Multidiciplinary Output Research For Actual and International Issue
(MORFAI Journal) | ISSN (e): 2808-6635
Volumes 6 No. 4 (2026)

A BIBLIOMETRIC-ASSISTED LITERATURE REVIEW AND PROPOSED CONCEPTUAL FRAMEWORK OF CONSUMER BEV ADOPTION

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Received	: 20 April 2026	Accepted	: 17 May 2026
Revised	: 05 May 2026	Published	: 04 June 2026

Abstract

This study reviews and synthesizes the literature on consumer adoption of battery electric vehicles (BEVs) to construct a proposed comprehensive conceptual framework. Although previous research has identified multiple determinants of BEV adoption, findings remain fragmented across psychological, economic, technological, policy, and social domains, limiting a comprehensive understanding. To address this gap, this study employs a bibliometric-assisted systematic literature review, following PRISMA-2020 and SPAR-4-SLR guidelines, covering Scopus-indexed publications from 2015 to 2025. A total of 198 studies were analyzed. The findings show that most studies on BEV still focus on adoption intentions and factor-based approaches, while studies on actual adoption behavior and post-adoption phases remain limited. Bibliometric mapping identifies strong thematic clusters, but the relationships between domains are still weak, indicating the need for a more process-oriented explanatory approach. Therefore, this study developed a proposed conceptual framework that conceptualizes BEV adoption as a gradual decision-making process. The framework integrates perceived technological attributes, value and risk evaluations, attitudes, intentions, and actual adoption, with policy and social contexts acting as moderating factors. Overall, this research contributes by shifting the focus from intention-based perspectives to a cross-domain, process-oriented understanding, offering a foundation for future empirical studies and policy development.

Keywords: Battery electric vehicles, Bibliometric-assisted systematic literature review, Conceptual framework , Consumer adoption, Electric vehicle adoption,

INTRODUCTION

The increased focus on sustainable mobility has made battery electric vehicles (BEVs) an important technological approach to mitigate emissions in the transport industry, enhance urban environmental quality, and reconfigure energy consumption patterns (Perez, 2023). Continuous advancements in vehicle technology and charging systems further strengthen the position of BEVs in the future transportation system. Consistent with this, governments and businesses worldwide have started to encourage the adoption of BEVs, including the implementation of a wide range of policies, such as financial subsidies, regulations, and promotion of BEV-oriented markets (Anilan & Vij, 2024). This phenomenon has sparked considerable interest from scholars in the field of consumer behavior, as the proliferation of BEVs is predominantly a function of individual vehicle technology selection decisions.

The literature on BEV adoption is still disjointed despite rapid growth in research on the topic. BEV adoption is influenced by numerous factors, including psychological, economic, technological, incentivizing policies, and social factors (Pamidimukkala, Kermanshachi, Rosenberger, & Hladik, 2024). However, much research tends to treat each influence in isolation and/or with more limited theoretical perspectives. Several intention-based frameworks such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Theory of Planned Behavior (TPB) (Ajzen, 1991). These frameworks do help explain adoption intentions, however, their focus is often narrow in treating adoption as a singular statistical behavioral outcome, as opposed to a substantive and dynamic behavioral decision process. Furthermore, the literature is sparse in discussing the interplay among the various factors, the process of transitioning from intention to actual purchasing, and the post-purchase dynamics (Hoang, Pham, & Vu, 2022). This study attempts to overcome these challenges by undertaking a systematic literature review in addition to a bibliometric study (Page et al., 2021) to evaluate and reintegrate literature concerning the adoption of BEVs from the consumer's standpoint. This methodology attempts to disentangle the elements that comprise the adoption decision and the complexity of the interactions of such components. This study employs a unique combination of

bibliometric mapping and theory-based synthesis to propose a conceptual framework that positions BEV adoption as a multi-faceted incremental process shaped by several inter-domain factors. Consequently, this study aims to refine the current state of literature, establish the parameters of the unresolved issues, and articulate a comprehensive conceptual framework to guide future empirical investigations of electric vehicle adoption.

LITERATURE REVIEW

In this study, a Systematic Literature Review (SLR) was performed to identify, select, and synthesize empirical evidence regarding the factors of consumer adoption of Electric Vehicles (EVs), specifically focusing on Battery Electric Vehicles (BEVs) in the context of passenger vehicles. The review was conducted based on the PRISMA 2020 guidelines (Page et al., 2021) and the Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR) (Paul, Lim, O'Cass, Hao, & Bresciani, 2021). Adhering to the two guidelines, this study aims to ensure transparency, consistency, and thoroughness in every step of the review process.

This Systematic Literature Review (SLR) not only attempts to reclassify previous studies but also provides theoretical interpretations as well. This approach is applicable since the major objective of the research is to develop a proposed conceptual framework to illuminate the processes of Battery Electric Vehicles (BEVs) uptake by consumers. To achieve this goal, a SLR combined with a Bibliometric Analysis is employed, what is denoted as a Bibliometric-assisted Systematic Literature Review (B-SLR) (B-SLR) (Marzi, Balzano, Caputo, & Pellegrini, 2025). This methodology entails the utilization of bibliometric methods to systematically structure and filter pertinent literature, while the synthesis process is conducted to elucidate conceptual frameworks regarding the adoption of battery electric vehicles by consumers.

Data Source and Search Strategy

The Scopus database was selected as the first source for the literature search because it has the most breadth of quality journals in the areas of energy, sustainable transport, and consumer behavior. In addition, Scopus also strongly supports the implementation of advanced bibliometric analysis. The literature search process was conducted until December 2025. The search strategy focused on the title, abstract, and keywords using a combination of predetermined Boolean operators.

The search was conducted by combining two groups of keywords. The first group was related to types of electric vehicles, such as electric motorcycles, electric scooters, electric vehicles, electric cars, battery electric vehicles (BEVs), hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), fuel cell electric vehicles (FCEVs), and range extender electric vehicles (REEVs). Meanwhile, the second group relates to aspects of consumer adoption, such as EV adoption, technology adoption, consumer behavior, purchasing decision, purchase intention, willingness to purchase, willingness to pay, and adoption behavior. The two groups of keywords are combined using the Boolean AND operator to ensure that the search results are relevant to the topic of electric vehicles and their adoption behavior.

The initial search process yielded 11,809 documents. To improve the relevance and quality of the literature analyzed, a gradual screening process was carried out. First, the publication period was limited to 2015–2025, reducing the number of documents to 10,717. Next, the document type was limited to journal articles, resulting in 6,362 studies. The next stage was screening based on language, which only included English-language publications, resulting in 6,209 articles. This collection of articles was then used as the initial dataset for further screening in the systematic literature review process

METHOD

Screening and Eligibility Assessment

In accordance with the PRISMA 2020 framework, the literature screening process involved two stages. The first involved an examination of the title, abstract, and keywords of each article. This was done to check for alignment with the research focus, which in this case, was the consumer adoption of electric vehicles. Analyses were excluded for studies that were purely technical, focused on policy with no discussion of behavioral adoption, and discussed the environment without the inclusion of consumer behavioral components. Also excluded were studies with no relevance to the field of transportation or mobility. The result of this screening process was that 396 articles were thematically relevant and were retained for subsequent processing. Stage two involved checking for the availability of the full text of the 396 articles. During this process, 90 articles were excluded from the analysis since they were either inaccessible or partially accessible. This left 306 articles that proceeded to the eligibility assessment stage. Thereafter, each article was examined in detail, and in a consistent manner, against the seven inclusion criteria (E1–E7) that had been established beforehand. The seven inclusion criteria are:

1. The research must clearly state electric vehicle adoption or stated intention to purchase
2. The study's unit of analysis should be individuals or households, as opposed to businesses, professionals, or other aggregates.
3. The study's findings must relate to the adoption of an electric vehicle, intention to purchase, willingness to pay, or actual purchasing behavior
4. The studies must also provide evidence of an analysis, whether quantitative, qualitative, or mixed.
5. The studies should focus on electric vehicles for personal use and more specifically on electric cars. Articles that use the general term "EV" may still be included if there is a clear indication that the discussion relates to electric cars.
6. Studies must explicitly discuss the adoption of battery electric vehicles (BEVs). If the research uses the term EV in general, the study is only included if it contains indicators relevant to BEVs, such as variables related to batteries, charging infrastructure, range anxiety, or a clear operational definition of BEV technology in its empirical model. Research discussing several types of vehicle technology is only retained if the results related to BEVs are reported separately or can be analyzed independently.
7. The research context relates to individual ownership or consumer purchasing decisions, not the use of vehicles in company or institutional fleets.

SciSpace is an AI-enhanced literature analysis tool used in this study to aid the assessment for eligibility and the extraction of relevant data. The tool is designed to define study parameters and condense article information. Content produced using the tool is verified against the article to ensure accuracy, logic, and adherence to the inclusion standards. The article inclusion or exclusion was determined entirely through the manual assessment, and the eligibility exclusion was not determined through the AI assessment. The risk of bias for the included studies was determined based on the study design, clear and unambiguous definitions of the measurement variables, the analysis, and whether the findings of the study were fully reported. As the purpose of this study was to develop a theory, the measures and assessment criteria were defined through the relevant context of the study and the strength of the empirical support. In the absence of a formal analysis to determine publication bias, the potential for publication bias was substantially decreased through the inclusion of only peer-reviewed articles.

During the evaluation against the criteria for eligibility, some articles were excluded based on lack of compliance to the defined standards. In detail, there were 14 articles that did not meet the E1 criteria, 27 articles for E2, 36 articles for E3, 15 articles for E4, 63 articles for E5, 94 articles for E6, and 22 articles for E7. Some studies did not meet more than one criterion. After the entire screening and eligibility assessment process was completed, 198 articles that met all the requirements were obtained and then used in the analysis and synthesis stages. The complete flow of the process of identification, screening, eligibility assessment, and final inclusion of studies is shown in the PRISMA 2020 flow diagram in Figure 1.

Analytical and Synthesis Strategy

After the eligibility assessment stage was completed, the analysis and synthesis process was carried out through three integrated steps. The first step was bibliometric analysis, focusing on determining the intellectual and thematic structure regarding BEV adoption. Bibliometric data was obtained from the Scopus database and analyzed using the VOSviewer software through the lens of keyword co-occurrence. This method allows for the identification of the literature's core concepts, the literature's structuring topics, and the recurring phenomena that are often researched. Subsequently, analysis results were supplemented with thematic groupings and an analysis on literature's growth over time. This methodology enabled the division of literature into several primary thematic areas in correlation with the time lapse. This phase was fundamental in organizing and simplifying literature and reducing the complexity of the research context.

The second step draws upon the output of the bibliometric mapping to undertake theory-based qualitative synthesis. At this stage, several central elements and notions that feature in the literature are distilled and examined to explicate the nexus between clusters of themes. This is intended to surface advanced conceptual arrangements and reiterate relational patterns across a range of research domains. From this synthesis, a conceptual framework that outlines the fundamental components of research on the adoption of BEVs is constructed. At this stage, the conceptual framework is intended to function as the principal conceptual scaffolding, without specifying the causal mechanisms or relational flows and impacts among variables. During the analysis process, 198 articles that met the eligibility criteria were treated as a collective body of evidence, rather than as independent units of synthesis. The selection of studies that formed the main basis for the development of the framework and model was based on thematic dominance, repetition of research contexts, and the relevance of their explanations to the topic of BEV

adoption. In line with practices commonly used in bibliometric-assisted systematic literature reviews (B-SLR), bibliometric analysis served as a supporting tool for mapping the literature, while SLR was the main mechanism in the process of concept synthesis and theory development.

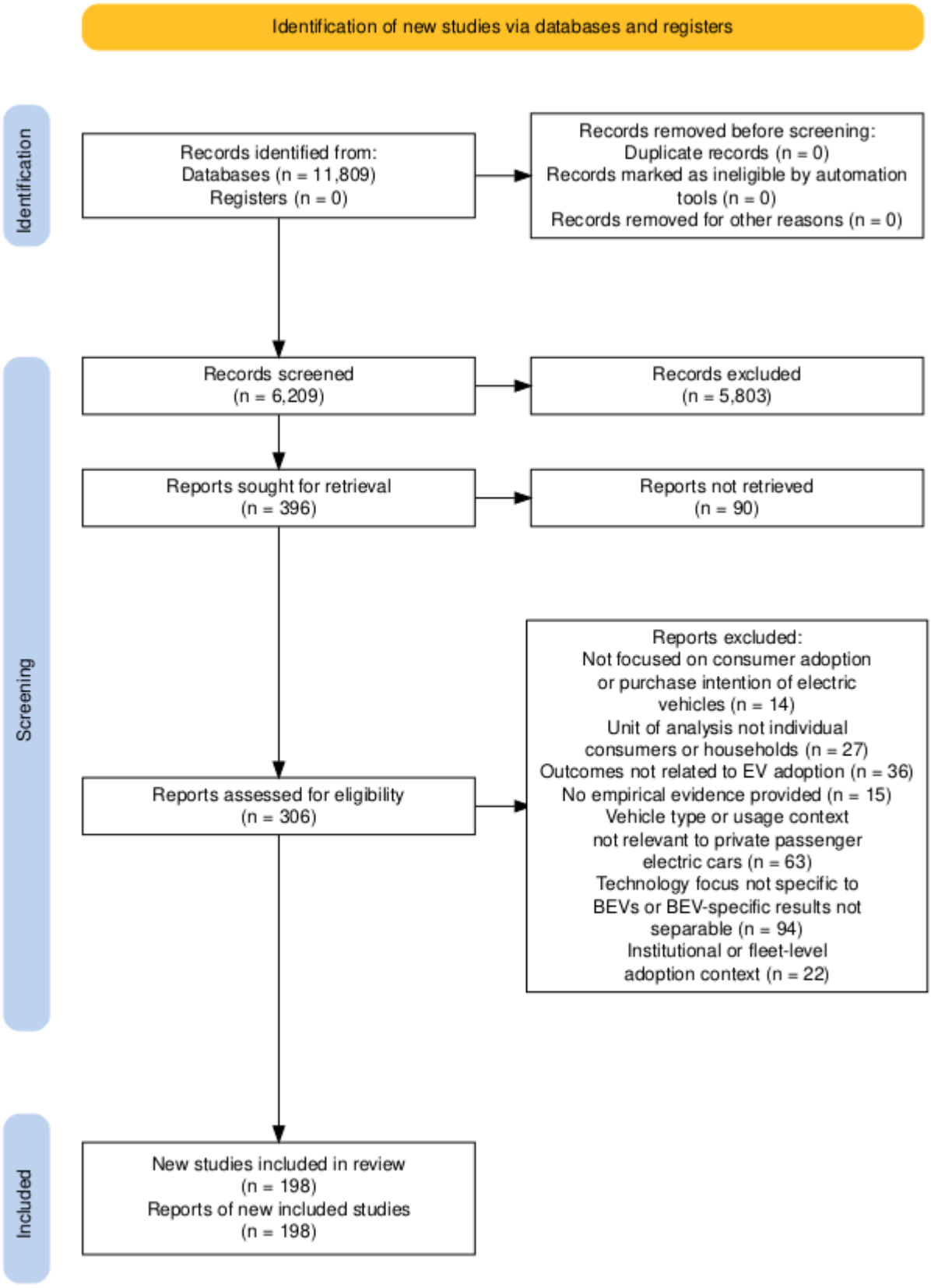

Figure 1. PRISMA 2020 flow diagram of the study selection process

Note: All 198 studies were included in the bibliometric analysis and constituted the evidence pool for systematic synthesis and conceptual framework and model development

RESULTS AND DISCUSSION

Descriptive Literature Overview

This section presents descriptive findings obtained from bibliographic metadata in the analyzed literature collection. The focus is not on interpreting the empirical results of each study, but rather on the general description and structure of existing research. After undergoing a selection process based on the PRISMA 2020 guidelines, 198 articles were included in the analysis and synthesis stage. The cited works offer a solid empirical foundation for comprehending the adoption of BEVs from the perspective of consumers. Figure 2 illustrates the growth of research publications focused on the adoption of BEVs over a set period of time. The total number of studies published has increased significantly from 2021 and a further step up is expected for 2024. This increasing volume of published literature is an indicator of increased academic activity on the burgeoning BEV market, the emergence of government incentives, and efforts to focus on the decarbonization of transport.

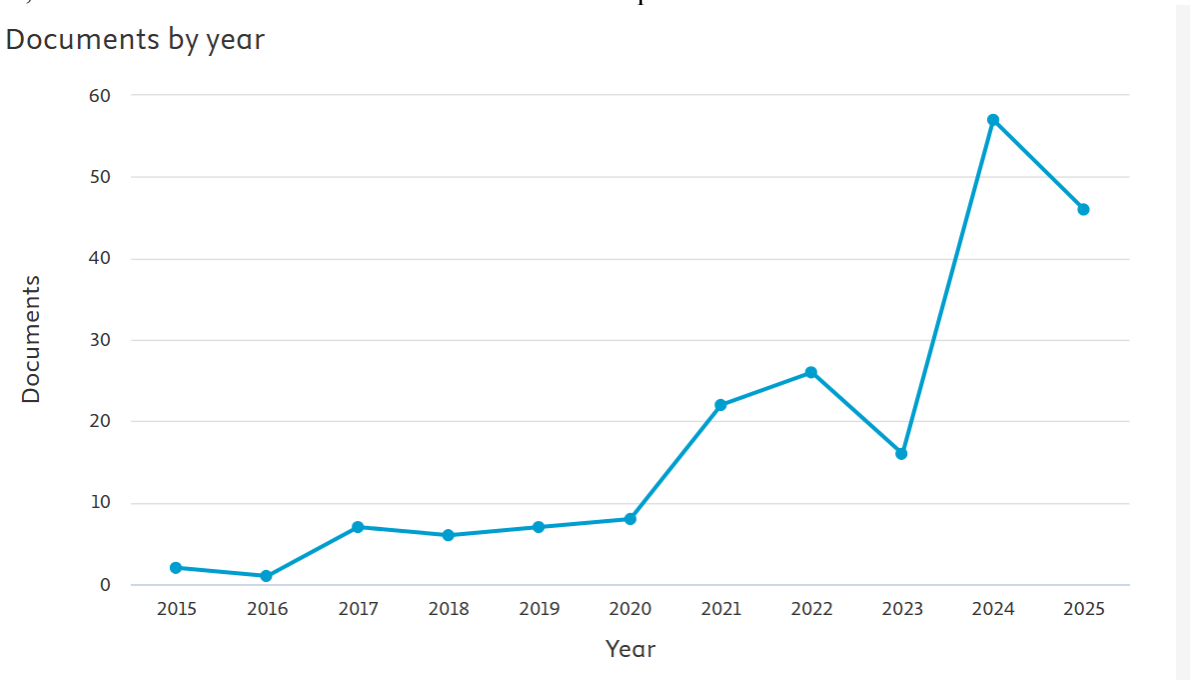

Figure 2. Research Publication Trends Related to BEV Adoption Over the Years

Figure 3 highlights the global reach of studies. Most of the research is focused on the rapidly growing markets of electric vehicles, particularly in Europe, Asia, India, and China. This trend suggests that studies are focused on the emerging markets, where barriers such as charging infrastructure limitations, policy dependence, and risk perceptions are significant.

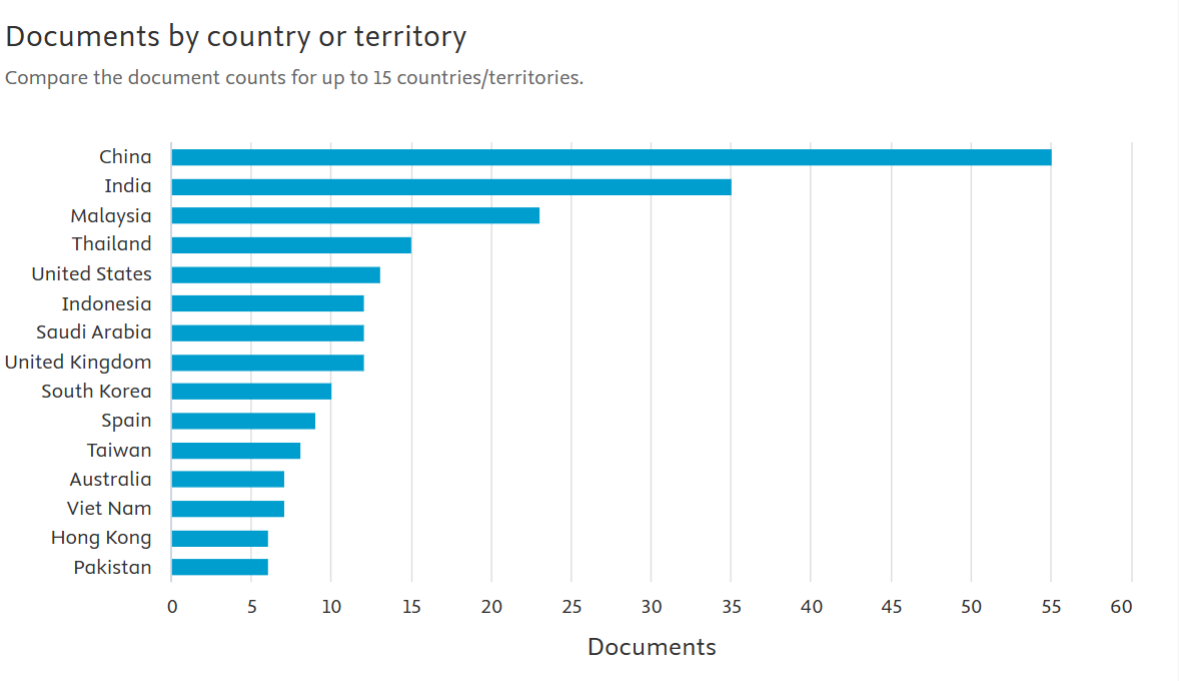

Figure 3. Research Publication Trends Related to BEV Adoption by Country

Intention-based outcomes like the intention to adopt, purchase intention, and willingness to pay, dominate the literature. The focus of the majority of studies is on the psychology and perception of the consumer, a common approach on behavior, however, the environmental and sustainability factors are seldom addressed as the main causative variables. The studies are mostly predictive, using a survey-based approach, and the prevalent analysis has been Structural Equation Modeling (SEM). The use of longitudinal studies, qualitative studies, and mixed studies, in particular to assess post-consumption behavior and behavioral changes, remains a research gap. In general, research on BEV adoption presents a fairly high level of empirical development, as evidenced by the increasing number of publications and the contribution of methodological consistencies. However, it has been observed that uniformity in the approaches to research is accompanied by methodological and conceptual fragmentation. Many studies still focus on individual factors and intention-based outcomes, while integration between contexts, adoption stages, and causal mechanisms remains limited. This condition indicates the need for more systematic bibliometric analysis and conceptual synthesis, which will be discussed in the next section.

Keyword Co-occurrence Network Analysis

A keyword co-occurrence is proposed, with a threshold of seven to give some insight into the patterns of the BEV adoption literature from the consumer's perspective. The threshold of seven provided 56 joined terms, classified into four clustered and interconnected themes, which is shown in a network in Figure 4. There are some keywords that occur more often in the center of the network, thus holding a more central and pivotal position. The more central keywords are electric vehicle, purchase intention, adoption intention, technology adoption, and consumer behavior. These terms indicate that BEV adoption is perceived primarily as a consumer behavior phenomenon involving psychological processes related to intention and decision making.

Behavioral and psychological keywords, together with technological and environmental keywords, have strong correlations. This suggests that consumer perceptions of BEVs stem from the interplay of behavioral components and the technological and environmental attributes of vehicles and the policy environment. The analysis has also located four primary thematic clusters in the literature. The presence of these clusters denotes divergence in the concentration of research, although the clusters are interconnected, implying possible conceptual overlaps within the different topics of research. These descriptive features indicate that BEV adoption research has progressed through several thematic streams, but the borders of these streams are interrelated instead of fully isolated.

The keyword analysis shows BEV adoption research seen from the consumer perspective, has a pronounced focus on behavioral and intention-based theories, leaving technological, policy, and environmental considerations as peripheral. This structure has potential for the construction of an integrated conceptual framework, which is elaborated in the next sub-section.

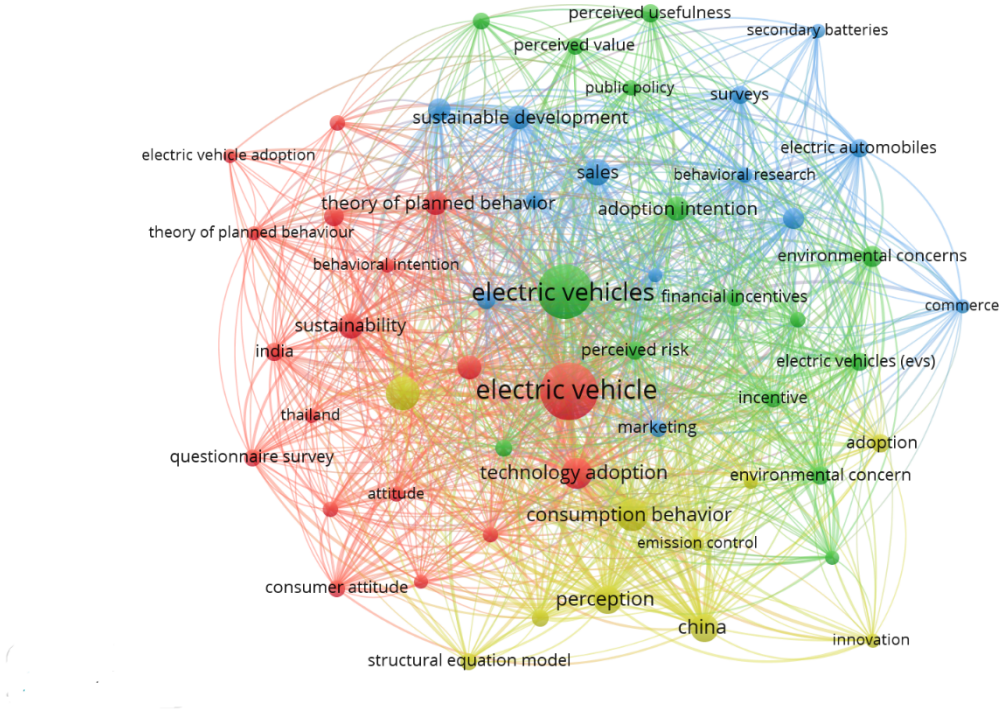

Figure 4. Keyword Co-occurrence Network Map

Thematic Clusters and Research Domains

Network analysis through keyword co-occurrence shows BEV adoption literature from a consumer perspective can be classified into four thematic categories. Each category pertains to a unique conceptual area, but those areas remain interrelated. Table 1 presents the thematic clusters and their keywords.

Cluster 1: Psychological and Behavioural Foundations of Adoption

The first cluster pertains to the psychological and behavioral components of consumers. These components include attitudes, behavioral intentions, willingness to pay, environmental concern, and the theory of planned behavior. Positive feelings towards a particular technology and the perceived value of it are considered some of the most important predictors of adoption intention. While this cluster provides the foundation for BEV adoption research, most studies emphasize the pre-adoption phase without adequately addressing the post purchase dynamics.

Cluster 2: Policy, Incentives, and Value–Risk Mechanisms

The second cluster focuses on consumers' assessment of the pros and cons of technology. Emerging key words include perceived risk, perceived usefulness, perceived value, financial motivation, public policy, and the risk of technology to the environment. Although consumers must assess the risk associated with using new technology in order to determine the expected payoff, policy and psychological factors are often studied in isolation and are not integrated.

Cluster 3: Market, Technology, and Product Characteristics

The third cluster examines BEVs from the perspective of technology and the market. Key terms are battery electric vehicles, electric cars, marketing, purchasing, and sales. Research in this cluster primarily focuses on the product, marketing, and sales that influence buying. However, research rarely integrates technology attributes and consumer psychology.

Cluster 4: Social and Environmental Context of Adoption

The fourth cluster focuses on the integration of social and environmental aspects surrounding the research subject. Some of the relevant concepts include adoption, purchase intention, perception, innovation, climate or environmental change, public attitudes and relevant geographical areas. This cluster attempts to understand the adoption of BEVs as a response to the increasing public perception of climate change and as a mode of sustainable consumption. However, many studies tend to define the social and environmental aspects of their research as peripheral or contextual factors, rather than core factors of adoption.

Cluster Synthesis and Conceptual Implications

The formation of the four thematic clusters demonstrates that research into BEV adoption is emerging on a number of important topics, including the technology and market, policy and economics, psychology, and the social aspects. Although this field of research is growing, the integration of theories across domains is still limited. Most studies tend to discuss each domain separately, rather than as part of a single interrelated process. These findings indicate the need for a more integrated conceptual framework that connects the various existing domains and explains the adoption process more systematically.

Table 1. Keyword Clustering

Cluster	Keywords
Cluster 1	attitude, behavioural intention, consumer attitude, electric vehicle, electric vehicle adoption, environmental awareness, greenhouse gas, india, psychology, questionnaire survey, structural equation modelling, sustainability, technology adoption, thailand, theory of planned behaviour, willingness to pay
Cluster 2	adoption behaviour, adoption intention, decision making, electric vehicles, environmental concern, environmental issue, financial incentive, incentive, perceived risk, perceived usefulness, perceived value, public policy, technology acceptance model
Cluster 3	battery electric vehicles, behavioural research, commerce, electric automobiles, electric car, knowledge, marketing, purchasing, sales, secondary batteries, structural equation modelling, surveys, sustainable development
Cluster 4	adoption, china, climate change, consumption behaviour, emission control, innovation, perception, public attitude, purchase intention, structural equation model

Density Visualization: Core and Peripheral Themes

Density visualization is used to see how much attention research has paid to specific themes in the literature on BEV adoption from a consumer perspective. The resulting density map is shown in Figure 5. The analysis results show that the highest density is found in keywords such as electric vehicle, purchase intention, adoption intention, technology adoption, and consumer behavior. This concentration shows that most of the available literature concentrates on the intention to adopt and the decision-making processes of consumers, particularly their psychological and cognitive processes.

On the other hand, themes pertaining to more advanced stages of adoption appear to be under-researched. The literature on experiences of consumers that are post-adoption, the post-adoptive processes, and the literature on the modification of consumer behavior following the purchase of a product are rarely represented in the density map. This indicates that research has paid limited attention to stages beyond intention. The uneven distribution of density also highlights under-researched areas, particularly those related to longitudinal adoption processes. The results indicate the need for a more integrated conceptual framework that considers adoption as a process rather than an outcome.

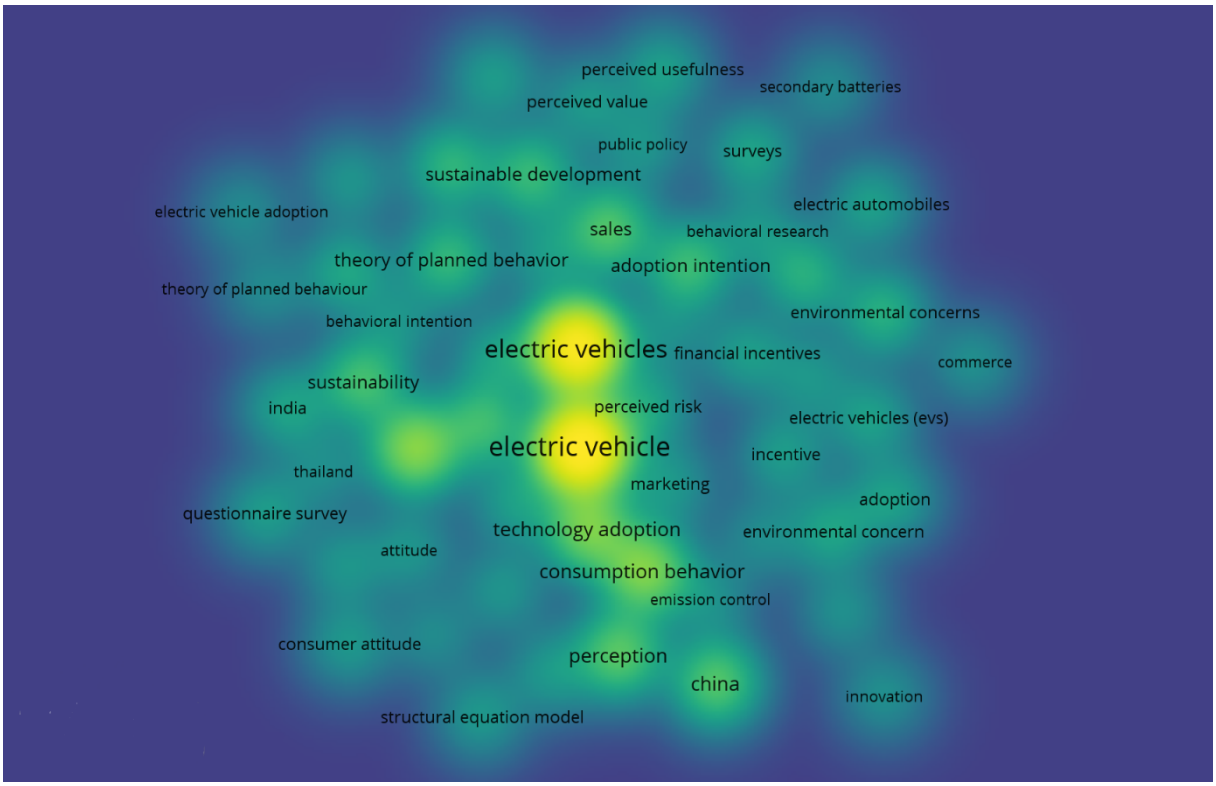

Figure 5. Density Visualization

Overlay Visualization: Temporal Evolution of Research Themes

Overlay visualization examines the evolution of research themes in literature related to the adoption of BEVs by determining the average publication year of each keyword. Figure 6 shows the outcome of the visualization. Early research focused on technology, environmental issues, and policy, with keywords such as emission reduction and financial incentives. More recent studies emphasize consumer behavior, including consumer attitude, perceived usefulness, and perceived value. Despite increased attention to behavioral factors, most studies still use a relatively static intention-based analytical framework. Topics such as inter-stage adoption dynamics, consumer learning processes, and post-purchase behavioral changes are still rarely discussed, even in recent studies. This indicates that the development of research themes has not been fully accompanied by conceptual changes in understanding BEV adoption as a dynamic process. Overall, the overlay visualization shows that BEV adoption research has undergone a significant shift in focus but still faces challenges in integrating the dimensions of time and the adoption process more comprehensively. Therefore, a more integrated conceptual synthesis is needed so that the development of research themes can be explained in a process-oriented framework.

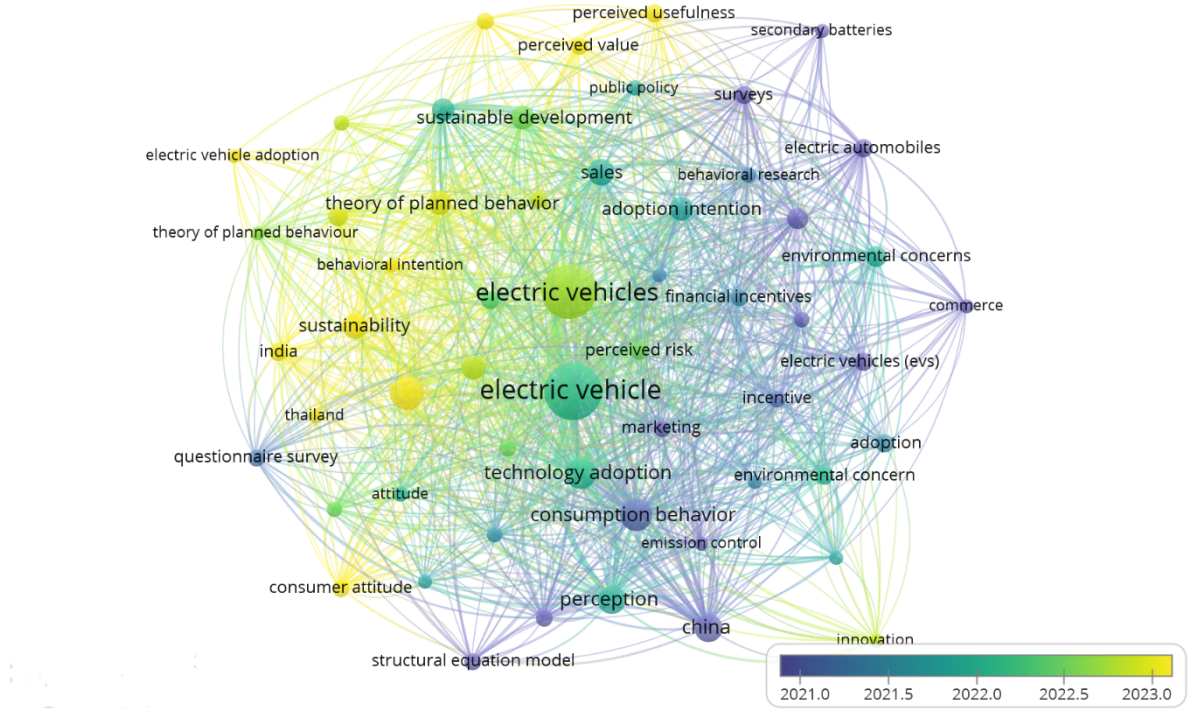

Figure 6. Overlay Visualization

Conceptual Synthesis and Framework Development

Bibliometric mapping and thematic synthesis in the previous section show that the literature on BEV adoption from a consumer perspective has a rich conceptual basis but is still fragmented. Co-occurrence analysis of keywords, density visualization, and overlay visualization consistently show the dominance of intention-based approaches in explaining BEV adoption. Although various factors from several domains have been identified, most studies have not clearly explained how the adoption process develops from the initial awareness stage to the actual purchase decision. Many studies still view BEV adoption as a direct result of a combination of individual and external context factors. This approach rarely positions adoption as a gradual decision-making process, in which each stage is influenced by different causal mechanisms. At the same time, although the literature has identified various explanatory domains such as psychological, economic, technological, policy, and social, these domains are usually analyzed separately rather than as interacting mechanisms. This condition indicates that a factor-based approach on its own is inadequate to account for the complexities and dynamics involving BEV adoption. To overcome these limitations, this study presents a conceptual framework that encompasses the BEV adoption process and cross-domain causal mechanisms. In this framework, BEV adoption is conceptualized as a gradual process shaped by several causal mechanisms from multiple interacting domains. This framework aims to provide a comprehensive understanding of how BEV adoption is approached, as depicted in Figure 7.

Using conceptual synthesis, the adoption process of Battery Electric Vehicles (BEVs) encompasses five distinguishable stages. These stages resemble the general order of consumer decision-making processes. The first phase identifies and describes the problem. At this stage, consumers cultivate an awareness of issues concerning environmental, energy and transportation costs and regard BEVs to be a solution to these challenges. A combination of public communication, governmental programs, and social pressure are attributed to this phenomenon. The second stage places an emphasis on the evaluation of both the technology and the attributes of a product. These consumers examine characteristics of range, charging infrastructure, and performance, among alternatives with BEVs vis-a-vis conventional vehicles. The third stage involves value and risk assessment, where an individual determines the perceived benefits (such as cost avoidance savings, environmental impact and social value) against the perceived risk (high costs, infrastructure limitations, and policy uncertainty). The formation of the willingness to adopt BEVs consists of adopting an attitude and motivation to adopt BEVs as shaped by the previous assessments along with a number of influences, including total cost of ownership, policy support, social norms and willingness to pay. The

final stage concerns purchase and adoption decisions, including post-purchase experience, usage patterns, and social diffusion effects. These post-adoption dynamics remain limited in existing studies. The synthesis also identifies five main domains influencing the BEV adoption process. The first domain is psychological and cognitive, including environmental concern, perceived attributes, value and risk assessment, and consumer attitudes. The second domain is economic and financial, including cost perception, economic benefits, total cost of ownership, and ownership experience. The third domain encompasses technology and product characteristics such as performance, efficiency, and charging availability. The fourth domain consists of policy and institutional factors including subsidies, regulation, and infrastructure provision. The fifth domain involves social and contextual factors such as social norms, public acceptance, and market conditions.The BEV adoption framework combines the stages in the BEV adoption process with cross-domain causal mechanisms. The horizontal dimensions show the stages of the BEV adoption process, whereas vertical dimensions show the range of factors that affect each stage. The framework explains BEV adoption as the result of interactions between multiple domains across different stages of the consumer decision-making process. This integrated structure provides a systematic explanation of how adoption decisions develop from awareness to actual adoption.

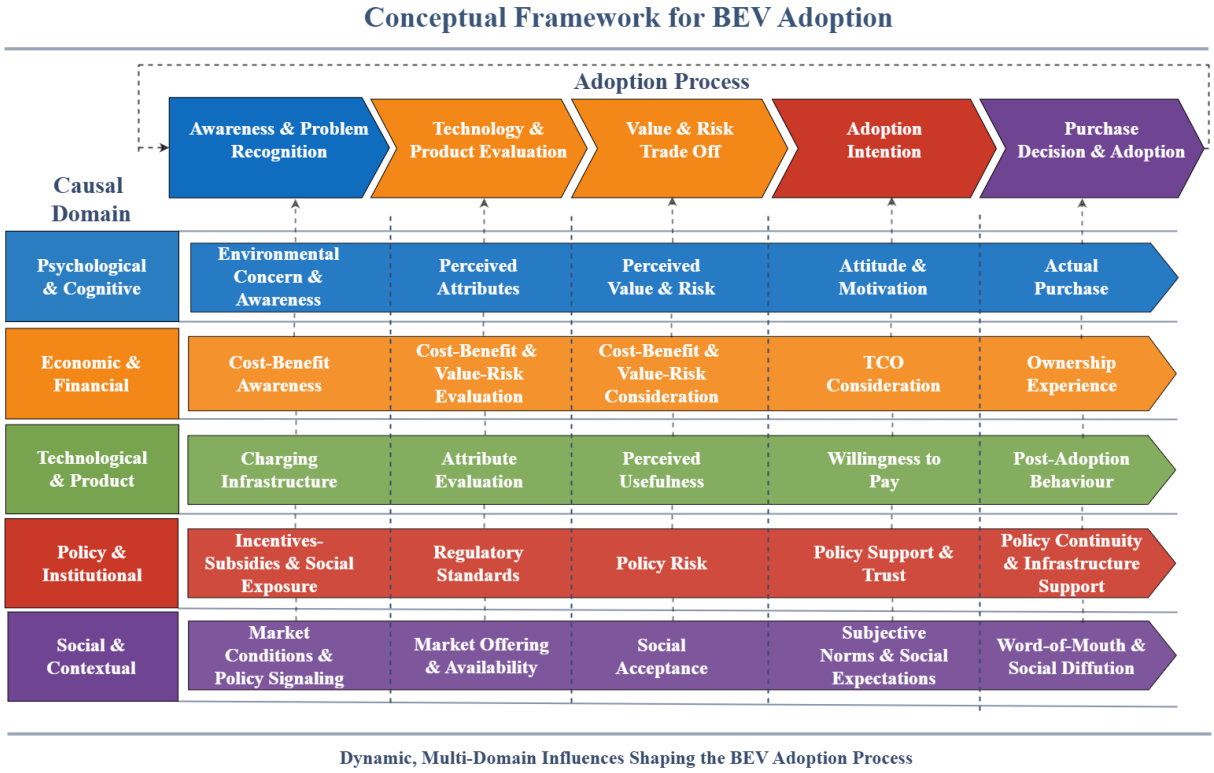

Figure 7. Proposed Conceptual Framework for BEV Adoption

Discussion: Fragmentation, Intention Bias, and Advancing BEV Adoption Theory

The intention-based approaches continue to dominate research on consumer adoption of BEVs based on bibliometric analyses (Boubker, Lakhal, Ait Yassine, & Lotfi, 2024)(Dutta & Hwang, 2021). Keyword networks and density visualizations highlight the prevalence of the keywords such as purchase intention, adoption intention, technology adoption, perceived usefulness, and theory of planned behavior. The emphasis on these keywords guides the understanding of BEV adoption as a psychological outcome rather than understanding BEV adoption as a process including multiple decisions over time.

This pattern reflects the presence of traditional technology adoption models, especially the TAM (Davis, 1989) and the TPB (Ajzen, 1991) in the studies on adoption of electric vehicles (Yi, Wisedsind, & Thavorn, 2025)(Chonsalasin, Champahom, Limpasirisuwan, Jomnonkwao, & Ratanavaraha, 2025). Numerous authors have employed or built upon these models to account for the intention to purchase BEV, and in doing so, highlighted the role of perceived risk, empathy toward the environment, and costs (Fu, 2024)(A. kumar Gupta, 2025). However, when intention is treated as primary outcome, BEV adoption is conceptualized as a static decision, and the evaluative and decision-making process preceding actual purchase are rarely examined (Wang, Li, & Zhao, 2017)(Asadi et al., 2021)(Singh, Singh, Singh, & Higueras-Castillo, 2023)(Sheeran, 2002).

At the same time, the literature demonstrates fragmentation across multiple explanatory domains. Psychological, economic, technological, policy, and social factors are frequently included, but are rarely integrated within a unified analytical framework (Gayathiri & Ahamed, 2025). Economic constructs such as willingness to pay and financial incentives are often analyzed separately from psychological constructs such as attitudes and perceived risk (Mpoi, Milioti, & Mitropoulos, 2023)(Munshi, Dhar, & Painuly, 2022). Likewise, the policy dimension is often framed as an external context rather than an active mechanism in fostering consumer choice (Lee, Zailani, & Shaharudin, 2025). As a result, the relationships between domains and their roles in shaping adoption pathways remain insufficiently explained.

Most empirical research is based on a factor analysis approach with one or two core domains explaining the intention of adopting BEVs or the willingness to purchase them (Rehman, Bresciani, Yahiaoui, & Kliestik, 2024)(Hasan, 2021). Psychological variables such as attitude, usefulness, and risk analyses are conducted in isolation from economic analyses of ownership costs or monetary incentive analyses (Sun, He, & Thøgersen, 2022)(Krishnan & Koshy, 2021). Also, technological analyses are usually only product attributes analyses, without a thorough linkage to the psychological or economic frameworks that are deemed to influence the consumer evaluation (Munshi et al., 2022)(Jang & Choi, 2021). Policy and institutional perspectives, including ncentives and subsidies and infrastructure are valid BEV adoption frameworks, but are typically relegated as external conditions rather than integrated components of the decision-making process (Featherman, Jia, Califf, & Hajli, 2021)(Hu, Zhou, Wang, Gao, & Zhu, 2023). The dominance of factor-based models is also associated with methodological tendencies in literature. A substantial number of studies relieve static analytical techniques such as Structural Equation Modeling (SEM) to examine direct relationships between variables and intention. While effective for hypothesis testing, such approaches tend to overlook the dynamic and staged nature of consumer decision-making. Consequently, BEV adoption is frequently treated as a state rather than as a process (Dangi, Kaur, & Jham, 2019).

Overlay visualization further indicates a temporal shift in research focus. Earlier studies tended to focus on the environment and pro-sustainability reasons to explain why consumers adopted the innovation (Cui, Wang, Chen, Wen, & Han, 2021)(Kim, Oh, Park, & Joo, 2018), while more recent studies emphasis on psychological evaluative dimensions such as perceived value and perceived usefulness (Kottala, Chanagala, Balaji, Reddy, & Babu, 2025)(Lakshmanan, Shanmugavel, Sakthivelu, & Senthil, 2024). Despite this shift, intention-based frameworks remain dominant, and topics such as inter-stage dynamics, consumer learning, and post-adoption behavior continue to receive limited attention (Jain & Singh, 2024)(Kumar, Kaushik, Noravesh, Sindhwani, & Mathiyazhagan, 2025). This suggests that changes in research themes have not been accompanied by corresponding conceptual advancements.

Although literature provides a strong empirical foundation for understanding the determinants of adoption intention (A. K. Gupta, Dash, & Sharma, 2025), it remains limited in explaining how intention develops across stages and how it translates into actual adoption behavior (Yadav & Yadav, 2024). This gap illustrates the necessity for a more comprehensive conceptual framework which connects stages of decision-making with mechanisms beyond one domain. To overcome these limitations, this study contributes to BEV adoption theory by offering a hybrid process–causal framework. The framework proposes that instead of just interpreting intention as an ultimate outcome, a process of BEV adoption can be broken down into a sequence of stages, including but not limited to awareness, evaluation, intention, and adoption. This perspective enables the analysis of how consumer preferences, evaluations, and decision criteria evolve over time (Prakhar, Jaiswal, Gupta, & Tiwari, 2024).

The framework's most significant contribution is the combination of five main causal dimensions, namely, psychological and cognitive, economic and financial, technological and product, policy and institutional, and social and contextual. Unlike the traditional framework that analyzes these domains as standalone segments, the proposed framework views these segments as mechanisms that drive changes among the stages of the adoption process. This integrated approach provides a more holistic understanding of the adoption process compared to previously identified literature gaps. In this framework, the policy and institutional domains are described as the principal contextual domains, in contrast to the historical and static domains. Policies are driven to fundamentally affect the technology lifecycle and BEV adoption as a result of changes in technology evaluation and adoption systems. This perspective enriches the literature on the role of policy, as it has been predominantly treated as a controlling factor or an outside variable (Lee et al., 2025). The framework also helps integrate purchase decisions and post-adoption experience into the adoption process, thereby filling the gap between intention and behavior. It also helps recognize and capture the full continuum of consumer behavior and the social and technical complexities associated with BEV adoption by focusing on the process beyond intention.

The proposed framework builds upon existing theories, such as the TAM and TPB diffusing and integrating their values beyond the linear process as seen in sequential, multi-level and multi-domain structures. Such an approach diffuses and builds a flexible and robust platform for subsequent empirical studies by defining the progression of adoption decisions through multiple stages and different contexts. Extant literature evidences a significant focus on identifying barriers and drivers of adoption; however, the literature largely neglects to demonstrate the mechanisms through which these determinants operate (Hoang et al., 2022)(Limpasirisuwan, Champahom, Jomnonkwao, & Ratanavaraha, 2024). The proposed conceptual framework developed in this study addresses this limitation by integrating process logic and cross-domain mechanisms, thereby providing a more robust theoretical foundation for understanding consumer adoption of BEVs.

Contributions, Research Implications, and Practical Insights

This study contributes to the literature on BEV adoption by going beyond adoption phenomena and looking at consumer behavior in the context of decision making. The adoption of BEV is conceived this study as a multi-step process, which consists of the technology perception, value and risk assessment, attitude formation, intention, and actual adoption. As such, BEV adoption is presented as an evolving decision process rather than a static behavioral outcome.

Secondly, the study provides a unified framework of multiple explanatory domains. Psychological, economic, technological, policy, and social domains have been treated in isolation or in limited combinations in previous research. This study views these domains as mutually causal mechanisms, thus enhancing the representation of BEV adoption as a socio-technical system in its entirety.

This study also fills the intention and behavior gap of adopting BEVs by conceptualizing it as the incorporation of multi-modal domains into a comprehensive framework. The adoption of an analytical gaze beyond intention equips this framework to better understand how adoption decisions manifest as purchase and usage behavior. Furthermore, the policy and social lenses operate as contextual mechanisms to the system, enhancing the framework on how externally these conditions operate to compel the consumers to draw an evaluative judgement.

Lastly, integrating bibliometric mapping and conceptual synthesis offers an original contribution by demonstrating the application of a Bibliometric-assisted Systematic Literature Review (B-SLR) to contribute to the progression of theory, as it maps existing literature. This enables the identification of relational patterns and subsuming them into a cohesive structuring of the framework.

The findings, from a practicacl perspective, suggest that the BEV adoption process involves numerous interactions between technological, social, economic, and policy factors. For automotive manufacturers and technology providers, this provides the opportunity to bridge the gap between consumers' perceived benefits, usability, and cost efficiency.

In a market perspective, certain aspects regarding the consumers, such as evaluations, and the assessment of risk, remain fundamental. These aspects dictate the patterns of decision making as well as the adoption of BEvs. BEVs' adoption may be facilitated by mechanisms that allow costs to be more transparent, financial mechanisms to be more available, and risk to be reduced. These mechanisms need to be paired with market demands, infrastructural capabilities, and consumers' behavioral tendencies.

Policy and institutional support shape the environment in which consumer decisions are formed. Increased BEVs adoption by consumers can be achieved by policies that enhance certainty, BEVs' legitimacy, and the availability of BEVs' charging infrastructure. However, the effectiveness of these policies may vary depending on regional and market conditions.

Social and contextual factors impact movement from positive attitudes toward intention to adopt. User interaction, community, and visibility presence in the market promote positive adoption. Contextual dynamics of community and culture dictate the impact of these positive adoption factors. Findings demonstrate that BEV adoption is a complex and multi-dimensional process that demands an innovative approach to manage the technology, market, policy, and social factors simultaneously.

CONCLUSION

This study examines BEV adoption literature from a consumer perspective from the consumer-scale perspective and applies a structured conceptual framework, which has been developed using a B-SLR approach. Both the bibliographic evidence of BEV adoption literature and the qualitative synthesis describe a seemingly positive BEV adoption trajectory, but an intention-based approach describes adoption without sufficient clarity and integration across the BEV adoption explanatory dimensions and the relevant adoption phases.

The bibliometric analysis indicates that studies on BEV adoption focus on the psychological, economic, technological, policy, and social factors. Out of these domains, most studies cite and evaluate factors in isolation. This indicates that there is a relatively in-depth analysis of factors that shape the adoption intention. However, studies and literature remain mute on the unfolding of the decision-making process that leads to the actual buying and usage of BEVs. Therefore, the study proposes a conceptual framework that identifies descriptive causal mechanisms of BEV adoption that transcend most domains. The framework features adoption instances, awareness, intention, evaluation of associated risks and value, and technology. Therefore, this study aims to broaden the scope of analysis that is generally focused on predictors and their domain to include a description of the process constituted of adoption intention and actual usage.

This study has several limitations. First, the synthesis is based on secondary literature. Second, the bibliometric analysis is limited to the Scopus database, which may exclude relevant studies from other sources. Third, the focus on consumer adoption of BEVs may limit generalizability to other contexts such as commercial fleets or shared mobility systems. These limitations suggest directions for future research. Empirical testing using longitudinal and cross-context data can improve understanding of adoption processes. Further research can examine variations in policy and market conditions across regions, as well as post-adoption behavior, including ownership experience and social diffusion.

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