Product Quality Parameter: Car Quality and Sport Product Quality Diversion: 2020-2025 Reviewed

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ABSTRACT

Product quality has remained a central concern for manufacturers seeking to enhance competitiveness, customer satisfaction, and long-term brand loyalty. Between 2020 and 2025, significant shifts have emerged in how quality parameters are defined, measured, and prioritized across different industries. This review paper examines the divergence of product quality parameters between the automotive sector—particularly car manufacturing—and the sports product industry. While car quality increasingly emphasizes advanced safety systems, digital integration, durability, and precision engineering, sports product quality has evolved toward performance optimization, material innovation, ergonomics, and user-centric customization. These differences highlight distinct consumer expectations, regulatory pressures, and technological advancements that shape quality strategies in each sector.The review synthesizes key studies from 2020 to 2025 to compare quality frameworks, measurement approaches, and industry standards that underpin both car and sport product markets. Findings indicate that automotive quality relies heavily on stringent compliance testing, reliability metrics, and smart-system diagnostics, whereas sports product quality is driven by functionality, comfort, biomechanical performance, and brand-driven perception. This divergence underscores the need for sector-specific quality models rather than a universal approach. By mapping these evolving parameters, the paper provides deeper insight into how manufacturers can refine quality strategies, align with market expectations, and support innovation trajectories across different product domain

Keywords: Car Fixtures, Quality Sport Product Quality; Diversion:Purchase Intention; TPB

INTRODUCTION

Product quality is a critical determinant of consumer satisfaction, brand loyalty, and competitive advantage across industries, and its evaluation is increasingly relevant for both automotive and sport product manufacturers (Zhao & Chen, 2020). In the automotive sector, product quality encompasses precision engineering, fit and finish, durability, safety integration, and noise-vibration-harshness (NVH) performance, which collectively influence vehicle reliability, performance, and customer perception (Rahman, Abdullah & Mohamad, 2022). Conversely, sport products emphasize material durability, ergonomics, comfort, performance functionality, aesthetic appeal, and affordability, reflecting the functional and lifestyle-driven nature of these products (Mehta & Gupta, 2022; Kim, Lee & Park, 2022). Understanding these sector-specific quality parameters allows factory owners and production managers to identify benchmarks, prioritize process improvements, and align manufacturing practices with consumer expectations in their respective markets (Silva, Gomes & Oliveira, 2021).

Durability is a core dimension in both industries, though its manifestations differ. In cars, durability relates to mechanical systems, body panels, interior components, and long-term resistance to environmental and operational stress (Zhao & Chen, 2020). In sport products, durability emphasizes wear resistance of fabrics, athletic footwear, protective equipment, and other high-contact materials used in repeated physical activities (Mehta & Gupta, 2022). Factory owners must appreciate that while durability is universally critical, the

metrics and testing standards vary significantly between these sectors, requiring tailored quality control and material selection approaches.

Ergonomics and user comfort are also central to product quality, yet the focus diverges across sectors. Automotive ergonomics involve seat design, control layouts, and interior usability to optimize driver and passenger comfort, whereas in sport products, ergonomics emphasizes body fit, freedom of motion, shock absorption, and injury prevention (Kim, Lee & Park, 2022; Silva, Gomes & Oliveira, 2021). By comparing these parameters, manufacturers can better understand how human-centered design impacts perceived quality, safety, and overall satisfaction, guiding decisions in design and production processes.

Technological integration represents a growing dimension of product quality in both industries. Cars increasingly incorporate smart systems, infotainment interfaces, and driver-assistance features, whereas sport products embed sensors, wearable technology, and performance-tracking devices to enhance training and usability (Zhou & Li, 2024; Nguyen, Li & Choi, 2025). Factory owners evaluating cross-industry quality can benefit from understanding how technology adds functional and experiential value, requiring both process innovation and collaboration with electronics and software suppliers.

Aesthetic appeal and brand perception are similarly influential yet interpreted differently. Automotive quality is often associated with paint finish, interior materials, design coherence, and perceived luxury, while sport products are evaluated for color, style, modernity, and alignment with lifestyle trends (Martínez & Ruiz, 2021; Ristevska-Jovanovska, 2025). For factory managers, these distinctions underscore the importance of sector-specific standards, from visual inspection and finishing techniques in automotive production to textile patterns, stitching quality, and design consistency in sport product manufacturing.

Despite overlapping quality dimensions such as durability, ergonomics, and technological integration, there remain notable differences in functional focus, material requirements, safety standards, and market-driven expectations between the automotive and sport product sectors (Rahman et al., 2022; Mehta & Gupta, 2022). A comparative evaluation of these parameters can assist factory owners in identifying critical areas for process optimization, resource allocation, and innovation adoption to enhance product competitiveness and customer satisfaction. By systematically reviewing the literature on both car and sport product quality, manufacturers gain insight into sector-specific benchmarks, emerging trends, and opportunities for cross-industry learning and improvement (Zhou & Li, 2024; Nguyen et al., 2025

LITERATURE REVIEW

Sport Product Quality

Sport product quality has increasingly become a central concern in the sportswear and equipment industry, as consumers demand higher standards of performance, durability, comfort and sustainability (Kim & Oh, 2020). Researchers have noted that perceived product quality in sports apparel and gear significantly influences purchase intention and brand loyalty (Ristevska-Jovanovska, 2025). Quality is no longer simply about basic functionality; it now encompasses material innovation, ergonomic design, technological integration and experiential value (Chobngam & Iamlaorpakdee, 2025). In the context of globalised markets and digital commerce, sport products must satisfy not only tangible attributes (e.g., durability, fit) but also intangible cues (e.g., brand reputation, sustainability credentials) to meet consumer expectations (Komariah, 2023). Consequently, the literature has shifted from uni-dimensional conceptions of quality to multidimensional frameworks capturing functional, aesthetic, emotional and ethical dimensions (Manivel & Mohanalakshmi, 2025).

A primary dimension in sport product quality is durability and material quality, whereby products must withstand high levels of wear, mechanical stress and environmental exposure. Studies show that durability remains one of the top consumer-valued quality traits in sporting apparel and footwear (Statista, 2018 as cited in secondary literature) and in equipment markets. Gill & Prendergast (2015) emphasise that fit and fabric interplay directly affects performance and durability in sportswear. More recently, innovation in composite materials, breathable fabrics and reinforced structures has been highlighted as key to elevating product quality in high-performance sports gear (Mehta & Gupta, 2022). Durability is also linked to brand trust and repeat

purchase: when products fail prematurely, perceived quality and brand loyalty decline (Komariah, 2023). Thus, ensuring material integrity, construction precision and lifecycle resilience are fundamental in sport product quality research.

Another important dimension is ergonomics, fit, comfort and performance functionality. In sportswear and equipment, quality is not just about surviving use but enabling optimal athlete or consumer performance: comfort, freedom of movement, proper fit, functionality of mechanisms (e.g., adjustable straps, shock absorption) are all part of the equation (Gill & Prendergast, 2015). Research on adolescent consumers of sports apparel reveals that quality attributes such as fit, comfort and functional features significantly affect purchase intention and online word-of-mouth behaviour (Tian & Xi, 2023). In the equipment segment, personalised design and biomechanical optimisation (e.g., gloves for wheelchair athletes) have become emerging research foci, linking product quality with athlete outcome (Chénier et al., 2023). Therefore, ergonomics and performance functionality represent a key dimension through which consumers evaluate sport product quality beyond mere aesthetics or brand. In sum, high-quality sport products must deliver seamless integration of function and fit.

A third dimension increasingly highlighted is sustainability, ethical manufacturing and technological integration. For sports apparel brands in particular, perceived sustainability level has been found to positively influence purchase intention and reduce consumer scepticism, especially when brand reputation is high (Kim & Oh, 2020). The movement toward eco-friendly, recycled materials and transparent supply chains is now part of the quality conversation in sports-product literature (Kopplin, 2023). Additionally, technological integration—such as smart sensors embedded in sportswear, connected devices in equipment, or digital feedback systems—expands the definition of quality to include user experience, data functionality, and product lifecycle intelligence (Tang et al., 2025). These developments mean that product quality is no longer static but dynamic, combining physical durability with digital and sustainable dimensions. Research suggests that sport-product manufacturers who invest in these emerging quality facets gain competitive advantage and positive consumer assessment.

Despite these advances, the literature also reveals gaps and future directions in sport product quality research. Many studies have investigated individual dimensions (e.g., sustainability, fit, brand image) but few have integrated them into comprehensive quality frameworks tailored for the sports product context (Komariah, 2023). Moreover, much of the sport-product quality literature is region-specific or limited to apparel, leaving equipment, accessories and emerging markets under-explored. For example, limited research addresses how technological integration influences durability and brand perceptions in mass-market sports equipment—or how Malaysian contextual factors (consumer price sensitivity, local brands, climate conditions) shape quality expectations. As consumer expectations evolve, future research needs to adopt longitudinal designs, mixed methods and cross-segment comparisons to fully capture the multi-dimensional nature of quality in sport products. Therefore, synthesising existing literature and identifying such gaps will help manufacturers and marketers understand how to elevate sport product quality and align with consumer expectations and industry trend.

Car Quality

Product quality is vital to a company as the superior product quality benefited the company with long-term survival and success within the companies (Luo & Bhattacharya, 2006). As the product quality improved, the sales performance also increased (Shapiro & Gomez, 2014). Besides, product quality showed a significant impact in affecting purchase intention among consumers (Sam & Tahir, 2009; Shaharudin, Mansor, & Elias, 2011; Yee et al., 2011). Added to that, there is a suggestion for further studies on the link between product quality and purchase intention, which lead to a possibility of product quality to play a moderating role (John & Brady, 2011; Shapiro & Gomez, 2014; Tsiotsou, 2006). Yet, previous studies on purchase intention have not covered on the impact of product quality as a moderating factor in the relationships of purchase intention (Hussin, Hashim, Yusof, & Alias, 2013).

Product quality remains a cornerstone of competitiveness and sustainability in the global automotive industry, particularly as consumers in 2025 demand higher safety, comfort, and reliability standards (Kim & Park, 2024). Quality in automotive manufacturing encompasses not only defect prevention but also continuous

improvement in processes, materials, and technologies (Ahmad et al., 2023). The evolution of Industry 4.0 and digital manufacturing systems has introduced data-driven quality management, where real-time monitoring ensures precision and consistency in production (Zhang et al., 2024). According to Patel and Singh (2023), automakers adopting predictive quality analytics report up to 30% reduction in defect rates. Furthermore, product quality has become closely linked to brand image and trust, with consumers associating reliability and performance consistency with long-term value (Rahman et al., 2024).

The integration of advanced materials and smart technologies has reshaped product quality dimensions, focusing on durability, efficiency, and user experience (Olsen et al., 2024). Electric vehicle (EV) manufacturers, for instance, emphasize battery safety, thermal management, and interior craftsmanship as part of holistic quality design (Tanaka & Wu, 2023). Innovations in composite materials, precision engineering, and digital twins enable manufacturers to detect quality deviations during the design phase rather than post-production (Lee et al., 2024). As Ali and Hassan (2025) highlight, the use of artificial intelligence (AI) in quality control enhances predictive maintenance and ensures consistency in high-volume production environments. This shift toward intelligent quality assurance aligns with global trends toward automation, reliability, and lifecycle optimization (Zhou & Li, 2024).

Sustainability has also become a critical dimension of product quality, as environmental performance increasingly influences consumer perception and regulatory compliance (Singh et al., 2023). Manufacturers now assess quality not only through mechanical strength or aesthetic appeal but also through the environmental footprint of materials and processes (Ramesh et al., 2024). According to BMW Group (2025), sustainable quality involves ensuring recyclability, reducing volatile organic compound (VOC) emissions, and enhancing energy efficiency during production. The introduction of eco-certifications and life-cycle analysis (LCA) frameworks has prompted automakers to adopt greener materials and cleaner assembly methods without compromising durability (Rahman et al., 2025). As consumer awareness grows, environmental quality is becoming an integral factor in vehicle purchase decisions, linking sustainability directly to perceived product quality (Nguyen et al., 2025).

Customer satisfaction represents another key performance indicator for automotive product quality in 2025, driven by consumer expectations of safety, reliability, and innovation (Davis & Ahmed, 2025). Product quality failures often translate into costly recalls and reputational damage, emphasizing the need for robust quality assurance frameworks (Khalid et al., 2023). Studies by Gupta and Mehta (2024) show that vehicles with fewer warranty claims and higher perceived build quality achieve stronger customer loyalty. Moreover, perceived quality, which combines tactile experience, acoustic comfort, and aesthetic precision, has become a defining factor for premium brands (Lim et al., 2025). As EV adoption expands, software reliability and user interface stability also form part of overall product quality, linking technological performance directly to customer satisfaction (Wang & Zhou, 2024).

Finally, in the Malaysian automotive context, product quality serves as a key enabler for industrial competitiveness under the National Automotive Policy (NAP 2020–2030) (MITI, 2023). Malaysian manufacturers such as Proton and Perodua are integrating Total Quality Management (TQM) and Lean Six Sigma principles to align with international standards like ISO 9001 and IATF 16949 (Abdullah et al., 2024). Continuous improvement programs and supplier quality collaborations have led to measurable gains in reliability and safety performance (Rahman et al., 2024). Moreover, the rise of EV and hybrid technologies in Malaysia necessitates a focus on high-precision component manufacturing, testing, and risk management to uphold global quality benchmarks (Chaudhary et al., 2025). Therefore, product quality in 2025 is not merely a technical outcome but a strategic imperative for sustainability, innovation, and consumer trust within the evolving automotive landscape.

Purchase Intention

Consumer purchase intention in the sport product sector reflects the likelihood that an individual will buy a particular sportswear item or equipment based on perceived value, quality, and personal preference (Ristevska-Jovanovska, 2025). It is widely acknowledged that product quality, including durability, ergonomics, and material performance, directly influences purchase intention, as high-quality sports products enhance consumer satisfaction and perceived value (Mehta & Gupta, 2022). Brand image and reputation further

moderate this relationship, where trusted brands increase consumer confidence and positively impact intention to purchase (Kim & Oh, 2020). Additionally, aesthetic appeal, style, and visual design play a crucial role in shaping purchase intention, particularly among younger consumers who consider fashion alongside functionality (Martínez & Ruiz, 2021).

Price perception is another critical determinant of purchase intention in the sport product market, as consumers evaluate whether the product delivers adequate value for its cost (Komariah, 2023). Research shows that Malaysian consumers are particularly price-sensitive due to the availability of both local and international brands, making competitive pricing strategies essential for driving purchase intention (Ken Research, 2025). Moreover, the perceived risk associated with a product, including concerns about durability, fit, or after-sales service, can negatively affect purchase intention if not addressed through warranties, reviews, or brand credibility (Davis & Ahmed, 2025). Therefore, manufacturers must balance product quality with cost-effectiveness to optimize purchase intention in competitive markets.

The influence of digital marketing and online reviews on purchase intention has grown significantly in recent years, as consumers increasingly rely on e-commerce platforms for sports products (Tian & Xi, 2023). Positive online reviews, ratings, and social media endorsements enhance trust and reduce perceived risk, thereby increasing the likelihood of purchase (Chobngam & Iamlaorpakdee, 2025). Furthermore, technological features such as smart sensors, wearable devices, and app connectivity also contribute to higher purchase intention, as consumers perceive added functional value and modernity in these products (Zhou & Li, 2024). Consequently, digital engagement and technology integration are key drivers of contemporary purchase intention in the sport product industry.

Sustainability and ethical production are emerging as influential factors affecting purchase intention among Malaysian consumers, who increasingly consider the environmental impact of their purchases (Nguyen, Li & Choi, 2025). Research indicates that eco-friendly materials, transparent supply chains, and sustainable manufacturing practices can positively influence consumers' intention to buy sportswear and equipment (Gupta & Mehta, 2023). Additionally, perceived social responsibility enhances brand loyalty and strengthens purchase intention, particularly among environmentally-conscious consumers (Kim & Oh, 2020). In sum, understanding the multifaceted drivers of purchase intention—including quality, price, technology, digital influence, and sustainability—is essential for manufacturers and marketers seeking to optimize product strategies in the Malaysian sport product market.

Theory of Planned Behavior

The grounded theory in predicting the intention is the Theory of Planned Behavior, as a person's behavior is controlled by his intention in performing certain types of behavior or action (Ajzen, 1991; Fishbein & Ajzen, 1975). According to the theory, a person's intention is guided by three constructs, which are attitudes, subjective norms and perceived behavior control. Attitude is the sum of beliefs about particular behavior weighted by the person's evaluations of these beliefs, while subjective norm is the beliefs of people weighted by the importance of one attributes to each of their opinions (Miller, 2005; Schiffman & Kanuk, 2006). Perceived behavior control is the extent control over internal and external factors upon behavior performance; whether facilitate or restrain it. It is consisting of control beliefs and perceived facilitation; which control beliefs refer to the person beliefs toward the factors available that facilitate or prevent performing a behavior, while perceived facilitation refers to the condition that the person perceived as being able to perform the behavior (Fishbein & Ajzen, 1975; Ajzen, 1991).

Numerous researchers had proved the applicability of the theory in predicting purchase intention across various industries, products and services (Alam & Sayuti, 2011; Jani & Han, 2011; Lada et al., 2009; Lee et al., 2011; Mukhtar & Butt, 2012; Omar, Mat, Imhemed, & Ali, 2012; Shaari & Arifin, 2010; Shaharudin, Ismail, et al., 2011; Shaharudin, Pani, Mansor, Elias, & Sadek, 2010). A firm will be at the competitive advantage when it has clear understanding on what influenced consumers in term of their decision making process, which then will contribute to a better meeting of customers' needs and expectation. So, it is important to measure them as close to behavioral observation as possible to ensure an accurate prediction, as well as intention can change over time (Padgett, 2009).

Table 1. Ranked Quality Dimensions in Sport Product Quality (2022–2025)

No.	Factor	Sector	Description / Rationale	Key Authors	Year Range
1	**Fit and Finish**	Car Fixtures	Focus on alignment precision, surface uniformity, and assembly tolerances affecting perceived luxury.	Rahman et al.	2022
2	**NVH (Noise, Vibration & Harshness)**	Car Fixtures	Optimization to minimize interior noise and vibration for comfort.	Lee et al.	2024
3	**Safety Integration (Crash Sensors, Airbags)**	Car Fixtures	Incorporation of safety systems within interior components.	Hassan & Ali	2023
4	**Innovation in Design (Adaptive Fixtures)**	Car Fixtures	3D printing and AI-based adaptive designs improving aesthetics and performance.	Nguyen et al.	2025

Table 2. Ranked Quality Dimensions in Car Quality (2020–2025)

No.	Factor	Sector	Description / Rationale	Key Authors	Year Range
1	Performance Functionality	Sport Products	Product's ability to enhance athletic performance via engineering and biomechanics.	Ahmad & Singh	2021
2	Fit Accuracy (Body-Fit Optimization)	Sport Products	Ensures precise body alignment and freedom of motion to prevent injury.	Kim et al.	2022
3	Safety Features (Protective Equipment)	Sport Products	Includes helmets, pads, and impact-absorbing materials to reduce injury risk.	Hassan & Ali	2023
4	Affordability/ Value	Sport Products	Focus on price–value balance, more sensitive in consumer goods than in automotive markets.	Patel & Singh	2020

CONCLUSION AND RECOMMENDATION

This study draws upon the different based on literature and it proposed a conceptual model outlining predicting factors likely to impact the purchase intention. Admittedly, this model draws upon a number of well-established constructs within the literatures, but this study differs and disqualified on several aspects on sport qualities and car product qualities. Car industry exclusives **f**ocused on precision, safety systems, and NVH performance**, reflecting** engineering and manufacturing complexity**.** Sport product exclusives which **emphasize** fit, performance enhancement, and affordability, reflecting **human** biomechanics and consumer market dynamics**. The** automotive industry **stresses** technical consistency and integration**, while the** sport product industry **emphasizes** usability, affordability, and personal performance **outcomes.** The study reviewed sport and car industries, focused on the segment of sport quality products and car manufacturers. Second, the study will be covered the northern region of peninsular Malaysia. It is hope that the result will be generalised as the culture across the country is quiet similar from one state to another.

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