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Article

Exploring the relationship between legitimacy, innovation, uncertainty and electric vehicle purchase intention: Empirical evidence from Spain, Portugal, Italy and Greece

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Abstract: This study analyzes the interaction between legitimacy, innovation, uncertainty, and electric vehicle (EV) purchase intention in Spain, Portugal, Italy, and Greece. Using partial least squares structural equation modeling (PLS-SEM) and data from 2016 to 2023, the relationships between these key variables are assessed. The results show that legitimacy has a positive impact on purchase intention, while innovation influences legitimacy but does not directly affect purchase intention. Uncertainty moderates these relationships in complex ways. The findings suggest that enhancing the perception of legitimacy is crucial to increase EV purchase intention, and strategies promoting innovation and managing uncertainty can improve market acceptance.

Keywords: legitimacy; innovation; uncertainty; purchase intention; electric vehicles

1. Introduction

The purchase intention and the variables of legitimacy, innovation, and uncertainty play a crucial role in consumer behaviour and purchase decisions (Kim et al., 2008; Persaud and Schillo, 2017). The perception of legitimacy of a product or service is positively related to consumer purchase intention (Wells et al., 2011). On the other hand, perceived uncertainty about a product or service has a negative effect on purchase intention (Park et al., 2005). Furthermore, the perception of innovation of a product or service positively influences consumer purchase intention (Li et al., 2021; Wu and Chen, 2014). This approach seeks to understand how consumers participate in the decision-making process within organisations and how this affects their purchasing decisions. However, the analysis of purchase intent is affected by numerous variables such as uncertainty, legitimacy and innovation among others. The relevance of this study lies in its ability to provide a comprehensive understanding of how these transformations affect purchasing decisions in the field of electric vehicles (EV). To do so, the different variables must be analysed and how they relate to each other.

The motivation for this study stems from the need to better understand the dynamics influencing electric vehicle (EV) adoption in Southern Europe, particularly in countries like Spain, Portugal, Italy, and Greece, where the EV market is still in its developmental phase. Despite growing governmental incentives and increasing awareness of the environmental benefits of EVs, consumer adoption remains relatively low in these regions compared to other parts of Europe. This lag suggests the presence of underlying factors, such as perceptions of legitimacy, innovation, and uncertainty,

which may hinder EV market growth. Our study aims to address these gaps by providing a comparative analysis across these countries, offering insights into how these factors interact and shape purchase intentions. Understanding these dynamics is crucial for policymakers, manufacturers, and marketers aiming to foster a more rapid and sustainable adoption of EVs in these markets.

Legitimacy is understood as "the perceived appropriateness of an organisation to a social system in terms of rules, values, norms and definitions" (Deephouse et al., 2017). Trusted organisations will thus have a greater legitimacy (Piber et al., 2019) and increased access to the resources needed to survive, thanks to the support of its stakeholders (Brown, 1998). State legitimacy constitutes a fundamental pillar for a nation's prosperity. Countries with low levels of legitimacy lack social support and are susceptible to social instability, as well as political, social, and economic crises (Gilley, 2006). T dimensions of state legitimacy are delineated in this context (Blanco-González et al., 2017; Díez-Martín et al., 2022; Gilley, 2006). Legal legitimacy, as proposed by Bernstein (2011), Jackson et al. (2012), Mena and Palazzo (2012), is manifested when stakeholders perceive that the state operates within the bounds of established laws and regulations, ensuring compliance and legal recognition. Justificatory legitimacy is attributed to the state when stakeholders perceive that its actions are justified, fair, and aligned with societal norms and values (Simmons, 1999; Suddaby et al., 2017). Consent-based legitimacy, according to Sherman (2002), Uslaner (2004), relates to stakeholders' acceptance and support of the state's authority and decisions, reflecting a broader social consensus. Together, these dimensions provide a comprehensive view of how legitimacy is constructed within the state and its relationship with stakeholders. State legitimacy, based on these dimensions, is crucial for effective governance and societal acceptance (Bernstein, 2011) and plays a decisive role in shaping public trust and cooperation (Braithwaite and Levi, 1998; Tyler and Jackson, 2014). However, these authors point out that organisations should not behave as passive elements in the legitimisation process. On the contrary, in order to gain acceptance by their many stakeholders, they must develop actions ranging from conforming to social models to changing the environment in which they operate (Oliver, 1991). An important part of stakeholder acceptance of a product is innovation.

Innovation is seen as an essential source of competitive advantage in an increasingly changing environment (Dess and Picken, 2000; O'reilly Iii and Tushman, 2008). According to management scholars (Hult et al., 2004; Subramanian and Nilakanta, 1996), innovativeness is the most important determinant of company performance. The academic studies conducted focus strictly on the level of analysis (individual, group, company, industry, consumer group, region and nation) (Bergman and Feser, 2020; Steenkamp et al., 1999) or the type of innovation (product, process and business model) (Snihur and Wiklund, 2019; Taran et al., 2015). Product and service innovation focuses on improving the functionality and features of products and services to meet changing consumer needs (Lusch, 2015; Qu and Mardani, 2023). Process innovation, on the other hand, focuses on optimising and transforming an organisation's internal processes to increase efficiency and quality (Agrawal et al., 2023; Anand et al., 2013). Finally, business model innovation refers to the reinvention of the way an organisation creates, delivers and captures value in its marketplace

(Geissdoerfer et al., 2018; Zhao et al., 2016). Innovation can generate uncertainty, so you need to study and learn how to manage it.

Uncertainty has been a central concept in organisational theory, especially in theories that attempt to explain the nature of the relationship between organisations and their environment (Dill, 1958; Duncan, 1972; Lawrence and Lorsch, 1967; Spender and Kessler, 1995). Uncertainty is defined as "Inability to assign probabilities of future events" (Duncan, 1972; Pennings, 1981; Pennings and Tripathi, 1978; Salancik and Pfeffer, 1978).

Uncertainty plays a central role in organizational theory and strategy, particularly in environments characterized by high unpredictability. Research has explored how uncertainty shapes inter-organizational relationships (Kreye, 2022), organizational control mechanisms (Yang et al., 2022), and firm structure (Ferracuti, 2022). Knight's concept of uncertainty has been applied to explain knowledge spillovers and entrepreneurship (Audretsch and Belitski, 2021). The resource-based view is most applicable in low-uncertainty markets, while a strategy creation approach is more suitable for highly uncertain environments (Furr and Eisenhardt, 2021). Numerous frameworks have been developed to analyze uncertainty, though synthesizing these remains challenging due to conceptual ambiguities (Bevan, 2022). Strategic leadership plays a crucial role in preparing organizations for unpredictable events by developing adaptive capabilities and resilience (Adobor et al., 2021). Overall, uncertainty necessitates new mental models and leadership approaches to navigate increasingly complex and unpredictable business environments.

Purchase intention is defined as "the consumer's mental predisposition towards the purchase of a product or service" and is revealed as a dynamic phenomenon influenced by several variables (Bearden et al., 1989; Kumar and Ghodeswar, 2015). Eurostat gauges purchase intent through surveys by the European Commission's Directorate-General for Economic and Financial Affairs (Eurostat, 2023). These surveys span sectors like manufacturing, services, retail, and construction, offering insights into economic facets such as production, employment, prices, and investment activity (Eurostat, 2023). Eurostat then computes indicators like Confidence Indicators (CIs), Economic Sentiment Indicator (ESI), and Employment Expectations Indicator (EEI) from these surveys, aiding in tracking economic activity, perceptions, and forecasts (Eurostat, 2023). These indicators are crucial for monitoring economic trends and sentiments across the EU and euro area (Eurostat, 2023).

The research questions will focus on analysing how legitimacy, innovation and uncertainty impact purchase intention for EVs.

RQ1: Is there a significant interaction between state legitimacy, innovation and uncertainty in their effects on EV purchase intention?

RQ2: What differences exist in the influence of state legitimacy, innovation and uncertainty on EV purchase intention between different demographic or geographic segments?

RQ3: How can companies in the EV sector effectively use state legitimacy, innovation and uncertainty management to positively influence purchase intent for their products?

The research questions give rise to the research objectives, which are explicitly stated, seeking to understand the aforementioned relationships and provide practical

insights. The originality of this work lies in its integrative approach, exploring the relationship of legitimacy, innovation, uncertainty and purchase intention, using indices. This research contributes to knowledge by providing a deeper understanding of how these interrelated factors influence purchase decisions in an integrative way with a methodology not previously employed with these variables such as PLS-SEM.

This research addresses an underexplored area, analysing the interplay between legitimacy, innovation, uncertainty and their impact on the purchase intention of EV. Understanding how these variables influence purchase decisions can provide companies with a crucial competitive advantage in a constantly evolving market. This knowledge enables business leaders to make more informed decisions and develop effective strategies to adapt and respond to market dynamics, thereby improving their ability to meet consumer needs and expectations in the EV sector.

Besides, the value and contribution of this research reside in its regional focus, which offers a unique comparative perspective on Southern European countries, an underexplored region in the context of EV adoption. The study not only advances theoretical understanding of the interplay between legitimacy, innovation, and uncertainty but also provides actionable insights for practitioners and policymakers. The use of PLS-SEM as a robust methodological approach further strengthens the findings, enabling a detailed examination of complex relationships among the variables. This work contributes to both academia and industry by identifying key drivers and barriers to EV adoption, helping to inform strategies that enhance market acceptance in this rapidly evolving sector.

The remainder of this paper is structured as follows. First, we conduct a comprehensive review of academic literature to establish the foundations for hypothesis formulation and research model development. Second, we detail and justify the data collection process, the variables involved, and the research methodology employed to test the hypotheses. A structural equation model is utilized for this purpose. Third, we validate the reliability and validity of the measurement model, as well as present the findings of the structural model. Finally, we discuss the results, implications, limitations, and propose directions for future research.

2. Theoretical framework

The evolution of electric vehicles (EVs) reflects changing technological and market dynamics. Initially focused on energy efficiency and environmental concerns (Gupta and Kumar, 2022), the EV narrative has shifted towards consumer-centric aspects like legitimacy and innovation (Khatua et al., 2023; Hou and Li, 2020). Factors influencing EV adoption include technological, economic, and psychological elements (Singh et al., 2020), with environmental considerations often less important than anticipated (Anastasiadou and Gavanas, 2022). The industry has gained regulatory legitimacy but faces challenges in normative and cultural-cognitive legitimacy (Hou and Li, 2020). Recent advances in battery technology and new market entrants have repositioned EVs as desirable high-tech products (Jones, 2018). The future of EVs depends on continued battery innovation (Crabtree, 2019) and addressing consumer expectations (Gupta and Kumar, 2022). E-businesses and digital marketing play

crucial roles in promoting EV adoption and addressing sustainability challenges (Almansour, 2022).

Legitimacy was integrated into the EV narrative, recognising the importance of socially responsible practices such as sustainable production and recycling for public perception (Korsunova et al., 2021; Rezvani et al., 2015). Considering innovation as new, more sustainable processes or products, it became a key factor in the evolution of EVs, highlighting improvements in battery range and fast charging technologies (Liu et al., 2022). The quality and performance of EVs is directly linked to the perception of innovation (Rezvani et al., 2015; Xia et al., 2022). Innovation in EVs can generate uncertainty, so it is important to study it and learn how to manage it (Camagni, 1991; Sawamura and Dumez, 2021). Learning how to manage innovation would affect uncertainty and thus purchase intention.

The understanding of uncertainty around EVs has also evolved. Initially considered aversive, uncertainty has been reconceptualised as an element that can be actively managed and, in some cases, even created in a functional and adaptive way to meet the needs of organisations and consumers (Capar et al., 2013; Duchek, 2020). This explains how important it is to manage uncertainty with the other variables that influence EV purchase intention.

Strategies that address legitimacy, innovation and uncertainty management play a key role in consumers' willingness to adopt EVs (Matos et al., 2022). This evolution has not only transformed the perception of EVs as a sustainable mobility alternative, but has also broadened the set of variables to be considered in purchasing decisions (Herberz et al., 2020).

This analysis dives into the dynamic temporal evolution of purchase intention, unravelling the underlying definition and the variables that shape this process. Purchase intention, conceived as the consumer's mental predisposition towards the acquisition of a product or service (Park et al., 2007) is revealed as a fluid phenomenon, intrinsically linked to changing factors over time (Kumar et al., 2021; Lu and Chen, 2021). The review of theoretical literature includes established models, such as the Theory of Planned Behaviour (TPB) (Ajzen, 1991) and the Theory of Reasoned Action (Fishbein, 1979), that provide an in-depth understanding of the factors that influence purchase intent.

2.1. Innovation and its relationship with the purchase intention of EVs

Innovation, a fundamental concept in academic and business literature, refers to the process of introducing novelties or significant improvements in products, services, processes or business models in order to gain competitive advantage and generate value (Damanpour, 1991; Farida and Setiawan, 2022; Geissdoerfer et al., 2018). This innovation process has been addressed from various theoretical perspectives and conceptual approaches over time. One of the most notable approaches is that of McCraw (2007), who highlighted the importance of disruptive innovation and entrepreneurial creativity as key drivers of economic change. In addition, other approaches, such as Rogers' diffusion model, have also been used (Rogers et al., 2014; Wolf, 2022), have contributed to understanding how innovations are adopted and diffused in society.

Innovation can manifest itself in different ways, including product and service innovation, process innovation and business model innovation (Hermundsdottir and Aspelund, 2021; Kivimaa et al., 2021). All the innovations listed above are important for understanding and explaining the relationship between innovation and purchase intention. The innovation literature has identified several factors and conditions that influence the success of innovation processes, such as organisational culture, technology management, collaboration with strategic partners and organisational learning capacity (Damanpour, 1991; Hermundsdottir and Aspelund, 2021). In addition, the adoption of information and communication technologies (ICTs) has played a crucial role in facilitating innovation in the digital age (Hund et al., 2021; Nylén and Holmström, 2015).

Innovation, especially in technology applied to the EV industry, also plays a crucial role in purchase intention (Xie et al., 2022). The perception that EVs are innovative and present cutting-edge technology can influence consumers' purchase decision. Innovation in battery efficiency, vehicle range and advanced technological features can increase the attractiveness of EVs to consumers (Alanazi, 2023; Liu et al., 2022). This is in line with previous research, such as the work of Omri (2020), which emphasises the importance of innovation in the adoption of sustainable technologies.

EV purchase intent is strongly influenced by innovation in this field (Krishnan and Koshy, 2021; Lashari et al., 2021). Consumers are more likely to consider EV purchasing when they perceive notable innovations in these vehicles (Saputra and Andajani, 2023). Innovation is not only limited to technological improvements, but also encompasses the ability of companies to introduce disruptive changes in the design, range, efficiency and sustainability of EVs (Higueras-Castillo et al., 2021). Effective communication strategies that highlight these innovations and their positive impacts on the consumer experience can be decisive in the purchase decision (Bunduchi et al., 2022). In this sense, the perception of innovation in EVs plays a crucial role in consumers' willingness to adopt these vehicles as a preferred option in today's market (Hwang, 2019).

It is argued that innovation has a positive impact on consumer purchase intentionss (Li et al., 2021; Rezvani et al., 2015). Al-Adwan et al. (2022), the authors found that innovation in EVs positively impacts purchase intent, as consumers value the adaptability and competitiveness of companies in a changing environment. That is, as consumers perceive a company to be innovative, they are more likely to show a greater willingness to buy its products or services. Based on the considerations discussed above, the following hypothesis can be formulated:

H1b: Innovation is positively related to the purchase intent of EVs.

2.2. The effect of innovation on legitimacy in EV

In the dynamic EV landscape, innovation represents a fundamental part of the authenticity and credibility of this mobility revolution (Bohnsack et al., 2020; Han et al., 2022). It is conceived as the force that engenders crucial improvements and breakthroughs in products, processes and business models. Innovation lays the foundation to legitimise the position of EV in the contemporary automotive market (Damanpour, 1991; Farida and Setiawan, 2022; Geissdoerfer et al., 2018). Legitimacy,

in the context of management and business, represents an essential concept in the academic literature, and its relationship to innovation has been the subject of increasing interest (Soewarno et al., 2019). Innovation in electric vehicles plays a crucial role in enhancing state legitimacy by fostering sustainable economic growth and improving public services, which in turn increases public trust and support in governmental institutions (Bergek et al., 2013; Nilsson and Nykvist, 2016).

From the perspective of McCraw (2007) disruptive innovation and entrepreneurial creativity are not only drivers of economic change, but also underpin the credibility of the adoption and expansion of EVs in society. In addition, approaches such as the Wolf (2022), amplifies the understanding of how these innovations are integrated and propagated in the collective consciousness, directly affecting stakeholders' perception of legitimacy and trust in EVs.

Innovation is not limited to a single manifestation, but encompasses multiple facets, including improved products, services, optimised processes and reinvented business models (Hermundsdottir and Aspelund, 2021; Kivimaa et al., 2021). In the context of EVs, this innovation translates into constantly evolving functionalities and features that respond to changing consumer needs (Qu and Mardani, 2023; Lusch, 2015). Innovation thus influences the perception of legitimacy (Bunduchi et al., 2022; Guo et al., 2019).

The legitimacy of EVs is also influenced by process innovation, which focuses on optimising and transforming internal procedures to increase efficiency and quality (Agrawal et al., 2023; Anand et al., 2013). Furthermore, business model innovation, by redefining the creation, delivery and capture of value in the EV market, plays a crucial role in legitimising the EV market (Geissdoerfer et al., 2018; Zhao et al., 2016).

The literature on the legitimacy of EVs identifies factors and conditions that influence consumer perceptions. Elements such as organisational culture, technology management, strategic collaboration and organisational learning capacity have a direct impact on the perceived legitimacy of EVs (Damanpour, 1991; Hermundsdottir and Aspelund, 2021). The adoption of information and communication technologies as a process of innovation also plays a crucial role in this legitimisation in the digital age (Hund et al., 2021; Nylén and Holmström, 2015).

A positive relationship is expected to exist between the level of innovation in a company and its perceived legitimacy (Höflinger et al., 2018). In the realm of management and business, the synergy between innovation in electric vehicles and state legitimacy underscores the importance of progressive policies and practices to maintain and strengthen the social contract between the state and its citizens, promoting a cleaner and more sustainable future (Block and Keller, 2015; Juntunen et al., 2019). This suggests that as a company stands out in terms of innovation in its products, services or business practices, consumers will perceive it as a more credible and trustworthy entity in the marketplace, which can strengthen its legitimacy in society. On the basis of the above considerations, the following hypothesis can be formulated:

H1a: Innovation is positively related to state legitimacy.

2.3. The effect of legitimacy on EVs purchase intention

The importance of legitimacy for organizations has been amply explained by (Meyer and Rowan, 1977) who argued that legitimacy favors the survival of organizations. This has led researchers to try to understand the actions and behaviours that lead to gaining legitimacy (Lu, 2015). Legitimacy is defined as the perception and acceptance of an organization by its stakeholders, including employees, customers, regulators, and society at large (Suchman, 1995). To substantiate legitimacy and its connection to purchase intent, fundamental theories are used to lay its foundations. The Legitimacy Theory of (Suchman, 1995) It underscores the imperative need for justified organizational actions to gain social acceptance. On the other hand, Institutional Theory (DiMaggio and Powell, 1983) delves into how organizations seek legitimacy through policies and innovations, while Stakeholder Theory (Freeman, 2010) places emphasis on meeting stakeholder expectations (Alexiou and Wiggins, 2018). These fundamental theoretical bases are used to explain how the perception of legitimacy in EVs, based on reputation, quality and adherence to standards, affects consumers' purchase intention.

Legitimacy theory holds that organizations and their actions must be perceived as justified and rational in order to gain and maintain social acceptance (Suchman, 1995). Authors such as Deegan (2002) and Gray (1996) They have explored communication strategies and the relationship between social accounting and legitimacy, respectively. Likewise, the Institutional Theory (DiMaggio and Powell, 1983) and more recent authors (Díez-Martín et al., 2021; Scott, 2014) They have highlighted the influence of environmental norms and expectations in the search for organizational legitimacy and how it is associated with the perception that they comply with established standards and norms. Factors such as manufacturers' reputations, quality, compliance with standards, and other consumers' opinions determine the legitimacy of EVs (Buhmann and Criado, 2023; Salari, 2022).

Previous research, such as studies conducted by (Blanco-González et al., 2023; Del-Castillo-Feito et al., 2020), they have highlighted the importance of legitimacy and reputation in consumer decision-making. Companies with a strong track record of quality and success are perceived as more legitimate, as are high-quality, high-performance EVs. This suggests that as the legitimacy of EVs increases, consumers are more likely to consider them as a preferred option when making purchasing decisions.

Previous research such as Parray et al. (2023) and Stanaland et al. (2011) They highlight the importance of reputation and legitimacy in consumer perception. High-quality, high-performance EVs are perceived as more legitimate, influencing purchasing decisions (Alanazi, 2023; Sanguesa et al., 2021). As the legitimacy of EVs increases, consumers tend to consider them a preferred option when making purchasing decisions.

In the study Parray et al. (2023), the authors noted that the legitimacy of EVs plays a key role in purchase intention, as consumers consider factors such as reputation, quality and compliance with standards. Along the lines of legitimacy, a study by Soewarno et al. (2019) demonstrated that innovation in products, services and Corporate Social Responsibility (CSR) practices reinforces the legitimacy of

organisations. However, few studies have investigated the relationship between legitimacy and innovation in the field of EVs and how they affect purchase intention. Therefore, it is of particular interest to study the relationship between both variables in the field of EVs.

State legitimacy can significantly impact consumers' purchase intention due to various factors. Firstly, the perceived legality of a product or service can influence consumer trust, as individuals tend to prefer products that comply with established state regulations and standards (Kim et al., 2008; Nuttavuthisit and Thøgersen, 2017). Additionally, justification provides consumers with a sense of ethics and responsibility from the company, which can increase their willingness to purchase products or services from that entity (Van de Ven, 2008; Wilson, 2012). Consent, on the other hand, reflects social and cultural acceptance of the company and its practices, which can be crucial for consumers' positive perception and purchase intention (Bian and Forsythe, 2012). Consequently, it is anticipated that consumers, perceiving a high level of state legitimacy, are more likely to place trust in companies operating within such an environment, which could result in a higher intention to purchase their products or services (Guo et al., 2017; Stanaland et al., 2011). Based on this evidence, in the present study, the following hypothesis will be tested:

H2: State Legitimacy is positively related to purchase intent.

2.4. Rationale for uncertainty and its relationship with innovation, legitimacy and intent to purchase EVs

The concept of uncertainty emerges as a pervasive feature of the environment in which people and organizations must adapt in order to survive (Bell, 1982; Dantzig, 1955; Duncan, 1972; Milliken, 1987). Although uncertainty tends to be seen as aversive, it prompts actors to reduce it (Mascarenhas, 1982; Whitecross and Smithson, 2023). Recent studies suggest moving towards "uncertainty regulation". This means acknowledging that, at times, functional and adaptable uncertainty is actively generated for both individuals and others (Peters et al., 2017). The uncertainty regulation model seeks to align endogenous uncertainty (Carriero et al., 2018), which is the one that arises within the person, related to their personal attitudes and abilities, with a preferred level of uncertainty with which they feel most comfortable. It is suggested that a person's actions and decisions can affect the amount of uncertainty they experience (Peters et al., 2017; Whitecross and Smithson, 2023; Yoon et al., 2021).

Uncertainty in the EV market plays an essential role in the relationship between legitimacy, innovation and purchase intent (Ye et al., 2021). It is approached from various perspectives, such as uncertainty in charging infrastructure, future EV costs or technological evolution (Unterluggauer et al., 2022).

EV purchase intent is influenced by legitimacy, innovation, and uncertainty (Krishnan and Koshy, 2021; Lashari et al., 2021). Strategies that highlight legitimacy and innovation, in addition to addressing uncertainties, can positively impact purchase intent (Higueras-Castillo et al., 2021; Saputra and Andajani, 2023). Effective communication of these aspects and the reduction of uncertainties are key to fostering EV adoption (Bunduchi et al., 2022; Hwang, 2019).

Similarly, the authors Griffin and Grote (2020) They suggest that uncertainty, aligned with the ability to innovate, can influence a company's perceived legitimacy. In evaluating the purchase of an EV, consumers consider the influence of state legitimacy, innovation and uncertainty (Corradi et al., 2023). Strategies that highlight EVs' state legitimacy, promote innovation and address uncertainty concerns have been shown to positively influence purchase intention (Al-Adwan et al., 2022; Li et al., 2022). In situations of high uncertainty, a firm's perceived state legitimacy may be more dependent on its ability to innovate. Consumers may see innovation as a sign of trustworthiness in an uncertain environment, strengthening the relationship between state legitimacy and innovation (Hofman et al., 2020; Zhou et al., 2021). Based on the above, the hypothesis is defined as:

H3a: Uncertainty positively moderates the relationship between state legitimacy and innovation.

According to the authors Al-Adwan et al. (2022), It is proposed that, in contexts of high uncertainty, the relationship between innovation and purchase intention may be stronger. Consumers may value innovation as an especially important feature when making purchasing decisions in situations of uncertainty, as they may see it as a sign of the company's adaptability and competitiveness in an ever-changing environment (Peña-García et al., 2020). In addition to the above, uncertainty around innovation in charging infrastructure and the availability of EV charging stations is also a significant factor in purchase intent (LaMonaca and Ryan, 2022). Consumers may have concerns about the availability of charging points and the convenience of charging an EV compared to internal combustion vehicles. This uncertainty can influence the relationship of innovation and purchase intent and is therefore a relevant area of research. Based on the above, the following hypothesis is presented:

H3b: Uncertainty positively moderates the relationship between purchase intention and innovation.

In times of heightened uncertainty, a company's perceived state legitimacy can have a more significant impact on consumers' purchase intent, as consumers may turn to companies perceived as legitimate to reduce uncertainty in their purchasing decisions (Islam and Hussain, 2022; Wu and Huang, 2023). Similarly, it is suggested that uncertainty in the market may also influence the relationship between legitimacy and purchase intent (Al-Adwan et al., 2022; Pavlou et al., 2007). Strategies that highlight the legitimacy of EVs, promote innovation, and address concerns about uncertainty have been shown to positively influence purchase intent (Higueras-Castillo et al., 2021; Saputra and Andajani, 2023; Tu and Yang, 2019). Effectively communicating legitimacy and innovation in marketing campaigns and the information provided to consumers is crucial (Bunduchi et al., 2022; Hwang, 2019). In addition, reducing uncertainty through strategies such as quality assurance, providing after-sales support, and educating about the benefits of EVs is essential to driving purchase intent (Angkiriwang et al., 2014; Featherman et al., 2021). Based on the considerations discussed above, the following hypothesis can be formulated:

H3c: Uncertainty positively moderates the relationship between state legitimacy and purchase intention.

2.5. Conceptual framework

The research model shown in **Figure 1** proposes that the better the innovation in organizations, the greater the legitimacy (H1a) and purchase intent (H1b); at the same time, the level of legitimacy of the organization will have a positive impact on purchase intent (H2). We also propose the moderation of the uncertainty variable with the relationship between the variables, legitimacy and innovation (H3a), the relationship between purchase intention and innovation (H3b) and the relationship between legitimacy and purchase intention (H3c).

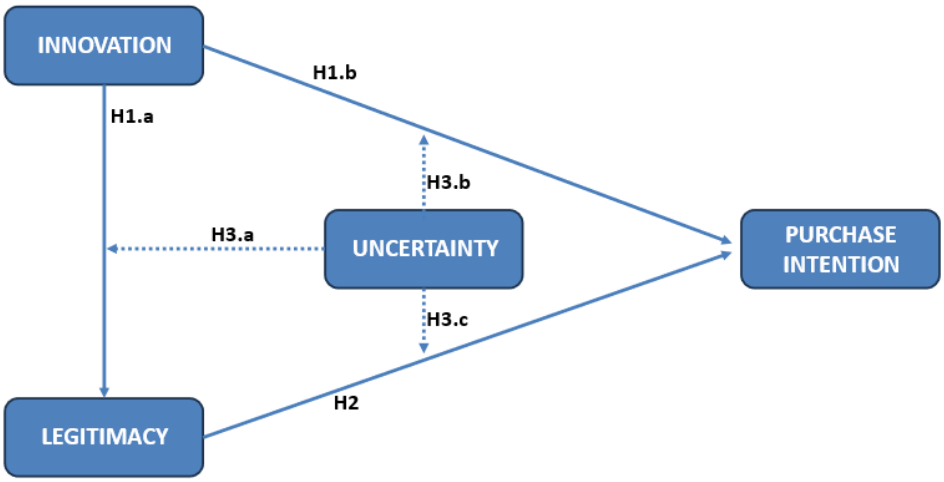

Figure 1. Proposed model and hypothesis.

3. Methodology

3.1. Sample and data collection

We have created a dataset from three publicly available datasets from European countries. It covers 24 of the 27 EU countries, as Estonia, Malta and Luxembourg do not have data for state uncertainty. The countries to be studied are therefore the following: Austria, Belgium, Bulgaria, Cyprus, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden.

Table 1. Descriptions of features.

ITEM	VARIABLE	DEFINITION	SOURCE
LEGITIMACY	State Legitimacy	Trust in the legal system Trust in the relationship with the political system Trust in the govern system	Fragile States Index
UNCERTAINTY	Uncertainty	State uncertainty	WUI
INNOVATION	Innovation	Regional innovation scoreboard	European Commission
PI	Purchase Intention	Purchase intention	Eurostat

We collected data from secondary sources (The purchase intention from Eurostat (https://ec.europa.eu/eurostat/, 2023), innovation Scoreboard from European Commission (Innovation Scoreboard, n.d.), WUI (WUI, n.d.), Fragile States Index

(State Legitimacy, n.d.). These countries are listed in **Table 1**. Data in the datasets was the most recent available. For this study, we collected data from 2016 to 2023 incorporating variables. In addition, we included two indicators, Purchase Intention. These characteristics are listed in **Table 1**, along with their descriptions.

3.2. Data analysis

In terms of methodology, we opted for a multivariate analysis approach to examine these relationships using the partial least squares (PLS) technique, which aligns with prior research (Díez-Martín et al., 2022; Fernández-Portillo et al., 2020) that also employed this method to study a diverse dataset encompassing multiple countries, time periods, and interconnected variables. Following this approach, the SmartPLS software was utilized to assess hypotheses and validate the theoretical framework proposed in this paper. In essence, this technique stands out as a robust method for conducting such analyses (Chin et al., 2003) and offers distinct advantages over alternative methods in terms of result accuracy (Sarstedt et al., 2021).

The PLS-SEM method was chosen due to its suitability for handling complex models with multiple constructs and relationships, particularly in exploratory research contexts. This method allows for the simultaneous assessment of measurement and structural models, offering insights into both the reliability and validity of the constructs and the strength of the relationships between them (Hair et al., 2019). Additionally, PLS-SEM is particularly effective when working with smaller sample sizes and non-normal data distributions, as was the case in this study (Henseler et al., 2009).

To evaluate the measurement model, we assessed the convergent validity and discriminant validity of the constructs. Convergent validity was examined through the average variance extracted (AVE), ensuring that the indicators were sufficiently representative of the underlying constructs. An AVE value greater than 0.50 indicates acceptable convergent validity (Fornell and Larcker, 1981). Discriminant validity was assessed using the Fornell-Larcker criterion and the heterotrait-monotrait ratio (HTMT), both of which confirmed that the constructs were distinct from one another.

This collection of papers explores advanced statistical methods for evaluating structural models in various research fields. Structural equation modeling (SEM) and partial least squares SEM (PLS-SEM) are highlighted as powerful techniques for analyzing complex relationships between variables (Harris and Gleason, 2022; Sharma et al., 2022). The papers discuss the importance of assessing model fit, predictive accuracy, and explanatory power using measures such as path coefficients, t-statistics, R-squared values, and predictive relevance (Q^2) (Becker et al., 2022; Syafiq et al., 2022). Bootstrapping is recommended for robust estimation of standard errors (Cao, 2023). The studies also introduce innovative approaches like cross-validated predictive ability test (CVPAT) for model comparison (Sharma et al., 2022) and exploratory structural equation modeling (ESEM) for improved factor analysis (Alamer and Marsh, 2022; van Zyl and ten Klooster, 2022). Additionally, multimodel inference using Akaike weights is proposed to quantify model selection uncertainty (Rigdon et al., 2023).

This methodological approach provided a comprehensive analysis of the relationships between legitimacy, innovation, uncertainty, and EV purchase intention, enabling us to draw meaningful conclusions and offer valuable insights for both academia and industry. **Table 2** below lists the main articles and their main contributions, providing an overview of the current state of research in this area.

Table 2. Principal articles and main contributions.

Article	Journal	Citatios	Methodology	Data	Main contributions	Uses
Lu and Chen, (2021)	Information and management	175	Survey and interview data	Uncertainty reduction perspective, signaling theory	Explores how live streaming affects consumers' purchase intention, contributes to literature of live streaming commerce, uncertainty literature, and signaling theory	Marketing strategies for live streaming commerce platforms, understanding consumer behavior in online markets
Confente et al., (2020)	Information and management (2021) 58(7)	140	Conceptual model development	Psychological drivers, consumer transition	Addresses market acceptance of new bioplastic generation, explores impact of consumer values and self-identity on purchase intentions	Guidance for firms, policymakers, marketers, and suppliers in promoting eco-friendly products, understanding consumer behavior towards sustainable materials
Kushwah et al., (2019)	Food quality and preference	136	Structural equation modeling	Consumer barriers, purchase decisions	Identifies barriers to organic food consumption, examines associations between barriers and purchase decisions	Insight for policymakers, marketers, suppliers, and consumer associations to understand buying behavior towards organic food
Zhang et al., (2020)	Service industries journal	121	Quasi-experiment using secondary data from Taobao.com	Construal level theory, product type moderation	Examines impact of live video streaming on online purchase intention, practical and managerial implications of findings	Insights for e-retailers, digital marketers, and businesses using live video streaming as a marketing strategy
Sadiq et al., (2021)	Journal of retailing and consumer services	100	Online survey	Innovation resistance theory, moderating factors	Investigates consumer resistance towards eco-friendly cosmetics, explores moderating roles of environmental and health concerns on barriers	Guidance for scholars, cosmetic manufacturers, and retailers in addressing barriers and promoting adoption of eco-friendly cosmetic products
Nguyen et al., (2019)	Sustainability	97	Online survey	Cognition-affect-behavior paradigm	Examines the relationship between greenwash, green skepticism, and green purchase intentions	Guidance for firms in reducing consumers' skepticism and increasing intentions to purchase green products

Table 2. (*Continued*).

Article	Journal	Citatios	Methodology	Data	Main contributions	Uses
Ghahtarani et al., (2020)	Journal of innovation and knowledge	92	Statistical analysis	Social capital theory, social interaction theory	Identifies factors influencing knowledge sharing and customer purchasing intention in social commerce context	Insight for businesses in developing strategies to enhance knowledge sharing and customer purchase intentions in social commerce
Li et al., (2021)	Sustainable production and consumption	73	Mediation analysis	Diffusion of innovation theory, theory of planned behavior	Examines mechanisms of consumer innovativeness on purchase intention for sustainable products	Guidance for marketers in attracting potential consumers for sustainable products
Yang et al., (2019)	Energy policy	67	Survey	Policy perceptions, EV adoption intentions	Identifies factors affecting EV adoption intentions among Chinese consumers, examines effects of incentive policies and product cognitions	Insights for policymakers and companies in targeting specific groups and guiding consumers toward clean vehicle technologies
Wu and Zhu, (2021)	Frontiers in psychology	64	Structural Equation Modeling	CSR engagement, customer-company identification	Examines relationship between CSR engagement, customer-company identification, and behavioral intention during the pandemic	Highlight's role of CSR engagement during crisis, offers strategies for businesses to compete effectively during challenging times
Yuan et al., (2022)	Journal of retailing and consumer services	65	User data analysis	Advantages of AI assistants, consumer value perceptions	Explores factors influencing user willingness to accept AI assistants, examines role of social anxiety as a moderator	Guidance for marketers and managers in improving AI assistants and developing effective marketing strategies for product promotion
Chen et al., (2022)	Electronic commerce research and applications	57	Online survey	Dual-process theory, habit mechanism	Examines impact of live streaming features on purchase intention, highlights importance of product information and habit mechanisms	Insights for sellers in understanding effects of live streaming features on purchase intention
Li et al., (2020)	Transportation research part d-transport and environment	57	Survey	Policy mix characteristics, EV purchase intention	Examines links among psychological factors, policy mix characteristics, and EV purchase intention	Policy implications for adoption of EVs, insights for policy research and EV adoption literature
Tsai et al., (2020)	Journal of retailing and consumer services	53	DEMATEL method, analytic network process	Green marketing, brand image	Evaluates how green marketing affects purchase intentions, constructs model for evaluating effects of green marketing strategies	Guidance for firms in improving tangible effects of green marketing strategies, stimulating consumers' purchase intentions

Table 2. (*Continued*).

Article	Journal	Citatios	Methodology	Data	Main contributions	Uses
Haustein et al., (2021)	Energy policy	52	Surveys	EV adoption factors, policy impacts	Examines factors influencing EV adoption in Denmark and Sweden, discusses policy implications	Insights for policymakers and companies in promoting EV adoption, understanding factors affecting EV adoption in different contexts
Mostaghel and Chirumalla, (2021)	Journal of business research	49	Theoretical model development	Critical factors impacting ethical purchase intentions	Identifies factors impacting customers' ethical purchase intentions for circular business models in retail sector	Insight for retail sector in implementing circular business models, understanding customer role in enabling ethical purchase intentions
Jguo et al., (2021)	Frontiers in psychology	41	Questionnaire survey	Live streaming features, cross-border purchase intention	Examines impact of live streaming features on cross-border purchase intention, investigates moderating effects of saving money	Guidance for cross-border e-commerce platforms and merchants in leveraging live streaming to influence purchase intention, understanding consumer perception
Mou et al., (2020)	Internet research	41	Online survey	Valence framework, repurchase intentions	Examines factors influencing repurchase intentions in cross-border e-commerce platform	Insight for online providers competing in international markets, understanding factors affecting repurchase intentions in cross-border e-commerce

4. Results

This study aims to analyse the interaction between state legitimacy, innovation and uncertainty in their effect on EV purchase intention in Spain, Portugal, Italy and Greece. Using the partial least squares structural equation modelling (PLS-SEM)

technique with SmartPLS, several hypotheses were evaluated to understand these relationships.

To obtain the results, all validation steps required by the PLS-SEM technique were applied, following the guidelines established by Hair et al. (2021). This approach states that structural model validation is essential, and our model achieves a standardised root mean square residual (SRMR) value < 0.1 (Williams et al., 2009). Next, the measurement instrument was validated by analysing the reliability and validity of the Type A reflective constructs. The indicators of these constructs present a loading (λ) > .707, a Cronbach's $\alpha > 0.7$, $\rho > 0.7$, a composite reliability > 0.7, and an AVE > 0.5 (Fernández-Portillo et al., 2019). Additionally, discriminant validity criteria such as the Fornell-Larcker criterion, cross-loadings and heterotrait-heteromethod correlations (HTMT) > 0.85 were met for all constructs (Fernández-Portillo et al., 2019).

Regarding multicollinearity, the indicators of the type B formative constructs were filtered to ensure that only those with a Variance Inflation Factor (VIF) below 3.3 (Diamantopoulos and Siguaw, 2006) were considered significant and remained in the model. Regarding the evaluation of the structural model, it is worth noting that the VIFs of the constructs were all kept below 5 (Hair et al., 2014).

Subsequently, the structural equation model is shown. **Figure 2** below shows the Structural Equations Model, with the respective values for each construct and estimated relationship.

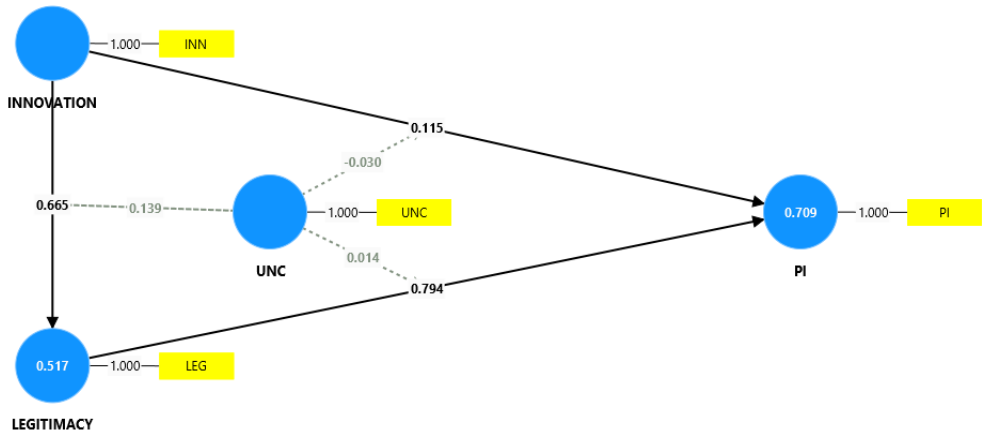

Figure 2. Structural equation model with values.

Partial least squares structural equation modeling (PLS-SEM) illustrates the relationships between Innovation, Legitimacy, Uncertainty and EV Purchase Intention (PI). First, it is observed that Innovation has a positive and significant impact on Legitimacy, with a path coefficient of 0.665 ($p < 0.001$). This finding is in line with previous studies highlighting the importance of innovation in establishing and maintaining organisational legitimacy (Bohnsack et al., 2020; Han et al., 2022). However, the direct relationship between Innovation and Purchase Intention is not significant (path coefficient of 0.115, $p = 0.690$), which is in contrast to research suggesting a positive relationship between these constructs (Krishnan and Koshy, 2021; Lashari et al., 2021).

On the other hand, a positive and significant relationship between Legitimacy and Purchase Intention is confirmed (path coefficient of 0.794, $p = 0.001$), supporting the theories of legitimacy (Suchman, 1995) and institutional theory (DiMaggio and Powell, 1983), which highlight the importance of legitimacy for consumers' acceptance of products and services. This result suggests that higher perceived legitimacy leads to higher purchase intention for electric vehicles.

Likewise, the relationship between Uncertainty and Legitimacy is positive and significant (path coefficient of 0.360, $p = 0.019$), suggesting that in contexts of high uncertainty, organisations may be perceived as more legitimate if they manage uncertainty appropriately (Peters et al., 2017; Whitecross and Smithson, 2023). However, the direct relationship between Uncertainty and Purchase Intention is negative but not significant (path coefficient of -0.208, $p = 0.095$). Although this direction is consistent with the literature suggesting that uncertainty may reduce purchase intention (LaMonaca and Ryan, 2022), the lack of significance indicates that other factors may be influencing this relationship.

Finally, moderation tests show that Uncertainty does not significantly moderate the relationships between Innovation and Legitimacy (coefficient of 0.139, p = 0.429), Innovation and Purchase Intention (coefficient of -0.030, $p = 0.891$), and Legitimacy and Purchase Intention (coefficient of 0.014, $p = 0.947$). These results contrast with some studies suggesting that uncertainty may intensify the perception of innovation as a crucial factor in decision-making (Peña-García et al., 2020). In summary, the findings highlight the importance of legitimacy in increasing EV purchase intention, while innovation and uncertainty play more complex and less direct roles in the formation of purchase intention. Legitimacy emerges as a key factor in the purchase decision, suggesting that strategies that increase the perception of legitimacy may be more effective than technological innovations alone.

Figure 3 is presented, which analyzes the relationship between legitimacy and purchase intention, showing the histogram of the scaled coefficients. This graph allows us to observe how the coefficient relating legitimacy to the intention to purchase electric vehicles varies.

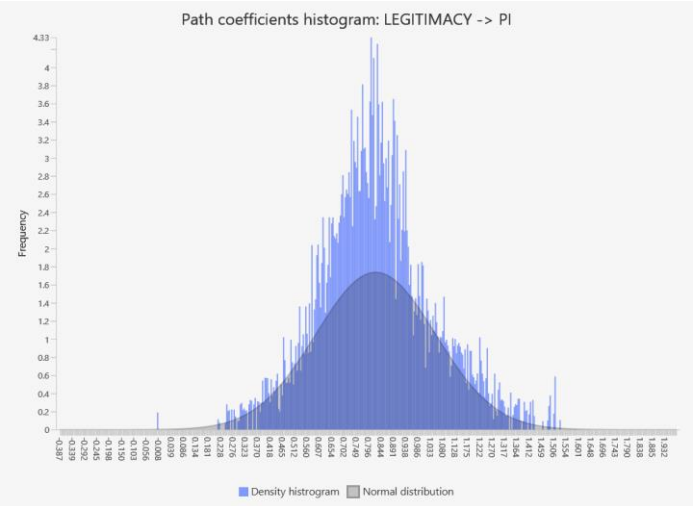

Figure 3. Histogram of step coefficients between legitimacy and intention to buy EVs.

The histogram presented shows the distribution of path coefficients between legitimacy (LEGITIMACY) and purchase intention (PI) in structural equation analysis (PLS-SEM). The distribution of the path coefficients approximates a bell shape, suggesting a normal distribution around a central point. The highest peak of the histogram is around the value of 0.794, indicating that this is the most frequent value of the path coefficients in the analysed sample. The highest frequency, with a maximum value close to 4.33, is located in the centre of the histogram, confirming that most of the path coefficients are concentrated around this central value.

The values of the path coefficients decrease progressively towards the extremes, both to the left and to the right of the central peak, showing a symmetrical distribution. The normal distribution curve superimposed on the histogram suggests that the data fit well to a normal distribution, which is a good indication of the validity of the model used. This fit to the normal distribution indicates that the estimates of the path coefficients are consistent and follow an expected distribution in terms of statistical inference.

In summary, the shape and fit of the histogram reinforces the acceptance of hypothesis H2 in the analysis, where legitimacy has a significant and positive impact on purchase intention. The path coefficients concentrated around a positive and significant value support the theory that higher perceived legitimacy leads to higher purchase intention for electric vehicles. This visual analysis provides further confirmation of the robustness of the structural model and the significance of the relationship between legitimacy and purchase intention in the study. The results of the hypothesis tests are presented in **Table 3**.

Table 3. Results of hypothesis testing.

	Path coefficients	**Standard deviation (STDEV)**	***T* statistics (|O/STDEV|)**	***P* values**	**Hypothesis value**
INN →LEG	0.665	0.144	4.616	0.000	Accepted
INN →PI	0.115	0.288	0.399	0.690	Rejected
LEG →PI	0.794	0.230	3.456	0.001	Accepted
UNC →LEG	0.360	0.153	2.351	0.019	Accepted
UNC →PI	−0.208	0.124	1.670	0.095	Rejected
UNC X INN →LEG	0.139	0.176	0.790	0.429	Rejected
UNC X INN →PI	−0.030	0.222	0.137	0.891	Rejected
UNC X LEG →PI	0.014	0.215	0.067	0.947	Rejected

T-Statistic: Measures the ratio of the estimated coefficient to its standard error. The higher the value, the more significant the relationship.

P-value: Indicates the probability that the observed results are due to chance. If it is less than 0.05, the relationship is considered to be significant.

Display:

P-values less than 0.05 are coloured in a shade representing 'accepted' (e.g., green) to indicate that the hypotheses related to those parameters are accepted.

p-values greater than 0.05 are coloured in a different shade (e.g., red) to indicate that the hypothesis has been rejected.

The results obtained using the partial least squares structural equation modelling (PLS-SEM) technique with the SmartPLS software reveal significant findings on the relationships between innovation, legitimacy, uncertainty and EV purchase intention in Spain, Portugal, Italy and Greece. First, hypothesis H1a is accepted, indicating that innovation has a positive and significant impact on legitimacy, with a path coefficient of 0.665 and a *p*-value of 0.000. This supports existing literature suggesting that innovation is central to the perception of legitimacy (Bohnsack et al., 2020; Han et al., 2022). However, hypothesis H1b, which posited a positive relationship between innovation and purchase intention, was rejected (path coefficient of 0.115, *p*-value of 0.690), which contrasts with previous studies suggesting a positive relationship between innovation and purchase intention (Krishnan and Koshy, 2021; Lashari et al., 2021).

On the other hand, hypothesis H2 is confirmed, showing that legitimacy has a positive and significant impact on purchase intention (path coefficient of 0.794, *p*-value of 0.001). This finding is in line with Suchman's (1995) legitimacy theory and DiMaggio and Powell's (1983) institutional theory, which highlight the importance of legitimacy for the survival and acceptance of organisations. Furthermore, the hypothesis that uncertainty positively affects legitimacy (path coefficient of 0.360, *p*-value of 0.019) was also accepted. This suggests that in contexts of high uncertainty, organisations may be perceived as more legitimate, supporting the perspective that uncertainty can be managed and used in a functional way (Peters et al., 2017; Whitecross and Smithson, 2023).

Finally, hypotheses exploring the moderation of uncertainty in the relationships between innovation and legitimacy (H3a), innovation and purchase intention (H3b), and legitimacy and purchase intention (H3c) were rejected. This suggests that uncertainty does not significantly moderate these relationships, which contrasts with the literature indicating that uncertainty can intensify the perception of innovation as a crucial factor in decision making (Peña-García et al., 2020; LaMonaca and Ryan, 2022). In sum, these findings highlight the importance of legitimacy in EV purchase intention, while innovation and uncertainty play more complex and less direct roles in the formation of EV purchase intention. This study contributes to the understanding of how legitimacy can be a determinant of purchase intention, providing a basis for future research on legitimacy strategies in high uncertainty markets.

Table 4 below details the results of the predictive analysis of the model, focusing on the legitimacy and purchase intention variables.

Table 4. Results of the predictive analysis.

	R^2	Q^2	PREDICTIVE	LEVEL
LEG	0.517	0.465	YES	LOW
PI	0.709	0.653	YES	MEDIUM

The results of the partial least squares structural equation model (PLS-SEM) show significant values of R^2 and Q^2 for the Legitimacy (LEG) and Purchase Intention (PI) constructs. The R^2 value for Legitimacy is 0.517, indicating that 51.7% of the variance in Legitimacy is explained by the independent variables in the model. This

value suggests a moderate level of explanation (R^2 = 0.517), in line with previous research demonstrating the importance of legitimacy for organisational acceptance (Suchman, 1995; DiMaggio and Powell, 1983). The value of Q^2 for Legitimacy is 0.465, indicating a good predictive ability of the model for this construct (Q^2 = 0.465), as a value of Q^2 greater than 0 indicates predictive relevance (Hair et al., 2017). The predictive ability of the model for Legitimacy is affirmative and is classified at a low level.

For Purchase Intention, the value of R^2 is 0.709, indicating that 70.9% of the variance in Purchase Intention is explained by the independent variables in the model (R^2 = 0.709). This value suggests a high level of explanation, confirming that Purchase Intention is significantly influenced by the factors in the model, which is consistent with studies highlighting the importance of legitimacy and innovation in purchase decisions (Bohnsack et al., 2020; Han et al., 2022). Furthermore, the value of Q^2 for Purchase Intention is 0.653, indicating an excellent predictive ability of the model for this construct (Q^2 = 0.653). The predictive ability of the model for Purchase Intention is affirmative and is classified at a medium level.

In summary, the values of R^2 and Q^2 show that the PLS-SEM model used has adequate predictive ability for both constructs, with a low-moderate level of predictivity for Legitimacy and medium-high for Purchase Intention. These results suggest that, although legitimacy is an important factor, additional factors may be influencing EV purchase intention in a significant way. Taken together, these findings reinforce the validity of the model and its ability to explain the relationships between the variables investigated, supporting the relevance of legitimacy and innovation in purchase decisions (Hair et al., 2017; Peña-García et al., 2020).

5. Discussion

The results of the partial least squares structural equation model (PLS-SEM) between the countries of Spain, Portugal, Italy and Greece have shown that innovation has a positive and significant impact on legitimacy with a path coefficient of 0.665 (p < 0.001). This reinforces the notion that innovation is a crucial factor in establishing and maintaining organisational legitimacy, as previous studies have suggested (Bohnsack et al., 2020; Han et al., 2022). Although one might argue to the contrary, arguing that innovation alone does not guarantee legitimacy, the empirical evidence from this study strongly supports the positive relationship between these two constructs. Furthermore, this underscores the role of technological advancements in legitimizing newer industries, such as electric vehicles (EVs), particularly in regions where adoption lags behind (Qu and Mardani, 2023). This implies that organisations looking to penetrate new markets must not only focus on innovation but also strategically enhance their perceived legitimacy by aligning with societal values and norms, as highlighted by institutional theory (DiMaggio and Powell, 1983).

Furthermore, the direct relationship between innovativeness and purchase intention was not significant (path coefficient of 0.115, p = 0.690), which is in contrast to research indicating a positive relationship between innovativeness and purchase intention (Krishnan and Koshy, 2021; Lashari et al., 2021). This result suggests that while innovation contributes to legitimacy, it does not automatically translate into a

stronger intention to purchase EVs. This finding indicates that consumers may prioritize other factors, such as the perception of the practicality, reliability, and established social acceptance of the product, over innovation alone. Thus, companies should consider complementing their innovation efforts with targeted marketing strategies that emphasize legitimacy and trustworthiness (Tyler and Jackson, 2014).

Hypothesis H2, which posits that legitimacy has a positive and significant impact on purchase intention, was confirmed with a path coefficient of 0.794 ($p = 0.001$). This finding is in line with Suchman's (1995) legitimacy theory and DiMaggio and Powell's (1983) institutional theory, which highlight the importance of legitimacy for consumers' acceptance of products and services. Higher perceived legitimacy leads to higher purchase intention for electric vehicles, which is consistent with the studies of Parray et al. (2023) and Stanaland et al. (2011). This result emphasizes the need for EV companies to focus on building a credible and legitimate brand image through public engagement, partnerships with trusted institutions, and transparent communication about the environmental and societal benefits of their products (Zhao et al., 2016).

In terms of uncertainty, a positive and significant relationship was found between uncertainty and legitimacy (path coefficient of 0.360, $p = 0.019$). This suggests that when uncertainty is managed effectively, it can enhance an organisation's legitimacy. This is particularly relevant in the EV market, where uncertainty surrounding infrastructure, battery life, and future government regulations may deter potential adopters. Organisations that successfully address these uncertainties—by providing clear, reliable information and demonstrating commitment to long-term sustainability—can increase their perceived legitimacy, as supported by Peters et al. (2017) and Whitecross and Smithson (2023). However, the direct relationship between uncertainty and purchase intention was negative but not significant (path coefficient of −0.208, $p = 0.095$). Although the negative direction aligns with prior research, the lack of significance suggests that uncertainty alone does not play a decisive role in preventing purchase decisions. Consumers may be willing to overlook uncertainties if they perceive a high degree of legitimacy in the organisation or product (LaMonaca and Ryan, 2022).

Finally, moderation tests show that uncertainty does not significantly moderate the relationships between innovation and legitimacy (coefficient of 0.139, $p = 0.429$), innovation and purchase intention (coefficient of −0.030, $p = 0.891$), and legitimacy and purchase intention (coefficient of 0.014, $p = 0.947$). These results are somewhat surprising given that prior literature often suggests that uncertainty can either weaken or strengthen the impact of innovation in decision-making contexts (Peña-García et al., 2020). This discrepancy may be due to the specific regional contexts of Spain, Portugal, Italy, and Greece, where cultural, economic, and infrastructural differences could diminish the moderating role of uncertainty in these relationships. It could also be influenced by the maturity of the EV market in these countries, where consumer attitudes may be shaped more by existing perceptions of legitimacy than by concerns about innovation or uncertainty.

In summary, the findings of this study relating the countries of Spain, Portugal, Italy, and Greece highlight the importance of legitimacy in increasing EV purchase intention, while innovation and uncertainty play more complex and less direct roles in

the formation of purchase intention. Legitimacy emerges as a key factor in the purchase decision, suggesting that strategies that increase the perception of legitimacy may be more effective than technological innovations alone. This underscores the need for comprehensive strategies that incorporate both technological advancements and efforts to establish trust and legitimacy in new markets. These results are in line with previous studies highlighting the relevance of legitimacy in purchase decisions (Suchman, 1995; DiMaggio and Powell, 1983), and the considerations of Hair et al. (2017) and Peña-García et al. (2020) are accepted when adapting these concepts to the area of electric vehicles. Moving forward, future research should explore the evolving relationship between legitimacy and consumer trust in regions with varying degrees of infrastructure development and government support for EV adoption.

6. Conclusions

In this study, the interaction between state legitimacy, innovation and uncertainty, and their effect on electric vehicle (EV) purchase intention in the European context, has been investigated across the countries of Spain, Portugal, Italy and Greece. Using the partial least squares structural equation modelling (PLS-SEM) technique, several hypotheses have been evaluated to better understand these complex relationships.

Research Questions

RQ1: Is there a significant interaction between state legitimacy, innovation and uncertainty in their effects on EV purchase intention? The research has shown that there is a significant relationship between state legitimacy and EV purchase intention (path coefficient of 0.794, $p = 0.001$). However, the interaction between innovation and uncertainty did not show a significant effect on purchase intention, suggesting that legitimacy is the predominant factor in this context. This is in line with the findings of Suchman (1995) and DiMaggio and Powell (1983), who stress the importance of legitimacy in consumers' acceptance of products and services.

RQ2: What differences exist in the influence of state legitimacy, innovation and uncertainty on EV purchase intention between different demographic or geographic segments? The study did not directly address demographic or geographic differences due to the limitations of the available data. However, it is suggested that future studies explore these differences to better understand how these effects vary across contexts (Blanco-Gonzalez et al., 2017).

RQ3: How can companies in the electric vehicle sector effectively use state legitimacy, innovation and uncertainty management to positively influence purchase intention for their products? Companies can focus their strategies on increasing the perception of legitimacy, as this has been shown to be a significant factor in purchase intention. This can be achieved through practices that reinforce trust and the perceived legality and justification of their products and services (Tyler and Jackson, 2014). Furthermore, although innovation alone did not show a significant direct relationship with purchase intention, it is still important in establishing legitimacy (Han et al., 2022).

Research Agenda

To advance this field, it is proposed to further investigate how the effects of legitimacy, innovation and uncertainty vary in different geographical and demographic

contexts. In addition, it is suggested to explore other dimensions of legitimacy and their impact on different types of technological innovation.

Research proposition: 'Perception of state legitimacy has a significant mediating effect between technological innovation and intention to purchase electric vehicles, moderated by market uncertainty'. This proposition opens new avenues to investigate how perceptions of legitimacy can be better managed and how they influence the adoption of sustainable technologies.

Table 5, which describes the proposed research agenda, is presented below.

Table 5. Research agenda.

Research topic	Description	Authors
Legitimacy and its impact on EV adoption	Investigate how different dimensions of legitimacy (legal, justifying, and consent-based) affect EV purchase intent in various geographic contexts.	Bernstein (2011); Gilley (2006); Jackson et al. (2012); Sherman (2002); Tyler and Jackson (2014)
Innovation and consumer perception	Analyze how product and process innovations, and the perception of these innovations, influence EV legitimacy and purchase intent.	Damanpour (1991); Hermundsdottir and Aspelund (2021); Qu and Mardani (2023); Snihur and Wiklund (2019)
Uncertainty in the adoption of technologies	Examine how the perception of uncertainty related to charging infrastructure and the technological evolution of EVs affects consumers' purchasing decision.	Dill (1958); Duncan (1972); Peters et al. (2017); LaMonaca and Ryan (2022); Unterluggauer et al. (2022)
Demographic and geographic factors	Explore how the effects of legitimacy, innovation, and uncertainty vary on EV purchase intent across different demographics and geographic regions.	Blanco-González et al. (2017); Díez-Martín et al. (2022); Herberz et al. (2020); Salari (2022); Sanguesa et al. (2021)
Communication and marketing strategies	To investigate which communication strategies are most effective in increasing the perception of legitimacy and acceptance of innovations in EVs.	Bunduchi et al. (2022); Confente et al. (2020); Tsai et al. (2020); Wu and Zhu (2021); Zhao et al. (2016)
Impact of public policies	Analyze the role of public policies and government incentives in promoting the legitimacy and adoption of EV.	Haustein et al. (2021); Nilsson and Nykvist (2016); Yang et al. (2019); Tu and Yang (2019)
Corporate social responsibility (CSR)	To study how CSR practices can strengthen the legitimacy of EV companies and how this influences consumers' purchase intention.	Deegan (2002); Gray (1996); Hu et al. (2020); Stanaland et al. (2011); Soewarno et al. (2019)
Technology adoption and consumer behavior	Investigate the psychological and social factors that influence the adoption of innovative technologies such as EVs, including the theory of innovation adoption.	Ajzen (1991); Rogers et al. (2014); Fishbein (1979); Park et al. (2007); Kumar et al. (2021)
Sustainable business models	Examine how innovative and sustainable business models can impact the legitimacy and acceptance of EVs in the marketplace.	Geissdoerfer et al. (2018); Lusch (2015); Taran et al. (2015); Zhao et al. (2016)

This research agenda offers a structured and detailed view of the recommended future areas of study, based on the findings of the present study and the recommendations of the existing literature. Each proposed topic is supported by multiple relevant authors, providing a solid theoretical framework for future research.

7. Limitations and implications

This study has several limitations that should be considered when interpreting the results. Firstly, the data used for the analysis were collected from only four Southern European countries: Spain, Portugal, Italy, and Greece. While these countries share certain socio-economic characteristics, their markets may differ in ways that were not captured in the study. Future research should consider expanding the geographical

scope to include other European regions or even global markets to generalize the findings (Blanco-González et al., 2017). Additionally, although the study used a purposive sampling method, the sample size and composition may not fully represent the entire population of electric vehicle (EV) consumers, limiting the generalizability of the results (Hair et al., 2019).

Another limitation stems from the reliance on PLS-SEM as the primary analytical tool. While this method is robust for handling complex models with multiple variables, it has limitations in terms of its sensitivity to model misspecifications and can lead to biased estimates if the assumptions are not met (Sarstedt et al., 2021). Furthermore, this study does not directly account for potential moderating variables such as income levels, education, or urban versus rural distinctions, which could influence the relationships between legitimacy, innovation, and uncertainty, and EV purchase intention (Díez-Martín et al., 2022). These moderating effects should be explored in future studies to provide a more nuanced understanding of consumer behavior across different demographic segments.

Lastly, the study focused primarily on perceptions of legitimacy, innovation, and uncertainty without delving into more detailed aspects of technological evolution, infrastructure development, and governmental policies, which are crucial in influencing consumer purchase behavior. This omission could lead to an incomplete understanding of the broader ecosystem affecting EV adoption (Peters et al., 2017). Future research should aim to integrate these elements to provide a more holistic view of the factors shaping EV adoption.

Implications for Theory and Practice

Despite these limitations, the study offers important theoretical and practical implications. From a theoretical perspective, this research contributes to the literature on innovation adoption by highlighting the pivotal role of legitimacy in shaping consumers' intentions to purchase electric vehicles, especially in regions where the market is still developing. The findings reinforce the work of DiMaggio and Powell (1983) and Suchman (1995) by demonstrating that consumers are more likely to adopt EVs when they perceive these vehicles to be legitimate within their socio-economic and legal environments. This underscores the importance of legitimacy as a central construct in technology adoption theories, complementing the established focus on innovation and perceived risk (Han et al., 2022).

For practitioners, particularly EV manufacturers and policymakers, the study provides actionable insights. The strong influence of legitimacy on purchase intention suggests that companies should prioritize strategies that enhance their perceived legitimacy. This can be achieved through transparent communication about the environmental benefits of EVs, alignment with regulatory frameworks, and leveraging endorsements from trusted institutions (Tyler and Jackson, 2014). While innovation itself did not show a direct relationship with purchase intention, it plays a crucial role in establishing legitimacy, as innovative products are often seen as more legitimate when they align with societal expectations and norms (Damanpour, 1991).

In terms of policy implications, governments in these countries should focus on developing policies that enhance the legitimacy of EVs, such as subsidies, tax incentives, and investments in infrastructure (Yang et al., 2019). Given the findings that uncertainty moderates the relationship between legitimacy and purchase intention,

reducing uncertainty through the expansion of charging infrastructure and providing clear information about the technological capabilities of EVs could enhance consumer confidence and accelerate adoption (LaMonaca and Ryan, 2022). Additionally, policymakers should consider the role of public trust and ensure that their actions to promote EV adoption are perceived as legitimate and in the public interest (Haustein et al., 2021).

Lastly, the study's findings suggest that while innovation alone may not directly drive purchase intention, it is critical in fostering long-term market acceptance. Companies should continue investing in innovative technologies but should complement these efforts with strategies that build and sustain legitimacy, such as corporate social responsibility (CSR) initiatives and sustainable business models (Soewarno et al., 2019). By doing so, they can enhance consumer trust and reduce the perceived uncertainty surrounding the adoption of new technologies.

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