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Vibhor Sharma
Senior Lecturer, Department of Automotive and Transport Design, University of Wales Trinity Saint David, IQ Campus, Swansea – SA1 8EW, United Kingdom

Dr. Nachiket Thakur
Dean, Department of Institute of Design, MIT Art, Design and Technology University, Rajbaug, Loni-Kalbhor, Pune, Maharashtra, India

Dr. Anant Chakradeo
Provost, MIT Group of Institutes, Rajbaug, Loni-Kalbhor, Pune, Maharashtra, India

Corresponding Author:
Vibhor Sharma
Senior Lecturer, Department of Automotive and Transport Design, University of Wales Trinity Saint David, IQ Campus, Swansea – SA1 8EW, United Kingdom

Aftermarket trends in car customization: A review of market dynamics and industry innovations

Vibhor Sharma, Nachiket Thakur and Anant Chakradeo

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Abstract
This study investigates the evolving trends in aftermarket car customization, analyzing market dynamics and industry innovations from global and Indian perspectives. The study identifies a consumer shift towards visual and comfort-oriented modifications over performance enhancements, driven by personal expression and technological accessibility. A comparative analysis reveals that while global markets embrace both aesthetic and performance upgrades, Indian practices are predominantly aesthetic due to regulatory constraints. Major findings highlight the growing influence of electric vehicles, digital personalization, and sustainability in shaping customization preferences. The study concludes that the aftermarket sector is a significant arena for cultural, technological, and economic engagement, with future growth potential in AI-driven and eco-friendly customization solutions.

Keywords: Aftermarket customization, automotive personalization, vehicle modification trends, automotive innovation, consumer behaviour in auto industry

1. Introduction
Car customization has transitioned from a niche enthusiast pastime in recent years to a ubiquitous phenomenon that mirrors identity expression, changing lifestyles, and general design directions. Auto owners these days no longer accept factory-standard specifications; rather, they aim to turn their cars into individual expressions [1]. This metamorphosis occurs within the aftermarket, an evolving environment where automobile owners customize, upgrade, and modify their cars post-purchase [2].

Aftermarket customization can take a very wide range of forms, including upgrades to a vehicle's look, performance, comfort, and tech features [3]. It can run the gamut from adding body kits and light upgrades to more substantive features like digital infotainment systems, bespoke interiors, and sustainable materials [4]. People these days prefer upgrades that serve not only aesthetically but also have a deeper resonance in terms of sustainable value, connectivity, and integrating smart tech [5].

Several studies have underscored the increasing need for vehicle alterations that blend aesthetics, performance, and functionality. For example, a study determined that alterations concerning wheels, tires, and car body appearances were the most favoured, followed by enhancements in audio systems and interiors [6]. Unsurprisingly, more profound mechanical alterations like engine tuning were the lowest favoured, reflecting a pattern towards more experiential and visual changes rather than technological performance changes, as depicted in Figure 1. Such a behaviour arises from an interaction circle of user-product contact where emotional delight and visual satisfaction stimulate more customization decisions [7].

The growth of Electric Vehicles (EVs) has also generated new sources of innovation for the aftermarket segment. Now, with less applicability for traditional engine modifications, EV owners are adopting software upgrades, digital customization, and environmentally friendly design upgrades [8]. Custom wraps, enhanced lighting solutions, and bespoke digital dashboards are a few illustrations of EV users dealing with the aftermarket differently compared with traditional automotive owners.

Another key factor driving aftermarket growth is accessibility. With platforms, tools, and modular kits available, customization is no longer limited to specialists [9]. Consumers can now explore, design, and install modifications with guidance from online configurators or third-party support services. This democratization of car personalization has helped reshape the automotive industry's relationship with its users, encouraging more collaboration between manufacturers, designers, and end-users [10].

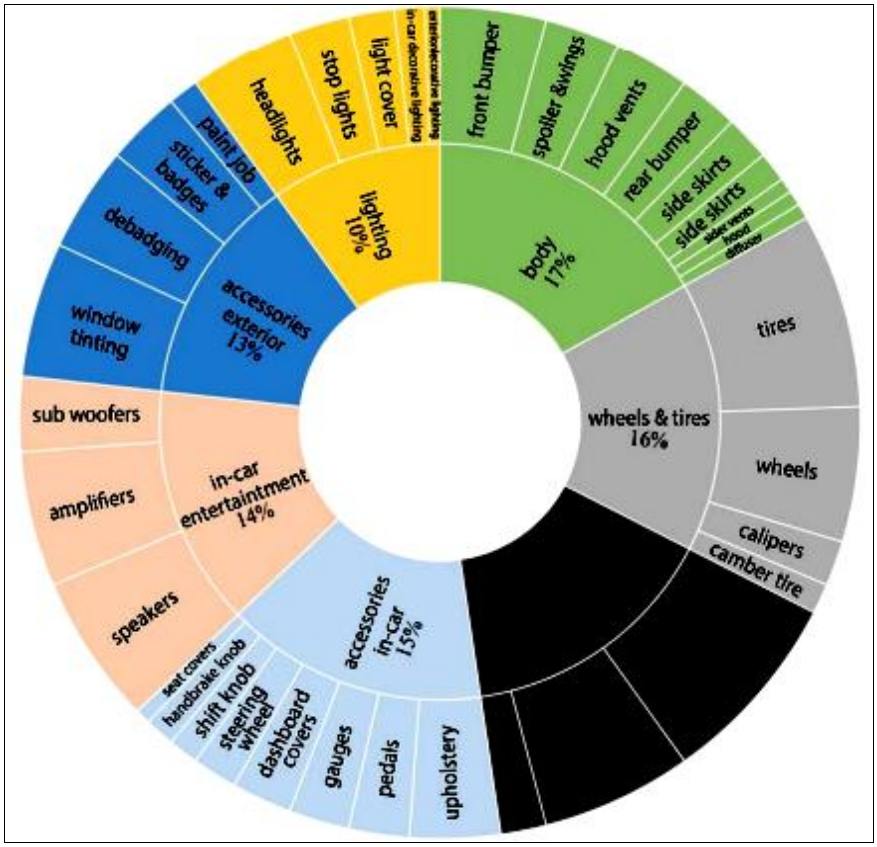

Fig 1: A framework for user-product interaction in car modification practices [7]

In addition, sustainability grows more important. Studies find a movement towards green materials, recycled parts, and energy-saving changes, particularly in urban markets where green consciousness shapes buying behaviour [11]. These indicate a redefinition of what customization can be for a car, less about speed or luxury and more about identity, ecology, and innovation.

Essentially, customization of cars via the aftermarket is more than a fad; it's a result of deeper cultural, technological, and environmental changes. As cars keep changing, so will the ways humans interact with them, rendering the aftermarket a significant platform for innovation and industry revolution.

1.1 Relevance of the Aftermarket Sector: Economic, Technological, and Cultural Perspectives

Aftermarket sector remains relevant over several lenses, economic, technological, and cultural, presenting itself as an integral part of the overall automotive value system [12]. From a financial standpoint, the aftermarket sector constitutes a major revenue, jobs, and value creation generator in the automotive value proposition. Empirical studies show that with time, when products become older and the term of ownership longer, replacement, accessories, as well as customization services, are demanded, hence sustaining local economies as well as small businesses. Studies present stakeholder sentiments about the evolving circumstances in aftermarket services, including that aftermarket revenues matter even when disruptive industry business models exist [13].

Technological innovation also underpins the strategic relevance of the aftermarket. The sector continues to grow beyond the limits of conventional mechanical repair and part replacement into custom digital upgrades, smart accessories, and software-centred tuning [14]. Automotive customisation research identifies how IoT-enabled products, AR configurators, and 3D printing procedures are reshaping sophistication in aftermarket products, enabling increased precision, as well as accessibility [15]. As automotive technology converges with that of home electronics, aftermarket businesses are better responding to digital innovations, filling gaps between OEM proficiency, as well as evolving expectations among users [16].

From a cultural perspective, the aftermarket embodies changing societal values and individual expression of identity. Vehicle customization is an expression of self, affiliation with a community, or expression of culture for consumers worldwide [17]. Local manifestations like the Japanese "Kawaii" customization, American low-rider phenomenon, and European focus on beauty refinement provide unambiguous examples of customization's cultural placement and significance [18]. Additionally, virtual communities and social media extend these cultural trends, developing shared histories and motivating new alterations that cross geographic borders.

As Figure 2 illustrates, the framework is grounded in perceptions of stakeholders, represents how macroeconomic conditions impact demand along with service dynamics in the aftermarket, driving technological adaptation as well as cultural adoption trends among consumers. Stakeholders view that economic changes, like car age along with car owning trends, inform service demand, driving firm innovation strategy, along with consumer behaviour [19].

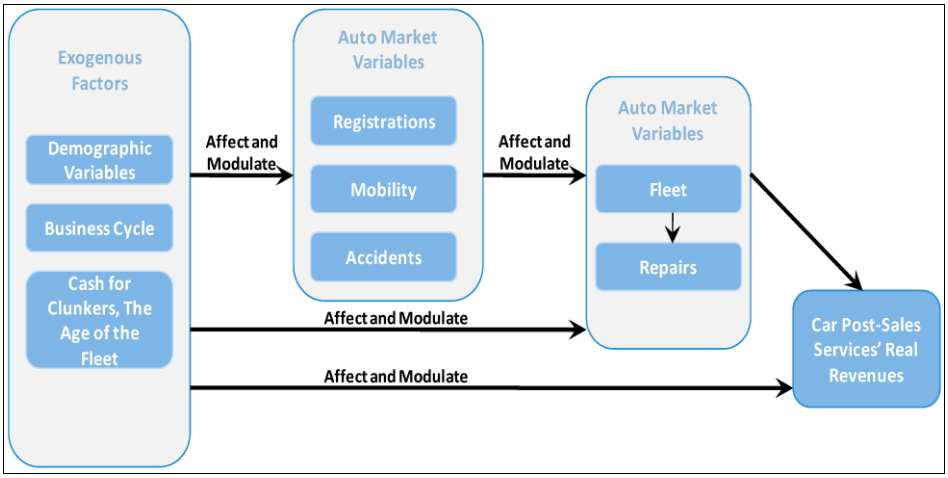

Fig 2: Overall approach and framework from Stakeholder perception [19]

In sum, the aftermarket sector serves as a nexus where economic opportunity, technological innovation, and cultural expression converge. Vehicle owners engage with the aftermarket not only to maintain functionality but also to personalize, to connect with values and communities, and to access emerging technologies [20]. As such, the sector continues to be highly relevant, not only to businesses and policymakers but also to designers, social scientists, and technology developers studying the evolving automotive landscape.

1.2 Aims and Objectives of the Review

The aim is to investigate emerging trends in the aftermarket car customization industry by analyzing key market dynamics, consumer behavior, and technological innovations. The study would evaluate how these factors influence industry growth, competitive strategy, and future market opportunities. The study has the following objectives:

- To examine the current trends in car customization, including aesthetic, performance, and tech-based modifications.
- To analyze consumer preferences and factors influencing the growth of the aftermarket customization market.
- To review innovative technologies and materials being introduced in the customization industry.
- To evaluate the role of e-commerce, social media, and influencer culture in driving customization demand.
- To identify challenges and opportunities for manufacturers, retailers, and service providers in the aftermarket ecosystem.
- To provide a comprehensive overview of the market's future outlook and potential growth areas.

2. Review of Past Studies

In this section, various studies are reviewed and analysed that have been investigated and implemented by several authors previously.

Braidy *et al*. (2025) [21] addressed the growing need to understand innovation parameters within the automotive industry. The study emphasized that past research often examined these parameters in isolation, lacking a comprehensive perspective. It revealed that innovation levels among automotive companies varied depending on core business focus and available resources. The paper analysed how innovation inputs, outputs, metrics, and policies differed across firms, influenced by organizational culture and business environments.

Furuhashi and Yang (2024) [22] investigated the impact of information presentation on decision-making and Purchase Intention in product Customization Services. Using interviews, the researchers examined the aspects causing user indecision and found that the existing User Interface (UI) had no comparison capabilities. Afterwards, Decision Fatigue and Purchase Intention were assessed in conjunction with the provided findings, which guided the creation of sample UIs. Aided comparison information was shown to alleviate the decision-making process, and Individual Differences were found to impact the information presentation's effectiveness.

Ma *et al*. (2024) [23] studied how cultural background influenced user preferences for features in Human Machine Interaction systems within smart vehicle cabins. They used Hofstede's five cultural dimensions as moderating variables and applied a random forest model along with K-means clustering to identify three user preference groups. Findings showed that users with high power distance valued ceremonial features, while those high in individualism preferred open and personalized systems.

Sumner *et al*. (2024) [24] developed a method to personalize driver safety interfaces by interpreting driving patterns as indicators of cognitive states like impulsiveness and inhibitory control. They trained a recurrent neural network using behavioral sequences from human drivers to infer these mental constructs. Using high-fidelity driving simulations, the study demonstrated that cognitive state-based interfaces could influence driver behavior, particularly by reducing risky decisions during yellow lights. This approach improved the effectiveness of Advanced Driver Assistance Systems in promoting safer driving.

Lee *et al*. (2021) [25] investigated whether customization at the boarding stage of self-driving shared vehicles could improve ownership satisfaction by carrying out a pre-experiment survey on factors of user satisfaction and discomfort and a review of previous research. The investigation confirmed preferred customization factors and their effects on ownership satisfaction using the Coefficient of Variation Technique (CVT). Results revealed that olfactory and interaction factors played a significant role in ownership satisfaction, and CVT results supported that

customizing boarding elements effectively improved ownership satisfaction.

Kim and Haksu (2021) [26] examined individual driving styles through quantitative analysis and proposed a personalization algorithm to adjust electric vehicle acceleration. They found that acceleration behaviours varied by driver and could be predicted using statistical features. The motor controller employed these characteristics to alter torque according to each driver's style. The outcome indicated that the identical accelerator input could result in diverse acceleration patterns, enabling bespoke propulsion performance.

Colley *et al*., (2021) [27] explore effects upon driver perception of car decals, with thematic data analysis of 29 city centres, in eight countries, an online experiment (N=64) exploring association with stereotypes, and an examination of attitude towards future external displays upon autonomous vehicles, with VR (N=16); result showed perceptions of decals varied with type and national nationality of participants, and while attitudes towards future personalization were mixed, nearly half the participants in the VR study expressed an interest in making use of such displays.

Szalai *et al*. (2020) [28] constructed a mixed reality simulation platform where an autonomous vehicle could be tested by incorporating a real test vehicle into a virtual scenario to investigate decision-making, motion planning, and perception. The mixed perception method was utilized, where the actual vehicle's movement was coupled with a virtual traffic scenario with obstacles and surprises, all orchestrated over a Controller Area Network with the vehicle under test. The results confirmed the development of a flexible testing setup capable of replicating various driving scenarios and extending traffic problem simulations beyond real-world limitations. However, refinements remained necessary in communication protocols for standard interoperability, virtual environment perception, and system geometry definition.

Keskar Ankush (2019) [29] conducted a survey-based study to assess how subscription business models influenced automotive companies and customer behaviour. The research explored how automakers used these models to introduce rapid innovations through software and feature updates. It also examined user perceptions, highlighting both motivations and barriers to adoption. Despite the flexibility offered by subscriptions, concerns about fees and resistance to abandoning traditional ownership remained. The study concluded with suggestions for future research and strategies to help manufacturers improve user acceptance and better implement subscription models.

Sathi and Amann (2019) [30] focused on the Indian citizen and their adaptation to online platforms. The information was gathered through in-depth interviews with current and future Hyundai Motors customers. Most Indian buyers view vehicle personalization as a significant decision, according to the statistics. Consumers were actively moving to different online platforms for information collecting, which was influenced by the information acquired from various sources. This was due to the rapid increase in internet connectivity. According to the findings, "value for money" was the most crucial criterion, followed by "internet security".

Table 1: Comparison of the Reviewed Literature

Author & Year	Country	Techniques	Outcomes
Braidy *et al*. (2025) [21]	Qatar	Comparative analysis, Innovation metric framework	Innovation in automotive firms varies by business focus, resources, culture, and policy orientation
Furuhashi & Yang (2024) [22]	Japan	Interviews, UI prototyping	Improved UI enhances purchase intention
Ma *et al*. (2024) [23]	China	Random Forest, K-means, Hofstede model	Guides UX design and segmentation
Sumner *et al*. (2024) [24]	USA	RNN, Behavioral simulations	Boosts driving safety via customization
Lee *et al*. (2021) [25]	South Korea	CVT, Pre-surveys	Personalization increases vehicle ownership satisfaction
Kim & Haksu (2021) [26]	South Korea	Driving style quantification, EV torque control	Enhances EV performance by personal torque tuning
Colley *et al*. (2021) [27]	Germany	Thematic analysis, VR & online studies	AV personalization is seen as appealing by many users
Szalai *et al*. (2020) [28]	Hungary	Mixed reality with a real car, CAN bus	Enables flexible autonomous vehicle testing
Keskar Ankush (2019) [29]	India	Survey, Empirical research	Highlights the need for user-centric model adoption strategies
Sathi & Amann (2019) [30]	India	Interviews (Hyundai customers)	Value-for-money and internet trust matter most

3. Research Gap

This section focuses on the identification and analysis of areas where research is lacking or incomplete. The research gaps are as follows:

- Limited research on economic and psychological motivations behind customization choices (Furuhashi and Yang 2024) [22].
- Lack of studies on customization's impact on vehicle longevity and resale value (Lee *et al*., 2021) [25].
- Challenges in balancing extensive customization with safety considerations (Sumner *et al*. 2024) [24].
- Insufficient exploration of sustainability and cost efficiency in customization (Kim and Haksu 2021) [26].
- Limited analysis of the trade-off between aesthetic and performance-based customization (Ma *et al*. 2024) [23].

4. Brief Comparison of Global vs Indian Customization Practices in Personal Cars

Globally, vehicle customization is deeply driven by individual identity expression and advanced aftermarket industries [31]. In Western countries such as the USA, Germany, and Japan, customization culture is more mature and diversified, ranging from performance tuning (e.g., ECU remaps, turbo upgrades) to aesthetic overhauls (body kits, wraps, interior LED systems). This is supported by a strong aftermarket ecosystem and minimal legal restrictions [32].

In contrast, Indian customization practices are still evolving. While aesthetic customizations like seat covers, alloy

wheels, body wraps, and infotainment upgrades are common, performance-related modifications are less popular due to stricter regulatory norms, warranty void issues, and lack of awareness [33]. However, India shows a growing appetite for personalization, especially among youth and SUV buyers, thanks to rising disposable income, urban lifestyle, and digital inspiration (e.g., YouTube vlogs, Instagram reels showcasing modified cars).

Table 2: Key Differences between Global and Indian Car Customization Practices

Feature	Global Market	Indian Market
Legal Flexibility	More tolerant (e.g., USA, Japan)	Restrictive (RTO approval needed)
Popular Mods	Performance + Aesthetic	Mostly Aesthetic
Customization Ecosystem	Advanced aftermarket & skilled garages	Emerging tier-wise garage ecosystem
Customer Drivers	Identity, luxury, and racing	Style, uniqueness, peer influence

5. Regional Customization Practices in India

India's car customization trends vary significantly by region due to cultural preferences, climate, vehicle ownership density, and urban-rural divide [34].

- **Delhi NCR:** Highest demand for full-body customization, including luxury car mods, alloys, sunroofs, LED DRLs, and tech-enhanced interiors. Due to a large population of car enthusiasts and a thriving aftermarket sector in Karol Bagh and Noida, Delhi has become a hotspot. Pollution regulations also push eco-mods like CNG conversions.
- **Mumbai:** Preferences lean towards elegant interiors, audio upgrades, and utility additions due to congested roads and weather challenges. Coastal humidity influences rust-proofing customizations.
- **Chennai:** Due to the tropical climate and industrial working-class population, car owners focus on heat-resistant films, upgraded AC vents, and functional mods over luxury aesthetics. There's also a rising trend of customizing hatchbacks for family comfort.
- **Bangalore:** Tech-savvy population drives digital upgrades wireless chargers, AI-enabled infotainment, and reverse cameras. Due to hilly terrain, all-terrain tires and suspension mods are gaining attention.
- **Punjab (e.g., Ludhiana, Jalandhar**): Shows high demand for flamboyant customizations, loud paint jobs, exhaust mods, tinted glasses, and premium sound systems. Punjabi youth lead in performance modifications.

6. Comparison of Exterior vs Interior Customization

Exterior and interior modifications serve different purposes and appeal to various customer personas [35].

Table 3: Comparison of Exterior vs Interior Customization

Aspect	Exterior Customization	Interior Customization
Key Mods	Wraps, spoilers, alloys, bumpers, lighting	Seat covers, infotainment, and ambient lights
Purpose	Aesthetic appeal, brand identity, street cred	Comfort, convenience, driver/passenger utility
Popularity	Higher among youth and off-road lovers	Preferred by family car owners, urban drivers
Legal Concerns	May attract RTO scrutiny	Generally permissible
Resale Impact	Might reduce value due to deviation	It can increase appeal if tastefully done
Cost Range	₹10,000 - ₹3 lakh	₹5,000 - ₹1.5 lakh

7. Future Directions and Emerging Trends

The following emerging trends highlight the potential directions for future research and industry development:

7.1 AI and Data-Driven Customization

Artificial Intelligence (AI) is set to revolutionize vehicle customization by enabling hyper-personalization through predictive analytics, user behavior modeling, and real-time diagnostics. Machine learning algorithms can recommend modifications based on driving patterns, environmental conditions, and individual preferences, enhancing both performance and user satisfaction.

7.2 Blockchain for Part Authentication

With the rise of counterfeit automotive parts in the aftermarket, blockchain technology offers a decentralized and tamper-proof solution for verifying the authenticity and origin of customization components. By integrating blockchain into supply chains, stakeholders can improve transparency, traceability, and trust in aftermarket transactions.

7.3 Sustainable Customization Practices

Environmental awareness creates market pressure for green products, minimal-impact fabrication, and modular constructions in car customization. Sustainable customization involves recycled components, biodegradable overwraps, and energy-saving technology, conforming with international aspirations for environmentally friendly manufacture and consumption.

7.4 Integration with Autonomous Vehicles

Increasing popularity in AVs (autonomous vehicles), customization will shift from conventional hardware appearance to interior experience design. Customization in AVs will involve setting up cabin environments, infotainment, and HMI (Human-Machine Interface) preferences individualized per user or per ride-share profile.

7.5 Customization-as-a-Service (CaaS) Business Models

New business ideas redefine customization as a flexible, on-demand service. Platforms within CaaS allow consumers to subscribe to or rent desired upgrades, such as digital dashboards, performance modes, and interior themes, providing modular, reversible, and inexpensive personalization throughout the lifetime of the vehicle.

8. Conclusion

Changing dynamics in the car customization aftermarket sector are the result of an interplay between consumer trends, technological innovation, regulation, and cultural expression. The review places attention upon how the car customization aftermarket sector has emerged, over time, from a niche interest area into a mainstream, technology-, culture-, and lifestyle-shaping consumer-oriented sector. Mature markets across the world accommodate varied

customization, whereas in India, aesthetic upgrade remains the area of concentration despite regulatory and infrastructural challenges. Growing digital interaction and geographical differentiation, however, are causing a spurt in personalization.

The movement toward technology-oriented, comfort-focused, and environmentally minded alterations, particularly among EV users, represents an important shift in consumer values. Advances such as IoT upgrades and virtual configurators are reshaping human interaction with cars. Ultimately, the aftermarket market represents an important intersection point where identity, innovation, and functionality take center stage. Future studies should investigate its psychological, environmentally friendly, and long-range effects to facilitate further innovation in car personalization.

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