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Why Consumers Resist Electric Cars: An Analysis of Purchase Barriers

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ABSTRACT

Most research on fully electric cars (ECs) still focuses on adoption drivers, treating obstacles either residually or as the simple inverse of drivers. This leaves practitioners with unprioritised lists of barriers and little guidance on which deterrents to tackle first, especially in late-adopting contexts. Southern Italy—characterised by high car ownership, low EC uptake, and infrastructural constraints—offers a critical setting to examine latent resistance. We reframe the Kano model as a diagnostic for innovation resistance and adopt a three-phase qualitative design: expert interviews to scope ownership frictions; a focus group to explore how consumers articulate them; and a Kano questionnaire to classify EC attributes and identify which ones trigger dissatisfaction when unmet and which yield proportional gains when improved. The analysis classifies ten attributes into two must-be, six one-dimensional, and two indifferent categories. Battery durability/warranty clarity and recharging infrastructure emerge as high-priority levers, while resale value and "cool factor" are currently indifferent. By mapping Kano categories onto innovation-resistance mechanisms, the study proposes a transferable framework for diagnosing resistance in late-adopting markets and clarifies when functional versus symbolic attributes dominate. Implications are derived for firms (warranty transparency, cost-containment, infrastructure partnerships) and policy makers (infrastructure reliability, disclosure standards, risk-sharing instruments).

1 | Introduction

The decarbonisation of road transport has become a central policy and industry priority. In the European Union, road transport accounts for a substantial share of total CO_2 emissions and remains one of the few sectors in which emissions have not declined sufficiently, prompting increasingly stringent regulatory targets, including the transition to zero-emission new cars from 2035 (European Environment Agency 2022). In this context, the diffusion of electric cars (ECs) has become strategically important both for policymakers seeking to reduce emissions and for automotive firms adapting their sustainability strategies (González et al. 2008; European Environment Agency 2022). Achieving these objectives requires a substantial increase in electric-vehicle adoption. Yet, despite manufacturers' strategic shift toward electric and hybrid models, market uptake remains constrained by technological limitations and limited consumer acceptance (ACEA 2024b; Heineke et al. 2024).

Building on these considerations, this study examines which specific electric-car (EC) attributes function as deterrents in a late-adopting context, namely Southern Italy. Rather than treating resistance as irrationality, the study approaches it as a meaningful evaluative response shaped by psychological, functional, social, and economic concerns (Claudy et al. 2015). In doing so, it shifts attention from generic adoption drivers

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to deterrent attributes and reframes the Kano model as a diagnostic lens for identifying innovation resistance in a real-world market setting.

Accordingly, the study addresses the following question: *What are the main features of electric cars that discourage consumers from purchasing them?* The analysis focuses specifically on fully electric cars, rather than hybrid or plug-in variants.

To address this question, the study adopts a three-phase qualitative design in Southern Italy, combining expert interviews, a focus group, and a Kano questionnaire derived from the attributes identified in the exploratory stages.

Southern Italy was selected because it combines high private car dependence with comparatively low EC uptake. Italy had the highest motorisation rate in the European Union in 2023, with 694 passenger cars per 1000 inhabitants, compared with the EU average of 574 (ACEA 2024a, 2025), yet consumer readiness for ECs remains modest (Lanzini 2024). Within Italy, only 5884 of the 51,513 ECs registered in 2023 were registered in Southern Italy, including the islands (Motus-E 2023). This pattern is comparable to other late-adopting contexts. In Romania, 15,368 of 144,611 new car registrations in 2023 were electric, or about 10.6% (ACAROM 2024), while car ownership remains substantially lower than in Italy (ACEA 2024a). In India, EC sales approached 100,000 in 2024, representing about 2% of new car sales, while overall car ownership remained around 34 vehicles per 1000 inhabitants (International Energy Agency 2025; Data for India 2024). Taken together, these contrasts situate Southern Italy within a broader cluster of late-adopting markets in which high or rising motorisation coexists with modest EC penetration.

This study extends prior research in three ways. First, it shifts the analysis of electric-car adoption from generic adoption drivers to resistance-inducing attributes, showing that barriers cannot be treated as the simple inverse of drivers. Second, it repurposes the Kano model from a satisfaction-oriented tool into a diagnostic framework for innovation resistance, allowing deterrents to be prioritised according to their asymmetric effects on dissatisfaction and satisfaction. Third, it develops a transferable interpretation of resistance in late-adopting markets by distinguishing between must-be, one-dimensional, and indifferent barriers, thereby clarifying when functional risks dominate over symbolic concerns.

2 | Literature Review

2.1 | Innovation Resistance in the Context of Electric Vehicles

Although ECs still struggle to achieve broad consumer acceptance, much of the literature has focused on factors that positively influence purchase decisions, such as environmental and technological enthusiasm, social influence, attention to environmental issues, and social status (Buhmann and Criado 2023; Bhat et al. 2022; Gunawan et al. 2022; Higueras-Castillo et al. 2021; Manutworakit and Choocharukul 2022; Abbasi et al. 2021; Wahl et al. 2020). While factors that positively affect EC adoption have been widely studied, negative factors remain less systematically examined.

Resistance to ECs may reflect psychological reactance, wherein the push toward adoption is perceived as a constraint on autonomy rather than an expansion of consumer choice (Brehm 1966). Ram and Sheth's (1989) classic framework on consumer resistance to innovation remains highly instructive for understanding the slow diffusion of ECs. They distinguish functional barriers (i.e., usage, value, and risk) from psychological barriers (i.e., tradition and image) and show that each barrier triggers a different kind of defensive consumer response. They further show that different barriers require different interventions, such as redesign, value reframing, or complementary services.

Consumer resistance to the adoption of innovative products (such as ECs) highlights that barriers to adoption are not simply the inverse of motivations to adopt. Resistance factors such as functional barriers (i.e., usage inconvenience, perceived risk, and poor value-to-price ratio) and psychological barriers (i.e., image concerns and conflicts with traditions or norms) can strongly inhibit consumer adoption, independent of the benefits associated with innovation (Claudy et al. 2015).

Anilan and Vij (2024) show that while subsidies and tax rebates can stimulate initial battery-electric-vehicle adoption, these instruments are often fiscally unsustainable and insufficient to secure continued uptake, underscoring the structural and multidimensional nature of consumer reluctance.

She et al. (2017) likewise found that public perceptions of battery electric vehicles were shaped by a cautious "wait-and-see" attitude, with safety, reliability, range, battery replacement costs, and charging infrastructure emerging as major perceived barriers.

2.2 | Literature Gaps and Conceptual Framing

Pamidimukkala et al. (2024) identify four broad categories shaping electric-vehicle adoption—contextual, situational, psychological, and demographic—highlighting the need to align technological, infrastructural, marketing, and policy strategies with consumer perceptions and needs.

Krishna (2021), using eWOM-based thematic analysis, identifies both functional barriers—such as cost, charging infrastructure, battery reliability, range anxiety, and recharge duration—and emotional or cultural concerns, including reduced fun, repairability, and perceived "soul."

Prior research consistently identifies high purchase cost, habit disruption, social-image considerations, limited range, and dependence on government incentives as persistent barriers to EC adoption (Xue et al. 2024; Jansson et al. 2017; Rezvani et al. 2018; Haustein and Jensen 2018; Zhou et al. 2021).

Recent work also points to the growing relevance of digitally enabled features, trust, and long-term value perceptions, while Italian evidence identifies insufficient charging infrastructure, high purchase costs, and limited long-distance usability as

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especially salient barriers (Wang and Khan 2025; Giansoldati et al. 2020).

Despite these efforts, there remains a research gap regarding the specific EC attributes that make electric cars less attractive to potential buyers. To address this gap, the present study examines how potential buyers perceive attributes that actively discourage purchase.

Read through an innovation-resistance lens, Must-Be attributes correspond to basic functional expectations that consumers take for granted, so their absence generates strong dissatisfaction without creating delight when present (Matzler and Hinterhuber 1998; Witell and Löfgren 2013). One-dimensional attributes map onto ownership-risk concerns—such as reliability, durability, cost, and access—because dissatisfaction rises with underperformance and satisfaction increases when performance improves (Kleijnen et al. 2009; Joachim et al. 2018). Attractive attributes may mitigate psychological barriers by adding unexpected value (Matzler and Hinterhuber 1998; Witell and Löfgren 2013), whereas indifferent attributes capture concerns that are either not yet salient or not diagnostic for choice and may evolve over time (Nilsson-Witell and Fundin 2005; Löfgren et al. 2011). Reverse attributes align with reactance, where consumers prefer the opposite of the proposed innovation (Brehm and Brehm 1981). This mapping helps distinguish among different forms of resistance by identifying which deterrents operate as basic expectations, performance-linked concerns, latent issues, or reactance-inducing features.

This framework also suggests that the configuration of resistance may vary across adoption contexts. In late-adopting markets such as Southern Italy, resistance is more likely to be anchored in functional hygiene and ownership-risk concerns, including range, charging infrastructure, and cost-performance trade-offs. In more mature markets, where such concerns are weaker, symbolic or psychosocial barriers may become more salient.

3 | Methodology

3.1 | Research Design and Logic

Most studies on EC and EV adoption rely on quantitative survey techniques. Consequently, they frequently miss capturing individuals' personal experiences and fail to identify unexpected factors that only become apparent through comprehensive, inductive, and qualitative research (Halkier 2010). Indeed, interactive research approaches, such as focus groups, can foster more meaningful discussions and uncover the fundamental motivations behind consumer behaviours and preferences (Calder 1977).

To bridge this gap, a three-phase qualitative study was conducted. The aim was to iteratively move from expert-driven market insights to consumer-grounded perspectives, ultimately leading to the formalisation of a set of resistance-driving attributes. By conducting initial interviews with experts and organising a focus group, the study sought to explore in depth the motivations and experiences influencing consumer reluctance toward ECs. This approach allowed us to uncover insights that might be missed when relying solely on testing predefined hypotheses in a deductive manner (Halkier 2010).

Insights from expert interviews guided the design of the focus group, which, in turn, grounded the Kano survey in the lived experience of consumers.

The three-phase design follows an abductive logic of discovery, where expert insight, lay perceptions, and formal modelling interact iteratively. Expert interviews surfaced latent resistance factors, which the focus group reframed from a user-experience angle, enabling their translation into concrete, testable attributes in the Kano model. This sequencing not only ensured ecological validity but also helped move from exploratory theorising to the identification of generalisable resistance structures.

3.1.1 | Pilot Interviews With Experts

In the first phase, three individual interviews with expert car dealership owners in Palermo, Italy, were conducted followed by a focus group of 11 participants. These expert interviews surfaced latent resistance factors—recurring themes and client objections—which shaped the exploratory frame for consumer-level discussion.

In particular, the three car dealers reported that despite the incentives they receive to push customers to purchase ECs, their efforts are often met with great resistance from customers, most of whom remain skeptical and prefer traditional diesel engines. By studying the answers gathered in the pilot interviews, we identified the main topics to begin the discussion in the following focus group.

3.1.2 | Focus Group

The aim of the focus group was to discuss the main themes and find unforeseen factors to develop an ad hoc Kano questionnaire. The focus group allowed us to validate expert-derived themes from the perspective of potential users and to discover new affective, symbolic, and usability concerns that had not emerged in expert discourse.

The focus group was held on Monday, 25 March 2024 from 20:00 to 23:30, after standard working hours. Participants were recruited from the researchers' personal contacts, selecting those who had some experience with electric cars and who were able to discuss the identified main topics. The researchers invited 19 people to participate (10 males and 9 females), and 11 of them agreed (6 males and 5 females) to take part in the focus group. All participants had some experience with ECs, either through direct use or professional involvement: three car dealers using and selling them, four participants who owned an EC, and four who had rented an EC for over 6 months. The sociodemographic characteristics of the participants are presented in Table 1.

From the discussion availed by the focus group, questions for the Kano questionnaire were developed. For the aim of our analysis,

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TABLE 1 | Demographic composition of the focus group.

Sex	Age	Job
Male	54	Consultant
Male	42	Car Dealer
Male	61	Car Dealer
Male	52	Employee
Male	40	Entrepreneur
Male	39	Car Dealer
Female	49	Entrepreneur
Female	42	Real estate agent
Female	39	Entrepreneur
Female	52	Attorney
Female	49	Attorney

Note: Authors' own work.

the focus was on the Kano questionnaire to ascertain the needs and problems that are the main hindrances in purchasing ECs and the possible solutions to overcome them. The Kano questionnaire operationalised emergent attributes, transforming qualitative perceptions into a structured classification of resistance levers. This shift from inductive emergence to structured categorisation aligns with the goal of generating informed, actionable insights.

The sequential expert interviews → focus group served as content and face validation for the item pool used in the Kano instrument. Expert interviews established content coverage and precise attribute definitions, while the focus-group debrief provided comprehension checks and wording refinements for the functional/dysfunctional pairs and attribute labels. The examination therefore relied on this iterative, theory-guided pre-test rather than a separate quantitative pilot, consistent with the interpretive, attribute-level nature of Kano classification.

3.1.3 | Development and Application of the Kano Questionnaire

According to the methodology described in the previous section, the Kano questionnaire was formulated (Appendix 1) to investigate the 10 themes previously identified. To capture the feelings of potential buyers, screening questions were used at the start of the questionnaire; the first asked about the age of the participants, while the second asked whether they had considered or purchased an EC within the past 2 years.

We purposefully restricted participation to adults aged ≥ 30 years; no other exclusion criteria were applied. In Southern Italy, younger consumers' purchasing power typically does not support the acquisition of a new EC at current prices. This design choice aligns the sample with the core purchasing age segment targeted by car dealerships in the study region; therefore, younger potential buyers were excluded by design.

TABLE 2 | Demographic composition of the target sample of the Kano questionnaire.

Sex		Age	
Female	55	30–45	32
Male	59	46–55	39
		over 55	43
	Total		114

Note: Authors' own work.

The questionnaire was administered online and shared via social media networks from mid-June to mid-July 2024 using an open, anonymous link. It was opened by 223 individuals and completed by 114 individuals (completion rate: 51.1%). All demographic variables were self-reported by the respondents. No incentives were offered to answer the questionnaire.

The demographic data of the sample of 114 respondents in Southern Italy are classified in Table 2.

3.2 | The Kano Model

To identify the key characteristics of electric cars that are significant to potential buyers, the model proposed by Noriaki Kano was employed. The Kano model offers a valuable framework for categorising product or service attributes based on how customers perceive them and their influence on customer satisfaction (Kano et al. 1984).

The Kano model is a qualitative, interpretive, and non-linear approach grounded in user perceptions. Unlike the quantitative methods used for assessing customer satisfaction, which aim for causal determination, prediction, and generalisation, the Kano model focuses on providing insight, understanding, and extrapolation to similar situations as a qualitative method. In qualitative research, the goal is to delve into a deeper understanding rather than simply measuring characteristics (Johnson 1997). The validity and reliability of qualitative methods are often framed as trustworthiness and methodological rigour, respectively. As Patton (2002) stated, in quantitative research, the reliability of findings hinges on the accuracy of measurement tools, whereas in qualitative studies, the trustworthiness of the results is largely determined by the researcher's expertise and engagement with the subject matter under investigation. Rigorous application of the Kano model emphasises the research process, and trustworthiness is established through the coexistence of diverse perspectives able to interact within the focus group and the repetition of in-depth qualitative interviews with experts to construct the questionnaire categories out of the researcher's ability to engage the participants. Because Kano assigns categories to attributes from paired functional/dysfunctional responses, items do not form reflective multi-item scales. Accordingly, internal-consistency coefficients (e.g., Cronbach's alpha) are not applicable to Kano instruments. Instead, dependability is evidenced through classification-stability indices (MOAI/top–second gaps, CSI/CDI, Category Strength, Total Strength) and the very low share of 'questionable' responses (Q).

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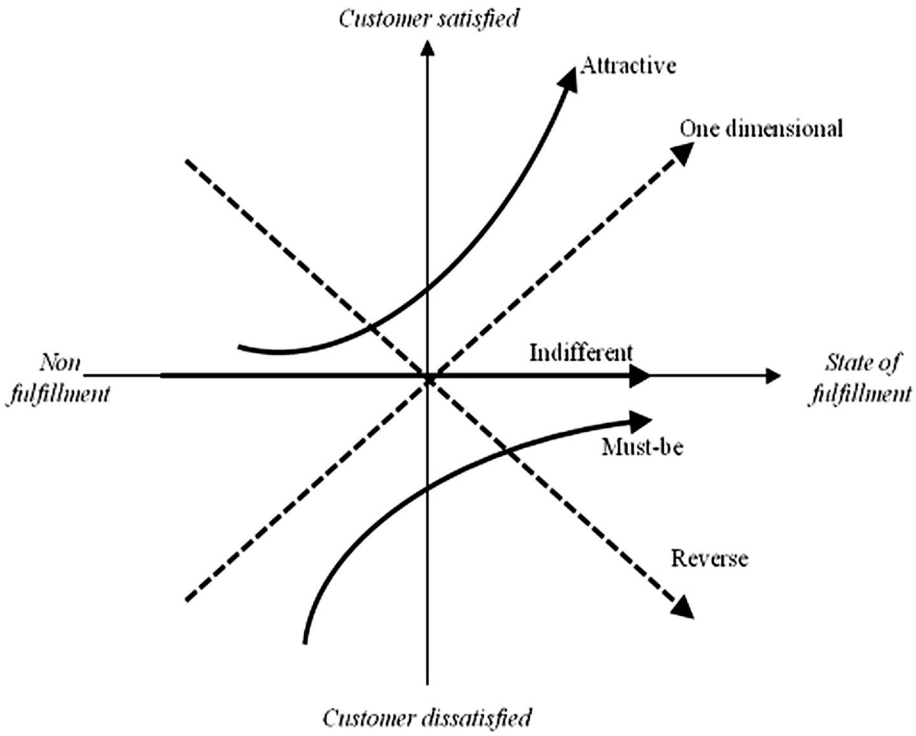

FIGURE 1 | The Kano model (adapted from Kano et al. 1984).

Unlike other models, the Kano model does not assume that every relationship between product or service performance and customer satisfaction is linear. Kano observed that not all customer requirements are equal; some have a greater potential to enhance satisfaction than others. Additionally, customer satisfaction is not always directly proportional to product functionality, meaning that higher quality does not always result in higher satisfaction for every product attribute or service requirement. In this vein, it should be noted that the Kano model has been widely applied to product and service quality development across various industries (Berger et al. 1993; Fuchs and Weiermair 2004; Löfgren et al. 2011; Bandyopadhyay 2015; Dominici et al. 2016; Materla et al. 2019; Shravan et al. 2024).

Due to its qualitative nature, the model enables the creation of a product or service concept that aligns with customer needs and desires, thereby ensuring customer satisfaction (Kano et al. 1984). To explore and identify these needs and desires, the Kano model investigates customers' perceptions of a product or service's attributes and their subsequent impact on customer satisfaction (Dominici and Palumbo 2013a, 2013b; Dominici et al. 2015). Product characteristics are classified into five categories:

1. *Must-be (M)*: These requirements are regarded by customers as basic factors; therefore, their presence does not significantly enhance satisfaction, but their absence will lead to extreme dissatisfaction.
2. *One-dimensional (O)*: These factors lead to satisfaction when their performance is high and cause dissatisfaction when their performance is low. These attributes are linear and symmetric, as they are typically tied to the customer's explicit needs and desires.
3. *Attractive (A)*: These attributes lead to customer satisfaction when fulfilled, but they do not cause dissatisfaction if unmet. Companies can leverage these factors to positively differentiate themselves from their competitors.
4. *Indifferent (I)*: These features do not impact customers' satisfaction, whether it is present or not.
5. *Reverse (R)*: Customers not only do not desire these product attributes but also prefer the opposite. The Kano model is typically represented as shown in Figure 1 (Kano et al. 1984).

The implementation of the measurement using the Kano Model involves four steps (Dominici and Palumbo 2013a; Palumbo et al. 2014): detection of customer needs, creation of the Kano questionnaire, distribution of the questionnaire to the target population, and analysis and evaluation of results. The detection of customer needs can be carried out through individual interviews and/or focus group discussions with participants who are already familiar with a product or service. Although individual interviews are generally quicker and more cost-effective, focus groups tend to be more valuable because interactions among group members often bring out latent needs. Individual interviews are typically effective for identifying one-dimensional quality attributes, whereas focus groups are better suited for uncovering attractive elements (Dominici and Palumbo 2013a).

After identifying the customer's needs and the ideal features of the product, the next step was to prepare the questionnaire. Once the main customer requirements have been identified, researchers create a questionnaire designed to categorise these features. This questionnaire must include several dyads of questions; one has to be positively formulated—the so called "functional" question—for each feature to assess the

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TABLE 3 | Kano evaluation matrix (adapted from Kano et al. 1984).

		Dysfunctional questions				
		How do you feel if requirement X is NOT present?				
		I like it	Must be that way	I'm neutral	I can live with it	I dislike
Functional questions	I like it	Q	A	A	A	O
How do you feel if requirement X is present?	Must be that way	R	I	I	I	M
	I'm neutral	R	I	I	I	M
	I can live with it	R	I	I	I	M
	I dislike	R	R	R	R	Q
		M = must be			I = indifferent	
		O = one dimensional			R = reverse	
		A = attractive			Q = questionable	

level of customer satisfaction resulting from its implementation, and one negatively formulated—the so called "dysfunctional" question—to investigate the customer's reaction if the feature is not being adequately implemented (Dominici et al. 2015, 2016). Dysfunctional questions, by contrast, are useful to highlight the quality of the item. When there is a dissonance among a functional and the corresponding dysfunctional question, then it is considered a Q (questionable requirement), meaning that it is unclear if these characteristics are expected or desired by customers, as they may yield ambivalent responses due to misunderstandings of the survey questions or errors in completing the questionnaire.

By cross-referencing the answers to functional and dysfunctional questions using a matrix developed by Kano, customer perceptions can be categorised into specific quality dimensions: M (must-be requirement), O (one-dimensional), A (attractive), I (indifferent), R (reverse), and Q (questionable requirements). For each pair of customer perception responses, the matrix assigns one of the corresponding requirements. For example, if a customer responds "I'm neutral" to the functional question and "I dislike it that way" to the dysfunctional question, the requirement is classified as *must-be* according to the Kano matrix (see Table 3).

The final step in adopting the Kano Model involves analysing and evaluating the results. In the academic literature, this step has been carried out using four approaches (Matzler and Hinterhuber 1998; Matzler et al. 1996; Berger et al. 1993):

1. *Evaluation based on frequencies*: Using the results obtained from the function/dysfunction matrix described earlier, each requirement can be definitively classified into one of five categories according to the highest frequency of responses.
2. *Evaluation using the M > O > A > I rule*: This rule prioritises the categories as follows: *must-be* requirements (M) are the most critical and must not be absent in a product or service, followed by *one-dimensional* (O) requirements, *attractive* (A) attributes, and *indifferent* (I) attributes. This hierarchy helps with the design of a product or service.
3. *Customer satisfaction and dissatisfaction indexes*: The *Customer Satisfaction Index* (CSI) indicates how strongly a product or service characteristic influences customer satisfaction. It is calculated by dividing the total count of answers categorising the feature as attractive or one-dimensional by the number of those categorising it as must-be, one-dimensional, attractive, or indifferent. The other index—that is, the *Customer Dissatisfaction Index* (CDI)—measures the average impact on customer dissatisfaction when a requirement is not met. These coefficients are calculated by dividing the total count of answers marking the feature as must-be or one-dimensional by the same factor used for the satisfaction coefficient. To calculate the average effect on customer satisfaction, one must sum the attractive and one-dimensional values and then divide this sum by the total number of responses in the attractive, one-dimensional, must-be, and indifferent categories. To determine the average impact on dissatisfaction, the must-be and one-dimensional columns were summed and divided by the same normalising factor. The customer satisfaction index ranges from 0 to 1, where values near 1 indicate high satisfaction and those near 0 indicate low satisfaction. The customer dissatisfaction index ranges from −1 to 0, with values closer to −1 indicating high dissatisfaction and those near 0 indicating low dissatisfaction.

Customer Satisfaction Index (CS)

$$\mathrm{CSI} = \frac{\mathrm{A} + \mathrm{O}}{\mathrm{M} + \mathrm{O} + \mathrm{A} + \mathrm{I}} \tag{1}$$

Customer Dissatisfaction Index (CD)

$$\mathrm{CDI} = \frac{\mathrm{M} + \mathrm{O}}{\mathrm{M} + \mathrm{O} + \mathrm{A} + \mathrm{I}} \cdot (-1) \tag{2}$$

CSI ranges from 0 to 1, with values near 1 indicating high satisfaction and those near 0 indicating low satisfaction, while CDI

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ranges from −1 to 0, with values closer to −1 indicating high dissatisfaction and those near 0 indicating low dissatisfaction.

4. *Category and Total Strength indexes*: To more thoroughly assess the frequency distribution, additional criteria such as "category strength" and "total strength" can be utilised (Berger et al. 1993; Barsalou 2023). Category strength indicates how clearly a category stands out compared to others and may be determined as:

$$\text{Category strength} = \%\text{ of most frequent response} - \%\text{ of 2nd most frequent response} \tag{3}$$

For a feature to be definitively assigned to a particular category, the category strength should exceed 5%. The total strength, on the other hand, reflects the overall importance of a feature as perceived by respondents. The total strength can be calculated as follows:

$$\text{Total Strength} = \frac{M + O + A}{M + O + A + I + R} \tag{4}$$

Generally, the total strength should be greater than 50% to indicate that respondents consider the feature to be significantly important. Once the types of expected requirements for a product or service are identified, the company can gather detailed information on how to best tailor its offering to maximise customer satisfaction.

The strategic implications of the Kano Model can be summarised as follows: prioritise fully meeting all must-be requirements, maintain competitiveness by effectively addressing one-dimensional requirements, aim to differentiate offerings by excelling in attractive requirements, avoid allocating time and resources to features that customers perceive as indifferent, and refrain from implementing reverse requirements.

4 | Findings

4.1 | Preliminary Results From the Interviews and Focus Group

The first phase of the research involved three individual interviews with car dealership owners in Palermo, Italy, aimed at exploring their expert perspectives on the key characteristics and challenges of ECs. The scope of the interviews was to define the themes to be proposed for the discussion in the focus group.

These interviews led to the identification of eight main themes, which were further examined in the focus group:

1. *Range autonomy*. Most potential customers doubt that the battery ranges officially declared by companies can be obtained in real-life situations. Furthermore, they fear that batteries will quickly lose their autonomy over time.
2. *Recharging infrastructure*. According to the interviews, customers are scared of the availability of charging infrastructure and their locations, even considering that the charging time is slow compared to the usual internal combustion vehicles.
3. *Trust in technology*. Many potential customers fear that ECs technology is still not mature. Furthermore, some feel that relying on electronics makes the tools less reliable; failures are not easy to forecast, and related issues are impossible to repair.
4. *Repair costs*. There is widespread concern about the potentially high costs associated with repairing ECs.
5. *Control and privacy concerns*. Some customers are concerned about privacy issues owing to car tracking technologies embedded in electric vehicles.
6. *Car resaleability*. Most customers are aware of the lack of a robust second-hand market for ECs, which is a strong deterrent to purchase.
7. *Desirability*. Many clients believe that ECs lack the "cool" factor associated with traditional cars. According to these potential customers, the electric cars are "cold" lacking the sound, the style, the personality of traditional cars.
8. *Sustainability concerns*. Although many customers hold that they buy electric cars for their lower ecological impact as well, many other potential buyers are not fully convinced of their social and environmental benefits, as they are concerned that the real environmental impact of producing and then disposing of ECs may be higher than traditional cars. In other cases, customers point out that ECs' materials are produced by exploiting labour in developing countries.

During the second phase of the research, the focus group adhered to a structured procedure, starting with an introduction to the eight themes derived from experts' interviews, each of which was discussed sequentially. During the discussion, two additional unforeseen themes emerged (the performance and durability of batteries), which were further discussed. Each theme sparked varying levels of agreement and led to insightful exchanges on both the practical and perceptual aspects of ECs adoption. The session concluded once thematic saturation was reached, with no new insights emerging from the discussion.

In Table 4, the themes were numbered as they were discussed or emerged during the focus group discussion.

Table 5 includes some of the most relevant quotes that emerged from the discussion of the 10 themes.

4.2 | Questionnaire and Kano Model Results

The third phase of the research involved processing the data collected through the Kano questionnaire. This stage began by identifying the frequency distribution of each attribute group and applying the MOAI classification, as illustrated in Table 6.

The extremely low percentage of *questionable* answers (Q) shows that the questionnaire achieved high reliability. The analysis of the results based on the MOAI classification

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TABLE 4 | Themes derived from the focus group discussion.

Themes	Main insights and standpoints
Theme 1: Range autonomy	Participants unanimously identified range autonomy as their primary constraint in buying an electric vehicle. Two business owners who frequently travelled long distances expressed a preference for older diesel cars over ECs, citing better range reliability and a faster refuel than recharging an EC.
Theme 2: Durability of batteries	All the participants raised concerns about the durability of batteries over time, as the already limited range would further decrease, making the whole car not viable for not-so-long distances.
Theme 3: Recharging infrastructure	The group concurred that recharging stations are not widespread in southern Italy, particularly for fast charging, requiring owners to significantly change how they use a car. The car dealer participants echoed the need for governmental investment in a comprehensive charging network to mitigate these concerns.
Theme 4: Trust in technology—warranty	There were varied responses to this theme. Car dealers highlighted the longstanding presence of technologies in diesel cars and that the most expensive maintenance problems are related to some electric parts, even though the reliability of these parts has increased in recent years. However, three participants shared negative experiences with ECs technology that they had not encountered in conventional cars. This led to mixed feelings about the current state of EC-related technologies. During the discussion all the participants agreed that a lifetime warranty would possibly overcome these kinds of concerns.
Theme 5: Repair costs	Car dealers explained that, while parts for ECs might be more expensive, the overall maintenance requirements are less frequent (e.g., no oil changes needed). Opinions were split among participants; three EC owners reported concerns about high repair costs if such a negative event would occur, but one participant (one of the female attorneys) had not encountered any issues within 18 months of ownership.
Theme 6: Control and privacy concerns – traceability	Only two participants voiced concerns regarding privacy and control, fearing constant tracking through car electronics. A consultant countered by noting the prevalence of tracking technology in smartphones, suggesting such concerns might be overblown. One of the attorneys added that any unauthorised tracking would be illegal in Italy, pointing out the need for more transparent communication from manufacturers.
Theme 7: Car resaleability	All car dealer participants concurred that the virtually non-existent second-hand market for electric cars (ECs) is a significant deterrent for potential buyers. In their opinion, this is linked to a general distrust towards the longevity and reliability of used ECs compared to those of traditional cars. The majority agreed that this general mistrust is due to the inability to visually assess wear and tear, unlike conventional cars. The car dealers and a male entrepreneur pointed out that electronic diagnostics have been necessary for diesel cars for many years, although having to rely only on these electrical systems to assess the state of ECs components raises greater concerns for some. Several participants proposed that some kind of rental agreements could mitigate these ownership risks. Everyone acknowledged that the inability to resell an electric car at a reasonable price remains a major issue. Two EC owners admitted they were previously unaware of the limited market for used electric cars and would have reconsidered their purchase had they known. Those who engaged in long-term rentals or frequent rentals for business travel suggested that rental arrangements could provide a practical workaround by minimising the risks associated with ownership.
Theme 8: Cool factor (sound) [interview theme Desirability]	The group debated whether ECs are perceived as "cool." One EC owner found her EC to be modern and appealing because of its quiet operation. The majority of participants highlighted how electric cars may be considered useful, but they are not cool; they miss some kind of "narrative" to make them cool. Most participants also agreed that electric cars do not have a real "personality", and they look like more as "toys" or, as suggested by two participants, they are "robots without soul". Developing these comments, the discussion on this point ended with 10 out of 11 participants saying that there is less emotional attachment to electric cars than they used to have with traditional engine cars. Four participants admitted they miss the "sound" of the engine which is like the voice of the car being the electric cars kind of "mute". This could be improved by working on the aspects that create the "good image" of these cars.

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TABLE 4 | (Continued)

Themes	Main insights and standpoints
Theme 9: Performance	Six participants pointed out that they perceived the performance of ECs as not the same as that of traditional cars, while the other four disagreed with this point. Observing the results, it emerged that the participants were not able to identify a uniform point of view for this theme.
Theme 10: Sustainability concerns	The discussion concluded with a split opinion on the social and environmental sustainability of ECs. Six participants held that ECs are less sustainable, citing concerns over production, disposal processes, and the exploitation of resources and labour in developing countries. Conversely, the other five participants argued that ECs are more environmentally friendly than traditional cars.

Note: Authors' own work.

yielded several important conclusions. Among the attributes analysed, *performance* and *sustainability concern*s were clearly fundamental consumer expectations, which fell into the *must-be* category. The presence of these attributes does not substantially contribute to satisfaction, but their absence generates extreme dissatisfaction. The availability of *recharging infrastructure* and *control and privacy concerns* (specifically traceability) fell into *one-dimensional* requirements. In these cases, the presence of the attribute adds satisfaction, and absence causes dissatisfaction, reflecting a linear relationship between the attribute and consumer attitude.

In contrast, *car resaleability* and the *cool factor* (e.g., sound) were categorised as *indifferent* features. These attributes appear to have little relevance to consumers' purchase intentions, which contrasts with the findings from the earlier focus group sessions. Four features (*range autonomy, battery durability, trust in technology*, and *repair costs*) showed frequency distributions that placed them near the boundary between must-be and one-dimensional categories.

Kano is a categorical classification method; 114 respondents are within common ranges used in prior studies and adequate for stable item-level classifications. We also report top–second category gaps and tie-break indices (CSI/CDI) to demonstrate stability.

To more precisely classify these borderline features, four additional measures were calculated: the *Customer Satisfaction Index* (CSI), or the degree to which a feature contributes to satisfaction if present; the *Customer Dissatisfaction Index* (CDI), or the degree of dissatisfaction if a feature is absent; *Category Strength*, or the degree to which a feature strongly fits one specific category; and *Total Strength*, or the degree to which a feature is rated as important in general by the respondents.

These indices provide a more detailed explanation of each attribute's impact on purchase decisions and customer experience, as described in Table 7.

When category strength was $<5\%$ (borderline M/O), we resolved the classification by pattern in CSI/CDI: items showing non-trivial satisfaction gains when present (CSI clearly >0) and substantial dissatisfaction when absent (CDI clearly <0) were classified as One-Dimensional; items with minimal satisfaction lift but pronounced dissatisfaction risk were classified as Must-Be.

The analysis of these indices confirmed that the indifferent attributes (*cool factor* and *car resaleability*) have limited relevance, as expressed by their low CSI and CDI scores. This agrees with the initial frequency analysis and suggests that the presence or absence of these factors has little impact on customer satisfaction. Also, for sustainability concerns and performance, the results are in line with evaluation with frequency and were validated as must-be requirements. Both attributes also exceed the 5% threshold for category strength, supporting their classification. These features cause significant dissatisfaction when absent but offer only limited gains in satisfaction when present.

Control and privacy concerns can be confirmed as *one-dimensional* requirement with a category strength of 12.28% ($>5\%$). The *Recharging infrastructure* attribute also fits within the one-dimensional, despite a category strength just below the 5% threshold, because its CSI and CDI values indicate that its presence leads to both satisfaction (average), while its absence contributes to dissatisfaction.

Finally, for the four borderline attributes—*range autonomy, durability of batteries, trust in technology*, and *repair costs*—by calculating these indexes, it could be determined that they belong to the *one-dimensional* category. They all possessed a category strength of less than 5%, and the CSI and CDI results indicate a two-way effect: the presence of these traits induces moderate satisfaction, whereas their absence induces high dissatisfaction.

Figure 2 visually depicts the Customer Satisfaction Index (CSI) for each feature alongside the inverse of its Customer Dissatisfaction Index (CDI), effectively showing their placement within the Kano categories.

Table 8 synthesises the Kano classifications by linking each attribute group to its underlying resistance mechanism and broader cross-contextual implication.

The synthesis in Table 8 supports the proposed linkage between Kano categories and innovation-resistance mechanisms. It also suggests two broader patterns in late-adopting contexts: ownership-risk attributes tend to dominate resistance where infrastructure remains weak, whereas symbolic and emotional attributes may become more salient once functional risks are reduced.

5 | Discussion

The findings show that perceived ownership risks dominate consumer resistance in late-adopting contexts. The most salient deterrents were battery durability, range autonomy, repair costs,

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TABLE 5 | Relevant quotes from the focus group discussion.

Themes	Main insights and standpoints
Theme 1: Range Autonomy	The male entrepreneur stated: "On the motorway I don't trust the stated range—with my old diesel I know exactly how far I can go". The 61 years old car dealer added: "Customers think the declared range isn't real life, and they worry it drops fast over time".
Theme 2: Durability of batteries	The male entrepreneur told: "If the range is already limited, what happens after two years when the battery drops? Then the car is not viable for normal trips". The female entrepreneur added: "Autonomy fading over time is my real fear"
Theme 3: Recharging infrastructure	The male employee noted: "Fast chargers are rare and require much time anyway; I'd have to change the way I use a car". The 61 years old car dealer replied that: "We need public investment in a proper network; otherwise, people won't switch".
Theme 4: Trust in technology—warranty	The 52 attorney told: "With all these electronics, when it fails none can know what's wrong". The 42 and 61 years old the car dealers told: "Extensive use of electronics is already there!". The 39 years old car dealer added: "Modern electronics has reached outstanding levels of reliability". The real estate agent, who is EC owner, argued: "I had a problem after less than 2 years and it took 2 months before they were able to fix! Therefore, it doesn't look like they are so reliable and easy to repair!". The real estate agent reported: "I had to go twice in one year to the maintenance of my EC". The consultant agreed: "I had also problems after few months. Thanks God it had warranty!". The 42 years old car dealer noted: "With a good long or life warranty, many of these concerns could be resolved".
Theme 5: Repair costs	The female 49 years old entrepreneur told that: "Even if maintenance is less frequent, one repair could wipe out the savings"; the male 39 years old car dealer replied: "Yes—but no oil changes. Still, it is true that the risk of a big bill scares people".
Theme 6: Control and privacy concerns—traceability	The consultant told: "Our phones already track us; I'm not sure the car adds anything"; the real estate agent replied: "Yes, but is something more to worry about". The female 52 years old attorney noted: "Unauthorised tracking is illegal here; manufacturers should be clearer about what data the car collects".
Theme 7: Car resaleability	The 39 years old car dealer noted: "Right now there's no real second-hand market for full electric cars; moreover, if you can't read battery health, you can't price the car". The other car dealers nodded and told: "absolutely true!". The 61 years old car dealer added: "Customers don't believe a used electric will last like a petrol one". The employee told: "With petrol I see and hear the wear—on an electric I'm blind". The real estate agent told: "I was used to go to a mechanic to buy a used car. I bought my EC new because I cannot check well the used ones". The 39 years old car dealer told: "We've used diagnostics for years on diesels, yes—but if that's all you have on an EC, people don't trust". The 42 years old car dealer agreed: "I agree! An OBD read-out is fine, but buyers want more than a screen to judge". The male entrepreneur added: "I won't buy or price a used EC on what the dashboard says—I need a clear battery-health check". The 52 years old attorney, who is EC owner pointed out: "If I'd known how thin the used market is, I would have reconsidered the purchase"; the 49 years old attorney added: "When I asked about resale, the dealer couldn't explain how the battery was evaluated—that worried me after buying". The consultant gave a possible solution: "*Long-term lease is my workaround—it sidesteps the resale risk until the market matures*".
Theme 8: Cool factor (sound)	The employee told: "The engine sound is the car's voice; electrics are kind of mute". The 61 years old car dealer added: "Customers don't get goosebumps—no sound, no narrative to get attached to". The consultant noted: "Until there's a clear identity—beyond savings and silence—emotion stays low". The male entrepreneur told: "They're useful, but not cool, are robots without soul". The 49 years old attorney disagreed with the group saying: "The quiet is what makes it feel modern—that's part of the appeal for me".

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TABLE 5 | (Continued)

Themes	Main insights and standpoints
Theme 9: Performance	The 39 years old car dealer noted that: "People benchmark against their 2.0 diesels; if it doesn't feel the same at speed, they call it 'underpowered'". The female entrepreneur told: "Once you adapt your driving and plan stops, performance isn't the issue—it's the infrastructure". The 42 years old car dealer told: "They can be faster, but they don't look so, the perception of customers make the issue". The 52 years old attorney affirmed: "I don't need sports-car; for me it's adequate and very comfortable". The real estate agent told: "On our hills, it's fine downhill with regen, but uphill it lags compared to my old car".
Theme 10: Sustainability concerns	The consultant told: "If the supply chain runs on unregulated mining and cheap labour, I struggle to call that 'green'". The employee added: "Until there's a clear end-of-life plan for batteries here, I can't call it sustainable". The female entrepreneur told: "Production and disposal still worry me more than with a normal car". The 49 years old attorney disagreed telling: "In city traffic the air is better". The 52 years old attorney affirmed: "Lifecycle isn't perfect, but recycling and battery-passport ideas are improving it".

Note: Authors' own work.

recharging infrastructure, and trust in technology. By contrast, performance consistency and credible sustainability emerged as must-be attributes whose absence generates strong dissatisfaction, while symbolic attributes such as resale value and emotional appeal were largely indifferent.

These results suggest that resistance in late-adopting markets is shaped less by symbolic appeal than by unresolved ownership-risk concerns.

Our one-dimensional results for range autonomy and charging infrastructure are consistent with prior EC adoption research that identified range anxiety and uneven public charging as the central constraints. Italian and international studies report the same pattern for prospective buyers (e.g., Giansoldati et al. 2020; Haustein and Jensen 2018; She et al. 2017). What the Kano framing adds is structure: these factors behave as one-dimensional levers, meaning incremental improvements deliver proportional satisfaction gains rather than merely clearing a threshold. This aligns with recent market evidence that additional range and denser, reliable charging tangibly move purchase intentions (Heineke et al. 2024; GridX 2025).

Battery durability and repair-cost concerns likewise reinforce the literature's emphasis on ownership-risk perceptions, showing that even where technical progress has been made, these attributes remain potent deterrents in late-adopting contexts. Privacy and traceability concerns, although less prominent in earlier studies, also emerged here as one-dimensional attributes with high category strength, indicating growing salience.

Finally, attributes frequently mentioned anecdotally—resaleability and "cool factor"—are Indifferent in our Kano grid.

In the focus group, "cool factor/sound" generated a vivid debate which signals conversational salience. The Kano classification, however, places this attribute as indifferent, meaning that—given the current late-adopting context and prevailing functional anxieties—its presence/absence does not measurably change satisfaction or dissatisfaction relative to other features. This should be read as relative impact to other more relevant factors in our larger survey sample; it does not imply that none thinks this is somehow relevant, but that it is "less relevant" than other factors. This divergence is methodologically coherent: group discussions uncover what people talk about and how they frame value, whereas Kano captures response asymmetry in purchase-relevant evaluations. Consistent with Kano's attribute life-cycle research, attributes can migrate from Indifferent to Attractive as markets mature (Nilsson-Witell and Fundin 2005; Löfgren et al. 2011). One could therefore interpret "cool factor/sound" as a latent, watch-list attribute that may gain impact once must-be and one-dimensional risk levers (reliability, durability, charging) are addressed (Rezvani et al. 2018).

Together, these comparisons show that the Kano-based lens does not just re-state known barriers; it prioritises them by response asymmetry, guiding where marginal improvements will most effectively reduce resistance.

5.1 | Interpreting the Must-Be Requirements

The Kano analysis confirms that performance and sustainability attributes are fundamental requirements in the perception of our "reluctant" target of Southern Italian consumers. Their role in actively driving satisfaction is low, while there is a strong dissatisfaction if absent. This is in line with observations that consumers have internalised sustainability as a baseline expectation.

Performance is historically associated with torque, acceleration, and highway stability, which are critical factors in Italian consumer culture, particularly in hilly or interurban terrains. While ECs are technically capable of rapid acceleration thanks to electric torque, participants in our focus group expressed concerns over performance degradation at low battery states and the perceived unreliability of sustained power at motorway speeds. These concerns have been reaffirmed by the Kano survey results. Engineering literature has confirmed that prolonged high-discharge rates can accelerate battery capacity deterioration

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TABLE 6 | Kano frequency results and MOAI.

Features	M	O	A	I	R	Q	MOAI
Range autonomy	38 (33.33%)	38 (33.33%)	7 (6.14%)	24 (21.05%)	7 (6.14%)	0	M/O
Durability of batteries	43 (37.72%)	41 (35.96%)	2 (1.75%)	11 (9.65%)	17 (14.91%)	0	M/O
Recharging infrastructure	41 (35.96%)	46 (40.35%)	2 (1.75%)	18 (15.79%)	5 (4.39%)	2 (1.75%)	O
Trust in technology—warranty	37 (32.46%)	32 (28.07%)	12 (10.53%)	22 (19.30%)	3 (2.63%)	8 (7.02%)	M/O
Repair costs	45 (39.47%)	40 (35.09%)	1 (0.88%)	11 (9.65%)	13 (11.40%)	4 (3.51%)	M/O
Control and privacy concerns—traceability	36 (31.58%)	50 (43.86%)	3 (2.63%)	20 (17.54%)	3 (2.63%)	2 (1.75%)	O
Car resaleability	11 (9.65%)	11 (9.65%)	9 (7.89%)	54 (47.37%)	19 (16.67%)	10 (8.77%)	I
Cool factor	16 (14.04%)	21 (18.42%)	1 (0.88%)	52 (45.61%)	20 (17.54%)	4 (3.51%)	I
Performance	44 (38.60%)	28 (24.56%)	4 (3.51%)	24 (21.05%)	11 (9.65%)	3 (2.63%)	M
Sustainability concerns	48 (42.11%)	30 (26.32%)	3 (2.63%)	18 (15.79%)	14 (12.28%)	(0.88%)	M

Note: Authors' own work.

TABLE 7 | CSI, CDI, category strength and total strength.

Features	CSI	CDI	Category strength	Total strength	MOAI
Range autonomy	42.06%	71.03%	0	72.81%	O
Durability of batteries	44.33%	86.60%	1.75%	75.44%	O
Recharging infrastructure	44.86%	81.31%	4.39%	79.46%	O
Trust in technology—warranty	42.72%	66.99%	4.39%	76.42%	O
Repair costs	42.27%	87.63%	4.39%	78.18%	O
Control and privacy concerns—traceability	48.62%	78.90%	12.28%	79.46%	O
Car resaleability	23.53%	25.88%	30.70%	29.81%	I
Cool factor (sound)	24.44%	41.11%	27.19%	34.55%	I
Performance	32.00%	72.00%	14.04%	68.47%	M
Sustainability concerns	33.33%	78.79%	15.79%	71.68%	M

Note: Authors' own work.

(Zhu et al. 2022). Companies must therefore go beyond advertising peak velocities or 0–100 km/h times to demonstrate long-term performance consistency using open degradation plots and real-world performance telemetry (Heineke et al. 2024).

Sustainability, which is usually framed as a leading selling point, appears to be more of a moral minimum rather than an enhanced satisfaction attribute. Respondents assumed environmental advantage as business-as-usual; an expectation in keeping with value-belief-norm theory, under which consumers are coming to regard environmental responsibility as a civic expectation rather than an identifier (Kilbourne and Pickett 2008). However, some issues with respect to the real ecological footprint of ECs such as lithium mining, exploitation of workers, and battery disposal exist, which are old and are reported extensively and have been highlighted in recent studies (Vega-Muratalla et al. 2024). The high CDI score is a demonstration of the fact that these are actually issues that lower customer satisfaction. Conquering these perceptions is far beyond green labelling; manufacturers need to spend money on ethical supply chain certification, battery passport programs, and lifecycle disclosure in order to enable evading reputational risk. Both of these must-be traits are threshold points for consumers to think about, as threshold conditions.

The Kano model's asymmetric satisfaction logic, in which some features only cause dissatisfaction when absent, can be reinterpreted to model the evolution of deterrents. For example, sustainability becomes a must-be feature once consumers expect regulation-compliant products and not a source of added satisfaction. This suggests that as markets mature, features migrate across Kano categories, reinforcing the idea that consumer resistance is not fixed but evolves with regulatory norms and market learning.

5.2 | Interpreting the One-Dimensional Requirements

Six features emerged as *one-dimensional* (O) requirements—attributes whose performance has a linear and proportional

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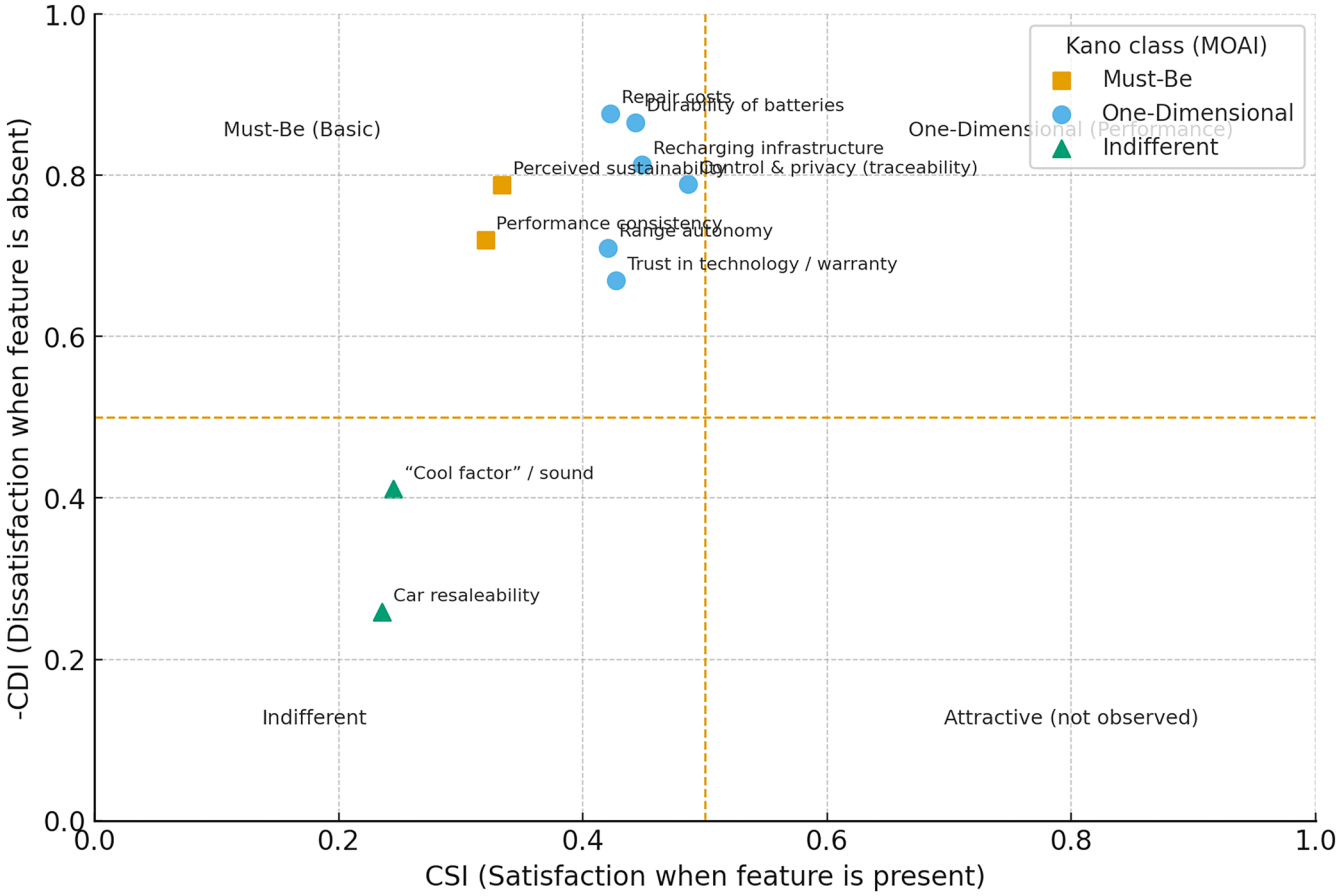

FIGURE 2 | Kano satisfaction–dissatisfaction matrix for EC categories (Authors' elaboration).

TABLE 8 | Conceptual synthesis.

Kano class	Underlying resistance mechanism	Generalisable insight
Must-Be (Performance, Sustainability)	Functional hygiene	"Green" attributes become hygiene once mandated by regulation.
One-Dimensional (Range, Battery, Repair, Warranty, Charging, Privacy)	Perceived ownership risk	Reductions in perceived ownership risk generate proportional satisfaction gains.
Indifferent (Resale, Cool-factor)	Symbolic/ emotional gap	Remain latent until functional risks are solved.

Note: Authors' own work.

impact on consumer satisfaction and dissatisfaction: *range autonomy, battery durability, repair costs, trust in technology/ warranty, recharging infrastructure*, and *control and privacy* (traceability).

Range autonomy, with the CSI of 0.42 and the CDI of −0.71, shows that while this is an issue that can generate strong dissatisfaction, each incremental gain in driving range results in improvements in satisfaction, suggesting that improvements beyond the minimum threshold continue to add value. This supports McKinsey's findings that each additional 100 km of driving range significantly increases the likelihood of purchase in Europe (Heineke et al. 2024). The "range anxiety" is therefore a strong factor, particularly in Italy, where the charging infrastructure remains underdeveloped compared to Northern European nations (Euronews Next 2024).

Battery durability is cognitively associated with range autonomy concerns: even as technical advances have narrowed the longevity gap between full ECs and combustion vehicles (Nguyen-Tien et al. 2025), our respondents still perceive battery degradation as a potential future liability. This aligns with NIST research showing that consumers still express concern over battery longevity, replacement hazards, and overall lifecycle uncertainty that create perceived ownership risk (Gore et al. 2024). Because of the high cost of replacement and uncertainty in general regarding second-life performance, consumers tend to equate battery life with the overall vehicle lifetime. Indeed, this attribute had the strongest CDI (−0.87) of any attribute in this research, highlighting concern over long-term battery deterioration. Trade publications highlight that enhancing battery warranty clarity and delivering simple information on battery performance will make consumer trust and perceived value to be maximised (Gore et al. 2024).

Recharging infrastructure received 0.45 CSI and −0.81 CDI ratings, which portray the importance of available charging for

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determining consumer trust. This supports GridX's (2025) figures that Italy lags behind charger-to-vehicle ratios and must accelerate the rollout of infrastructure to meet the 2030 climate targets. Growing the rapid-charging point density and visibility remains one of the simplest ways of enhancing EC uptake.

Repair costs represent another significant source of concern, especially in a market where the total cost of ownership heavily influences consumer decisions. Although ECs tend to require less frequent routine maintenance, the limited availability of trained service personnel and specialised repair infrastructure has been identified as a barrier to adoption in several markets (Pamidimukkala et al. 2024). Prepaid maintenance packages and modular component designs could be effective in addressing this concern.

Trust in technology/warranty is conceptually linked with the fear of expensive repair costs. It remains a key one-dimensional attribute, closely linked to consumers' general acceptance of new and complex technologies. Research on consumer behaviour suggests that epistemic trust—built through understanding and confidence in a product's reliability—is key to the adoption of unfamiliar technologies. Offering transparent battery performance guarantees and field failure data can improve trust.

Control and privacy concerns represent a somewhat newer addition to the one-dimensional category. The category strength of 12.28% (the highest in the one-dimensional group) suggests increasing salience in consumer consciousness. While not universal, these concerns are significant for consumers who worry about constant traceability, vehicle surveillance, and data monetisation. Implementing privacy-by-design features and user-controlled data-sharing options could enhance brand perception and consumer satisfaction.

In summary, one-dimensional features offer strategic levers for market differentiation. Improving these attributes does not merely meet minimum standards; it generates competitive advantage by driving satisfaction linearly with each gain in feature quality or reliability.

These one-dimensional attributes constitute the core of perceived ownership risk—linear deterrents that dominate consumer evaluation in late-adopting markets such as Southern Italy. Their consistent appearance suggests a broader pattern: in infrastructurally weak contexts, functional anxieties crowd out symbolic concerns, consistent with Ram and Sheth's (1989) framework, in which functional barriers dominate in early resistance stages.

5.3 | Interpreting the Indifferent Requirements

Surprisingly, *car resaleability* and the "cool factor" (sound) emerged as indifferent attributes in the Kano survey: both posted low satisfaction and dissatisfaction scores, and each exhibited high category-strength values (> 27%), signalling that respondents consistently viewed them as immaterial to their purchase decision. This outcome is at variance with richer accounts voiced at the focus-group phase, when interviewees grumbled about ECs' failure to have an emotional "soul" and worried about substandard second-hand markets. The contradiction suggests that the moment respondents transitioned from open discussion to the Kano questionnaire, they implicitly prized functional assurances (range, battery life, price) above symbolic or residual-value considerations. In practical terms, the result cautions manufacturers and policymakers against channelling scarce resources into artificial engine sounds or guaranteed buy-back schemes before the one-dimensional pain points are solved; doing so would add cost without measurable gains in satisfaction. At the same time, the Kano literature warns that indifferent attributes can migrate to higher-impact categories as markets mature. Thus, while resale incentives and experiential branding may be safely deprioritised in the short run, firms should continue nascent experiments and monitor sentiment, ready to scale them quickly once core reliability hurdles have been cleared and consumers begin to seek emotional differentiation.

However, indifferent attributes should not be dismissed. As basic ownership risks are resolved—through public infrastructure investment and improved product reliability—symbolic and experiential factors may "migrate" into one-dimensional or even attractive categories. This echoes Ram and Sheth's (1989) claim that resistance evolves in tandem with familiarity.

Taken together, the study extends prior research showing that the Kano model can do more than classify sources of satisfaction: it can also identify, prioritise, and theoretically interpret the product attributes that sustain innovation resistance in late-adopting markets.

6 | Conclusions

6.1 | Summary of the Study

This study examined which features of fully electric cars discourage purchase among Southern Italian consumers aged 30 and over. Using a three-phase design, it identified 10 relevant attributes and classified them into must-be, one-dimensional, and indifferent categories. Performance consistency and perceived sustainability emerged as must-be attributes; range autonomy, battery durability, repair costs, trust in technology and warranty, recharging infrastructure, and privacy/traceability emerged as one-dimensional barriers; resaleability and "cool factor" were classified as indifferent. Overall, the findings indicate that practical reliability and ownership-risk concerns are more influential than symbolic or stylistic features in late-adopting contexts.

6.2 | Practical Implications

Southern Italy provides a useful diagnostic setting for understanding resistance in late-adopting markets. The findings show that consumers prioritise practical ownership-risk concerns—especially battery durability, range, recharging infrastructure, repair costs, and warranty clarity—over symbolic features such as resale value or emotional appeal.

For manufacturers, the main implication is that broader EC acceptance depends on reducing perceived ownership risk before attempting symbolic or stylistic differentiation. Greater battery-durability transparency, clearer warranties, more predictable

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repair costs, and stronger charging support are more likely to improve acceptance than aesthetic enhancements or experiential features.

For policymakers, the results point to the importance of visible and reliable charging infrastructure, transparent battery and lifecycle information, and incentive schemes that go beyond purchase subsidies to address risk-sharing, warranty confidence, and long-term cost visibility. In late-adopting contexts, such measures are likely to be more effective than symbolic environmental messaging alone.

6.3 | Theoretical Implications

The study extends the Kano model by showing its usefulness not only for identifying delight-generating attributes, but also for diagnosing resistance-inducing features in emerging technologies. In doing so, it links attribute-asymmetry logic to innovation-resistance theory and offers a structured way to interpret how specific EC attributes operate as functional, risk-related, or symbolic barriers.

6.4 | Limitations and Directions for Future Research

This study is qualitative and place-bound, focusing on Southern Italy and on adults aged 30 and over. The findings should therefore be interpreted as context-specific and are not automatically generalisable to younger consumers or to other geographic settings.

In addition, the exploratory design and the use of convenience sampling limit statistical representativeness. Although these choices were appropriate for identifying deterrent attributes in a late-adopting market, larger-sample studies are needed to test the robustness of the observed patterns.

Future research could extend this framework in three directions. First, cross-national comparisons across markets at different stages of EC adoption would help clarify whether functional barriers dominate earlier and symbolic barriers become more salient later. Second, larger-sample quantitative studies could test the stability of the Kano-resistance classifications. Third, the framework could be applied to other green technologies, such as heat pumps, e-bikes, or domestic solar panels, to assess its broader transferability.

Author Contributions

Gandolfo Dominici: conceptualisation, methodology, data curation, investigation, writing – original draft, writing – review and editing, supervision, validation. **Mario Tani:** data curation, investigation, methodology, writing – original draft. **Elena-Mădălina Vătămănescu:** writing – review and editing, visualisation, supervision. **Dan-Cristian Dabija:** validation, supervision.

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Ethics Statement

All procedures performed in this research were in accordance with the ethical standards of the universities of the authors and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent

Informed consent was obtained from all individual participants included in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix 1:** Questionnaire translated in English for peer review.

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