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Marketing Strategies and Digital Mental Healthcare Consumption in Guangxi, China: The Mediating Role of Customer Perception and Digital Technology

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Abstract

Background and Aim: Chinese mental healthcare providers increasingly adopt digital technologies to address mental distress. This study examines how marketing strategies influence digital mental healthcare consumption among young adults (18-25) in Guangxi, China, focusing on the mediating roles of customer perception and digital technology.

Methodology: Data were collected from 735 young adults aged 18-25. To capture an effective sample, the survey was distributed to psychological counseling centers in universities to sample those who have used digital mental healthcare services. Structural equation modeling and the Bootstrap Test were used as statistical analyses.

Results: More than 30% of young adults consumed digital mental healthcare through Apps, web-based. Female respondents dominantly used digital mental healthcare (72.9% - 86.6%). Marketing strategy indirectly affected consuming behavior, significantly mediated by digital technology ($\beta = 0.553$, 95% CI [0.435, 0.655] in the urban population dominated model; $\beta = 0.110$, 95% CI [0.035, 0.174] in the rural population dominated model) and customer perception ($\beta = 0.084$, 95% CI [0016, 0.152] and 0.090, 95% CI [0.042, 0.148], respectively). Digital technology's mediating effect significantly outweighed customer perception in the urban population-dominated model, while exhibiting no significantly greater effect size in the rural population-dominated model.

Conclusion: Our empirical findings provide novel insights into the patterns of out-of-pocket consumption on digital mental healthcare. Specifically, the study highlights the mediating roles of digital technology and customer perception in shaping consumer behavior. These factors not only influence the willingness to pay but also affect the perceived accessibility, trust, and effectiveness of such services, thereby offering a more nuanced understanding of out-of-pocket consumption in the digital healthcare landscape.

Keywords: Marketing Strategies; Digital Mental Healthcare; Consumption; Mediating Role

Introduction

The rising prevalence of mental health disorders among young adults has become a pressing public health issue globally, with China witnessing a significant burden in this area. Recent national reports reveal that 24.1% of individuals aged 18–24 in China are at risk of depression (CCMHAD, 2021). Compounding this challenge is the country's low mental health workforce density of just 2.8 mental health professionals per 100,000 people compared to 44.8 in European nations (WHO, 2020). These systemic limitations in accessibility and affordability have catalyzed the growth of digital mental healthcare (DMH), offering scalable and round-the-clock support through technologies such as mobile apps, web platforms, and telepsychiatry (Bond et al., 2023; Torous et al., 2021). The digital transformation of mental health services has been accelerated by the COVID-19 pandemic. At the Center for Addiction and Mental Health (CAMH), the largest psychiatric hospital in Canada, virtual mental care increased from about 350 per month to almost 3000, which means an increase of over 850% from March to April 2020(American Psychiatric Association, 2023; Ben-Zeev, 2020). American psychiatrists also expressed that all of them changed to fully virtual practices because of the COVID-19 pandemic (Gratzer, Torous et al. 2021). In China, 31% of digital mental healthcare users are aged between 14 and 25 (PDHT, 2022). Digital mental healthcare marketization can be an effective solution to relieve the public mental health burden. The young generation is labeled “digital natives” who tend to turn to the internet for mental help. Market potential of digital healthcare drives the

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providers to seize the market by effective marketing (Ali & Anwar, 2021; Kannan, 2017). Guangxi is a mountainous provincial region with vast rural areas in the southwest of China. The combination of urban and rural areas makes Guangxi a representative region for digital mental healthcare marketing and consumption promotion in China, as well as some countries in Southeast Asia.

Marketing research has been structured and explored in various industries. For example, while traditional transaction marketing centered around the 4Ps (product, price, place, and promotion) continues to drive customer acquisition, relationship marketing approaches that build trust through social media engagement and electronic word-of-mouth (EWOM) are gaining prominence (Grönroos, 1984; Zhang & Luo, 2024). Besides, digital technologies are evolving rapidly to shape the market. It not only facilitates service delivery but also shapes consumers' readiness to consume digital mental healthcare through digital literacy and technology acceptance (Camacho & Torous, 2023; Song et al., 2021). Meanwhile, customer perception exerts a substantial impact on consumer behavior, particularly in health services where trust and privacy are paramount (Souki et al., 2020; Akbarialiabad et al., 2021). However, seldom does empirical research focus on the marketing strategy in the context of digital mental healthcare. This study addresses this gap by examining how marketing strategies affect digital mental healthcare consumption among young adults in Guangxi, China, with a particular focus on the mediating roles of digital technology and customer perception. By doing so, it contributes novel insights into consumer behavior in the emerging out-of-pocket digital mental healthcare market and offers implications for designing ethical, effective, and technologically grounded marketing strategies.

Literature Review

China is facing a growing burden of mental healthcare demands. This burden can be mirrored by the high detection rate of depression risk among young adults aged 18-24, which stands at 24.1% (China National Center for Mental Health Assessment and Development, 2021). It is noteworthy that mental illness contributes the most to the loss of gross domestic product among all non-communicable diseases, accounting for 35% of the global economic burden, with 50% of mental health disorders first emerging before age 15 and 75% by age 25(Bloom et al., 2012). Mental disorders are common in young people, with more than 50% impacted by the age of 25 (Caspi et al., 2020). Another burden lies in the cost of mental health disorders, which will rise to \$6 trillion by 2030, and 58 % of which will be borne by low- and middle-income countries (Marquez & Saxena, 2016). These challenges call for improvements and new efforts to bridge the treatment gap. Digital mental healthcare is a potential solution that is available 24/7.

Digital Mental Healthcare (DMH) is an emerging field that applies digital technologies in mental healthcare assessment, support, prevention, and treatment. It includes the use of asynchronous mobile technologies, such as smartphone apps, text messaging, email, and online forums, to improve health outcomes through convenient, patient-driven access to mental health support and self-management tools (Bond et al., 2023; Ramos et al., 2024; Torous et al., 2021). It is a fluid and actionable tool that may help enhance mental healthcare like a 'digital glue' but not a substitute for traditional, highly qualified face-to-face mental healthcare (Bond et al., 2023).

Young adults are coined 'digital natives' and like to turn to digital for help. About 31% of the Chinese users of DMH are the youth aged 14-25 (People's Daily Health Times, 2022). Digital technologies have become an important engine to underpin young adults' mental healthcare (McGorry et al., 2022). Akin to other countries (e.g., the United States with 12 million plan members, which now delivers 90% of its psychiatric care virtually), China has begun utilizing the digital platform at a much larger scale since the COVID-19 pandemic (American Psychiatric Association, 2023; Ben-Zeev, 2020; Choudhary et al., 2024). However, previous research rarely explored the mental health issue from the perspective of the market versus. The growing number of DMH customers choose to consume mental healthcare in the out-of-pocket market. That means the vast potential of the DMH market to address the growing mental health burden. The research objective is to explore effective marketing strategies to promote the out-of-pocket DMH consumption. Especially, to explore the latent effect of digital technology and customer perception

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influencing young adults' response to DMH marketing strategies. To structurally examine the core factors influencing the DMH marketing strategy and consumption, the research literature review is divided into four parts as follows:

1. Marketing Strategy of Digital Mental Healthcare

There are two main streams of marketing strategies. Transaction marketing is a strategy that focuses on quick deals. A classic theory of transaction marketing is the 4 Ps marketing mix model, which tangibly divides marketing strategies into product, price, place, and promotion. Pricing strategy, digital coupons, and free trial settings are proven to have a significant positive impact on quick deals (Hamilton et al., 2024; Luo & Hancock, 2020). Another is the relationship marketing, which focuses more on the interaction between customers and companies or other stakeholders (Grönroos, 1984; Magrath, 1986; Rafiq et al., 1995). Several studies focusing on relationships were launched. For example, the perceived electronic word of Mouth (EWOM) marketing and social media marketing are certified to have a positive effect on the consumption of DMH (Mannan et al., 2019; Zhang & Luo, 2024). The two streams of marketing strategies could differ in the influence on the DMH market, in that the quick pricing strategy seems to lack a merciful and kind relationship foundation if merely transactional marketing is applied. Based on the positive effect of transaction pricing strategy and relation-based (e.g., social media marketing, etc.) on DMH consumption, H1 is proposed:

H1: Marketing strategy has a positive direct effect on DMH consumption.

2. Digital Technology's Role

Digital technology has a dual role. One role lies in the fact that digital technology has a direct positive impact on the economy (Kannan, 2017; Li et al., 2020). In this view, digital technology directly pushed mental healthcare to be delivered through six remote ways: Apps, Email, Telephone and/or Audio Call, Text, Videoconferencing, and Web-based (McCord et al., 2020). Furthermore, smartphone ownership (95.5%) and access to the internet (82.1%) are the highest technologies reported (Zhang et al., 2023). The other role is that technology has an indirect impact on consuming behavior through digital literacy and technology acceptance. People with high digital skills and acceptance tend to be more adapted to DMH. This was confirmed by empirical research that digital literacy training helped mental illness patients significantly improve self-reported outcomes (Camacho & Torous, 2023). And Perceived Usefulness (PE) and Perceived Ease of Use (PEOU) significantly predicted consumers' attitudes (Song et al., 2021). Akin to the positive effect of digital literacy on DMH adoption, technology acceptance's role in the DMH marketing and consumption could be further tested. In summary, digital technology could have two roles in DMH consuming behavior(direct and indirect roles). Based on this, H2 is proposed:

H2: Digital technology is a positive mediator in the relationship between marketing strategy and consumer behavior.

3. Customer Perception's Role

Consumer perception has a directly crucial impact on consuming behavior, willingness, and brand loyalty in brick-and-mortar and service industries (Souki et al., 2020). Customers tended to perceive risks in low price campaigns and disturbing messages from DMH marketers (e.g., privacy risk) (Akbarialiabad et al., 2021). When customers perceived risk, it was surely for them to avoid trusting the companies unless the perceived benefits were worth it. That implies the indirect role of perceived risk between the marketing stimulus and the consuming response. Extant customer perception research focused on two directions: risk avoidance and benefit pursuit. For further investigation of the elements of risk and benefit, a wealth of research was conducted. The consistent points of this research on perceived risk and perceived value are: perceived risk hurts consuming behavior (Kamalul Ariffin et al., 2018; Mitchell, 1999); both perceived value and perceived quality have a positive mediating effect between marketing strategy and consuming behavior (Habibi & Rasoolimanesh, 2021; Mannan et al., 2019; Souki et al., 2020). Based on this, H3 is proposed:

H3: Customer perception is a positive mediator of the relationship between marketing strategy and consumption behavior.

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4. Consuming Behavior of Digital Mental Healthcare

To date, most research has focused on the consuming behavior of seeking treatment (Goodday et al., 2023; Zhang et al., 2023). Consumption is a complex concept, especially in a digital world (Belk & Russell, 1975; Belk, 2013; Holt, 1995). Treatment experience is not the only consuming intention for DMH. In this vein, some seek a sense of belonging or even for play (e.g., a kind of Einstein's 'brain' is popular before exam anxiety online) (Hamilton et al., 2024; Luo & Hancock, 2020). The state-of-art research of DHM consuming behavior had structural similarity with Holt's classical four-dimensional typology model, which proposed consuming behavior as:1)Consuming as Experience: in this dimension, the consumption itself becomes an experience through which the consumer obtains pleasure, excitement or other emotional satisfaction; 2)Consuming as Integration: in this dimension, consumption helps individuals integrate into social groups and build and maintain social relationships; 3)Consuming as Classification: consumers express their social status and taste by buying and using certain brands or goods to distinguish themselves from other social groups; 4)Consuming as Play, this dimension emphasizes that consumption can be a way to escape the stress and routine of daily life, providing consumers with fun and entertainment(Holt, 1995).

In summary, digital mental healthcare is an emerging field(Bond et al., 2023). Observational or empirical studies have rarely been conducted from the perspective of marketing. In the literature review of the four factors involved in DMH marketing and consumption, it was found that the influence of marketing strategy, digital technology, and customer perception delved into the specific field of DMH(e.g., six remote modalities for DMH were proposed, and social media has a positive effect on DMH consumption). However, scarce empirical studies were found to synthetically explore the complicated factors in the process of the marketing strategic stimulus-consuming behavioral response in the theory of the consumer behavior model. Therefore, this paper aims to address the research gap with empirical research in the DMH marketing and consumption. Especially, the joint roles of customer perception and digital technology on an empirical evidence basis.

Theoretical Model and Hypothesis

This paper aims to delve into the relationship between marketing strategy, consuming behavior, and these psychological factors in the context of the DMH industry. And further explore the mediating role of digital technology and customer perception. Given the literature review, four concepts are introduced to measure. The concept of marketing strategy is divided into transaction marketing and relationship marketing. The concept of customer perception consists of perceived risk, perceived value, and perceived quality. The concept of digital technology is divided into digital technology preference, technology acceptance, and digital literacy. The concept of consumption consists of four dimensions: experience, integration, classification, and play. Based on the concept involved, hypotheses are proposed:

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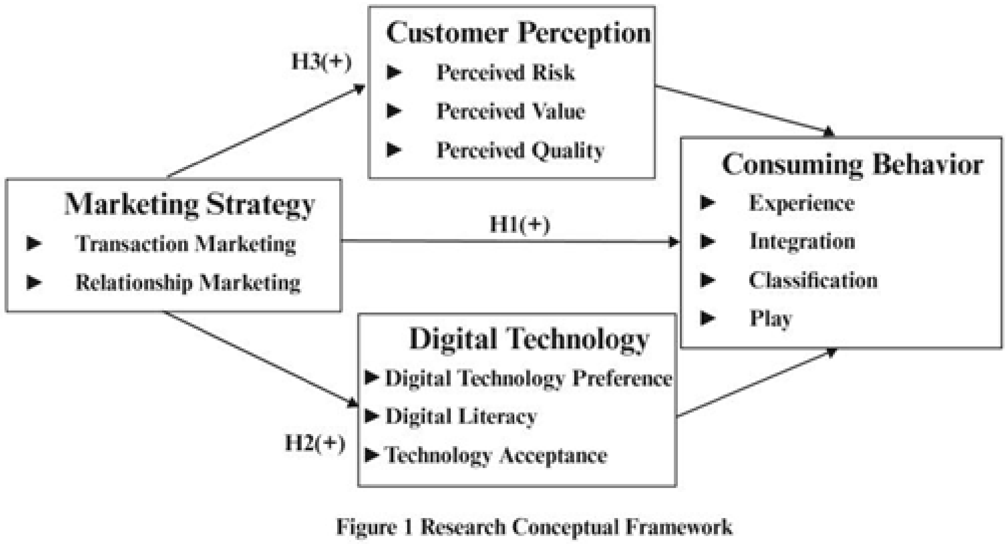

Figure 1 The Conceptual Framework

Research design

1. Population and Sampling

The sample is young adults who had used the DMH service before, and a convenience sampling method is used. Because the actual population of young adults aged 18-25 in Guangxi are not given, a sample size of about 385 can be calculated according to Cochran's formula [error level e = 0.05, when estimated proportion of the population p = 0.5, the sample size reached the maximum size required, so in this formula, p is valued 0.5, and then z is valued 1.96(two-tailed)]. Therefore, it is acceptable to collect a minimum sample size of 385.

2. Research Tool

A 92-item questionnaire is extracted from previous scales related to the research concepts as a research tool. The questionnaire was scored with Item-Object Consistency (IOC) by 3 experts using a 3-point Likert scale (+1 represents "The item accurately measures the objective"; 0 represents “Uncertain whether the item measures the objective”; -1 indicates “The item does not measure the objective”). Items with a score equal to or greater than 0.6 will be introduced in the formal questionnaire. As a result, 72 out of 92 items were confirmed by experts.

These 72 items are edited into an online anonymous questionnaire consisting of three sections. The first section consists of the items for collecting demographic characteristics (e.g., consuming channel, gender, expenditure per month, mental health level). The mental health level of the respondents is evaluated by the Depression Anxiety Stress Scales 21(DASS-21). DASS-21 contains 21 items corresponding to three sub-scales of depression, anxiety, and stress, each of which contains 7 items (Henry & Crawford, 2005; Wang et al., 2020). The second section includes screening items for excluding attention distraction and those who have not used DMH, while the third section contains items compiled as a 5-point Likert scale covering four research concepts of marketing strategy, consuming behavior, digital technology, and customer perception in the DMH market.

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3. Sampling Data Collection

Then, a pretest was conducted with a sample of 40 according to the 1 in 10 rule, that is, one-tenth of the total sample. The respondents were young adults aged 18-25. The pretest yielded a Cronbach's Alpha score of 0.992, indicating excellent internal reliability of the research(Tavakol & Dennick, 2011). In the formal survey, convenience sampling was used to survey the respondents. The respondents were mostly recruited from the counseling centers of universities. Due to the accessibility distinct of digital technologies between urban and rural areas, an equal proportion of respondents living in urban and rural areas is expected to be sampled. However, the first survey collected more respondents who lived in urban areas, so a second sample was launched with a one-month interval. As a result, a total sample of 810 was collected, with 419 samples in the first survey and 391 samples in the second. That caters to the minimum sample size of 385, as aforementioned.

4. Data Analysis

A series of data cleaning processes was employed to exclude data deviations or prepare the data for further analysis. These processes include outlier assessment, common method deviation(Harman's one single-factor test), and the normal distribution test. Moreover, to ensure the reliability and validity of the scale, Cronbach's alpha and Bartlett's sphericity test value were checked. In terms of the research hypothesis, firstly, considering the sample size, Covariance-Based Structural Equation Modeling (SEM) was conducted to check the factors and fitness of the empirical model. Secondly, a Bootstrap Method was used to compare the effect size of the mediators(Mackinnon et al., 2002; Mackinnon et al., 2004; Preacher & Hayes, 2008).

Results and Discussion

1. Descriptive results

This research consisted of 810 eligible respondents, but after outlier assessment, the valid sample was reduced to 735 respondents. Finally, the first survey covered 406 valid questionnaires, while the second survey covered another 329 valid questionnaires. The sample covered respondents of different consuming channels, genders, areas, expenditure per month, and mental health level (See Table 1). Regarding the consuming channel proposed according to the consolidated model for telepsychology practice (McCord et al., 2020), Apps ranks as the most popular digital technology for young adults, accounting for 36.7% in the first survey and 37.4% in the second survey, while web-based takes the second place and e-mails takes the last place. E-mails have almost negligible usage (0.0% and 0.3%) as a consumption channel. That indicates that emails have gone out of the young adults' routine of DMH and have been pushed to a consideration for channel management in DMH marketing. In terms of gender, female respondents constitute 72.9% in the first survey and 86.6% in the second survey, indicating a high level of participation among women in this research. Concerning the area, urban area respondents outnumber those living in rural areas in the first survey, with 64.8% versus 35.2%, while the reverse with 46.2% versus 53.8% in the second. In terms of expenditure distribution, 1001-1500¥ reflects the dominant position. Given that the mental health level, middle score level constitutes 46.6% in the first survey versus 49.8% in the second survey, outnumbering the other two levels. When comparing the two surveys, a Pearson Chi-square test is conducted to check the diversity of the two samples. A significant difference is reported for gender ($\chi 2 = 20.63$, df = 1, $p < 0.000$***) and for area ($\chi 2 = 25.53$, df = 1, $p < 0.000$***) between the two surveys, while the consuming channel, expenditure, and mental health level showcase no significant difference between the two surveys. In summary, the sample of this research shows diversity in the consuming channel, gender, expenditure, and mental health level. Gender and area have significant disparities in demographic characteristics.

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Table 1 Demographic Characteristics (n=735)

Variables	**The first survey (N=406)**	**The second survey (N=329)**			
	Frequency (%)	**Frequency (%)**	*χ2*	*df*	*p*
Consuming channel			2.29	5	0.81
APPs	149(36.7)	123(37.4)			
E-mails	0(0.0)	1(0.3)			
Mobile phone	105(25.9)	82(24.9)			
Text message	13(3.2)	14(4.3)			
Video conferencing	11(2.7)	11(3.3)			
Wed-based	128(31.5)	98(29.8)			
Gender			20.63	1	0.000***
Female	296(72.9)	285(86.6)			
Male	110(27.1)	44(13.4)			
Area			25.53	1	0.000***
Urban area	263(64.8)	152(46.2)			
Rural area	143(35.2)	177(53.8)			
Expenditure per month			1.28	5	0.94
Lower than 500¥	11(2.7)	10(3.0)			
501-1000¥	74(18.2)	65(19.8)			
1001-1500¥	175(43.1)	135(41.0)			
1501-2000¥	96(23.6)	72(21.9)			
2001-2500¥	25(6.2)	23(7.0)			
Higher than 2500¥	25(6.2)	24(7.3)			
Mental health level			0.98	2	0.61
Low score level	103(25.4)	82(24.9)			
Middle score level	189(46.6)	164(49.8)			
High score level	114(28.1)	83(25.2)			

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Note: The symbol *** denotes p<0.01. In the mental health level, a low score level denotes below the 25th percentile, a middle score level denotes 25%-75% percentile, and a high score level denotes above 75% percentile.

The mean scores were compared among marketing strategy, customer perception, digital technology, and consuming behavior. The mean score for customer perception indicated no significant difference in the mean score (standard deviation, SD) 80.10(15.53) for the first survey respondents versus 78.13(10.12) for the second survey respondents. Similarly, no significant difference was noted for consuming behavior, with a mean score of 37.85(7.77) for the first survey respondents and 37.22(5.63) for the second survey respondents. However, the mean score for marketing strategy was significantly higher for the first survey respondents [89.55(19.14)] versus the second survey respondents [63.70(11.92); $t = 22.38$, $p < 0.05$]. Moreover, the mean score for digital technology of the first survey respondents, 76.66(14.48), was higher than that of the second survey respondents [49.25(8.50); $t = 31.95$, $p < 0.05$]. These disparities in DMHS marketing strategy perception between urban and rural areas in Guangxi confirm the role of local perception in marketing of rural areas in previous studies. The perception of marketing in rural areas is influenced by social and economic factors such as local communication, experience, and reputation influence, and localized marketing strategies are needed to influence consumption decisions in rural areas(Giles, Bosworth et al. 2013). In the same lines, digital technology means scores differ between urban and rural areas, indicating the disparities of digital technology preference, digital literacy, and technological acceptance make it difficult to 'copy-paste' city marketing strategies onto rural areas.

2. Structural Equation Modeling Results

The Cronbach's alpha coefficient for the overall questionnaire was 0.982, indicating excellent reliability and consistency. To further check the validity, KMO and Bartlett's Test were conducted. As a result, the KMO stands at 0.961 for the first survey and 0.879 for the second survey, and the p-values of Bartlett's Test in the two surveys were less than 0.01, which showed that the scale had excellent internal consistency and was suitable for extracting factors. The structural equation model (SEM) reveals the relationship among the four variables involved. The empirical data from the two surveys are used to examine the research concept framework model. The sample of the first survey is urban population dominated (64.8%), so the SEM model of it is named a "urban population dominated model" (See figure 2). In the same vein, the second survey is rural population dominated; therefore, the SEM model is named a "rural population dominated model" (see Figure 3). According to previous studies, a good model fitness is indicated when Chi-square/degree of freedom is less than 5(reasonable fit), GFI (goodness of fit index), AGFI (Adjusted Goodness of fit index), CFI (comparative fit index), and TLI(Tucker Lewis index) are all greater than 0.90, and RMSEA (root-mean-square error of approximation) is less than 0.08(reasonable fit)(Faturohman et al., 2021; Intarot & Beokhaimook, 2018). The criteria of the urban population dominated model met the standard ($\chi 2/ df = 3.450$, GFI = 0.941, AGFI = 0.900, CFI = 0.975, TLI = 0.974, RMSEA = 0.078). Akin to that, the criteria of the rural population dominated model met the standard value too ($\chi 2/ df = 2.470$, GFI = 0.948, AGFI = 0.910, CFI = 0.971, TLI = 0.957, RMSEA = 0.066). Namely, both models pass the standard criteria for SEM.

To further examine the two models, the two full models are compared. The consistency lies in the following points:

1) In the urban population dominated model, marketing strategy positively affects digital technology with a regression weight $\beta= 0.908$, $p < 0.01$. Furthermore, the application of digital technology has a positive effect on consuming behavior with $\beta= 0.961$, $p < 0.01$. In the rural population dominated model, marketing strategy positively affects the application of digital technology ($\beta= 0.964$, $p < 0.01$) while digital technology has a positive effect on consuming behavior with $\beta= 0.535$, $p < 0.05$. Because the product of

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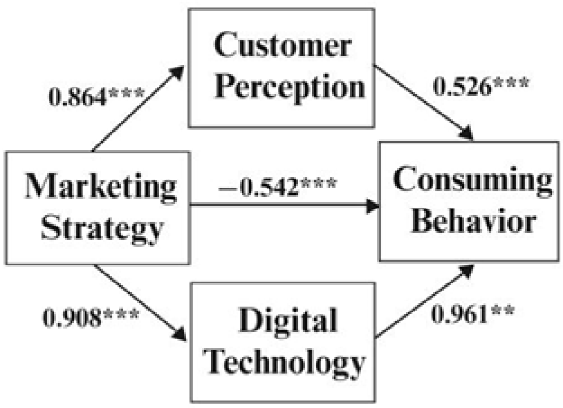
standardized regression weights of the two paths is positive, and the P-values of the two paths are both significant in the two models, digital technology has a positive effect on the relationship between marketing strategy and consuming behavior. Therefore, the result supports H2.

2) As for the urban population dominated model, marketing strategy has a positive effect on customer perception with β= 0.864, $p < 0.01$. Moreover, Consuming perception has a positive effect on consuming behavior with β= 0.526, $p < 0.01$. As for the rural population dominated model, marketing strategy has a positive effect on customer perception with β= 0.864, $p < 0.01$. Moreover, Consuming perception has a positive effect on consuming behavior with β= 0.229, $p < 0.01$. Given that the product of standardized regression coefficients of the two paths in the two models is positive and the p-values of the two paths are significant, customer perception is a positive mediator of the relationship between marketing strategy and consuming behavior, which confirms the research hypothesis H3.



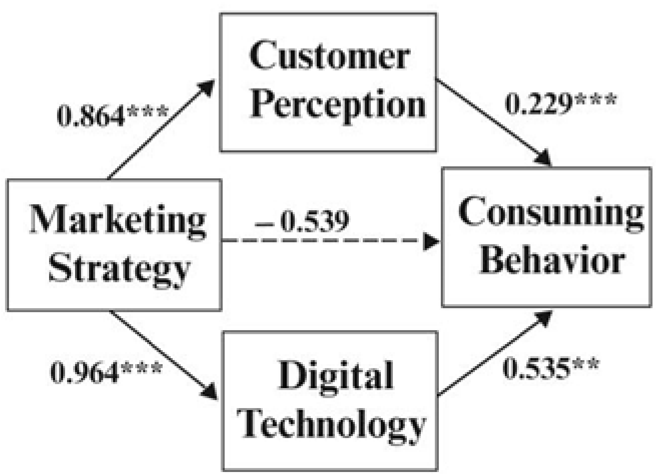


Figure 3 Rural population dominated model

However, there is a difference between the two models. In the urban population dominated model, marketing strategy exhibits significant positive direct effects on consuming behavior with β= -0.542, $p < 0.01$, whilst marketing strategy has no significant effect on consuming behavior for the rural population dominated model($p > 0.05$). Thus, the SEM result rejects H1 in that marketing strategy has a significant

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negative effect on consumer behavior for the urban population-dominated model, while marketing strategy has no significant effect on consumer behavior for the rural population-dominated model. The negative effect of marketing strategy and consuming behavior in the urban population-dominated model indicates a counter-effect of marketing strategy on the sensitive customer perception and the advanced digital technology urban area. The absence of the direct effect between marketing strategy and consuming behavior for the rural population dominated model implies that young adults in rural areas may not be as sensitive to marketing strategies and marketers may not solely rely on direct "push" strategies, but rather focus on improving local "customer perception" and "digital technology", which act as significant mediators.

3. The Bootstrap Test Results

In order to further test the effect of mediators, a Bootstrap Test is conducted. This research follows Preacher & Hayes to conduct a Bootstrap test with 5000 bootstrap samples. The Bootstrap test is considered to be more robust and accurate in evaluating mediating effects, especially when the sample size is small or the effect distribution deviates from the normal distribution. If the confidence interval does not contain 0, there is a significant effect on the path(Mackinnon et al., 2002; Mackinnon et al., 2004; Preacher & Hayes, 2008).

As a result, the threshold of all paths is processed (See Table 2).

Table 2 Results of the Bootstrap Method

Path	Urban population dominated model(n=406)				
	Effects	S.E.	95%CI LB	95%CI UB	Indirect Effect/Total Indirect Effect (%)
Total effect: Marketing Strategy → Consuming Behavior	0.345^{**}	0.020	0.307	0.383	--
Direct effect: Marketing Strategy → Consuming Behavior	0.012	0.024	-0.034	0.058	--
Total indirect effect: indirect effect1 + indirect effect2	0.637^{**}	0.054	0.528	0.737	100%
Indirect effect1: Marketing Strategy → Customer Perception → Consuming Behavior	0.084^{**}	0.035	0.016	0.152	13%
Indirect effect2: Marketing Strategy →Digital Technology →Consuming Behavior	0.553^{**}	0.056	0.435	0.655	87%
Indirect effect1-indirect effect2	-0.468	0.075	-0.611	-0.315	--

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Path	Rural population dominated model(N=329)				
	Effects	S.E.	95%CI LB	95%CI UB	Indirect Effect/Total Indirect Effect (%)
Total effect: Marketing Strategy → Consuming Behavior	0.112**	0.025	0.062	0.162	--
Direct effect: Marketing Strategy → Consuming Behavior	0.017	0.026	-0.033	0.068	--
Total indirect effect: indirect effect1 + indirect effect2	0.201**	0.043	0.114	0.281	100%
Indirect effect1: Marketing Strategy → Customer Perception → Consuming Behavior	0.090**	0.027	0.042	0.148	45%
Indirect effect2: Marketing Strategy →Digital Technology →Consuming Behavior	0.110**	0.035	0.035	0.174	55%
Indirect effect1-indirect effect2	-0.020	0.045	-0.102	0.077	--

Note: The symbol* denotes p < 0.1, **denotes p < 0.05, ***denotes p < 0.01; 95% CI denotes 95% confidence interval, LB denotes the lower bound of the 95% confidence interval, UP denotes the upper bound of the 95% confidence interval.

The Bootstrap results are as follows:

1) The confidence intervals of path (Marketing Strategy→Consuming Behavior) is [-0.034,0058], p > 0.05, β=0.012, for urban population dominated model, while 95%CI[-0.033,0.068], p > 0.05, implying a rejection of H1 both for two models. Because the Bootstrap method is more accurate than SEM (Mackinnon et al., 2002; Mackinnon et al., 2004; Preacher & Hayes, 2008), we finally accepted that the marketing strategy had no significant effect on consuming behavior in the two models that rejected H1. This indicates that the direct "push" strategies have a stable, limited effect on the out-of-pocket consumption of DMH by young adults living in urban and rural areas.

2)The confidence intervals of path (Marketing Strategy→Digital Technology→Consuming Behavior, nominated indirect effect) are [0.435,0.655] for the urban population dominant model and [0.035,0.174] for the rural population dominated model, do not contain 0. Therefore, this path is significant and supports the H2 that digital technology has a significant mediating effect between marketing strategy and consuming behavior.

3) The confidence intervals of path (Marketing Strategy→Customer Perception→Consuming Behavior, called indirect effect1) are [0.016,0.152] for the urban population dominated model and [0.042,0.148] for the rural population dominated model. Neither threshold contains 0. Therefore, this path is significant and supports the H3 that customer perception has a significant positive mediating effect between marketing strategy and consumption behavior. Since the mediating effect of digital technology and customer perception has been confirmed, further calculation is due to compare the effect size. The indirect effect size is calculated by the percentile of Indirect Effect/Total Indirect Effect (%). According to the percentile. The role of mediator "digital technology" (accounting for 87% of the total indirect effect for the urban population-dominated model, 55% for the rural population-dominated model) is greater than that of consumer perception (accounting for 13% versus 45% between the two models). This result highlights the crucial role of digital technology in promoting DMH consumption, surpassing customer perception in the urban population-dominated model. However, the mediating effect size of "digital technology" is not significantly greater than "customer perception" in the rural population dominated model with 95% CI [-0.102,0.077]. Specifically, the disparities of digital technology preference, digital literacy, and technological acceptance make it difficult to copy-paste city-dominated marketing strategies onto rural

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areas. The leverage of marketing strategy for DMH needs to take into account the local customers' perception habits and their preferences, literacy, and acceptance of digital technology in a localized manner.

Discussion

This research investigates the intricate relationship between marketing strategies and the consuming behavior of digital mental health (DMH) services among young adults in China, with a particular focus on the mediating roles of digital technology and customer perception. This paper makes several interesting findings. First, the results reveal that customer perception and digital technology are mediating factors. Furthermore, digital technology has a greater effect than customer perception in two surveys compared to customer perception. These findings highlight the pivotal role of digital technology in shaping consumer behavior in the DMH out-of-pocket market. Three components (e.g., digital technology acceptance) of digital technology are synthetically measured in the conceptual framework. That confirms the validity of the technology acceptance model (TAM) (Davis 1989) in the context of the DMH industry. Second, the finding that marketing strategies have no significant direct effect on consuming behavior for the rural-dominated population model is a departure from traditional marketing theories, which often emphasize the direct outcomes of marketing efforts. Therefore, this study provides a deeper understanding of consuming behavior for the digital health sector, highlighting the need for a more nuanced approach to marketing strategies that considers the mediating effects of digital technology and customer perception in rural areas. Third, previous studies have extensively explored the role of marketing strategies, digital technology, and customer perception in influencing consumer behavior in various industries. The findings of this study offer both corroborations and novel insights. For instance, the mediating roles of digital technology and customer perception are consistent with previous research, which has shown that digital literacy and technology acceptance significantly influence consuming attitudes and behaviors (Camacho & Torous, 2023; Wahyudi & Parahiyanti, 2021). However, this study uniquely identifies the dominant mediating role of digital technology over customer perception in the context of DMH services in the urban population-dominated model only. This distinction is crucial as it suggests that digital technology may be a more potent driver of consuming behavior in the urban young adults, potentially due to its pervasive influence. That gives rise to the urgency of ethical issues and legislation to avoid digital technology from being the accomplice of "over-marketing" and "over-treatment" in the city healthcare industry. Furthermore, when AI (Artificial Intelligence, e.g., DeepSeek) hits the world, the mental healthcare market will be greatly reshaped. Therefore, it remains to be further explored the influence of AI in this field. Fourth, this paper mainly explored the mediating role of customer perception and consuming behavior with two survey datasets, focusing on the disparities of the urban population-dominated model and the rural population-dominated model. Female respondents are dominantly included in this paper with a convenience sampling method. However, further comparison of results between gender disparities could reveal critical insights and address sampling bias. This issue is worthwhile to explore in the future.

Conclusion

DMH out-of-pocket consumption has fueled interest, investment, and research at home and abroad. The empirical results provide novel insights into the complex relationship between marketing strategies and consuming behavior in the DMH market, highlighting the significant mediating roles of digital technology and customer perception. While the findings offer valuable contributions, addressing the study's limitations and exploring new research questions will further advance our understanding of this rapidly evolving sector. However, the marketing strategy of DMH is unique, meaning that DMH marketing should consistently emphasize customer perception and the effective use of digital technology. Given the rapid advancements in digital technology and the increasing prevalence of AI in the healthcare sector, future research should explore the impact of AI-driven marketing strategies on consumer behavior in the DMH market. For instance, how do AI-powered chatbots influence consumer perceptions and consumption behavior? Additionally, considering the potential ethical concerns associated with digital technology and AI, future studies should investigate the role of ethical marketing practices in mitigating consumer skepticism and enhancing trust in DMH services. Another area for exploration is the influence of social media and online reviews on consumer behavior. As young adults are highly active on social media platforms, understanding how EWOM (electronic word-of-mouth) and social media marketing interact with digital technology and customer perception could provide valuable insights for marketers. Lastly, examining the role of cultural differences in shaping consumer behavior across various regions could offer a more nuanced understanding

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of the global DMH market. In conclusion, the absence of a direct effect implies that DMH marketers should not solely rely on direct "push" strategies, but rather focus on improving "customer perception" and "digital technology," which act as significant mediators.

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