Leveraging Electronic Word-of-Mouth to Enhance Mobile App Consumer Satisfaction: The Mediating Role of Brand Awareness

Xiangzhou Hua[1,2], Nurul Ain Mohd Hasan[1*], Feroz De Costa[1]

[1]Faculty Of Modern Languages and Communication, Universiti Putra Malaysia, Serdang, Malaysia, 43400

[2]Faculty of Communication, Zhengzhou Normal University，Zhengzhou, China, 475000

hxz18749897931@gmail.com (Corresponding author)

Abstract. This study aimed to examine the influence of electronic word-of-mouth (Ewom) on consumer satisfaction with mobile apps, and the mediating role of brand awareness. Data was collected through a questionnaire of 494 WeChat users in China. The results showed volume, valence, and source of Ewom significantly predicted consumer satisfaction. Furthermore, brand awareness mediated the relationship between Ewom and satisfaction. The findings suggest businesses should actively manage Ewom and focus on improving brand awareness and trust to enhance customer satisfaction with their mobile apps. Specific measures are proposed such as prompt response to Ewom and brand building through social media engagement.

Keywords: Electronic Word-of-Mouth; Social media; Consumer Satisfaction; Brand Awareness; mobile APP

1.Introduction

With the advent of the 5G era, mobile phone applications (apps) have become ubiquitous in everyone's life. According to the White paper on mobile applications in 2022, mobile devices will further penetrate in 2021, with the number of active mobile application devices steadily increasing, the daily active scale exceeding 1.1 billion, and the daily active application time reaching 5.26 hours, up 2.7% year-on-year (Ai Rui Research, 2022). The popularity of apps has continued to increase over the last decade, with over 2.87 million apps currently available (Buildfire 2021). At the same time, mobile apps are having a significant economic impact on a global scale. 90% of the global TOP100 brands can provide users and consumers with one or more apps (Tseng and Lee 2018), the popular short video APP Tiktok has 1 billion video views per day, it also generates $50 million a day in consumer spending (Williams 2020). Given that most apps lose 76% of their users after the first three months of use (Alnawas & Aburub, 2016), solving such a problem is not an easy task, and it is a significant challenge for app developers (Chen, 2019). However, some scholars have found that users' satisfaction with mobile apps will have a positive impact on continued use (Li & Fang, 2019). Therefore, it is necessary to improve the customer satisfaction of mobile applications. At the same time, some scholars have also found through research that eWOM is a basic factor to promote the download and purchase intention of mobile applications (Al-Adwan & Sammour, 2020).

In recent years, with the development of technology and the popularity of the internet, electronic word-of-mouth (Ewom) has become an important way for consumers to obtain information and make decisions. Ewom is the traditional word-of-mouth based on the dissemination of information about products, services or brands via the Internet. Consumers today can gain valuable assessments, experiences and advice from other consumers by visiting social media, review sites, blogs and forums. This form of electronic word-of-mouth (Ewom) has a significant impact on consumer decision-making.

The relationship between Ewom and consumer satisfaction has always been a hot topic in the field of business. This research showed that Ewom plays an important role in shaping consumer attitudes and behaviors, ultimately impacting their purchasing and download APP decisions. For example, the credibility and objectivity of reviews on social media will have an impact on customer trust, which in turn will influence customers' choice of restaurants (Bui, 2021). Positive Ewom can increase consumer recognition and trust in products or brands, thereby increasing consumer satisfaction. On the other hand, negative Ewom may lead to negative impressions of products or brands, lowering consumer satisfaction. However, most of the current research may limit e-reputation to positive and negative comments, and lack in-depth classification of more complex e-word of mouth types, such as emotion, information, source, etc. (Chevalier & Mayzlin, 2006; Cheung & Lee, 2012). Therefore, studying the impact of Ewom on consumer satisfaction is of great significance, providing scientific decision-making basis for consumers, market marketers and economists.

Although there have been many studies on the impact of electronic word-of-mouth on consumer satisfaction, there are still some gaps in the research. Many existing studies in the field of electronic word-of-mouth (Ewom) primarily examine the direct impact of Ewom on consumer satisfaction, overlooking the potential moderating role of brand recognition. Facing this research gap, in this study, we address this gap by studying the interaction of Ewom and brand perception on consumer satisfaction. Specifically, this study will explore the dimensions of "volume," "valence," and "source" within the context of Ewom and examine how these aspects interact with brand recognition to influence consumer satisfaction. By considering the moderating role of brand recognition, this study seeks to provide a more comprehensive understanding of the relationship between Ewom and consumer satisfaction. At the same time,a gap in the theoretical support. Some scholars have found that there is no classical and dominant theoretical basis and research framework (Cheung, 2012; Breazeale. 2009). The inclusion of brand recognition as a moderating factor in the analysis acknowledges that consumers' perception and recognition of a brand may influence how they respond to Ewom messages. By investigating the interplay between Ewom and brand recognition, this study aims to fill the existing research gap and

shed light on the complex dynamics that affect consumer satisfaction in the context of electronic word-of-mouth. In addition, the current study has less research on APP user groups. Therefore, this study will explore satisfaction among APP consumers and consider the impact of electronic word-of-mouth and brand awareness.

This study takes wechat APP as an example. Wechat is an instant-like social chat app developed by Tencent. Tencent, a well-known Internet company in China, owns many APP products such as QQ, wechat, Tencent Video, Tencent Music, etc. Wechat is Tencent's most user products, have a high brand awareness, the number of monthly active accounts reached 1.327 billion (Tencent's second quarter of 2023 financial report). Almost everyone in China uses wechat, and having such a large user base will make the experiment more scientific and objective.

Through this research, we mainly want to understand the following five questions: How do consumers' e-word-of-mouth performance on wechat APP? How satisfied are consumers with the wechat APP? How is the brand awareness of wechat APP among consumers? How does wechat APP's e-word of mouth (valance, volume, source) affect consumer satisfaction? Does brand awareness play a mediating role between e-word of mouth and consumer satisfaction?

General Objective in this study is the main purpose of this study is to take wechat APP as an example to investigate the relationship between e-word of mouth, brand awareness and consumer satisfaction in the context of mobile applications.

This study has both theoretical and practical implications of great significance. Theoretically, it provides a more comprehensive model and enhances our understanding of how electronic word-of-mouth influences consumer satisfaction. Moreover, it emphasizes the importance of effective management of Ewom to enhance consumer satisfaction.

From a practical standpoint, this study is highly relevant and valuable for marketing professionals. By exploring the effects of Ewom and its various aspects such as volume, valence, and source, the study offers practical implications for marketing professionals to develop more effective marketing strategies. Furthermore, it aids businesses in improving brand awareness and, consequently, increasing consumer satisfaction.

Hence, this study holds importance not only in academia but also in practice. It contributes to increased attention towards electronic word-of-mouth, ultimately enhancing consumer satisfaction and enabling businesses and marketers to effectively leverage and manage electronic word-of-mouth, thereby positively impacting businesses and brands.

2. Literature Review

2.1. Research of consumer satisfaction

The concept of consumer satisfaction is an interdisciplinary and multidimensional concept that has been extensively studied in the field of marketing. The American Marketing Association defines customer satisfaction as the degree to which a product or service meets customer expectations. It is often considered to be the result of a comparison between pre-consumption expectations and post-consumption perceptions of the product or service.

Recent literature in the field of consumer behavior has shown that consumer satisfaction can have a significant impact on consumer loyalty and future purchasing behavior. For example, a study by Yoo and Donthu (2001) found that consumer satisfaction is positively related to customer loyalty, and that this relationship is stronger for high-involvement products. Another study by Oliver (1997) found that consumer satisfaction is a strong predictor of repurchase intentions and customer referrals.

Additionally, consumer satisfaction is influenced by a variety of factors, including product quality, value for money, and the overall customer experience. Indeed, numerous studies have established a positive association between consumer satisfaction and favorable word-of-mouth (WOM), as well as consumer loyalty. Researchers such as Brown et al. (2006), Reynolds and Beatty (1999), and Swan and

Oliver (1989) have contributed to understanding this relationship.

In summary, consumer satisfaction holds paramount significance in the field of marketing, given its profound impact on consumer behavior and overall business success. Further research is warranted to gain a deeper understanding of the factors influencing consumer satisfaction and to develop effective measurement approaches.

2.2. Theroy and model of consumer satisfaction

The theoretical foundations of consumer satisfaction have been developed through various disciplines including marketing, psychology, and sociology. Consumer satisfaction, as described by Oliver (1997), is a psychological state that arises from comparing consumers' expectations with their actual perceptions of a product or service they have received.

As the economic world becomes increasingly interconnected, scholars from different countries have established their own theories on consumer satisfaction to explore the correlation between satisfaction and perceived quality, value, complaints, and loyalty. In the late 1980s, Sweden presented the first satisfaction theory with the SCSB (Sweden Customer Satisfaction Barometer), which determines an overall satisfaction index based on 31 economic sectors. This was followed by similar efforts in Germany, Israel, Taiwan, and New Zealand during the late 1980s and early 1990s. China developed the China Customer Satisfaction Index (CCSI) in 2002 by adapting the ACSI and ECSI models to cater to the requirements of Chinese enterprises.

China's exploration into consumer satisfaction began later than other countries. Domestic researchers created the China Consumer Satisfaction Index (CCSI) model, drawing from the ACSI and ECSI models and considering the actual operations of Chinese enterprises. The CCSI model, composed of six variables including brand image, customer expectation, perceived quality, perceived value, customer satisfaction, and customer loyalty, has been widely adopted in China and has shown improved accuracy in predicting consumer satisfaction in service industries. (Fig 1: China Consumer Satisfaction Index Model)
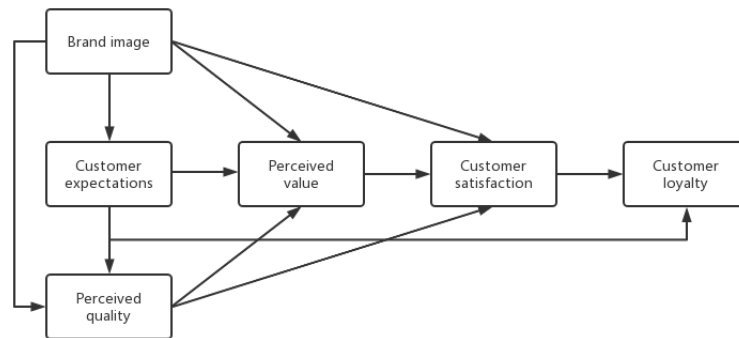

Fig 1: China Consumer Satisfaction Index Model

2.3. Definition of electronic word-of-mouth

Electronic word-of-mouth (Ewom) is defined as the exchange of information about products, services, or brands via electronic channels such as social media platforms, forums, blogs, and instant messaging apps (Cheung & Lee, 2012; Hennig-Thurau et al., 2004). The concepts of e-WOM in most studies are derived from traditional WOM. The similarities are that their connotations are the communication and sharing of information between consumers on enterprises, brands, products or services, and this information will affect consumers' purchasing decisions. The difference is that e-WOM emphasizes that the media of word-of-mouth information dissemination is the Internet, which has new characteristics of information dissemination in the Internet, such as faster dissemination speed and wider dissemination range compared with traditional word-of-mouth.

With the widespread use of social media, the number of studies on Ewom in social media continues to rise in recent years. These studies analyze the influence of Ewom in social media from different fields and perspectives. Users who have difficulty in direct experience with products and services prior to purchase will first search for word-of-mouth or online word-of-mouth on websites for decision-making (Jeong et al., 2021). Anastasiei (2019) classified Ewom into two aspects: "volume" and "valence". In the context of electronic word-of-mouth (Ewom), the term "volume" refers to the frequency or extent to which individuals engage in Ewom communication. On the other hand, the term "valence" in Ewom refers to the sentiment or tone of the message being communicated. It indicates whether the message conveys a positive or negative opinion, evaluation, or experience related to a product, service, or brand.

Indeed, several studies have examined the influence of electronic word-of-mouth (Ewom) on consumer behavior and have highlighted the significance of the volume and valence of Ewom messages. Kim et al. (2018) and Liu (2006) are among the researchers who have contributed to this area of study. In general, consumers are satisfied with their purchases when they believe that the performance of the product meets or exceeds expectations.Consumer expectations may be derived from feedback from other consumers (Halsted et al., 1994), such as e-WOM. Therefore, a positive e-WOM will increase consumer expectations for the product, and a negative e-WOM will do the opposite (Guo and Nakata, 2019).

2.4. Theoretical foundations of electronic word-of-mouth

E-word of mouth is a typical interdisciplinary research, mainly focusing on the three fields of advertising communication, marketing science and information system, and also involves e-commerce, management and behavioral science. On the other hand, multidisciplinary research also leads to the disunity of theoretical framework and paradigm in the current field of Ewom research (Chenung,2012; Breazeale, 2009). This fully shows that it is necessary to further explore the connotation of e-word of mouth, discover its basic principles and related influencing factors, and form a relatively mature paradigm and theory as soon as possible.

To gain insight into how individuals use persuasive information to make decisions. In recent years, the concept of "Information Adoption Model (IAM)" has been accepted by scholars in the field of information systems. The IAM theory, originally proposed by Sussman and Siegal, this model suggests that individuals are influenced by a set of messages through two paths: the central path and the peripheral path (Fig 2). Many studies have used the IAM model to determine the influencing factors of Ewom.

Consumer adoption of information relies on two primary factors:information quality and source credibility. In recent years, with the continuous application of this theory in the ewom field, some scholars have also proposed the limitations of the original IAM theoretical structure, and that the model should be improved and expanded to better adapt to the rapidly developing ewom status quo. Therefore, this study is based on the original IAM theory and uses Song's 2021 study to expand the IAM theory and increase the quantity of information to more comprehensively explain the influencing factors and measurement dimensions of ewom (Song et al., 2021)
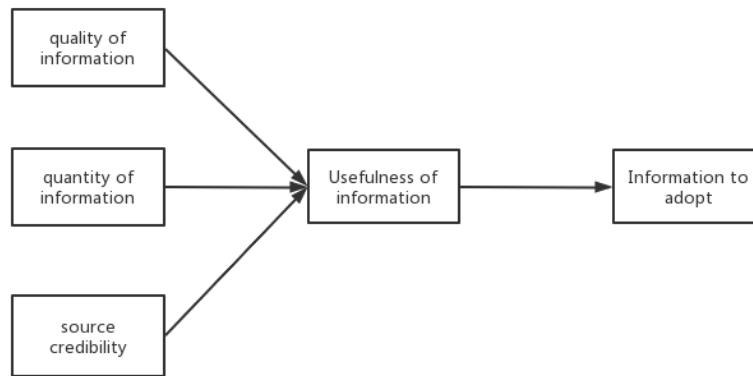
Fig 2: Information adoption model

The IAM model shows that people's behavior and thoughts are often influenced by computer mediated information on Internet platforms. Therefore, many studies on eWOM are carried out with the IAM model, because the IAM model defines the influencing factors of eWOM. Consumer adoption of information depends on three main factors - quality of information (volume of Ewom) , quantity of information (Valance of Ewom) and source credibility of information (Source of Ewom).

2.5. Brand awareness

Consumer brand choice is influenced by brand awareness, as consumers tend to pay more attention to brands they are familiar with and associate them with positive qualities. According to Macdonald and Sharp (2000), brand awareness also affects consumers' consideration of brand quality. Aaker (1992) defines brand awareness as the "consumer's capability to recognize and recall the brand across various scenarios."

According to Keller (2013), brand awareness, which refers to the extent to which a brand is recognized and recalled by consumers, can be assessed using two key variables: brand recognition and brand recall.

Scholars in the field of advertising and marketing first put forward relevant research and theories on brand cognition, and most scholars found in their research that brand cognition is very important to shape consumer behavior in the process of consumption. Keller (1993) proposed a customer-based brand equity model, which emphasizes the role of brand recognition in creating a strong and distinctive brand identity that can positively influence consumer attitudes and behaviors. Moreover, the rise of digital media has changed the landscape of brand recognition, as consumers are exposed to an increasing number of brand messages and have greater access to information about brands through online sources (Kwon and Lennon, 2009). Brand awareness has a positive impact on consumer satisfaction (Sudirman et al., 2021).

Brand awareness is widely recognized as an important component of brand equity. It holds a significant influence over consumer attitudes and behaviors towards a brand. When consumers are aware of a brand and have knowledge about it, it can shape their perceptions, preferences, and purchase decisions. Building and maintaining brand awareness is crucial for companies seeking to establish a strong brand presence and effectively connect with their target audience.

2.6. Conceptual Framework

With the popularity of the Internet, more and more people are used to learning about the items and services they want to buy, as well as related brand information through social media before shopping, which makes electronic word-of-mouth play an important role for brands and enterprises. The relationship between Ewom, brand recognition, and consumer satisfaction can be explained by theories

in marketing and psychology literature. For example, the social comparison theory (Festinger, 1954) suggests that consumers are influenced by the opinions and experiences of others when making evaluations of products and brands. In the context of electronic word-of-mouth (Ewom), this implies that consumers are susceptible to the influence of positive or negative information and opinions they come across online when forming evaluations or perceptions of a brand. The content, sentiment, and credibility of Ewom messages can significantly shape consumers' attitudes, beliefs, and decision-making processes related to a particular brand. As consumers engage with and are exposed to Ewom on various online platforms, they are likely to consider and incorporate these opinions and experiences into their overall brand evaluations. In real life, people seem to favor well-known brands, so the framework in Fig 3 is model formed in this research.
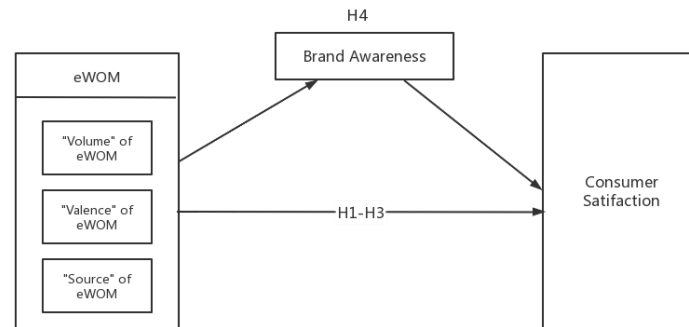

Fig 3: model formed in this study

2.6.1 Volume of Ewom and Consumer satisfaction

The volume refers to the frequency at which people communicate Ewom. The volume of Ewom can vary greatly depending on the product, service, or brand in question, as well as the specific platform being used. For example, the volume of Ewom for a popular consumer product may be much higher on a site like Amazon, where many consumers leave product reviews, than it would be on a lesser-known forum or blog. Similarly, the volume of Ewom for a brand may be higher on social media platforms like Twitter and Instagram, where users can quickly and easily share their thoughts with a large audience, than it would be on a more specialized forum or discussion board. Through the analysis of the relationship between Volume of Ewom and Consumer satisfaction, we put forward the following hypothesis

H1：volume of Ewom positively affects on consumer satisfaction.

2.6.2 Valence of Ewom and Consumer satisfaction

The valence of Ewom refers to the type of message, it is include positive and negative. Valence refers to the emotional tone or sentiment of a piece of Ewom communication. In the context of Ewom, valence can range from positive to negative, and can influence consumer attitudes and behavior towards a product, service, or brand. For example, a positive Ewom message might praise the quality of a product, while a negative Ewom message might criticize it. Valence can also range from neutral to extreme, including extremely positive or extremely negative comments. The following hypothesis is proposed based on the above analysis.

H2：valence of Ewom positively affects consumer satisfaction.

2.6.3 Source of Ewom and Consumer satisfaction

Indeed, the characteristics of the information source play a crucial role in determining the persuasiveness of electronic word-of-mouth (Ewom). Attribution theory, a psychological theory, explains how individuals make attributions about the causes of behavior and how these attributions influence their judgments and evaluations. Brown's research has divided the dimension of source credibility into two aspects: site trustworthiness and credibility judgment of the poster's expertise

(Brown et al., 2007). Through the analysis of Source of Ewom and Consumer satisfaction, we put forward the following hypothesis.

H3：Source of Ewom positively affects consumer satisfaction.

2.6.4 The mediating role of brand awareness

Aaker (2020) defines brand awareness as the "consumer's capability to recognize and recall the brand across various scenarios." According to Keller (2013), brand awareness can indeed be evaluated using two variables: brand recognition and brand recall. Through the analysis of brand awareness, we put forward the following hypothesis.

H4：Brand awareness is not only a significant mediator but also a positive factor in the relationship between environmental awareness and consumer satisfaction.

The specific assumptions are summarized below (Table 1):

Table 1: Specific assumptions for research models

Number	Hypothesis
H1	volume of Ewom positively affects on consumer satisfaction.
H2	valence of Ewom positively affects consumer satisfaction.
H3	Source of Ewom positively affects consumer satisfaction.
H4	Brand awareness is not only a significant mediator but also a positive factor in the relationship between Ewom and consumer satisfaction.

3. Methodology

This study adopts the method of questionnaire survey for quantitative research design. The research will be conducted online in mainland China. The research examines the correlation between Ewom, brand recognition, and consumer contentment, utilizing a sample of WeChat (A Tencent product) users. Tencent is among China's most prosperous internet corporations and a top 500 global company. As WeChat, QQ, Tencent's software, has remained at the top of the download charts and has widespread use among all age groups, nearly all Chinese citizens are Tencent consumers (Negro, Balbi & Bory, 2020).

The sampling method will be a sampling of voluntary responses in non-probabilistic samples. The questionnaire will be distributed by the researchers to users and consumers via wechat. The sample data will be obtained by direct sampling and without repeated sampling. In other words, the study population will collect valid data from a voluntary questionnaire conducted through an online platform, which means that participants who do not meet the sample criteria will be excluded after the data collection.

The total number of users in wechat APP is 1.327 billion. This study used Taro Yamane's (2003) sampling formula to calculate the sample size. $n = \frac{N}{1 + N(e)^2}$ N means elements of sampling formula to calculate the sample size population, in this study was 1.327 billion, e means error of sampling, in this study was 5%. So the sample size were 400 respondents, on 0.05 margin of error, 95% confidence interval.

Based on previous studies on Ewom, the independent variable Ewom into three dimensions: E1-E5 are measures of volume of Ewom, E6-E10 aim to measure valence of Ewom, E11-E15 are measures of Source of Ewom. In combination with previous studies on brand awareness and consumer satisfaction, the researchers adopted mature and verified items. Questions B1-B3 are used to test brand awareness (mediating variable). S1-S5 is used to measure consumer satisfaction (dependent variable). (Table 2)

Table 2: item in questionnaire and basis

variable	Number	Item	Source
Ewom	E1	I mention quite frequently Tencent on social media.	(Anastasiei & Dospinescu, 2019)
	E2	In social media platforms, I mention Tencent's brand more than other competing brands.	
	E3	When I mention the Tencent brand in social media , I prefer to talk more about it.	
	E4	The more discussions in the comment section, the more popular the software and service.	(Lin et al., 2013)
	E5	When I see a brand that is discussed by many people, it will largely affect whether I make up my mind to buy its products and services.	(El-desouky,2011)
	E6	Although I use Tencent's series of products and services, I will not recommend to others to use or buy them on social media such as Weibo, WeChat, Douyin, etc.	(Anastasiei & Dospinescu, 2019)
	E7	When we talk about Tencent products and services on social media, I will advise my friends not to buy and use the products and services of this brand.	
	E8	The Tencent products and services I use have very high or very low ratings on professional download websites.	(Yaylı and Bayram, 2012)
	E9	When downloading software or buying services on professional websites, I tend to try products and services with consistent reviews, such as consistent positive reviews or consistent negative reviews.	
	E10	When downloading software or purchasing services in professional websites, it will be more convenient for me to choose the most suitable products and services for me if I have the ranking of the overall services and products.	
	E11	I think the online message maker or the speaker are competent in the subject we discuss	(Zainal et al., 2017)
	E12	I think the advices/information offered by the online message maker or the speaker in social media is honest and objective	
	E13	I consider most of the reviews that appear on social media about a product or service to be trustworthy.	
	E14	I think the advices/information offered by the online message maker or the speaker in social media is sincere	
	E15	I think most of the online message maker or the speaker in social media are concerned about the needs of the other members.	
Brand awareness	B1	I know exactly which brand parties I follow on social media such as Weibo, WeChat and Douyin.	(Büyükdağ, 2021)
	B2	Whenever, I can recall Tencent's icon and related products.	
	B3	I can quickly recognize the Tencent logo from other competing brands	
consumer satisfaction	S1	You are very satisfied with Tencent app that you used.	Bosque et al. (2008)
	S2	The Tencent app you bought and download meet all your requirements.	
	S3	You are satisfied with the service when you purchase and download Tencent app.	

	S4	You are satisfied with the price of the Tencent app.	
	S5	Your purchase and download exceeds your expectations in some way	

The questionnaire used in this study consists of two sections. The first part is about the understanding of personal information. The main part of the questionnaire is in the second part, which includes three measurement scales: Ewom, consumer satisfaction, and brand awareness. The Likert scale, with five levels of evaluation ranging from strongly disagree to strongly agree, was employed to measure the questionnaire. Each question was assigned a number from 1 to 5, with 1 representing strong disagreement and 5 representing strong agreement, with higher numbers indicating greater agreement.

The study employed a questionnaire to collect data, which was subsequently analysed and hypotheses tested using PLS-SEM 4.0 software. Structural equation modeling (SEM) is used in the study, which is a scientific and multivariate statistical analysis method that draws conclusions by establishing and testing hypotheses related to variables. It allows for the analysis and testing of linear relationships between latent variables. SEM was employed in this study to model the connection between Ewom, brand awareness, and consumer satisfaction, providing a comprehensive understanding of their relationships.

Prior to issuing the questionnaire, respondents were presented with approval and informed consent forms and were informed that their personal information would be kept strictly confidential and used for academic purposes only. In addition, there are no risks involved in this study. However, participants may have to spend their valuable time while giving sincere attention. It is also important that there is no conflict of interest or any form of financial subsidy from any sector during the course of this study. After answering all questions, respondents can click Submit on the questionnaire page to receive 5.00CNY e-cash.

4. Results and Discussion

The data in this paper were collected by the largest questionnaire collection platform in China, Questionnaire Star website. After 550 questionnaires were distributed, 529 questionnaires were actually collected, with a response rate of 96%. In the 529 questionnaires answered, the data that more than 10 consecutive options choose the same option is excluded, and the researcher has set a "trap question" for the questionnaire in advance, and the questionnaire with common sense errors in the "trap question" will be excluded. Finally, 494 effective questionnaires were selected, and the effective response rate was 90%. During the screening process, the fifth question (How often do you use social media) and the sixth question (How long do you use Tencent products and services, such as QQ, WeChat, Tencent client, etc., every day?) were set as trap questions, and questionnaires with the last option (never used) chosen were deemed invalid. A total of 35 invalid questionnaires were identified through data summary and analysis.

The part one in the questionnaire aimed to collect basic information (Table 3), which included gender, age, education level, income, frequency, and duration of using Tencent products. From the collected 529 questionnaires, 494 valid questionnaires were obtained by excluding those who chose the trap option or selected the same option for 10 consecutive questions. Among the respondents, 32.2% were male, and 67.8% were female. The age distribution of the samples is as follows: 18-24 years of age are the most, accounting for 50%, followed by 25-34 years of age, accounting for 22.7%, 35-44 and 45-54 years of age are decreasing in descending order, and the age of 55 and above is the least Yes, only 1.2%. In terms of education level, most of respondents had a college education, almost 67.4%. Regarding income, 39.5% earned less than 2000 RMB per month, 28.3% earned between 2000-5000 RMB per month, 22.1% earned between 5000-10000 RMB per month, and 10.1% earned more than 10000 RMB per month.

Table 3: Questionniare sample survey characteristics

Item	Category	Number	Percentage
Gender	Male	159	32.2%
	Female	335	67.8%
Age	18-24	247	50%
	25-34	112	22.7%
	35-44	106	16.4%
	45-54	48	9.7%
	above 55	6	1.2%
Education background	below high school	45	9.1%
	High school	67	13.6%
	Diploma/bachelor	333	67.4%
	Postgraduate	49	9.9%
Income	below 2000RMB	195	39.5%
	2000-5000	140	28.3%
	5000-10000	109	22.1%
	Above 10000	50	10.1%

Through the analysis of the author's basic information data, the proportion of female respondents is more than male. The age distribution is in line with wechat's main user group, which is mainly concentrated between 18 and 45 years old. The higher the proportion of respondents with higher education level, mostly with a bachelor's degree or above, they tend to focus on their level of satisfaction. The income level of most respondents is below 5,000 yuan, which is the average income level in ordinary Chinese cities. Therefore, from the data collection results, the collection of samples is reliable and scientific.

4.1. Descriptive Analysis

Table 4: Descriptive Analysis

Descriptive Statistics

	N	Range	Mean	Std. Deviation	Variance
volume of Ewom	494	4.0	3.283	.9862	.973
valence of Ewom	494	4.0	3.247	.9430	.889
Source of Ewom	494	4.0	3.234	.9711	.943
brand awareness	494	4.0	3.245	1.0751	1.156
consumer satisfaction	494	4.0	3.233	.9709	.943
Valid N (listwise)	494				

Among the 494 samples surveyed, the average score of volume of Ewom was 3.283 ($\pm$0.9862), the average score of valence of Ewom was 3.247 ($\pm$0.9430), and the average score of Source of Ewom was 3.234 ($\pm$0.9711). The average score of brand awareness is 3.245 ($\pm$1.0751) and the average score of consumer satisfaction is 3.233 ($\pm$0.9709). As can be seen from Table 4, all dimensions are slightly higher than the average level. (Table 4)

4.2. Reliability and validity analysis

The validity and reliability of a scale are directly influenced by its quality. Ensuring the accuracy and reliability of data is crucial for making informed decisions. Reliability analysis is used to evaluate the reliability and stability of questionnaires, and it can be used to test the internal consistency of the results obtained from measuring the same thing with a scale. Cronbach's alpha greater than 0.7 was regarded

as better reliability, and from the analysis, all variables had better reliability.

Validity is used to test the effectiveness of an individual's behavioral performance in a certain situation. This study used structural validity to verify the validity of the data, which is divided into discriminant validity and convergent validity. The lower the correlation between each measurement item, the higher the discriminant validity. Convergent validity was evaluated using Composite reliability (rho_c) and Average variance extracted (AVE), and the higher the correlation between each measurement item, the better the convergent validity. (Table 5)

Table5: Reliability and Validity analysis

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Brand Awareness	0.865	0.866	0.917	0.787
Consumer Satisfaction	0.887	0.893	0.917	0.688
Source of Ewom	0.887	0.89	0.917	0.687
Valence of Ewom	0.867	0.868	0.903	0.652
Volume of Ewom	0.893	0.896	0.921	0.699

4.3. Discriminant validity and correlation analysis

The discriminant validity of the variable data in this study was evaluated using the Fornell-Larcker criterion (FLC) and the heterotrait-monotrait ratio (HTMT). According to the FLC results, when the square root of the average variance extracted (AVE) for each latent variable is greater than its correlation with other variables, it indicates good discriminant validity among the variables.(Table 6)

Table 6: The Vernell-Lack Rule (FLC) results

	BA	CS	SE	VAE	VOE
BA	0.887				
CS	0.448	0.829			
SE	0.373	0.413	0.829		
VAE	0.411	0.444	0.441	0.807	
VOE	0.429	0.459	0.399	0.434	0.836

Abbreviation: BA: Brand Awareness; CS:Consumer satisfaction; SE:Source of Ewom; VAE:Valence of Ewom; AOE:Volume of Ewom

The analysis presented in the figure demonstrates that the correlation coefficients between each variable in the study are all below the square root of their respective Average Variance Extracted (AVE) values. During the examination of discriminant validity, the Average Variance Extracted (AVE) values for each latent variable were evaluated in relation to the inter-factor correlation coefficients. In this study, Brand exhibits an AVE of 0.887, exceeded the maximum absolute value 0.448. This suggests that Brand has good discriminant validity.

Similarly, All the AVE values of the other variables met the criteria, these findings support the conclusion that the latent variables in the study possess good discriminant validity. It indicates that the measures used for Brand Awareness, Consumer satisfaction, Source of Ewom, Volume of Ewom and Valence of Ewom capture distinct aspects or dimensions of the constructs they represent and are not highly correlated or overlapping.

Table 7: HTMT result

	BA	CS	VAE	VOE	SE
BA	-				
CS	0.501	-			

VAE	0.469	0.491	-	
VOE	0.482	0.495	0.481	-
SE	0.416	0.45	0.494	0.432	-

Abbreviation: BA: Brand Awareness; CS:Consumer satisfaction; SE:Source of Ewom; VAE:Valence of Ewom; AOE:Volume of Ewom

The results of the HTMT (Heterotrait-Monotrait) test provide insights into the discriminant validity between latent variables in the structural model. In this study, the correlation coefficients between variables, as shown in the table above, are all less than 0.900. According to the accepted criteria, this indicates that the structural model demonstrates good discriminant validity(Table 7).

4.4. PLS-SEM result diagram

Smart PLS4.0 was used to calculate the research model and obtain the relevant parameters to examine the relationships between latent variables and manifest variables, as well as between latent variables. This was done to verify the research model presented in this paper. The results for model fit and path coefficients are presented below.(Fig 4)
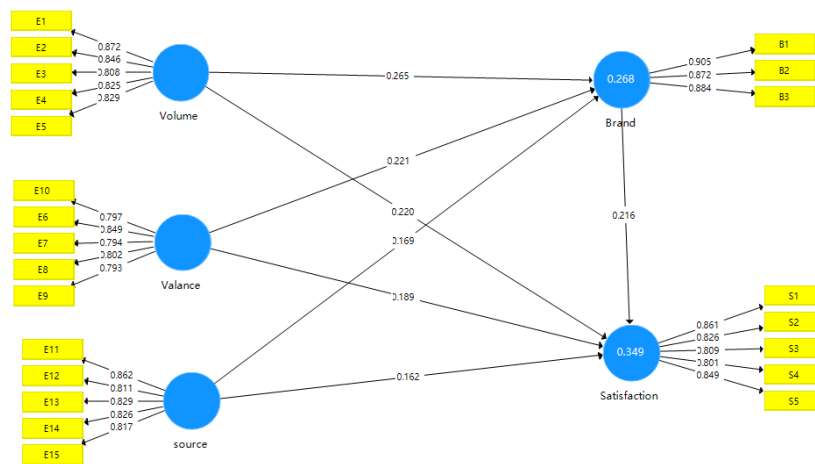

Fig 4: PLS-SEM result diagram

Table 8: Testing of model assumptions

Adaptation index	parameter values	Suggest the standard
Range of R^2	0.337~0.510	-
Adjusted R^2 value	0.336~0.05	-
Range of VIF	1.980~3.453	<5.00
SRMR	0.048	<0.08
d_ULS	1.530，95%[0.213]	Does not fall within the 95% confidence interval
d_G	0.462，95%[0.470]	Does not fall within the 95% confidence interval
chi-square value	1282.436	-
NFI	0.902	>0.90

Table 9: model fit

	R-square	R-square adjusted
Brand Awareness	0.268	0.263
Consumer satisfaction	0.349	0.343

The evaluation of the SmartPLS model primarily includes two aspects: model fit assessment and model hypothesis testing.(Table 8, Table 9) Regarding the model fit assessment for this study, the results indicate that the R2 values for each predicted variable are 0.263 and 0.343, with significant p-values of 0.000, which are less than 0.05. This suggests that the respective combinations of independent variables have a high level of explanatory power for each predicted variable.

In addition to the previously mentioned fit indices, there are other model fit indices used to evaluate the goodness of fit for the structural model in a study. These include SRMR, d_ULS, d_G and NFI. When these additional fit indices, such as SRMR, d_ULS, d_G, and NFI, meet the recommended criteria (e.g., SRMR < 0.08, d_ULS < 0.10, d_G < 0.10, NFI > 0.90), it indicates that the structural model in the study fits the observed data well. This shows that the relationship between variables in the model is supported by data and the results are reliable.

4.5. The results of the path coefficient test

Table 10:The results of the path coefficient test

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ($|O/STDEV|$)	P values
BA -> CS	0.216	0.215	0.046	4.653	0.000
SE -> BA	0.169	0.169	0.047	3.588	0.000
SE -> CS	0.162	0.163	0.050	3.264	0.001
VAE -> BA	0.221	0.223	0.048	4.630	0.000
VAE -> CS	0.189	0.190	0.047	3.978	0.000
VOE -> BA	0.265	0.265	0.049	5.448	0.000
VOE -> CS	0.220	0.220	0.047	4.702	0.000

Abbreviation: BA: Brand Awareness; CS:Consumer satisfaction; SE:Source of Ewom; VAE:Valence of Ewom; AOE:Volume of Ewom

The results of the analysis in Table 10 indicate the following significant findings: the results of the data show that brand awareness and consumer satisfaction (β=0.216, p<0.05), the source of Ewom, sound volume and Valence are respectively related to consumer satisfaction (β=0.162, p<0.05; β=0.220, p<0.05; β=0.189, p<0.05) and brand awareness (β=0.169, p<0.05; β=0.265, p<0.05; β=0.221, p<0.05) had positive and significant effects. These findings suggest that Source of Ewom, Valence of Ewom, and Volume of Ewom all have significant positive effects on Consumer Satisfaction. H1,H2,H3 are accept. At the same time, it also proves once again that brand awareness has a significant positive impact on consumer satisfaction(Sudirman et al., 2021).

Table 11: The results of the mediation analysis

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ($|O/STDEV|$)	P values
VOE -> BA -> CS	0.057	0.057	0.017	3.390	0.001

SE -> BA -> CS	0.037	0.037	0.013	2.730	0.006
VAE -> BA -> CS	0.048	0.048	0.013	3.559	0.000

The results of the mediation analysis (Table 11) show that in the mediating path "volume of Ewom -> Brand Awareness -> Consumer Satisfaction", the mediating effect of Brand is 0.057 (P < 0.05), and it reaches a significant level, mediating effect is established. Similarly, Brand Awareness in the path"valance of Ewom -> Brand Awareness -> Consumer Satisfaction" and "Source of Ewom -> Brand Awareness -> Consumer Satisfaction",mediating effect is established. H4 is accept.

4.6. Discussion

Through data analysis, H1-H4 was established. Consistent with the results of previous studies, Ewom's valance has an impact on customer satisfaction. Positive comments can increase customer satisfaction, while negative or negative comments can reduce customer satisfaction with the brand or even make consumers lose interest (Guo and Nakata, 2019). The volume of Ewom also has a positive relationship with consumer satisfaction. When there is more discussion on the Internet, consumer satisfaction will be increased. Given the actual situation, which does happen, For example, In July 2021, the Chinese sports brand Hongxing Erke donated goods worth 50 million yuan after suffering a loss of 200 million yuan in the China floods. This event was exposed on Weibo, attracting 9.41 million likes and 286,000 comments, followed by a buying spree. This is a good reality. Of course, if it is a lot of negative discussion, it may get the company into a lot of trouble. The source reliability of Ewom also attracts more and more consumers' attention. With the increasing number of social media, it is more difficult for people to identify online comments and comments. Therefore, comments or news sent by an objective, fair and scientific channel will be more popular, including some opinion leaders, Internet celebrities, celebrities, etc. It also includes the company's own official account and other official channels. Finally, the experiment also verifies the mediating role of brand awareness. When consumers face familiar brands, they will not help but increase their satisfaction. Therefore, when familiar brands are in crisis, consumers will pay more attention to specific online events and word of mouth, which may form an "invisible" protection for brands in a certain sense.

Based on these research results, some suggestions can be made for enterprises. First of all, enterprises should strengthen the management and guidance of ewom, especially marketing and promotion on online platforms and social media. In particular, the company's own official account should often interact with netizens and fans online and take the initiative to join the discussion about its own brand. You should also have the ability to spot positive events in your brand.

Secondly, enterprises should give priority to establishing and maintaining brand awareness, improving consumers' cognition and trust in the brand, and ultimately improving consumers' satisfaction with the products or services provided. When encountering problems about consumers, we should respond to customers' demands in a timely and positive manner. In order to enhance their brand awareness, daily advertising promotion is also essential.

Finally, businesses must recognize that ewom's impact on consumer satisfaction is complex and diverse, requiring targeted strategies and measures to effectively manage and direct the spread of ewom. When positive events are found, enterprises should seize the opportunity to use highly exposed accounts such as official accounts, KOL or star accounts to discuss and do a good job of secondary marketing.

In theory, it provides a more comprehensive model, especially in the measurement of Ewom. Consumers are concerned about the Ewom source of the APP. If they think the source is problematic, they will question the Ewom, thus affecting the degree of satisfaction with the APP. Furthermore, from a practical perspective, this study is highly relevant and relevant for marketing professionals. By exploring Ewom and its quantity, valence, source and other aspects of influence, can increase the number of word of mouth, especially in the APP download platform message, reply and discuss number,

at the same time should rely on the official channels, or has the objectivity of some KOL promotion and introduction effect will be better, because there is a clear source and reliability. At the same time, enterprises can also improve their brand awareness through advertising and other means, so as to improve consumer satisfaction.

5.Conclusion

This study makes important theoretical contributions by validating a model that links Ewom to consumer satisfaction, mediated by brand awareness, specifically for mobile apps. It highlights the need for app businesses to actively manage Ewom and focus on brand-building. Practical measures are proposed such as Strengthen their management and guidance of Ewom, especially account management in online platforms and social media where they engage in marketing and promotion, and should respond promptly and positively to discussions and comments. Enterprises should also prioritize the establishment and maintenance of brand awareness in order to improve consumer awareness and trust in the brand. Finally, enterprises must realize that Ewom's impact on consumer satisfaction is complex and diverse, and need targeted strategies and measures to effectively manage and guide Ewom's dissemination. For example, when a positive event is found, they should know how to make use of the event, increase the number of comments, select more professional accounts for dissemination, and do a good job in secondary marketing. Nevertheless, this study does have certain limitations. Firstly, its findings may lack external validity due to its focus on a particular industry and sample. Secondly, the study solely investigates the mediating role of brand awareness and does not consider other potential mediating variables. Lastly, a cross-sectional design used in this research, which cannot observe changes over time and therefore does not account for long-term effects. These issues need to be considered and addressed in future research.

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