Review

Bibliometric Analysis NEV Purchase Intention: Past, Present and Future Trends

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Abstract: Purpose: This study aims to systematically map the intellectual structure and evolution of research on purchase intentions for new energy vehicles (NEVs). It uncovers thematic trends, key contributors, and emerging directions within this evolving field. Design/methodology/approach: A comprehensive bibliometric analysis was conducted using the Web of Science Core Collection database. Tools like VOSviewer enabled citation, co-citation, and co-word analyses of publications from 1982 to 2024 to visualize thematic clusters and identify leading journals, influential scholars, and country-level contributions. Findings: Sustainability, Journal of Cleaner Production, and Energy Policy emerged as the most influential journals in NEV research. Leadership has shifted from Western countries to China, reflecting changes in production, policy, and infrastructure. Three dominant co-citation clusters identified include external policy drivers, consumer behavioral factors, and methodological foundations, while four co-word clusters encompass information influence, technical performance, psychological mechanisms, and policy incentives. Originality: This study offers a multidimensional, data-driven synthesis of NEV purchase intention research, bridging technical and behavioral perspectives. It provides strategic insights for policymakers, manufacturers, and marketers, emphasizing critical areas for R&D investment and the need for integrated marketing and infrastructure strategies to accelerate NEV adoption. An updated agenda for future scholarship and policy intervention is also presented.

Keywords: consumer behavior; purchase intention; bibliometric analysis; electric vehicle adoption; economic growth; environment

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1. Introduction

The accelerating rise in global carbon emissions presents a critical environmental challenge driven largely by the transportation sector's dependence on internal combustion engine (ICE) vehicles. As oil production expands to meet surging demand, crude prices have climbed steadily, exacerbating economic burdens for consumers and nations alike. This reliance on fossil fuels amplifies greenhouse gas output and exposes societies to volatile energy markets and geopolitical tensions. Against this backdrop, new energy vehicles (NEVs) have emerged as a promising solution to decouple mobility from petroleum, offering near-zero tailpipe emissions and the potential for integration with renewable electricity sources, such as solar and wind power [1,2].

Despite these environmental and strategic advantages, the transition to NEVs has remained uneven. While NEVs sales have surged in some regions, market penetration across many countries remains below expectations [3]. Consumer hesitancy persists due to concerns over driving range, battery life, charging infrastructure, and total cost of ownership [4]. Moreover, inconsistencies in governmental incentives, such as purchase subsidies and tax relief, have led to fluctuating adoption rates, raising questions about the long-term effectiveness of policy interventions [5].

Existing research has extensively examined the technical performance parameters of the NEV battery technology, powertrain efficiency, and charging network deployment [6]. Parallel streams of inquiry have explored consumer behavior through theoretical constructs such as the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM), identifying attitudes, social norms, and perceived behavioral control as significant predictors of purchase intention [7]. However, a critical gap persists: few studies integrate bibliometric methods to map the evolving scholarly landscape of NEV adoption, nor do they synthesize insights from both technical and behavioral literature to guide future research agendas [8].

Accordingly, this study addressed two interrelated objectives: First, it seeks to perform a comprehensive bibliometric analysis of global NEV research over the past decade to elucidate publication trends, leading journals, influential authors and institutions, and national contributions [9]. Second, it aims to synthesize core findings from technical performance and consumer behavior literature, highlighting convergent themes and persistent research gaps [10]. By bridging methodological and disciplinary divisions, this study provides an interdisciplinary perspective on trajectories in EV research and identifies promising avenues for technological innovation, policy design, and consumer engagement [11].

2. Literature Review

The existing body of NEV research has grown rapidly, yet its structure and evolution have seldom been examined using comprehensive bibliometric methods [12]. Bibliometric analysis quantitatively maps publications, citations, co-citation networks, and keyword co-occurrence and provides a powerful lens for delineating intellectual structures and tracing emerging trends [13]. Typical indicators include author productivity, institutional collaborations, and thematic clusters, but many NEV reviews still rely on simple counts or narrative summaries, limiting insights into the field's dynamics [14,15]. By employing advanced network tools such as VOSviewer, scholars can visualize co-authorship patterns, detect influential research hubs, and chart the temporal progression of topics, such as battery technology, charging infrastructure, and consumer behavior [16].

Parallel to these methodological developments, an extensive strand of the literature has established that environmental concern is a major driver of NEV purchase intentions [17]. Structural equation models consistently show that consumers with stronger ecological values report higher willingness to adopt low-emission vehicles, particularly when they perceive that their choices will effectively reduce their carbon footprints. Nonetheless, the translation from abstract concern to concrete purchase depends critically on whether consumers believe that NEVs can meet their daily needs, highlighting the interplay between attitudinal motivation and practical feasibility [18,19].

The brand reputation further shapes this practical calculus. Familiar automotive marques that extend into NEV models benefit from established trust, alleviating perceived risks related to performance and reliability [20]. Conversely, lesser-known entrants often face consumer skepticism despite offering competitive pricing or novel features, underlining the importance of transparent performance data, rigorous warranties, and visible endorsements in mitigating barriers [21].

To explain these behavioral phenomena, researchers have extensively drawn on the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) [22]. The TPB posits that attitudes, subjective norms, and perceived behavioral control jointly determine intentions, with social endorsement, peer influence, and societal expectations playing a decisive role in normalizing NEV ownership [23]. TAM emphasizes perceived usefulness and ease of use as key predictors of technology uptake, leading scholars to adapt the model to NEV contexts by incorporating range anxiety, charging convenience, and technological reliability into perceived usefulness constructs [24]. However, these frameworks often treat external factors, such as infrastructure availability and policy incentives, as exogenous, rather than integrating them directly into behavioral models [25].

Indeed, government interventions have been pivotal in accelerating NEV markets but warrant deeper scrutiny [26]. Purchase subsidies, tax credits, and fee exemptions have demonstrably spurred sales in leading economies; however, evidence suggests diminishing marginal returns and potential dependency effects [27]. Comparative studies advocate for a phased withdrawal of fiscal incentives, coupled with sustained investment in robust charging networks and non-monetary perks such as preferential parking and high-occupancy-vehicle-lane access to maintain momentum without long-term fiscal burdens [28].

Technological advances have continued to shrink barriers to traditional adoption. Breakthroughs in lithium-ion and emerging solid-state battery chemistries now support ranges exceeding 400 km per charge, while fast-charging systems deliver 80 percent capacity in less than 30 min. Nevertheless, the uneven geographical distribution of charging stations, particularly in rural or underdeveloped areas, sustains "range anxiety" among prospective buyers and underscores the need for standardized charging protocols and coordinated public-private infrastructure initiatives [29,30].

Beyond individual attitudes and technology, sociodemographic and cultural variables moderate NEV uptake. High-income and better-educated consumers are more likely to adopt NEVs, reflecting both greater discretionary purchasing power and a propensity for early-adopter behavior. Cultural dimensions, such as uncertainty avoidance and collectivism, also influence how social norms and perceived risks translate into purchase decisions. Collectivist societies respond more strongly to community endorsement campaigns, while individualistic cultures emphasize cost–benefit analyses [31].

Despite these rich, multifaceted insights, few studies have combined bibliometric mapping with substantive findings from technological and behavioral research [32]. A truly interdisciplinary overview could overlay keyword clusters such as battery technology, consumer attitudes, and policy incentives onto temporal publication trends, revealing co-evolution patterns and pinpointing nascent subfields [17]. Such an approach would not only highlight established research clusters, but also expose underexplored intersections, for example, between blockchain-enabled smart charging, peer-to-peer energy trading, and consumer willingness to participate in decentralized energy markets [33].

This integrated review clarifies the interplay between innovation, policy, and consumer dynamics in the NEVs domain by synthesizing bibliometric trends and thematic findings [34]. Recognizing how technical breakthroughs, incentive designs, and socio-psychological drivers coalesce provides scholars, industry practitioners, and policymakers with strategic roadmaps [35]. In doing so, it illuminates promising directions for future research, whether in optimizing battery supply chains, refining behavioral interventions, or crafting sustainable subsidy frameworks, thereby steering the electric mobility transition toward its full environmental and economic potential [36].

3. Methods

3.1. Bibliometric Approach

Bibliometrics refers to the quantitative analysis of the academic literature. It systematically investigates literature repositories by employing quantitative indicators, such as citation frequencies, institutional affiliations, authorship networks, and geographical distributions within bibliographic databases across a specified time frame [37]. The primary objective of bibliometrics is to offer a comprehensive overview of academic productivity, scholarly impact, and evolution of research topics over time [38].

Citation analysis provides a basis for science mapping and is an important way to measure the impact of publications in a specific field. A high citation count is crucial as it offers valuable insights into a publication's relative influence within the field [39].

Co-citation analysis examines the frequency with which two documents are cited in the same article. By detecting pairs of references that co-occur in subsequent publications, co-citation analysis reveals intellectual linkages and the evolution of research fields [40]. This technique enables the identification of the most influential publications and authors within a research field and elucidates the structural organization of scientific literature in a specific domain [41].

Co-word analysis investigates the content of publications by examining the words found in "author keywords," "titles," and "abstracts". It helps scholars uncover the conceptual relationships between terms and identify key research directions and trends within a field [42]. By analyzing the interaction between keywords, co-word analysis reveals the underlying structure of a research area and offers insights into future research trajectories. One significant advantage of this method is its ability to predict emerging trends by uncovering a discipline's latent themes and intellectual organization [43].

3.2. Data Source

Data for this study were collected from the Web of Science (WoS) Core Collection, focusing on journal articles, conference papers, and reviews published between 1982 and 2024. Only documents from the WoS Core Collection published in English were included to ensure consistency. The search was conducted on April 26, 2025, and yielded 1,055 publications [44]. After excluding non-journal publications, 1,014 journal articles remained for analysis, in line with the common practice for bibliometric reviews due to journals' rigorous peer-review standards. The inclusion and exclusion criteria are summarized in Table 1.

Table 1. Search string and selection criteria.

Criterion	Details
Database	Web of Science Core Collection
Period	Publications through 31 December 2024
Search Field	Topic
Keywords (NEVs)	"new energy vehicle*" OR "electric vehicle*" OR "green vehicle*" OR "alternative fuel vehicle*" OR "NEV*"
Keywords (Behavior)	"consumer purchase" OR "consumer behavior" OR "buying behavior" OR "consumer decision" OR "purchase intention" OR "consumer preference" OR "customer purchase" OR "adoption preference" OR "willingness to purchase*"
Document Type	Journal articles only
Language	English

4. Results

4.1. Trends

Applying these criteria resulted in 1,014 publications for a detailed analysis, which together accrued 20,332 citing records in WoS. After removing self-citations, 19,866 remained. The h-index of this corpus was 85, with an average of 32.89 citations per article. The earliest publication dates to 1982. Figure 1 shows the annual publications and corresponding citation counts from 2000 to 2024. Because data collection was completed in April 2025, we analyzed trends only until 2024 to avoid incomplete records. The results indicate a marked acceleration in research on consumer purchase intentions for new energy vehicles, with exponential growth observed after 2010, reflecting the maturation of NEV technologies and policies during that period.

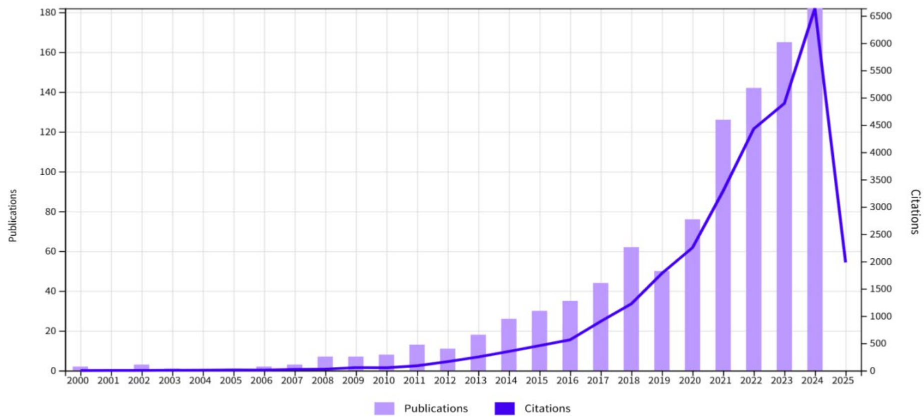

Figure 1. Number of publications and citations between 2000 and December 31, 2024.

4.2. Citations Analysis

The top ten journals published 258 articles in total, with sustainability contributing the most. Based on Table 2, sustainability, published by the MDPI, produced 84 articles with 1,318 citations. The journal with the highest citation count is Energy Policy (Elsevier). These articles account for approximately 25% of all the publications in this domain. They span various disciplines including transportation engineering, environmental science, sustainability, transportation policy and practice, new energy technologies, and artificial intelligence [45].

Table 2. Top 10 journals in terms of publication volume on NEVs adoption and sustainability.

No	Source	Documents	Citatios	Total link strength
1	Sustainability	84	1318	330
2	Journal of Cleaner Production	31	1842	343
3	Transportation Research Part D-Transport and Environment	29	2580	379
4	Energy Policy	26	2973	309
5	Transportation Research Part A-Policy and Practice	20	778	169
6	World Electric Vehicle Journal	19	115	113
7	Energies	18	263	73
8	Frontiers in Psychology	11	153	22
9	Technological Forecasting and Social Change	10	587	88
10	Transport Policy	10	160	72

These trends demonstrate that sustainable energy and green transportation are gaining recognition in diverse academic fields. Policymakers and other decision-making bodies actively investigate the factors and preferences that influence NEV purchases to promote clean energy adoption and low-carbon transportation. Moreover, this pattern reflects a growing trend toward interdisciplinary research, offering broader perspectives and novel directions for future studies.

Overlay visualization effectively illustrates the relationship between countries' citation counts and publication years. As shown in Figure 2, before 2019, the most-cited articles on NEV purchases originated primarily from Western countries and were led by the

United States [46]. Since then, this trend has shifted: Asian countries have now dominated the field, with China at the forefront. This change reflects China's surpassing of the United States in annual NEV production, driven by generous government policies and widespread charging infrastructure [47]. Moreover, China hosts hundreds of new-energy-vehicle manufacturers, including BYD, Xiaomi, and Xpeng, each of which focuses intensively on NEVs development. In contrast, in the U.S. market, in addition to Tesla, plug-in NEV production remains in the hands of established automakers, which must balance investment in NEVs with the continued production of internal combustion engine vehicles [48].

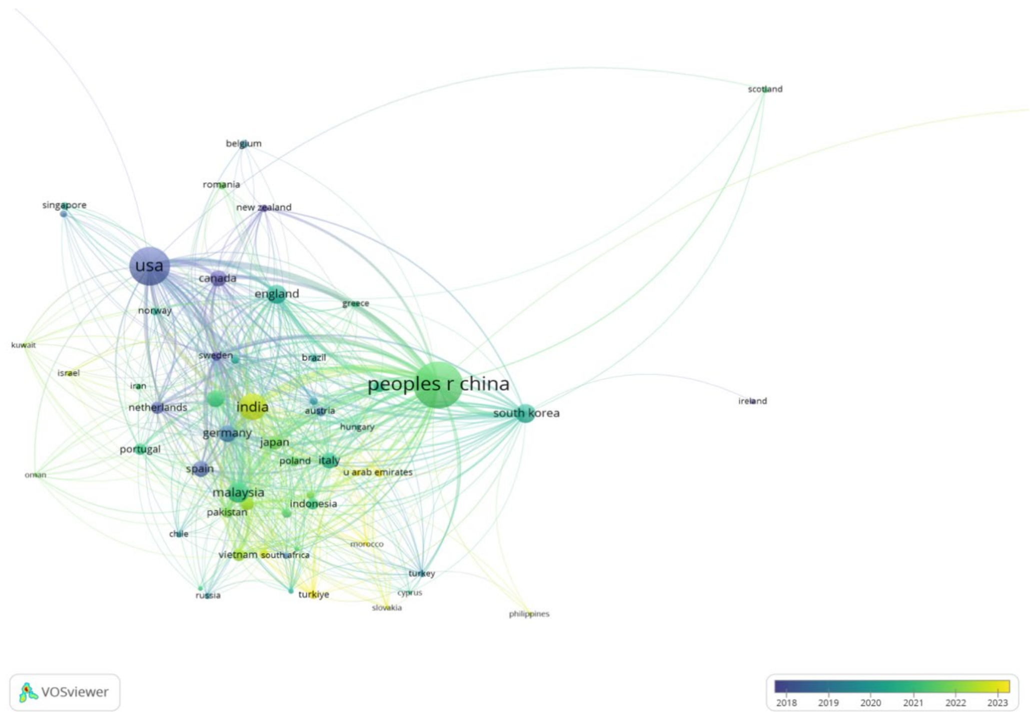

Figure 2. Citation overlay in highly published countries.

4.3. Co-Citation Analysis

In this study, we set a threshold of 32 co-citations, meaning that only reference pairs cited together at least 32 times were included; 70 references met this criterion, focusing our analysis on the most impactful works [49].

Table 3 lists the top ten co-cited references ranked by total link strength (TLS). The TLS quantifies the overall strength of a reference connection within the network. A higher TLS indicates frequent co-citations with many other works, signaling a foundational influence. Ajzen proposed 1,674 TLS, followed by Fornell and Larcker with 1,292 TLS.

Table 3. The top 10 documents, based on Co-Citations and total link strength.

No	Title	Citations	TLS
1	Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179-211.	183	1674
2	Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1), 39-50.	156	1292

3	Rezvani, Z., Jansson, J., & Bodin, J. (2015). Advances in consumer electric vehicle adoption research: A review and research agenda. Transportation Research Part D: Transport and Environment, 34, 122-136.	129	1692
4	Egbue, O., & Long, S. (2012). Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. Energy Policy, 48, 717-729.	116	1445
5	Hair, J. F. (2011). Multivariate data analysis: An overview. In International Encyclopedia of Statistical Science (pp. 904-907).	107	817
6	Schuitema, G., Anable, J., Skippon, S., & Kinnear, N. (2013). The role of instrumental, hedonic and symbolic attributes in the intention to adopt electric vehicles. Transportation Research Part A: Policy and Practice, 48, 39-49.	103	1397
7	Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879.	94	761
8	Carley, S., Searing, E. A., & Krause, R. M. (2013). Intent to purchase a plug-in electric vehicle: A survey of early impressions in large U.S. cities. Transportation Research Part D: Transport and Environment, 18, 39-45.	87	1268
9	Sierzchula, W., Bakker, S., Maat, K., & van Wee, B. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. Energy Policy, 68, 183-194.	87	1183
10	Hidrue, M. K., Parsons, G. R., Kempton, W., & Gardner, M. P. (2011). Willingness to pay for electric vehicles and their attributes. Resource and Energy Economics, 33(3), 686-705.	84	933

We identified three thematic clusters. In Figure 3, nodes sharing the same color belong to the same cluster.

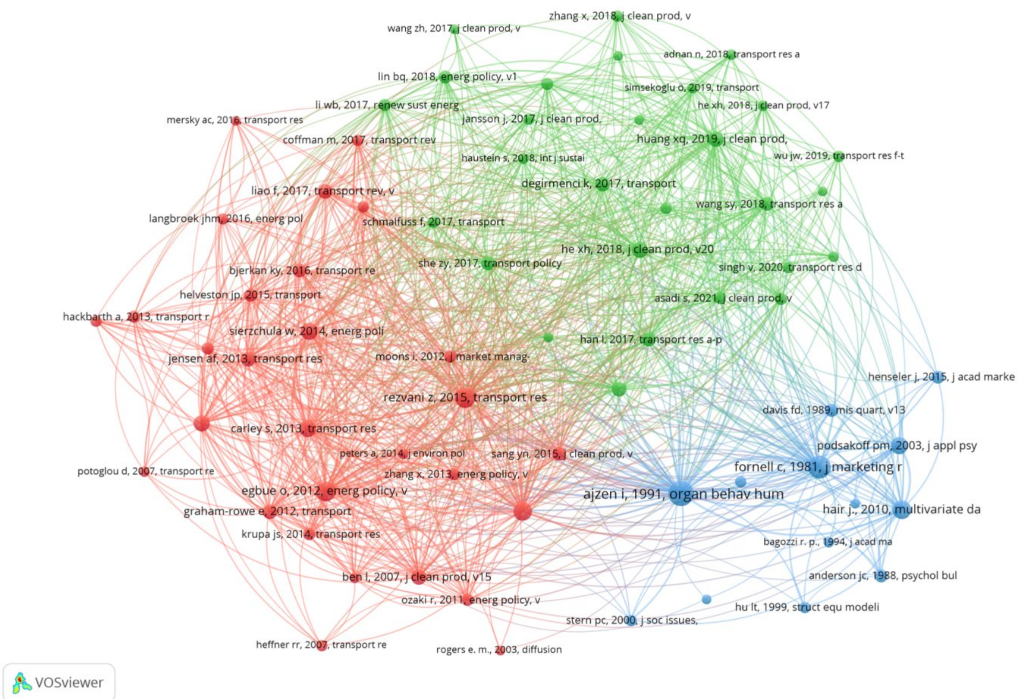

Figure 3. Co-citation analysis of NEV.

Cluster 1 (red): External Forces Pushing the NEVs Market. This cluster (29 publications) encompasses studies of government policies, financial incentives, and charging infrastructure. For example, Bjerkan and colleagues demonstrated that Norway's tax and VAT exemptions significantly boosted EV uptake [50]. Carley and colleagues reported a persistent intention–behavior gap in U.S. cities due to range anxiety and charging inconvenience. Discrete-choice experiments by Hidrue and colleagues further showed consumers' willingness to pay premiums for additional ranges and faster charging [51]. These findings underscore that financial incentives alone may not drive real sales, unless accompanied by expanded infrastructure and verifiable performance gains [52].

Cluster 2 (green): Endogenous Drivers of Individual Adoption. Comprising 28 publications, this cluster examined the psychological and behavioral factors that influence purchase intention. Han and colleagues found that both functional (price and performance) and nonfunctional (social identity and environmental concern) values shape adoption intentions [53,54]. Wang and colleagues identified perceived risk concerns regarding reliability and safety as direct negative predictors of adoption. Kumar and Alok similarly reported that high perceived risk undermines attitudes toward EVs. These studies confirm that consumer perceptions and value judgments are central to their purchasing decisions [55].

Cluster 3 (blue): Methodological Foundations for Sustainable-Consumption Research. This cluster (13 publications) includes early highly cited works that establish core theoretical and methodological frameworks. Ajzen's Theory of Planned Behavior posits that attitude, subjective norms, and perceived behavioral control predict behavioral intention, which is the strongest indicator of action [56]. Davis's Technology Acceptance Model explains technology adoption through perceived usefulness and ease of use. Many NEV adoption studies employ structural equation modeling (SEM) or partial least squares SEM (PLS-SEM) to analyze latent variable relationships, combining factor analysis and path analysis to validate complex models [57,58].

Table 4 summarizes each cluster's label, publication count, and representative references, highlighting the foundational literature shaping NEV research.

Table 4. purchase intention on NEVs.

Cluster	Cluster label	Number of articles	Representative articles
1 (Red)	External Forces That Unfreeze the NEVs Market	29	Carley et al. (2013); Egbue and Long (2012); Rezvani et al. (2015); Schuitema et al. (2013); Sierzchula et al. (2014).
2 (Green)	Endogenous Drivers of Individual Adoption	28	Asadi et al. (2021); Degirmenci and Breitner (2017); Han et al. (2017); Huang and Ge (2019); Wang et al. (2018).
3 (Blue)	Behavioural Theory and Measurement Validation	13	Ajzen (1991); Fornell and Larcker (1981); Hair (2011); Podsakoff et al. (2003); She et al. (2017).

4.4. Co-Word Analysis

In the research domain of public purchase preferences for NEVs, high-frequency keywords directly reflect the level of attention and importance given to this subfield, indicating major research trends [59]. Setting a high threshold for keyword selection can result in overly stringent filtering, potentially omitting significant clusters. Conversely, setting the threshold too low may produce excessive clusters, leading to overlapping or repetitive themes [60].

Based on previous experience, the threshold parameter was set to 14, resulting in the identification of 105 keywords. Table 5 displays the top 20 keywords, highlighting the primary research hotspots over the past 12 years and collectively shaping a knowledge map of the field. Among these keywords, "electric vehicles" and "purchase intentions" exhibited the highest frequencies of co-occurrence.

Table 5. keywords in terms of NEV adoption.

No	Keyword	Occurrences	Total link strength
1	electric vehicles	232	1155
2	purchase intention	205	1201
3	adoption	176	1072
4	impact	134	636
5	consumer behavior	127	505
6	behavior	118	604
7	attitudes	114	680
8	electric vehicle	114	581
9	model	100	411
10	preferences	94	593
11	consumption	86	460
12	planned behavior	86	534
13	incentives	79	536
14	willingness-to-pay	77	429
15	acceptance	73	452
16	consumers	69	310
17	intention	60	369
18	china	59	376
19	consumer preferences	57	360
20	perceptions	57	276

Figure 4 presents a network map depicting the three major clusters based on the keyword co-occurrence analysis. Clusters are differentiated by color and the strength of the links between keywords. After categorizing the keywords into four clusters, the relationships between the clusters were analyzed, highlighting how they interconnect to form a comprehensive knowledge structure. The labels and descriptions of the four identified clusters are listed in Table 6.

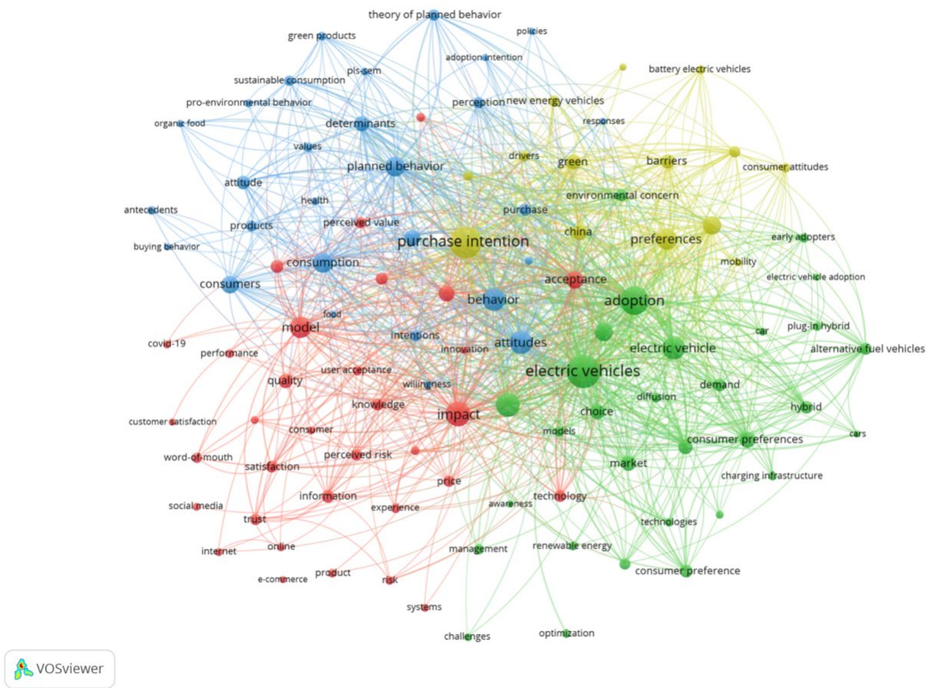

Figure 4. Co-word analysis.

Table 6. Co-word analysis on NEVs.

Cluster	Cluster label	Number of key-words	Representative key words
1 (Red)	Information Influence and Trust in-formation	33	information quality, advertising, trust, reputation, satisfaction, word-of-mouth, product quality, risk, brand trust.
2 (Green)	Technical Performance and Infra-structure Support	30	battery range, charging infrastructure, technological performance, cost of ownership, electric vehicle, renewable energy integration, diffusion, de-mand, optimization.
3 (Blue)	Psychological Mechanisms and Pro-Environmental Intentions	28	attitude, environmental concern, values, perceived behavioral control, subjective norms, theory of planned behavior, pro-environmental behavior, sustainability consciousness, purchase intention.
4 (Yel-low)	Policy Incentives & Early-Market Dy-namics	14	subsidies, tax incentives, policy signals, early adopters, mobility transitions, market barriers, China case.

Cluster 1 (red): Information Influence and Trust Formation. Comprising 33 keywords, this cluster emphasizes the critical role of information sources in shaping consumers' perceptions of product quality, risk, and brand trust, thereby influencing purchasing decisions and post-purchase satisfaction [61]. He and colleagues found that positive information, such as highlighting environmental benefits and cost advantages, significantly enhances consumer trust and purchase intention. Similarly, Higueras-Castillo and colleagues revealed that skepticism toward green advertising can substantially weaken consumers' perceived value [62]. Adnan and colleagues emphasized that transparent and authentic brand communication and peer word-of-mouth effectively boost consumers' trust in NEV technologies. Thus, building a highly credible information environment and fostering positive social influence is crucial for reducing perceived risks and promoting broader NEV adoption.

Cluster 2 (green): Technical Performance and Infrastructure Support. This cluster, comprising 30 keywords, examines product-side enablers and barriers, such as range anxiety, charging convenience, and total cost of ownership. Nimesh and colleagues highlighted that battery range, maintenance costs, and accessibility to charging facilities are key factors that influence purchase decisions in the Indian market. Lee found that, despite the accelerated expansion of charging networks, concerns over battery reliability and durability remain prominent. Research conducted in Beijing by Huang and Ge also shows that technical reliability and user convenience have become major considerations in consumers' purchasing decisions [63]. Thus, technological optimization and infrastructure improvement are fundamental to driving NEVs from early adoption toward mainstream market acceptance.

Cluster 3 (blue): Psychological Mechanisms and Pro-Environmental Intentions. This cluster, containing 28 keywords, captures the internal psychological mechanisms grounded in the Theory of Planned Behavior (TPB) that transforms environmental values and perceived control into concrete purchase intentions [64]. Wang and colleagues demonstrated that environmental concern significantly strengthens positive attitudes and perceived behavioral control, thereby enhancing purchase intention. Kumar and colleagues further pointed out that across various cultural contexts, environmental propensity and social norms serve as critical psychological drivers of NEV adoption. Moreover, perceived proximity to environmental threats such as climate change is considered an important factor that boosts pro-environmental motivation. This cluster emphasizes that attitude formation and subjective norms serve as gateways to actual purchasing behavior.

Cluster 4 (yellow): Policy Incentives and Early-Market Dynamics. This cluster contains 14 keywords and focuses on how government incentives and regulatory frameworks stimulate early adopters and shape broader consumer preferences. Chatterjee and colleagues empirically confirmed that financial subsidies directly promote purchase intentions and indirectly enhance purchase intentions by strengthening subjective norms and perceived behavioral control [65]. Wu and colleagues noted that China has achieved global leadership in NEV adoption through the simultaneous implementation of policy incentives and infrastructure development. Research also shows that uneven policy execution across regions such as India leads to significant differences in NEV adoption rates. Therefore, designing sustained, consistent, and widely applicable incentive schemes is vital for transitioning NEVs from the early adopters to the mass market. Table 6 categorizes the co-word analysis into four clusters.

4.5. Implications

4.5.1. Theoretical Implications

This study advances the theoretical landscape of NEV adoption research on several important dimensions. First, it proposes a multi-level socio-technical framework that integrates technological attributes such as battery range, powertrain performance, and charging infrastructure with behavioral constructs drawn from theories such as the Technology Acceptance Model (TAM) and Theory of Planned Behavior (TPB). Previous studies have often treated these dimensions separately; however, findings indicate that technological progress, policy interventions, and consumer perceptions are dynamically interdependent and must be modeled in an integrated fashion to fully explain NEV adoption patterns. Future research should consider longitudinal structural equation models or dynamic system models that capture the feedback loops between these elements.

Second, the bibliometric analysis utilizing VOSviewer illustrates that the NEV research landscape is rapidly evolving, driven by emerging topics, such as solid-state batteries, vehicle-to-grid (V2G) technologies, and AI-enabled energy management. This observation implies that static bibliometric snapshots are insufficient. Instead, there is a pressing need for dynamic knowledge-graph analytics capable of forecasting emergent trends, moving bibliometric methods from descriptive to predictive science. Future scholars should explore graph neural networks and temporal topic modeling to anticipate paradigm shifts within the NEV research fields.

Third, this study highlights the importance of cross-cultural considerations in consumer behavior research. Findings suggest that while subjective norms strongly influence adoption decisions in collectivist societies, individualistic cultures tend to prioritize personal cost-benefit calculations. This calls for cross-cultural invariance testing using multi-group structural equation modeling or Bayesian approaches to verify whether classical models such as TPB and TAM hold consistently across diverse sociocultural contexts.

Finally, the findings emphasize the value of integrating behavioral economics into policy design for NEVs. External policy clusters reveal that although financial incentives initially drive sales, their effectiveness diminishes over time without complementary non-financial interventions. Future studies should explore how behavioral economic principles such as loss aversion, framing effects, and mental accounting can optimize policy incentives for sustained NEV adoption.

4.5.2. Practical Implications

The findings of this study also generate several important practical implications for policymakers, manufacturers, urban planners, marketers, and financial institutions.

Policymakers should shift from static financial subsidy models to adaptive phased incentive schemes. Rather than providing undifferentiated subsidies, financial support should be increasingly linked to performance metrics such as verified carbon savings and lifecycle emissions. Declining-block subsidies tied to improvements in battery energy density can avoid creating dependency while stimulating technological innovation. Furthermore, governments must prioritize investment in smart infrastructure planning, including GIS-based deployment of charging stations, to ensure equitable access across both urban and rural areas, thereby eliminating range anxiety as a systemic barrier to adoption.

Manufacturers and technology developers should align R&D investments with consumer concerns regarding reliability and convenience. Breakthroughs in ultrafast charging architectures, predictive battery health monitoring systems powered by artificial intelligence, and vehicle-to-home (V2H) capabilities are likely to mitigate psychological barriers related to range anxiety and perceived risk. Long-term battery warranties of ten years or more would further strengthen consumer trust and serve as a strategic differentiator in increasingly competitive NEV markets.

Urban and energy planning authorities should integrate NEV considerations into broader city development frameworks. Initiatives such as mandating that new residential and commercial buildings pre-wire a minimum proportion of parking spaces for electric vehicle charging will be future-proof urban infrastructure and will ensure that NEV adoption is not constrained by facility shortages.

Marketing strategies must evolve from generic environmental appeal to evidence-based trust-building campaigns. Consumers are increasingly skeptical of "greenwashing," and thus demand transparent, verifiable information about real-world performance metrics, such as driving range, maintenance costs, and environmental impact. Community-based test-drive events, peer endorsement programs, and interactive information dashboards can enhance perceived credibility and lower perceived adoption risk.

Financial institutions and insurers play an important role by creating tailored financial products that directly address consumer anxiety regarding up-front costs and depreciation. Green auto loans with preferential interest rates for vehicles verified to be charged primarily from renewable sources could incentivize both adoption and environmentally responsible usage patterns. Similarly, residual value guarantees for electric vehicles would mitigate concerns about resale uncertainty, while usage-based insurance models could reward eco-driving and nighttime charging behavior, aligning consumer financial incentives with broader sustainability objectives.

4.6. Strategic Roadmap (2025–2030)

Based on a synthesis of technological, behavioral, and policy insights, This study proposes a three-phase roadmap for accelerating NEV adoption from 2025 to 2030. In the first phase, from 2025 to 2026, the focus should be on consolidating infrastructure. Governments should aim for a minimum ratio of one public fast charger for every fifteen electric vehicles and ensure that these chargers are integrated into national smart grid systems. Interoperable payment systems and real-time occupancy tracking are mandatory.

In the second phase, spanning 2027 to 2028, policymakers transition toward performance-based incentives. Instead of simple purchase subsidies, tax credits should be awarded based on verifiable carbon savings, annual zero-emission kilometer-driven costs, or battery recycling rates. Bonus–malus systems, in which low-carbon behaviors are rewarded, and high-carbon behaviors are penalized, can create stronger behavioral incentives for sustainable mobility.

In the third phase, from 2029 to 2030, regulatory frameworks should fully integrate circular economic principles. Extended producer responsibility schemes should be mandated for battery end-of-life management, with tax incentives for firms to achieve high material recovery rates. Public-private partnerships should be fostered to scale up battery recycling and second-life energy storage solutions, ensuring that NEV diffusion does not create unintended environmental burdens.

5. Conclusion

This study addresses the pressing need to systematically map the evolving knowledge architecture of sustainable energy and NEVs, focusing on consumer purchase intentions. Despite rapid technological progress and increasing environmental concerns accelerating NEV research, the field's conceptual structure, key contributors, and future directions remain unclear. By conducting a comprehensive bibliometric analysis of the Web of Science Core Collection, this study clarified the scholarly landscape, identified leading research hubs, and uncovered major thematic trends.

Key findings reveal that Sustainability, Journal of Cleaner Production, and Energy Policy have emerged as the dominant publishing outlets, collectively accounting for approximately 25% of all publications. Sustainability published the highest number of articles, while Energy Policy achieved the highest citation impact, confirming its pivotal role in shaping NEV-related scholarship. From a geographical perspective, leadership in NEV consumer purchase research has shifted from Western countries, particularly the United States, to China, which is supported by strong policy measures, ongoing technological innovation, and infrastructure development.

Co-citation analysis further identified three major intellectual clusters: external policy drivers, endogenous behavioral factors, and methodological foundations rooted in the Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), and SEM/PLS-SEM. Complementing this, the co-word analysis uncovered four thematic constellations: information influence and trust, technical performance and infrastructure support, psychological mechanisms and pro-environmental intentions, policy incentives, and early market dynamics. These clusters collectively illustrate the interplay between consumer perceptions, technical barriers, and policy-levers in shaping NEVs adoption.

Theoretically, this study advances the literature by proposing an integrative framework that combines technical attributes with behavioral science theories, offering a multidimensional understanding of NEV purchase behavior. Methodologically, it contributes by applying VOSviewer's advanced bibliometric techniques to reveal the deep structure of the field, moving beyond traditional frequency counts to a more nuanced visualization of intellectual linkages and research evolution. Practically, the findings provide actionable insights for manufacturers, policymakers, and marketers, highlighting critical areas, such as infrastructure deployment, brand communication, and incentive design, that can directly influence consumer behavior and accelerate market penetration.

Nevertheless, this study has several limitations. First, relying exclusively on the WoS database may have excluded relevant articles indexed in other repositories, such as Scopus, ScienceDirect, and Wiley Online Library, potentially affecting the comprehensiveness of the results. Second, the selection of search terms focusing primarily on electric vehicles and purchase intention may have overlooked emerging factors, such as artificial intelligence (AI), autonomous driving technologies, and solid-state battery innovations that increasingly influence consumer decisions. These omissions may have narrowed the scope of the captured research landscape.

Future research should address these limitations by expanding the range of databases consulted, including CNKI, for broader geographical representation and by enriching search vocabularies to encompass emerging NEV-related technologies. Methodological innovations, such as combining CiteSpace for literature visualization and Tableau for enhanced data analytics, could offer even deeper insights into the field's evolution. Furthermore, integrating real-time infrastructure deployment data and granular consumer behavioral analytics could enable the design of precision-targeted policies that better align fiscal incentives, brand strategies, and social norm interventions with actual consumer behavior.

In conclusion, this study positions the scholarly community at a pivotal moment, and the next wave of breakthrough research will likely emerge from the deep fusion of marketing psychology and techno-economic modeling, translating behavioral theories into scalable, data-driven policy tools. By advancing a more holistic understanding of the technological, psychological, and policy dimensions of NEV adoption, this study contributes to the global endeavor to accelerate the transition toward a sustainable, low-carbon mobility future.

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