SHAPING SUSTAINABLE TRANSPORTATION: A BIBLIOMETRIC EXPLORATION OF LEADING RESEARCH IN ELECTRIC VEHICLES ADOPTION

Rosmaizul Mustapha[1], Ahmad Nazrul Hakimi Ibrahim[2] and Muhamad Nazri Borhan[3]

[1,2]*Department of Civil Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Bangi 43600, Selangor, Malaysia.*
[3]*Smart and Sustainable Township Research Centre, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, Bangi 43600, Selangor, Malaysia.*

[*]*P146039@ukm.edu.my*

ARTICLE INFO	ABSTRACT
	The adoption of Electric Vehicles (EVs) has become a central topic in sustainable transportation research, driven by global environmental concerns, regulatory initiatives, and technological advancements. Understanding the most influential contributions in this area is essential to guide future research directions and policy development. This study applies a bibliometric approach using the Scopus database, retrieving articles from the title field with the keywords ("EV adoption" OR "EVs adoption" OR "electric vehicle adoption" OR "electric vehicles adoption"). The search covered publications from 2009 to 2025, yielding 657 records eligible for bibliometric analysis. Bibliomagica 2.9 was used to extract descriptive data, while VOSviewer generated and visualized citation networks and overlay maps. The 20 most cited publications were identified and examined by author, title, source, citation count, and citations per year. Citation frequencies ranged between 158 and 1,237, with an average of 400.4 citations. The most cited study by Egbue and Long (2012) emphasized psychological barriers to EV adoption, followed by works by Sierzchula et al. (2014) on financial incentives and Rezvani et al. (2015) on consumer behavior. Results show that EV adoption research predominantly focuses on consumer attitudes, government incentives, and sociodemographic factors. Overlay visualizations reveal increasing citations for recent studies, highlighting evolving scholarly priorities and the need to address regional disparities and socio-technical challenges.

1. Introduction

The global shift towards sustainable transport has increased academic interest in researching the use of Electric Vehicles (EVs) as a realistic alternative to internal combustion engine cars.

It has emerged as the best alternative to meet long term environmental and economic sustainability goals at a time of growing concerns about climate change, energy security and urban pollution (IEA, 2022). The academic literature on EVs adoption has grown significantly over the past two decades by examining a variety of perspectives from consumer behaviour, technological innovation, government incentives and socioeconomic considerations (Rezvani et al., 2015; Sierzchula et al., 2014). Despite the growing body of research, there is still a need to conduct a thorough assessment of the most important contributions that have impacted this emerging subject. While numerous reviews and meta-analyses have investigated thematic patterns and theoretical frameworks in EVs adoption, the insufficient emphasis could be remedied by bibliometric studies. This studies able to measure academic influence and describe the intellectual structure of the area. It can identify highly cited publications and citation patterns can help academics assess how knowledge has developed, where gaps exist and whether an area holds growing promise for academic investigation (Donthu et al., 2021).

In response to this gap, the current study engages in a bibliometric analysis focusing on the top 20 most cited papers related to EVs adoption research, as listed in the Scopus database between 2009 and 2025. This study uses the Bibliomagica 2.9 (Ahmi, 2023) to collect and retain bibliographic data, while VOSviewer is used to create and show citation networks and overlay trends. The objectives of this study are to identify and characterize the most highly cited articles in EV adoption literature, to map the citation network and also to visualize intellectual linkages across influential studies, and to highlight emerging citation trends and potential research trajectories. Accordingly, this study is guided by the following research questions:

RQ1: Which articles have received the highest citation impact in the domain of EV adoption?
RQ2: What thematic and methodological patterns can be identified among the most cited studies?
RQ3: How have recent citation trends evolved, and what do they suggest about future research directions?

RQ1 was used to identify the most influential scholarly works in this area, which is articles that have received the highest citation impact in the domain of EVs adoption. It is based on citation measures, including citation count and citations per year. This question helped to identify the foundational profile of the most effective research in the field by examining source titles, publication years and author contributions. For the RQ2, it facilitates to explore the intellectual structure of the literature by analysing thematic focus areas, dominant theoretical models and methodological approaches used in high impact studies. This study has been supported by VOSviewer generated graphics, which show the co citation and bibliographic linking among the top articles. RQ3 uses overlay visualization tools to track recent citation performance, thereby discovering articles and topics getting steam in the academic debate. This allows for the discovery of new research areas and underexplored areas that require further investigation. By answering these questions, this study offers a basic reference for academics, policymakers and industry players who want to navigate the complex and rapidly changing EVs adoption research environment.

2. Methodology

This study conducts a bibliometric analytic technique to widely analyse the academic environment in EVs adoption research. Bibliometric techniques are particularly essential for recognizing significant publications, thematic trends and the intellectual frameworks associated with a certain topic (Donthu et al., 2021). Figure 1 shows a flow diagram of the search strategy.
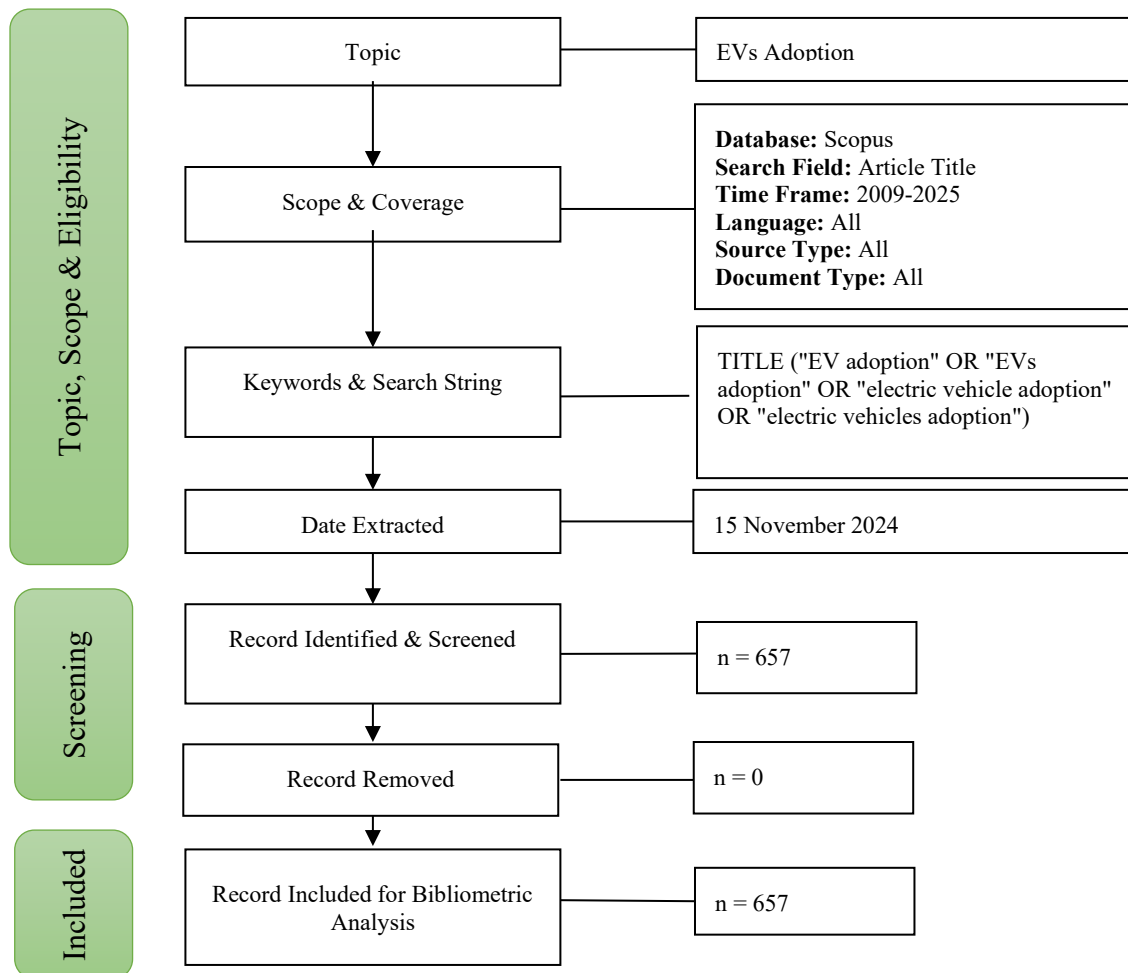

Figure 1. Flow diagram of the search strategy.
Source: Punj et al. (2021), Moher et al. (2009)

To address the research questions and meet the stated objectives, a bibliometric analysis was conducted using a structured and transparent methodological approach. Bibliometric analysis is a quantitative method that enables the identification of research impact, thematic development, and intellectual linkages across publications (Aria & Cuccurullo, 2017; Donthu et al., 2021). This method is particularly appropriate for mapping a rapidly expanding and interdisciplinary field such as electric vehicle (EV) adoption. The Scopus database was determined to be used for this investigation, because its comprehensive indexing of high impact journals and its trustworthy citation metrics. The data retrieval was handled using the article

title field with the following search string: TITLE ("EV adoption" OR "EVs adoption" OR "electric vehicle adoption" OR "electric vehicles adoption"). Time frame selected for this study ranged between 2009 until 2025. There are no limits put on language, document format or source type. An initial dataset of 657 items was record and identified with this process. These records were subjected to a screening and eligibility method, which includes reviewing titles and abstracts to show relevance to the topic of EVs adoption. Only empirical literature, conceptual papers and reviews clearly addressing EVs adoption concerns were saved for analysis.

For the bibliometric processing, Bibliomagica 2.9 (Ahmi, 2023) was used to find out basic descriptive information, such as publication year distribution, citation counts and document categories. To further enrich the research, VOSviewer (Jan van Eck & Waltman, 2014) was employed to construct and depict the bibliometric networks. This dual tool strategy enhanced the analytical depth by merging quantitative metrics with graphical depiction. Three types of bibliometric networks were constructed including co-authorship patterns used to identify relationships between frequently cited documents and reveal intellectual foundations of the field, keyword co-occurrence to uncover major research themes and terminologies used in EV adoption literature and bibliographic coupling which is to examine linkages between documents that cite similar references, reflecting thematic proximity. For each network, thresholds were applied to ensure clarity and interpretability of the maps which is only keywords with a minimum of five occurrences across the dataset were included in the keyword co-occurrence analysis, and for the co-citation network, documents with at least 50 citation links were retained. These thresholds balanced inclusivity with visualization clarity, allowing the identification of prominent clusters without overloading the maps. In addition, overlay visualization was generated to highlight recent citation dynamics. The node size represented total citation count, while node colour indicated the average year of citations in this visualization. This technique provided insights into the temporal evolution of the field, distinguishing foundational works from emerging contributions. Subsequently, the top 20 most cited papers were determined based on total citation count. For each article, significant bibliometric data were obtained including total citations, citations per year, source title and authorship detail was recorded. Thematic analysis was conducted to describe repeated research issues and theoretical approaches.

By combining descriptive statistics from Bibliomagica with structural and temporal mapping using VOSviewer, the methodology provided a comprehensive analytical framework for addressing the research questions and objectives of this study. This methodological approach gives a comprehensive platform for assessing the intellectual development and academic effect of EVs adoption research across disciplines.

3. Results

This section outlines the key findings obtained from a bibliometric analysis for identifying the most influential articles by using the data retrieved from the Scopus database. The results are derived from the bibliometric analysis of EVs adoption literature based on citation performance, examining citation network structures, and visualizing emerging citation trends.

Results are organized into three parts which is the top 20 highly cited articles, the citation network analysis and the overlay visualization of recent citation dynamics. Together, these results provide a comprehensive overview of the intellectual structure, thematic concentrations and evolving directions in EVs adoption research.

3.1 Top 20 highly cited articles

The bibliometric analysis identified the top 20 most-cited articles on electric EVs adoption from the Scopus database within the time frame 2009 to 2025. The total citation counts range from 158 to 1237 indicating substantial scholarly attention toward EV adoption research. Table 1 shows full result for the top 20 cited articles, the citation counts and citations per year.

Table 1. Top 20 highly cited articles

No.	Authors	Title	Source Title	Cites	Cites per Year
1	Egbue & Long, 2012	Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions	Energy Policy	1237	95.15
2	Sierzchula et al., 2014	The influence of financial incentives and other socio-economic factors on electric vehicle adoption	Energy Policy	932	84.73
3	Rezvani et al., 2015	Advances in consumer electric vehicle adoption research: A review and research agenda	Transportation Research Part D: Transport and Environment	874	87.40
4	Kumar & Alok, 2020	Adoption of electric vehicle: A literature review and prospects for sustainability	Journal of Cleaner Production	496	99.20
5	Bjerkan et al., 2016	Incentives for promoting Battery Electric Vehicle (BEV) adoption in Norway	Transportation Research Part D: Transport and Environment	441	49.00
6	Coffman et al., 2017	Electric vehicles revisited: a review of factors that affect adoption	Transport Reviews	419	52.38
7	Helveston et al., 2015	Will subsidies drive electric vehicle adoption? Measuring consumer preferences in the U.S. and China	Transportation Research Part A: Policy and Practice	392	39.20
8	Langbroek et al., 2016	The effect of policy incentives on electric vehicle adoption	Energy Policy	361	40.11
9	Mersky et al., 2016	Effectiveness of incentives on electric vehicle adoption in Norway	Transportation Research Part D: Transport and Environment	356	39.56
10	She et al., 2017	What are the barriers to widespread adoption of battery electric vehicles? A survey of public perception in Tianjin, China	Transport Policy	278	34.75
11	Bockarjova & Steg, 2014	Can Protection Motivation Theory predict pro-environmental behavior? Explaining the adoption of electric vehicles in the Netherlands	Global Environmental Change	269	24.45
12	Wang et al., 2018	Policy implications for promoting the adoption of electric vehicles: Do consumer's knowledge, perceived risk and financial incentive policy matter?	Transportation Research Part A: Policy and Practice	264	37.71
13	Avci et al., 2015	Electric vehicles with a battery switching station: Adoption and environmental impact	Management Science	207	20.70
14	Singh et al., 2020	A review and simple meta-analysis of factors influencing adoption of electric vehicles	Transportation Research Part D: Transport and Environment	203	40.60
15	Haustein et al., 2021	Factors of electric vehicle adoption: A comparison of conventional and electric car users based on an extended theory of planned behavior	International Journal of Sustainable Transportation	199	28.43
16	Vassileva & Campillo, 2017	Adoption barriers for electric vehicles: Experiences from early adopters in Sweden	Energy	194	24.25
17	Jansson et al., 2017	Examining drivers of sustainable consumption: The influence of norms and opinion leadership on electric vehicle adoption in Sweden	Journal of Cleaner Production	192	24.00

No.	Authors	Title	Source Title	Cites	Cites per Year
18	Tarei et al., 2021	Barriers to the adoption of electric vehicles: Evidence from India	Journal of Cleaner Production	190	47.50
19	Shao et al., 2017	Subsidy scheme or price discount scheme? Mass adoption of electric vehicles under different market structures	European Journal of Operational Research	190	23.75
20	Bakker & Jacob Trip, 2013	Policy options to support the adoption of electric vehicles in the urban environment	Transportation Research Part D: Transport and Environment	188	15.67

Source: Generated by the author(s) using biblioMagika® (Ahmi, 2024)

3.2 Citation Network Analysis

Citation network analysis was conducted using VOSviewer to further examine the intellectual structure of the EV adoption research landscape. This approach allows for the visualization of citation relationships among scholarly publications which is offering insights into how knowledge is interconnected and evolves within a field. By mapping this citation links, clusters of related studies can be identified. It also revealing the dominant research themes, influential publications and emerging areas of interest. The network analysis also supports distinguishing between well-integrated core literature and more peripheral, potentially novel contributions. The following visualization illustrates the structure and density of these relationships within the dataset.
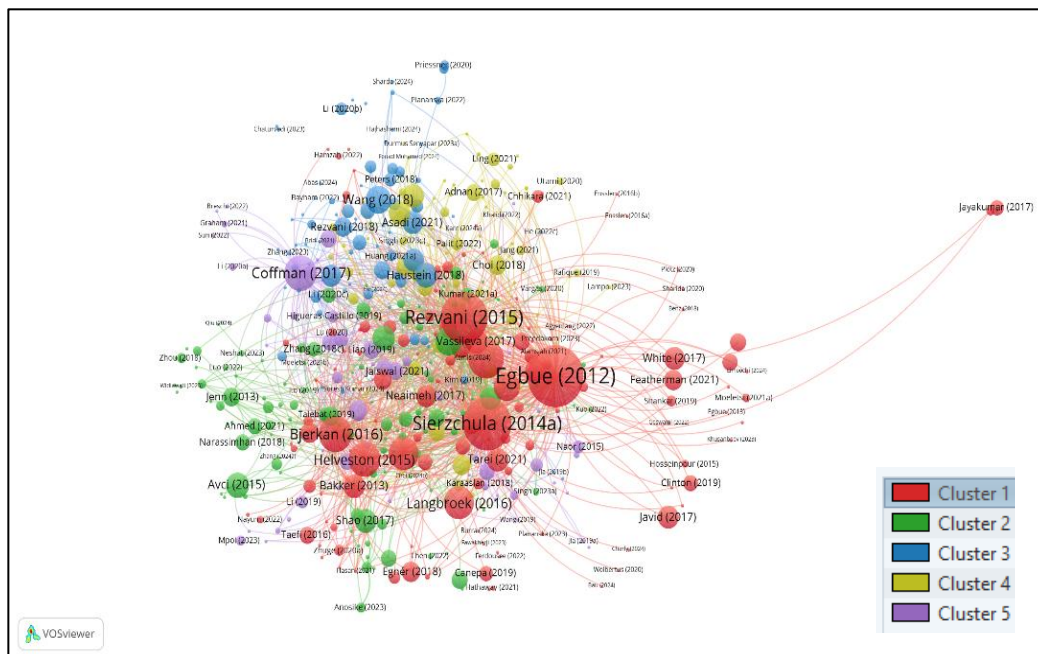

Figure 2. Network visualization of the citation by recent citations scores.
Source: Generated by the author(s) using VOSviewer (van Eck & Waltman, 2014)

The citation network based on recent citation scores are shows in Figure 2 represent the total dataset of 8387 documents used in this study. This data ware analyzed using a full computational approach. The graphic identifies the most prominent publications based on citation frequency indicating each study's academic significance. Node in the network

symbolizes in this figure referred to published document and its size corresponds to the number of citations received. The bigger nodes reflect paper with a stronger impact on the scientific area. Furthermore, the varied colors in the network indicates diverse clusters which bring together studies that concentrate on comparable study topics. The citation links show how studies refer to one another and how knowledge has developed within the topic indicate by connections between nodes. Most cited document by Egbue & Long, 2012, followed by Rezvani et al., 2015, Sierzchula et al., 2014, Coffman et al., 2017 and Langbroek et al., 2016. Demonstrated by their important position many citations in the network these publications have had a significant impact in shaping the academic debate on EV adoption. Certain papers, such as Jayakumar et al., 2017 are placed on the perimeter, suggesting that although they contribute to the field, they have less direct citation linkages to the core clusters.

Based on the interpretation of Citation Network Analysis it shows that the citation network provides some important insights on the intellectual structure of EVs adoption research. The existence of highly cited publications shows that the factor is substantially affected by a few fundamental research that have altered our knowledge of consumer behavior, legislative interventions, and technical improvements. The close relationship between specific papers suggests that EVs usage research is interdisciplinary, including psychology, economics, engineering and environmental sciences where the distribution of publications across many clusters clearly indicates that different parts of EVs usage research developed simultaneously but independently. The clustering pattern suggests five primary study themes, each of which addresses a unique aspect of EV adoption as below:

i. Cluster 1(Red): Adoption & Consumer Behavior

This cluster is the largest and most influential, featuring key documents such as Egbue & Long, 2012, Rezvani et al., 2015 and Sierzchula et al., 2014. Focuses on consumer decision making processes, psychological factors and behavioral models that influence the adoption of EVs. This cluster frequently apply technology acceptance (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) and the Diffusion of Innovation (DOI) theory to understand how consumers perceive EVs. Key themes include are Perceived Risk and Range Anxiety, Willingness to Pay, Social Influence and Awareness. This cluster emphasizes the importance of consumer perception and behavioral intent in accelerating EV adoption rates.

ii. Cluster 2(Green): Sustainability & Environmental Impact

Avci et al., 2015 and Vassileva & Campillo, 2017 dominate this cluster, by emphasizing the environmental benefits of EVs adoption. Key research areas include greenhouse Gas (GHG) Reduction, Renewable Energy Integration and Climate Change Mitigation Strategies. This cluster reinforces the role of EVs in achieving global sustainability goals and reducing carbon footprints.

iii. Cluster 5(Blue): EV Policy & Market Development

Led by Wang et al., 2018 and Huang et al., 2021 this cluster focuses on government policies, incentives and market structures that impact EV adoption. The key research areas for this cluster include Government Subsidies and Tax Incentives, Regulatory Frameworks and Market Penetration Strategies. It highlights how regulatory and economic factors serve as both enablers and barriers to large scale EVs adoption.

iv.   Cluster 4(Yellow): Future Trends & Innovation Adoption

This emerging cluster, directed by Choi et al., 2018 and Tarei et al., 2021, explores future advancements in EVs technology. Key themes include Artificial Intelligence (AI) and Machine Learning, Smart Mobility Solutions and Policy Forecasting and Big Data Analytics. This cluster suggests that data science and emerging technologies will play an important role in shaping the future landscape of EVs adoption.

v.   Cluster 3(Purple): Charging Infrastructure & Technology Readiness

Studies in this cluster, such as Coffman et al., 2017 and Naor et al., 2015, focus on the technological and infrastructural requirements for EV adoption. Key themes include Charging Infrastructure Deployment, Vehicle-to-Grid (V2G) Systems and Battery Technology Advancements. It's highlighting that technological advancements and infrastructure expansion are critical for increasing the practicality and convenience of EVs usage.

As the EVs industry evolves, future research is expected to focus on AI driven adoption models, predictive analytics, and the role of digital transformation in EVs market growth. This analysis not only enhances academic understanding of EVs adoption trends but also provides valuable insights for policy makers, industry stakeholders and technology developers aiming to accelerate the transition to electric mobility.

3.3 Recent Citation Dynamics and Overlay Visualization

In addition to traditional citation-based analysis, an overlay visualization was generated using VOSviewer to assess recent citation trends within the EVs adoption literature. The overlay map in Figure 3 displays a network of cited authors, where the node size indicates total citation to recently cited. This approach highlights the temporal relevance of publications, showing which works continue to drive scholarly attention in the present. volume, and node color represents the average year of recent citations ranging from dark blue indicates earlier influence until yellow which is designates more. Core publications such as Egbue & Long, 2012, Rezvani et al., 2015 and Sierzchula et al., 2014, shows that they are not only remain as highly cited but also demonstrate to continued influence based on their position in the green to yellow spectrum. This suggests their sustained relevance in guiding current EVs usage discourse. Meanwhile, newer studies especially those appearing between 2021 and 2023, including research by Tarei et al., 2021 and Haustein et al., 2021 appear in lighter yellow shades, indicating rising interest and relevance. The map also reveals the development of newer citation clusters on the network's edge, often reflecting novel research domains such as behavioral economics, emerging market adoption and infrastructure equity.
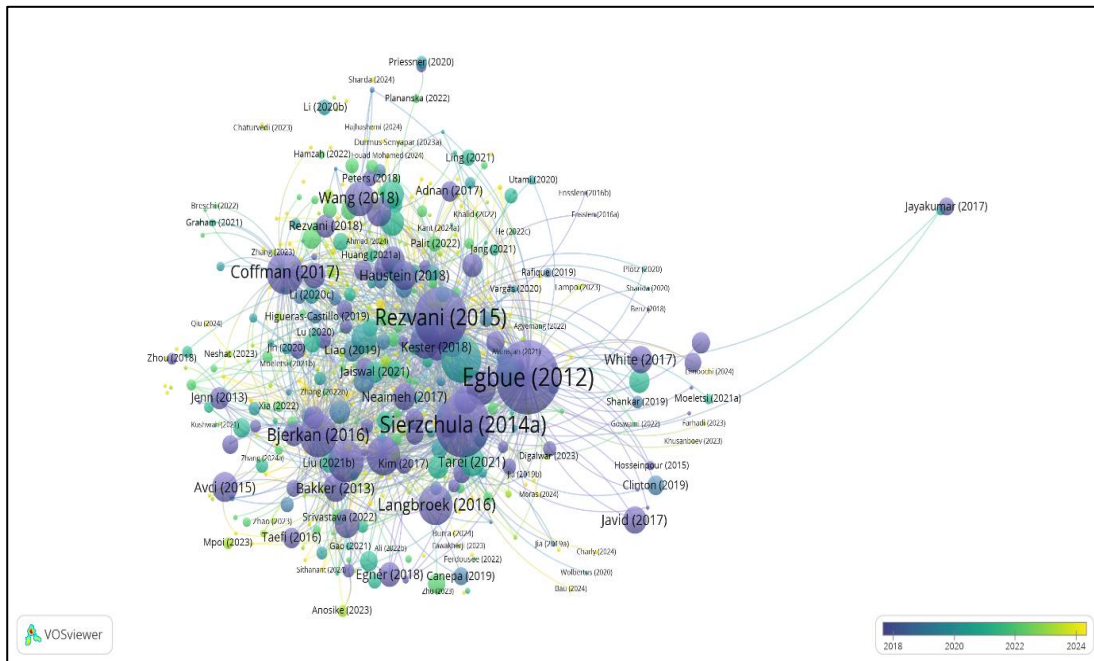
Figure 3. Overlay visualization of the citation by recent citations scores.
Source: Generated by the author(s) using VOSviewer (van Eck & Waltman, 2014)

This visualization offers a dynamic perspective, revealing not only historical academic impact but also current intellectual momentum. It helps to identify shifting scholarly attention and possible research frontiers. For instance, the relative isolation of Jayakumar et al., 2017 which appears in a distinct area with weak linkages, may indicate a niche topic that is just beginning to gain traction. This overlay visualization can complement traditional bibliometric indicators by providing insights into emerging trends and future directions in EVs usage research.

4. Discussion

From the result analysis of Top 20 highly cited articles, indicate that highly cited EVs adoption research is anchored in top tier journals and covers diverse but interconnected themes. Significant publications such as Energy Policy and Transportation Research Part D emphasize the policy driven and multidisciplinary nature of this field. Customer perceptions, financial incentives, and behavioural intention models are highlighted in the most cited publications, indicating that this is an important area of discussion in the EVs adoption research. Additionally, three of the top five most cited publications were in Energy Policy, demonstrating the importance of policy-oriented discourse in EVs adoption research. The most referenced paper by Egbue and Long (2012), with 1,237 citations, emphasizes the relevance of customer attitudes and perceptions in identifying challenges to mainstream EVs adoption. Similarly, article by Sierzchula et al.'s (2014) second most cited article examines the effect of financial incentives and socioeconomic determinants which is underlining the varied character of adoption behaviour.

A prominent theme across the top-cited articles is the role of government intervention and incentives. Articles such as Langbroek et al., 2016 and Mersky et al., 2016 examine the impact of policy mechanisms like subsidies and tax incentives on consumer decision making. These findings reinforce the notion that strategic policy frameworks are essential to stimulate market acceptance. Moreover, some studies which is analyze specific case countries such as Norway ((Bjerkan et al., 2016); (Mersky et al., 2016)) and the Netherlands (Bockarjova & Steg, 2014) it only provides empirical evidence on how national level support structures significantly influence adoption rates. However, despite their policy depth these works remain geographically concentrated in developed economies, raising concerns about generalizability to low and middle-income contexts.

Another important finding is the theoretical diversity among the EVs adoption literature. Several research employ existing behavioral theories to better understand user motivation. For example, Bockarjova & Steg, 2014 use the Protection Motivation Theory to explain pro-environmental behavior, while Haustein et al., 2021 use the Theory of Planned Behavior. This indicates a transition in the field from descriptive analyses toward theory driven investigations, enriching the conceptual landscape and providing stronger predictive power. Review articles, such as those by Kumar & Alok, 2020 and Singh et al., 2020, play an important role in synthesizing previous research findings and guiding future research directions. They assist clarify what has already been discovered and indicate the potential areas for further study.

The patterns observed in publication dates and citation metrics are quite remarkable. Typically, older articles accumulate citations over time, however, more recent works, such as those by Haustein et al., 2021 have already received considerable attention. It reflects a growing momentum and sustained academic engagement in related topics to EVs. With an average of 99.20 citations per year, Kumar & Alok, 2020 achieve a remarkable standard of excellence among the significant contributions. This high citation intensity underscores the timeliness and significance of their work in this field. These metrics not only emphasize the immediate impact of comprehensive literature reviews. It also reflects a significant demand for integrative perspectives in this rapidly evolving technological field.

From a geographical perspective, the dataset reveals a strong bias toward studies based in developed countries, particularly the U.S., China, Norway, Sweden, and the Netherlands. These nations are often early adopters of EV policy, which is offers fertile ground for academic inquiry. For instance, Helveston et al., (2015) and Mersky et al., (2016) evaluate adoption trends and incentive effects in the U.S. and China, while Nordic countries are led by Berjerkan et al. (2016) and Vassileva & Campillo, (2017) The geographical concentration perspective reflects that policy leadership limits applicability of findings to lower- and middle-income regions, with few articles addressing the Global South. Only one study by Tariq et al., 2021 examined India's unique challenges. It highlights a pressing need for more inclusive, comparative studies for this regional gap.

The citation network analysis reveals five distinct clusters, each representing a major strand of EV adoption research. Cluster 1 (red) focuses on consumer behaviour and adoption models, frequently applying frameworks such as the Technology Acceptance Model and the Theory of Planned Behaviour. Cluster 2 (Green), emphasizes the policy and market development,

including the role of subsidies and regulatory frameworks. For Cluster 3 indicate in blue colour addresses charging infrastructure and technological readiness, while Cluster 4, Yellow colour centres on sustainability and environmental impacts. Cluster 5 (Purple) explores future trends, smart mobility and innovation adoption pointing to integrating AI, big data and digital technologies. Together, these clusters illustrate the interdisciplinary scope of EV adoption research while also showing convergence around core issues such as behavioural intention, policy design, and infrastructure readiness. For instance, Sierzchula et al., (2014) and Langbroek et al., (2016) offer quantitative insights into how incentives affect EV acceptance, while Bockarjova & Steg, (2014) apply psychological theories to model environmental behaviour. Several studies integrate empirical survey data with conceptual frameworks, highlighting a trend toward theory driven analysis.

The overlay visualisation addresses another layer of insight shows how recent publications are increasingly shaping the field. The emergence of newer citations signals evolving interest in topics such as behavioural economics, adoption in emerging markets, and charging ecosystem equity. By refer to the visualization, it shows that Jayakumar (2017) are the relatively isolated positioning of studies. Suggests this may be pioneering but under integrated and less focused contributions to this field.

These findings highlight a shift from purely descriptive studies to theory driven, multidisciplinary research. It remains inviting to the further exploration and discussion of this topic by highlighting the persistent geographic and thematic gaps. The most influential studies are concentrated in high-income countries, otherwise there is only limited representation from the Global South. Future research should bridge this gap by exploring adoption dynamics in diverse socio-economic and infrastructural contexts. Furthermore, the growing attention to data driven approaches and emerging technologies which is gives a sign for the next research development phase. Scholars are encouraged to adopt predictive models, longitudinal designs, and systems-based perspectives to understand better long-term behavioural shifts and policy impacts in EV adoption.

5. Conclusion

This bibliometric analysis was conducted to identify the most influential literature on electric vehicle (EV) adoption between 2009 and 2025, based on data extracted from the Scopus database.

Key Finding: The top 20 most cited articles reveal sustained scholarly focus on behavioral, policy-related, and technological determinants of EVs adoption. Results from data analysis reveal that authors such as Egbue & Long, 2012; Rezvani et al., 2015; Sierzchula et al., 2014, the foundational contributions who are shaped to the theoretical frameworks and empirical approaches for this field. Their continued dominance in citation counts highlights the pivotal role in setting research agendas and influencing policymaking strategies. This study also employed an overlay visualization technique. It used to explore recent citation patterns across the research network. The overlay map revealed that while classic studies maintain a central position, newer contributions particularly those published from 2020 onwards are beginning to gain prominence, as indicated by lighter colored nodes. These emerging studies suggest a shift

toward newer themes such as consumer behavior in developing countries, socio technical transitions and sustainable policy mechanisms. The recent citations highlight the field's adaptability to the changing technologies, market conditions, and global environmental commitments.

Scholarly and Practical Contribution: This study contributes to the intellectual structure of EV adoption research by offering a structured overview of historical foundation while identifying influence and emerging trends in EVs adoption research. The findings help researchers, policymakers and practitioners understand the complex field of sustainable transportation. They highlight important historical foundations and emerging topics. Using visual bibliometric mapping makes it easier to identify key authors, influential works, and areas that need further research. This study's findings have important implications for the academic community researching electric EVs adoption. By identifying key publications and analyzing recent citation trends, this bibliometric analysis clarifies the evolution of knowledge in this field over time. The overlay visualization further discovers the shifting scholarly momentum toward emerging themes, enabling researchers to position their work within evolving intellectual landscapes. This insight assists scholars identify the impactful research area. It also guided to avoid the redundancy and explore underexamined topics such as focusing on EVs adoption in developing regions and the second-hand EVs market. This study also emphasizes key theoretical frameworks including the Theory of Planned Behavior and Protection Motivation Theory, while highlighting the need for broader theoretical diversity. Collectively, these implications guide future academic inquiry, refine theoretical contributions, and promote interdisciplinary dialogue in the field of sustainable transportation studies.

Limitations and Directions for Future Research: Several limitations warrant consideration. The search for this study was confined to the Scopus database and limited to the article title field, which may have excluded relevant studies published under broader or alternative keywords. Moreover, citation-based metrics while serve as useful tools, but it also may not fully capture the quality of research or its practical impact or policy relevance especially in the rapidly evolving fields. For future studies, it would be beneficial to incorporate full text analysis and content clustering to gain deeper insights.

In conclusion, the body of literature on EVs adoption reveals a strong intellectual foundation and considerable theoretical insight. However, it is now shift into a vibrant phase marked by thematic expansion and diversification. Employing bibliometric tools to effectively monitor these developments provides a productive approach for enhancing scholarly research and facilitating informed evidence-based transitions toward a more sustainable mobility future.

Acknowledgements

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