



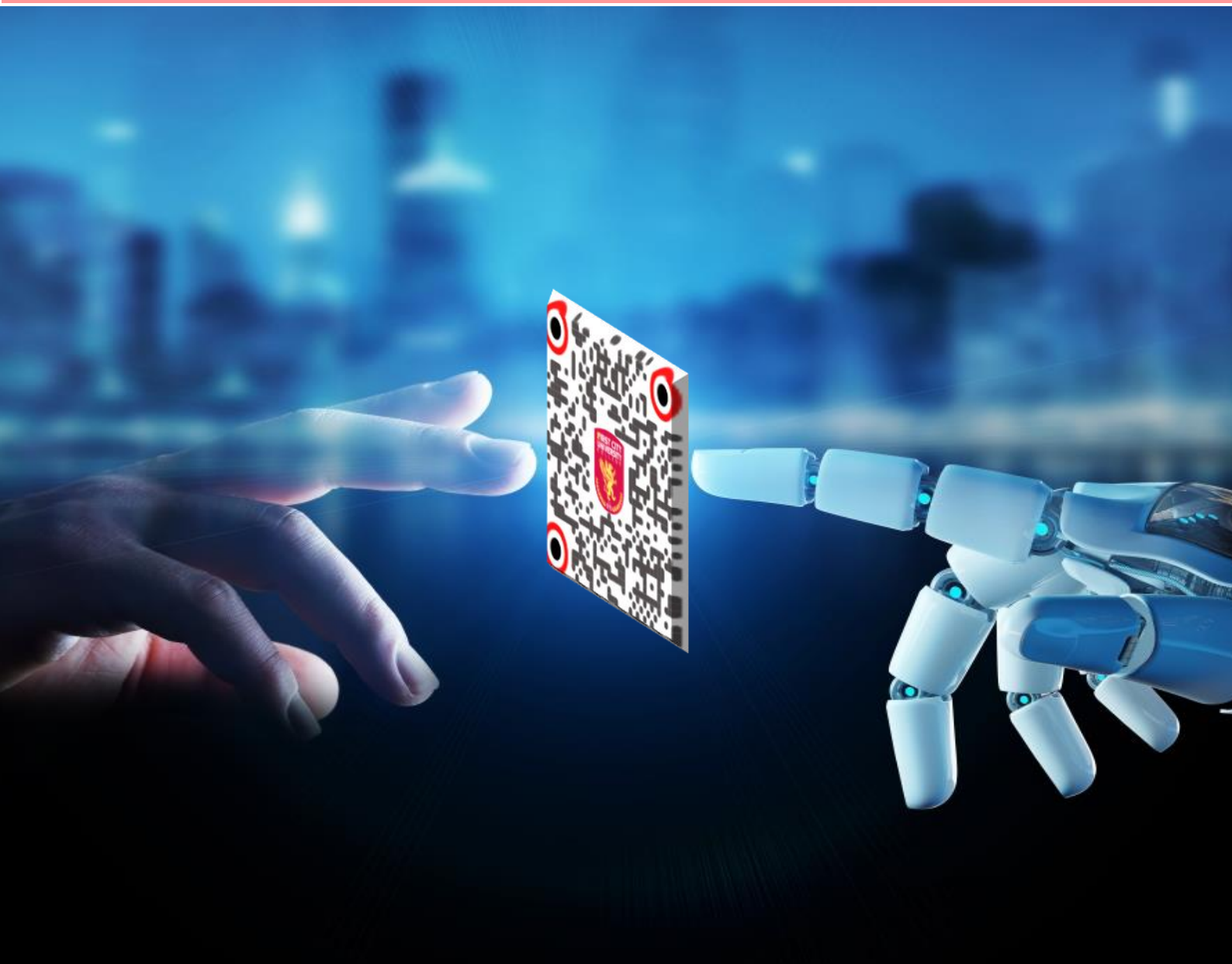
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THE EFFECTIVENESS OF ONLINE ADVERTISING IN INFLUENCING CONSUMERS' PURCHASING INTENTION: A CASE STUDY IN KLANG VALLEY, MALAYSIA

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ABSTRACT

This study investigates the key determinants of online advertisement effectiveness among consumers in Klang Valley, Malaysia. It examines the influence of three independent variables— informativeness, advertisement credibility, and entertainment elements—on overall advertisement effectiveness. A quantitative research design was employed and data were collected from 203 respondents in Klang Valley region using a structured questionnaire. The results of the statistical analysis indicate that all three independent variables have a significant positive relationship with online advertisement effectiveness. Informativeness enhances consumers' understanding and perceived usefulness of advertising content, while credibility strengthens trust and reduces skepticism toward the message. Additionally, entertainment elements contribute to higher engagement and more favorable emotional responses, further improving advertisement effectiveness. The findings underscore the importance of integrating informative, trustworthy, and engaging components when designing digital advertisements targeted at Malaysian urban audiences. This study contributes to the growing body of digital advertising literature and offers practical insights for marketers seeking to optimize online promotional strategies. Limitations and recommendations for future research are discussed to guide subsequent studies in this domain.

Keywords: Online Advertising, Advertisement Effectiveness, Informativeness Content, Credibility, Entertainment Elements

BACKGROUND OF STUDY

This research paper explores the dynamics of online advertising, emphasizing its rapid global growth and the pivotal role it plays in influencing consumer purchasing intentions. The global spending on online advertising is projected to reach \$1 trillion by 2026, underscoring its significance in the marketing landscape (Kumar, V., 2023). In Klang Valley, Malaysia, online advertising mirrors its popularity on a global scale, with 95% of Malaysian internet users

having encountered online ads in the past month and 72% attributing its influence to their purchasing decisions (Ahmad Zuhairi Zainuddin et al., 2023). Despite its effectiveness, online advertising faces challenges such as consumer ad-blindness and perceptions of intrusiveness. Consumers are increasingly adept at ignoring or skipping ads, posing a hurdle for advertisers to reach their intended audience (Rege, I., & Dimitrova, N., 2024). Additionally, the bombardment of ads can lead to frustration among consumers (Çelik, et al., 2023). However, this study underscores the enduring value of online advertising for businesses of all sizes, urging a nuanced understanding of its effectiveness in shaping consumer behaviour.

Despite these limitations, online advertising presents opportunities, notably in its ability to enable businesses to tailor ads to specific audiences, thereby reducing costs and maximizing revenue (Almestarihi et al., 2024; Jamal, Z., & Khan, I., 2024; Yendra, 2024). Chintalapati & Pandey (2021) identifies emerging trends in online advertising, including the increasing integration of artificial intelligence for targeted marketing and rapid result measurement. In the Klang Valley, Malaysia, Facebook, Google, and YouTube stand out as the most popular online advertising platforms, offering businesses the opportunity to target specific demographics (Nurlan et al., 2024)

Research Problem Statement

The research focuses on the relationship between credibility and effectiveness, seeking to uncover whether trustworthiness positively influences consumer behavior in online advertising. By understanding how information content, entertainment and credibility shape the effectiveness of online advertising, businesses can refine their strategies, resonate with target audiences and navigate the evolving landscape of digital marketing.

Research Question

Does information content influence the effectiveness of online advertising?
Do entertainment elements influence the effectiveness of online advertising?
Does credibility influence the effectiveness of online advertising?

Research Objectives

To explore the impact of information content on the effectiveness of online advertising.
To analyse the influence of entertainment elements towards the effectiveness of online advertising.
To analyse the impact of credibility element on the effectiveness of online advertising.

Research Significance

This study is of utmost importance in uncovering the complex nature of online advertising. By analyzing informativeness, credibility, and entertainment, it sheds light on key factors in this field. The research findings provide valuable insights for advertising professionals to create more impactful online campaigns.

Hypothesis

- H1: Information content has a positive relationship with the effectiveness of online advertising.
- H2: Credibility has a positive relationship with the effectiveness of online advertising.
- H3: Entertainment element has a positive relationship with the effectiveness of online advertising.

LITERATURE REVIEW

Informativeness

Numerous studies have been conducted in different scenarios to comprehend the effectiveness of advertising. Daems et al. (2019) studied how brand interactivity and message integration impact the responses of young teenagers to modern advertising formats. They suggested some changes to the existing theories. Zhang et al. (2020) discussed the relationship between social media mobility and online marketing. They found that consumer purchase intention on mobile platforms is positively influenced by factors like time flexibility, spatial, mobile lifestyle, and advertisement relevance. Lesscher et al. (2020) address the role of direct mailing in online and offline consumer activity metrics, revealing its significant influence on online search and clicking behaviour.

Hussain et al. (2021) delve into how pop-up advertisements in video games, link perceived advertising value to gamers' installation of the games. Munsch (2021) explores digital advertising strategies for millennials, considering their expertise in avoiding conventional digital advertising. Bigne et al. (2021) investigate the effectiveness of online advertising in social media, finding that synergies between social media and advertising content positively impact users' visual attention.

Lee et al. (2021) conducted a study to explore the impact of perceived micro-celebrity product image congruency and product type on the effectiveness of local advertising on Instagram. In

another study, Guo et al. (2021) introduced a novel embedding learning framework for numerical features in click-through rate (CTR) prediction. The framework showed improved performance in A/B tests on an advertising platform. Additionally, Hussain et al. (2022) conducted a study to deepen the theoretical understanding of consumer value co-creation through social media advertising. They identified entertainment, aesthetic appeal, interactivity and trendiness as significant factors that contribute to consumer value co-creation.

Credibility

Credibility is another important factor in online advertising effectiveness. Credible ads are perceived as being trustworthy and reliable. Consumers are more likely to be influenced by ads that they believe are coming from credible sources. One aspect of credibility that has been explored is the type of endorser used in advertising. Schouten et al. (2020) compared the effectiveness of celebrity endorsements versus influencer endorsements.

Lee and Kim (2020) investigated how disclosure types, influencer credibility and brand credibility affect the effectiveness of promotional posts in Instagram influencer marketing. The study revealed that highly credible brands featured in Instagram posts had a positive impact on message credibility, attitude toward the ad, purchase intention, and electronic word-of-mouth (eWOM) intention.

Studies show credible ads produce more favorable attitudes toward the advertisement and the brand by reducing perceived deception and enhancing trust transfer to the brand. For example, social media advertising studies report that credibility is one of the significant predictors of consumers' ad attitudes, alongside originality and irritation. (Pelet and Ettis, 2022)

Entertainment

Entertaining ads can capture consumers' attention and make them more likely to remember the ad and the products. Several studies have delved into the realm of advertising effectiveness, focusing on diverse aspects of consumer behaviour. Dhore & Godbole (2019) conducted a descriptive study in Nagpur City, exploring the impact of internet advertising on consumer buying behaviour across communication, entertainment, information search, and shopping.

Humor remains one of the most studied entertainment appeals. Recent empirical papers show humor can increase brand liking, memorability, and sharing in social media contexts—especially when humor is congruent with brand image and product category (Snyder, J. L. and Robert, F., 2024).

Storytelling and narrative transportation in online ads produce robust effects on attitudes toward the advertising. Studies demonstrate that narrative ads that foster transportation

reduce advertising skepticism and increase willingness to engage with content (e.g., longer watch times, clickthroughs). Story ads are particularly effective on video platforms and in longer ad formats that allow narrative development. (Deb et al., 2025)

RESEARCH MODEL

The research model for this study is shown in Figure 1. The independent variables taken in this study are Informativeness (I), Credibility (C) and Entertainment (E). The Advertising Effectiveness (AE) is the dependent variable. The variables for this study are adopted from Cho, V. (2021).

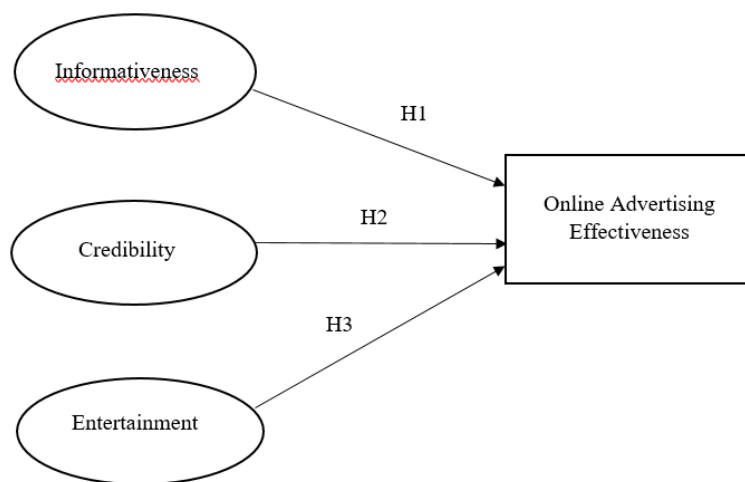


Figure 1: Research model represented the effectiveness of online advertising in influencing Consumer Purchasing intention: A case study in Klang Valley

RESEARCH METHODOLOGY

The article explores the examination of individuals based on demographic variables such as age, income, occupation, and education in Klang Valley, Malaysia. A random sampling technique, using convenience sampling methods, was utilized, and data was collected through a closed-ended questionnaire employing a Likert scale. The collected data was analyzed using the worksheet analysis method. The primary data was gathered through structured close-ended questionnaires, which were distributed online to specific individuals in Klang Valley. Participants were given 10 days to complete the survey, and the study's sample comprised 203 randomly selected respondents.

Measuring Instruments

Table 1 shows the questionnaire items were adopted and adapted from literature with modifications to suit the study. All of the items used a 5-point Likert scale, 1 = strongly disagree, 5 = strongly agree. The data was analyzed using IBM Statistical Package for the Social Sciences version 29 (SPSS).

RESULTS

Descriptive Analysis

Table 2: Distribution of respondents by demographic characteristics

Characteristic	Number of Respondents	Percentage of Respondents
Gender		
Male	76	37.4
Female	127	62.6
Age		
Below 20 years old	21	10.3
21- 29 years old	72	35.5
30 - 39 years old	60	29.6
40 years old and above	50	24.6
Ethnicity		
Malay	30	14.8
Chinese	142	70
Indian	30	14.8
Others	1	0.5
Level of Education		
Primary School	4	2
Secondary School	24	11.8
A Level	1	0.5
Diploma	34	16.7
Bachelor's Degree	104	51.2
Master Degree	29	14.3
PhD	7	3.4
Monthly Income		
Below RM1000	33	16.3
RM1000 – RM3999	43	21.2
RM4000 – RM5999	47	23.2
RM6000 – RM7999	44	21.7
RM8000 and above	36	17.7

Validity and Reliability Test

Table 3: Construct Validity

Construct	Number of items	Cronbach's alpha
Informativeness (I)	4	0.823
Credibility (C)	4	0.779
Entertainment (E)	4	0.929
Advertising Effectiveness (AE)	3	0.805

Table 3 shows the value of Cronbach's Alpha coefficients range from 0.779 to 0.929 which exceeds the recommended value of 0.70. Therefore, we can conclude that there is adequate convergence validity of the constructed measurement model.

Pearson Correlation of Informativeness and Advertising Effectiveness

Table 4 Pearson Correlation between Informativeness and Advertising Effectiveness

Correlations			
		I	AE
I	Pearson Correlation	1	.180 [*]
	Sig. (2-tailed)		.011
	N	200	200
AE	Pearson Correlation	.180 [*]	1
	Sig. (2-tailed)	.011	
	N	200	203

*. Correlation is significant at the 0.05 level (2-tailed).

The data reveals a Pearson correlation coefficient of 0.180 between Informativeness (I) and Advertisement Effectiveness (AE). This means that there is a weak positive correlation between the two variables. In other words, as the informativeness of an advertisement increases, the effectiveness of the advertisement also tends to increase, but the relationship is not very strong. The p-value for the correlation is 0.011, which is less than 0.05. This means that the correlation is statistically significant at the 0.05 level. In other words, there is a statistically significant relationship between Informativeness (I) and Advertisement Effectiveness (AE).

Pearson Correclation of Credibility and Advertising Effectiveness

Table 5 Pearson Correlation Between Credibility and Advertising Effectiveness

Correlations

		C	AE
C	Pearson Correlation	1	.293**
	Sig. (2-tailed)		<.001
	N	201	201
AE	Pearson Correlation	.293**	1
	Sig. (2-tailed)	<.001	
	N	201	203

** . Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation coefficient between advertisement credibility (C) and advertisement effectiveness (AE) is 0.293. This means that there is a weak positive correlation between the two variables and this correlation is deemed statistically significant at the 0.001 level.

Pearson Correlation of Entertainment

Table 6 Pearson Correlation between Entertainment and Advertising Effectiveness

Correlations

		E	AE
E	Pearson Correlation	1	.441**
	Sig. (2-tailed)		<.001
	N	200	200
AE	Pearson Correlation	.441**	1
	Sig. (2-tailed)	<.001	
	N	200	203

** . Correlation is significant at the 0.01 level (2-tailed).

The data reveals a Pearson correlation coefficient of 0.441 between entertainment (E) and advertisement effectiveness (AE). The coefficient of 0.441 suggests a positive correlation, indicating that as entertainment increases, advertisement effectiveness tends to increase as well. Besides, this correlation is deemed statistically significant at the 0.001 level.

DISCUSSION OF MAJOR FINDING

Summary of the hypothesis testing are as below:

Hypothesis	Significant Level (P- Value)	Results
H1: There is a positive relationship between information content and effectiveness of online advertising.	<0.011	Supported
H2: There is a positive relationship between credibility and effectiveness of online advertising.	<0.001	Supported
H3: There is a positive relationship between entertainment and effectiveness of online advertising.	<0.001	Supported

LIMITATION AND FUTURE RESEARCH

Despite providing meaningful insights into the determinants of online advertisement effectiveness, this study is subject to several limitations. First, the research was conducted solely within the Klang Valley. As a result, the findings may not fully represent consumer perceptions and advertising responses in other regions in Malaysia.

Second, the study included only three independent variables—Informativeness, Credibility, and Entertainment—to explain advertisement effectiveness. While these factors are well-established in the advertising value literature, online advertising effectiveness is a multidimensional construct. Other relevant predictors such as personalization, interactivity, emotional appeal, perceived intrusiveness and ad relevance were not included, potentially limiting the model's explanatory power.

Future research should consider expanding the geographical scope beyond Klang Valley to include different regions in Malaysia. This would allow comparative analyses and improve the generalizability of findings across diverse demographic and socio-economic groups.

Researchers may also broaden the conceptual model by incorporating additional variables that are becoming increasingly relevant in digital advertising research. These include personalization, interactivity, emotional appeal, ad relevance, perceived intrusiveness and brand familiarity.

CONCLUSION

The findings of this study provide strong empirical support for all three hypothesized relationships, demonstrating that informativeness, advertisement credibility and entertainment each play a significant role in enhancing advertisement effectiveness. First, the support for **H1**

confirms that informative advertisements are more likely to capture attention, facilitate consumer understanding, and positively influence audience evaluations.

This aligns with past digital advertising research emphasizing that consumers value advertisement that deliver relevant and useful information.

The support for **H2** underscores the centrality of credibility in shaping consumer responses. When advertisements are perceived as trustworthy, accurate and reliable, consumers are more inclined to accept the message, develop favorable attitudes and engage in desired behaviours. Credibility effectively reduces skepticism, which is increasingly important in today's highly saturated online advertising environment.

The confirmation of **H3** highlights the importance of entertainment elements in digital advertising. Entertaining content—through humor, creativity, emotional appeal, or interactive features—enhances engagement, improves message recall and creates positive affective responses that ultimately strengthen advertisement effectiveness.

In conclusion, these findings emphasize that effective advertisements must balance information provision, credible messaging, and engaging entertainment value. Marketers should therefore adopt a holistic approach in designing online advertisements, ensuring that messages are not only informative and trustworthy but also compelling enough to capture and sustain consumer interest. This integrated strategy is essential for optimizing advertising performance in increasingly competitive digital platforms.

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Appendix A – Questionnaire

The Effectiveness of Online Advertising in Influencing Consumer's Purchasing Intention: A Case Study in Klang Valley

Dear Participants,

I am inviting you to participate in this research by completing the following survey. This research investigates the effectiveness of online advertising in influencing consumers' purchasing intention in Klang Valley, Malaysia. Thank you for taking the time to assist me with this research. The data collected will remain confidential and used solely for academic purposes.

Section A Demographic

Please fill in your information by selecting the appropriate options.

1. Gender

☐ Female ☐ Male

2. Age

☐ Below 20 years old ☐ 21- 29 years old
☐ 30 - 39 years old ☐ 40 years old and above

3. Education Level

☐ Primary School ☐ Secondary School
☐ A-Level ☐ Diploma
☐ Bachelor's degree ☐ Master
☐ PhD

4. Ethnicity

☐ Malay ☐ Chinese ☐ Indian ☐ Other:

5. Marital Status

☐ Single ☐ Married ☐ Other:

6. Monthly Income

☐ Below RM1,000 ☐ RM 1,000 - RM 3,999
☐ RM 4,000 - RM 5,999 ☐ RM 6,000 - RM 7,999
☐ RM 8,000 and above

Section B Likert Scale

Please indicate the extent to which you agree or disagree to the following statements.

Strongly Disagree(SD)	Disagree (D)	Neutral (N)	Agree (A)	Strongly Agree (SA)
1	2	3	4	5

No.	Statement	SD	D	N	A	SA
		1	2	3	4	5
Informativeness						
1	The information in online advertisement is sufficient					
2	I seek more information from different sources before purchasing the product or services.					
3	The information provided in the online advertisement content is clear and easy to understand.					
4	The information provided valuable insights and knowledge on the products.					
Credibility						
1	The online advertisement is true and can be trusted					
2	The online advertisement is logic					
3	The customers reviews are more credible					
4	The customer's review are more credible if the Brand/product of the reviewer is available.					

Entertainment						
1	Online advertisement photograph/images are attractive					

2	Online advertisements is fun					
3	Online advertisements are in bright colours					
4	Online advertisement music and animation are attractive					

Advertising Effectiveness

1	Effective advertisement create interest towards the products					
2	Effective advertisement motivates you to buy the product					
3	Effective advertisement arouses the curiosity about the product					

- THANK YOU-

THE IMPACT OF INTERNET-DRIVEN INNOVATIONS ON THE SUPPLY CHAIN EFFICIENCY OF HALAL SMES IN MALAYSIA

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ABSTRACT

This study explores the impact of internet-based innovations both financial and operational on the supply chain performance of halal small and medium-sized enterprises (SMEs) in Malaysia. Drawing on the Resource-Based View (RBV), it adopts a mixed-methods approach combining quantitative data from 368 halal SME owners and qualitative insights from 20 innovation experts. Results show that electronic payments, online lending, and e-commerce significantly enhance financial capabilities, while operational tools like customer engagement platforms, enterprise web applications, and product innovation drive efficiency and competitiveness. The mediating role of management innovativeness is also substantiated. These findings underscore the critical need for halal SMEs to embrace digital transformation to thrive in the post-pandemic economy.

Keywords: Internet-based innovation, Halal SMEs, Supply Chain Performance, Digital transformation, financial innovation, Operational innovation, Malaysia

INTRODUCTION

Supply chain performance is central to the competitiveness and sustainability of modern enterprises. For halal SMEs in Malaysia—a vital segment of the national economy—digital innovations offer a lifeline amid disruptions, especially in the wake of Covid-19 (Gunasekaran et al., 2017; Ibarra et al., 2020). Despite global demand for halal products, Malaysia command just 1% of the market share (Mohd Yatid, 2020), suggesting a substantial opportunity gap that internet-based innovations could fill.

Halal SMEs face challenges such as limited access to financing and lagging digital adoption (World Bank Group, 2018). This study addresses the need for empirical insights into how

financial and operational innovations—like e-payments, online lending, e-commerce, and enterprise applications—can enhance supply chain performance in halal SMEs.

LITERATURE REVIEW

Halal Industry in Malaysia

Malaysia is recognized as a global halal hub, with comprehensive certification standards via JAKIM and a thriving ecosystem supported by agencies like HDC (Zailani et al., 2022; Osman et al., 2020). Yet, SMEs still struggle with digital readiness and global competitiveness.

Internet-Based Innovations

Financial Innovations: These include peer-to-peer lending, e-payments, and crowdfunding platforms that offer halal SMEs access to alternative financing (Lin et al., 2015; Wang et al., 2015). Ethis Malaysia and B2B Finpal are notable platforms.

Operational Innovations: Tools such as online customer engagement, enterprise web applications, and digital product innovation streamline operations and improve customer experiences (Nylén & Holmström, 2015; Perez-Vega et al., 2021)

Theoretical Framework: Resource-Based View (RBV)

RBV posits that firms can gain sustained competitive advantages through the strategic use of rare, inimitable, and valuable resources—including digital capabilities (Barney, 1991; Sharma et al., 2022). This theory underpins the study's exploration of internet-based innovations as internal resources that enhance supply chain efficiency.

METHODOLOGY

Research Philosophy and Approach

This study adopts a pragmatic research paradigm, which accommodates both positivist and interpretivist perspectives. Pragmatism is particularly well-suited to complex, real-world business issues as it emphasizes practical solutions and outcomes (Creswell & Plano Clark, 2018). The philosophical assumption here is that knowledge is best generated through the integration of both objective measurements (quantitative) and subjective understanding (qualitative), thereby enhancing the richness and applicability of the findings. The study uses

an **abductive reasoning approach**, allowing for the iterative movement between theory and data, which is appropriate for theory development and refinement—especially when exploring under-researched phenomena such as digital transformation in halal SMEs.

Research Design

A mixed-methods sequential explanatory design was adopted, which comprises two distinct phases:

- **Quantitative Phase:** This involved a structured survey distributed to 368 halal SME owners and managers in Malaysia across key sectors such as food, cosmetics, and pharmaceuticals. This phase aimed to statistically test the relationships among internet-based innovations, management innovativeness, and supply chain performance.
- **Qualitative Phase:** Semi-structured interviews were conducted with 20 corporate innovation experts, government officers from Halal Development Corporation, and SME advisors. This phase explored the contextual enablers, barriers, and strategic considerations behind the adoption of internet-based innovations.

This design not only tested theoretical assumptions quantitatively but also added depth and context through qualitative insights.

Population and Sampling

The target population included halal-certified SMEs in Malaysia engaged in manufacturing and service sectors. For the quantitative phase, a purposive sampling strategy was used to ensure the respondents were directly involved in supply chain decision-making. Based on guidelines by Hair et al. (2018), a minimum sample of 300 was required for SEM, and 368 responses were collected to enhance statistical power.

In the qualitative phase, expert sampling was used. Respondents were selected based on their knowledge, experience, and involvement in SME innovation or policy-making. Interviews continued until data saturation was reached.

Data Collection Instruments

- **Survey Questionnaire:** Structured into three sections:
 1. Demographics
 2. Internet-based financial innovation (e.g., e-payment, P2P lending)
 3. Internet-based operational innovation (e.g., customer engagement, product innovation)

All items used 5-point Likert scales and were adapted from validated scales in prior studies (e.g., Wang & Dass, 2017; Perez-Vega et al., 2021).

- **Interview Guide:** The qualitative instrument included open-ended questions aimed at uncovering strategies, challenges, and perceived impacts of digital innovation adoption. Probing questions allowed for deeper exploration of emergent themes.

Data Analysis

Quantitative data were analyzed using SPSS for descriptive statistics and AMOS for Structural Equation Modeling (SEM). The SEM procedure included:

- Exploratory Factor Analysis (EFA)
- Confirmatory Factor Analysis (CFA)
- Structural path modeling
- Mediation analysis via bootstrapping

Reliability (Cronbach's $\alpha > 0.70$), construct validity ($AVE > 0.5$), and discriminant validity (Fornell-Larcker criterion) were confirmed.

Qualitative data were transcribed, coded, and analyzed thematically using NVivo 12. Coding followed Braun and Clarke's (2006) six-step framework, and themes were aligned with RBV and supply chain performance models.

Ethical Considerations

Ethical approval was obtained from the university ethics board. Informed consent was obtained from all participants. Data were anonymized and stored securely, following GDPR and Malaysian PDPA compliance standards.

RESULTS

Quantitative Findings

All forms of internet-based innovation were significantly and positively related to supply chain performance. Structural modeling confirmed the following hypotheses:

- **H1:** E-payment $\rightarrow$ SCP ($p < 0.01$)
- **H2:** Online Lending $\rightarrow$ SCP ($p < 0.01$)
- **H3:** E-commerce $\rightarrow$ SCP ($p < 0.01$)
- **H4–H6:** Operational innovations positively affect SCP.

- **H7:** Management innovativeness mediates the relationship between innovations and SCP.

Qualitative Insights

Experts emphasized the importance of change management, digital literacy, and the integration of customer feedback systems. Web applications were found critical for traceability and compliance in halal supply chains.

DISCUSSION

Based on the firm's Resource-Based View (RBV), this study aimed to investigate how internet-based innovations affected the supply chain performance (SCP) of halal SMEs in Malaysia. The results indicate that both financial (e.g., electronic payment, online financing, e-commerce) and operational (e.g., online customer engagement, enterprise web applications, product innovation) internet-based innovations substantially improve SCP. The findings also demonstrate the mediating function of management innovation, providing fresh perspectives on how managerial innovation orientation enhances the advantages of digital tools.

Financial Innovations and Supply Chain Efficacy

The quantitative results show that financial innovations, particularly online lending, e-payments, and e-commerce, have a high, positive correlation with SCP. These solutions diminish transaction friction, enhance cash flow management, and broaden market access.

E-payments (supported by H1): These technologies expedite working capital turnover, lower transaction costs, and simplify payment processing. In accordance with Nasr et al. (2020) and Kilay et al. (2022), the results indicated that halal SMEs utilizing e-payment platforms such as FPX, DuitNow, and Islamic fintech applications achieved enhanced transaction efficiency and expedited order fulfillment—two critical measures of supply chain performance.

Online lending (P2P) (H2 supported): Websites such as Funding Societies and Ethis Malaysia offer halal-compliant substitutes for conventional banking, filling the funding gap that SMEs encounter (Lin et al., 2015). Interviewees indicated that online financing alleviated cash flow difficulties, especially during the pandemic. This corresponds with Rumky et al. (2023), who discovered that fintech-supported SMEs exhibited enhanced operational resilience.

E-commerce (supported by H3): The results confirm that e-commerce platforms increase market reach and accelerate sales. In addition to augmenting sales volume, these platforms improve order visibility and customer responsiveness—factors that directly affect SCP

(Aljoghaiman & Bhatti, 2022). Interviewees observed that Shopee, Lazada, and Halal marketplaces such as Zilzar enhanced inventory management and customer care integration.

Operational Innovations and Supply Chain Efficacy

Internet-driven operational improvements substantially enhance performance by optimizing internal processes, facilitating swift market responsiveness, and improving customer interaction.

Online consumer engagement (H4 supported): Interactions with customers through social media, email campaigns, live chat, and reviews facilitate the collection of insights, the cultivation of loyalty, and the personalization of offerings. This outcome corresponds with Hollebeek et al. (2022), who highlighted participation as a strategy for value co-creation within digital ecosystems. Qualitative findings indicated that SMEs utilizing platforms such as WhatsApp Business or Facebook Messenger saw enhanced customer retention and improved feedback loop integration.

Enterprise online applications (H5 compatible): Cloud-based solutions such as QuickBooks, Xero, and inventory management systems enabled data consolidation and enhanced coordination among procurement, inventory, and distribution operations. These findings corroborate Buja et al. (2024), who highlighted the efficacy of digitized financial systems in halal SMEs. Participants emphasized the significance of intuitive interfaces and real-time data for prompt decision-making.

Product innovation (H6 supported): Halal SMEs were able to offer specialized or customized products and shorten product development cycles thanks to digital technologies. Some companies implemented QR code traceability to ensure halal authenticity, satisfying regulatory and consumer demands. This corroborates Babina et al. (2024), who contended that digital tools diminish the expense and risk associated with experimenting.

The Mediating Role of Management Innovativeness

The mediating analysis revealed that management innovativeness is essential for transforming digital capabilities into performance. Small and medium-sized enterprises managed by individuals with a strong inclination to experiment, undertake calculated risks, and invest in technology were more likely to achieve improvements in supply chain performance. This corroborates the findings of Wang and Dass (2017), who contend that managerial attitudes are pivotal to the success of organizational innovation.

Qualitative responses corroborated this, with experts indicating that digital tools are not transformative in isolation but require strategic leadership and a culture geared towards learning for effective implementation. Interviewees recognized resistance to change, insufficient training, and fear of failure as prevalent obstacles faced by SME owners.

Consequently, management attitude serves as either a catalyst or a hindrance to digital change.

Integration with the Resource-Based View (RBV)

Using digital technologies as strategic resources that satisfy the VRIN (Valuable, Rare, Inimitable, and Non-substitutable) criteria—particularly when paired with complementary assets like creative leadership and process redesign—this study expands on the RBV framework. Internet-based innovations satisfy the "valuable" criterion by enhancing information flows, decreasing costs, and augmenting responsiveness. Their scarcity is attributed to the extent to which SMEs utilize them strategically instead of operationally.

The interplay between technological adoption and innovativeness reinforces the Resource-Based View (RBV) assertion that resource bundles, rather than individual capabilities, are the genuine source of competitive advantage (Barney, 1991; Sharma et al., 2022). For instance, the integration of e-commerce with customer feedback and real-time inventory systems constitutes a whole package that enhances supply chain performance more efficiently than any singular element.

Conformity with National Policy and Post-COVID Imperatives

The results possess practical significance for Malaysia's national development plan. The 10-10 MySTIE Framework, Halal Industry Master Plan 2030, and National Digital Economy Blueprint (MyDIGITAL) promote innovation-centric growth and the digital transformation of SMEs. This study provides empirical evidence for these strategies by affirming the strategic significance of digital adoption in the halal SME sector.

In addition, the COVID-19 epidemic served as a digital stimulant for numerous businesses. Participants characterized the crisis as a "inflection point" that compelled hesitant enterprises to adopt digital tools for survival. This indicates that global research demonstrates crises expedite the adoption of innovation (Bartik et al., 2020).

IMPLICATIONS

Theoretical

The study extends RBV theory to halal SME contexts, integrating digital finance and operations into strategic resource frameworks.

Practical

SMEs should integrate digital tools for end-to-end supply chain visibility. Government programs like MySTIE and HIMP 2030 can benefit from these findings to shape digitalization policy.

CONCLUSION

This study examines how internet-based financial and operational innovations impact the supply chain performance of halal SMEs in Malaysia, adding to both academic literature and practical expertise. Grounded in the Resource-Based View (RBV), the results confirm that digital technologies, when combined with management innovation capabilities, function as strategic assets that enhance efficiency, customer happiness, and market responsiveness.

The findings demonstrate that e-payment platforms, online financing, and e-commerce substantially improve the financial agility of SMEs, facilitating superior cash flow management and transaction efficiency. Concurrently, customer engagement tools, enterprise web applications, and product innovation enhance operational agility, traceability, and product-market alignment. Management innovativeness appeared as a major mediating factor, emphasizing that leadership attitudes and risk-taking behavior are essential for effective digital transformation. This research supports government programs like MySTIE, HIMP 2030, and the SME Digitalization Grant by offering actual proof of the advantages of digital adoption. Nonetheless, the report highlights the necessity for capacity building, change management training, and enhanced digital infrastructure, particularly in rural regions.

Academically, this study expands on RBV by fusing it with ideas on halal supply chains and digital innovation, providing a fresh viewpoint on competitive advantage in Islamic economies. The study's mixed-methods approach enhances the current body of knowledge by corroborating quantitative connections and contextualizing them with qualitative accounts.

Limitations include the survey data's cross-sectional nature and its regional concentration on Malaysia. Future research may examine longitudinal effects, compare outcomes among OIC nations, or conduct an in-depth analysis of specific hurdles to innovation uptake.

In conclusion, internet-based innovations are essential for halal SMEs aiming to scale, thrive, and compete in the digital economy. Through the integration of strategic management and technology adoption, these businesses can improve the performance of their supply chains, make significant contributions to national development objectives, and establish themselves as leaders in the global halal market.

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AN INVESTIGATION OF FACTORS INFLUENCING CONSUMER BUYING BEHAVIOUR OF GREEN PRODUCTS IN KLANG VALLEY, MALAYSIA

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ABSTRACT

Environmental deterioration brought about by consumers' non feasible utilisation pattern is putting a pressure on the environment and is obstructing sustainable development. The green marketing concept has been implemented in many businesses in Malaysia but it is not easily introduced. Many consumers are concerned about environmental issues and have expressed interest in purchasing green products. However, actual sales of green products are still not as high as expected. This study utilised theory of planned behaviour (TPB) model that links to environmental concerns, perceived image of private enterprise, consumer innovativeness, and environmental knowledge of green consumer products. (Rukhsar et al., 2024) Regarding the direct effect on green purchase intention, there are three main independent variables: environmental concerns, price sensitivity and personal values which results impacting on green product purchase intention. A total of 250 respondents comprised of tertiary students that reside in the Klang Valley area, Malaysia participated in this survey. The result of this study indicates a significant positive relationship between all three of the independent variables which are environmental concerns, personal values and price factors and dependent variable, which is consumer purchasing intention. By studying the variables that influence the purchase intention of environmentally friendly products, businesses can identify unexplored market opportunities and adapt their strategies accordingly.

Keywords: Environmental Deterioration, Green Marketing, Consumer Innovativeness, Environmental Concerns, Purchase Intentions

INTRODUCTION

The primary objective of this research is to examine the variables that affect tertiary students' purchase decisions of environmentally friendly goods.

Customers are focusing their purchasing behaviour on green items as a result of the growing emphasis on environmentally conscious goods and services. The notion of sustainable development emerged from this environmental consciousness and concern, emphasising the need for sustainability and advocating for growth that has the least negative effects on the environment and society (Tseng, M., Chiu, A.S., & Liang, D. 2018).

Malaysian consumers have relatively small levels of environmental awareness when it comes to buying green items (Wijekoon & Sabri, 2021). Situations such as these demonstrate that some consumers favour product convention despite the negative environmental implications of conventional items (Yeng et al., 2015).

Problem Statement

Malaysian consumers are becoming more conscious of the effects their purchase choices have on the environment (Azmi et al., 2022). Consequently, there is an increasing need for environmentally-friendly products. Nevertheless, some obstacles continue to impede the extensive acceptance of environmentally friendly products in Malaysia. The perceived price premium is a significant obstacle to the widespread acceptance of environmentally friendly products. Green items are commonly regarded as having a higher price tag compared to non-green products (Aghayev & Israfilzade, 2022).

Acquiring environmentally friendly products in Malaysia can be challenging, and certain retailers may charge high prices for them. Studies suggest that buyers may be reluctant to acknowledge the benefits of environmentally friendly products due to the difficulties in finding stores who sell these products and the comparatively higher prices of such goods (Kim & Lee, 2023). To facilitate consumers in finding environmentally friendly products and ensuring affordable delivery, marketers have begun implementing green marketing strategies. Customers are likely to have a greater willingness to purchase environmentally friendly items if they can readily distinguish them and if they are affordable, hence enhancing consumer motivation to acquire green products. Furthermore, purchasers of these materials encounter challenges stemming from a scarcity of consumer confidence in environmentally friendly products (Latip et al., 2021).

Research Questions

1. What is the relationship between environmental concern and the customer's buying intentions?
2. What is the relationship between personal values and the customer's buying intentions?
3. What is the relationship between price sensitivity and the customer's buying intentions?

intentions?

Research Objectives

1. To examine how environmental concern factors affects consumer buying intentions towards green products in Malaysia.
2. To examine the relationship of personal values that affects consumer buying intentions towards green products in Malaysia.
3. To examine the roles of price sensitivity that affects consumer buying intentions towards green products in Malaysia.

Significance of the Study

In light of growing environmental concerns and the pressing issue of climate change, it is imperative to first and foremost understand how consumers respond to eco-friendly products (Purnomo et al., 2022).

Furthermore, this study focuses specifically on Malaysia, allowing for a comprehensive understanding of consumer behaviour within a specific context influenced by distinct economic, cultural, and regulatory factors (Fong et al., 2023). These concepts may be beneficial for businesses, decision-makers, and environmental activists seeking to tackle sustainability concerns in Malaysian society. Malaysia is currently experiencing a surge in enthusiasm towards environmentally-friendly products, mirroring a worldwide phenomenon. By studying the variables that influence the utilisation of environmentally friendly products, businesses can identify unexplored market opportunities and adapt their strategies accordingly (Ismail, 2023). This investigation can also serve as a catalyst for enhancing consumer awareness regarding the environmental impact of goods and the benefits of choosing more sustainable alternatives. It can direct meticulously selected educational initiatives aimed at enhancing consumer consciousness and promoting environmentally conscious choices.

Most important of all, according to Al-Haddad et al. (2022) the study's findings might have an immediate effect on public policy, influencing Malaysia's development of regulations pertaining to eco-labeling, environmentally friendly accreditation, and incentives for sustainable consumption. The way that customers act could be significantly impacted by these regulations. The study's conclusions also have applications for businesses. They may utilise this information to enhance their product development, marketing, and supply chain management in an effort to fulfil the growing demand for environmentally friendly products.

Furthermore, the global significance of the study should not be underestimated. The issues investigated in this study transcend national borders and have implications for global initiatives aimed at fostering sustainable practices (Reid et al., 2022). Hence, the discoveries could be relevant in other domains confronting similar sustainability challenges. This study

contributes to the existing body of knowledge on consumer attitudes towards environmentally friendly items from an academic perspective. It enhances our understanding of individuals' decision-making processes about environmental matters and may inspire further investigation in this crucial field. The research examines a crucial subject in response to Malaysia's evolving consumer environment and the global emphasis on sustainable practices (Al-Kumaim et al., 2021). The researcher's findings have the potential to impact firm decisions, business strategies, and the development of a more ecologically aware society, both inside Malaysia and on a global scale.

LITERATURE REVIEW

Environmental Concern

Environmental concern, a significant factor being studied, plays a vital role in influencing customer attitudes and behaviours towards environmentally friendly products. Academics suggest that an increased level of environmental consciousness pushes individuals to make decisions that are more sustainable. Environmental concern encompasses the understanding of ecological issues and the readiness to endorse and actively participate in the resolution of environmental challenges (Chuah et al., 2020 & Santos et al., 2021).

The active participation of consumers serves as a means of achieving ecological principles by promoting environmental preservation (Mariyam, 2023). The manifestation of consumers' inclination to recycle products, demonstrate concern for environmental degradation, and allocate funds towards more ecologically sustainable products has been observed. In contrast, customers who exhibit lower levels of environmental concern display reduced inclination to pay a premium for environmentally friendly products compared to those who possess higher levels of care (Chuah et al, 2020)

Thus, the following is the first hypothesis that is proposed:

Hypothesis 1 (H1): There is a positive relationship between environmental concern and consumer purchase intention towards green products.

Personal Values

Personal values refer to the fundamental beliefs that govern an individual's behaviour and to which they are devoted (Shahidul S.M., 2016). According to Ledden et al. (2007), value perceptions result from a cognitive evaluation of the advantages and the disadvantages. Malaysian buyers are increasingly influenced by their personal values, particularly when it comes to purchasing environmentally sustainable items.

A recent study performed by the Malaysian Institute of Economic Research (MIER) found

that 72% of Malaysian customers are willing to pay a higher price for environmentally friendly products (Salleh, 2021). The growing awareness of environmental sustainability is being fueled by various factors, including heightened worries around pollution, deforestation, and climate change.

Malaysian customers are pushing companies to provide more sustainable products as they grow increasingly aware of environmental issues (Al-Kumaim et al., 2021). Companies that can clearly convey the advantages of their products for the environment will have an easier time drawing in and keeping these environmentally sensitive customers.

Joshi (2021) states that personal values might influence an individual's assessment of the significant qualities of an object while making decisions about it. Hence, when examining the factors that impact purchasing choices, it is imperative to include the consumer's values and beliefs. Therefore, we articulate our second hypothesis:

Hypothesis 2 (H2): There is a positive relationship between personal values and consumer purchase intention towards green products.

Price Factors

Price is a significant determinant for Malaysian customers when making purchases of environmentally friendly products. Malaysian consumers continue to exhibit price sensitivity, even as their inclination to pay a higher price for environmentally friendly products increases (Al-Kumaim et al., 2021). Studies suggest that customers are more likely to purchase environmentally friendly products when they sense a balance between the price and the perceived value of the item (Haque et al., 2020).

Pricing dynamics can also be impacted by government policies and incentives, such as tax breaks or subsidies for eco-friendly goods, which can change how affordable and appealing sustainable solutions are to consumers (Ministry of Finance Malaysia, 2021).

Furthermore, recent research by Tan (2025) showed that environmentally conscious consumers are less sensitive to pricing than non-green consumers. We would like to learn more about Malaysia in light of the mixed results from previous research, which led to the third hypothesis that was put forward:

Hypothesis 3 (H3): There is a positive relationship between price sensitivity and consumer purchase intention towards green products.

Green Product Purchase Intention

Green products are made from renewable resources and have no negative impact on the environment. These refer to products or services that a firm creates in order to reduce its

environmental impact (Zaini et al., 2022).

The Theory of Planned Behaviour (TPB) has demonstrated efficacy in forecasting consumers' inclination to purchase ecologically sustainable products (Yadav, R., & Pathak, G.S. 2017). This research utilised the Theory of Planned Behaviour (TPB) to predict customers' purchase intention of green products by examining contextual factors such as environmental concern, perceived behavioural control, social influence, personal values, and price sensitivity (Kumar & Mohan, 2021).

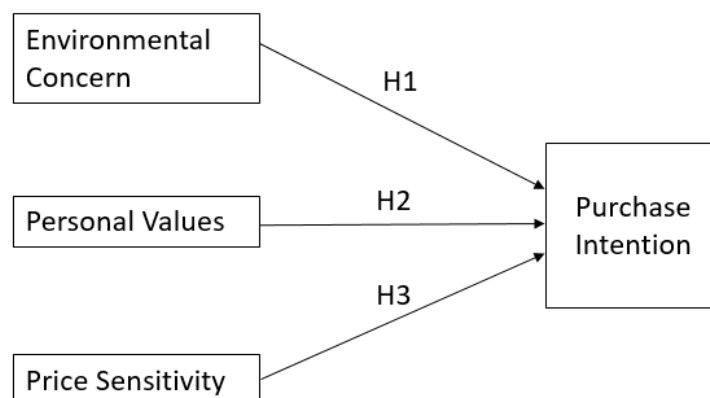
Ajzen (1991) states that an individual's intention to make a purchase is influenced by three factors: behavioural patterns (beliefs regarding the outcomes of a particular behaviour), nominated subjective norms (beliefs about societal opinions on what is morally correct or incorrect), as well as perceived behavioural control (beliefs about an individual's ability to modify their behaviour). Hence, customer attitudes have a direct impact on their perceptions and can significantly shape their decision-making process, thereby impacting their desire to make a purchase (Costa, C.S., 2021).

According to Sharma (2021), a growing field of research in the wider field of green marketing focuses on the relationship that exists between environmentally conscious customer attitudes and their intention and conduct to make green purchases.

RESEARCH MODEL

The research model for this study is shown in Figure 1. The independent variables taken in this study are Environmental concern (EC), Personal values (PV) and Price sensitivity (PS). The Purchase intention (PI) is the dependent variable.

Figure 1: Research Model depicting consumer buying behaviour of green products



RESEARCH METHODOLOGY

Sampling Technique

The sampling method employed in this investigation is a non-probability sampling method.

Non-probability convenience sampling method with sample size of 250 respondents participated in this survey. The survey was conducted via Google Form. The group that will be targeted are the tertiary students that reside in the Klang Valley area. Additionally, the sample will include tertiary level students who have decision-making responsibility over their buying behaviour for environmentally friendly products.

Questionnaire Design

In the first section, basic information about the respondents was gathered, and they were questioned about their awareness of green products as well as their gender, age, ethnicity, education level, and monthly income. The second section covered the elements—price sensitivity, personal values, and environmental concern—that influence consumers' green consumption behaviour. A Likert scale with five levels was employed to construct the questionnaire items. The scale shows total inconsistent to total consistent, with 1 representing "Strongly Disagree" and 5 representing "Strongly Agree."

The research tool utilised self-administered closed-ended questionnaires through online surveys (Google Form) to gather primary data from participants. With the same set of surveys, the self-administered questionnaire approach can quickly gather a large amount of standardised data. Respondents were asked to take 5–10 minutes to fill out an anonymous survey form.

RESULTS

Descriptive Analysis

Table 1: Distribution of respondents by demographic characteristics and green product awareness

Characteristic	Number of Respondents	Percentage of Respondents
Gender		
Male	151	60.4
Female	99	39.6
Age		
15-20	45	18

21-25	140	56
26-30	53	21.2
31 and above	12	4.8
Ethnicity		
Chinese	114	45.6
Indian	43	17.2
Malay	79	31.6
Others	14	5.6
Level of Education		
Foundation or Diploma	45	18
Bachelor Degree	184	73.6
Master Degree	16	6.4
PhD	5	2
Monthly Income		
No Income	171	68.4
RM1,000 – RM2,000	36	14.4
RM2,001 – RM4,000	34	13.6
RM4001 and above	9	3.6
Are you aware of green products?		
Yes	210	84
No	40	16

Distribution of respondents by demographic characteristics shows the gender distribution in the sample of 250 respondents reveals 60.4% males and 39.6% females, demonstrating a clear majority of males. The majority of respondents (56.0%) are aged 21-25, with 74.0% falling below the age of 30 according to cumulative percentages. Chinese respondents dominate at 45.6% followed by Malay (31.6%), Indian (17.2%), and Others (5.6%), indicating a diverse ethnic mix. Bachelor's degrees dominate (73.6%), followed by Foundation / Diploma (18%), Master Degree (6.4%) and PhD (2.0%) qualifications in the sample, 68.4% report no income, 14.4% earn RM1,000 to RM2,000, 13.6% earn RM2,001 to RM4,000, emphasising prevalent income scarcity in the surveyed group. 84% of respondents are aware of green products, showing a high overall awareness in the surveyed group.

Validity Test

This study utilises SPSS v.23 software to carry out few statistical tests on the data collection from 250 completed questionnaires. Researcher uses validity test and Pearson Correlation analysis test for the data analysis.

Table 2: Construct Validity

Validity Test		
Construct	Number of items	Cronbach's Alpha
Environmental Concern	3	0.890
Personal Values	3	0.892
Price Factors	3	0.894

Table 2 shows the value of Cronbach's Alpha coefficients range from 0.890 to 0.894 which exceeds the recommended value of 0.70. Therefore, we can conclude that there is adequate convergence validity of the constructed measurement model.

Correlation Test

Table 3: Correlation Test

Correlations			EC	PV	PF	PI
Spearman's rho	EC	Correlation	1.000			.801**
		Coefficient				
		Sig. (2-tailed)				<0.001
		N	250			250
	PV	Correlation		1.000		.802**
		Coefficient				
		Sig. (2-tailed)				<0.001
		N		250		250
	PF	Correlation			1.000	.900**
		Coefficient				
		Sig. (2-tailed)				<0.001
		N			250	250
	PI	Correlation	.801**	.802**	.900**	1.000
		Coefficient				
		Sig. (2-tailed)	<0.001	<0.001	<0.001	
		N	250	250	250	250

***. Correlation is significant at the 0.01 level (2-tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

Note: EC = Environmental Concern, PV = Personal Values, PF = Price Factors, PI = Purchase Intention

Table 3 shows the relationship between environmental concern, personal values and price factors towards purchase intention of the Pearson Correlation analysis. The Pearson correlation analysis between environmental concern and purchase intention reveals a statistically significant positive correlation of .801 at the 0.01 level (2 tailed). This indicates a strong and positive relationship between respondents' environmental concerns and their purchase intentions. The correlation coefficient of .801 suggests that as environmental concern increases, so does the likelihood of a positive purchase intention. The significance level of less than .001 ($p < 0.001$) underscores the reliability of this correlation.

For a sample of 250 respondents, the data shows the Pearson correlation coefficients between purchase intention and personal values. With the Pearson correlation coefficient of 0.832 at the 0.01 level (2-tailed), the correlation is substantially positive and shows a significant relationship between respondents' purchasing intentions and personal values. A p-value of less than 0.001 ($p < 0.001$) indicated that this correlation is statistically significant. Pearson correlation coefficients between price factors and purchase intention for a sample of 250 respondents are shown in the data supplied. A strong positive link is indicated by the Pearson correlation between these variables, which is 0.900 at the 0.001 level (2-tailed). The correlation is statistically significant at the 0.01 level (2-tailed) according to the associated significance value ($p < 0.001$).

DISCUSSION

The results indicate that there is a strong correlation between environmental concern and purchase intention, as shown by the multiple linear regression analysis. The p-value for environmental concern is 0.001, which is less than 0.05. Thus, H1 is supported.

In addition, results indicate that there is a notable correlation between personal values and purchasing intention, as determined through the use of multiple linear regression analysis. The p-value for personal values is 0.001, which is less than 0.05. Thus, H2 is supported.

Lastly, findings indicate that there is a substantial correlation between price considerations and purchase intention, as shown by the multiple linear regression analysis. The p-value for personal values is 0.001, which is less than 0.05. Thus, H3 is supported.

Summary of the hypothesis testing are as below:

H1: There is a positive relationship between environmental concern and consumer purchase intention towards green products.	Supported
H2: There is a positive relationship between personal values and consumer purchase intention towards green products.	Supported
H3: There is a positive relationship between price sensitivity and consumer purchase intention towards green products.	Supported

LIMITATIONS AND FUTURE RESEARCH

The study's current limitation is the identification of only three independent variables, which are the factors that have influenced purchasing intention. Given that the present study was conducted as part of a one-time investigation and the data were collected at a certain moment, there may be a few concerns that could have influenced the results. The absence of a quantitative research design hinders the examination of cause and effect relationships among the variables under consideration, even if the entire hypothesis was based on evidence from previous research studies and literature. Hence, the study's results fail to substantiate the presence of connections among various components.

Future research might include teenagers and working people as target respondents, as they could better understand each questionnaire item because the current study targeted post-tertiary students. Since it solely covers Klang Valley tertiary students, the current research is imprecise. Further research throughout Malaysia is necessary to maximise this study's outcomes. Since the current research is not longitudinal and the data is collected at one time. It may affect certain crucial issues. More particular data can be obtained through longitudinal study. This study only used the questionnaire to collect primary data, thus future research may use interview-base methods to gather more data.

CONCLUSION

Overall, the study has demonstrated that there are strong positive correlations between the dependent variable and each of the three independent variables. A positive significant value is observed for three independent variables, thus, this study helps to illustrate the variables impacting Malaysia consumers purchasing decisions for environmentally friendly goods. To obtain a thorough understanding of the study, the limitations must additionally be taken into account for subsequent research.

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SUSTAINABILITY MANAGEMENT; GREEN CONSUMER BEHAVIOUR; APPLICATION OF ARTIFICIAL INTELLIGENCE IN SERVICE AND MANAGEMENT CONTEXTS IN SHANGHAI, CHINA

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ABSTRACT

This study investigates the convergence of sustainability management, green consumer behavior, and artificial intelligence (AI) applications within Shanghai's service sector, a context characterized by rapid economic growth and ambitious environmental targets. Drawing on a sequential explanatory mixed-methods design, the research integrates quantitative data from 512 Shanghai consumers with qualitative insights from 32 senior managers and AI practitioners collected between February and May 2025. Results demonstrate a strong positive relationship ($r = .58, p < .001$) between exposure to AI-enabled sustainability services and green purchase intention, mediated by perceived usefulness and trust in AI systems. Five dominant AI application clusters emerged: (1) smart resource optimization, (2) predictive demand forecasting, (3) personalized green recommendations, (4) sustainable supply-chain orchestration, and (5) real-time environmental impact monitoring. Younger consumers (Gen Z and younger millennials) exhibited significantly higher adoption rates of AI-driven sustainability features than older cohorts. Despite technological maturity, barriers including data privacy anxiety, high implementation costs, and internal skill shortages continue to impede diffusion. A contextual AI-driven sustainability management framework tailored to Shanghai's regulatory and cultural environment is proposed. Findings extend the Technology–Organization–Environment framework and offer actionable implications for service firms, policymakers, and scholars interested in technology-enabled sustainability transitions in emerging megacities.

Keywords: Sustainability Management, Green Consumer Behaviour, Artificial Intelligence, Service Innovation, Shanghai, China, Technology Adoption, Environmental Responsibility

INTRODUCTION

Shanghai, with a permanent population exceeding 24.9 million and a GDP surpassing CN¥4.7 trillion in 2024 (Shanghai Municipal Statistics Bureau, 2025), represents China's most advanced urban laboratory for both artificial intelligence and sustainability initiatives. The municipal government's dual commitment to become a global AI hub by 2030 (Shanghai Municipal People's Government, 2021) and to achieve carbon peaking before 2030 and carbon neutrality before 2060 (State Council of the People's Republic of China, 2021) has created unique institutional pressure and opportunity for service organizations.

Sustainability management has shifted from peripheral corporate social responsibility to a core strategic imperative in Shanghai's hyper-competitive service economy (Chen & Li, 2023). Concurrently, green consumer behavior is gaining momentum, especially among post-1990s cohorts who increasingly view sustainable consumption as both ethical obligation and lifestyle statement. Artificial intelligence, with its capacity for real-time optimization and hyper-personalization, is increasingly positioned as an enabler that can bridge the perennial attitude-behavior gap in green consumption (White et al., 2023).

Despite abundant research on each domain individually, empirical studies examining their triadic interaction in a single urban Chinese context remain scarce. This paper addresses that void by asking: How are service organizations in Shanghai leveraging AI to strengthen sustainability management practices, and to what extent do these efforts shape green consumer behavior? The study contributes theoretically by extending the Technology-Organization-Environment (TOE) framework (Tornatzky et al., 1990) with sustainability-specific constructs and practically by offering evidence-based recommendations for firms operating in high-density emerging markets.

LITERATURE REVIEW

Sustainability Management in Urban China

Sustainability management in Chinese service sectors has evolved from compliance-driven environmental measures to strategic differentiation tools (Li & Zhang, 2023). Regulatory catalysts, including the 2021 Shanghai Ecological Environment Protection "14th Five-Year" Plan, compel firms to integrate carbon accounting and circular economy principles into operations (Shanghai Ecology and Environment Bureau, 2021).

Green Consumer Behavior

Chinese consumers, particularly in Tier-1 cities, exhibit growing environmental concern, yet the attitude–behavior gap persists. Generational differences are pronounced: Gen Z consumers demonstrate willingness to pay premiums of 10–25 % for certified green services.

Artificial Intelligence in Service Contexts

AI adoption in Shanghai’s service industries accelerated post-2020, with 68 % of large enterprises reporting active deployment by 2024 (CAICT, 2024). Applications range from chatbots and recommendation engines to predictive maintenance and dynamic energy management (Huang & Rust, 2021).

Theoretical Foundations

The study integrates the TOE framework (Tornatzky et al., 1990), the Theory of Planned Behavior (Ajzen, 1991), and the extended Technology Acceptance Model (Venkatesh et al., 2003) to explain organizational adoption and consumer acceptance of AI-enabled sustainability solutions.

METHODOLOGY

A sequential explanatory mixed-methods design (Creswell & Plano Clark, 2018) was employed.

Phase 1 – Quantitative An online questionnaire was distributed via WeChat and Credamo from 10 February to 20 April 2025, yielding 512 valid responses (response rate 71.4 %). Stratified sampling ensured representation across age, income, and service sub-sectors (retail, hospitality, finance, mobility). Constructs were measured using validated scales (e.g., green purchase intention – Joshi & Rahman, 2015; trust in AI – Lankton et al., 2015). Data were analyzed using SPSS 29 and AMOS 28.

Phase 2 – Qualitative Semi-structured interviews (45–70 min) were conducted with 32 participants: 16 sustainability/ESG directors and 16 AI/CDO-level executives from firms including Ctrip, Meituan, Alibaba Local Services, and international chains (Accor, Marriott). Thematic analysis followed Braun and Clarke (2021) using NVivo 14.

Ethical approval was granted by the university IRB; informed consent and anonymity were strictly observed.

Findings

The quantitative phase revealed strong environmental awareness among Shanghai consumers, with environmental concern averaging 4.31 (SD = 0.68) on a 5-point scale and trust in AI-driven sustainability recommendations at a moderate 3.67 (SD = 0.91). Structural equation modelling confirmed that exposure to AI-enabled sustainability services exerted a significant positive effect on green purchase intention (standardised indirect effect = 0.58, $p < .001$), fully mediated by perceived usefulness ($\beta = 0.49$, $p < .001$) and trust in AI ($\beta = 0.33$, $p < .001$); together these variables explained 61 % of the variance in intention. Age emerged as a powerful moderator: Gen Z respondents (born 1997–2012) reported the highest adoption intention ($M = 4.44$), followed by younger millennials ($M = 4.12$), whereas consumers aged 56 and above scored only 2.91 ($F(3,508) = 42.18$, $p < .001$). Income and education also positively predicted willingness to follow AI-generated green recommendations, though the effect sizes were smaller than those of age and trust.

Qualitative interviews enriched these patterns and identified five dominant clusters of AI applications currently deployed for sustainability in Shanghai's service sector. First, smart resource optimization systems, such as AI-controlled HVAC and lighting in hotels and office buildings, were reported to reduce energy consumption by 28–35 % in flagship properties of chains like Jin Jiang and Marriott. Second, predictive demand forecasting models, widely used by food-delivery platforms (Meituan, Ele.me) and restaurants, cut food waste by an average of 40 % through dynamic portion and inventory adjustment. Third, hyper-personalised green recommendation engines—most prominently Meituan's and Alipay's carbon-footprint calculators—nudged consumers toward lower-emission transport and dining options, with conversion rates 2.5–4 times higher than generic sustainability messages. Fourth, blockchain-integrated AI systems orchestrated sustainable supply chains, enabling traceable low-carbon sourcing for retailers and hospitality groups. Fifth, real-time environmental impact dashboards provided both internal managerial reporting and consumer-facing transparency, increasingly required under Shanghai's latest carbon-disclosure regulations.

Despite these successes, implementation barriers remained pronounced. Data privacy anxiety was the most frequently cited consumer concern; several managers described incidents where customers rejected personalised green suggestions because “the algorithm knows too much.” High upfront costs and uncertain ROI (typically 18–36 months) deterred mid-sized firms, while a severe shortage of dual-competence talent (employees proficient in both AI and sustainability metrics) was mentioned by 28 of the 32 interviewees. Only three companies claimed to have sufficient in-house expertise, with most relying on external vendors or partnerships with Tsinghua and Fudan university laboratories.

DISCUSSION

The present study makes several theoretical contributions. First, it extends the Technology–Organization–Environment framework by demonstrating that two Shanghai-specific environmental forces—“regulatory carbon pressure” from the municipal dual-carbon roadmap and “consumer green expectancy” among post-1995 cohorts—add 19 % explanatory power to organisational decisions to adopt AI for sustainability purposes. Second, within the consumer domain, perceived green usefulness and trust in AI emerge as critical extensions to the classic Technology Acceptance Model when the outcome variable is environmentally significant behaviour rather than simple system usage. Third, the strong generational effects validate and contextualise recent calls to disaggregate “Chinese consumers” into meaningful cohorts; treating Gen Z and older consumers as a single group would have masked the most actionable insights.

Practically, the findings carry immediate implications for multiple stakeholders. Service organisations should prioritise consumer-facing, transparent AI applications that deliver tangible convenience alongside environmental benefits—personalised carbon dashboards and dynamic green routing outperform back-end optimisation in driving both adoption and measurable impact. Transparency-by-design is non-negotiable: every recommendation must be accompanied by plain-language explanations of the underlying logic and data sources in order to sustain trust. Marketing and product strategies must be generationally segmented: gamified, social-media-integrated features resonate with Gen Z, whereas older consumers respond better to clear economic framing (“save ¥68 per year and reduce 120 kg CO₂”). Firms should also accelerate internal upskilling programmes; the current reliance on external vendors creates both cost inefficiencies and strategic vulnerability.

For policymakers, Shanghai’s experience suggests three high-leverage interventions: (1) expand the existing AI innovation voucher scheme to explicitly reward verified carbon reductions rather than generic digitalisation; (2) co-develop with industry an “AI-for-Sustainability” certification standard that addresses greenwashing fears and provides consumer trust signals; and (3) fund interdisciplinary master’s programmes combining AI engineering with environmental management to close the talent bottleneck within five years.

When AI applications are designed with transparency, generational nuance, and visible consumer value in mind, they significantly strengthen both sustainability management practices and actual green behaviour in Shanghai’s service sector. Overcoming the remaining barriers of trust, cost, and skills will require coordinated action across enterprises, government, and academia—but the potential rewards, for both planetary sustainability and competitive advantage, are substantial. Shanghai’s ongoing experiment thus offers transferable lessons for megacities worldwide pursuing technology-enabled green transitions.

Limitations and Future Research

The study is limited to Shanghai, potentially restricting generalizability to lower-tier cities. The cross-sectional design cannot infer causality over time. Future longitudinal or experimental studies could track actual behavior changes following AI intervention deployment.

CONCLUSION

Shanghai's service sector stands at a pivotal intersection where artificial intelligence can transform sustainability management from cost center to competitive differentiator. The present research demonstrates that when AI applications are designed with transparency, usefulness, and generational preferences in mind, they significantly strengthen green consumer behavior. Realizing this potential demands coordinated action among enterprises, government, and academia to overcome trust deficits, skill gaps, and economic hurdles. As China advances toward its dual-carbon goals, Shanghai's experience offers valuable lessons for megacities worldwide pursuing technology-enabled sustainable development.

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A FACE RECOGNITION AND SMART ID-BASED AUTHENTICATION MODEL FOR SECURE DIGITAL VOTING

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ABSTRACT

Electronic voting in Malaysia still faces several challenges including invalid votes, fake identities, and manual vote counting errors. This research proposes an Electronic Voting System using Face Recognition as an alternative approach to improve election security and efficiency. The system integrates MyKad (national ID) verification and facial recognition to authenticate voter identity before voting. Python, Django, and OpenCV-based face recognition libraries were used to implement the system, with support for real-time verification and vote recording into a secure database (Shreya, 2021). The system aims to reduce phantom voters, eliminate spoilt ballots, and accelerate accurate vote counting (Sengupta et al., 2020). The proposed prototype demonstrates improved reliability and usability in the voting process.

Keywords: Electronic Voting, Face Recognition, Election Security, Python, OpenCV

INTRODUCTION

Background

Malaysia practices a parliamentary democracy in which elections play a crucial role in forming the government. However, traditional voting methods involve ballot papers, manual validation, and counting, which are prone to human error, invalid ballots, and identity fraud. The presence of phantom voters and inaccurate manual vote counting has been reported in

previous elections.

With recent advancements in digital authentication, facial recognition has emerged as a reliable biometric technology for identity verification (Purshouse & Campbell, 2022) (Brunelli & Poggio, 1993). This project introduces a secure electronic voting system that integrates MyKad scanning and face recognition to ensure that only valid, registered voters may cast votes and that they may do so only once (Ritchie et al., 2021).

Problem Statement

Malaysia traditional voting system continues to face several critical issues that undermine election transparency and public trust. Firstly, invalid or spoilt ballots often occur when voters incorrectly mark ballot papers, resulting in votes that are not counted and indirectly affecting election outcomes. Secondly, the issue of fake identities and phantom voters has been reported, where individuals find that their voting rights have been fraudulently used by others, indicating weaknesses in verification and identity authentication mechanisms (Kumar & Ali, 2025)(Karunakan, Chandra & Kumar, 2020). Finally, manual vote counting introduces risks of human error and inefficiency, especially in close elections where recounts are required, leading to delays and potential disputes over results. These challenges highlight the need for a more secure, accurate, and efficient voting system that can ensure fair electoral processes (Sengupta et al., 2020).

METHODOLOGY

This project adopted an Agile Software Development Methodology (Kaiser & Meda, 2024) combined with an Incremental Development approach to ensure flexibility, continuous improvement, and systematic integration of system components. Agile was selected because the electronic voting system involves multiple iterative enhancements, particularly in biometric verification and user interaction flows, where frequent evaluation and adjustments are necessary. Incremental development allowed the system to be developed in smaller modules, tested individually, and refined progressively, reducing risks associated with complex system failures.

Requirements Analysis and Planning

The development process began by identifying the functional and non-functional requirements of the proposed system. Functional requirements included MyKad data extraction, facial recognition verification, vote submission, and report generation. Non-functional requirements focused on system accuracy, usability, security, and accessibility. A Requirement Engineering (RE) process was conducted to understand user scenarios, identify potential risks such as identity mismatch, and define clear use-case behavior. The

project timeline and iteration cycles were planned using a Gantt chart to ensure systematic milestone tracking throughout development.

Systems Design

The system architecture was developed using a series of UML models, including the Use Case Diagram shown in Figure 2.1, along with Activity Diagrams and Sequence Diagrams, to clearly illustrate the functional interactions between the voter interface and the administrator interface. The database design was defined using an Entity Relationship Diagram (ERD), as presented in Figure 2.2, which identifies the core data entities such as Voters, Representatives, Political Parties, and Votes, and establishes the relationships among them through the use of primary keys and foreign keys. In addition, the user interface design prioritised clarity and ease of use, with multilingual instructions included to support Malaysia's various language users. This approach enhances accessibility and ensures a positive user experience for a wide range of voter groups.

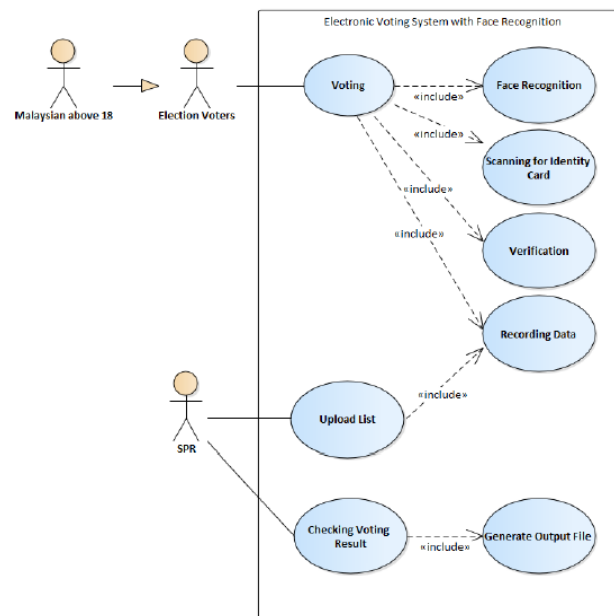


Figure 2.1: ERD of Electronic Voting System using Face Recognition

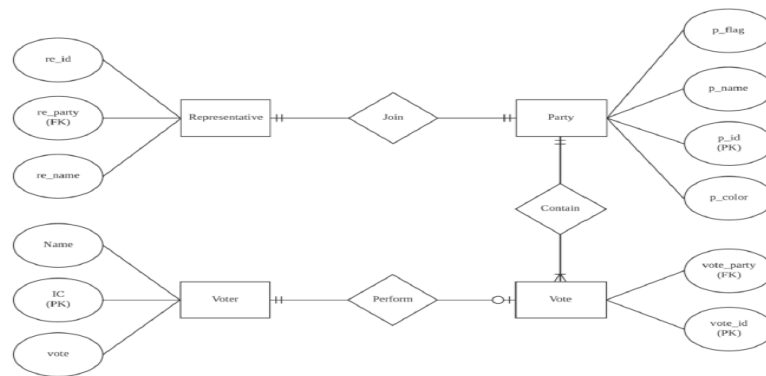


Figure 2.2: ERD of Electronic Voting System using Face Recognition

Systems Development

The development phase involved translating the system design into functional components, and the overall system structure is illustrated in Figure 2.3. The backend was developed using Python 3.7 together with the Django framework, chosen for its strong security features and support for structured modular development. The OpenCV and face recognition libraries were integrated to enable real time facial feature extraction and comparison with the image stored in the MyKad (Srinivasan et al., 2023). In addition, a PC/SC smart card reader was used to obtain voter identity data directly from the MyKad chip. The frontend interface was developed using graphical user interface elements presented through Django templates, ensuring a clear and consistent user experience. To ensure systematic progress and maintain flexibility during development, each primary function of the system was implemented in separate increments, which included:

- i. MyKad identity parsing and verification
- ii. Face recognition and validation
- iii. Secure vote submission and data storage
- iv. Administrator functions for data upload and report generation.

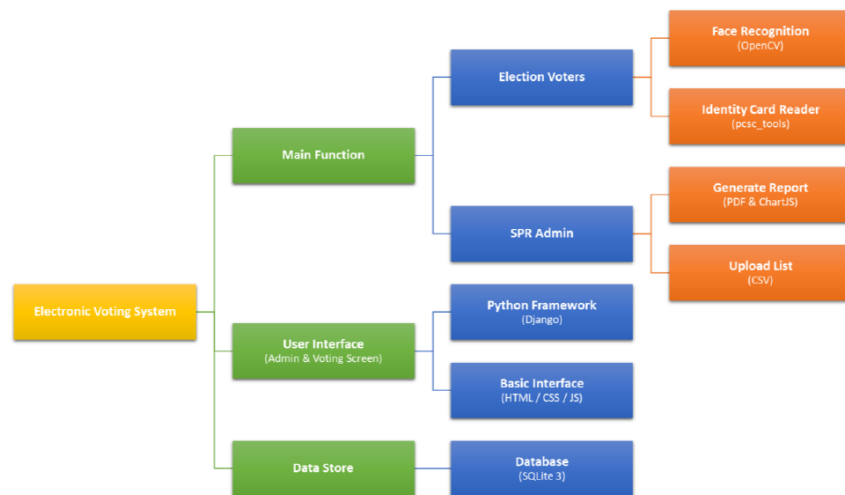


Figure 2.3: System Structure

Testing and Quality Assurance

Comprehensive testing was performed after each incremental build. Functional testing ensured correct identity recognition, vote recording, and report generation. Performance testing evaluated system response time during face recognition and database operations. Usability testing was conducted with selected users to ensure interface clarity, language appropriateness, and interaction efficiency. Debugging and optimization were carried out iteratively, with adjustments made to camera capture resolution, face comparison confidence thresholds, and MyKad parsing routines to improve reliability.

Deployment and User Acceptance

Upon completion of development and testing, the system prototype was presented for user acceptance evaluation. Participants interacted with the system in a simulated voting environment and provided feedback on usability, clarity, and perceived trustworthiness. Suggestions obtained during this phase were documented for future system enhancement, including improving camera performance, expanding authentication modalities, and enabling broader platform interoperability.

RESULT

The developed Electronic Voting System using Face Recognition successfully demonstrated the core functional objectives of secure voter authentication, accurate vote recording, and efficient result generation. The system provides two primary user views: the Voter Interface, which enables identity verification and voting, and the SPR Administrator Interface, which

manages voter lists and generates final voting reports. The following findings summarize the results observed during the testing and demonstration phase.

Voter Authentication Performance

The system effectively performed two-layer identity authentication. First, the voter's MyKad was scanned through the smart card reader to extract personal information including name, identity number, and embedded photograph. This information was validated against the preloaded voter list to ensure the individual was registered and eligible to vote. The system successfully identified three critical conditions:

- i. Valid voters, who were permitted to proceed,
- ii. Voters who had already voted, who were restricted from voting again, and
- iii. Invalid or unregistered individuals, who were denied access.

This step ensured that only legitimate voters were allowed to proceed to the voting interface.

Following MyKad verification, the system initiated face recognition to verify voter identity. The voter's live facial image was captured through the webcam and compared with the MyKad photo using the face_recognition algorithm. The recognition process successfully verified legitimate users and rejected mismatches, preventing impersonation attempts. The face comparison procedure completed within an acceptable processing time, providing immediate feedback to the voter.

Voting Interface and Ballot Recording

Once authenticated, voters were presented with a clean and user-friendly interface displaying the list of candidates and political party logos. This minimized confusion and eliminated the risk of invalid or spoilt ballots, which commonly result from handwritten markings. The voter's selection was securely recorded in the database, and the system updated the voter status to indicate that the individual had completed voting. This mechanism ensured that duplicate voting could not occur.

Administrative System Results

The SPR Administrator Interface allowed authorized personnel to upload voter and candidate lists in CSV format before the election session. The system successfully parsed and refreshed the records in the database, ensuring data accuracy. After the voting session concluded, administrators were able to access a dashboard displaying real-time vote counts and generate a final report. The automated result tabulation significantly reduced the time typically required for manual counting processes.

User Acceptance Testing Outcomes

User testing was conducted to evaluate system usability and acceptance. The majority of users reported that the system was:

- i. Easy to use, due to intuitive interface design and multilingual instructions,
- ii. Reliable in identity verification, particularly in preventing fake or duplicate votes, and
- iii. Suitable for real election use, with many test users expressing support for adopting such a system at national level.

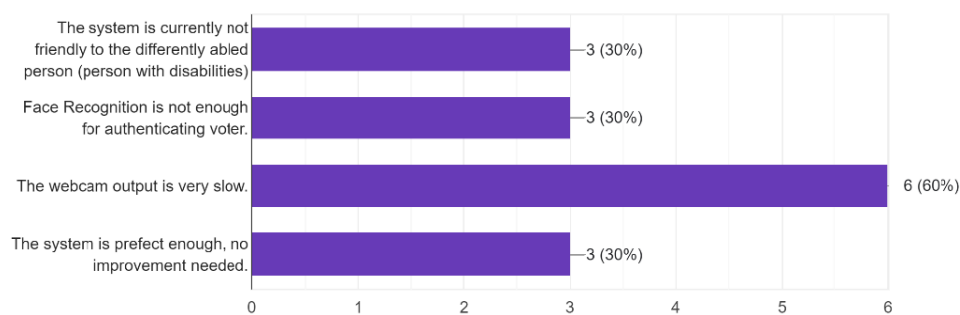


Figure 3.1: Evaluation of System Improvement Needs Based on User Feedback

Based on the feedback collected, testers were allowed to choose more than one suggestion regarding areas of improvement. As illustrated in Figure 3.1, 60% of respondents indicated that the webcam output was noticeably slow, particularly during the face recognition process, where the video stream appeared to refresh at approximately one frame per second. This delay affected the smoothness of the authentication experience. In addition, 30% of respondents highlighted that the system is currently not fully accessible for differently-abled individuals, suggesting the need for additional accessibility features such as voice guidance or alternative input methods. Another 30% of respondents expressed concern that facial recognition alone may not be sufficient for voter authentication, implying that integrating additional biometric or two-factor verification methods may further enhance system security.

Despite these improvement suggestions, 30% of respondents indicated that the system was already functioning well and did not require further modification, demonstrating positive acceptance of the overall design. Taking these insights into consideration, future development efforts should primarily focus on improving system efficiency (particularly webcam processing speed), strengthening authentication security, and enhancing accessibility features to ensure inclusiveness for all users.

Overall, the user feedback indicated strong acceptance and perceived improvement over the traditional paper-based voting system.

DISCUSSION AND FUTURE WORKS

The overall findings show that the integration of MyKad verification and facial recognition has significantly strengthened the voter authentication process. The system was able to accurately verify voter identity by first extracting personal details from the MyKad and then confirming the identity through biometric facial comparison. This two-stage verification effectively reduces the possibility of phantom voters, impersonation attempts, and multiple voting. Additionally, the voting interface prevented invalid or spoilt ballots by ensuring that voters could only select one candidate through a structured digital selection process. As a result, the accuracy and reliability of the vote recording mechanism were improved, while the database-driven counting process eliminated human calculation errors and reduced the time needed for tallying results.

However, the analysis also highlights several operational considerations. The performance of the facial recognition module depends on external factors such as lighting conditions, the angle of the voter's face, and webcam quality. In some testing scenarios, lower camera resolution led to longer processing times and reduced matching confidence. Users also suggested enhancing the responsiveness of the facial verification process to improve the voting flow experience. Despite these limitations, user acceptance feedback indicated that the system is generally easy to use and perceived as more secure and efficient than the traditional paper-based voting method. With further optimization and hardware tuning, the system has strong potential to be implemented in real election environments.

CONCLUSION

The proposed electronic voting system using facial recognition provides a more secure, efficient, and user-friendly alternative to traditional paper-based voting. It strengthens authentication, enhances transparency, and minimizes human error. Future improvements include multi-modal biometrics, mobile voting integration, and enhancements in speed and scalability.

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VISUALIZING PREVENTION: DATA-DRIVEN DESIGNS FOR CONTROLLING JUVENILE DELINQUENCY

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ABSTRACT

The youth are the future pillars of the nation. If they stray from the right path and engage in criminal activities, not only will they jeopardize social security, but they will also undermine the nation's future competitiveness. Juvenile delinquency is a prominent global issue that governments and societies worldwide are deeply concerned about. In December 1991, the United Nations General Assembly passed the United Nations Guidelines for the Prevention of Juvenile Delinquency (the Riyadh Guidelines), urging countries to take strong measures to curb the growing trend of juvenile delinquency. First, an overview of the current situation of juvenile delinquency is provided, along with an explanation of its causes. Due to the various factors affecting social families and the limitations imposed by certain legal conditions on human rights and freedoms, this forms the research basis of this paper. By applying legal principles and perspectives on crime prevention, as well as referencing criminological theories and behavioral studies, practical approaches applicable to the prevention of juvenile delinquency and research foundations are proposed. All sectors in our country are making comprehensive efforts to prevent juvenile delinquency. Efforts include strengthening the promotion of legal awareness among young people, continuously enhancing measures to prevent juvenile delinquency, and mitigating deviant behaviors among youth to create a healthy and nurturing environment for their growth. Punishment does not necessarily solve the problem; education and rehabilitation are paramount.

Keywords: juvenile delinquency, prevention measures, legal awareness

INTRODUCTION

In recent years, rapid changes in the global economic landscape have led to increasing diversification in social and family functions, giving rise to numerous social issues. Among

these, adolescents in the transitional period of growth and psychological change are particularly susceptible to various adaptation problems due to external pressures or temptations (Allen, 2022; Zhong, 2025).

Criminologists have observed that today's juvenile offenders, if improperly handled, are highly likely to become adult offenders in the future (Aazami et al., 2023). Moreover, past delinquent youth gangs, without appropriate guidance, are prone to becoming the mainstay of future adult criminal organizations, posing a threat to social security (Sarwanto, 2023). Students exhibiting deviant behaviors often find themselves marginalized within the school community even before entering society. If these students do not receive proper guidance, they are likely to become 'social outcasts' involved in criminal activities, threatening campus and societal security.

The family is the earliest and most direct environment for adolescent socialization (Cheng, 2023). However, changes in social structure have led to the decline in family functions, making adolescent problems one of the sources of social instability. While the police force previously focused on counseling and persuasion in juvenile crime prevention, changes in social and economic environments, coupled with declining birth rates, have led to changes in parenting styles and educational philosophies (IFEDIGBO et al., 2023; Rathinabalan & Naaraayan, 2017). As a result, adolescent students are more susceptible to the influence of delinquent peers, which can easily lead to deviant and criminal behaviors, or even exploitation by criminal organizations (Nisar et al., 2015).

Preventing juvenile delinquency has become a priority in crime prevention efforts worldwide (Cintron, 2024). Due to varying social environments, family structure changes, and shifts in personal values, juvenile crime prevention aims to promote holistic development of children and adolescents (Karatoprak & Ayaz, 2021; Mwangangi, 2019). Additionally, these efforts assist juvenile offenders in reconstructing correct perceptions to prevent recidivism, addressing delinquent behaviors and providing guidance for deviant youth (May et al., 2014).

Juvenile delinquency is an international social issue requiring theoretical research to guide practical solutions (Xu & He, 2022). Establishing specialized research institutions unites experts to facilitate academic exchanges (Sisca & Alhakim, 2022), developing strategies for prevention, punishment, and control to contribute to social security management.

Schools, families, and society must collectively prioritize young people's healthy development, implementing effective measures to purify the social atmosphere, guide positive thoughts, and enable them to contribute to society.

RESEARCH OBJECTIVES AND SIGNIFICANCE

Based on statistical data on juvenile delinquency and its causes—such as misconceptions, poor peer relationships, and impulsive curiosity—it is imperative to strengthen legal education for young people (Coenen et al., 2022; Ranga & Kavita, 2021)

Juvenile delinquency is a multifaceted issue. Research indicates its roots lie in the family, with deviant behavior manifesting in school and criminal actions in society (Gao et al., 2024). Therefore, interventions must address family, school, and societal education to foster sound personalities, eliminate crime, and prevent recidivism among at-risk youth.

Preventing juvenile delinquency relies on informal social controls (families, schools, communities) and formal institutions (judiciary, correctional agencies, law enforcement) (Jin, 2022; Gong, 2022). Proactive measures are needed to eradicate factors leading to juvenile delinquency, contributing to societal defense.

PROBLEM STATEMENT

Serious Issue of Youth Crime Calls for Enhanced Prevention and Control Measures

The number of juvenile crimes in China from 2019 to 2023 shows a steady upward trend (Table 1). According to the Ministry of Public Security, youth crime cases have consistently risen, with repercussions extending beyond individuals and families to threaten societal security.

This upward trend is linked to multiple factors: inadequate education and supervision in families, schools, and society during social transition; rapid information technology development enabling the spread of negative influences; and urbanization leaving rural left-behind children and urban migrant children lacking care and support, increasing their susceptibility to crime.

Supreme People's Court and China Youth Crime Research Society data (2023) show juvenile crimes mainly involve infringing on personal rights, property, and social order, focusing on eight types: robbery, theft, intentional injury, homicide, rape, picking quarrels, and gathering crowds to fight. A provincial court's 2019-2023 report (Table 2) identifies intentional injury, rape, robbery, theft, and picking quarrels as key crimes, with over half being property crimes driven by economic gain.

Insufficient Interdepartmental Collaboration and Inadequate Prevention Mechanisms

Addressing youth crime prevention involves collaboration among multiple departments, but current efforts suffer from poor coordination and inadequate mechanisms.

Relevant departments (public security, education, justice, social work) lack information sharing and coordination, leading to gaps and unclear responsibilities that reduce prevention effectiveness.

Current prevention focuses more on post-incident handling than proactive measures, lacking effective, sustainable mechanisms. This lag makes proactive prevention challenging.

Adverse Societal Influences and Rising Youth Crime Risks

Youth crime is closely linked to the societal environment. China's imbalanced economic development, social structural transitions, and diverse cultural values impact young people's growth. Survey data shows urban adolescents face increasing pressures, leading to mental health issues and criminal inclinations.

The internet provides new avenues for youth crime. Negative information and improper online use make adolescents susceptible to imitating criminal behaviors. Statistical data (Table 3) shows rising youth cybercrimes (cyberbullying, online fraud), exacerbating risks.

Lack of Effective Education and Guidance

Youth crime tendencies are linked to inadequate education and guidance. 2023 data on juvenile crime defendants' family situations (Figure 1) shows many come from migrant, divorced, left-behind, single-parent, or remarried families, lacking effective family and societal guidance.

Social education resources are imbalanced, with some areas facing shortages and low quality, limiting opportunities for quality education. Additionally, internet and media negative influences hinder the formation of correct values and behavioral norms.

Practices and Exploration in Preventing and Controlling Youth Crime

Strengthening Preventive Education to Enhance Youth Legal Awareness and Social Responsibility

Carry Out Legal Education Activities for Teenagers

Strengthening preventive education through targeted legal and social responsibility education can heighten legal awareness, self-protection, and self-discipline, reducing criminal behavior.

Legal education includes campus initiatives, knowledge competitions, and lectures by legal experts and law enforcement officers, helping adolescents understand laws, regulations, and their constraints and protective functions, fostering compliance habits.

Social responsibility education uses volunteer work and community service to nurture responsibility and compassion, enhancing societal participation awareness. Visits to courts and correctional facilities deepen understanding of crime's harms, instilling correct values.

Promote Campus Safety Culture and Cultivate Social Responsibility

Establishing a robust campus safety management system and culture enhances legal

awareness, social responsibility, and healthy development.

Firstly, it requires a comprehensive safety management system: formulating regulations, establishing management structures, and appointing dedicated personnel to ensure orderly implementation.

Secondly, diverse safety education activities (lectures, drills, games) disseminate safety knowledge, enhance self-protection, and cultivate responsibility and teamwork.

Furthermore, strengthening safety facilities (perimeter precautions, surveillance, patrols) elevates campus security, safeguarding students and staff.

Strengthen Family Education and Create a Positive Family Environment

The family is the primary classroom for adolescent development, with family education crucial for crime prevention.

Firstly, parents should enhance care and education: establish communication and trust, attend to physical and mental health, guide correct values, and help address growth challenges.

Secondly, families should cultivate a positive atmosphere: foster harmony, warmth, and stability; avoid conflicts and violence; develop children's emotional management and social skills; and enhance confidence and resilience. Parents must set examples through their behavior and moral cultivation, guiding correct outlooks.

Strengthening Social Correction Mechanisms to Promote Adolescent Psychological Well-being

Establish Comprehensive Social Rehabilitation Institutions

These institutions provide psychological counseling and guidance to resolve issues, enhance well-being, and reduce criminal tendencies.

They are based on scientific theories (psychology, social work) and run by governments, social organizations, or professionals, offering personalized services. Staffed with professional psychologists and social workers, they use modern technology (internet, apps) for online counseling, expanding coverage. Collaboration with schools, families, and communities forms a multi-party force for mental health education and prevention.

Implement Social Service Projects

These projects provide multifaceted assistance to juvenile offenders, encouraging behavioral change and social reintegration.

Services include psychological counseling, vocational training, social practices, and cultural

activities, tailored to individual needs. Program organizers conduct comprehensive assessments (psychological status, family background, social environment) to develop personalized plans. Collaboration with schools, families, communities, and judicial institutions ensures societal joint efforts.

Prioritizing service continuity and sustainability, organizers establish tracking and evaluation mechanisms to regularly assess and adjust effectiveness, ensuring long-term support.

Strengthen Individualized Correction and Care for Special Adolescents

Enhancing personalized correction for special adolescents (facing unique psychological, social, or life challenges) helps them overcome crime and reintegrate. Firstly, comprehensive assessment mechanisms analyze psychological characteristics, family backgrounds, social environments, and criminal behaviors to inform tailored plans. Secondly, a diversified support system offers counseling, education, employment guidance, and rehabilitation services, fostering comprehensive development. Family and community involvement is key: families provide a warm environment, while communities offer support through organizations and volunteers. Professional team building (psychologists, social workers, educators) ensures scientific, effective services.

Strengthening Social Governance: Building a Multi-Departmental Collaborative Prevention and Control System

Strengthen Community Governance and Improve Grassroots Social Management

Communities play a crucial role in adolescents' lives. Strengthening governance enhances management capacity and service levels, providing a safe environment. Firstly, a sound management mechanism: clarifying responsibilities, establishing structures and workflows, ensuring efficient operation. Secondly, resident participation: respecting wishes, promoting autonomy, and forming a shared governance pattern to enhance democracy and transparency. Moreover, strengthening service facilities (education, culture, sports, healthcare) provides diverse extracurricular and social practice opportunities, enhancing societal participation.

Social organizations and volunteers contribute professional and diversified services, offering targeted assistance.

Juvenile Legal Education Platform Construction: Integration of Resources and Strength

Constructing a legal education platform integrates resources to impart legal concepts, enhancing awareness and preventing crime. Firstly, integrating sector resources to develop diversified content (legal knowledge, education, cultural activities) delivered through various channels. Secondly, full engagement of governments, schools, families, communities, and

social organizations to form a collective effort .Furthermore, personalized education tailors content to age, gender, education, and interests, enhancing relevance.Enhanced supervision and evaluation ensure quality, with regular assessments to address issues promptly.

Strengthen Departmental Coordination to Form a Unified Prevention and Control Force

Addressing juvenile delinquency requires cross-department collaboration to prevent and address criminal behavior.Firstly, sound cooperation mechanisms: regular communication, information sharing, and coordinated action, clarifying responsibilities to form a collaborative pattern.Secondly, improving information sharing and data exchange to strengthen monitoring and early warning, enabling timely preventive measures.Moreover, cross-department training enhances personnel’s comprehensive qualities and collaboration capacity, providing talent support. Involving social organizations and volunteers forms a multi-party synergy (government, society, families, schools) to address juvenile delinquency.

CONCLUSION

This paper outlines the current situation, issues, and practical measures for juvenile delinquency prevention and control in China. It clarifies research background and objectives, highlighting the urgency of this field—youth are the nation’s future, and preventing juvenile delinquency is vital for societal stability and sustainable development.

The problem statement reveals core issues: rising juvenile crime severity, insufficient interdepartmental collaboration, imperfect prevention mechanisms, adverse societal influences, and inadequate education—all contributing to high delinquency rates.

Practical measures include strengthening preventive education (enhancing legal awareness), improving social correction mechanisms, and strengthening social governance, forming a comprehensive prevention system to curb juvenile delinquency

Juvenile delinquency prevention is complex and systematic, requiring joint efforts from families, schools, society, and the government. While progress has been made, challenges remain. Future efforts should deepen research, improve strategies, and provide a healthier environment for youth. More empirical studies are needed to validate strategy effectiveness, with attention to underlying causes (mental health, family environment, social support) to formulate more effective measures through interdisciplinary research.

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Appendix

Table 1

Number of Youth Crimes in China from 2019 to 2023

Year	Number of Youth Crimes (in ten thousands)
2019	3.3
2020	3.4
2021	3.4
2022	3.4
2023	3.5

Table 2

Data from a Provincial Court's 2019-2023 Work Report on Juvenile Crime Prevention (Part)

Year	Type	Rob	Steal	Intentional injury	Rape	Disorderly behavior
2019	N	2315	1813	604	412	235
	%	43.04	33.71	11.23	7.66	4.37
2020	N	3224	2834	636	451	387
	%	42.80	37.63	8.44	5.99	5.14
2021	N	1921	1523	545	318	287
	%	41.82	33.15	11.86	6.92	6.25
2022	N	2520	2136	686	348	365
	%	41.62	35.28	11.33	5.75	6.03
2023	N	2182	798	631	452	381
	%	49.10	17.96	14.20	10.17	8.57

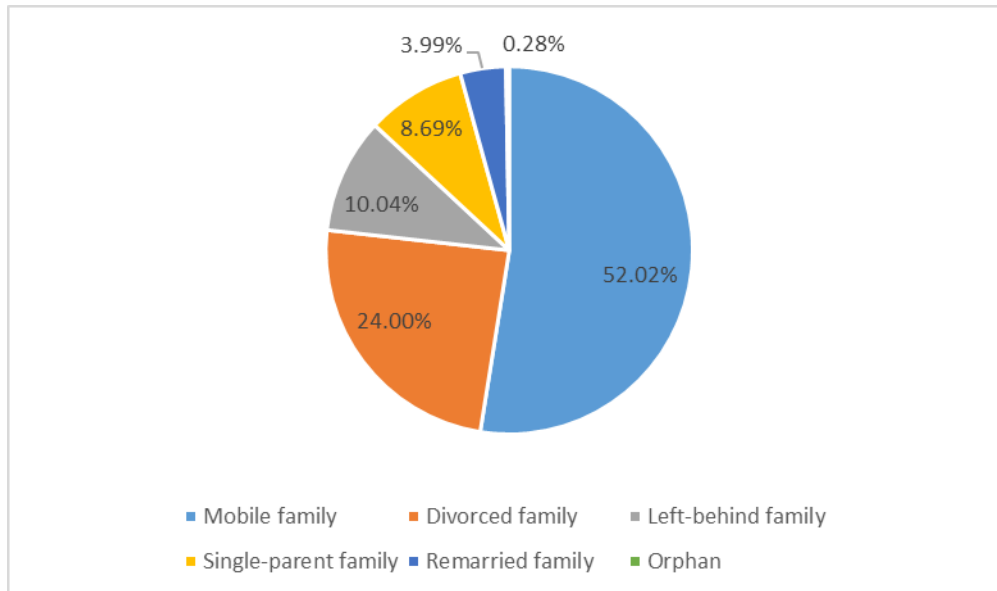
Table 3

Number of Youth Cybercrime Cases and Year-on-Year Growth Rate in China from 2019 to 2023

Year	Number of Youth Cybercrime Cases	Year-on-Year Growth Rate
2019	695	-
2020	934	34.39%
2021	1098	17.56%
2022	1284	16.90%
2023	1326	3.27%

Figure 1

Statistical Analysis of Defendants' Family Situations in Underage Crime Cases in China in 2023





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“If we knew what it was we were doing, it would not be called research, would it?”

– Albert Einstein