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**Beauty Product Online Purchasing Behavior Between Guangzhou and Macau Consumers: A Study Based on TAM**

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*Master in Marketing*

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October, 2024

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## Resumo

O objetivo deste estudo é comparar o comportamento de compra *online* de duas regiões culturalmente diferentes da China, Guangzhou e Macau, aplicando o modelo de aceitação de tecnologia (TAM). Através de um inquérito online, foram recolhidas 476 respostas válidas. Usaram-se os softwares IBM SPSS e Smartpls para analisar os dados do questionário.

Os resultados evidenciam que a Utilidade percebida tem um impacto positivo significativo na intenção de compra dos consumidores tanto em Guangzhou como em Macau, indicando que a praticidade dos produtos de beleza é um fator-chave nas decisões de compra online dos consumidores. Os consumidores de Macau consideram a Facilidade de Uso Percebida, que não só promove diretamente a formação da intenção de compra, como também afecta significativamente a utilidade percebida. Em contraste, os consumidores de Guangzhou dão importância ao Risco percebido. Ainda, o impacto do risco percebido na intenção de compra é bidirecional. Para além disso, neste estudo a idade é variável moderadora em Guangzhou, mas não o é em Macau.

Este estudo revela diferenças regionais significativas no impacto do risco percebido na intenção de compra dos consumidores entre Guangzhou e Macau, fornecendo uma referência valiosa para as marcas de produtos de beleza no desenvolvimento de estratégias de marketing trans-regionais e enfatiza a importância de adotar estratégias de marketing diferenciadas em diferentes regiões. Ao mesmo tempo, este estudo também aponta direções potenciais para pesquisas futuras e fornece novas perspectivas e ideias de pesquisa para pesquisadores subsequentes.

**Palavras-chave:** TAM; Comportamento de compra online do consumidor; transcultural; Produto de beleza, comércio electrónico, China.

JEL Classification system: M31; F23



## Abstract

The purpose of this study is to compare online purchasing behavior of two culturally Chinese different regions, Guangzhou and Macao, applied to the beauty products, and to explore the applicability of technology acceptance model (TAM) in this field. Through online survey, 476 valid respondents were successfully collected. The softwares IBM SPSS and Smartpls were used to analyze the questionnaire data.

The results highlight that Perceived Usefulness has a significant positive impact on consumers' purchase intention in both Guangzhou and Macau, indicating that the practicality of beauty products is a key factor affecting consumers' online purchase decisions. Further analysis shows that Macau consumers pay more attention to Perceived Ease of Use, which not only directly promotes the formation of purchase intention, but also significantly affects perceived usefulness. In contrast, consumers in Guangzhou show more complex reactions in Perceived Risk, and some analysis results show that the impact of perceived risk on purchase intention is bidirectional. In addition, this study verifies the effect of age as a moderator variable in Guangzhou, while this hypothesis is not supported in Macao.

This study reveals the significant regional differences in the impact of perceived risk on consumers' purchase intention between Guangzhou and Macao, which provides valuable reference for beauty brands in the development of cross-regional marketing strategies and emphasizes the importance of adopting differentiated marketing strategies in different regions. Also, this study points out potential directions for future research and provides new research perspectives and ideas.

**Keywords:** TAM; Consumer online shopping behavior; Cross-cultural; Beauty Product, e-commerce, China

JEL Classification system: M31; F23





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# 1 Introduction

Driven by the digital wave, the e-commerce market has seen rapid expansion, with the beauty product market being particularly notable, becoming an important engine for the growth of China's e-commerce. The vast Chinese territory has given birth to diverse regional characteristics, and the diversity in economic development levels, cultural traditions, and market sizes has created rich differences in consumers' online shopping behavior. This study focuses on Guangzhou and Macau, two regions each with unique economic and cultural features. Through in-depth analysis, it aims to reveal the similarities and differences in online shopping behaviours for beauty products among consumers in these two areas.

Based on the Technology Acceptance Model (TAM), this study explores how perceived ease of use, perceived usefulness, and perceived risk affect consumers' purchase intentions. Through an online questionnaire survey, this study collected a large amount of primary data and conducted in-depth analysis through statistical methods. The results not only confirm the applicability of TAM theory in beauty product purchase behavior but also reveal the impact of regional culture, market size, and economic development levels on consumer behavior.

Furthermore, this study discusses how to formulate differentiated marketing strategies based on region-specific consumer behaviors and preferences, and how to improve users' continued usage intentions by enhancing user experience design. Finally, this study points out the limitations of the research and proposes suggestions for future research directions, aiming to provide valuable insights and data-driven strategic recommendations for academia and practitioners.

## 1.1 Topic

In recent years, online shopping has experienced significant growth, showing strong consumer demand and a diverse range of product categories. Although online shopping in developed countries has achieved great success and brought significant economic and social benefits, developing countries face many challenges in the development of e-commerce (Uwemi & Fournier-Bonilla, 2016). Understanding online shopping behavior in different economic regions is crucial. China's vast territory and significant differences in e-commerce development across regions warrant attention from marketers.

The internet, as a multifunctional platform, meets a variety of needs and has become a hub for business activities. It has not only promoted the rise of new consumer markets but also provided alternatives for traditional businesses. Online platforms enable consumers to review and critique products and services, shaping marketing strategies in an unprecedented way (Hoffman & Novak, 2000, pp.121). Therefore, businesses adjust payment options, shipping methods, and website interfaces according to different demographic and geographical needs. The rapid growth of online shopping has significantly changed consumer behavior. Understanding the factors that drive and hinder online shopping is crucial for academia and practitioners to enhance e-commerce strategies (Srivastava & Thaichon, 2023).

According to statistics from Zhiyan Consulting, the global beauty market has achieved 20 years of growth, with an annual growth rate of about 5%, reaching a global cosmetics market size of over 210 billion euros by 2018. Beauty giants began their overseas expansion in the last century and, through long-term exploration, a set of scientific and effective cross-border marketing strategies have enabled beauty giant companies to firmly grasp the global market. Under the internet economy, China's beauty market is an important growth point for China's e-commerce. China's market size is also an important research strategy point.

Understanding the complexity of online consumer behavior is crucial for businesses operating in

the digital domain. By understanding the various factors influencing consumer decisions, companies can adjust their strategies to meet the changing consumer needs and establish lasting relationships in the dynamic field of e-commerce. Understanding online consumer behavior is of paramount importance in the digital commerce domain. Analysing the factors influencing consumer behavior is crucial for devising effective marketing strategies. By interpreting online shopping patterns and consumer interactions, retailers can gain valuable insights into consumer preferences and needs.

## **1.2 Research Questions**

Existing literature primarily explores online shopping behavior through cross-cultural studies between different countries. For instance, Pena-García (2020) investigated the key factors affecting the adoption of e-commerce, including attitudes, subjective norms, perceived behavioral control, ease of use, and perceived usefulness, as well as non-traditional factors such as impulsive shopping and self-efficacy. However, these studies often lack a focus on comparisons within different economic systems across various regions within the same country. Research compared internet usage, innovation, perceived risk, and online purchasing behavior between the United States and South Korea, highlighting cultural differences affecting technology adoption (Smith, 2015). Similarly, studies using the Technology Acceptance Model (TAM) explored the role of cultural influences on online shopping behavior in Germany, Norway, and the United States but often suffer from limitations in sample diversity and geographical focus. It is proposed whether future research could replace samples from different special regions. Due to the regional specificity of Mainland China and the Macau Special Administrative Region, this paper is also derived from this issue, aiming to answer the following questions.

Research Question: How applicable is the Technology Acceptance Model (TAM) in explaining the online

shopping behavior for beauty products among consumers in Guangzhou and Macau regions?

### **1.3 Research Objectives**

It is crucial to study the differences in online shopping behavior between Guangzhou and Macau, despite their shared historical roots, their economic and cultural backgrounds are starkly different. Guangzhou, an ancient trading port, boasts a vibrant e-commerce market with a robust economy. Macau, formerly under Portuguese administration, is influenced by tariff and economic policies, leaning towards overseas shopping platforms. Understanding these differences can provide references for formulating targeted cross-regional marketing strategies and fill the knowledge gap in regional consumer behavior.

This review emphasizes the need for research on regions within the same country with different economic systems, especially Guangzhou and Macau. By examining website quality, perceived ease of use, and perceived usefulness, this study aims to reveal the factors driving online shopping behavior in these two regions, providing valuable insights for academia and practitioners. For marketing professionals, understanding these regional differences is crucial for devising targeted strategies. In Guangzhou, emphasizing technological convenience and diversity can attract consumer groups; in Macau, establishing trust through reliable services and genuine products can enhance consumer engagement (Sam & Chatwin, 2023; Gong et al., 2013). Online shopping behavior in Guangzhou and Macau is jointly influenced by cultural, technological, and consumer preference factors. Recognizing and addressing these differences can enable marketing professionals to effectively target and attract consumers in the Macau and Guangzhou regions.



## **1.4 Structure**

The structure of the thesis mainly consists of five important chapters. Firstly, in the literature review, the theme elaborates on the market trends and facts of the internet online purchasing consumer market from top to bottom, then continues with the factors influencing online purchasing and the incentives and inhibitors of online shopping consumption in this part. The development of consumer online shopping research and the Technology Acceptance Model. This paper will introduce the TAM theory in detail, as it is the foundation of this research. Finally, the main research of this work is introduced, most of which has adapted the model to explore the factors affecting consumer online purchasing differences.

The conceptual framework and hypothesis development are based on the literature review. The results of the literature review will be transformed into hypotheses, which will be visualized in the conceptual framework. To ensure reliability and validity, the methodology explains the procedures of scientific work. Data collection will be interpreted and justified. According to the collected data, analysis will be conducted to verify the hypotheses. Next, the results will be presented, and if they deviate from the conceptual framework, an updated version will be presented. In the final chapter, the research results will be discussed, and the theoretical and practical purposes, limitations, and ideas for future work will be elaborated. This process not only demonstrates the depth and breadth of the research but also reflects the rigor and scientific nature of the research methodology. Through this research journey, we expect to provide new perspectives for understanding consumer behavior in different regions and guide marketing practices in the field of e-commerce.



## **2 Literature Review**

### **2.1 The online shopping behavior and its culture effects**

Scholarly investigations shed light on various facets of online consumer behavior. Hirst and (Ashwin ,2008) juxtaposed online shopping cultures in London and Bangkok, unveiling cultural disparities in consumer preferences and attitudes toward online retail experiences. (Lim,2016) delved into the intricate relationship between purchase intention, perceived usefulness, and online shopping behavior among Malaysian university students, highlighting the sway of cultural influences on consumer decisions. Similarly, (Alyami &Spiter,2015) probed into the motivations and perceptions driving international university students' online shopping behaviors, shedding light on the nuanced interplay of experience and attitude formation.

Moreover, generational disparities in online shopping habits have been scrutinized by researchers like (Lissitsa &Kol,2016), elucidating distinct preferences and purchasing patterns between Generation X and Generation Y. Cross-cultural comparisons conducted by scholars such as (Smith,2013) provide insights into how cultural nuances shape online shopping behaviors across different societies.

Theoretical frameworks proposed by (Clemes,2014) and empirical studies by various scholars underscore the multifaceted nature of online shopping behaviors, elucidating factors such as perceived risk, consumer income, and platform-specific attributes that influence consumer decisions. Furthermore, scholars like (Bellman,1999) and (Joines ,2003) shed light on the intricate interplay between individual characteristics, online experiences, and purchase intentions, emphasizing the pivotal role of satisfaction and trust in shaping online consumer behavior.

This review synthesizes the current literature on online shopping consumer behavior, focusing on

the motivations, perceived benefits and risks, and the impact of situational factors (Biswas, 2017; Wolfinbarger & Gilly, 2001).

## **2.2 Overview of the E-commerce Market in China**

With the rapid development of internet technology, China's e-commerce market has become one of the most dynamic online shopping markets globally. E-commerce has not only transformed traditional shopping methods but has also significantly promoted economic development and social change (Chen & Zhang, 2018).

### **Market Size and Growth**

According to Euromonitor, the size of China's cosmetics market grew from RMB 230.944 billion in 2011 to RMB 616.433 billion in 2022, with a compound annual growth rate (CAGR) of approximately 9.3% (Euromonitor, 2023). It is expected that by 2028, the market size will reach RMB 937.4 billion, with an anticipated average annual growth rate of 7.11% from 2023 to 2028 (Fortune Business Insights, 2023).

### **Consumer Behavior**

Chinese consumers have a high acceptance of online shopping, thanks to the widespread availability of the internet and the convenience of payment methods. Research indicates that when shopping online, consumers are more focused on product quality and service (Li & Liang, 2020). Additionally, social media and online reviews significantly influence consumers' purchasing decisions (Zhang et al., 2019).

### **Technological Advancements and Innovations**

E-commerce platforms are enhancing the shopping experience by introducing new technologies, such as virtual try-on mirrors and augmented reality (AR) technology (Mordor Intelligence, 2023). These

innovations not only make shopping more interactive and engaging but also help consumers preview product effects more accurately.

### **Market Trends**

Currently, several distinct trends are emerging in China's e-commerce market. First, the penetration rate of mobile shopping continues to rise, with more consumers shopping online via smartphones (PwC, 2019). Second, there is a growing demand for personalized and customized products, as consumers expect a more tailored shopping experience (Zhou & Lu, 2021). Lastly, as consumers' demand for instant beauty solutions increases, e-commerce platforms need to offer faster logistics services and more flexible return policies (Chen & Zhang, 2018).

### **Challenges and Opportunities**

Despite the rapid development of China's e-commerce market, it faces several challenges. For instance, data security and privacy protection are becoming increasingly important concerns (Wang & Chen, 2020). Additionally, the proliferation of counterfeit and substandard products has harmed consumer interests and market trust (Liu & Zhang, 2021). However, with the strengthening of government regulations on the e-commerce industry and the improvement of service quality by companies, these challenges are expected to be addressed.

The rapid development of China's e-commerce market has created significant opportunities for consumers, businesses, and the overall economy. By continuously optimizing technology, improving services, and strengthening regulation, China's e-commerce market is poised to maintain its global leadership and provide consumers with a richer and more convenient shopping experience.

## 2.3 Comparative Analysis

The comparative analysis between Guangzhou and Macau reveals several key differences:

**Cultural Influences:** Cultural factors play a significant role in shaping online shopping behaviors in both regions. Macau consumers are more influenced by traditional values and local norms, which impact their trust in online platforms and payment methods (Sam & Chatwin, 2023). In contrast, Guangzhou consumers are more influenced by modern and cosmopolitan trends, reflecting a broader acceptance of online shopping (Gong et al., 2013).

**Technological Adoption:** Guangzhou, being a larger and more technologically advanced city, has higher rates of internet penetration and technological adoption. This leads to greater engagement in online shopping activities compared to Macau (Gong et al, 2013).

**Consumer Preferences:** Preferences for online shopping vary significantly, with Guangzhou consumers showing a preference for convenience and variety offered by large e-commerce platforms, while Macau consumers prioritize trust and authenticity (Sam & Chatwin, 2023).

## 2.4 Factors Affecting Consumer Purchasing Behavior and Personality in Online Shopping

Consumer behavior can be explained in four items. These are personal traits, psychological traits, social traits, and cultural traits. Identifying these features is important for determining marketing strategies and reaching target consumer groups.

**Personal characteristics:** The personality of the consumer has an important place in the process that affects the purchasing decisions. Personal factors; age, gender, occupation, income status, education level, and lifestyle. Most of the online shopping studies have been done with young adults

because young people are more prone to internet use. According to Kau et al., (2003;150) older people (40 years and older) usually decide on traditional shopping. According to the results of research on youth, adults have an important role in easily predicting future consumer behavior. Compared to previous generations, the new younger generation has more options. The new generation makes its own decisions. They easily choose what they prefer. In addition, comparison shopping continues intensively in this consumer group.

Low-income individuals approach online shopping more cautiously and consider it risky because they are less likely to cope with financial losses than high-income individuals. But once users experience online shopping, their attitudes are not affected by their income.

According to the results of the research, consumers who shop online are not more educated than others. Online shopping is seen as an easy activity, so education level doesn't have a big impact on it. But educated people accept innovations more easily. Therefore, it is thought that the level of education influences the decision-making process.

Demographic factors have an important place when individuals encounter new things. A comprehensive study conducted by Hernandez (2011) showed that the socioeconomic characteristics of consumers do not affect the purchasing efforts of experienced internet shoppers. When consumers get used to online shopping, their behavior becomes more similar, there is no difference in socioeconomic characteristics such as gender and age. Because these factors only matter when consumers come across new things. Moreover, the number of experienced internet consumers is quite large. Researchers suggest that behavioral dimensions should be emphasized to produce more effective results, rather than focusing on demographic and socio-economic characteristics of consumers.

Psychological Features: Smith, A.D. and Rupp examined in W.T. (2003), "Strategic online consumer decision making" the psychological characteristics that affect the behavior of online shoppers in their study in 2003. Online consumers generally shop under the influence of psychological factors. They also constantly question themselves. The motivation of consumers makes them ask various questions such as should I search for a more affordable price or should I shop online more often. Detection is one of the most important factors. Consumers investigate the reliability of websites and the quality of products with the effect of perception. In this case, commercial organizations that are in the position of sellers have to be successful in terms of providing trust to the consumer.

Another psychological factor is personality. The personality factor makes consumers ask the question: Which website suits my personal preferences better? Thus, personal characteristics direct the decision-making stage of consumers. Another factor is attitude. Attitude can easily change. That's why marketers pay a lot of attention to these features. Consumers try to find out what they like and dislike about a given situation. The last factor is emotion. Consumers make decisions based on their most recent experience. In short, consumers are influenced by their experiences and emotions.

**Social Features:** Social influence occurs through reference groups. Reference groups for online consumers are defined as virtual communities of discussion groups on a website. Other people's experiences and opinions are discussed on websites and this affects other consumers' decisions.

Another communication link between consumers is communication links and website addresses that affect consumers' decision making and provide detailed information about products and services. According to Kotler and Armstrong (2012), the effects of reference groups are basically based on the view that a person's behavior is influenced by many small groups. Family is one of these reference



groups. Reference groups have different ways of influencing a person's attitude, introducing a new behavior or lifestyle, or creating pressure to accept the attitude.

**Cultural Features:** Smith and Rupp (2003) revealed in their research that different social classes exhibit different consumer behavior. Low social class consumers cannot purchase goods and services at the same level as high social class consumers. In addition, it was emphasized by Kotler and Armstrong (2012) that cultures determine values and beliefs at an early age, and therefore a person's wishes and needs are based on these determined characteristics.

Nearly everything we do is influenced by culture, such as receiving and imparting information, decision making, leadership and management, teamwork, effective use of time. Hofstede (2001) defines culture as "the collective mental programming of minds that distinguishes members of one group or category from another".

**Country Culture:** The cultures of countries are affected by the thoughts, actions, and decisions of individuals. Cultures of countries are one of the most important factors affecting online consumer behavior. For example, different cultures occur because there are differences in the goods and services demanded by individuals in different countries and the attitudes of these consumers also differ. Moreover, some consumers may rely on certain conditions, others may not trust one company because it encourages group decisions and may prefer another individualistic behavior. By definition, culture is a shared set of values that influence societal perceptions, attitudes, preferences, and responses. According to Hoffstede, there are five main cultural differences in terms of culture: individualism, collectivism, masculinity-femininity, uncertainty avoidance, and long-term orientation.

However, Zhou, Dai, and Zhang (2007) argue that only two of these factors, individualism,

collectivism, and masculinity-femininity, are used to explain consumer online behavior. Collectivism-individualism is a member of its own interpretation of a culture in terms of its dependence on its own conviction. For this reason, it has been emphasized in many studies that western and eastern cultures are different from each other in terms of addiction and this situation leads to different online consumer behaviors in western and eastern societies. In other words, in individualistic societies, people are more likely to use the internet for personal use such as shopping and searching for information. In collectivist societies, on the other hand, people are more inclined to use the Internet for social communication.

Another difference in online shopping behavior arising from cultural differences is related to Perception of Risk differentiation in different cultures. It is emphasized that collectivist consumers have a higher risk of online shopping than consumers from individualistic culture. Individual consumers, on the other hand, do not see risk as a very important factor in determining the decision.

When it comes to masculinity, it is stated that gender roles are different in a masculine society, and these roles overlap in a feminine society. According to this fact, in a more masculine society there is more gender segregation and shoppers are usually men who shop. According to Stafford, Turan, and Raisinghani's (2004) study, which compared consumers' online shopping behaviors, it was stated that consumers from more masculine cultures were less willing to shop online from these more masculine cultures.

Technological products and information systems have started to change shopping habits as well as changing many habits of consumers. In online shopping, just like in traditional shopping, consumers have other expectations from companies before shopping. It is important to be able to meet these expectations. Satisfaction or dissatisfaction arises from experiences after online shopping. This affects

the trust in companies. The loyalty or disloyalty of the consumer depends on these factors.

**Trust:** Consumers trust the companies they shop with. Trust is based on several successful transactions, because of which the consumer knows that the company, he trusts will meet his needs. On the other hand, the information provided is another issue for online shopping because the online shopping action takes place through the computer system. Individuals cannot see or touch the products. The consumer can only access the information provided by the retailer. The subject of knowledge is important not only for availability but also for the concepts of online availability and personalization. Other factors that affect consumers' behavior include web-page design, access to information and access time.

If there were no online sales channels, all these operations of the companies would take more time and be more costly. In addition, it would not be possible to reach the necessary information for consumers and to compare them with most of the competitors. Because it is advantageous for both companies and consumers, online sales technology has been adopted by companies but has not been sufficiently accepted by consumers. In this context, users' online purchasing behavior should be analyzed.

## **2.5 Motivations and perceived risks for Online Shopping**

Several studies have identified key motivations for consumers to engage in online shopping. Convenience is a primary factor, as online shopping allows consumers to purchase goods at any time and from any location (Srivastava & Thaichon, 2023). Additionally, the availability of a wider range of products and the ability to easily compare prices are significant motivators (Biswas, 2017; Wolfenbarger & Gilly, 2001). Perceived value, encompassing both functional and hedonic benefits, also plays a critical

role. Functional benefits include time savings and the ease of finding specific items, while hedonic benefits relate to the enjoyment and excitement of shopping online (Grewal et al., 2002; El Moussaoui et al., 2022).

Despite the advantages, perceived risks remain a substantial barrier to online shopping. These risks include concerns about the security of online transactions, the potential for fraud, and issues related to privacy (Bhatnagar et al., 2000; Monsuwé et al., 2004). Moreover, the inability to physically inspect products before purchase can deter consumers, especially for experience goods that require sensory evaluation, such as clothing and perfumes (Gehrt & Yan, 2004; Elliot & Fowell, 2000).

## **2.6 Situational Factors and Product Characteristics**

The type of product significantly influences online shopping behavior. Standardized and familiar products, such as books and electronics, are more likely to be purchased online due to their lower associated risks (Reibstein, 1999; Grewal et al., 2002). In contrast, products that require personal interaction or have significant variability, such as fashion items, are less frequently purchased online (Wolfenbarger & Gilly, 2001). Situational factors, such as the need for special items that are difficult to find in physical stores, can also drive online shopping. During the COVID-19 pandemic, health concerns and confinement led to an increased reliance on online shopping as consumers sought to avoid physical stores (Ozturk, 2020; Hajraoui & Chalabi, 2021).

Individual consumer traits, including demographics and prior online shopping experiences, significantly impact online shopping intentions. Positive past experiences reduce perceived risks and encourage repeat purchases (Eastlick & Lotz, 1999; Shim et al., 2001). Furthermore, personal characteristics such as technological proficiency and trust in online vendors enhance the likelihood of

engaging in online shopping (Karahanna et al., 1999; Sabik, 2014).

## **2.7 Comparative Analysis of Online Shopping Behavior Between Guangzhou and Macau**

Understanding the differences in online shopping behavior between Guangzhou and Macau is crucial for marketers aiming to tailor their strategies to specific consumer bases. This section synthesizes the findings from various studies to highlight the key differences and factors influencing online shopping behaviors in these two regions.

### **2.7.1 Online Shopping Behavior in Guangzhou**

Guangzhou, as a major commercial hub in China, exhibits distinct online shopping behaviors influenced by demographic characteristics and technological advancements. Research indicates that factors such as age, income, education, and perceived usefulness significantly affect online shopping intentions among Chinese consumers (Gong et al., 2013). Additionally, the same author emphasized the rapid development of e-commerce infrastructure in Guangzhou has led to increased consumer trust and convenience, further driving online shopping activities.

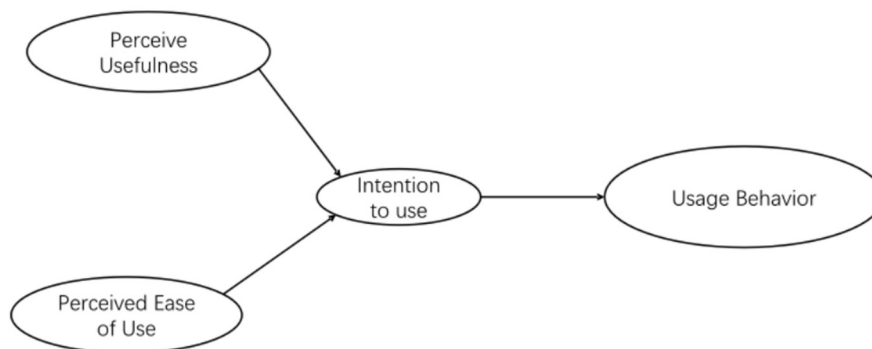
### **2.7.2 Online Shopping Behavior in Macau**

Macau, with its unique cultural and economic environment, presents different online shopping behaviors compared to Guangzhou. Studies suggest that Macanese consumers' decision-making styles are heavily influenced by cultural factors and local consumer behavior patterns (Sam & Chatwin, 2023). Macau consumers tend to prioritize factors such as website reliability, product authenticity, and security in online transactions. Furthermore, the smaller market size and different regulatory environment in Macau also shape consumer preferences and behaviors.

## 2.8 Model Technology Acceptance Model (TAM)

### 2.8.1 The Evolution and Application of the Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), introduced by Davis in 1989, has become a pivotal framework in understanding the factors influencing the acceptance and use of new technologies. Grounded in the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (1975), TAM posits that users' motivation to adopt technology is primarily influenced by two key determinants: perceived usefulness (PU) and perceived ease of use (PEOU). PU refers to the degree to which a person believes that using a system would enhance their job performance, while PEOU is the degree to which a person believes that using a system would be free of effort (Davis, 1989; Venkatesh & Davis, 2000).



**Figure 1 – Technology Acceptance Model**

Source: Venkatesh & Davis, 1996

Over the years, TAM has been expanded and modified to include additional variables and has been applied across various contexts. Extensions of the original model, such as TAM2 and TAM3, incorporate factors like social influence, facilitating conditions, and user satisfaction to better predict technology adoption (Venkatesh & Bala, 2008). The Unified Theory of Acceptance and Use of Technology (UTAUT) further integrates elements from TAM and other models to provide a

comprehensive framework (Venkatesh et al., 2003).

Recent studies have applied TAM in diverse fields such as healthcare, education, and mobile technology. During the COVID-19 pandemic, the model gained significant traction in higher education to understand the acceptance of online learning platforms (Abu Bakar & Mohd Tahir, 2022). Research has identified key factors such as self-efficacy, subjective norms, and perceived enjoyment as influential in technology acceptance (Scherer et al., 2019).

### **2.8.2 TAM in Internet and Online Shopping Contexts**

In the context of the internet, TAM has been extensively employed to investigate technology adoption across various settings. These include mobile internet services (Jiang, 2009), online auctions (Stern et al., 2008), online transactions (Lee, 2009), online gaming (Hsu & Lu, 2004), instant messaging services (Wang et al., 2004), email (McCoy et al., 2005), and online banking (Gounaris & Koritos, 2008).

The original structure of the TAM model comprises PU, PEOU, and Behavioral Intention (BI), which is a self-prediction of behavior (Davis, 1989). The fundamental premise of TAM is that individuals will use new information technologies based on their perceived enhancement of performance. Technologies that are perceived as easier to use are considered more useful, all other conditions being equal, as they require less of a learning curve.

### **2.8.3 Extensions and Consistency of TAM**

Since its introduction, TAM has been tested on numerous technologies using samples of students and non-students from different countries. Subsequent researchers have extended the original model in various ways, accepting interpretive antecedents as well as various moderating factors and outcomes. Meta-analyses of these studies have shown considerable consistency, providing extensive support for

the theoretical foundation of TAM (King & He, 2006; Schepers & Wetzels, 2007). PU and PEOU are identified as the most significant predictors of individual technology usage intention (BI), with meta-analysis results indicating that PU has a larger impact across both constructs.

#### **2.8.4 Cross-Cultural Studies and Unresolved Issues**

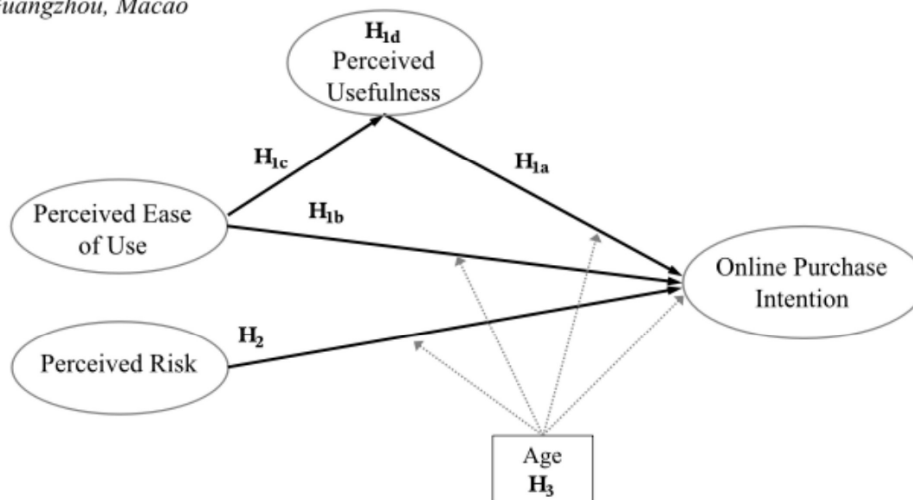
Through comprehensive analysis, several unresolved issues in the field of cross-cultural online shopping consumption have been identified, involving complex factors influencing consumers' online purchasing behavior. Researchers considered distinct economic characteristics and features in a comparative analysis of the factors influencing online shopping, such as social groups, between different regions. The construction of a research model based on TAM and other relevant theories highlights TAM's continuous evolution and adaptation in various cultural and economic contexts. The Technology Acceptance Model (TAM) has proven to be a robust framework for studying the determinants of technology adoption across diverse contexts and technologies. Its extensions and integration into broader models like UTAUT have enriched its explanatory power. As digital technologies continue to evolve, TAM remains a valuable tool for researchers and practitioners aiming to understand and enhance technology adoption.



### 3 Conceptual model and Hypotheses

The constructed model primarily includes independent and dependent variables, with two control variables. The core variables of the Technology Acceptance Model (TAM), perceived ease of use (PEOU) and perceived usefulness (PU), serve as the explanatory variables. We use age as a moderating variable in this model of TAM and talk about exploring its moderating role in this model. In this study, we use online purchase Intention as the output variable to assess consumer behavior regarding beauty products in two regions.

Model  $i$ ,  $i = \text{Guangzhou, Macao}$



**Figure 2 - Conceptual model**

Based on the aforementioned analysis, we propose the following hypotheses:

#### Perceived Usefulness

Davis et al. (1989) proposed a strong direct relationship between perceived usefulness and the intention to use technology. This relationship explains why consumers intend to use technology: they perceive its benefits. The more useful people find a technology, the more likely they are to use it. In the context of online shopping, if individuals perceive online shopping as useful—providing numerous product alternatives, enabling faster satisfaction of their needs, and reducing time spent on non-productive activities—they will use it more frequently. This can be defined as a positive correlation

between perceived usefulness and the intention to shop online. Research by Viega et al. indicates a significant positive correlation between consumer trust in online shopping and perceived usefulness.

**H1a:** Perceive Usefulness have a significant positive impact on beauty online purchases Frequency.

### **Perceived Ease of Use**

The perceived ease of use and benefits from past online shopping experiences are positively correlated with the likelihood of future online shopping. Weisberg, Te'eni, and Arman (2011) found that individuals with prior online shopping experience are more inclined toward future repurchase intentions compared to those without such experience. This suggests that consumers who have previously purchased goods online may have more favorable attitudes toward online shopping (Chaudary, Ahmed, Gill, & Rizwan, 2014; Nwaizugbo & Ifeanyichuwu, 2016). Furthermore, researchers such as Hernandez Ortega, Jimenez Martínez, and Martin DeHoyos (2008) emphasize significant differences in the perception of usefulness and ease of use among potential shoppers, new shoppers, and experienced shoppers. They found that experienced shoppers reported higher average perceived usefulness and ease of use than the other two groups. Their findings suggest that consumer experiences persist over time and become ingrained in consumer mindsets (Jaafar, Lalp, & Mohamed, 2013). When consumers purchase products, they evaluate them, resulting in valuable purchasing experiences, which may influence future repurchase intentions and decisions.

**H1b:** Perceived Ease of Use will have a significant positive impact on beauty online purchase intentions.

Under identical conditions, technology perceived as easy to use should also be perceived as more useful. Previous surveys on online shopping (Ha and Stoel, 2009) and customer service applications (McKechnie, Winklhofer, and Ennew, 2006) have confirmed this relationship. Given the strong individualism present in these three cultures, perceived ease of use should positively influence

perceived usefulness across all three cultures.

**H1c:** Perceived Ease of Use will have a significant positive impact on consumers' perceived usefulness.

**H1d:** Perceived Usefulness is a mediator

## **Perceived Risk**

The impact of perceived risk on technological adoption tends to be negative. According to Arkam (2008), perceived risk is a critical factor in e-commerce, exerting a significant influence on the intention to shop online, albeit in a negative manner. The risks associated with online shopping go beyond financial loss; they also involve the potential compromise of personal information required for transactions (Szymanski and Hise, 2000). Consequently, when perceived risks are high, such as concerns about products not being accurately represented online, products not being delivered after payment, or product quality not meeting expectations, consumers are less likely to engage in online shopping.

Therefore, perceived risk negatively affects the intention to shop online, indicating a negative relation between perceived risk and the willingness to make online purchases. This negative effect is primarily driven by uncertainties, such as concerns about product quality and the potential leakage of personal information. To encourage online shopping, it is essential to reduce the perceived risks associated with it. Based on this, the following hypothesis is proposed:

**H2:** Perceived Risk has a significant negative impact on consumers' purchase intentions.

## **Age**

Using age as a moderating variable in the TAM model, age can explain the differences in online purchasing behavior among consumers of different age groups. For younger consumers, perceived usefulness (PU) and perceived ease of use (PEOU) have a stronger and more direct influence on their

online purchase intentions (Gefen et al., 2003). In contrast, older consumers are more susceptible to the role of perceived risk and social influence, which may be more influential than the core variables of the TAM model (Venkatesh & Bala, 2008). In addition, research has shown that older consumers tend to rely more on peer recommendations and user reviews when making decisions, further moderating the influence of TAM composition on their purchase decisions (Hernandez et al., 2009).

Based on this, the following hypothesis is proposed:

**H3:** Age is a moderator variable in the relationships between the independent variables and the consumers' purchase intentions

## **4. Methodology**

To demonstrate the appropriateness of the research and to identify its limitations, the methodology of this study will be introduced in the following chapter. Initially, decisions regarding the nature of data, research methods, and data collection will be discussed. Subsequently, the questionnaire design, sampling strategy, and finally, the operationalization of the construct will be conducted.

### **4.1 Research Method**

This study primarily formulates research questions to seek answers. Explanatory research aims to answer why a phenomenon occurs (Sue & Ritter, 2012). Therefore, based on an extensive literature review, hypotheses regarding the relationships between specified variables (purchase intention) are established. In this context, the relationship between PE, PEOU, perceived risk, and the intention to purchase beauty products is examined. Moreover, quantitative data is collected for statistical testing to establish the validity of the relationships. The data collection process will be described in the following chapter to examine the reliability and validity of the data.

### **4.2 Data Collection**

For the current work, the research method of online surveys was selected to collect data. Accessing many consumers through other channels is difficult, and online shopping consumers are predominantly active on the internet. In China, questionnaire surveys are also the preferred data method.

In a short period, a questionnaire can reach many individuals. Similarly, the cost advantage also influenced the decision to select online surveys for collecting primary data. Besides the advantages, there are drawbacks to applying online surveys. The sampling issue is often mentioned. Since the data is self-reported, researchers cannot ensure that participants provide accurate demographic or

characteristic information. Moreover, self-selection bias may occur. Some individuals may ignore survey requests because they might be insensitive to advertisements in online communities. That is to say, there may be a tendency for certain individuals to be more likely to respond, leading to potential systematic bias (Wright, 2005). Finally, the method of online questionnaire surveys was chosen primarily because it can reach the most authentic beauty product consumers. Direct research can be conducted on consumers in Guangzhou and Macau through WeChat groups (the most used social media in China).

### **4.3 Questionnaire Design**

To determine and analyse consumer behaviour, the survey questionnaire was initially designed to compare the differences of online purchases of beauty products between two different regions under different economic systems in the same country. Quantitative methods are used to analyze the responses to the questionnaire, for which a specialized questionnaire form was designed. Compared to interviews, the characteristic of the survey method is its rigidity, typically used to collect data from a broader population where each participant answers the same questions.

After the survey form was developed, it was electronically disseminated via the Internet to increase reach and accessibility, further ensuring the quality and quantity of respondents. The survey was conducted online, consistent with the nature of online consumer behavior research. The introduction outlined the objectives and content of the study.

The first part of the survey inquired about internet usage habits, types of beauty products purchased, and consumption patterns. The second part of the survey explored the comparative relationship between perceived usefulness, perceived ease of use, perceived risk, and purchase

intention, for which a scale design was developed. A five-point Likert scale was adopted for the analysis of researchers' scores, and participants were scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The final part collected participants' demographic information, including residential area, gender, age, occupation, education level, and monthly income. A total of 32 statements were presented to participants. To prevent participants from canceling the questionnaire before completion, demographic questions were placed at the end of the survey. The questionnaire can be reviewed in the appendix of this work.

#### **4.4 Operationalization of Constructs**

The variables in the framework need to be operationalized to be applicable to online surveys. The scales of the variables are primarily derived from online shopping and TAM (Technology Acceptance Model) literature to ensure validity. Some scale items have been slightly adjusted to fit the topic of this study. The following table shows the adjustments made in this study. The subsequent paragraphs discuss the source of each adjusted scale.

Firstly, the dependent variable "purchase intention" is measured using the scales of Tony Ahn et al. (2003), Hans (2000), and Leida Chen et al. (2001), which are used to measure the intention to purchase beauty products.

The independent variable perceived ease of use (PEU) implies that online shopping is perceived as very simple and clear, and consumers can easily learn how to purchase beauty products online. This study mainly involves the perceived ease of use of websites and their application in the ordering and payment process. The questionnaires of Tony Ahn et al. (2003) and Leida Chen et al. (2001) are used to measure the perceived ease of use of online beauty product shopping.

Another independent variable, perceived usefulness (PU), indicates that consumers satisfy their needs by purchasing high-quality, reasonably priced beauty products online, mainly based on cost savings and improved purchasing efficiency. The PEU model by Lin and Davis (1989) is applied to study the scale of online shopping behavior for beauty products.

Perceived risk is an explicit negative impact factor; consumers generally reduce purchases due to risk. The primary need is to reduce consumers' perceived risk. The perceived risk scale by Ho et al. (2004) is applied to this study to measure the impact of perceived risk on consumers' intention to purchase beauty products.

In addition, control variables are considered, focusing on differences in online purchasing behavior between different regions in China, and age is also an important factor but playing the role of being a moderator.

Quantitative methods are used to analyze the online purchase intentions of PEU, PU, and PR, comparing the differences in online beauty product purchases between the two regions. To summarize these analyses, Table 1 shows the adapted items. It is used an ordinal scale of agreement from 1 (strongly disagree) to 5 (strongly agree).

In the next chapter, the collected data obtained from the questionnaire will be analysed, and the results will be discussed.



**Table 1: Operationalization of the constructs**

Constructs	Source	Scale Items modified for questionnaire
Perceived ease of use (PEU)	Tony Ahn et al. (2003) Leida Chen et al. (2001)	PEU1. Buying skincare products online is easy to learn PEU2. The process of buying skincare products online is very clear PEU3. My order and payment are clear when I order skincare products online PEU4. Information about buying products online is complete and easy to find
Perceived Usefulness (PU)	Lin (2007) [adapted from Davis (1989)]	PU1. Online shopping allows me to get more product information about skincare products PU2. Online shopping can save me the cost of buying skincare products PU3. Shopping online saves me time in buying skincare products. PU4. Buying skincare products online can improve my purchasing efficiency
Perceived Risk (PR)	Ho et al. (2004)	PR1. The product may not meet my expectations. (Performance risk) PR2. The product may pose a risk to my health or safety. (Physical risk) PR3. I may waste time or effort to repair or replace the product. (Time Risk)
Online purchase intention (OPI)	Schiffman, L. G., & Wisenblit, J. L. (2019).	OPI1. Willing to buy beauty products online OPI2. I would prioritise buying beauty products OPI3. I will buy beauty products online more frequently in the future OPI4. I would recommend my friends to buy beauty products online



## 5. Data Analysis and Results

The online survey was launched on August 16th and concluded on September 9th. During this period, 519 responses were collected, with 476 ultimately deemed valid.

The tool utilized for the online survey was the Qualtrics survey. The software IBM SPSS Statistics, version 26, and the SmartPLS, version 4, were used to analyse the data and to estimate the causal relationships between the variables in each region as well as to validate the hypotheses proposed in Chapter 3.1.

Finally, the research findings were discussed and compared with the literature introduced in relation to the research questions and the literature review.

### 5.1 Respondent's profile

Most respondents (60.2%) reside in Guangzhou.

From Table 2, it can be said that the female residents of Guangzhou account for 88% while the male residents of Macao are in majority (53.9%). Most of the Guangzhou respondents are students (55.4%) and are also the most frequent professional category (49.7%) in Macao. In both regions the second most relevant professional category is full-time workers (20.9% in Guangzhou and 32.7% in Macao); the unemployed residents in both regions are a small group of the total.

Bachelor's degree holders stand out from other academic degrees in both regions (46.8% for Guangzhou and 43% for Macao); only 9.3% for residents in Guangzhou and 10.9% for residents in Macao have a high school degree; those that hold a PhD degree, the most educated group in the sample, only represent a very small percentage in both samples.

Concerning the most relevant level of income earned by month in both regions is the lowest level with income up to 4000 RMB or up to 5000 MOP, but the percentages are quite different (41.6% for Guangzhou residents and 29,3% for Macao residents). A major difference between these regions is related to the highest level of income earned that, in Guangzhou (>8001 RMB or >10001 MOP), is below the corresponding percentage in the Macao region (7.2% vs. 21.3%, respectively). But there is a reason for that: the residents' age in Macao vary from 18 years old to 51 years old while, in the other region, age varies from 18 years old to 39 years old, meaning that many of the older residents from Macao are full-time workers (32.7%).

**Table 2: Characteristics of the sample profile**

		Guangzhou		Macao	
		Count	%	Count	%
What is your gender?	Female	220	88.00	76	46.10
	Male	30	12.00	89	53.90
	Total	250	100.00	165	100.00
Age levels	18-22	75	36.06	50	30.67
	23-30	95	45.67	95	58.28
	>=31	38	18.27	18	11.04
	Total	208	100.00	163	0.00
What is your professional occupation?	Student	138	55.40	82	49.70
	Full-time working	52	20.90	54	32.70
	Self-employed	28	11.20	14	8.50
	Retired	7	2.80	3	1.80
	Unemployed	3	1.20	4	2.40
	Other	21	8.40	8	4.90
	Total	249	100.00	165	100.00
What is your educational level?	High school degree	23	9.27	18	10.91
	Associate degree	42	16.94	22	13.33
	Bachelor's Degree	116	46.77	71	43.03
	Master's Degree	64	25.81	46	27.88
	PhD Degree	3	1.21	8	4.85
	Total	248	100.00	165	100.00
Monthly income levels [[in Chinese Yuan (RMB) and in Macao (MOP)]]	< 4000 RMB   < 5000 MOP	104	41.60	48	29.30
	4000 - 6000 RMB   5001 – 7500 MOP	74	29.60	44	26.80
	6001 - 8000 RMB   7501 -10.000 MOP	54	21.60	37	22.60
	>= 8001 RMB   >= 10.001 MOP	18	7.20	35	21.30
	Total	250	100.00	164	100.00

The main purchase-behaviour characteristics between the residents of both regions (Table 3) shows that Guangzhou residents dedicated less hours a day, from 3 to five hours a day, on the Internet

than Macao residents.

In both regions the main use of the Internet is chatting and socializing, watching videos, and reading (73.5% for Guangzhou and 74.2% for the Macao).

Related to the purchase of entertainment tickets, software, flights and transportation booking online, Macao residents do that once a month more often (31.2%) while Guangzhou residents do that every 2-3 months more often (48.4%).

Finally, the Macao residents have a majority position in buying beauty products from both type of stores (63.2%) than Guangzhou residents (46.0%), respectively).

**Table 3: Characteristics of the purchased behaviour**

		Guangzhou		Macao	
		Count	%	Count	%
How many hours a day do you use the Internet?	[1; 3[ hours	43	17.3	4	2.4
	[3; 5[ hours	98	39.4	45	27.4
	[5;8[ hours	68	27.3	80	48.8
	>= 8 hours	40	16.0	35	21.3
	Total	249	100.0	164	100.0
Main uses of the Internet	Playing games	19	7.6	9	5.5
	Chatting and socializing, watching videos, reading	183	73.5	121	74.2
	Getting study materials, following current events	38	15.3	26	16.0
	Online shopping	9	3.6	7	4.3
	Total	249	100.0	163	100.0
How often do you purchase entertainment tickets, software, flights, and transportation booking online?	Once a month	36	14.4	52	31.7
	Every 2-3 months	121	48.4	43	26.2
	Every 6 months	82	32.8	50	30.5
	Once a year	7	2.8	16	9.8
	Never	4	1.6	3	1.8
	Total	250	100.0	164	100.0
What are your primary channels for purchasing beauty products?	Only online stores	76	30.4	48	29.4
	Only physical stores	59	23.6	12	7.4
	Both online stores and physical counters	115	46.0	103	63.2
	Total	250	100.0	163	100.0

In sum, Macao residents generally spend more time on the internet (about 70.1%), being the range of 5-8 hours, the most common time frame for 48.8% of them. In Guangzhou, respondents spend less

time on the internet, with 39.4% of them using the internet for 3-5 hours daily. Most residents from these regions (over 70%) use the internet to chat and socialize or watch videos or, even, to read. While most Guangzhou residents (62.8%) purchase tickets once a month or every 2-3 months, 88.8% of Macao respondents.

Regarding the beauty products purchased online (Table 4), lotions and creams occupies the most purchased product in Guangzhou with 68.7% of the cases followed by (1) masks and serums and sunscreens with 54.6% each and (2) cleansers and make up removers and masks and serums and sunscreens with 51.8% each; in Macao region, the beauty products most purchased online is cleansers and makeup removers (54,8% of the cases) followed by lotions and creams as well as masks and serums (47.1% each).

**Table 4: Beauty products most purchased online**

	Guangzhou			Macao		
	Responses		% of cases	Responses		% of cases
	Count	%		Count	%	
Cleansers and makeup removers	129	16.9	51.8	86	21.6	54.8
Lotions and creams	171	22.4	68.7	74	18.6	47.1
Masks and serums	136	17.8	54.6	74	18.6	47.1
Sunscreens	136	17.8	54.6	63	15.8	40.1
Facial and eye makeup	124	16.2	49.8	50	12.6	31.8
Beauty devices (e.g., cleansers)	28	3.7	11.2	15	3.8	9.6
Perfumes and fragrances	40	5.2	51.8	36	9.0	22.9
Total	764	100.0	342.5	398	100.0	253.5

## 5.2 Exploratory factor analysis

To reduce the dimensionality of the input variables for each construct, a exploratory factor analysis in principal components is going to be performed for each of the dimensions.

The adequacy measures of the data to this multivariate technique for each dimension are verified, under two conditions:

- 1) The coefficient Kaiser-Meyer-Olkin (KMO) as a sampling adequacy coefficient should be greater than 0.5, being the cutoff value equal to 0.5.
- 2) In the Bartlett's test of sphericity, the null hypothesis, that states that the population correlation matrix is equal to an Identity matrix, is rejected, as desired.

The extraction of principal components for all dimensions are based in two criteria: the Kaiser's criterion if the values for the communality for each item associated to the construct are equal or greater than 0.6 and the cumulative percentage of total variance criterion should be equal or greater than 0.7. The results are shown in the next two tables.

**Table 5: Extraction of principal components**

Dimensions	Guangzhou			Macao		
Perceived ease of use (PEU)	KMO		0.758	KMO		0.820
	Bartlett's Test of Sphericity	≈ Chi-Square df	229.879 6	Bartlett's Test of Sphericity	≈ Chi-Square df	349.346 6
		Sig.	< 0.001		Sig.	< 0.001
	Communalities		≥ 0.634	Communalities		≥ 0.643
	Extracted:		<b>PEU1</b> <b>PEU2</b>	Extracted:		<b>PEU</b>
	% of variance explained		57.78 16.84	% of variance explained		73.857
Perceived usefulness (PU)	KMO		0.660	KMO		0.797
	Bartlett's Test of Sphericity	≈ Chi-Square df	126.657 6	Bartlett's Test of Sphericity	≈ Chi-Square df	298.461 6
		Sig.	< 0.001		Sig.	< 0.001
	Communalities		≥ 0.632	Communalities		≥ 0.632
	Extracted:		<b>PU1</b> <b>PU2</b>	Extracted:		<b>PU</b>
	% of variance explained		48.36 21.81	% of variance explained		70.158
Perceived risk (PR)	KMO		0.706	KMO		0.688
	Bartlett's Test of Sphericity	≈ Chi-Square df	211.233 3	Bartlett's Test of Sphericity	≈ Chi-Square df	138.210 3
		Sig.	< 0.001		Sig.	< 0.001
	Communalities		≥ 0.697	Communalities		≥ 0.622
	Extracted:		<b>PR</b>	Extracted:		<b>PR</b>
	% of variance explained		70.107	% of variance explained		69.521
Online purchase intention (OPI)	KMO		0.754	KMO		0.829
	Bartlett's Test of Sphericity	≈ Chi-Square df	178.911 6	Bartlett's Test of Sphericity	≈ Chi-Square df	290.783 6
		Sig.	< 0.001		Sig.	< 0.001
	Communalities		≥ 0.620	Communalities		≥ 0.651
	Extracted:		<b>OPI1</b> <b>OPI2</b>	Extracted:		<b>OPI</b>
	% of variance explained		54.64 17.09	% of variance explained		70.891

Notes: (1) KMO is the Kaiser-Meyer-Olkin coefficient; (2) df – degrees of freedom.

**Table 6: Rotated Component Matrices for Guangzhou**

PERCEIVED EASE OF USE:

	Component	
	1	2
My order and payment are clear when I order beauty products online	<b>.825</b>	.052
The process of buying beauty products online is very clear	<b>.773</b>	.328
Buying beauty products online is simple and easy to learn	<b>.733</b>	.310
Information on buying beauty products online is complete and easy to find	.216	<b>.957</b>

CP1 – Clarity and easiness of PE

CP2 – Complete information and easiness of PE

PERCEIVED USEFULNESS:

	Component	
	1	2
Online shopping can save my time in buying beauty products	<b>.859</b>	.106
Online shopping for beauty products can improve my purchasing efficiency	<b>.779</b>	.221
Online shopping saves me the cost of buying beauty products	.070	<b>.874</b>
Online shopping allows me to get more information about beauty products	.277	<b>.746</b>

CP1 – Efficiency and saving time

CP2 – Information and saving costs

PURCHASE INTENTION:

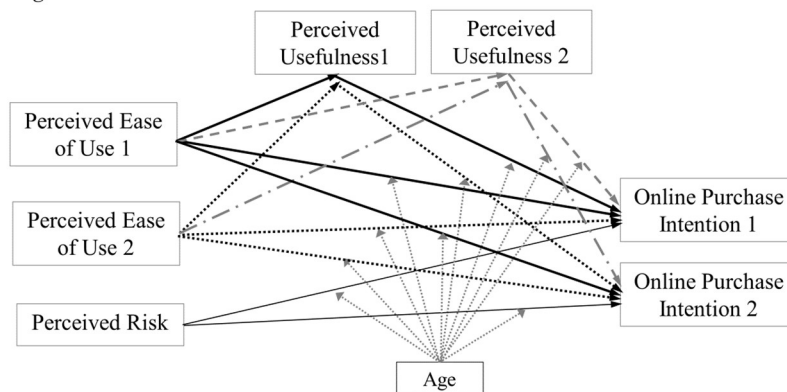
	Component	
	1	2
I would recommend my friends to buy beauty products online	<b>.889</b>	.125
I would like to buy beauty products online	<b>.701</b>	.379
I would prioritise buying beauty products	.125	<b>.891</b>
I will buy beauty products online more often in the future	.383	<b>.688</b>

CP1 – Liking to buy online beauty products

CP2- Willingness to buy online beauty products

The empirical models to be estimated are viewed in the next two figures.

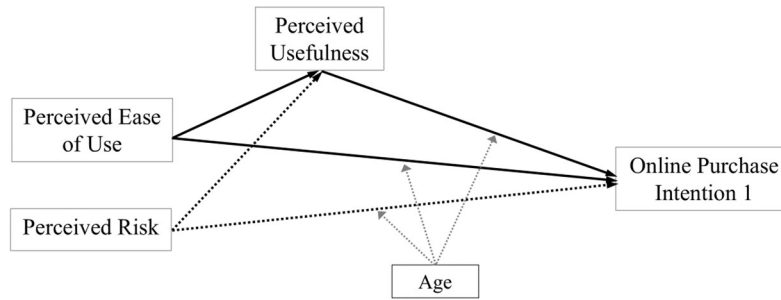
Model  $i$ ,  $i = \text{Guangzhou}$



**Figure 3: Empirical model to be estimated for Guangzhou**



Model  $i$ ,  $i = \text{Macao}$



**Figure 4 – Empirical model to be estimated for the Macao region**

## 5.2 Models to be estimated

The models' specifications are in line with the conceptual model. In the conceptual model it is specified that the Perceived Usefulness is a potential mediator, and age is a potential moderator. Because of that the software SmartPLS, version 4, is used to estimate both regressions which apply a bootstrapping method with the 5000 resamples with replacement to refine the estimates to avoid biasedness. The main idea is to use the estimated values of the standard deviations towards the mean of these samples and, consequently, to estimate the p-values.

### 5.2.1 Guangzhou

The estimations for the empirical model are revealed in Tables 7 and 8.

- The variable Perceived Usefulness 1 could not be a mediator even if the level of significance is set to be equal to 0.081. In this case,  $PR \rightarrow PU1$ ;  $PR \rightarrow OPI2$ ; but  $PU1 \nrightarrow OPI2$ .

$$\begin{bmatrix} (\hat{\beta}_{PR \rightarrow PU1} = 0.107; Sig = 0.081) \\ (\hat{\beta}_{PR \rightarrow OPI2; TotalEffect} = 0.142; Sig = 0.028) \\ (\hat{\beta}_{PU1 \rightarrow OPI2} = 0.022; Sig = 0.729) \end{bmatrix}$$

- The Perceived Usefulness 2 cannot be a mediator even if  $\alpha = 0.068$ . In this case,  $PEU1 \rightarrow PU2$ ;  $PU2 \rightarrow OPI2$ ; but  $PEU1 \nrightarrow OPI2$ .

**Table 7: Estimations of potential mediating effects**

Dependent variables	Independent variables	Direct effects	P values	Total effects	P values
PU1	PEU1	-0.015	0.823	-0.015	0.823
	PEU2	-0.027	0.652	-0.027	0.652
	PR	0.107	0.081	0.107	0.081
PU2	PEU1	0.119	0.068	0.119	0.068
	PEU2	0.066	0.255	0.066	0.255
	PR	0.091	0.153	0.091	0.153
OPI1	PU1	0.165	0.018	0.165	0.018
	PU2	0.090	0.181	0.090	0.181
	PEU1	0.194	0.004	0.202	0.002
	PEU2	-0.016	0.827	-0.014	0.843
	PR	0.004	0.955	0.030	0.680
OPI2	PU1	0.022	0.729	0.022	0.729
	PU2	0.206	0.002	0.206	0.002
	PEU1	-0.015	0.808	0.009	0.889
	PEU2	0.075	0.205	0.088	0.149
	PR	0.121	0.066	0.142	0.028

**Table 8: Interaction effects when age is the potential moderator**

Dependent variables	Independent variables	Direct effects	P values
OPI1	Age	-0.033	0.666
	Age x PU1	-0.019	0.769
	Age x PU2	0.069	0.310
	Age x PEU1	0.025	0.695
	Age x PEU2	-0.001	0.993
	Age x PR	-0.085	0.222
OPI2	Age	0.028	0.694
	Age x PU2	0.017	0.801
	Age x PU1	0.147	0.007
	Age x PEU1	0.049	0.395
	Age x PEU2	-0.150	0.033
	Age x PR	0.079	0.203

Looking at Table 8, it is noticed two significant interactions dictated by the variable age in the relationships between PU1 → OPI2 and PEU2 → OPI2:

$$\left[ \begin{array}{l} \hat{\beta}_{\text{Age} \times \text{PU1} \rightarrow \text{OPI2}} = 0.147; \text{Sig} = 0.007 \\ \hat{\beta}_{\text{Age} \times \text{PEU2} \rightarrow \text{OPI2}} = -0.150; \text{Sig} = 0.033 \end{array} \right]$$

The adjustment coefficients (Table 9) for the two dependent variables that are measuring the online purchased intentions and the two components of perceived usefulness, have a weak but significant adjustment in terms of the determination coefficient for the first dependent variable. But the

percentages of the variations of PU1 and PU2 explained by the independent variables ( $PE_i$  and PR) are extremely low and not significant. In sum, only 8.8% of the variations in online purchase intention 2, after correcting the  $R^2$  values to the sample size and the number of independent variables, are significantly explained by its antecedent variables in the model with a weak intensity but significant (Adjusted  $R^2 = 0.088$ ;  $Sig = 0.035$ ).

**Table 9:  $R^2$  and  $R^2$ adjusted for the Guangzhou model**

	$R^2$	P values	$R^2$ <i>adjusted</i>	P values
OPI1	0.079	0.044	0.037	0.373
OPI2	0.128	0.001	0.088	0.035
PU1	0.012	0.462	0.000	0.977
PU2	0.033	0.121	0.022	0.320

## 5.2.2 Macao

Following the estimations revealed in next table, some conclusions can be drawn:

**Table 10: The estimations for the empirical model**

Dependent variables	Independent variables	Direct effects	P values	Total effects	P values
PU	PEU	0.482	0.000	0.482	0.000
	PR	0.225	0.001	0.225	0.001
PU $\rightarrow$ OPI		0.380	0.001	0.380	0.001
OPI	Age	-0.054	0.439	-0.054	0.439
	PEU	0.221	0.063	0.404	0.000
	PR	-0.050	0.547	0.035	0.670
	Age x PU	0.082	0.643	0.082	0.643
	Age x PEU	-0.120	0.469	-0.120	0.469
	Age x PR	-0.068	0.289	-0.068	0.289

- (1) The perceived Usefulness (PU) is a mediator because it is significantly explained by the Perceived Ease of Use ( $\hat{\beta}_{PEU \rightarrow PU} = 0.482$ ;  $Sig = 0.000$ ); the Perceived Ease of Use significantly explains the dependent variable (OPI), ( $\hat{\beta}_{PEU \rightarrow OPI; TE} = 0.404$ ;  $Sig = 0.000$ ), in terms of total effect, and the Perceived Usefulness significantly explains Online Purchase Intention ( $\hat{\beta}_{PU \rightarrow OPI; TotalEffect} = 0.380$ ;  $Sig = 0.001$ ). Thus, the mediation is full or complete.
- (2) There are not significant interactions effects when age is hypothesized to be a moderator.

- (3) There is a direct effect of Perceived risk on the Perceived Usefulness ( $\hat{\beta}_{PR \rightarrow PU} = 0.225; Sig = 0.001$ ).

**Table 11:  $R^2$  and  $R^2$  adjusted for the Macao model**

	$R^2$	P values	$R^2$ <i>adjusted</i>	P values
OPI	0.281	0.000	0.249	0.000
PU	0.317	0.000	0.308	0.000

The adjustment coefficients for the two dependent variables are moderate, according to Chin (1998): 24.9% of the variations in the online purchased intention, after correcting the  $R^2$  values to the sample size and the number of independent variables, are significantly explained by its antecedent variables in the model; and, 30.8% of the variations in the Perceived Usefulness are significant explained by the Perceived Ease of Use.

### 5.2.3 Hypotheses' Validation

#### 5.2.3.1 Hypotheses' Validation for Guangzhou.

The summary Table 12 shows the hypotheses' validation.

**Table 12: Hypotheses' validation for Guangzhou residents**

Hypotheses	Validation
H1a: Perceive Usefulness have a significant positive impact on beauty online purchases Frequency.	Validated for PU1 $\rightarrow$ OPI1: [ $\hat{\beta} = 0.165; Sig = 0.018$ ]  Validated for PU2 $\rightarrow$ OPI2: [ $\hat{\beta} = 0.206; Sig = 0.002$ ]
H1b: Perceived Ease of Use will have a significant positive impact on beauty online purchase intentions.	Validated for PEU1 $\rightarrow$ OPI1: [ $\hat{\beta} = 0.194; Sig = 0.018$ ]
H1c: Perceived Ease of Use will have a significant positive impact on consumers' perceived usefulness.	Partially validated for PEU1 $\rightarrow$ PU2 (If $\alpha = 0.068$ )
H1d: Perceived Usefulness is a mediator	Not validated for PU1 and PU2
H2: Perceived Risk has a significant negative impact on consumers' purchase intentions.	Partially validated for OPI2: [ $\hat{\beta}_{Total\ Effect} = 0.142; Sig = 0.028$ ]
H3: Age is a moderator variable in the relationships between the independent variables and the consumers' purchase intentions	Validated for PU1 and OPI2: [ $\hat{\beta} = 0.147; Sig = 0.007$ ]  Validated for PEU2 and OPI2: [ $\hat{\beta} = -0.150; Sig = 0.033$ ]

### 5.2.3.2 Hypotheses' Validation for Macao.

The summary Table 13 shows the hypotheses' validation.

**Table 13: Hypotheses' validation for Macao residents**

Hypotheses	Validation
H1a: Perceive Usefulness have a significant positive impact on beauty online purchases Frequency.	Validated: [ $\beta = 0.380$ ; $Sig = 0.001$ ]
H1b: Perceived Ease of Use will have a significant positive impact on beauty online purchase intentions.	Validated for PEU1 $\rightarrow$ OPI in terms of total effect: [ $\beta_{Total\ Effect} = 0.404$ ; $Sig = 0.000$ ]
H1c: Perceived Ease of Use will have a significant positive impact on consumers' perceived usefulness.	Validated: [ $\beta = 0.482$ ; $Sig = 0.000$ ]
H1d: Perceived Usefulness is a mediator	Validated and the mediation is full/complete
H2: Perceived Risk has a significant negative impact on consumers' purchase intentions.	Partially validated with a positive sign: [ $\beta = 0.225$ ; $Sig = 0.001$ ]
H3: Age is a moderator variable in the relationships between the independent variables and the consumers' purchase intentions	Not validated

## 5.3 Discussion

In this chapter, the research findings will be discussed, addressing independently all predictive factors that have explanatory power for the results and sustained intentions. In addition, the verified moderating effects will also be discussed.

As a theoretical contribution, to investigate the differences in the purchase of beauty products between Guangzhou and Macau, we have implemented online purchase intentions into the model. We have examined the effects between the independent variables and the dependent variables, as well as observed whether age acts as a moderating role between the independent and dependent variables in the two regions. These results are consistent with previous studies in some respects but contradictory in others.

Firstly, in both Guangzhou and Macau, the impact of perceived usefulness and perceived ease of use on the frequency of online purchases has been verified. This is consistent with the Technology Acceptance Model proposed by Davis (1989) and Venkatesh and Davis (2000). This indicates that consumers in Macau, like those in Guangzhou, consider the practicality of shopping platforms as an important factor in their purchase of cosmetic products.

However, in Guangzhou (Table 6), through the principal component analysis of PU and PU and OPI, the variables were reduced to two principal components. (Table 7) shows that the positive impact of perceived usefulness (PU1 and PU2) on purchase intentions (OPI1 and OPI2) in Guangzhou. The perceived ease of use in Guangzhou also showed a significant positive impact on online purchase intentions (PEU1→OPI1), and partially verified the positive impact of perceived ease of use on perceived usefulness (PEU1→PU2). However, the relationship between PEU1 and PU2 was not fully established, indicating that in Guangzhou, although perceived ease of use is important, its influence on perceived usefulness is not always direct.

The verification in Macau shows that perceived ease of use not only has a significant positive impact on purchase intentions but also fully verifies its influence on perceived usefulness. This indicates that consumers in Macau may place more emphasis on the ease of use of shopping platforms than consumers in Guangzhou and believe that ease of use directly affects the practicality of the platform (Table 10).

In Guangzhou, the negative impact of perceived risk on purchase intentions was not verified. This is not consistent with the study by Gefen et al. (2003). In Table 7, the results for OPI2 showed a positive effect, indicating a paradoxical phenomenon that may be related to certain particularities of

Guangzhou consumers (such as higher trust in online platforms). Age in Guangzhou was verified as being a moderating variable, namely between  $\text{Age} \times \text{PU1} \rightarrow \text{OPI2}$  and  $\text{Age} \times \text{PEU2} \rightarrow \text{OPI2}$  (Table 8). This indicates that age plays an important moderating role in consumer decision-making in Guangzhou, especially in the relationship between perceived usefulness or perceived ease of use with purchase intentions. This result supports the study by You, Nie, and Zhang (2015).

In this study, it was found that the negative impact of perceived risk on the purchase intentions of Macau consumers was not verified, indicating that in Macau, consumers may have a higher tolerance for potential risks in online shopping or they believe that risks do not hinder their purchase decisions. Age in Macau was not verified as being a moderating variable, indicating that there is no significant difference in attitudes towards online purchases among Macau consumers of different age groups, or age is not a key factor in online shopping in that region.

As a conclusion of this work, both perceived usefulness and perceived ease of use are important explanations for online purchasing behavior in both Guangzhou and Macau.





## **6 Conclusion**

### **6.1 Theoretical Contributions**

This study delves into the differences in consumer behavior regarding the purchase of beauty products in Guangzhou and Macau and verifies the applicability of the Technology Acceptance Model (TAM) in this specific domain. The results indicate that perceived ease of use and perceived usefulness are key factors affecting consumer purchase intentions, a finding consistent with the original TAM theory proposed by Davis et al. (1989).

Consumer behavior patterns in Guangzhou and Macau are similar in some aspects; however, consumers in Macau place greater emphasis on perceived ease of use. This factor not only directly affects purchase intentions but also significantly impacts perceived usefulness. In contrast, the manifestation of perceived risk among consumers in Guangzhou is more complex, with partial verification showing a dual nature in the impact of risk on purchase intentions. In Macau, perceived risk has less influence on online purchases.

Furthermore, age as a moderating variable was verified in Guangzhou, indicating that age plays an important role in purchase decisions in that region; in Macau, this hypothesis was not supported, possibly indicating that the purchasing behavior of Macau consumers is less influenced by age.

### **6.2 Managerial Implications**

The study reveals the impact of regional culture, market size, and economic development levels on consumers' internet usage habits, shopping channel choices, and product preferences. After an in-depth analysis of the behavior and preferences of consumers in Guangzhou and Macau when purchasing beauty products, this study uncovers significant differences between the two regions across

multiple dimensions. When discussing the managerial implications of marketing strategies for beauty products in Guangzhou and Macau, cross-regional marketing strategies need not only to identify the unique needs of each region but also to flexibly apply data and innovative technologies to enhance market competitiveness.

Perceived risk has a significant negative impact on the purchase intentions of consumers in Guangzhou, while it is not significant in Macau. This finding points out that when formulating market strategies, brands need to consider regional differences, especially in risk communication and management. To increase consumer trust and reduce perceived risk: enhance the quality of products, optimize logistics costs, increase promotional efforts, adjust pricing strategies, and other means to improve the shopping experience and satisfaction of consumers. E-commerce platforms should continuously improve consumer trust in the platform, which can attract more consumers and also attract more brand merchants.

In the Guangzhou area, beauty brands should first strengthen online marketing activities. Consumers in Guangzhou are highly dependent on the internet and digital platforms, and brands need to reach target users through social media, mobile applications, and e-commerce platforms. At the same time, due to the importance Guangzhou consumers place on multi-channel shopping experiences, brands need to ensure seamless integration of online and offline channels, providing consistent and convenient shopping paths. This multi-channel strategy not only improves the customer's shopping experience but also increases customer loyalty and brand trust. In addition, the Guangzhou market has a higher acceptance of new products and innovation, and brands should continue to launch innovative products and customize specific products for this market to meet the personalized needs of consumers.

Because of the gender differences in Guangzhou and Macau, it is necessary to formulate differentiated marketing strategies for male and female consumers. For example, male consumers may focus more on the practicality and efficiency of products, while female consumers may focus more on the brand and emotional value of products. Use social media and KOLs for marketing, especially among Generation Z, using platforms and idols they like to promote products.

Promote gender-neutral beauty products in Macau, emphasizing the universal applicability and inclusiveness of the products, eliminating gender labels, and attracting a broader consumer base. Educate the market to increase consumer awareness and acceptance of gender-neutral beauty products, while using social media and online platforms for promotion.

Overall, cross-regional marketing strategies should fully consider regional differences and formulate corresponding differentiated strategies. Brands can make decisions through the use of consumer behavior data, including product development, pricing, promotional activities, and advertising placement, to maximize market benefits. In addition, brands also need to maintain market flexibility and adjust strategies in a timely manner to cope with dynamic changes in the market and consumer behavior. Finally, establishing long-term customer relationships in various markets is key to ensuring the brand's enduring competitiveness.

By applying these managerial implications, beauty brands and retailers can more effectively implement cross-regional marketing strategies, thereby enhancing market competitiveness and brand value, achieving sales growth and market expansion.

### **6.3 Limitations and Recommendations for Future Research**

While this study provides valuable insights, it also has some limitations. Firstly, the research focuses primarily on Guangzhou and Macao, which may not fully represent the consumer behavior of all markets in China.

The market environment involved in this work is too large to be objective. Later respondents can refer to deeper psychological and shopping behavior variables. There is also a sample, not based on convenient respondents, but on chance probabilities and a larger sample, even compared to other product categories.

Future research could explore other factors that may influence consumers' purchase intentions and consider how these factors interact with regional differences. Additionally, studies could be extended to other regions or countries to verify the generalizability of the findings from this research. For instance, the differences in consumer behavior between Hong Kong and Macao in different contexts could be considered within China. Comparative studies could also be conducted between two different provinces in China or with neighboring countries like South Korea and Japan. The focus could extend beyond fast-moving consumer goods to other types of products, such as luxury items or electronic goods.

Future studies could consider employing a more diverse range of methodologies, such as in-depth interviews or case studies, to gain a deeper understanding. Concurrently, researchers should consider including a larger sample size to enhance the representativeness and universality of the study's findings. More sophisticated research methods could also be utilized.

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## 8 Annex

### Annex A Questionnaire

Q1 您一天有多长时间使用互联网? How many hours a day do you use the internet?

1-3 小时 1-3 hours (1)

3-5 小时 3-5 hours (2)

5-8 小时 5-8 hours (3)

8 小时以上 More than 8 hours (4)

Q2 您使用互联网主要用途有哪些? What are your main uses of the internet?

玩游戏 Playing games (1)

QQ、微信等聊天交友工具、影视、阅读 Chatting and socializing (e.g., QQ, WeChat), watching videos, reading

(2)

获取学习资料, 关注时事新闻 Getting study materials, following current events (3)

网上购物 Online shopping (4)

Q3 您通过互联网多久购买一次娱乐票务、软件、航班和交通预订? How often do you purchase

entertainment tickets, software, flights, and transportation bookings online?

每月一次 Once a month (1)

每 2-3 个月一次 Once every 2-3 months (2)

每 6 个月一次 Once every 6 months (3)

一年一次 Once a year (4)

从未 Never (5)

Q4 您购买美容产品的主要渠道？ What are your primary channels for purchasing beauty products?

只在线上网店购买 Only online stores (1)

只在线下商店 Only physical stores (2)

线上网店和线下专柜结合 Both online stores and physical counters (3)

Q5 您觉得在线购买的优点和缺点—— What do you think are the advantages and disadvantages of online purchasing?

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Q6 您最常在網上购买的美容产品是什么？ What beauty products do you most often purchase online?

清洁和卸妆产品 Cleansers and makeup removers (1)

乳液和面霜 Lotions and creams (2)

面膜、精华液 Masks and serums (3)

防晒霜 Sunscreens (4)

面部和眼部化妆品 Facial and eye makeup (5)

美容设备（如清洁器等） Beauty devices (e.g., cleansers) (6)

香水和香料 Perfumes and fragrances (7)

Q7 您通常多久在网上购买一次护肤品？ How often do you usually purchase skincare products online?

一周一次或更多 Once a week or more (1)

2-3 次/月 2-3 times a month (2)

一个月一次 Once a month (3)

每 2-3 个月一次 Once every 2-3 months (4)

每 6 个月一次 Once every 6 months (5)

一年一次 Once a year (6)

从不 never (8)

Q9 感知易用性 Perceived ease of use

	1 (Strongly disagree)	2 (Disagree)	3 (Neither agree nor disagree)	4 (Agree)	5 (Strongly agree)
E1. Buying beauty products online is simple and easy to learn (1)	1	2	3	4	5
E2. The process of buying beauty products online is very clear (2)	1	2	3	4	5
E3. My order and payment are clear when I order beauty products online (3)	1	2	3	4	5
E4. Information on buying beauty products online is complete and easy to find (4)	1	2	3	4	5

Q10 感知有用性 Perceived usefulness

	1 (Strongly disagree)	2 (Disagree)	3 (Neither agree nor disagree)	4 (Agree)	5 (Strongly agree)
EO1. online shopping allows me to get more information about beauty products (1)	1	2	3	4	5
EO2. online shopping saves me the cost of buying beauty products (2)	1	2	3	4	5
EO3. online shopping can save my time in buying beauty products (3)	1	2	3	4	5

EO4. online shopping for beauty products can improve my purchasing efficiency (4)	1	2	3	4	5
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Q11 感知风险 Perceived risk

	1 (Strongly disagree)	2 (Disagree)	3 (Neither agree nor disagree)	4 (Agree)	5 (Strongly agree)
Getting a product online may not meet my expectations. (Performance Risk); (1)	1	2	3	4	5
The product may pose a risk to my health or safety. (physical risk); (2)	1	2	3	4	5
I may waste time or effort repairing or replacing the product.' (time risk) (3)	1	2	3	4	5

Q13 购买意愿 Purchase intention

	1 (Strongly disagree)	2 (Disagree)	3 (Neither agree nor disagree)	4 (Agree)	5 (Strongly agree)
I would like to buy beauty products online (1)	1	2	3	4	5
I would prioritise buying beauty products (2)	1	2	3	4	5
I will buy beauty products online more often in the future (3)	1	2	3	4	5
I would recommend my friends to buy beauty products online (4)	1	2	3	4	5

Q15 Where do you currently live?

Guangzhou (1)

Macao (2)

Q16 How old are you? (number) \_\_\_\_\_

Q17 What is your gender?

Female (1)

Male (2)

Q18 What is your professional occupation?

Student or/and Not working (1)

Student or/and Part-time working (2)

Full-time working (3)

Self-employed (4)

Retired (5)

Unemployed (7)

Other. Please, specify (8)

Q19 What is your educational level?

High school degree (1)

Professional degree (2)

Bachelor's Degree (3)

Master's Degree (4)

PhD Degree (5)

Q20 Please indicate your monthly income range. (Amounts specified in each option are shown both in Chinese

Yuan (RMB) and Macao (MOP) respectively)

Less than 4000 RMB or less than 5000 MOP (1)

4000 RMB - 6000 RMB or 5000 MOP- 7500MOP (2)

6000 RMB - 8000 RMB or 7500MOP-10.000 MOP (3)

8000 RMB or more or 10.000 MOP or more (4)