes a digital problem. Evidence from online marketplaces suggests why. Platform-level sales data from two Chinese marketplaces show vague domain language and function-stacking boosted sales (Zhang et al., 2025b). Large-scale analyze to nearly 17,000 fashion products at two German online retailers found that only 14% of products tag as ecofriendly carried a good third-party verify label (Gossen et al., 2022). Review-mining work on e-commerce data reports a sustainability language to consumer review is not associated with higher ratings or satisfaction (Mirabdolbaghietal.,2026). Digital channels therefore both amplify unverifiable green signals and offer new tools to detect them.

Three streams of research bear on the problem but have rarely been joined. The greenwashing literature explains why consumers become skeptical and lose green trust ((Chen & Chang, 2013; Szabo & Webster, 2021)). The dark-pattern literature documents how interface design steers choices ((Mathur et al., 2019;Witte,2025)).The quick-commerce literature describes adoption, logistics and platform labour ((Panesar et al., 2026; Peng & Mun, 2025; Sorooshian, 2026)). A recent bibliometric and systematic review covers green washing in marketing in general (Persakis et al., 2025), but, within the evidence examined here, no synthesis has examined digital greenwashing specifically in the compressed, algorithm-driven environment of quick commerce.

This paper addresses that gap with a combined bibliomteric analysis and systematic literature review (SLR) covering 2015-2026. It answers five research questions:

RQ1.How has research on digital greenwashing and adjacent topics developed in volume, venues, geography and collaboration?

RQ2.What intellectual structure (foundational works and thematic clusters) underlies this literature?

RQ3.What do existing studies show about how digital green claims are produced , perceived and verified, and with what consumer and firm outcomes?

RQ4.What is known about greenwashing in quick-commerce and otherfast, low-deliberation platform settings?

RQ5.Which theoretical, methodological and contextual gaps should guide future research?

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The contribution is threefold: (i) a transparent, reproducible mapping of a nascent field using a documented screening trail;(ii)a thematic synthesis that connects consumer-response, interface-design and quick-commerce evidence; and (iii) an integrative framework and agenda tailored to quick commerce.

1. Conceptual background Greenwashing: definitions and drivers

Greenwashing is commonly defined as the combination of poor environmental performance with positive communication about it ((Delmas & Burbano, 2011; Lyon & Montgomery, 2015)). Delmas and Burbano (2011) locate its drivers at the external (regulatory, NGO and market), organisational and individual levels, while Lyon and Montgomery (2015) show that it takes many forms and that its means and ends vary. A systematic review by de Freitas Netto et al. (2020) classifies concepts and forms of greenwashing, and Marquis et al. (2016) showthat scrutinyand norms shape selective disclosure. On the consumerside,perceived greenwashing raises green consumer confusion and green perceived risk, which erode green trust (Chen & Chang, 2013). Sustainability ratings have been proposed as one deterrent (Parguel et al., 2011).

Not all gaps between talk and action take the form of exaggeration. Guercini et al. (2025) study green blushing, under-communication of sustainable in digital environments, and identify six drivers, including fear of greenwashing accusations. Together, over-claiming and under-claiming show the digital sustainable communication shaped as much credibility risk by marketing opportunity.

Digital greenwashing

Digitalisation changes both the production and the reception of green claims. Brands can publish claims instantly, in many formats and at the point of purchase. Conceptual work frames greenwashing as a digital marketing strategy (Yilmaz & Abanoz, 2025) and identifies platform amplification, algorithmic bias, manipulation of social proof and false transparency as mechanisms of trust erosion (Tathavadekar & Mahankale, 2025). Generative AI adds a further layer: authorship labels become credibility cues in their own right (Israfilzade, 2026). In this paper, digital greenwashing is therefore treated as the use of digital interfaces, content formats and algorithmic delivery to communicate environmental claims that are vague, unverifiable or inconsistent with performance.

Quick commerce as a distinctive setting

Fast commerce differs from conventional e-commerce on three dimensions relevant here. First, decisions are fast and often low-involvement, which limits systematic processing of claims. Second,the interface is compressed: small product tiles, badges and filters carry most of the information. Third, the operating model—dark stores and rapid last-mile delivery—has its own environmental footprint ((Andreas,2024;Choubeyetal.,2025;Pintadoetal.,2022)). Signalling theory ((Connellyetal.,2011)) offers a natural lens, since consumers must infer visible environmental quality to observable signals, and dual-process logic of the elaboration likelihood model predicts heavier reliance on peripheral cues under time pressure.

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2. Methodology Research design and reporting standards

The study combines two complementary methods. Bibliometric analysis maps quantitative patterns in publications, sources, countries, keywords and citations ((Aria & Cuccurullo, 2017; Donthu et al., 2021)).The literature review follows an explicit protocol of eligibility, screening and coding in the spirit of proof-informed management reviews ((Tranfield et al., 2003)) and is reported with a PRISMA 2020-style flow diagram ((Page et al., 2021)). Because the evidence base comes from two sources, the flow diagram was adapted accordingly (Figure 1).

Data sources

Source 1 is a Scopus export (CSV, 42 records, 45 fields, extracted 2 October 2026). The export does not record the search string. The exact query should be inserted here before submission: [("digital greenwash*" OR "online greenwash*" OR "dark pattern*" OR "eco-badge*" OR "green nudge*" OR "choice architecture" OR "interface design") AND ("e-commerce" OR "m-commerce" OR "mobile app*"OR"onlineplatform*" OR"retailapp*"OR"mobileshopping")AND("consumerbehavior"OR "consumer behaviour" OR "trust" OR "perceived deception" OR "user experience")]. Source 2 is an author-curated research-paper database (Excel workbook, 138 records) holding bibliographic details, objectives, methodology, key findings and thematic tags. It was assembled from a library spreadsheet and a ranked list of the 20 most relevant digital-greenwashing papers; the original search strategies for these records are not documented in the workbook and are there for not reported. Bibliometric indicators were computed only on the Scopus export, because only Scopus records carry the affiliation, keyword, citation-count and cited-reference fields needed for science mapping. The systematic review used both sources.

Eligibility criteria

Table 1 lists the inclusion and exclusion criteria applied on both sources.

Table1. Eligibilitycriteriausedforscreening.

Criterion	Inclusion	Exclusion
Topic(IC1/EC1)	Addresses (a) greenwashing, unverifiable or misleading green claims, or sustainability signalling, trust or skepticism in consumer-facing contexts; or (b) deceptive or manipulative digital design (dark patterns, nudges, fake reviews) in commerce; or (c) quick-commerce, on-demand or dark-store platforms with a consumer or sustainability dimension	No link to green claims, deception, e-commerce trust or quick-commerce(off-topic)

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Criterion	Inclusion	Exclusion
Context(EC2)	Commercial, consumer or platform setting	Generic usability or interface studies of non-commercial apps (health, government, education, assistive)with no sustainability, deception or commerce link
Focus(EC3)	Consumer, communication, governance or sustainability dimension	Purely operational optimization (routing, fleet, scheduling, data infrastructure)
Timewindow(IC 3)	Published2015–2026	Publishedbefore2015ordatedafter2 026
Document(IC2/ EC4)	Journal article, book chapter, book, conference paper or preprint with an English abstract	Errata and corrections
?		
Duplicates(EC5)	One record per work	Repeated records with in or across sources

Screening, DE duplication and data-quality checks

Records were matched on normalized DOI and title. Seven duplicates were removed: two records appear in both sources (Zhangetal. (2025b) and Choubeyet al. (2025)),and five database rows (S.No133–136 and 138) repeat earlier rows (S.No 117, 90, 64, 103 and 93) under slightly different titles. The workbook‘s merge log reports only one duplicate removed, so these five were missed at merging. The duplicate rows also carry DOIs that differ from those of the retained rows; the retained rows, which include volume and page details consistent with their DOIs, were kept. One of the discarded DOIs (10.1504/IJGE.2025.100000) has the form of a placeholder and should not be cited.

The remaining173 records were screened against the criteria in Table1on titles, abstracts, keywords and the database‘s recorded objectives, methods and findings. This yielded 51 exclusions and 122 included studies. Two details of the Scopus export were handled explicitly: an erratum was removed, and one record carrying a 2027 volume date was excluded by the time-window criterion. Author names were disambiguated with Scopus author identifiers, because two different authors share the label —Mitra A.

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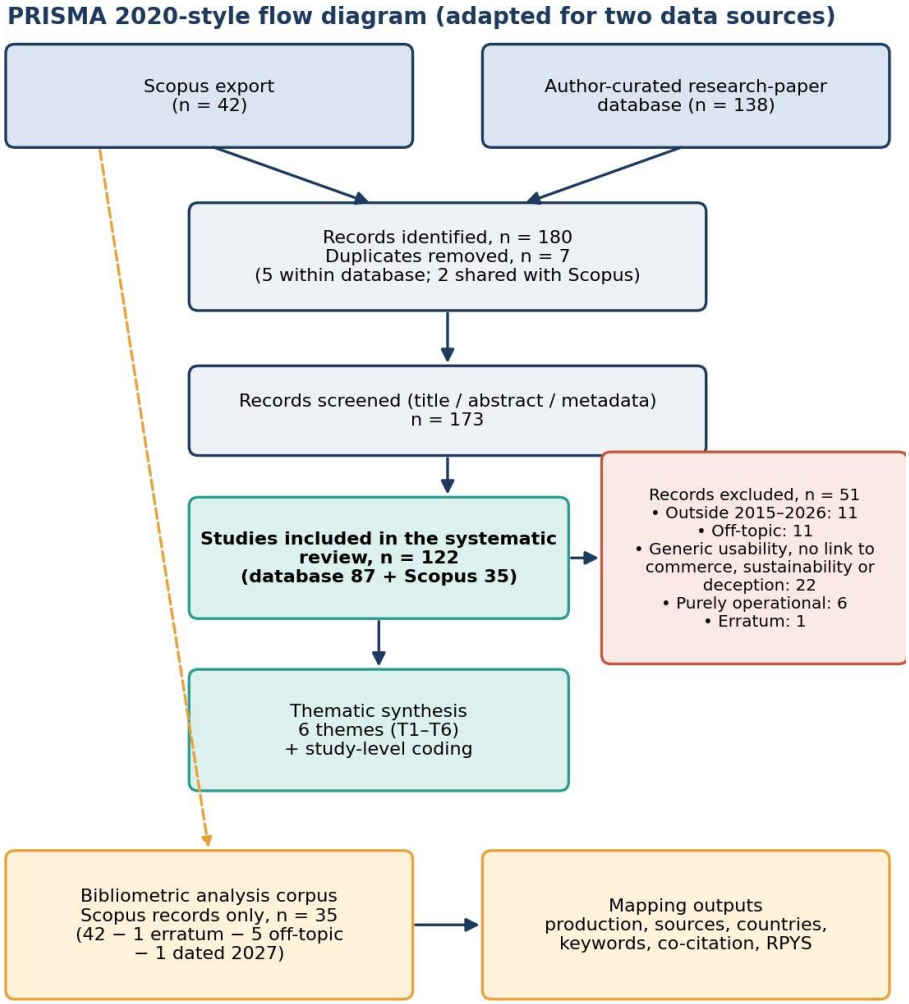

Figure 1. *PRISMA 2020-style flow diagram adapted to two data sources. Counts are from the screening log in the supplementary workbook.*

Bibliometric procedures

Performance indicators (documents, citations, h-index of the corpus, document types, access status)were computed from the Scopus fields ((Hirsch, 2005)). Countries were extracted from affiliation strings with full counting, so a document with authors in several countries counts once for each country.

Internationally co-authored documents were identified from affiliations, not from corresponding-author data, so the multi-country share is an approximation. Author keywords were lower-cased and merged where spelling varied; a keyword co-occurrence network was built for terms occurring at least twice, and clusters were detected with greedy modularity maximization in Network X. Cited references were parsed from the—References‖ field and matched on first author, year and title stem to find works cited by atleast two corpus documents (co-citation counts) and to draw a reference publication-year spectrum. Analyses were run in Python (pandas, NetworkX, Matplotlib); dedicated utensil such as VOS viewer ((van Eck & Waltman, 2010)) or bibliometrix ((Aria & Cuccurullo, 2017)) can reproduce them from the same export.

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Coding and synthesis

Each included study was coded for primary theme, research design, named theories and identifiable study setting. Theme assignment used the study‘s main contribution, and each study received one primary theme. Design and theory codes were generated from the recorded method and abstract text with keyword rules and then checked and corrected manually; setting was coded only where a country is stated in the record. Synthesis was narrative and thematic. No formal risk-of-bias appraisal was performed, because manyrecords were available only as abstracts and metadata; instead there view reports design type as a proxy for evidential strength.

3. Bibliometric results

Corpus overview

The bibliometric corpus holds 35 documents from 29 source titles, written by 125 distinct authors from 24 countries (Table 2). All records are dated 2022 or later, and 32 of 35 (91%) are dated 2025–2026.

Collaboration is the norm (3.57 authors per document; only 5 single-authored documents), and 12 documents (34%) have affiliations in more than one country. Citation impact is highly skewed: the 219 citations are concentrated in a few documents, the median is1, 16documents (46%) are uncited and the corpus h-index is 7.

Table2. Main information about the bibliometric corpus (Scopus export after cleaning).

Indicator	Value
Documents(screened corpus)	35
Publication years of records	2022–2026(2022:1;2023:2;2025:14;2026:18;nonein2024)
Source titles	29
Authors(distinct Scopus IDs)	125
Single-authored documents	5
Authors per document/permulti-authored document	3.57/4.00
Documents with multi-country affiliations	12 (34%)
Countries in affiliations	24
Document types	Article(23),Bookchapter(9),Review(1),Book(1), Conference paper(1)
Open access(any category)	18 (51%)

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https://cgscopus.com/index.php/journal

Indicator	Value
Unique author keywords(documents with keywords)	108(26documents)
Cited references parsed(documents with reference lists)	2,386(34 documents)
Total citations/mean/median	219/6.26 /1
Un cited documents	16 (46%)
h-index of the corpus	7

Scientific production

Output rises sharply (Figure 2). After one document in 2022 and two in 2023, no record is dated 2024, and 2025 and 2026 contribute 14 and 18 documents. Because the data were exported on 2October 2026, 2026 is incomplete, so the true acceleration is larger than shown. The gap in 2024 should be interpreted cautiously: it may reflect the search string, indexing lags or the narrow topical filter, since the database search string was not recorded in the export.

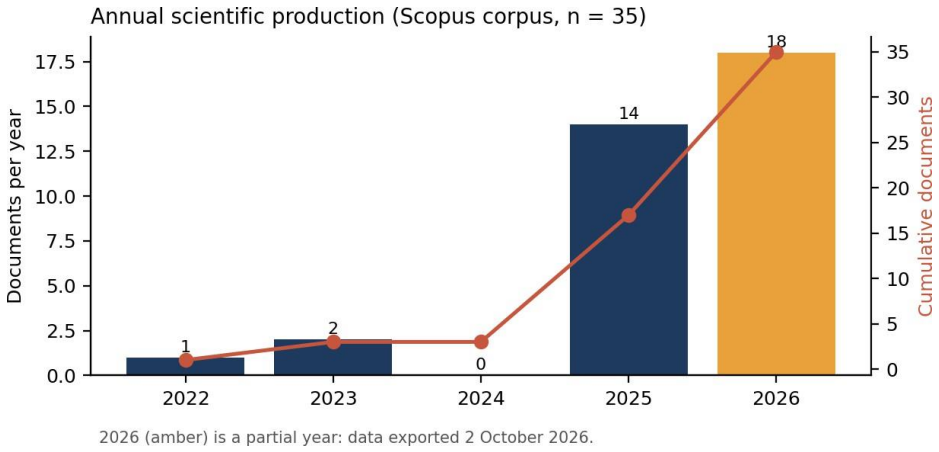

Figure2. *Annual scientific production and cumulative growth of the Scopus corpus(n=35).*

Document types and access

Journal articles dominate (23 of 35), but 9 documents are book chapters and one is an edited book, so about 29% of the corpus sits in edited volumes (Figure3). 18 documents(51%) are open access in some form. The high share of chapters is a sign of a topic still being framed in practitioner-oriented volumes, which are typically less likely to report new empirical tests.

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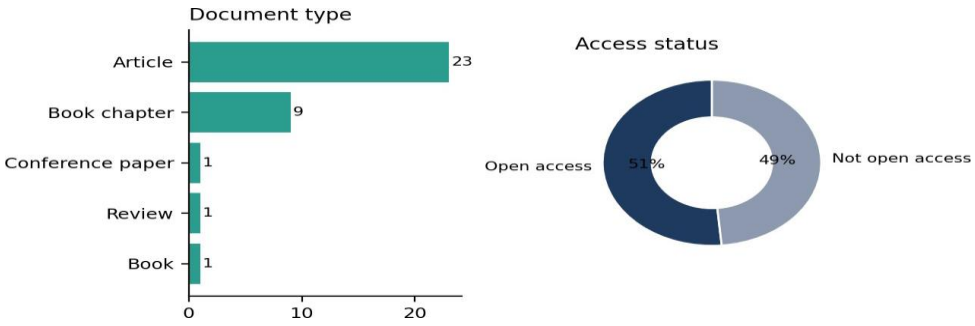

Figure3.*Documen ttypes and open-access status.*

Sources and publishers

The literature is widely dispersed: 29 source titles carry 35 documents. Sustainability leads with 4 documents, follow the Business Strategy and the Environment (2), book series World Sustainability Series (2) and the edited book tackle Greenwashing to Ethical Marketing Intelligence and Environmental Governance (2) (Figure 4). IGI Global (6 documents), MDPI (5), and Wiley, Emerald, Elsevier and Springer Nature (3 each) are the main publishers. With no source holding more than a nominal core, Bradford-type zoning would not be informative at this size.

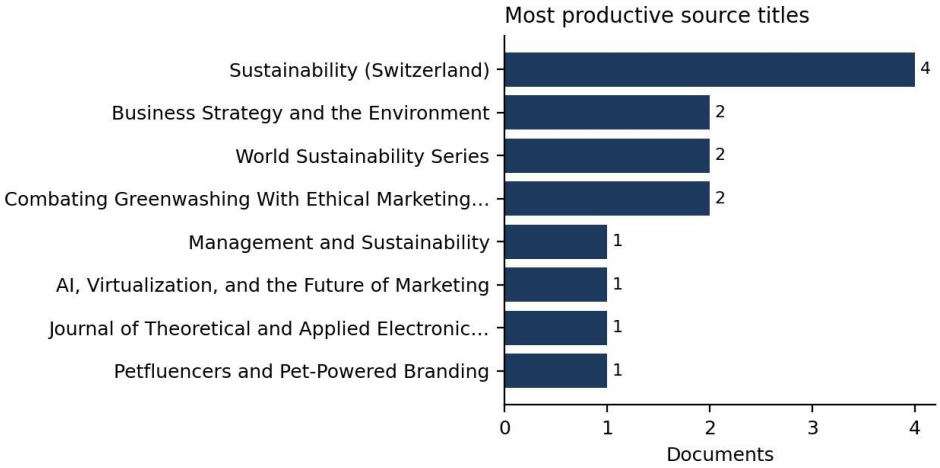

Figure4.*Most productive source titles in the Scopus corpus.*

Authors, countries and collaboration

No author has more than one document, so a Lotka-type productivity analysis is not meaningful and the field has no established core group of authors. India a largest productive country (12 documents), follow by China (6), United Kingdom (5), Italy (4) and Saudi Arabia (3). By citations, China (106) and Hong Kong (87) lead, but this ranking is driven largely by one highly cited supply-chain model with Hong Kong and mainland-China authors (Dong et al., 2023); Italy (38) and India(33)follow(Figure5).TheIndianleadinvolumeisrelevantforaq-commercetopic,sinceIndiais one of the settings where the business model has expanded quickly.

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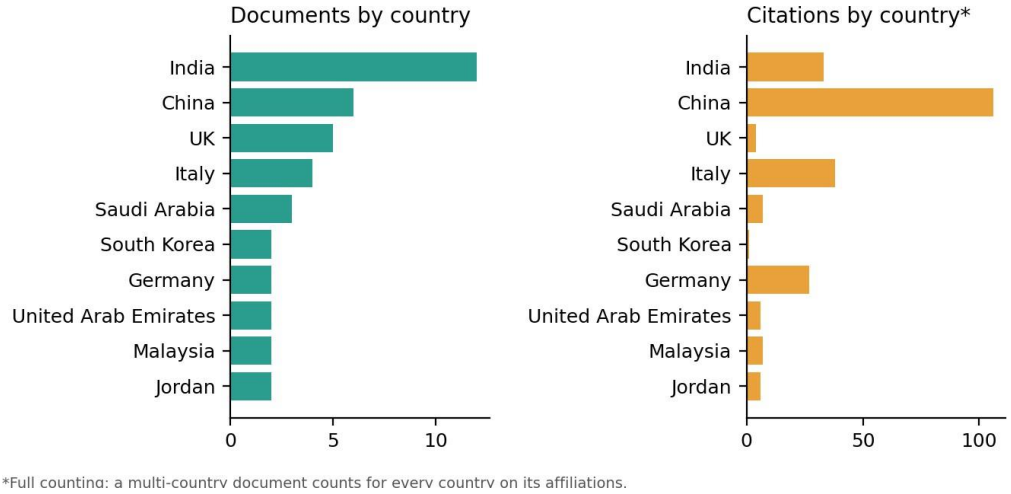

Figure5. *Country productivity and citations (full counting by affiliation).*

Most influential documents

Table 3 and Figure 6 list the ten most cited documents. Dong et al. (2023) account for 87 of the 219 citations in the corpus, so the citation distribution is dominated by one document. The set mixes analytical supply-chain models with greenwashing (Dong et al., 2023), an analysing to sustainability labels in online fashion retail(Gossenetal.,2022), thequick-commerce green-claims study (Choubeyet al., 2025) and a review of blockchain against greenwashing (Silkoset & Nygaard, 2025).

Table3. Ten most cited documents in the corpus(Scopus—Citedby‖,asofexport).

#	Document	Source	Cites
1	Dong et al. (2023): Logistics outsourcing: Effects of greenwashing and blockchain technology	Transportation Research PartE: Logistics and Transportation Review	87
2	Gossen et al. (2022): Nudging Sustainable Consumption: A Large-Scale Data Analysis of Sustainability Labels for Fashion in German Onli…	Frontiers in Sustainability	27
3	Choubeyetal.(2025):Signals vs.Reality: Consumer Responses toGreen Claims in QuickCommerce	Business Strategy and the Environment	24
4	Silkosetetal.(2025):Leveraging Blockchain and Smart Contracts to Combat Greenwashing in Sustainable Development	Sustainable Development	21
5	Guercinietal.(2025):To Tell or Not to Tell? On the Under Communicating of Sustainability in Digital Environments	Business Strategy and the Environment	14

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https://cgscopus.com/index.php/journal

#	Document	Source	Cites
6	Yu et al. (2025): Dynamic decision-making of the e-commerce supply chain considering greenwashing and sales format	Socio-Economic Planning Sciences	9
7	Kokash et al. (2025):Environmental Concern and Digital Engagement as Drivers of Circular Product Buying Intention in Malaysia: an Int…	Circular Economy and Sustainability	7
8	Al-A babnehet al.(2025): Using block chain and digital marketing to build trust in green projects	E3SWebofConferences	6
9	Zhangetal.(2025): Unverifiable Green Signals and Consumer Response in E-Commerce: Evidence from Platform-Level Data	Sustainability	5
10	Jainetal.(2025): Navigating environmental regulations in digital marketing: Ensuring compliance while promoting green claims	Regulatory Frameworks and Digital Compliance in Green Marketing	5

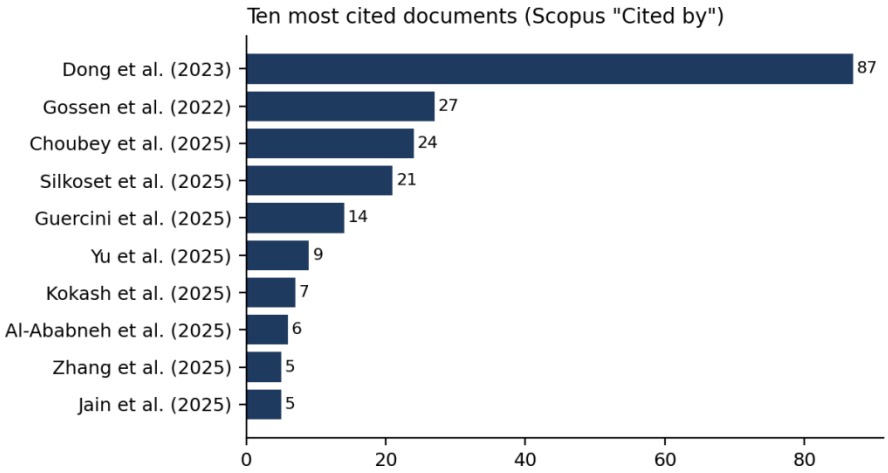

Figure6.*Ten most cited documents.*

Keywords and thematic clusters

Author keywords confirm a focus on green washing (11ofthe26documentsthatcarrykeywords), digital marketing (7), e-commerce (6) and sustainability (5) (Figure 7). Terms linked to verification and technology (blockchain 3, artificial intelligence 2, transparency 2) and to trust (green trust 2) form the second layer. —fast commerce is not appearing among author keywords of the corpus, which confirms the gap this study addresses. Of 108 distinct author keywords, only 18 occur at least twice, so the co-occurrence map (Figure 8) is deliberately restricted to those terms.

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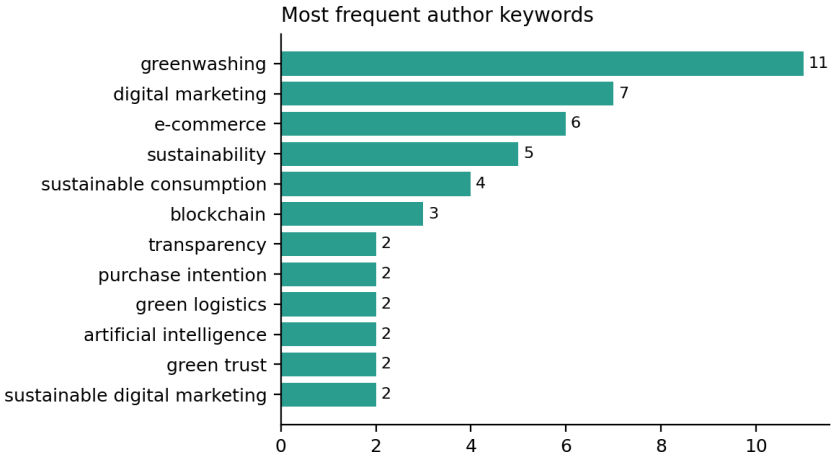

Figure7.*Most frequent author keywords.*

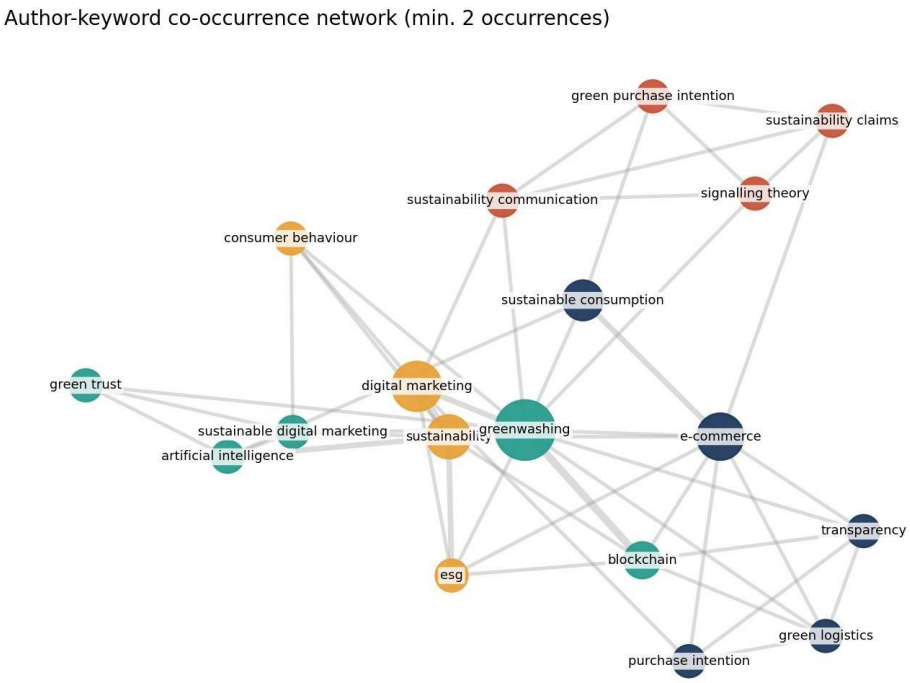

Figure8.*Co-occurrence network of author keywords occurring atleast twice. Node size reflects frequency; colours indicate clusters from greedy modularity maximization.*

Four clusters emerge (Table 4). Average publication years show that artificial intelligence, green trust, ESG, sustainable digital marketing and sustainability communication are the newest terms(average year 2026.0),while green logistics (2024.5) and block chain (2024.7) are older. Given the small corpus, these overlays are indicative only.

Table4. Keyword clusters(authorkeywordsoccurring≥2times).

Cluster	Keywords
Platform operations and transparency(navy)	e-commerce, green logistics, purchase intention, sustainable consumption, transparency

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Cluster	Keywords
Technology-mediated verification and trust(teal)	Artificial intelligence, blockchain, greentrust, greenwashing, sustainable digital marketing
Digital marketing and ESG (amber)	Consumer behaviour, digital marketing, esg, sustainability
Claims, signaling and communication(red)	Green purchase intention, signaling theory, sustainability claims, sustainability communication

Intellectual base: co-cited references and reference years

A 34 documents with reference lists cite 2,386 references, of which only115 are cited by two or more documents, a low overlap that again indicates fragmentation. The most co-cited works (Table 5) are general greenwashing references: Delmas and Burbano (2011) is cited by 13 documents, Lyon and Montgomery(2015)by7andChenandChang(2013)by6,followed by a systematic review of idea and forms of greenwashing (de Freitas Netto et al., 2020), work on perceived greenwashing, sustainability ratings and selective disclosure, and Ajzen's assumption of Planned Behavior. Blockchain in sustainable supply chains and information transparency also appear. Among the most co-cited works none is digital-specific or concerned with quick commerce, so the field's foundations are still the general ones. The reference year spectrum (Figure 9) peaks in recent years (median reference year 2022), which shows that the literature builds on very recent work.

Table5. Mostco-cited references (number of corpus documents citing each work).

Citedby	Reference(aslistedin Scopus)
13	DelmasM.A.;BurbanoV.C.,TheDriversofGreenwashing,California Management Review, 54, 1, pp. 64-87, (2011)
7	LyonT.P.;MontgomeryA.W.,Themeansandendofgreenwash,Organization & Environment, 28, 2, pp. 223-249, (2015)
6	Chen Y.-S.; Chang C.-H., Greenwash and Green Trust: TheMediation Effects of Green Consumer Confusion and GreenPerceivedRisk,JournalofBusinessEthics,114,3,pp.489-500,(2013)
5	de Freitas Netto S.V.; Sobral M.F.F.; Ribeiro A.R.B.; SoaresG.R.D.L.,ConceptsandFormsofGreenwashing:ASystematicReview, Environmental Sciences Europe, 32, pp. 1-12, (2020)
4	SzaboS.;WebsterJ.,PerceivedGreenwashing:TheEffectsofGreenMarketing on Environmental and Product Perceptions, Journal of Business Ethics, 171, 4, pp. 719-739, (2021)

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Citedby	Reference(aslistedin Scopus)
4	Parguel B.; Benoit-Moreau F.; Larceneux F., How sustainability ratings might deter_ greenwashing‘: A closer look at ethical corporate communication, Journal of Business Ethics, 102, 1,
4	Marquis C.; Toffel M.W.; Zhou Y., Scrutiny, Norms, and SelectiveDisclosure:AGlobalStudyofGreenwashing,OrganizationScience,27, 2, pp. 483-504, (2016)
4	AjzenI.,The theory of planned behavior, Organizational Behavior and Human Decision Processes, 50, 2, pp. 179-211, (1991)
3	Zhang L.; Li D.; Cao C.; Huang S., The influence of greenwashing perception on green purchasing intentions : the mediating role of green word-of-mouth and moderating role of green concern,…
3	Yang Z.; Nguyen T.T.H.; Nguyen H.N.; Nguyen T.T.N.; Cao T.T., Greenwashing behaviours: Causes, taxonomy and consequencesbasedonasystematicliteraturereview,JournalofBusinessEcono…

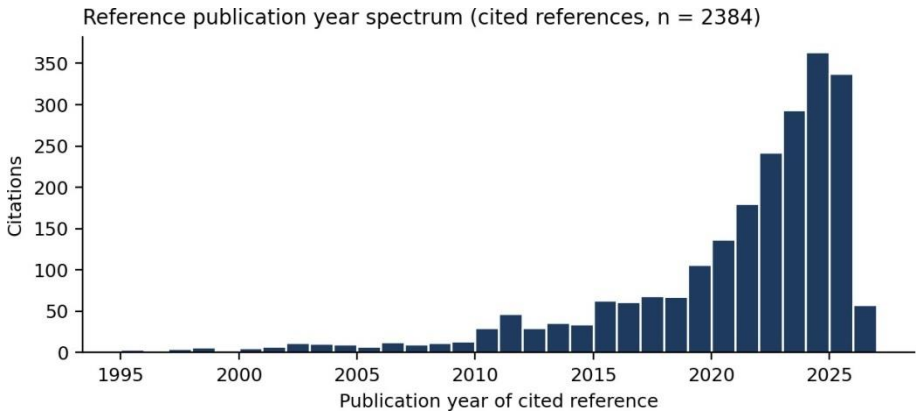

Figure9. *Reference publication-year spectrum of cited references.*

4. Systematic review result :Characteristics of the included studies

A 122 including study is publish between 2016 and 2026, and 88 (72%) appeared in 2025–2026. Thirty-five studies (29%) address consumer response (T2), the largest theme, followed by interface design and dark patterns (T4, 28), digital and AI-mediated communication (T3, 21), mitigation (T6, 16), the quick-commerce context (T5, 12) and firm-level drivers (T1, 10) (Figure 10). Digital and AI-mediated communication (T3) is the youngest theme: its earliest study dates from 2025.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

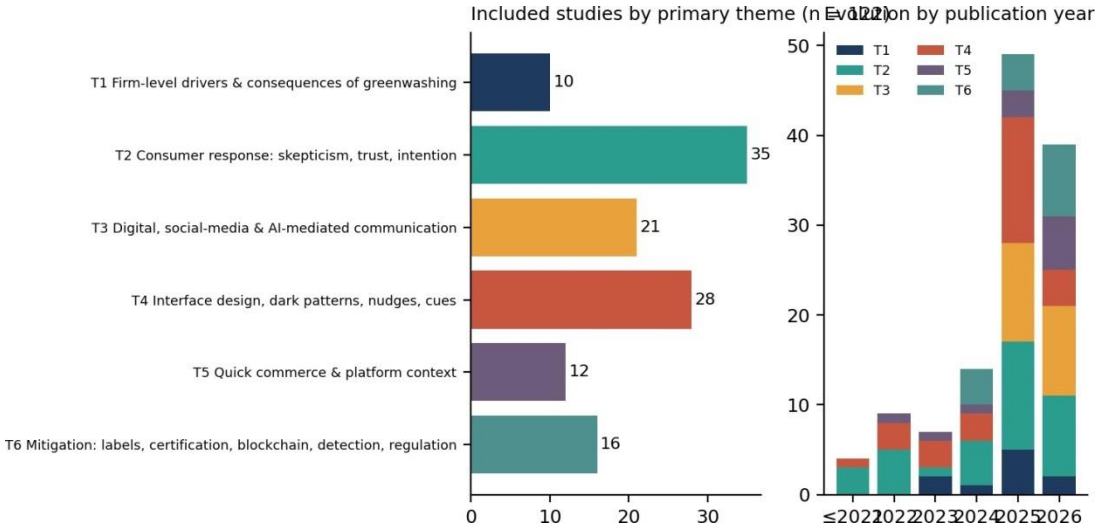

Figure10. *Included studies(n=122)by primary theme and publication year.*

Survey analyzing to structure equation modelling or regression to most ordinary design (46 studies,38%),followedbyexperiments(16),conceptual,legalorpolicypapers(16),qualitative and case studies (13) and studies using platform or secondary data and machine learning (10). Signalling theory, stimulus–organism–response model, the Theory of Planned Behaviour and information-asymmetry arguments are the most commonly named frameworks (Figure 11). Where a study setting can be identified (46 of 122 records), India, China and Vietnam are most common (Figure 12).

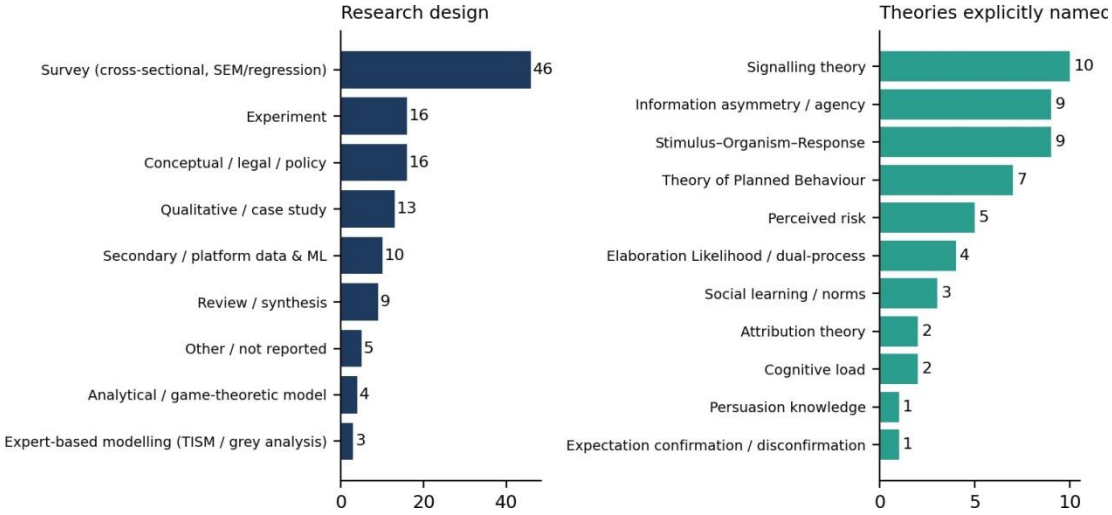

Figure11. *Research design and explicitly named theories across included studies. Design and theory codes are keyword-assisted.*

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ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
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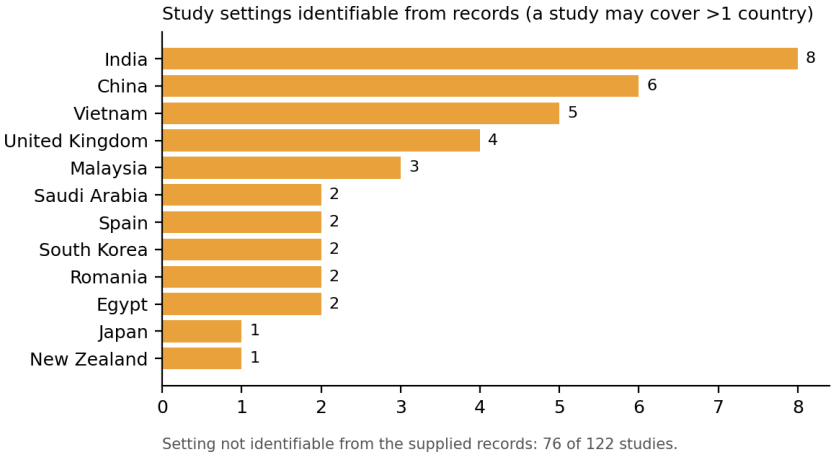

Figure12. *Identifiable study settings.*

Thematic synthesis

Table 6 summarises the six themes; the sections that follow synthesise the evidence for each.

Table6. Summary of the six themes in the systematic review.

Theme	N	Dominant design	Main insight	Representative studies
T1Firm-level drivers and consequences	10	Analytical/ game-theoretic model(2)	Greenwashing choice depends on exposure probability and penalty; markets punish exposure	(Dong et al., 2023; Xu etal.,2025;Yuetal.,2025a)
T2Consumer response	35	Survey(28)	Perceived greenwashing lowers trust and intention via skepticism, confusion and risk; mostly survey evidence	(Daouetal.,2025;Nagy-Kercsó et al., 2026;Najmudin et al., 2025;Nguyen et al., 2019)
T3Digital,socialandAI-mediatedcommunication	21	Survey(10)	Detection is inconsistent; AI labels and influencers act as credibility cues	(Balaskas&Yfantidou, 2026; Eze, 2025; Israfilzade,2026;Jaffari etal.,2026)
T4 Interface design, darkpatterns, nudges, cues	28	Experiment(11)	Interfaces steer choices; green cues rarely studied; no quick-commerce apptested	(Gossen et al., 2022;Tunceretal.,2024;Witte,2025;Zhangetal.,2025b)
T5Quickcommerceandplatformcontext	12	Survey(5)	Adoption and logistics context; one anchor study on green claims	(Alahmari et al., 2026;Choubey et al., 2025;Khanetal.,2026;Panesaret al., 2026)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

Theme	N	Dominant design	Main insight	Representative studies
T6Mitigation	16	Conceptual/legal/policy(4)	Blockchain, labels ,certification, detection tools, regulation, pre-bunking	(Marschlich & Hurtado,2024;Silkoset &Nygaard,2025; Timmons et al.,2024; Wang et al., 2026)

Firm-level drivers and consequences of greenwashing

Ten studies address the firm side of greenwashing. Their common insight is that greenwashing is a strategic response to the probability of exposure and the size of the penalty, not merely an ethical lapse. In two game-theoretic models of e-commerce supply chains, firms choose greenwashing depending on the probability that it is exposed and on the penalty (Dong et al., 2023; Yu et al., 2025a). Yu et al. (2025a) find that when exposure is unlikely, the manufacturer tends to greenwash, to the detriment of the platform. Dongetal.(2023) add that blockchain can deter greenwashing in principle, but a high adoption cost can still leave firms willing to take the risk.

Market evidence points in the same direction. Greenwashing news is linked to negative stock-market response, particularly in Asia-Pacific markets (Xu et al., 2025), and, in a study to building-materials manufacturers, expected outcomes drop as the threat of media disclosure of greenwashing grows (Li&Ding,2024).Studies one-commerce firms also point to a gap between declared and implemented sustainability: a multiple case study of seven e-commerce companies reports a substantial gap between dedication and real execution (Gazzola et al., 2026), and a chapter on e-commerce governance links greenwashing to ESG data-integrity failures (Das et al., 2026). On the opposite side, Guercini et al. (2025) show that fear of greenwashing accusations leads firms to under-communicate sustainability. These firm-level findings imply that platform-level verification matters, because it changes the exposure probability that drives firm behaviour.

Consumer response to perceived green washing

Thirty-five studies, the largest group, examine how consumers respond to perceived greenwashing, and 28 of them use cross-sectional surveys analysed with structural equation modelling or regression. The core finding is consistent: perceived greenwashing lowers trust, raises skepticism and weakens intention. Perceived greenwashing and perceived risk both lower consumer attitudes (Shojaei et al., 2024), and perceived greenwashing reduces purchase intention (for example $\beta = -0.43$ in the Chinese fashion market; (Yu et al., 2025c)) and works through green skepticism, which mediates the link to green purchase intention among Vietnamese buyers of green vegetables (Nguyen et al., 2019). Skepticism and brand trust jointly mediate the path to purchase intention, and environmental concern strengthens it (Najmudinetal.,2025).A Lebanese study traces a chain from belief disconfirmation to confusion, lower trust and weaker loyalty (Daou et al., 2025).

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

Several results qualify this picture. Greenwashing counter balances rather than cancels pro-environmental drivers in the extended Theory of Planned Behaviour (Di Pillo et al. (2025); (Ajzen, 1991)).

Greenwashing reduced green trust without affecting green word-of-mouth in Chinese fashion (Zhao et al., 2026),and it was not directly associated with green brand equity in one Vietnamese sample, possibly because of a halo effect (Ha, 2022). Moderators identified include information quality and brand reputation in Saudi skincare (Adiletal.,2024) and environmental knowledge in electric-vehicle purchase (Diep & Khoi, 2026; Li et al., 2025). Beauty and personal-care evidence is thin but consistent with the general model: an Indian survey of 393 respondents links greenwashing to lower trust and purchase intention (Singh et al., 2026), and a review of green-cosmetics research lists skepticism and greenwashing among inhibitors (Testa et al., 2024).

Qualitative work shows how consumers cope. In focus groups, signal degradation led to culturally embedded heuristic substitution rather than uniform rejection of green claims (Nagy-Kercsóet al.,2026), and a Spanish mixed-methods study documents credibility discounting along side a stated commitment to sustainability (Compte-Pujol et al., 2026). Even brands with a morally transgressive past can gain trust through sustainable production actions (Munaier C.G.-E.-S. et al., 2022), which suggests that consumers weigh recent credible action heavily. A small Indian sample found that 72% of women could not correctly define greenwashing and that most relied on visual cues such as colour, packaging and labelling (Garg & Narang, 2026), a finding that matters for small-screen shopping. Overall, the evidence supportsa robust negative effect of perceived greenwashing but rests mostly on self-reported intentions in deliberate purchase settings.

Digital, social-media and AI-mediated sustainability communication

Twenty-one studies address digital, social-media and AI-mediated sustainability communication. A meta-analysis of 24 studies from 2020–2025 concludes that consumers are increasingly aware of deceptive claims, yet detection remains inconsistent because of cognitive biases, platform-specific trust and the complexity of digital tactics (Eze, 2025). Influencers matter: authenticity and parasocial relationships relate positively to sustainable purchase intention in Greece and the United Kingdom, with trust adding explanatory power (Balaskas & Yfantidou, 2026), and the attractiveness, credibility and expertise of green influencers predict millennials‘ purchase intentions (Chan et al., 2025). Persuasion knowledge and skepticism partially mediate the effects of perceived greenwashing, literacy and credibility among young adults exposed to ESG-labelled online advertisements (Balaskas et al., 2025).

AI is a double-edged element. In an experiment with Generation Z participants, AI attribution raised greenwashing perceptions and lowered green trust, while the disclosed label, not the actual generative source, was the dominant cue, a pattern the author calls a transparency paradox (Israfilzade, 2026). In a UK survey of eco-label buyers, perceived AI-mediated sustainability communication related positively to authenticity and, through green brand trust, to purchase intention, but perceived greenwashing risk weakened the trust–intention link (Jaffari et al.,

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

2026). Conceptual work argues that algorithmic amplification and false transparency are mechanisms through which digital greenwashing spreads (Rao& Kaur, 2026; Tathavadekar & Mahankale, 2025). Several remaining entries in this theme are chapters on digital marketing for sustainability, ESG and tourism ((George, 2025; Katoch, 2026; Thangam et al., 2026)) that are largely conceptual or descriptive and report no new empirical tests.

Interface design, darkpatterns, nudges and platform cues

Twenty-eight studies concern interface design, dark patterns, nudges and platform cues. Almost none speaks to sustainability claims, but together they explain how interfaces shape trust. Consumer manipulation has been characterised along three dimensions: limited transparency, perceived restriction of autonomy and the feeling of being tricked (Witte, 2025). Expert-based studies identify user unawareness, trust in brands and normalisation of aggressive marketing as top barriers to resisting dark patterns (Singh et al., 2024), long-term economic and short-term marketing goals as leading motives for usingthem(Singh et al., 2025b), and user preference for short-termbenefits as a key challenge (Singh et al., 2025a). Experiments show that scarcity cues are associated with a perceived lack of vendor benevolence (Tuncer et al., 2024), and generative-AI voice search can reproduce social-proof, confirm shaming and scarcity patterns (Song&Yun,2025). A walk through of 100 New Zealand websites found that dark patterns cluster around financial transactions and most often take the form of interface interference (Lacey et al., 2023).

The studies that do touch sustainability show that interface cues can be both informative and misleading. Sustainability labels are widespread but rarely credible in German online fashion retail (Gossen et al., 2022), and vague green language and function-stacking increased sales on Chinese platforms (Zhang et al., 2025b). AI-based nudging, through personalisation, default green options, social proof and gamification, can raise engagement with sustainable purchasing (Panwar et al., 2025); the same machinery can in principle promote claims that cannot be verified, which makes interface design a two-sided variable. Information richness affects purchase behaviour through cognitive load, mental imagery and flow(Guoetal.,2025),and a peripheral-cue-based review aid was preferred over alternatives (Liu& Gao,2025), both consistent with heavier reliance on simple cues in fast decisions. No study in this theme examines a quick-commerce app.

Quick commerce, on-demand delivery and platform context

Twelve studies concern quick commerce, on-demand delivery or related platform settings, and they are mostly about adoption, logistics and labour. Q-commerce adoption studies show that technological advancement, effective marketing, social influence and service quality raise perceived value and trust, which in turn drive usage intention (Panesar et al., 2026), and that q-commerce use has a significant positive total effect on financial inclusion through digital literacy, platform accessibility and ecosystem trust (Khan et al., 2026). Operational and sustainability studies cover dark-store packing (Pintado et al., 2022), last-mile logistics in smart cities (Andreas, 2024), crowdshipping (Sorooshian, 2026), gig-work

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

sustainability(Peng&Mun,2025),platformbusinessmodels(Lebayle,2025),public-healthperceptions of on-demand delivery (Sims et al., 2026) and adoption of autonomous delivery vehicles, where green image is a significant positive factor (Lu et al., 2023). In a survey of 100 respondents across Blinkit and Zepto operations, HR sustainability practices showed weak, non-significant relationships with sustainability reporting (Keerthi et al., 2026).

Only one study examines green claims in quick commerce itself. Choubey et al. (2025) build a model from signalling, elaboration-likelihood, agenda-setting and cognitive-load theories and test it in two survey phases (512 and 478 respondents). Signals raised the perceived credibility, visibility and complexity of green claims, and all three drove consumer responses. Companies' real environmental actions moderated the effects in the first phase but not in the second, which the authors read as evidence that consumers become better informed and eventually scrutinise even visible green signals. A study of Egyptian e-commerce adds that last-mile green logistics practices translate into brand outcomes mainly through satisfaction, with transparency as a boundary condition(Alahmarietal.,2026).The q-commerce literature therefore offers context and one anchor study, but no interface-level or category-level evidence on digital greenwashing.

Mitigation: verification, certification, detection and regulation

Sixteen studies examine ways to curb or detect greenwashing. Verification technologies attract much attention: smart contracts and blockchain are proposed to reduce the information asymmetry that lets greenwashed counterfeit goods circulate on digital platforms (Silkoset &Nygaard,2025),blockchain is combined with digital marketing to build trust in green projects (Al-Ababneh et al., 2025), a tripartite evolutionary-game model shows that platform-enabled transparency mechanisms such as blockchain traceability and carbon labelling interact with detection probability, premium loss and screening cost (Wang et al., 2026), and an e-commerce case analysis explores blockchain as a route to verifiable transparency (Gazzola et al., 2026). Machine-learning detectors are emerging: a multimodal pipeline reports 81.6% accuracy on an Amazon hold-out set and 97% on a Persian-language marketplace (Mirabdolbaghietal.,2026),adeep-learning modeluses BERT embeddings with a bi directional LSTM and attention (Sumanet al.,2026),and a web-based assessment too lreceived high perceived usefulness and ease of use from stakeholders (Na Songkhla et al., 2026).

Certification and literacy are the demand-side levers. In an online experiment with 184 participants, corporate communication certified with a B Corporation label was reported to score higher on credibility and authenticity than identical uncertified communication (Marschlich & Hurtado, 2024), whereas an experiment with Spanish Generation Z participants (n=126) suggests that business-wide labels applied across sectors with different sustainability challenges can cause confusion (Sanchez-Chaparro et al., 2024).Apre-registered—pre-bunking‖inoculationexperiment(pre-testN=206;replicationN=2,000) found that one greenwashed advertisement, for a familiar brand's dairy-free milk alternative, was unaffected by the intervention, which suggests that familiarity and product sustainability may mitigate such interventions (Timmons et al., 2024). On the regulatory side, an analysis of India's Central Consumer Protection Authoritycovers 165 ordersin 118 casesto 2025, with enforcement

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

concentrated in sectors with high information asymmetry, including e-commerce platforms (Pathak et al., 2025); a mixed-methods chapter reports variation in compliance with environmental rules across industries (Jain & Mitra, 2025). None of these mitigation studies is set in quick commerce.

Integrative framework

Figure 13 integrates the six themes into a framework for quick commerce. Platform-side stimuli (unverifiable green signals,vague claims, signal density, interface patterns and AI personalisation)shape consumer cognition: perceived digital greenwashing, skepticism and confusion, perceived risk and,under time pressure, heuristic substitution. These feed the green-trust pathway and then outcomes such as purchase intention, word-of-mouth, brand avoidance and brand equity. Consumer moderators (environmental concern, literacy, brand familiarity and reputation) and the time-pressure context shape the strength of these links, while governance and verification levers (certification, standard labels, traceability, detection and regulation) act on the stimuli and on trust. The links among stimuli, cognition, trust and outcomes are supported by the consumer-response and interface evidence; the specific moderating roles of time pressure and signal density in quick commerce are hypotheses that the corpus does not test.

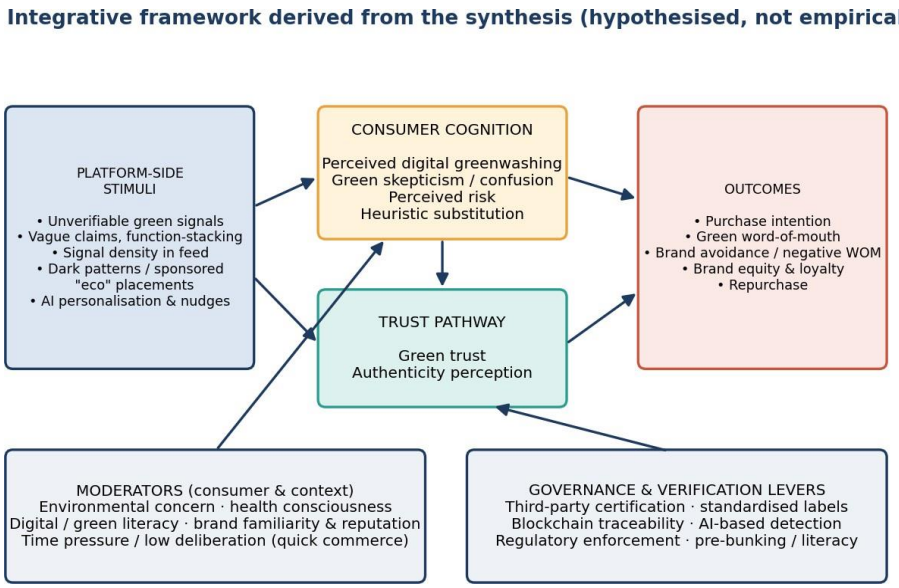

Figure13. *Integrative framework of digital greenwashing in quick commerce, derived from the synthesis(hypothesised, not empirically tested).*

Propositions for future testing

P1. Time pressure and low deliberation strengthen the effect of unverifiable green signals on purchase intention and weaken the effect of perceived greenwashing on skepticism(boundary condition on T2).

P2. Higher signal density in a quick-commerce feed increases heuristic substitution (brand familiarity,price)andlowerstheweightofclaimcontent(extendsthesignal-degradationevidence of T2/T3).

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

P3.Green badges, eco-filters and sponsored eco-placements function as a distinct dark-pattern family whose effect is moderated by third-party verification (joins T4 and T6).

P4.Algorithmic personalization amplifies the effect of green cues on purchase and lowers detection of greenwashing among low-literacy users (joins T3 and T4).

P5.Visible platform-level verification raises green trust and reduces brand avoidance more than seller-level claims (joins T1 and T6).

5. Discussion Answering the research questions

RQ1 (development). The field is new and still fragmented. The bibliometric corpus contains no document before 2022 and 32 of 35 documents in 2025–2026; 125 distinct authors (ScopusIDs) share 35 documents and none has more than one; and nine documents are book chapters, a sign of an edited-volume field that is only beginning to consolidate in journals. India leads in output, China and Hong Kong in citations, which in the latter case is driven by a single highly cited supply-chain model (Dong et al., 2023).

RQ2 (intellectual structure). Foundational influence comes from a small set of general greenwashing works, led by Delmas and Burbano(citedby13of the 34 documents with reference lists) and Lyonand Montgomery, together with Chen and Chang. The keyword network shows four clusters: platform operations and transparency; technology-mediated verification and trust (blockchain, AI, green trust); digital marketing and ESG; and claims, signalling and communication.

RQ3(evidence).Perceived greenwashing consistently lowers trust and intention; mediators (skepticism, confusion, perceived risk, green trust) and moderators (environmental concern, knowledge, brand reputation, literacy) are well mapped, but largely in deliberate, survey-based settings. Digital-specific evidence shows that detection is inconsistent, that AI labels act as credibility cues, and that platform signals can raise sales without being verifiable.

RQ4 (quick commerce). The q-commerce literature supplies context (adoption, trust, dark stores, gig labour) and a single anchor study on greenclaims. Interface-level and category-level evidence is absent.

RQ5(gaps). Section 7 sets outten gaps; four have high priority.

Theoretical implications

Signalling theory is the most frequently named lens (10 of 122 records name it explicitly), followed by the stimulus–organism–response model (9) and the Theory of Planned Behaviour (7); information-asymmetry and agency arguments appear in 9. The reviewed work seldom integrates these with theories of fast, low-effort processing. Because the elaboration-likelihood and cognitive-load logics are named in only four and two records respectively, the contingent role of time pressure remains theoretically under-specified. The integrative framework (Figure 13) therefore treats time pressure and signal density as boundary conditions on the familiar chain from perceived greenwashing through skepticism and trust to outcomes.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 21, Issue 2, 2026
https://cgscopus.com/index.php/journal

Implications for platforms, brands and regulators

For platforms, the evidence suggests that verification should be built into the interface rather than left to consumers. Standardised, third-party-verified labels ((Gossen et al., 2022; Marschlich & Hurtado, 2024)), trace ability tools ((Silkoset &Nygaard, 2025;Wanget al., 2026)) and visible provenance cues are the levers best supported in the corpus. Platforms also control the exposure probability that, in the game-theoretic models, drives seller behavior ((Dongetal.,2023;Yuetal.,2025a)),so detection and penalties for unverifiable claims matter commercially as well as ethically.

For brands, authenticity and verifiable action are safer than volume of claims. The evidence on green blushing (Guercinietal.,2025), AI disclosure (Israfilzade,2026) and signal degradation (Nagy-Kercsóet al., 2026) implies that unsubstantiated claims lose value asthey multiply, whereas credible substantiation retains it. For regulators, enforcement experience in consumer protection (Pathak et al., 2025) and the finding that standardised governance tools may fit poorly with localised trust structures (Nagy-Kercsó et al., 2026) suggest combining rule-based oversight with consumer-literacy measures such as pre-bunking (Timmons et al., 2024).

6. Limitations

- The Scopus corpus is small (n=35)and the export‘s search string is not recorded, so the results describe this export, not the whole field; indicators such as the h-index and country counts are unstable at this scale.
- 2026 is a partial year, so growth from 2025 to 2026 is understated, and recent records have had little time to accumulate citations (16 of 35 are uncited).

7. Conclusion

Digital greenwashing in quick commerce is a research question that the literature has not yet asked directly. The bibliometric evidence shows a young, fragmented field resting on general greenwashing foundations. The systematic review shows a robust consumer-response chain, a growing interface-design and AI literature and a quick-commerce literature focused on adoption and logistics. Only one study joins green claims and quick commerce, and none examines sustainability cues inside q-commerce interfaces.

The agenda that follows is concrete: build and validate a construct of digital greenwashing for q-commerce interfaces; test time pressure and signal density as boundary conditions; study green badges, filters and sponsored placements as a distinct dark-pattern family; and use platform-level and field data alongside surveys. Evidence of this kind would let platforms, brands and regulators act on how green claims are actually seen and verified in a few seconds on a small screen.

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