



An Analysis of Factors Affecting Undergraduates' Attitudes and Intention to Use Online Shopping in Zigong, China

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Abstract

Purpose: The core of this paper is to explore and evaluate how many factors affect college students' attitude towards online shopping and their intention to use it. To this end, we construct a conceptual framework that systematically reveals the complex causal relationship path between the pre-factors of perceived usefulness (PU), perceived ease of use (PEOU), perceived enjoyment (PE), convenience (CON), and trust (TRU) with attitude (ATT) and ultimately intent to use (INT). **Research design, data and methodology:** The researchers used quantitative research methods to conduct a questionnaire survey among students majoring in brewing Engineering, materials Science and engineering, and law, three majors with a relatively large enrollment scale at Sichuan University of Science and Engineering, in Zigong, China, and effectively collected 500 responses. The sampling strategy combines a multi-stage approach, including purposeful sampling, stratified random sampling, convenient and snowball sampling. Data analysis used confirmatory factor analysis (CFA) and structural equation modeling (SEM) to comprehensively evaluate model fit, reliability, and structural validity to ensure the rigor and reliability of the study results. **Results:** The research results show that in the three majors of brewing engineering, materials science and engineering, and law of Sichuan University of Science and Engineering in Zigong, China, Perceived usefulness (PU), perceived ease of use (PEOU), perceived enjoyment (PE), convenience (CON) and trust (TRU) have significant effects on college students' attitudes about online shopping. Among them, attitude, as a key intermediary variable, also has a significant positive impact on their intention to use online shopping (INT). Notably, convenience (CON) has the most significant impact on attitude (ATT), followed by perceived usefulness (PU) and perceived ease of use (PEOU). **Conclusions:** The statistical analysis results of this study provide solid and powerful data support for the six research hypotheses, and successfully achieve the established research objectives. Based on these findings, we suggest that in order to further increase the interest and participation of college students in online shopping, all stakeholders, including policy makers, online platform operators and commodity suppliers, should focus

on and optimize the above key influencing factors. Especially the three key dimensions of convenience, perceived enjoyment and trust, effectively optimize the user experience in these aspects, effectively enhance the attractiveness of online shopping for college students, so as to improve their willingness to use.

Keywords: Perceived Usefulness (PU), perceived Ease of Use (PEOU), perceived enjoyment (PE), convenience (CON), Trust (TRU), Attitude (ATT), Intent to Use (INT), Online Shopping

1. Introduction

With the global popularization of Internet technology and the rapid development of digital infrastructure, online shopping has ushered in an unprecedented prosperity. It creates a seamless, convenient and efficient interactive platform for users around the world, enabling them to easily cross geographical boundaries and achieve different personal goals and aspirations. Braga and Jacinto (2022) define online shopping as a way for consumers to browse, select and purchase goods or services through Internet platforms, and enjoy convenient services such as home delivery and personalized recommendation. Harris et al. (2017) pointed out that online shopping, by combining information technology and commercial transactions, has greatly improved the convenience, flexibility and selectivity of shopping, not only changed consumption habits, but also promoted the global commodity circulation.

A number of studies have shown that factors such as shopping convenience (Bhatnagar et al., 2000), product category uniqueness (Chiang and Dholakia, 2003) and trust (Azam et al., 2013) significantly affect consumers' attitudes and online shopping intentions. Rogers and Harris (2003) found that men are more likely than women to trust online shopping. Mummalaneni and Meng (2009) emphasize that the online shopping environment seamlessly integrates the sales process and improves shopping efficiency. In recent years, the online shopping market has grown further due to pandemic lockdown measures (Mohiuddin, 2020) and changes in consumer shopping habits (Dannenberg et al., 2020).

According to a research report (2024) by Beijing Hengzhou Primus International Information Consulting Co., LTD., the global online shopping market sales will continue to grow, and China, the United States and India will become the main markets. Referring to the data of the National Bureau of Statistics of China, China's online retail sales continue to grow (Figure 1.1), and the number of online shopping users continues to grow (Figure 1.2), accounting for 83.8% of the total number of Internet users (as of December 2023). This trend reflects the high recognition and reliance of Chinese consumers on online shopping.



Figure 1.1: data sources: National Bureau of Statistics of China

https://dzswgf.mofcom.gov.cn/news_attachments/0b705cad272d2f27479e27aaba27ebe816731b07.pdf

2. Literature Review

2.1. Factors affecting undergraduates' attitude and intention to use online shopping

Harris et al. (2017) believe that "online shopping" means that consumers search and buy products with reliable quality and perfect after-sales through Internet platforms. Braga and Jacinto (2022) argue that online shopping is a way to enjoy services such as home delivery, personalized recommendation, diversified payment and flexible return and exchange. Tong (2010) found that in online shopping in China and the United States, perceived usefulness and risk affect purchase intention, and ease of use promotes usefulness, but the impact of online shopping experience is different between the two countries.

Maghrabi and Dennis (2011) point out that the sustainability of online shopping in Saudi Arabia is influenced by usefulness, enjoyment and social pressure, and there are gender differences. Arora and Aggarwal (2018) found that price, convenience, and variety drive Indian women's online shopping attitudes, especially diversity. Dharmesti et al. (2019) showed that young consumers in Australia and the United States had a positive attitude towards online shopping and enhanced their willingness to do so. Aziz and Khan (2022) found that utilitarian motivation promotes shopping intention, hedonic motivation leads to impulse shopping, and self-esteem motivation is negatively correlated with shopping intention. Mondal and Hasand (2023) point out that Bangladeshi users' perceived usefulness and ease of use influence their shopping habits and mediate relationships in online shopping intentions.

Davis (1989) first introduced the concept of perceived usefulness, describing it as an individual's subjective judgment on whether a new system or technology can improve his or her work effectiveness, that is, "the degree to which an individual believes that the use of a specific system can improve his or her work performance". Davis et al. (1992) view perceived usefulness as an external driving force in the application of information technology. Venkatesh and Davis (2000) reiterate that perceived usefulness plays a critical role in driving user behavior change, influencing both first-time users and subsequent adopters. Rogers (2003) perceived usefulness is a measure of superiority over previous innovations. In the study on "Consumers' motivations for online shopping", Monsuwe et al. (2004) explained that "perceived usefulness" refers to how online shopping helps consumers complete the shopping process more efficiently.

Davis (1989) defines perceived ease of use as "the degree to which an individual believes that a particular system can be implemented without effort". In the same year, Davis et al. further explained that perceived ease of use refers to the degree to which users expect a system or technology to meet their needs quickly and easily. Taylor and Todd (1995) argue that perceived ease of use reflects people's belief that adopting certain technologies can reduce their burden. According to the study of Hernández et al. (2009), perceived ease of use refers to the perception that a new system is easy to operate and can be used without extra effort. Rahmiati and Yuannita (2019) pointed out that the concept of perceived ease of use reflects consumers' satisfaction with the degree to which the information system meets their needs when shopping online, meaning that they do not need to put more effort into understanding and operating the website.

Davis et al. (1992) proposed the concept of perceived enjoyment, which occurs in the internal manifestation of an activity. Davis et al. (1992) found that perceived pleasure is the



extent to which the activity of using a computer is itself considered pleasurable in addition to any performance consequences that might be expected. Venkatech (2000) argues that perceived enjoyment refers to "the extent to which an activity using a particular system is perceived as pleasurable". According to Verhoef et al. (2007), perceived enjoyment refers to the intrinsic rewards that come from the use of technology. Dickinger et al. (2008) prove that perceived enjoyment is emotional and is defined as the degree of pleasure or enjoyment that consumers feel when using a particular technology. Sumi and Ahmed (2022) consider perceived pleasure as a predictor of consumer media use, focusing on assessing individual consumers' feelings of pleasure and pleasure when engaging in media interactions.

Hung et al. (2014) believe that in the context of online shopping, convenience is mainly reflected in time saving, which means that shopping can be done anytime and anywhere, and also includes the ability to easily compare prices when shopping online. Al-Debei et al. (2015) emphasize that the specific definition of convenience needs to be adjusted according to different situations. Referring again to the views of Xu and Jackson (2019), in the context of omnichannel retail, they interpret convenience as the time and energy saving benefits that cross-channel shopping brings to customers. Ray et al. (2019) argue that convenience is the ability to use objects without barriers. Yang et al. (2021) regard convenience as a utilitarian feature in the retail environment. Zhao et al. (2023) defined convenience in the OGS environment as the efficiency and convenience of consumers using GDP to quickly search, select stores and products, and complete payments.

Carter et al. (2014) propose that 'trust' is the customer's trust in an online provider to act in an impartial manner. Barney and Hansen (1994) point out that trust is mutual trust in which neither party takes advantage of the other's weaknesses. Mayer et al. (1995) defined trust as the willingness of one party to act in a vulnerable way to the influence of the other party in anticipation of the other party taking a particular action that is important to the principal. Gefen et al. (2003) explain that trust reflects the expectation that others will not act opportunistically. Lin (2011) argues that trust can also be understood as an individual's belief in the trustworthiness of others. Carter et al. (2014) further clarified that in the online shopping environment, trust refers to the customer's trust in the online supplier that it will handle the transaction in a fair manner.

Fishbein and Ajzen (1975) have described the concept of "attitude" as the degree to which an individual likes or dislikes an object. Rosenberg and Hovland (1960) defined it as a pattern of tendentious behavior that includes thoughts, feelings, and emotions. Davis (1989,1993) and his team (1989) define an attitude as a user's demonstrated preference when actually operating a particular device or technology. Ajzen (1991) further pointed out that the attitude towards a behavior is reflected in the degree to which an individual evaluates the behavior positively or negatively. Vijayarthi (2004) argues that attitudinal characteristics are the tendency of individuals to produce specific reactions to objects or concepts.

Fishbein and Ajzen (1975) view use intention as a comprehensive structure that integrates cognitive, emotional, and conscious dimensions. In their 1977 study, they further defined intent to use technology as the motivation that drives behavior, and quantified the extent to which an individual intentionally tries to perform a specific behavior when adopting a new technology. Davis (1989,1993) and Davis et al. (1989) describe usage intent as the extent to which users perceive the use of specific devices and technologies. Bhattacharjee (2001) points out that, from the definition level, adoption intention and use intention often have similar meanings. In their study on e-commerce, Daragmeh et al. (2021) proposed that usage intent is a key indicator for predicting user acceptance of fintech during the pandemic. Huang et al. (2012) believe that "intention" can reveal the relationship between individual



mentality and actual behavior. William et al. (2022) emphasize that use intention reflects the extent to which an individual consciously plans to take a specific action in the future.

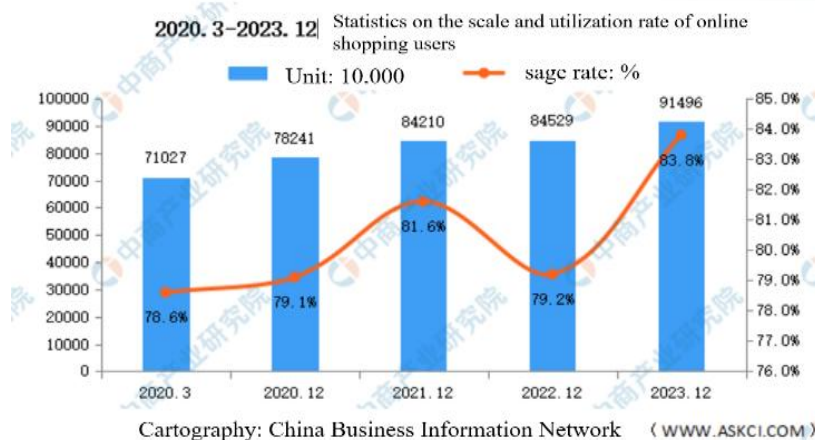


Figure 1.2: 2020.3-2023.12 Statistics on the scale and utilization rate of online shopping users
Data source: CNNIC, China Business Industry Research Institute (Cartography: China Information Network WWW.ASKCI.COM)

<https://www.askci.com/news/chanye/20240327/085757271150107730571834.shtml>

However, while China's online shopping market is booming, it also faces multiple challenges, including fierce competition among platforms, potential market monopoly risks, unfair competition behaviors, uneven product quality, unsatisfactory after-sales service, personal information security risks, low logistics distribution efficiency, and the proliferation of counterfeit and shoddy goods (Parasuraman et al., 2005). These problems not only hinder the healthy development of the market, but also profoundly affect the overall attitude and intention of consumers towards online shopping, especially for college students, an active and sensitive consumer group, the impact is particularly significant, and it is urgent for the industry and all sectors of society to jointly deal with and solve.

This study aims to deeply analyze the key influencing factors of college students' online shopping attitude and usage intention in Zigong City, China, focusing on seven dimensions of perceived usefulness, perceived ease of use, perceived enjoyment, convenience, trust, attitude and usage intention. Through detailed statistical analysis, the researchers hope to provide insightful references for policy makers, e-commerce platforms and follow-up research, so as to continuously optimize the online shopping environment and better meet the diverse needs of consumers, especially college students.

2.2. Research Hypothesis and Relationship between Variables

2.2.1. Relation between Perceived usefulness and Attitude

In the research field of image interaction technology, Wu (1999) pointed out that image interaction technology is highly praised for its ability to improve customers' feedback on e-retailers or products, and concluded that customers' interactive perception is positively correlated with their attitude towards websites. Koufaris (2002) argues that perceived usefulness has a significant effect on the attitude of online retailers. Further, under the framework of the technology acceptance model (TAM), perceived usefulness is regarded as a key factor in determining users' attitudes toward virtual stores, and an important indicator to predict users' behavioral intentions when visiting organizational websites. The view of Rosen et al. (2013) shows that when users believe that new technologies are beneficial to them and meet their needs, they will have a positive attitude towards them.

Rese et al. (2017) validated the positive impact of perceived usefulness on attitudes in a study of Intelligent service systems (SST) and augmented reality (AR). Alalwan (2018), in his literature review, shows that consumers positively view advertising and marketing campaigns on social media because they perceive them to be useful. Dwivedi et al. (2019) proposed on the basis of TAM theory that the higher the practicality of the technology, the more positive the user's attitude towards the use



of the technology. To sum up, based on previous research literature, we propose the following hypotheses regarding consumers' cognition and attitude towards the usefulness of online shopping.

H1. Perceived usefulness has a significant influence on attitude.

2.2.2. Relation between Perceived ease of use and Attitude

Teo (2001) highlighted the ease of use of the system as a core factor driving its adoption. On the other hand, if the system is complex and difficult to master, it requires increased learning investment and user interaction in order to become proficient, which inevitably reduces its popularity. Shanmugam et al. (2014) revealed that user perception of ease of use has a significant impact on stimulating consumer interest. In Malaysia, people's perception of convenience and practicality plays a role in the adoption process of mobile banking through the intermediary variable of attitude, which means that the acceptance of mobile banking is not only limited by its ease of use and practicality, but also influenced by users' attitudes towards the technology. Research by Indarsin and Ali (2017) shows that perceptions of ease of use and usefulness have a positive and significant impact on the attitudes of mobile commerce users in the wholesale merchant applications of Ikens Group in Indonesia.

In their study, Zhang et al. (2018) emphasized that job seekers' perception of the ease of use of an e-recruitment system is critical, as it is directly related to their attitude and willingness to use the system. Nuryyev et al. (2020) clearly state that perceptions of ease of use have a positive effect on attitudes, driving adoption of blockchain technology. Lavuri et al. (2022b) further pointed out that the user's attitude towards digital technology or existing technology is mainly determined by two key factors: the perception of ease of use and the perception of usefulness. Based on this, we propose the following hypothesis on the relationship between consumers' perceptions of usability and attitudes towards online shopping.

H2. Perceived ease of use has a significant influence on attitude.

2.2.3. Relation between Perceived Enjoyment and Attitude

The findings of Hsu and Lin (2008) support the idea that perceived happiness has a positive promoting effect on an individual's attitude towards website use. When Wojciechowski and Cellary (2013) explored the augmented reality environment, they found that both perceived usefulness and pleasure had a significant and positive impact on users' attitudes towards media and usage intentions. Choi and Kim (2016) pointed out that customers' perceived enjoyment has a significant impact on their preferences, which in turn affects their attitudes towards the use of technology tools. By applying stimulus-response theory (SRT), it can be observed that high levels of perceived enjoyment by customers can drive their adoption of technology tools.

Research by Perumal et al. (2022) further reinforces this view, showing that when customers experience a high level of enjoyment while using technologies, they are more inclined to accept and adopt those technologies. In their study on online grocery shopping, Driediger and Bhatiasavi (2019) clearly pointed out a positive correlation between perceived enjoyment and customers' attitudes towards technology. The study shows that the more customers enjoy their online shopping experience, the more positive they are about using technology, which in turn increases the likelihood that they will accept and use online grocery shopping platforms. Based on the above research results, we can conclude that perceived enjoyment is the key factor affecting users' attitude towards technology and use behavior. Therefore, we further put forward the following hypothesis on this basis.

H3: Perceived enjoyment has a significant influence on attitude.

2.2.4. Relation between Convenience and Attitude

Meuter et al. (2000) pointed out that the key to attracting customers to technology-driven banking is its ease of use and convenience. Their research reveals that when banking services provide users with a simple and intuitive operating experience, this effectively changes customer attitudes and makes them more willing to adopt these services. Gerrard and Cunningham (2003) further revealed the positive correlation between perceived convenience and the use of online banking, emphasizing that the convenience of online banking services plays a crucial role in enhancing users' willingness to adopt them. This positive correlation suggests that improving the convenience of services can positively



influence user attitudes and make them more inclined to use online banking.

Anesbury et al. (2016) found that convenience is a core factor for consumers to choose online shopping in their research on online shopping motivations. They pointed out that consumers are increasingly inclined to make purchases through the Internet, mainly due to the great convenience provided by online shopping, such as flexibility of time and place, variety of products and personalized services. Ivanov and Webster (2018) mention in their research review that previous research has identified convenience as a significant advantage of smart technology use and confirmed its positive impact on consumer responses, including attitudes and behavioral intent. The study further deepens our understanding of how smart technology shapes consumer behavior by providing convenience. In their research on drone food delivery service, Hwang and Kim (2021) found that convenience and functionality are the two key factors that affect consumers' attitude towards this service. Consumers' perception of the convenience of drone delivery services, particularly the ease of use and time efficiency of the services, plays an important role in shaping their positive attitudes towards the services. Based on the above research, we propose the following hypothesis.

H4: Convenience has a significant influence on attitude.

2.2.5. Relation between Trust and Attitude

In the field of e-commerce, Ponte et al. (2015) discussed and revealed a significant positive correlation: consumers' trust in Internet providers is in direct proportion to their positive attitude towards online shopping and their purchase intention. In other words, a decline in trust tends to be accompanied by a corresponding decline in the willingness to shop online. According to the literature review by Seckler et al. (2015), trust is diversified, one of which is trust in a website. It is based on users' comprehensive consideration of the website's ability to protect personal information, past experience, website reputation, information transparency and other factors, and is related to whether a website can provide real and effective services or products. The research of Kaur and Khanam Quareshi (2015) emphasizes that customers' trust in online suppliers is crucial before online purchase, because online transactions often require consumers to disclose sensitive financial information. Therefore, building trust becomes an indispensable part to ensure transaction security and safeguard consumer privacy.

Hajiheydari and Ashkani (2018) pointed out that users' trust in mobile apps is the cornerstone of building a positive attitude, and this trust can significantly promote users' positive evaluation and attitude towards apps. An in-depth study by Sarkar et al. (2020) also focuses on this topic and reveals that trust has a significant and positive impact on user attitudes in a mobile commerce environment, further highlighting the importance of trust as a key driver of positive evaluation and behavioral intent in mobile commerce. Bugshan and Attar (2020) show that the trust established by customers on a company's website will have a significant and positive effect on their attitude towards the company, thus enhancing their willingness to buy products or services from the company's website. This finding emphasizes the core position of customers' trust in websites in driving changes in consumer behavior. In view of this, we propose the following hypothesis.

H5: Trust has a significant influence on attitude.

2.2.6. Relation between Attitude and Intention to use

Empirical research by Korvenmaa (2009) shows that there is a close correlation between tourists' willingness to use social networks when searching for travel information and their attitude towards interactive travel websites. Specifically, when visitors have a positive view of these sites, they tend to show a strong interest and desire to continue to obtain information about travel products through these platforms in the future. Amin et al. (2010) pointed out that individuals' positive attitude towards Qardhul Hassan's financing method can effectively promote them to choose and use this financing method, indicating that positive customer attitude is the key factor to promote the adoption of Qardhul Hassan's financing service. After in-depth analysis of Islamic insurance literature, Husin and Rahman (2016) clearly pointed out that attitude is an important variable to predict customers' intention to use Islamic insurance services.

Ibrahim et al. (2017), in their study of Islamic banking and finance, found that individuals'



attitudes towards Islamic banking products had a significant positive impact on their purchase intentions. Meanwhile, Ali et al. (2017b) came to a similar conclusion in their study from the same year, observing a positive correlation between an individual's attitude toward Islamic family financing and their willingness to use it. Together, these studies highlight the important role of attitudes in the willingness to use financial products, particularly in Islamic finance. In their latest findings, Jiang et al. (2023) further show that consumers' positive attitudes toward virtual travel experiences (VTO) have a significant positive impact on their willingness to use them, highlighting the importance of consumer emotional tendencies in predicting the adoption of new technologies or services. Based on the above research, we propose the following hypothesis.

H6: Attitude has a significant influence on intention to use online shopping.

3. Research Methods and Materials

3.1. Research Framework

This study is a conceptual framework based on three classical theories and three theoretical frameworks. The three classical theories include the Rational behavior theory (TRA) proposed by Fishbein and Ajzen (1975), the technology acceptance model (TAM) constructed by Davis (1986), and the Planned behavior theory (TPB) developed by Ajzen (1991).

(1) The three theoretical frameworks are as follows:

1. Raman's (2019) theoretical framework: Extending the theory of Rational Behavior (TRA) to construct a new framework including trust, convenience and customer service (Figure 1), and analyze Indian women's willingness to shop online. Through the empirical analysis of 909 female consumers with a three-part questionnaire, it is found that attitude, convenience, customer service and subjective norms significantly affect online shopping intentions; Trust directly affects online shopping attitude and indirectly affects purchase intention; Convenience and customer service are key pre-variables.

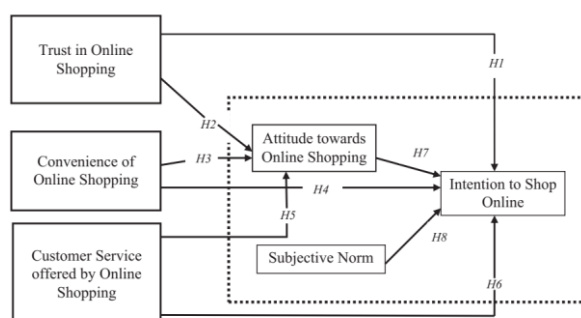


Figure 1: Understanding female consumers' intention to shop online

The role of trust, convenience and customer service

Source: Raman, P. (2019). Understanding female consumers' intention to shop online the role of trust, convenience and customer service, Asia Pacific Journal of Marketing and Logistics Vol. 31 No. 4, 2019 pp. 1138-1160.

(2) The theoretical framework of Lee et al. (2006). A model was built based on TAM (Figure2) to explore the influence mechanism of image interaction technology on American e-commerce consumers' attitudes and behavioral intentions. The model was constructed through literature review, interdisciplinary experiments were conducted, and 206 undergraduate students were tracked and investigated by LISREL 8.54 software. The results show that the model effectively reveals the action path, and the structural fitting degree and explanatory power are scientifically verified, demonstrating the robustness of the theoretical framework.

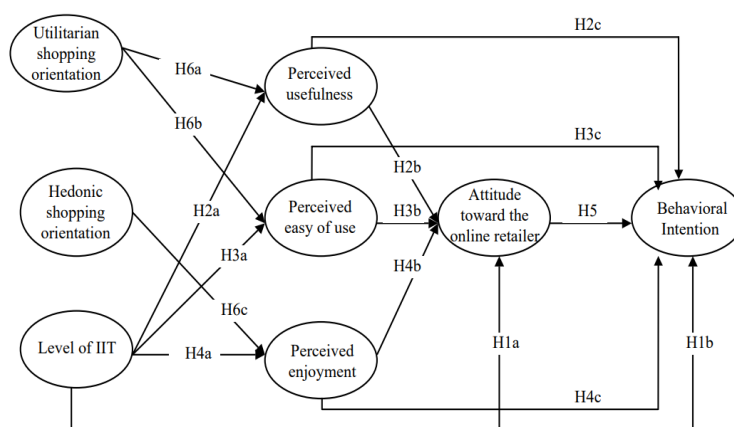
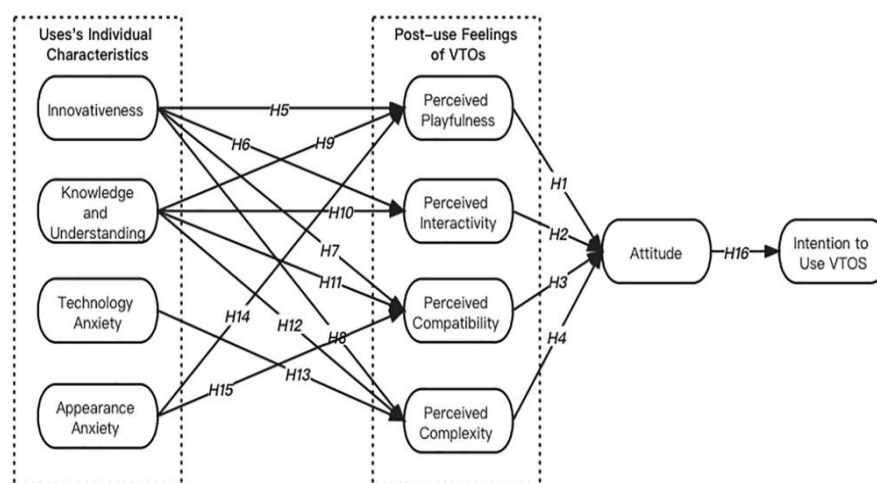


Figure 2: The role of the technology acceptance model in explaining effects of image interactivity technology on consumer responses

Source: Lee et al. (2006). The role of the technology acceptance model in explaining effects of image interactivity technology on consumer responses. *International Journal of Retail & Distribution Management* Vol. 34 No. 8, 2006 pp. 621-644.

(3) The theoretical framework of Hua et al. (2024). Developed an extended model (e-TAM) (Figure3), combined with electronic technology and TAM, to understand the determinants of young Chinese consumers' willingness to use VTO, detect the influence of consumer characteristics on their feelings, attitudes and intentions, and explore gender differences. Data were collected from 243 college students in a university, 227 valid questionnaires were collected, and structural equation model (SEM) was used for empirical evaluation and analysis to test the research hypothesis.



Source(s): Author's own creation

Figure 3: Exploring users' adoption intention of virtual try-on apps: how users' individual characteristics affect post-use feelings

Source: Hua et al. (2024). Exploring users' adoption intention of virtual try-on apps: how users' individual characteristics affect post-use feelings. *Asia Pacific Journal of Marketing and Logistics* © Emerald Publishing Limited 1355-5855 DOI 10.1108/APJML-09-2023-0920.

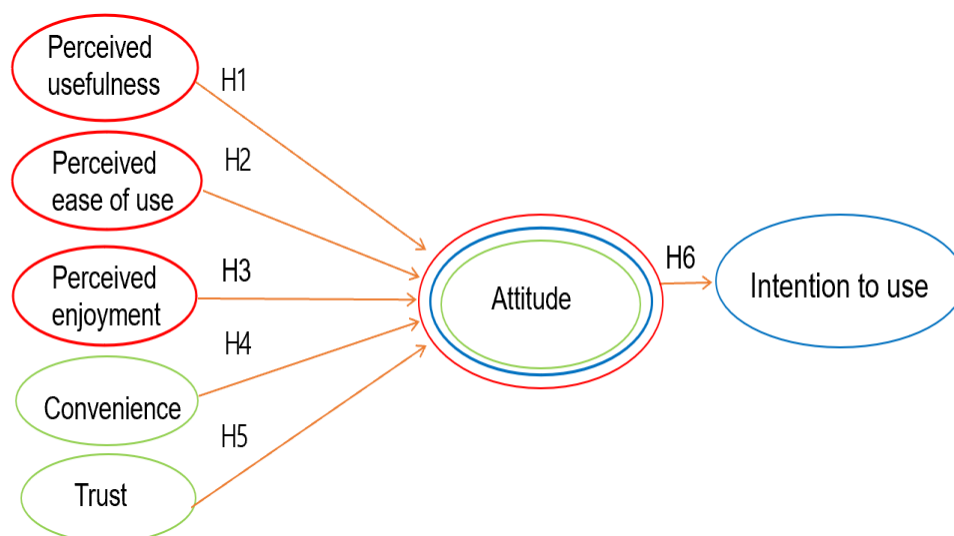


Figure 4: A conceptual framework for “Examining the influence of Multiple Factors on Undergraduates' Attitudes and Intention to Use Online Shopping in Zigong, China”
 Source: Established by the author

Based on the above theoretical cornerstones, this study constructs an innovative conceptual analysis framework (Figure 4), focusing on the research of online shopping behaviors of students from Sichuan University of Science and Technology in Zigong, China. The core goal of this study is to analyze the multidimensional driving mechanism of college students' online shopping attitude and usage intention, focusing on the interaction of the following key variables: perceived usefulness (PU), perceived ease of use (PEOU), perceived pleasure (PE), convenience (CON), trust (TRU), attitude (ATT) and usage intention (INT). By constructing a causal structure model among variables, this paper attempts to reveal how functional cognition (usefulness/ease of use), emotional experience (pleasure), situational factors (convenience) and social psychological factors (trust) jointly shape college students' online shopping attitudes and ultimately affect their use decisions under the consumption scenario enabled by digital technology. This research design not only expands the interpretation boundary of the traditional TAM model, but also provides a new theoretical perspective for understanding the behavioral characteristics of Generation Z consumer groups by introducing the perceived pleasure variable.

3.2. Methodology

This study adopts a quantitative method of non-probabilistic multi-stage sampling. The sampling process is carefully designed and consists of three progressive stages: the first stage is targeted sampling, the second stage is stratified random sampling, and the third stage is a combination of convenience sampling and snowball sampling techniques. Through an online questionnaire platform, we distributed questionnaires to a specific target group, namely, the large enrollment of students majoring in wine engineering, materials Science and engineering, and law at Sichuan University of Science and Engineering in Zigong, China.

This study focuses on the factors that affect the online shopping attitude and usage intention of the above major student. The questionnaire structure is carefully constructed and divided into three core parts: the first part is a screening question to ensure the pertinence and relevance of the sample; The second part contains 31 items based on seven variables, using a five-point likert scale to measure the six core hypotheses of the study, ranging from "1 - strongly disagree" to "5- strongly agree", covering the attitudinal tendencies of respondents. The third



part focuses on the basic demographic characteristics of the respondents, covering key information such as gender, age, grade, monthly shopping frequency, online shopping motivation, types of purchases and monthly online shopping expenditure.

In order to ensure the validity and reliability of the questionnaire before the formal large-scale survey, the research team conducted a pre-test on 30 pre-selected respondents. The pre-test questionnaire passed the expert review and obtained a high project goal consistency index (IOC) score, which laid a solid foundation for the smooth implementation of subsequent research.

Using Cronbach's Alpha coefficient evaluation method, this study successfully verified the validity and reliability of the questionnaire, which met the requirements of academic rigor (Dikko, 2016). The researchers then distributed the questionnaire to the intended target population and successfully collected and analyzed 500 valid data samples.

In the data analysis stage, researchers used SPSS AMOS 23 software as a statistical tool to conduct similar statistical tests and comprehensive analysis of the collected feedback data. To ensure the accuracy and validity of the convergence results, the scientific method of confirmatory factor Analysis (CFA) was used, a step that was essential to verify the applicability of the theoretical conceptual framework of the study. With CFA, we further solidify the foundation of model validity and reliability.

3.3. Population and Sample Size

This study adopts a well-designed non-probabilistic multi-stage sampling strategy, which is carried out in a quantitative way. The researchers focused on Sichuan University of Science and Engineering in Zigong, China, and specifically selected three majors with relatively large enrollments at the university: brew engineering, materials science and engineering, and law. In order to ensure the broadness and efficiency of data collection, we used the online questionnaire platform as a tool to send questionnaires to these student groups. Table 1 details the specific sampling scheme and its implementation in this study.

Table 1: Students and sample size of three majors in Sichuan University of Science and Engineering, Zigong, China

Subject	Number of Students	Proportional Sample Size
Brewing Engineering Students	720	154
Materials Science and Engineering Students	795	170
Law Major Students	825	176
Total	2340	500

Source : The data comes from Sichuan University of Science and Engineering population statistics 2023. https://lzc.suse.edu.cn/p/O/?StId=st_app_news_i_x636088597402582838

From August 2024 to March 2025, the researchers carefully organized and conducted a questionnaire survey. In the data screening stage, we strictly ensured the suitability of the target interviewees, that is, they were all students from the three majors with large enrollment scale in Sichuan University of Science and Engineering in Zigong, brewing engineering, materials science and engineering, and law. It is worth mentioning that the teachers of these students gave active support and encouragement to this study. They mobilized and encouraged the students to participate enthusiastically and fill out the online questionnaire carefully, thus laying a solid foundation for the smooth progress of this study



4. Results and Discussion

4.1. Respondent's Demographic Profile

Table 2: Respondent's Demographic Profile

Tatret population: three major students			
Demographic and Behavior Data (N=500)		Frequency	Percentage
Gender	Male	193	38.6%
	Female	307	61.4%
College grade	freshman	148	29.6%
	Sophomore	165	33%
	Junior	127	25.4%
	senior	60	12%
Monthly shopping frequency	1-3times	39	7.8%
	4-6times	177	35.4%
	7-9times	179	35.8%
	More than 9 times	105	21%
Reasons for using online shopping	Perceived usefulness	87	17.4%
	Perceived ease of use	27	5.4%
	Perceived enjoyment	38	7.6%
	Convenience	343	68.6%
	Trust	5	1%
Types of products purchased online	Electronic product	19	3.8%
	Clothing	240	48%
	Beauty makeup	38	7.6%
	other	203	40.6%
Monthly spending on online shopping	1-200 RMB	244	48.8%
	201-400RMB	203	40.6%
	401-600RMB	37	7.4%
	Over 600 RMB	16	3.2%

Source: Created by the author

Through the collection of questionnaire data, it was found that among the three majors, there was no significant difference in the proportion of male and female students majoring in brewing engineering and materials science and engineering when using online shopping (male students accounted for 45.7% and 51.2%, respectively), showing more balanced shopping behavior. However, there is a significant gender gap in liberal arts law majors (23.9% for men), and a larger proportion of men and women shop online. In addition, from the grade distribution, the second and third grade students are the main group of online shopping, and their monthly shopping frequency is concentrated between 4-6 and 6-9 times. The main reason students choose to shop online is its convenience, with clothing having the largest number of buyers among the categories of goods purchased. In terms of consumption amount, the proportion of students who spend 100-200 yuan and 201-400 yuan per month is relatively high. This information will help us more accurately grasp the characteristics and differences of online shopping behaviors of college students of different majors, grades and genders in Zigong



Sichuan University of Science and Engineering, China, and provide strong data support for subsequent marketing strategy formulation, campus online shopping behavior research or related service optimization.

4.2. Confirmatory Factor Analysis (CFA)

In this study, confirmatory factor analysis (CFA) was used to measure each variable in the conceptual framework of the study. The measurement results showed that all scale items of each variable showed significance. Moreover, the factor load values of each scale item are in the acceptable range, which strongly indicates that the conceptual framework of this study has a high degree of fit. Specifically, most of the factor load values are over 0.70, and only the factor load value of "convenience" (CON) is 0.665, which is slightly lower than 0.70, but still in the acceptable range. In terms of statistical tests, all P-values are less than 0.05, all structural reliability coefficients are greater than 0.70, and all mean extraction variance (AVE) is greater than 0.50. These statistical indicators are crucial for evaluating the validity and reliability of the model, and the specific values are shown in Table 3.

Table 4 shows the square root of the mean extraction variance (AVE) of each construct. These values are all higher than the correlation coefficients among the constructs, which clearly indicates that each construct has good discriminative validity.

In terms of model fitting indicators, this study selected GFI, AGFI, NFI, CFI, TLI and RMSEA as indicators to evaluate the degree of model fitting in confirmatory factor analysis (CFA) tests. Table 5.1 presents the convergence validity and discriminant validity of this study. After testing, both of these two validity indicators have reached acceptable levels.

In summary, all the measured results strongly validate the validity of the structural model estimated in this study.



Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Perceived Usefulness (PU)	Lee et al. (2006)	4	0.944	0.893	0.945***	0.811
Perceived Ease of use(PEOU)	Lee et al. (2006)	5	0.958	0.791	0.958 ***	0.821
Perceived enjoyment (PE)	Lee et al. (2006)	6	0.960	0.722	0.960 ***	0.800
Convenience (CON)	Raman. (2019)	4	0.938	0.665	0.938***	0.792
Trust (TRU)	Raman. (2019)	4	0.942	0.794	0.942***	0.804
Attitude (ATT)	Raman. (2019)	4	0.935	0.716	0.935 ***	0.783
Intention to Use (INT)	Wen Hua, (2024)	4	0.944	0.821	0.943***	0.804

Note: CR = Composite Reliability, AVE = Average Variance Extracted

Source: Created by the auth

Table 4: Discriminant Validity

Factor Correlations

Variable	PU	PEOU	PE	CON	TRU	ATT	INT
PU	0.811						
PEOU	0.380	0.906					
PE	0.335	0.367	0.894				
CON	0.425	0.325	0.322	0.890			
TRU	0.377	0.331	0.373	0.307	0.897		
ATT	0.434	0.1353	0.394	0.429	0.345	0.885	
INT	0.320	0.295	0.315	0.321	0.315	0.322	0.897

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

Source: Created by the author



Table 5.1 : Goodness of Fit for Confirmatory Factor Analysis (CFA)

Fit Index	Acceptable Criteria	Values
CMIN/df	<3 (Hair et al.2006)	581.408/413; 1.408
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.930
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.916
NFI	≥ 0.80 (Wu & Wang, 2006)	0.965
CFI	≥ 0.80 (Bentler, 1990)	0.989
TLI	≥ 0.80 (Sharma et al., 2005)	0.988
RMSEA	< 0.08 (Pedroso et. al., 2016)	0.029

Remark: CMIN/DF = the ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, IFI = Incremental Fit Indices, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

Source: Created by the author

Table 5.2: Goodness of Fit for Structural Equation Model (SEM)

Fit Index	Acceptable Criteria	Values
CMIN/df	<3 (Hair et al.2006)	1085.111/428; 2.535
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.854
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.831
NFI	≥ 0.80 (Wu & Wang, 2006)	0.934
CFI	≥ 0.80 (Bentler, 1990)	0.959
TLI	≥ 0.80 (Sharma et al., 2005)	0.955
RMSEA	< 0.08 (Pedroso et. al., 2016)	0.055

Source: Created by the author

4.3. Structural Equation Model (SEM)

This study follows the fitting criteria proposed by authoritative scholars in the field of structural equation modeling (SEM) for comprehensive evaluation. According to the suggestions of Hair et al. (2006), the Chi-square freedom ratio (CMIN/DF) was controlled below 3.00 in this study, and the actual calculation result was 2.535, which met the requirements of the absolute fitting index. In terms of incremental fitting index, $GFI \geq 0.85$ (0.857 in this study) and $AGFI \geq 0.80$ (0.831 in this study) recommended by Sica and Ghisi (2007) met the criteria. The $NFI \geq 0.80$ standard proposed by Wu and Wang (2006) was exceeded with an excellent value of 0.934. For comparative fitting index, Bentler's (1998) $CFI > 0.80$ criterion and Sharma et al.'s (2005) $TLI > 0.80$ criterion obtained high scores of 0.959 and 0.955 respectively. The approximate root-mean-square error (RMSEA), using the strict criteria (< 0.08) recommended by Pedroso et al. (2016), performed well in this study with an error value as low as 0.055.

After parameter estimation and modification of the theoretical model by SPSS AMOS 23 software, all the core fitting indicators reached or exceeded the accepted standards in the academic field (see Table 5.2 for specific values), indicating a high degree of compatibility between the model and the observed data. This multi-dimensional fitting verification method not only ensures the rigor of model testing, but also fully confirms the high adaptability of theoretical framework and empirical observation through quantitative data.



4.4. Research Hypothesis Testing Result

In this study, through the path analysis framework, standardized regression coefficient (β) and determination coefficient (R^2) were used to systematically test the causal relationship strength and explanatory power of each variable in the theoretical model. Table 6 presents the core parameters of hypothesis testing, and all preset paths reach the level of statistical significance ($p < 0.05$), which fully supports the establishment of the research hypothesis.

Table 6: Hypothesis Result of the Structural Model

Hypotheses	Paths	Standardized Path Coefficients (β)	S.E.	T-Value	Tests Result
H1	ATT<---PU	0.197	0.035	5.615***	Supported
H2	ATT<---PEOU	0.108	0.037	2.917	Supported
H3	ATT<---PE	0.191	0.039	4.900	Supported
H4	ATT<---CON	0.245	0.041	5.953	Supported
H5	ATT<---TRU	0.095	0.037	2.566	Supported
H6	INT<---ATT	0.383	0.056	6.891***	Supported

Note: * $p < 0.05$

Source: Created by the author

The details are as follows:

First of all, attitude formation mechanism

Convenience has the most significant impact on technology acceptance attitude ($\beta=0.245$), highlighting the core position of service acquisition efficiency in user experience. Perceived usefulness ($\beta=0.197$) and perceived enjoyment ($\beta=0.191$) constitute the dual driving force of attitude formation, reflecting the dual role of functional value and emotional value respectively. Perceived ease of use ($\beta=0.108$) and trust ($\beta=0.095$) are relatively weak, but they are still important supplementary factors in attitude shaping

secondly, transformation path of behavior intention

Attitude variable has the strongest predictive power for use intention ($\beta=0.383$), indicating that attitude plays a key mediating role in the transformation of psychological cognition into behavioral tendency. This finding is highly consistent with the strong association mechanism of attitudinal and behavioral intention in the TRA/TPB paradigm.

Through multi-dimensional path coefficient matrix, this study not only validates the applicability of technology acceptance model (TAM) in the context of digital services, but also reveals the expanding value of emerging variables such as convenience and enjoyment to the traditional theoretical framework. All path coefficients in Table 6 were repeatedly sampled by Bootstrap method to ensure the robustness of the conclusion.

5. Conclusions and Recommendation

5.1. Conclusion

This study focuses on the analysis of factors that affect the attitudes and usage intentions of Zigong college students in China in the context of the digital age. From the perspective of integrating rational behavior theory, technology acceptance model and planned behavior theory, six hypotheses are proposed to deconstruct the multi-dimensional driving factors that affect the shopping attitudes and usage intentions of college students.

Quantitative research was carried out on 500 active users of online shopping in the three dominant majors of Sichuan University of Science and Engineering, and the measurement model was strictly tested through multiple rounds of cross-validation with JAMOV and SPSS, combined with confirmatory factor analysis. The structural equation model showed that



shopping attitude had a significant mediating effect between perceived usefulness, perceived ease of use, perceived pleasure, convenience, trust and usage intention ($\beta=0.383$, $p<0.001$). Lee et al. (2006), Hua et al. (2024) and Raman (2019) form cross-context verification.

Based on data collected from 500 valid questionnaires, the researchers successfully passed the rigorous measurement of confirmatory factor Analysis (CFA). The analysis results show that the conceptual model constructed in this study performs well in validity and reliability tests, thus establishing its scientificity and rationality. Specifically, the convergent validity test covers multiple dimensions such as composite reliability, Cronbach's reliability, factor load and mean variance extraction, which, combined with the comprehensive evaluation of discriminant validity, fully proves the correctness of the conceptual framework of this study (Hair et al., 2006; Fornell and Larcker, 1981).

Further, this study uses structural equation model (SEM) to deeply analyze the behavioral psychological mechanism between college students' online shopping attitude and usage intention in Zigong region of China under the background of digital age. The analysis results show that all six research hypotheses proposed in this study have been effectively verified, showing a high degree of theoretical and practical fit.

Specifically, the study finds that in the tide of the digital age, key factors such as perceived usefulness, perceived ease of use, perceived pleasure, convenience and trust all have a direct impact on college students' shopping attitude, and shopping attitude further directly affects their usage intention. Convenience has the most significant effect on shopping attitude ($\beta=0.245$), followed by perceived usefulness ($\beta=0.197$) and perceived pleasure ($\beta=0.191$), while trust has a relatively weak effect ($\beta=0.095$). This finding reveals that when college students do online shopping, they not only attach great importance to the convenience of the shopping process, but also pay full attention to the practicability and pleasure of shopping, and college students' trust in online shopping needs to be further improved. These factors together form an important cornerstone of their shopping decisions.

In addition, the study also revealed that shopping attitude played a significant mediating role between perceived usefulness, perceived ease of use, perceived pleasure, convenience, trust and use intention ($\beta=0.383$, $p<0.001$). The discovery of this operation mechanism not only deepens our understanding of the psychological mechanism of college students' online shopping behavior, but also provides a solid theoretical support and empirical basis for Zigong, an old industrial city, to formulate policies targeting college students' online shopping behavior under the background of digital transformation. At the same time, this study also provides a new perspective and ideas for the innovative practice of digital literacy education in universities and the optimization and adjustment of localization operation strategies of e-commerce platforms, which effectively promotes the optimal allocation and efficient use of relevant resources.

5.2. Recommendation

Based on the research results of this paper, we propose the following suggestions, hoping to be helpful. First and foremost, online shopping platforms should focus on improving the five key elements - perceived usefulness, perceived ease of use, perceived enjoyment, convenience and trust, so as to optimize students' online shopping attitudes and usage intentions. Specific measures can include simplifying the shopping process, beautifying the interface design, and implementing personalized product recommendations, aiming to upgrade the shopping experience of students in all aspects, so as to strengthen their positive attitude towards online shopping and purchase intention.

Secondly, this study elucidates the internal relations among the seven variables, and



constructs a comprehensive conceptual framework accordingly. This framework closely links perceived usefulness, perceived ease of use, perceived enjoyment, convenience, trust, attitude and use intention, and reveals the internal mechanism that affects students' online shopping behavior in Sichuan University of Science and Engineering. Online shopping platforms and campus managers can learn from this framework and optimize the service mechanism to improve students' shopping satisfaction. For example, by improving the after-sales service system, providing clear return and exchange policies, strengthening payment security and showing real user evaluation measures to enhance students' trust; Through the launch of campus exclusive offers, limited time promotional activities, etc., to meet the diversified consumer needs of students; And through the establishment of campus express service center, providing free delivery service on campus, further convenient shopping experience for students.

In addition, this study provides valuable theoretical support for e-commerce platforms and campus administrators to further optimize online shopping services and improve college students' consumption experience. Through the implementation of precise strategic adjustments, online shopping platforms can more effectively fit the consumption preferences of college students and promote the widespread popularity and sustainable development of online shopping on campus.

5.3. Limitation and Further Study

There are some limitations in this study. First, the variables in this study were all at the individual level, and the data were collected from specific three majors in specific schools at a specific point in time, which may lead to limitations in the data and sample. Second, the study design is cross-sectional, which cannot determine the causal relationship between variables, and it is difficult to capture the change of variables over time.

In order to overcome these limitations, future research may consider the following improvement directions. First, expand the sample to collect data from more schools in different districts to improve the generality and representation of the results. Second, a longitudinal study design was used to collect data at multiple points in time to better understand the dynamic relationships between variables and causal mechanisms. In addition, experimental designs can be attempted to test hypotheses more rigorously by randomly assigning and controlling variables. Finally, qualitative and quantitative research methods, such as interviews and questionnaires, are combined to obtain more comprehensive and in-depth research results. These improvements will help to further validate and extend the findings of this study, and provide richer theoretical and empirical support for research in related fields.

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