

Factors Impacting 18-30 Years old Consumers' Purchase Intention of New Energy Vehicles in Sichuan, China

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Abstract

Purpose: This study aims to examine the impacting factors of consumers' purchase intention of new energy vehicles in Sichuan, China. A conceptual framework incorporates six variables, including trust, attitudes, perceived risk, perceived behavioral control, perceived quality, and purchase intention. **Research design, data, and methodology:** The researchers applied quantitative research methods to construct and distribute questionnaires as a research tool. The population is consumers who own or are interested in purchasing new energy vehicles in Sichuan, China. The sample size is consumers who are 18-30 Years old (n=500). This study collects the data using judgmental, convenience, and snowball sampling. The primary objective of this investigation is to utilize confirmatory factor analysis (CFA) and structural equation modeling (SEM) as robust statistical methodologies for scrutinizing data integrity, assessing model precision, and evaluating the influence of pivotal variables. **Results:** Trust has a significant impact on attitudes. Purchase intention is significantly impacted by perceived risk and perceived quality but not trust, attitude, and perceived behavior control. **Conclusions:** In conclusion, this research enhances our understanding of age-related differences in consumer behavior and provides actionable insights for businesses and marketers.

Keywords : Trust, Attitudes, Perceived Quality, Purchase Intention, New Energy Vehicles

JEL Classification Code: E44, F31, F37, G15

1. Introduction

New energy vehicles refer to vehicles that are fueled by unconventional power sources (or fueled by conventional sources while adopting new onboard power devices). By integrating advanced technology in power control and the drive of vehicles, new energy vehicles are embedded in advanced technologies, along with new techniques and structures (Kumar et al., 2023).

With the development of the policies and technologies on new energy vehicles in various countries worldwide, the "new energy" era in the automobile industry has thrived. In 2011, only 50,000 new energy vehicles were sold globally. However, by 2019, the sales quantity had soared to 1.2 million, and the sales number in China accounted for more than half of the world (Yu et al., 2019).

During the period of the eighth "Five-Year Plan," the Chinese government had already put up the plan to develop new energy vehicles on the agenda. In 1995, the Ministry of Science and Technology set electric vehicles as a key project in developing the ninth "Five-Year Plan." During that time, an electric car show was even held in Beijing, attended by Li Peng, the prime minister of China (Tan et al., 2014).

China's new energy vehicles have grown from scratch, from the industry's cooling to the success of the present turnaround. Although we have gone through many detours, the inspiration left by each detour can not only enable us to better summarize the experience from the failure but also enable China's new energy vehicles to go further and further (Cong et al., 2022).

Based on the current situation, the industry of new energy vehicles has been raised to China's national development strategy and become an irreversible developing trend. In

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2020, China introduced several policies to encourage the development of new energy vehicles by lowering the entry threshold for new energy enterprises, raising product requirements, improving mandatory standards, and extending financial subsidies.

Users' recognition of the concept of new energy vehicles has become the primary reason for purchasers to buy cars in Sichuan for commuting. In addition, battery quality and stability are the main factors that buyers care about before they buy a car. Nearly 90% of new energy vehicle users in Sichuan pay attention to vehicle intelligence, believing that intelligent hardware and autonomous driving are the main advantages of intelligent cars. However, battery and charging problems are the main obstacles for potential buyers of new energy vehicles in Sichuan.

In this research, the study model was built based on the previous research and review of the various literature, which consisted of six independent variables, mediators, and dependent variables. This study aims to examine the impacting factors of consumers' purchase intention of new energy vehicles in Sichuan, China. A conceptual framework incorporates six variables, including trust, attitudes, perceived risk, perceived behavioral control, perceived quality, and purchase intention.

2. Literature Review

2.1 Trust

Trust is defined as the "perceived trustworthiness of a target of trust (i.e., the other party)." Trust was theorized as a direct determinant of comportment (Gefen et al., 2003; Hassanein & Head, 2007; Lin, 2011). Trust is a main factor for successful online trades (Salo & Karjaluo, 2007) and is also a key point for attracting and retaining clients and obtaining competitive ascendancy online (McKnight & Chervany, 2002). Trust is important in online circumstances because of the different perceived risks in such contexts (Van der Heijden et al., 2003).

Garbarino and Johnson (1999) have confirmed that trust predicts customers' attitudes and future actions significantly. Trust is regarded as the prerequisite of attitudes for purchase behavior (Wu & Chen, 2005). According to Garbarino and Johnson (1999) and Gifford and Bernard (2006), trust is critical in predicting customers' attitudes and future purchase actions. Moreover, Kim et al. (2008) believe consumers will hesitate to buy if they do not trust the seller, so trust is an antecedent for a successful business. Hence, the hypothesis for the relationship between trust, attitudes, and, purchase intention is:

H1: Trust has a significant impact on attitudes.

H2: Trust has a significant impact on purchase intention.

2.2 Attitudes

Attitude is a main predictor of behavioral adoption motive (Ajzen & Fishbein, 1980). Attitude is the major predictor of behavioral motive (Kotchen & Reiling, 2000). Attitude is a person's entire evaluation of an idea (Peter & Olson, 2010). Consumers' attitudes are an essential determinant, so this improved the connection between the consumer and the retailer over the Internet (Hasan, 2010). Consumers' attitude seems to be a major predictor of their intentions to buy online (Mansour, 2016). Intention is a function of attitudes toward behavior and subjective norms. Consumers often join in a behavior linked to a beneficial outcome (Ha & Janda, 2012).

Based on the Theory of Planned Behavior (TPB), attitude is a key determinant of behavioral intention, meaning that the better the individuals' attitude toward the behavior, the stronger their intention to carry it out (Gifford & Bernard, 2006). This is also confirmed by the other research conducted by Honkanen et al. (2006) that there is a significant positive relation between consumers' attitudes and purchase intention. Therefore, the third hypothesis is:

H3: Attitudes have a significant impact on purchase intention.

2.3 Perceived Risk

Perceived risk refers to the degree to which a person perceives the consequences of uncertainty associated with their actions and is believed to play a significant role in decision-making (Chen, 2010). Perceived risk represents a consumer belief that buying products may have some negative consequences (Michaelidou & Christodoulides, 2011). Risk propensity refers to the action stage after the decision to take or avoid risk. It is seen by some theorists as the result of consumer's attitudes and perceptions influencing individual actions or behavior (Liu et al., 2005). Consumers' perceived risk significantly negatively impacts their attitude toward purchasing (Michaelidou & Christodoulides, 2011).

According to Mitchell and Boustani (1994), consumers usually tend to reduce the risk perception to the lowest level while amplify the perceived value to the highest level when they undertake their action in buying. Van der Heijden et al. (2003) additionally concluded that risk perception influences consumers' online purchase intention indirectly via their attitude. Thus, the fourth hypothesis is proposed below:

H4: Perceived risk has a significant impact on purchase intention.

2.4 Perceived Behavioral Control

Perceived behavioral control is expected self-control based on past behavior (Ajzen, 2002). Perceived behavioral

control reveals the individual’s personal control level about what to buy (Chen, 2007). Perceived behavioral control shows the individual’s perception of the ease or difficulty of undertaking a specific behavior (Ajzen & Fishbein, 1980). Perceived behavioral control may directly affect behavior when an individual fails to recognize available resources and opportunities (Ajzen, 2002).

Ajzen (1991) expressed that PBC can directly influence real behavior. PBC may be affected by control ability and control belief (Bandura, 1986). According to Taylor and Todd (1995), perceived behavioral control reflects the degree to which an individual perceives his/her behaviors that are controlled. Perceived behavioral control has been considered one of the three variables that determine the customers’ behavioral intention in the Theory of Planned Behavior (Fishbein & Ajzen, 1975). Hence, the sixth hypothesis is:

H5: Perceived behavior control has a significant impact on purchase intention.

2.5 Perceived Quality

Perceived quality is the consumer’s evaluation of a recent consumption experience regarding a product’s excellence (Baker et al., 2010; Yoo et al., 2000). Product perceived quality can be defined as “the consumer’s view about a product’s overall excellence” (Zeithaml, 1988, p. 3). Quality is usually divided into objective and subjective aspects: “objective quality is the physical characteristics of products, and subjective quality is the quality as perceived by consumers” (Grunert, 2005, p. 371). Many researchers determined the active effect of perceived quality on consumers’ purchase intentions (e.g., Baek et al., 2010; Hao et al., 2007; Tsiotsou, 2006; Zeithaml et al., 1996). Consumers in developing countries think the quality of foreign brands is better (Kinra, 2006).

In a study by Bao et al. (2011) on private labels, it has been concluded that consumers are more likely to buy high-quality products. A similar study carried out by Fan et al. (2021) also demonstrated that the perceived quality is worth gaining more significance rather than other factors, including price sensitivity, especially when the consumers make decisions on their behavior of buying the products. Hence, a hypothesis is indicated:

H6: Perceived quality has a significant impact on purchase intention.

2.6 Purchase Intention

Purchase intention refers to the possibility that a consumer prepares or is willing to buy a certain brand in the future (Huang et al., 2011). Consumers’ attitudes toward a specific brand directly impact their purchasing intention (Pradhana et al., 2016). Kudeshia and Kumar (2017)

emphasize that user evaluation can influence consumers’ purchase intention. Lee et al. (2011) stress that a stronger perceived credibility of online reviews causes a higher purchase intention. Demographics (such as age and gender) have been found to influence online purchase intention (Lian & Yen, 2014; Lowry et al., 2009) and moderate the effects of other purchase intentions. Consumers who are effectively satisfied with the purchase of a brand tend to re-purchase the brand even when provided with other options (Gobe, 2001).

3. Research Methods and Materials

3.1 Research Framework

This study aims to examine the elements influencing consumers’ purchase intention of new energy vehicles in Sichuan, China. The conceptual framework for this research originates from the previous theories and empirical research, and all the variables are demonstrated in Figure 1. The main theories provide the study with the variables, including attitudes, trust, perceived risk, purchase attitude, perceived behavioral control, perceived quality, and purchasing intentions. The first framework comes from a study conducted by Teng and Wang (2015) that researched the relations between trust and attitudes, trust and purchase intentions, and attitudes and purchase intentions. The second framework adopted by Wang et al. (2013) illustrates the study of the relations between perceived risk and purchase attitudes, purchase attitudes and purchase intentions, and perceived behavioral control and purchase intentions. The last research framework that Yan et al. (2019) employed studied the relationship between perceived quality and purchase intentions.

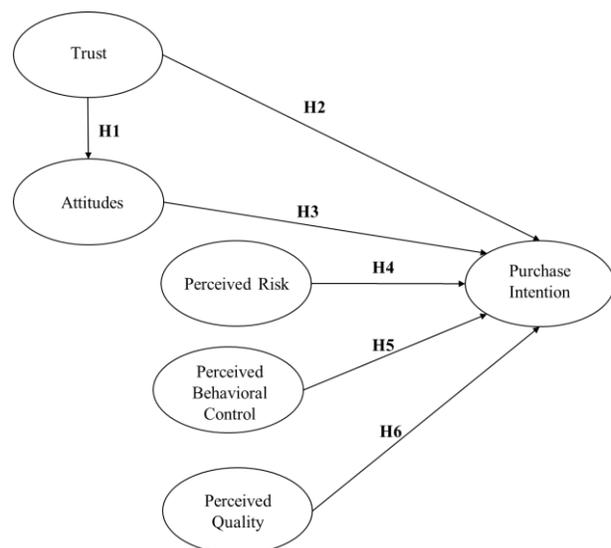


Figure 1: Conceptual Framework

- H1:** Trust has a significant impact on attitudes.
H2: Trust has a significant impact on purchase intention.
H3: Attitudes have a significant impact on purchase intention.
H4: Perceived risk has a significant impact on purchase intention.
H5: Perceived behavior control has a significant impact on purchase intention.
H6: Perceived quality has a significant impact on purchase intention.

3.2 Research Methodology

In this study, all participants must answer the whole part of the questions displayed in a questionnaire. The researcher produced the questionnaire, facilitated to the respondents, and collected the data via an online platform. The questionnaire consists of screening questions, measuring items, and demographic information.

During the index of item-objective congruence (IOC) approach, the experts were asked to rate each item on a scale of 1, 0, and -1. After the three experts had evaluated all the items, the score for each item was inserted into the formula to calculate the project-goal conformance indicator. The index of the IOC rating form and the calculation part are shown in Appendix A. All 29 items were equal to or above 0.67, all considered valid for this research.

To enhance reliability, the researcher adopted a pilot test involving distributing the questionnaires via an online platform to 50 consumers interested in buying new energy vehicles living in Sichuan, China. Conclusively, the alpha coefficient of each construct in this study was above 0.6, meaning that all constructs were reliable and adequate to be applied as the research instrument (Hair et al., 2003).

After collecting the data, all the data were saved and then converted to SPSS data. The primary objective of this investigation is to utilize confirmatory factor analysis (CFA) and structural equation modeling (SEM).

3.3 Population and Sample Size

In this study, the target population was 18-30-year-old consumers who own or are interested in purchasing new energy vehicles in Sichuan, China. Boomsma (1985) mentioned that the minimum sample size requirement for using SEM should be around 100 to 200. Therefore, the most appropriate sample size decided by the researcher was 500.

3.4 Sampling Technique

This study collects the data using judgmental, convenience, and snowball sampling. Per judgmental sampling, the researcher selects 18-30-year-old consumers

who own or are interested in purchasing new energy vehicles in Sichuan, China. Convenience sampling: The research distributed the questionnaires using convenience sampling and chose the respondents based on their willingness and availability. Moreover, snowball sampling is theoretically random, but rather, it is a doctrine that should be practiced and selected as a convenient sampling method.

4. Results and Discussion

4.1 Demographic Information

Based on the data presented in Table 1, the study involved 1,000 participants. The participants between 18-30 years old show that among the surveyed individuals, 54.6% are male, while 45.4% are female. The largest occupational group is Government/Corporate Employees, constituting 45.8% of the respondents. Business Owners comprise 23.6% of the population, followed by Self-Employed individuals at 15.6%. A smaller proportion consists of Students (9.0%), Retirees/Unemployed individuals (4.4%), and Others (1.6%). The majority of respondents (70.2%) hold a Bachelor's degree. 18.0% of individuals have a Master's degree, while 6.8% possess a Doctorate. Those with education below a Bachelor's degree account for 5.0% of the population. The income distribution among the surveyed individuals is Less than \$500: 2.0%, \$501 to \$1000: 6.4%, \$1001 to \$1500: 18.2%, \$1501 to \$2000: 47.0%, and more than \$2000: 26.4%.

Table 1: Demographic Profile

Demographic and General Data		18-30 Years old (n=500)	
		Frequency	Percentage
Gender	Male	273	54.6%
	Female	227	45.4%
Occupation	Student	45	9.0%
	Government/Corporate Employee	229	45.8%
	Business Owner	118	23.6%
	Self-Employed	78	15.6%
	Retire/Unemployed	22	4.4%
	Other	8	1.6%
Education	Below Bachelor's Degree	25	5.0%
	Bachelor's Degree	351	70.2%
	Master's Degree	90	18.0%
	Doctorate Degree	34	6.8%
Income	Less than \$500	10	2.0%
	\$501 to \$1000	32	6.4%
	\$1001 to \$1500	91	18.2%
	\$1500 to \$2000	235	47.0%
	More than \$2000	132	26.4%

4.2 Confirmatory Factor Analysis (CFA)

Before delving into the examination of the measurement model within the structural equation model (SEM), we first conducted Confirmatory Factor Analysis (CFA). The results of the CFA emphasized the significance of all items within each variable, as indicated by their substantial factor loadings. This robustly supports the concept of discriminant validity. Following the guidelines outlined by Stevens (1992), an item

was considered satisfactory when its loading exceeded 0.40, along with a p-value below 0.05 for Confirmatory Factor Analysis. Furthermore, in line with the recommendations put forth by Fornell and Larcker (1981), we took into account that while an Average Variance Extracted (AVE) value below 0.5 might still be acceptable, it is imperative to maintain a Composite Reliability (CR) above 0.6 to ensure the construct's convergent validity remains robust.

Table 2: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
1. Trust	Chawla and Joshi (2019)	6	0.855	0.678-0.738	0.856	0.498
2. Attitudes	Chawla and Joshi (2019)	5	0.844	0.647-0.792	0.846	0.524
3. Perceived Risk	Wang et al. (2013)	6	0.824	0.608-0.712	0.828	0.446
4. Perceived Behavioral Control	Lee et al. (2011)	4	0.827	0.675-0.810	0.829	0.549
5. Perceived Quality	Yan et al. (2019)	4	0.772	0.582-0.758	0.779	0.470
6. Purchase Intention	Teng and Wang (2015)	4	0.807	0.674-0.780	0.696	0.535

Table 3 presents various indices utilized for evaluating model fit within the context of Confirmatory Factor Analysis (CFA) testing. For 18-30 years old, the computed values for these indices were as follows: CMIN/DF = 1.613, GFI = 0.926, AGFI = 0.912, NFI = 0.904, CFI = 0.961, TLI = 0.956, and RMSEA = 0.035. These values provide insights into the quality of fit between the model and the observed data.

Table 3: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	≤ 5.00 (Marsh et al., 2004)	583.886/362 = 1.613
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.926
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.912
NFI	≥ 0.80 (Wu & Wang, 2006)	0.904
CFI	≥ 0.80 (Bentler, 1990)	0.961
TLI	≥ 0.80 (Sharma et al., 2005)	0.956
RMSEA	≤ 0.08 (Pedroso et al., 2016)	0.035
Model summary		In harmony with empirical data

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index and RMSEA = Root mean square error of approximation

In accordance with the framework established by Fornell and Larcker (1981), an evaluation of discriminant validity entailed computing the square root of each Average Variance Extracted (AVE). In alignment with the results of this analysis, the computed discriminant validity values surpassed all inter-construct or inter-factor correlations, firmly reinforcing the credibility of the discriminant relationships. With both convergent and discriminant validity firmly established, the amassed evidence stands as substantial support for the confirmation of construct validity.

Table 4: Discriminant Validity

	PQ	T	ATT	PR	PBC	PI
PQ	0.686					
T	0.513	0.706				
ATT	0.622	0.509	0.724			
PR	0.579	0.651	0.568	0.668		
PBC	0.446	0.140	0.363	0.305	0.741	
PI	0.267	0.233	0.194	0.281	0.094	0.731

Note: The diagonally listed value is the AVE square roots of the variables

Source: Created by the author.

4.3 Structural Equation Model (SEM)

To compute these fit indices and refine the model, SPSS AMOS was employed in this study. The results for both groups indicate a good fit, as indicated by the following fit indices: For the 18-30 years old, CMIN/DF = 3.178, GFI = 0.856, AGFI = 0.831, NFI = 0.806, CFI = 0.858, TLI = 0.844, and RMSEA = 0.066.

Table 5: Goodness of Fit for Structural Model

Index	Acceptable	Statistical Values
CMIN/DF	≤ 5.00 (Marsh et al., 2004)	1179.090/371 = 3.178
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.856
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.831
NFI	≥ 0.80 (Wu & Wang, 2006)	0.806
CFI	≥ 0.80 (Bentler, 1990)	0.858
TLI	≥ 0.80 (Sharma et al., 2005)	0.844
RMSEA	≤ 0.08 (Pedroso et al., 2016)	0.066
Model summary		In harmony with empirical data

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index and RMSEA = Root mean square error of approximation

4.4 Research Hypothesis Testing Result

In summary, SEM is a valuable tool for analyzing complex relationships in research data, and the examination of standardized coefficients and t-values in Table 6 helped confirm the hypotheses at a significance level of $p < 0.05$, demonstrating the statistical validity of the relationships investigated in the study.

Table 6: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-Value	Result
H1: T→ATT	0.507	8.543*	Supported
H2: T→PI	0.103	1.588	Not Supported
H3: ATT→PI	-0.008	-0.123	Not Supported
H4: PR →PI	0.152	2.772*	Supported
H5: PBC→PI	-0.003	-0.064	Not Supported
H6: PQ→PI	0.144	2.572*	Supported

Note: * $p < 0.05$

Source: Created by the author

The relevant statistical data for H1 supported the hypothesis of a significant impact of trust on attitudes with a standardized coefficient value of 0.507. In the structured method, the standardized route coefficient value is 0.103, and H2 has been failed to validate a significant impact of trust on purchase intention. According to H3 analysis findings, attitudes have no significant impact on purchasing intention, with a standardized path coefficient value is -0.008. The statistical results of H4 support the hypothesis that perceived risk considerably impacts purchase intention with a standardized coefficient value of 0.152. In H5, the perceived behavior control does not significantly influence the purchase intention with a standardized path coefficient -0.003. H6 shows that perceived quality influences purchase intention with the standard coefficient value of 0.144.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

Consumer behavior is a complex interplay of various factors, including personal preferences, attitudes, and perceptions. While these factors are relevant across all age groups, research suggests that they may manifest differently among consumers of different ages. This study explores the intricate dynamics of consumer behavior across age group, with a specific focus on younger adults (18-30 years old) Through an analysis of key findings and their implications, we aim to provide actionable insights for businesses and

marketers seeking to tailor their strategies to different age segments.

A noteworthy finding of this research is the consistent significance of trust across both age groups. Trust emerged as a pivotal factor influencing consumer attitudes in both younger and older adults. Trust-building initiatives, therefore, should be central to marketing strategies, irrespective of the target age demographic. Establishing and maintaining trust through transparent communication, reliable customer service, and consistent product quality can foster long-term customer relationships

The research findings provide valuable insights into the relationships between various variables and their impacts on attitudes and purchase intention. Trust has a significant impact on attitudes. Purchase intention is significantly impacted by Perceived risk and perceived quality, but not by trust, attitude and perceived behavior control.

In summary, the research findings highlight age-related differences in the impact of variables on attitudes and purchase intention. While trust consistently influences attitudes in both age groups, its direct impact on purchase intention is not supported. Attitudes significantly impact purchase intention in the older age group but not in the younger group. Additionally, the influence of perceived risk, perceived behavior control, and perceived quality varies between age groups. These findings underscore the importance of considering age as a factor in understanding consumer behavior and decision-making processes. Further research could explore the underlying reasons for these age-related differences in greater detail.

5.2 Recommendation

The research findings have shed light on the significance of age as a determinant of consumer behavior and decision-making. These insights have practical implications for businesses and marketers looking to engage with diverse age groups effectively.

One of the key takeaways from the research is the importance of age-tailored marketing campaigns. It is essential for businesses to recognize that different age groups have distinct values, preferences, and motivations. Therefore, we recommend the development of marketing campaigns that are customized to resonate with the characteristics of each age demographic. Crafting messaging and visuals that align with the unique qualities of each group can significantly enhance campaign effectiveness.

Trust emerged as a critical factor influencing consumer behavior across all age segments. To build and maintain trust, businesses should invest in transparent communication, reliable customer service, and consistent product quality.

Trust-building initiatives should be a fundamental aspect of marketing strategies to foster long-term customer relationships.

Addressing perceived risks associated with products or services is particularly crucial for younger consumers (18-30 years old). To alleviate concerns and build confidence in your brand, provide clear information, warranties, and guarantees. Assuaging these perceived risks can be a decisive factor in attracting and retaining the trust of this demographic.

Recognizing the importance of perceived quality for younger consumers (18-30 years old), businesses should invest in product quality and ensure it is effectively communicated in marketing materials. Demonstrating a commitment to delivering high-quality products or services can attract the attention and loyalty of this demographic.

Consider implementing consumer education programs or content, especially for younger consumers. Educate them about the value and benefits of your products or services, empowering them to make informed decisions. Providing educational resources can position your brand as a trusted source of information.

5.3 Limitation and Further Study

While the current research has provided valuable insights into the impact of various factors on consumer behavior across different age groups, it is essential to acknowledge its limitations. The study primarily focused on one age groups (18-30 years old). Future research could expand the age ranges to include older adults and adolescents to provide a more comprehensive understanding of age-related differences in consumer behavior. The study may not have accounted for all relevant contextual factors that could influence consumer behavior. Future research could explore how cultural, economic, and social factors interact with age to shape consumer decisions. Finally, the research was conducted in a specific geographic region or cultural context. Future studies could adopt a cross-cultural approach to examine how age-related differences in consumer behavior manifest across diverse cultural backgrounds.

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