



Perceived Impact of Product Innovation on Brand Loyalty: A Study of Smartphone Consumers in China

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ABSTRACT

With heightened competition within the smartphone industry, especially in China, coupled with increasing consumer expectations, understanding the factors influencing brand loyalty is crucial for both academia and industry. This study investigates the nuanced relationship between product innovation and brand loyalty within the dynamic context of smartphone products. The study adopts a quantitative approach, incorporating a survey among 385 smartphone users from China. The findings revealed that the features influencing smartphone preferences among respondents include wireless charging features, superior camera capabilities, and performance to name a few. In addition, respondents express favorable views on product innovation dimensions that include appearance and design; quality and durability; functional innovation; and features of the smartphones they own at the time of the study. In terms of the association between brand loyalty and socio-demographic characteristics, results showed that gender, age groups, education level, income level, and employment status emerged as factors in shaping brand loyalty within the smartphone market among Chinese owners. However, contrary to expectations, the study found no significant relationship between perceived product innovation dimensions (Appearance and Design, Quality and Durability, Functions, and Features) and brand loyalty. To thrive in the ever-evolving landscape of the smartphone industry, Chinese businesses must adopt strategic approaches that will promote brand loyalty among their target market. Even though product innovation does not directly lead to brand loyalty, the business should continue innovating to ensure that customers will purchase their products, and then elevate other possible factors that will lead to brand loyalty. This study relied on self-reported data from a cross-sectional survey, limiting the ability to track changes in brand loyalty over time or establish causality. It also focused solely on specific product innovation factors, excluding emotional or psychological influences. Future research should explore how brand loyalty evolves, using longitudinal and qualitative methods to capture its long-term and emotional dimensions.

RESUMO

Com o aumento da concorrência na indústria de smartphones, especialmente na China, juntamente com o aumento das expectativas dos consumidores, compreender os factores que influenciam a fidelidade à marca é crucial tanto para o meio académico como para a indústria. Este estudo investiga a relação sutil entre inovação de produto e fidelidade à marca no contexto dinâmico de produtos de smartphones. O estudo adota uma abordagem quantitativa, incorporando uma pesquisa entre 385 usuários de smartphones da China. As descobertas revelaram que os recursos que influenciam as preferências dos smartphones entre os entrevistados incluem recursos de carregamento sem fio, recursos superiores de câmera e desempenho, para citar alguns. Além disso, os entrevistados expressam opiniões favoráveis sobre as dimensões da inovação de produtos que incluem aparência e design; qualidade e durabilidade; inovação funcional; e características dos smartphones que possuíam no momento do estudo. Em termos da associação entre a lealdade à marca e as características sociodemográficas, os resultados mostraram que o gênero, os grupos etários, o nível de escolaridade, o nível de rendimento e a situação profissional surgiram como fatores na formação da lealdade à marca no mercado de smartphones entre os proprietários chineses. No entanto, contrariamente às expectativas, o estudo não encontrou nenhuma relação significativa entre as dimensões percebidas da inovação do produto (Aparência e Design, Qualidade e Durabilidade, Funções e Características) e a fidelidade à marca. Para prosperar no cenário em constante evolução da indústria de smartphones, as empresas chinesas devem adotar abordagens estratégicas que promovam a fidelidade à marca entre o seu mercado-alvo. Mesmo que a inovação de produtos não conduza diretamente à fidelidade à marca, a empresa deve continuar a inovar para garantir que os clientes comprarão os seus produtos e, em seguida, elevar outros possíveis fatores que levarão à fidelidade à marca.

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Introduction

The emergence of the mobile phone business sector has placed more of an emphasis on innovation in recent years, particularly as smartphones have become the standard configuration for many mobile device kinds (Cecere, Corrocher, & Battaglia, 2015). In 2019, the global smartphone market was valued at \$714 billion, with Apple, Samsung, and Huawei being the global leaders. Samsung has been the top smartphone player in 2023, with the top five brands (Samsung, Apple, Xiaomi, Oppo, and Vivo), contributing almost 80% to the total 5G shipments of smartphones (Counterpoint, 2023). This rapid advancement, fueled by a wave of innovation, has transformed the way consumers buy smartphone products. With new features and functionalities, smartphones have become an integral part of the daily routine of many if not all individuals, which transformed the way they communicate, work, and entertain, with people using smartphones at an increasing rate (Panigrahi et al, 2020). Product innovation has revitalized established enterprises and given organizations a competitive advantage (Rothaermel, 2016). In the modern technological environment, a smartphone is more practical and helps students quickly obtain the data they require to improve their academic work. Furthermore, consumers' expectations and demands for innovative smartphone products have significantly increased, leading to intense competition among smartphone brands.

This competition among smartphone companies drove various innovations and improvements to ensure brand loyalty among their consumers. From the day cell, mobile, or smartphones debuted, they evolved endlessly, featuring superior and unique functions in terms of style, appearance, function, image or camera technology, and mobile photography (Tecno, 2020). These efforts are part of the general strategy of smartphone companies to make an edge and ensure brand loyalty among their customers. A brand serves as a tool for fostering customer-business relationships and is a crucial instrument that assists consumers form positive opinions of a business and help it stand out from competitors (Kotler & Armstrong, 2004).

Customers' relationships with businesses foster a sense of trust and brand loyalty. Loyalty has been recognized as a vital factor in the success of any brand, which refers to the commitment of customers and their attachment to a particular brand (Akoğlu & Özbek, 2021). It affects consumers' repurchase behavior, positive word-of-mouth, and willingness to pay a premium for the brand. Therefore, understanding the determinants of brand loyalty has become a crucial area of research in the academic and business sectors. Perceived product innovation, which refers to the subjective perception of a product's level of novelty, has emerged as a significant factor that influences brand loyalty (Zhang, et al, 2020). Customers increasingly value innovative features and functionalities in their smartphone products, as they offer added value and enhance the overall user experience.

Given the importance of brand loyalty and product innovation in today's smartphone market, examining the relationship between these two factors is essential. There has been much research conducted regarding this topic. However, whether product innovation directly affects brand loyalty has yet to be extensively explored, especially in the local context of China. Thus, this study was conducted to ascertain the perceived influence of product innovation on brand loyalty among consumers of smartphone products in China.

Method

The study titled "Perceived Impact of Product Innovation on Brand Loyalty: A Study of Smartphone Consumers in China" predominantly employs a quantitative approach and employs an online survey design among selected consumers of smartphones in China. It aims to investigate the relationships between perceived product innovation (including product innovation attributes) and brand loyalty in the context of smartphone products. The study utilized a correlational research design using a survey questionnaire from a sample of respondents. This research design aimed at getting feedback from customers using a well-defined measurement scale used to collect data on participants' perceptions, preferences, and loyalty toward smartphone brands. Before the main survey, a pilot test is conducted to ensure questionnaire clarity and effectiveness. The collected data was analyzed using appropriate statistical methods, which may include descriptive statistics, correlation analysis, and regression analysis. Ethical considerations are carefully addressed, ensuring participant informed consent, data privacy, and anonymity. In this study, the measurement scales used for each potential variable are all scales that have been used in relevant research fields, and the reliability and validity of the scales have been tested by several scholars.

The participants of this study were smartphone users who had purchased and used smartphone products. The sample respondents were taken from China, which is a dynamic and diverse consumer market that has a significant impact on the global smartphone industry. This focus is both timely and significant. As the world's largest smartphone market and a global hub for innovation and manufacturing, China provides a dynamic environment for understanding consumer behavior in a highly competitive and technologically advanced industry.

Insights gained from Chinese consumers offer valuable implications for local companies aiming to strengthen domestic brand loyalty, as well as for international firms seeking to compete in or learn from this vibrant market. With China's significant market share in the smartphone industry, with a smartphone penetration rate of 72% or the equivalent of more than one billion of its population (Slotta, 2023), the country was chosen by the researcher as a good sampling locale respondent that provides insightful information about the particular context of the study and is likely to yield results that can be generalized to broader contexts.

The survey instrument consisted of 37 items, divided into two main sections: 29 items focused on product innovation and 8 items on brand loyalty. A 4-point Likert scale was used, where “1” represented complete disagreement and “4” represented complete agreement. The first section of the questionnaire collected socio-demographic information from the respondents. Prior to administering the main survey, a pilot test was conducted with 20 participants to identify any ambiguities or issues in the instrument.

China's smartphone user base is diverse in terms of age, income, educational background, and location—it spans both urban and rural areas. A more thorough understanding of how perceived product innovation affects brand loyalty across different consumer segments is made possible by the diversity of the respondent pool. The study can investigate whether the relationship between brand loyalty and product innovation is influenced by variables like age, income, or employment status. Furthermore, fierce competition, quick technological advancements, and constantly changing consumer preferences define China's smartphone market. In the first half of 2023, more than 130.9 million smartphones were shipped to the Chinese market (IDC, 2023). Chinese consumers have a strong brand loyalty to smartphone brands, which is influenced by a wide range of factors. By examining this particular subset of participants, the research can fully capture the distinct dynamics and nuances of the Chinese smartphone market, offering insights that may prove beneficial to international smartphone brands.

Furthermore, China has been a hotbed of creative smartphone features, and its people are known for embracing new technology fast with different smartphone companies such as Huawei, Oppo, Vivo, Honor, and Xiaomi making up the local market in addition to Apple. The study's focus on Chinese smartphone users allows it to go deeper into their perceptions of product innovation, which may have ramifications for companies planning to introduce and sell cutting-edge smartphone products in China as well as other markets where consumer behavior is comparable.

However, given that different sources of information make it impossible to identify the precise number of smartphone users in the whole country, the researcher chose to apply Cochran's equation to determine the right sample size for the research given various combinations of precision, variability, and confidence. The right sample size for this investigation, given the stated parameters, is 385 with an accuracy level of $\pm 5\%$, a confidence level of 95%, and an expected proportion of 0.5. For this study, respondents were selected through purposive sampling, a technique chosen to ensure that participants possess characteristics relevant to the research objectives. It focuses on respondents with direct experience, enabling them to provide informed insights into their smartphone preferences, perceptions, and brand loyalty. This method enhances the study's validity by ensuring that the sample is purposefully aligned with the research objectives, resulting in data that is both relevant and reliable. The primary criterion for inclusion is current ownership and usage of

smartphones, as this firsthand experience is crucial for providing insights into preferences, perceptions, and behaviors related to smartphones. Diversity in smartphone brands was considered, and it was not limited to famous brands only, such as Apple, Samsung, Huawei, and others.

Results

Demographic profile of the respondents

In the current study, a total of 385 participants were surveyed to examine various demographic characteristics. As shown in Table 2, the majority of participants identified as female, constituting 52.5% ($n = 202$), while males accounted for 47.5% ($n = 183$) of the sample. Regarding age distribution, participants under 18 years old comprised 20.3% ($n = 78$), those aged 18 to 25 years old constituted 35.1% ($n = 135$), and individuals aged 26 to 30 years old represented 22.9% ($n = 88$). Participants aged 31 to 40 years old constituted 9.6% ($n = 37$), and those aged 40 years and above comprised 12.2% ($n = 47$) of the sample.

In terms of education level, the majority of participants had attained a high school education or below (41.3%, $n = 159$), followed by junior college graduates (32.2%, $n = 124$), bachelor's degree graduates (19.0%, $n = 73$), and those with a master's degree or above (7.5%, $n = 29$). Participants' income levels varied, with 29.1% ($n = 112$) earning less than 1,500 yuan, 26.8% ($n = 103$) earning between 1,500 and 3,000 yuan, 18.7% ($n = 72$) earning between 3,000 and 5,000 yuan, 18.2% ($n = 70$) earning between 5,000 and 8,000 yuan, and 7.3% ($n = 28$) earning 8,000 yuan and above. Employment status distribution included privately employed individuals (35.6%, $n = 137$), those not currently employed (27.3%, $n = 105$), government employees (20.0%, $n = 77$), and self-employed individuals (17.1%, $n = 66$). Furthermore, smartphone ownership varied among participants, with Brand 1 being the most prevalent (30.7%, $n = 118$), followed by Brand 2 (23.9%, $n = 92$), Brand 3 (18.7%, $n = 72$), Brand 4 (18.7%, $n = 72$), Brand 5 (15.6%, $n = 60$), Brand 6 (10.9%, $n = 42$), Brand 7 (8.8%, $n = 34$), and Brand 8 (1.8%, $n = 7$).

Table 1
Demographic Profile of the Respondents

Profile	Frequency (n = 385)	Percent
Sex		
Female	202	52.5%
Male	183	47.5%
Age		
Under 18 years old	78	20.3%
18 to 25 years old	135	35.1%
26 to 30 years old	88	22.9%
31 to 40 years old	37	9.6%
40 years old and above	47	12.2%

Education Level		
High school and below Level	159	41.3%
Junior College Graduate	124	32.2%
Bachelor Degree Graduate	73	19.0%
Master degree and above graduate	29	7.5%
Income Level		
Less than 1,500 yuan	112	29.1%
1,500 – 3,000 yuan	103	26.8%
3,000 – 5,000 yuan	72	18.7%
5,000 – 8,000 yuan	70	18.2%
8,000 yuan and above	28	7.3%
Employment Status		
Privately employed	137	35.6%
Not employed	105	27.3%
Government employee	77	20.0%
Self-employed	66	17.1%
Smartphone Ownership		
Brand 1	118	30.7%
Brand 2	92	23.9%
Brand 3	72	18.7%
Brand 4	72	18.7%
Brand 5	60	15.6%
Brand 6	42	10.9%
Brand 7	34	8.8%
Brand 8	7	1.8%

II. Product Innovation Features

In a comprehensive analysis of smartphone features based on mean scores and standard deviations obtained from recent consumer surveys (Table 3), it is evident that respondents consistently prioritize several aspects when evaluating potential purchases. Performance (PF1) emerged as a critical factor, with 2.97 mean score and a 1.03 standard deviation, indicating participants' level of agreement on its significance. Similarly, the Software version (PF2) garnered a mean score of 2.92 with a standard deviation of 1.01, reinforcing the consensus regarding the importance of up-to-date software.

Camera quality (PF3), Storage space (PF4), and Audio and Sound quality (PF5) received mean scores of 2.99, 2.94, and 2.97, respectively, each accompanied by standard deviations ranging from 0.98 to 1.02. These results suggest a shared emphasis on the visual and auditory capabilities of smartphones, with respondents expressing relatively consistent preferences.

Critical utility features such as Call quality (PF6), Data connectivity (PF7), Display and screen resolution (PF8), and Battery Life (PF9) demonstrated mean scores ranging from 2.93 to 2.97, alongside standard deviations between 0.98 and 1.03. These findings

underscore the collective importance placed on reliable communication, connectivity, and screen performance, as well as enduring battery life.

Fast Charging support (PF10) and the availability of Accessories (PF11) also received mean scores of 2.97, indicating respondents' shared interest in rapid charging capabilities and the availability of accompanying accessories. The size and weight of the device (PF12) garnered a mean score of 2.96 with a slightly higher standard deviation of 1.06, suggesting a marginally greater variability in preferences for these physical attributes.

The feature with the highest mean score, Wireless charging (PF13), achieved a mean of 3.00 with a 0.99 result in standard deviation, highlighting a strong consensus in valuing wireless charging functionality among customers. This finding underscores the growing demand for convenience and technological advancements in smartphone features. From a practical standpoint, smartphone manufacturers should prioritize the integration of wireless charging in their product offerings to meet consumer preferences. This not only enhances customer satisfaction but also provides a competitive edge in the market, where consumers increasingly expect more efficient and user-friendly features.

The 2.96 overall mean, coupled with a 0.86 standard deviation, reaffirms the general agreement among participants across all features. While there is a moderate level of variability in opinions, the collective preferences expressed by respondents underscore the significance of these features in shaping their smartphone purchasing decisions. They are now used for mass media enjoyment as well as voice communication between two people (Leung, 2020). In the last few years, there has been a dramatic shift in the functionality and usage of smartphones. They have become an indispensable part of many people's lives because of their many features, which include access to social media networks, mobile games, augmented reality applications, GPS, 5G connection, Wi-Fi, location sharing, and instant messaging (Breitinger et al., 2020; Leung, 2020).

The results of the survey showed the respondents emphasized performance, software version, camera quality, and audio and sound quality, which highlights the holistic approach consumers adopt when evaluating smartphones. According to previous studies, smartphone users are increasingly using their devices for a variety of activities in their spare time, including messaging, surfing the web, downloading files, snapping photos, viewing live streaming, and visiting social media sites (Leung, 2020; Rangaswamy and Arora, 2016; Silk et al., 2016). This requires that their phones are equipped with the best features to enable better performance and meet their needs. Thus, it is apparent that when choosing a new phone, people are more concerned with speed and performance. In the 91mobiles 2022 Smartphone Buyers Insights Survey, the largest gadget discovery website in India, 43% of respondents said they prioritize performance over other features, while one in five said they look for a good camera when purchasing a smartphone.

The survey's findings are also consistent with current trends, which show that consumers are looking for gadgets that are great at their essential functions but also offer a smooth and enjoyable user experience (Statista, 2022). According to a Morning Consult survey conducted in 2023 among 1,894 smartphone owners in the US, the top four consumer priorities were battery life (95%), convenience of use (93%), memory storage size (90%), and durability (88%) with a 3.2 percentage point margin of error (Sabin, 2023). Similar findings were found from a UK study by Deloitte consultants Lee et al. (2022) where people tend to value battery life (43%), ease of use (29%), camera quality (29%), and storage capacity (23%). Therefore, it is not unfair to state that, in terms of their preferences for smartphone innovation, Chinese consumers have the same opinions as other smartphone users worldwide. These insights provide valuable guidance for smartphone manufacturers. Additionally, emphasizing user convenience and ensuring that smartphones remain durable could help manufacturers gain a competitive edge in a crowded global market. These trends indicate a clear opportunity for companies to align their product innovations with consumer expectations, enhancing brand loyalty and market penetration.

Table 2
Product Features that Respondents Look for Smartphones

Product Features	Mean	Std. Dev.	Interpretation
PF1. Performance	2.97	1.03	Agree
PF2. Software version	2.92	1.01	Agree
PF3. Camera quality	2.99	1.02	Agree
PF4. Storage space	2.94	0.98	Agree
PF5. Audio and Sound quality	2.97	1.02	Agree
PF6. Call quality	2.93	0.99	Agree
PF7. Data connectivity (e.g., 5G or 4G support)	2.94	1.03	Agree
PF8. Display and screen resolution	2.95	0.98	Agree
PF9. Battery Life	2.94	1.03	Agree
PF10. Fast Charging support	2.97	1.04	Agree
PF11. Accessories	2.97	1.03	Agree
PF12. Size and weight of the device	2.96	1.06	Agree
PF13. Wireless charging	3.00	0.99	Agree
Overall Mean	2.96	0.86	Agree

1.00 to 1.75 = Strongly Disagree / 1.76 to 2.51 = Disagree / 2.52 to 3.27 = Agree / 3.27 to 4.00 = Strongly Agree

The positive evaluation of appearance and design innovation among the respondents is in line with studies emphasizing the impact of aesthetics on consumers' inferences about functionality, product choices, and decisions (Crollic et al., 2019; Wen & Lurie, 2019). The acknowledgment of uniqueness in design reflects the growing importance of distinctive product attributes in a crowded market.

The strong preference for wireless charging, highlights the increasing demand for convenience and advanced technology in smartphones. Wireless charging, which eliminates the need for wired connections, offers benefits like enhanced safety, reduced costs, and the removal of physical connectors (Sharma, 2020). China is a leader in wireless charging innovation, accounting for over 50% of global patents (Sharma, 2020). Due to these advantages, wireless charging has become a standard feature in major smartphone brands. As battery limitations continue to challenge smartphone use, the growing adoption of wireless chargers is a natural response to meet consumer needs (Hanif et al., 2020).

Perceived Product Innovation

Appearance and Design

In terms of respondents' perceptions regarding product innovations when it comes to smartphones' Appearance and Design, the gathered data reveals notable insights (Table 4). Respondents expressed positive sentiments regarding the innovative aspects of their phones' appearances, with mean scores for individual statements such as "I think the appearance of this phone is quite innovative" (AD1), "I think this phone gives me a new experience in terms of appearance" (AD3), and "I think the phone's innovation in appearance is useful" (AD5) ranging from 3.13 to 3.18. These scores, coupled with standard deviations between 0.90 and 0.95, reflect a consistent and favorable perception of the phones' visual attributes.

The statement "My phone is visually appealing" (AD4) also received a positive mean score of 3.15, indicating that respondents generally find their smartphones aesthetically pleasing. The associated 0.95 standard deviation reveals a moderate level of variability in participants' response on visual appeal of their devices. Furthermore, the mean score of 3.10 for the statement "I think this phone has a unique design" (AD2) affirms the respondents' recognition of uniqueness in the design of their smartphones. The 0.94 standard deviation indicates a moderate degree of variability in opinions about the distinctiveness of the phone's design.

In summary, the obtained data suggests that respondents generally assess the product innovations of their smartphones positively in terms of Appearance and Design. The high overall mean score of 3.14, coupled with generally low to moderate standard deviations, underscores a shared appreciation for the innovative and visually appealing aspects of their devices.

Businesses always come up with new ideas to build strong brands and win over customers' loyalty. Innovation increases the appeal and demand for brands and products among consumers (Yildiz and Koçan, 2018). Respondents overwhelmingly expressed positive perceptions of product innovations in Appearance and Design, Quality and Durability, Functions, and Features. The high mean scores, coupled with moderate standard deviations, suggest a shared appreciation for the innovative and visually appealing aspects of

smartphones. This aligns with prior research emphasizing the significance of aesthetics and built quality in consumer preferences and brand perception (Chitturi et al., 2008).

Table 3
Product Innovation in Terms of Appearance and Design of Smartphones

Appearance and Design	Mean	Std. Dev.	Interpretation
AD1. I think the appearance of this phone is quite innovative.	3.13	0.90	Agree
AD2. I think this phone has a unique design.	3.10	0.94	Agree
AD3. I think this phone gives me a new experience in terms of appearance.	3.14	0.95	Agree
AD4. My phone is visually appealing.	3.15	0.95	Agree
AD5. I think the phone's innovation in appearance is useful.	3.18	0.93	Agree
Overall Mean	3.14	0.81	Agree

1.00 to 1.75 = Strongly Disagree / 1.76 to 2.51 = Disagree / 2.52 to 3.27 = Agree / 3.27 to 4.00 = Strongly Agree

Quality and Durability

In terms of Quality and Durability, respondents conveyed a positive perception of the brand's commitment to high-quality products, as reflected in the mean score of 3.12 for the statement "I think the brand always puts out high-quality products" (QD1). The associated 0.98 standard deviation suggests a moderate degree of variability in respondents' opinions regarding the brand's consistency in delivering high-quality products (Table 5). Similarly, participants expressed confidence in the brand's mobile phones, with a mean score of 3.13 for the statement "I think the quality of this brand's mobile phones is above the market average" (QD2). The 0.97 standard deviation indicates a moderate degree of variability in opinions about the brand's perceived quality compared to the market average. In terms of durability, the mean score of 3.12 for the statement "I think the mobile phones of this brand are very durable" (QD3) underscores a positive perception of the durability of the brand's smartphones. The associated 0.93 standard deviation reveals a moderate level of variability in respondents' opinions regarding the durability of the devices.

The overall mean score of 3.12, coupled with a standard deviation of 0.85, signifies a general consensus among respondents in evaluating the product innovations of their smartphones positively in terms of Quality and Durability. These findings provide valuable insights for the brand, indicating that consumers generally perceive their smartphones as high-quality and durable, which can contribute to positive brand image and customer satisfaction.

The positive evaluation of product innovations in Quality and Durability corroborates the pivotal role that perceived durability plays in shaping brand loyalty (Voss et al., 2003). Consumer confidence in a brand's commitment to delivering high-quality and durable products contributes to positive brand image and long-term customer satisfaction.

Table 4
Product Innovation in Terms of Quality and Durability of Smartphones

Quality and Durability	Mean	Std. Dev.	Interpretation
QD1. I think the brand always puts out high quality products.	3.12	0.98	Agree
QD2. I think the quality of this brand's mobile phones is above the market average.	3.13	0.97	Agree
QD3. I think the mobile phones of this brand are very durable.	3.12	0.93	Agree
Overall Mean	3.12	0.85	Agree
<i>1.00 to 1.75 = Strongly Disagree / 1.76 to 2.51 = Disagree / 2.52 to 3.27 = Agree / 3.27 to 4.00 = Strongly Agree</i>			

The Function

In the domain of Functions, respondents expressed a positive view of the phone's functional innovations, evident in the mean score of 3.15 for the statement "I think the functions of this phone are quite innovative" (FU1) (Table 6). The associated 0.94 standard deviation presents a moderate degree of variability in respondents' opinions on perceived innovativeness of the phone's functions. Furthermore, respondents recognized the uniqueness of the phone's functions, as indicated by the mean score of 3.17 for the statement "I think this phone offers some unique functions" (FU2). The 0.93 standard deviation implies a moderate degree of variability in opinions about the distinctiveness of the phone's functional offerings.

The statement "I think this phone gives me a new experience in terms of functions" (FU3) received a mean score of 3.13, underscoring respondents' positive experiences with novel functionalities. The 0.93 associated standard deviation implies a moderate level of variability in opinions about the extent to which the phone provides a new and engaging functional experience. Moreover, participants indicated a favorable perception of the phone's ability to meet their functional needs, as reflected in the mean score of 3.14 for the statement "I think the functions of this phone meet my needs" (FU4). The 0.94 standard deviation indicates the respondent's perception of how well the phone's functions with their needs with a moderate degree of variability.

In summary, the data portrays a positive assessment of product innovations in smartphone Functions by respondents. The overall mean score of 3.15, coupled with a standard deviation of 0.82, underscores a general consensus among participants in recognizing the innovativeness, uniqueness, and functional efficacy of their smartphones.

Furthermore, the favorable assessment of functional innovations highlights the importance of unique and user-friendly features. In a market saturated with similar products, distinctive functionalities become key differentiators that influence brand loyalty and consumer choices (Kotle., 2017).

Table 5
Product Innovation in Terms of Function of Smartphones

Function	Mean	Std. Dev.	Interpretation
FU1. I think the functions of this phone are quite innovative.	3.15	0.94	Agree
FU2. I think this phone offers some unique functions.	3.17	0.93	Agree
FU3. I think this phone gives me a new experience in terms of functions.	3.13	0.93	Agree
FU4. I think the functions of this phone meet my needs.	3.14	0.94	Agree
Overall Mean	3.15	0.82	Agree

1.00 to 1.75 = Strongly Disagree / 1.76 to 2.51 = Disagree / 2.52 to 3.27 = Agree / 3.27 to 4.00 = Strongly Agree

Features

As shown in Table 7, respondents demonstrated a strong preference for superior camera capabilities, as indicated by the mean score of 3.19 for the statement "I chose this phone because it has a superior camera" (FE1). The 0.93 associated standard deviation implies a moderate degree of variability in respondents' opinions regarding the importance of a high-quality camera in their smartphone selection. The consideration of speedier internet accessibility emerged as another key factor influencing smartphone choices, as reflected in the mean score of 3.12 for the statement "I considered the speedier internet accessibility of the phone I have" (FE2). The 0.95 standard deviation implies a moderate degree of variability in opinions about the significance of fast internet connectivity in the decision-making process. Participants also expressed the importance of a mature app store in their decision-making, as indicated by the mean score of 3.14 for the statement "I chose this phone because it has a mature app store" (FE3). The associated standard deviation of 0.94 suggests a moderate level of variability in opinions regarding the influence of a robust app store on their smartphone selection.

The operating system of the phone was identified as another feature considered by respondents, as reflected in the mean score of 3.11 for the statement "I considered the operating system of the phone I have" (FE4). In addition, the 0.96 standard deviation indicates a moderate degree of variability in opinions regarding the significance of the operating system in their smartphone choice.

In summary, respondents positively assess the product innovations of their smartphones in terms of Features, with a notable emphasis on superior camera capabilities, fast internet accessibility, a mature app store, and the operating system. The overall mean score of 3.14, coupled with a standard deviation of 0.83, underscores a general consensus among participants in recognizing the importance of these features in influencing their smartphone preferences.

Table 6
Product Innovation in Terms of Features of Smartphones

Features	Mean	Std. Dev.	Interpretation
FE1. I chose this phone because it has a superior camera.	3.19	0.93	Agree
FE2. I considered the speedier internet accessibility of the phone I have.	3.12	0.95	Agree
FE3. I chose this phone because it has a mature app store.	3.14	0.94	Agree
FE4. I considered the operating system of the phone I have.	3.11	0.96	Agree
Overall Mean	3.14	0.83	Agree

Brand Loyalty

Participants expressed a commitment to their current smartphone brand, as reflected in the mean score of 2.99 for the statement "I would stay with my current smartphone brand" (BL1). The 1.05 associated standard deviation implies a moderate level of variability in respondents' opinions regarding their willingness to remain loyal to their existing brand. Even when faced with comparable functionality from other brands, respondents tended to stick with their current smartphone brand, as indicated by the mean score of 2.91 for the statement "I would still choose my current smartphone brand even though another brand has the same functionality as my current smartphone" (BL2). The 1.08 standard deviation implies a moderate degree of variability in opinions regarding the resilience of brand loyalty when confronted with functional parity.

The self-perception of loyalty is affirmed by the mean score of 2.92 for the statement "I consider myself to be loyal to my smartphone brand" (BL3). The 1.04 associated standard deviation presents a moderate degree of variability in respondents' self-identification with brand loyalty. The inclination to prioritize the current brand over others is further emphasized in the mean score of 2.95 for the statement "My choice of brand is the first choice among other brands in the market" (BL4). The 1.03 standard deviation indicates a moderate degree of variability in respondents' perceptions of their brand's standing in comparison to other brands.

Positive advocacy for their current smartphone brand is evident in the mean score of 2.92 for the statement "I say positive things about my smartphone brand" (BL5). The 1.03 standard deviation indicates a moderate level of variability in respondents' likelihood to endorse and speak positively about their chosen brand. While respondents generally expressed brand loyalty, there was a slight inclination towards brand-switching, as indicated by the mean scores of 2.92 for both the statements "If I can, I prefer to move to another brand" (BL6) and "I am intending to switch to another brand" (BL7). The associated standard deviations of 1.06 and 1.03, respectively, suggest a moderate level of variability in respondents' openness to exploring alternative brands. The balance between brand quality

and loyalty is reflected in the mean score of 2.90 for the statement "I choose brand quality over loyalty" (BL8). The 1.04 standard deviation indicates a moderate degree of variability in respondents' prioritization of brand quality in comparison to brand loyalty.

The study's exploration of brand loyalty provides showed valuable insights into the respondents' overall positive attitude towards brand loyalty, despite a slight inclination towards brand-switching, which is consistent with existing literature (Nandi and Pattanayak, 2015). A customer's existing smartphone setup, the need to learn how to use a different smartphone type, and the need to transfer their content—such as music, videos, books, and apps—from one smartphone type to another could be the biggest obstacles to switching smartphones, according to Kumar and Menon (2015).

The acknowledgment that brand quality marginally outweighs loyalty is consistent with several research (Parmer, 2014; Aydin and Ozer, 2005) that highlight the significance of perceived product quality in shaping brand perceptions, though other studies emphasized that this may differ depending on the product, the region, and other factors (Vikaliana et al., 2021; Srivastava, 2016).

Brand loyalty is reinforced by-products that are well-supported by the newest features and offer good value. When people believe in a brand, they are more likely to suggest it. The findings of the study are consistent with output in the study of Vikaliana et al. (2021), Rizwan et al. (2014), and Alam et al. (2012), who showed that customers remain devoted to brands even when they face competition.

Table 7
Respondents' Opinion in terms of Brand Loyalty

Brand Loyalty	Mean	Std. Dev.	Interpretation
BL1. I would stay with my current smart phone brand.	2.99	1.05	Agree
BL2. I would still choose my current smart phone brand even though other brand has the same functionality as my current smart phone.	2.91	1.08	Agree
BL3. I consider myself to be loyal to my smart phone brand.	2.92	1.04	Agree
BL4. My choice of brand is the first choice among other brands in the market.	2.95	1.03	Agree
BL5. I say positive things about my smart phone brand.	2.92	1.03	Agree
BL6. If I can, I prefer to move to another brand.	2.92	1.06	Agree
BL7. I am intending to switch to another brand.	2.91	1.03	Agree
BL8. I choose brand quality over loyalty.	2.90	1.04	Agree
Overall Mean	2.93	0.91	Agree

According to Sweeney & Swait (2008), strong and enduring trust is developed between producers and consumers by high-quality brands, which boosts brand loyalty. Thus, brands need to continuously engage and meet evolving consumer expectations.

The delicate balance between quality and loyalty among Chinese consumers suggests that brands must not solely rely on established reputations but actively cultivate and communicate an ongoing commitment to innovation and excellence.

Relationship between Perceived Product Innovation and Brand Loyalty

The relationship between product innovation factors (Appearance, Features, Functions, and Quality) and Brand Loyalty was examined through regression analyses, and the results are summarized in Table 15. The analysis aimed to determine whether these product innovation dimensions significantly predict variations in Brand Loyalty.

For the dimension of Appearance influencing Brand Loyalty, the regression coefficient (B) was 0.221, with 1.585 t-value and a corresponding 0.113 p-value. Since the p-value is greater than the conventional significance threshold of 0.05, the null hypothesis (Ho) cannot be rejected. Therefore, the relationship between Appearance and Brand Loyalty is deemed not significant.

Similarly, the regression coefficients for Features, Functions, and Quality influencing Brand Loyalty were 0.132, 0.143, and -0.033, respectively. The t-values associated with these coefficients were 1.013, 1.211, and 0.264, with corresponding p-values of 0.311, 0.226, and 0.791. In all cases, the p-values exceeded the 0.05 threshold, leading to the decision not to reject the null hypothesis. Consequently, the relationships between Features, Functions, Quality, and Brand Loyalty were also considered not significant.

In summary, based on the results of the regression analyses, there is insufficient evidence to support a significant relationship between product innovation dimensions (Appearance, Features, Functions, and Quality) and Brand Loyalty.

The lack of a significant relationship challenges conventional wisdom and underscores the complexity of factors influencing brand loyalty in the smartphone industry (Yildiz and Koçan, 2018; Hanaysha, 2014; Wang et al., 2017; Torres et al., 2015). For example, Yildiz and Koçan (2018) revealed in their study that the influence of product innovation and product quality on brand loyalty has a positive effect on brand image, brand loyalty and brand awareness. These findings are consistent with the literature cited by Hanaysha and Hilman, 2014; Wang et al., 2017; Torres et al., 2015; Hameed, 2013). On the other hand, the present study suggests that while consumers may appreciate and prioritize certain product innovations, these do not necessarily translate into heightened brand loyalty among Chinese consumers. Many scholars have widely accepted that attributes of product innovation are important consideration of clients' satisfaction, which, in turn, leads to a regular customer (Panigrahi et al., 2020; Winarti et al., 2021). While the impact of product

innovation on buying choices is acknowledged (Yusuf, 2021), the present study challenges the assumption that it invariably translates into customer loyalty.

Moreover, despite the generally positive influence of brand innovation on consumers, especially evident in various studies, the current research unveils a distinctive perspective among Chinese users concerning brand loyalty. This outcome underscores the need for a deeper investigation into the intricate aspects of brand loyalty, taking into account emotional, experiential, and psychological factors that could outweigh the perceived significance of product innovation. Furthermore, there is a need for a reevaluation of the traditional understanding of how consumers attribute loyalty to specific product features like smartphones. Future research may also explore broader engagement factors that mediate the perceived relationship between brand loyalty and product innovation.

Table 16
Relationship between Product Innovation and Brand Loyalty of Respondents

Relationship of Product Innovation and Brand Loyalty	B	t-value	p-value	Decision	Remarks
Appearance -> Brand Loyalty	0.221	1.585	0.113	Do Not Reject Ho	Not Significant
Features -> Brand Loyalty	0.132	1.013	0.311	Do Not Reject Ho	Not Significant
Functions -> Brand Loyalty	0.143	1.211	0.226	Do Not Reject Ho	Not Significant
Quality -> Brand Loyalty	-0.033	0.264	0.791	Do Not Reject Ho	Not Significant

Reject Ho if $p < 0.05$; significant

Conclusion

The findings from this study offer valuable insights on the perceived relationship between product innovation and brand loyalty in the smartphone industry among Chinese users.

1. The findings of the study revealed a relatively balanced gender distribution and a significant concentration of users aged 18 to 30 years old. Brands 1, 2, and 3 were the most commonly owned smartphones among the respondents. The majority of the Chinese smartphone owners included in this study had a high school education, earned less than 1,500 yuan, and were privately employed. These findings indicate that the demographic profile of Chinese smartphone owners suggests a diverse and dynamic consumer base. Understanding these demographics helps smartphone manufacturers and marketers in tailoring their products, features, and marketing strategies to meet the preferences and needs of different segments within the Chinese market.
2. Analyzing consumer preferences in product innovation uncovered key features that significantly influence purchasing decisions. Participants placed high importance on

wireless charging, camera quality, performance audio and sound quality, fast charging support, and accessories. The emphasis on wireless charging indicated a growing appetite for cutting-edge technologies. Brands can leverage these insights to prioritize and enhance specific features in their product development to ensure alignment with Chinese consumer expectations.

3. The objective of assessing perceived product innovations aimed to understand how consumers view various aspects of their smartphones. The study found overwhelmingly positive perceptions in terms of Appearance and Design, Quality and Durability, Functions, and Features. This aligns with established literature emphasizing the role of design and functionality in shaping consumer satisfaction and brand image.

The positive sentiments expressed by respondents towards these aspects of smartphone product innovations carry significant implications for the smartphone industry. The consistent praise for appearance and design emphasizes the paramount importance of visual aesthetics in influencing user satisfaction and brand loyalty. Manufacturers should prioritize innovative and appealing designs to align with consumer preferences. Additionally, the positive evaluations of quality and durability underscore the need for reliable and long-lasting devices. Owners also value smartphones with unique and efficient features. The emphasis on specific features such as superior camera capabilities and fast internet accessibility signals the importance of key functionalities in shaping smartphone preferences.

4. Examining the influence of socio-demographic factors on perceived product innovation provided nuanced insights. Gender, age, education, income, and employment status all demonstrated significant associations with consumer perceptions. Brands can tailor their marketing and innovation strategies to address the specific preferences of different demographic segments, ensuring a more targeted and effective approach. Moreover, the number of owned smartphones does not exert a substantial influence on how respondents evaluate and prioritize product innovation aspects in their smartphones.
5. In terms of the association between brand loyalty and socio-demographic characteristics, results showed that gender, age groups, education level, income level, and employment status emerged as factors in shaping brand loyalty within the smartphone market among Chinese owners. Brands should consider these socio-demographic nuances when developing loyalty-building initiatives to foster stronger connections with diverse consumer groups.
6. Contrary to expectations, the study did not find a significant relationship between perceived product innovation dimensions (Appearance, Features, Functions, Quality) and brand loyalty. This challenges traditional models and underscores the complexity

of factors influencing brand loyalty. Other factors, such as emotional and psychological connections, may play a more significant role in brand loyalty. Future research and marketing strategies should explore the emotional and psychological aspects that may play a more substantial role in fostering brand loyalty within the Chinese market.

By implementing a comprehensive brand strategy, smartphone companies in China can enhance brand loyalty among diverse consumer segments while driving innovation and competitiveness in the dynamic smartphone market. Future research could explore the temporal aspects of brand loyalty, investigating how consumer preferences and loyalty evolve, including how emotional and psychological factors shape brand loyalty. Longitudinal studies could provide deeper insights into the sustainability of brand loyalty and how it adapts to technological advancements. Additionally, qualitative research methodologies could uncover the emotional and psychological dimensions of consumer-brand relationships, offering a more comprehensive understanding of brand loyalty dynamics.

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