Comparative Impact of ChatGPT vs. Human-Driven Marketing Campaigns on Compulsive Buying Behaviors: Insights from Consumer Demographics and Marketing Mix

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Abstract

This study aims to explore the impact of marketing campaigns generated by ChatGPT, versus those crafted by traditional human marketing managers, on consumer compulsive buying behaviors. The marketing mix is one of the most important tools used by marketing managers in their marketing activities. Grounded in the diffusion of innovation theory, this study investigates the influence of ChatGPT-generated marketing activities on marketing mix (MM) elements (product, price, place or distribution, and promotion), which, in turn, affect consumers' compulsive buying behavior in different demographic groups. In this scenario-based study, data gathered from the questionnaires were analyzed through structural equation modeling to compare the effectiveness of AI-driven and human-generated marketing strategies. Our findings reveal that in the context of the marketing mix, traditional marketing managers' marketing strategies have a stronger influence on consumer-compulsive buying behaviors than those generated by ChatGPT. These insights provide valuable guidance for business managers looking to integrate ChatGPT into their marketing strategies, as

well as how ChatGPT could be strategically deployed across different demographic groups. This study highlighted the need for a demographic-sensitive, user-centric perspective in generative (ChatGPT) technologies.
Keywords: ChatGPT, Compulsive Buying Behavior, Marketing Campaign, Marketing Mix, Consumer Demographics, Diffusion of Innovations Theory.

1. Introduction

Contemporary business trends are dynamic, vibrant, and evolving continuously. Such innovations permeate various domains within the business landscape, including the marketing sector, which has also experienced significant transformations. The evolution and spread of digital technologies contributed to the shift in customer experiences (AI has turned theory-driven marketing research into data-driven research and strategies [1].In recent times, the inclination of customers towards online purchases has increased, making offline retail less popular [2, 3]. Integrating modern technologies with traditional marketing strategies is crucial for increasing the number of outlet buyers. The digitization of businesses has enabled marketing managers to create unique customer shopping experiences [4].

The application of modern technologies such as AI comprises listening and speaking to humans through their language, providing quick and smart responses to queries, and helping consumers make better decisions as well as organizations in making strategic business decisions [5] . Among the advancements in AI, ChatGPT represents a significant breakthrough, built upon the foundational ChatGPT models developed by OpenAI but specialized for conversational applications [6]. Its capacity to process natural language and generate coherent responses has garnered widespread interest, particularly in its potential to revolutionize business practices across diverse sectors, including marketing [7] . Firms with exceptional digital tools and expertise have a greater chance to fully leverage the advantages of big data in business [8]. ChatGPT enhances customer interactions and operational efficiencies, offering organizations opportunities for automation and data-driven decision-making [9]. This AI-driven automation is particularly transformative in marketing, leading to innovations in customer engagement, campaign optimization, and overall marketing effectiveness

[10].

The efficacy of marketing campaigns in influencing consumer behavior is well-documented [11]. The traditional marketing mix—Product, Price, Place, and Promotion—remains foundational, but advancements in AI enable deeper consumer insights and more precise targeting strategies [12]. However, despite these advancements, the specific impacts of AI-generated campaigns, particularly those by ChatGPT, across various demographic segments remain relatively underexplored [13].

Demographic factors such as age, gender, and income play pivotal roles in shaping consumer behaviors and responses to marketing stimuli [14, 15]. Age influences consumer spending patterns, with younger individuals often prioritizing discretionary spending on entertainment and social activities, while older demographics focus more on health and financial security. Gender differences also contribute to varying [14] consumer responses to advertisements, necessitating tailored marketing strategies [15]. Moreover, income levels have a significant impact on consumer purchasing behaviors, influencing product preferences and responsiveness to marketing campaigns [16]. Understanding these demographic nuances is crucial for designing effective marketing strategies that resonate with diverse consumer groups and maximize campaign effectiveness [10].

Compulsive buying behaviors, characterized by spontaneous, unplanned, and compelling purchases, are influenced by various factors, including promotional offers, emotional triggers, and demographic characteristics such as age, gender, and income [17] . Modern technologies like ChatGPT can influence customers' buying decisions and lead to purchase decisions. Understanding how AI-generated campaigns impact these behaviors across different demographics is crucial for optimizing marketing strategies and enhancing consumer engagement in the digital age [11].

One of the fundamental frameworks in understanding the adoption of ChatGPT in marketing strategies for organizations is the Diffusion of Innovation Theory.

Everett Rogers' Diffusion of Innovations Theory (2003) states that, based on variables such as age, gender, and income, customers accept innovations like ChatGPT marketing strategies at varying rates. AI-based marketing is generally less popular among older consumers (late majority and laggards) and those with lower incomes, as they prefer the

kind of intimate, emotionally charged relationships that human marketers are best at offering. Additionally, women might be more hesitant to embrace AI-driven material because they value emotional appeal and trust [18-20]. Even younger, tech-savvy consumers (early adopters and innovators) may like the emotional connection and genuineness that AI marketing offers, but they are also more receptive to it.

The integration of ChatGPT into digital marketing strategies offers several advantages, requiring minimal human intervention [9]. Firms can hardly achieve excellence performance if they fail to utilize available resources and managerial capabilities to the fullest by leveraging AI, companies can automate routine tasks, analyze vast amounts of consumer data in real-time, and tailor marketing messages to individual preferences and behaviors [21].

The current body of research on ChatGPT predominantly focuses on its technical capabilities and applications in academic and conversational settings, with limited exploration of its specific role and effectiveness in business and marketing contexts [13]. This study aims to fill this gap by examining how AI-generated marketing campaigns, particularly those created by ChatGPT, compare to traditional campaigns developed by experienced managers in influencing consumer behaviors, particularly compulsive buying tendencies.

This study makes a significant contribution to the burgeoning literature in several ways.

First, our study discusses the role of ChatGPT from the perspective of Marketing Mix. It examines the impact of marketing campaigns generated by ChatGPT on consumer compulsive buying behavior. Second, ChatGPT marketing is compared with managers' traditional marketing strategies. Third, the relationship between traditional marketing by managers and marketing by ChatGPT is examined through the lens of demographic factors, including consumers' age, gender, and income level. Fourth, there are few fragmented research studies regarding ChatGPT. The marketing approaches of seasoned managers, compared to those using modern technologies, such as ChatGPT, are examined in relation to the marketing mix. Our study will not only try to fill this gap but also consider the effects of these approaches on consumer demographics and their compulsive buying decision. This research tries to address the following research questions (RQ) empirically:

RQ1: How can traditional marketing campaigns by experienced managers be compared with ChatGPT-generated campaigns in terms of effectiveness across different consumer groups?

RQ2: How does the integration of ChapGPT with traditional marketing mix elements (Product, Price, Place, Promotion) boost the overall impact of campaigns on the compulsive buying tendencies of different demographic groups?

RQ3: What is the role of demographic factors (e.g., age, gender, and income level) in moderating the impact of traditional and ChatGPT-generated marketing campaigns on compulsive buying behavior?

2. Literature review and Hypotheses Development:

2.1 Diffusion Theory of Innovation:

The Diffusion of Innovation Theory provides a valuable framework for understanding the adoption of ChatGPT in the corporate sector. This theory explains how innovations are adopted and spread within social systems, focusing on the interaction between organizations and emerging or developing technologies [22]. Murray et al. (2010) elaborate on the factors driving the adoption of new ideas. When implementing AI, aligning organizational readiness with strategic goals is crucial, and successful AI adoption requires careful decision-making [23].

The Diffusion of Innovation Theory provides a comprehensive framework for understanding AI (ChatGPT) integration in businesses [24]. AI technologies, such as the ChatGPT model, have gained popularity, significantly enhancing communication and decision-making capabilities. Rogers' theory provides a deeper understanding of the challenges in integrating advanced technology into marketing, focusing on the innovation's attributes, communication channels, and adopters' perceptions.

2.3 ChatGPT vs Traditional Roles of Marketing Managers

The digital revolution is reshaping the definition of marketing, giving rise to innovative strategies for connecting with customers and enhancing their satisfaction [25]. For decades, Marketers have used several strategies to get the desired response from their target consumers. The combination of these strategies, including product attributes, prices, promotions, and place or distribution channels, that come together to create a

particular offer, is known as the marketing mix, or 4P [26]. The marketing mix, along with digital tools, media, and friends or associations, also influences consumers' purchase decisions [27]. An organization's strategic competitiveness relies on its strategic resources and capabilities, which include technological, human, financial, and several other physical resources. The similarities between the language used by ChatGPT and humans focus on aspects such as syntactic structures, lexical choices, and semantic coherence [28]. Their study highlights the significance of understanding the subtleties and complexities of how large language models, such as ChatGPT, generate language, and how closely this process resembles human linguistic patterns [29].

New technologies often alter customer behavior, and AI is expected to do so as well [30] . The sales performance of companies employing ChatAI (Chat GPT) is better than that of those using traditional marketing [31, 32]. For instance, in banking and fintech sectors, ChatGPT assists users in accomplishing tasks quickly, lowering call volumes and decreasing costs on the service [33].

The ongoing disruption caused by the Fourth Industrial Revolution is leading to a shift in the responsibilities of marketing managers [34, 35]. AI is expected to play a crucial role in predicting what customers want to buy, determining the optimal price to charge, and deciding whether price promotions should be offered [36]. Price and promotions are important tools in the traditional Marketing Mix for sales [37]. Thus, an important area for future research is how AI can be best utilized to predict optimal prices and whether price promotions should be offered.

ChatGPT provides gamified ways for consumers to make purchases. Through a conversational interface, companies transform themselves into personal shopping assistants and successfully engage customers [38] . While users might seek a fast solution, ChatGPT in retail is meant to draw and retain customers' interest by encouraging them to browse and offering answers on products or purchases.

The primary objective of any business is to boost sales. To achieve this, companies must create a highly effective marketing strategy, which includes a plan designed to provide high-quality products at competitive prices to the target audience, using efficient promotional tactics [39]. Thus, the impact of AI goes beyond transforming the role of marketing managers within organizations. In the future, AI is expected to make

marketing more resourceful by accelerating the decision-making process and providing marketing managers with knowledge and insights for marketing that they could not develop in any other traditional way [40].

Customers are the company's assets, and the customer relationships and responses to the company's AI (ChatGPT) marketing communication might also enhance the financial performance of the company [41].

The marketing landscape will undergo a transformation where the primary competition will be for the attention of AI assistants [42]. Despite having sufficient resources, many companies face difficulties producing new products that match customer preferences and current market trends [43].

These challenges stem from limitations in marketing capabilities, a lack of skilled marketers, and experienced marketing managers.

A short-term focus might help marketers react quickly to volatile market conditions; companies need to employ the use of ChatGPT across the organization's marketing activities. Such an experience by marketing managers might help the organization to acquire maturity and sustainably grow its brands [44].

2.4 Compulsive buying behavior

Compulsive buying refers to sudden, unplanned, compelling purchasing behavior [45]. Consumer purchasing involves the decision-making process aimed at fulfilling all the necessary requirements [46]. Purchasing decisions can be influenced by various external factors such as advertising, marketing campaigns, word-of-mouth recommendations, and reviews. The digital era has pushed some companies to reflect on their marketing strategies to better align them with the new emerging needs of their customers [47] .

As a result, businesses often invest heavily in marketing and advertising campaigns to ensure their products or services are at the top of their' minds when they make purchasing decisions. Compulsive buying is influenced by multiple factors, such as purchaser resources (financial and/or time availability), motivations (hedonic or utilitarian), individual characteristics (tendencies towards compulsive buying and sensation-seeking), and marketing cues [48]. In addition price attributes, visual appeal, and outside influence can lead to compulsive buying behaviors [49]. Businesses using

AI-powered campaigns may see an increase in compulsive purchases, higher conversion rates, and more income if ChatGPT's marketing campaigns successfully elicit compulsive behaviors in their target audience. Marketers may be better able to recognize and take advantage of compulsive buying patterns if they comprehend the precise components and methods AI uses to produce attractive advertisements.
Therefore, we put forth Hypothesis 1:

H1: Marketing campaigns generated by ChatGPT are more attractive than those produced by experienced managers in influencing customers' compulsive behaviors.

2.5.Marketing Mix:

Marketers employ various techniques to achieve their desired objectives with their target market. These tools or techniques form a marketing mix, also known as the 4Ps, which combines product characteristics, prices, promotions, and place or distribution channels to create a special offer [26].

Although not a scientific theory, the marketing mix's techniques can be applied to create both short-term and long-term marketing programs [50]. McCarthy improved on Borden's earlier theory of target market satisfaction. The product, price, promotion, and location are the four aspects, or 4Ps, that he combined from Borden's 12 elements (product planning, pricing, branding, channels of distribution, personal selling, advertising, promotions, packaging, display, servicing, physical handling, fact-finding, and analysis [51]. Further advancements were made within the marketing mix concept by other scholars, such as adding another Ps - people, processes, and the idea of physical evidence. However, the concept of the 4Ps remains widely accepted and is still used by many scholars [52].

2.5.1 AI and Product Mix

The integration of Technological capabilities (AI) has a profound impact on organizational performance across various dimensions, fostering innovation and enhancing overall business outcomes [53] .AI integration in product strategy offers various opportunities as outlined by [54]. These include identifying areas for new

product development and enhancement, creating personalized products based on consumer preferences, streamlining product delivery and logistics, and leveraging AI to predict future product demand. Additionally, AI-powered audience insights platforms enable product marketing by extracting valuable customer insights from social media [54]. The product's physical attribute includes its initial influence on consumers through its appearance, touch, and feel [20]. However, ChatGPT improves customer loyalty and cross-selling by implementing automated product recommender systems, increasing customer satisfaction [55]. Furthermore, AI facilitates collaborative design processes that prioritize customer insights in product development [56].

2.5.2 AI and Price Mix

The cosmetic industry is utilizing digital technologies, such as AI, to devise marketing strategies for customer targeting, segmentation, pricing, promotion, and distribution [57]. AI technology makes various contributions to pricing strategies, including estimating price elasticity, identifying pricing patterns, and facilitating dynamic pricing [54]. AI can monitor consumer buying trends, enabling competitive pricing solutions [58]. AI collects pricing information on discounted prices offered by competitors and assesses customers' willingness to pay discounted prices. AI has the ability to build a competitive pricing index by taking into account competitor prices, providing a benchmark for brands aiming to ensure competitive pricing [52].

AI enhances pricing strategies by customizing prices for customized products and adjusting pricing decisions based on various revenue management methods [58].

2.5.3 AI and Place Mix

AI is poised to positively impact distribution across three crucial areas: point of sale, supply chain, and internal processes [59]. It has opened new avenues for marketing channels, such as e-commerce and online platforms, leading to significant cost reductions for organizations [60]. AI can automate online merchandising, thereby increasing revenue and value [61]. With the convenience of online shopping, consumers can shop anytime, anywhere, providing businesses with new opportunities to engage with customers outside of their traditional locations. Furthermore, AI enables channel optimization and simplifies the identification of untapped channels. Integration of AI in

distribution improves transaction times and expedites the overall transaction process [62].

2.5.4 AI and Promotion Mix

AI has revolutionized marketing communications by offering various platforms and tools for effective implementation, such as A/B ad testing, contextual ad targeting, AI-optimized ad retargeting, keyword bidding, and automated content personalization [63]. AI is vital in customizing advertising content, such as text, images, and videos, to suit market segments across various marketing channels. In addition, AI expands and enhances direct marketing by selecting the right formats, channels and content types for different target groups [61]. In addition, AI contributes to marketing communications by creating unique experiences, eliminating the learning curve associated with product categories, and minimizing consumer disappointments, thereby fostering a positive brand image [52].

To achieve maximum sales, it is crucial to effectively and optimally integrate various marketing activities such as product development, pricing, distribution and promotion. This harmonious mixture is often called the marketing mix [11]. Marketers employ diverse strategies and techniques to shape their products' and services' supply and demand. The alignment of market demand and supply is an ongoing process, and the objective of the marketing mix is to influence consumer buying behavior [64].

2.5.5 ChatGPT and Marketing Mix

The progress in Internet technologies, which give a boost to businesses and organizations' marketing strategies are evolving rapidly [18] . At present, ChatGPT stands out as the leading GenAI platform. Its popularity has grown significantly with content marketing due to its remarkable ability to produce human-like text. This groundbreaking feature differentiates it from earlier auto-generating models since it can grasp contextual elements and intent [65]. In addition, comprehensively analyze ChatGPT's potential applications in diverse marketing strategies [66]. These strategies encompass building marketing campaigns, content marketing developments, content picture and art design, service marketing, customer experience, keyword suggestions, marketing research, and brand comparison. It assists in generating content for various

platforms, such as social media updates, blog entries, and other forms of content. The chatbot can suggest headlines, opening words, and even entire paragraphs for marketing materials based on specific subjects or keywords.

Furthermore, potential customers can train it to respond to frequently asked queries, provide customer service, and suggest products. Furthermore, ChatGPT's data analysis capabilities allow it to categorize customer reviews and unstructured data into groups based on product features and customer service, thereby improving the understanding of consumer needs and preferences. These strategies provide insights into marketing from product, price, promotion, and place.

2.6.ChatGPT and Demographic Factors of Customers:

(i) ChatGPT and age:

From chatbot perspective authors [67] analyze data from a field experiment to explore how disclosing an AI-powered financial chatbot influences customer purchasing decisions. Another study [68] proposed that youth actively engage in advertisements and imitate celebrities, which leads to higher levels of materialism and urge to purchase in younger consumers. Young people appreciate innovative products and are responsive to promotional marketing strategies, which in turn causes an inclination towards purchase [69] .

Furthermore, younger people, when compared to older individuals, seeking out hedonistic shopping experiences generated by digital technologies, are more likely to develop compulsive buying behavior [70]. People under 40 show greater openness and willingness to accept new AI technologies, while people over 40 show more suspicion and distrust [71] .

Older consumers may be less inclined to recognize the benefits of AI due to a lack of curiosity and reluctance to try new technologies. Younger people who use digital tools such as AI tend to seek out hedonistic shopping experiences and indulge in compulsive buying [72]. Consumers with a tendency for compulsive buying tend to purchase when exposed to technology-based (AI) promotional marketing strategies [73].

H2: Marketing campaigns generated by ChatGPT have a significant positive influence on younger customers' compulsive behaviors.

2.6.1. ChatGPT and Gender:

Both gender and age influence shoppers' compulsive buying tendencies [74]. Specifically, they found that younger women made compulsive purchases more frequently than older men. However, there were differences between the gender of consumers in terms of correlations between the use of AI robots [75]. Another study [76] points out that gender norms and expectations influence consumer behavior due to their unique perspectives and preferences on fashion and lifestyle, leading to differences in purchasing behavior. Research shows that gender shapes individuals' online consumption preferences [77].

Women are more concerned about rewards and are more likely to take advantage of promotions and sales when shopping using digital technologies [78]. However, females are more fashion-conscious and less sensitive to price than males when purchasing fashion goods on recommendations (AI). A strong relationship exists between interest generated by digital tools and compulsive buying among females [79]. In study authors [80] suggested that young Chinese female students show higher compulsive buying behaviors and greater avoidance coping tendencies.

H3: Marketing campaigns generated by ChatGPT have a significant positive influence on female customers' compulsive behaviors.

2.6.2. ChatGPT and Income:

Consumers' compulsive buying behavior is influenced not only by gender but also by income level. (2019) concluded that there is a significant positive relationship between consumers' income and compulsive buying behavior [81] Another study [82] noted that higher income levels tend to lead to an increase in compulsive buying due to greater purchasing power and ability to afford such purchases when engaging in marketing campaigns. Higher-income consumers tend to be less sensitive to price changes and more likely to make compulsive purchases.

This research examines the influence of ChatGPT-generated marketing campaigns on consumers' compulsive behaviors in different income brackets. The study seeks to determine whether AI-generated campaigns significantly shape the compulsive actions of customers with higher incomes. The study emphasizes customers with varying income levels by employing marketing strategies created by ChatGPT. This study rigorously examines and evaluates the reactions and behaviors of customers across

various income brackets in relation to each marketing campaign.

This study aims to offer significant insights into the possible efficacy of AI-driven marketing strategies in attracting and influencing affluent clients on a compulsive level. If it is determined that AI-generated advertising has a substantial impact on influencing the compulsive behaviors of customers with higher incomes, it indicates a potential opportunity for capturing a greater portion of their disposable income.

Firms can leverage this knowledge to design marketing strategies that align with the compulsive buying tendencies of customers with higher income levels. This can improve customer engagement, brand loyalty, and overall sales performance within the target market segment. Furthermore, it can contribute to increased profitability and strategic competitiveness of the businesses. Customers with higher incomes are more likely to buy compulsively, leading to larger transaction sizes and the possibility of repeat business. Hence, we put forth the Hypothesis 4:

H4: Marketing campaigns generated by ChatGPT have a significant positive influence on customers' compulsive buying behaviors with higher incomes.

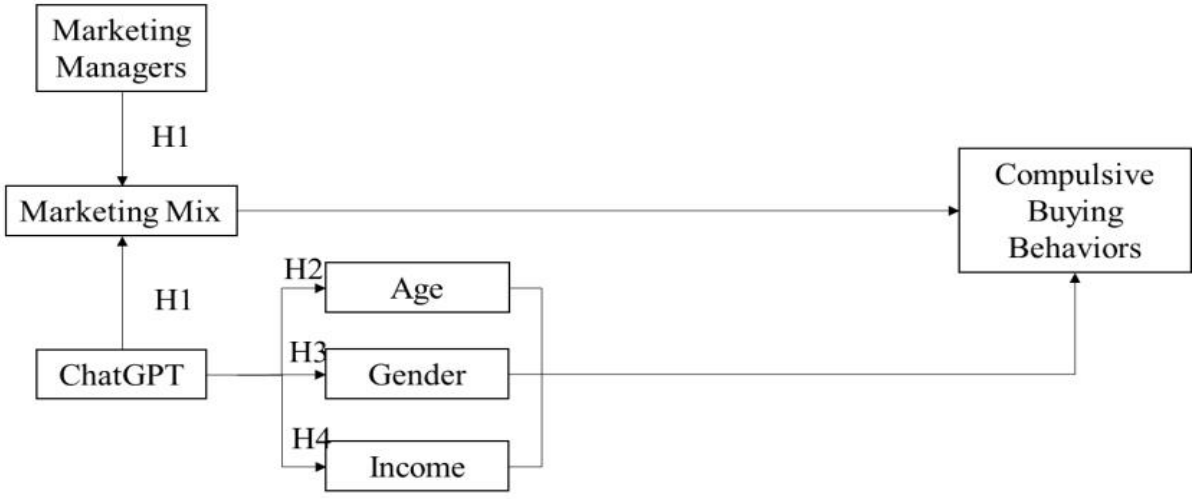


Figure.1 Conceptual Framework

3. Methods

3.1. Scenario

This study examines two scenarios: marketing strategies generated by ChatGPT and those developed by expert marketers, focusing on their alignment with the marketing mix (Product, Price, Place, Promotion). A self-administered questionnaire was designed and provided at the end of each scenario to the respondents. It comprised two parts. The first part was related to demographic information related to age, gender, and income level. The next part was comprised of a scenario and questionnaire at the end. A seven-point Likert scale (1 = Strongly Disagree to 7 = Strongly Agree) was used to measure variables. However, the respondents were unaware of whether the marketing mix strategies were generated by ChatGPT or by human marketers. The questionnaire included two randomly selected solutions (one generated by ChatGPT and one by a marketing manager) presented anonymously to eliminate bias. Respondents, acting as customers, selected their preferred solution based on personal preference alone. The questionnaire was titled "Research on How Different Marketing Strategies Affect Purchasing Behavior as a Consumer" to avoid influencing participant responses.

3.2. Measures:

3.2.1. Products:

In the questionnaire, 5 measuring items for products are adapted from Hashem and Al-Rifai's study [83] and modified according to the needs of the study.

3.2.2. Prices:

Three items are used for the Prices, adapted from Hashem and Al-Rifai's [83] and modified according to the study's requirements.

3.2.3. Promotions:

For the promotion, four items are adapted from Hashem and Al-Rifai's [83] and modified.

3.2.4. Place:

Items for place were adapted and modified from Hashem and Al-Rifai's [83] and Burt and Carralero-Encinas's [84]. Four items were used to measure the place

The original English questionnaire was translated into Mandarin for participants. The initial version was pre-tested with six participants to ensure clarity and semantic understanding, with further revisions made for readability. A second pre-test with ten

participants confirmed the final quality of the questionnaire. The survey was distributed using the Wenjuanxing platform via WeChat, ensuring a randomized and diverse participant pool. We used purposive sampling. The respondents include consumers of different gender, age, area and income level. Data were obtained from 572 customers from various provinces of China. Of these, 286 (50%) were male, and 286 (50%) were female. Table1 shows the descriptive statistics.

Table1. Descriptive information of participants

Demographic Variable	Category	Frequency	Percent
Age	<18	48	8.39%
	18-25	271	47.38%
	26-44	133	23.25%
	45-60	68	11.89%
	>60	52	9.89%
Gender	Male	286	50%
	Female	286	50%
Income level/ year	0-60000 RMB	302	52.8%
	600001-360000RMB	185	32.34%
	>3600000RMB	85	14.86%

3.3. Results:

The study employed validated English and Mandarin versions of various self-rating instruments. Compulsive buying behavior (CB) was assessed using the 7-item Compulsive Buying Scale (CBS) [85] . The CB scale demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.901, exceeding the recommended threshold of 0.7. Additionally, Cronbach's alpha (CA) and composite reliability (CR) were used to confirm internal consistency, both of which yielded values above 0.70. Convergent validity (CV) was confirmed through the examination of the average variance extracted (AVE) values, with each construct's value surpassing the necessary 0.50 threshold, validating the correlation of the indicators (Fornell & Larcker, 1981). All items demonstrated reliability and alignment with their corresponding constructs.

Furthermore, discriminant validity (DV) was confirmed, highlighting the high loadings of the measurement items onto theoretically positioned factors [86]. Table 2 displays the DV values, indicating that the square root of AVE exceeded the correlations across constructs.

Table 2. Items' reliability and validity

Constructs and Items	Loadings	AVE	CR	CA
GPTPRODUCT		**0.573**	**0.871**	**0.72**
GPTPRODUCT1	0.753			
GPTPRODUCT2	0.790			
GPTPRODUCT3	0.755			
GPTPRODUCT4	0.739			
GPTPRODUCT5	0.750			
GPTPRICE		**0.627**	**0.627**	**0.715**
GPTPRICE1	0.792			
GPTPRICE2	0.778			
GPTPRICE3	0.781			
GPTPROMOTION		**0.576**	**0.576**	**0.711**
GPTPROMOTION1	0.759			
GPTPROMOTION2	0.801			
GPTPROMOTION3	0.811			
GPTPROMOTION4	0.784			
GPTPLACE		**0.711**	**0.711**	**0.702**
GPTPLACE1	0.843			
GPTPLACE2	0.782			
GPTPLACE3	0.771			
GPTPLACE4	0.793			
MPRODUCT		**0.613**	**0.613**	**0.850**
MPRODUCT1	0.783			
MPRODUCT2	0.839			
MPRODUCT3	0.694			
MPRODUCT4	0.701			
MPRODUCT5	0.732			

MPRICE		**0.681**	**0.681**	**0.739**
MPRICE1	0.825			
MPRICE2	0.752			
MPROMOTION		**0.664**	**0.664**	**0.733**
MPROMOTION1	0.815			
MPROMOTION2	0.673			
GPTPROMOTION3	0.700			
GPTPROMOTION4	0.703			
MPLACE		**0.626**	**0.626**	**0.711**
MPLACE1	0.791			
MPLACE2	0.762			
GPTPLACE3	0.722			
GPTPLACE4	0.752			

Table 3. Discriminant validity

	Constructs	1	2	3	4	5	6	7	8
1	GPTPRODUCT	1.0							
2	GPTPRICE	0.357	1.0						
2	GPTPROMOTION	0.361	0.350	1.0					
4	GPTPLACE	0.388	0.286	0.360	1.0				
5	MPRODUCT	0.323	0.288	0.332	0.292	1.0			
6	MPROMOTION	0.290	0.283	0.322	0.324	0.554	1.0		
7	MPLACE	0.294	0.278	0.310	0.323	0.555	0.576	1.0	
8	MPLACE	0.277	0.282	0.308	0.342	0.552	0.570	0.525	1.0

No missing values were observed in the study. To mitigate common method bias (CMB), the questionnaires were carefully designed following the guidelines outlined by [87]. Variance inflation factor (VIF) values demonstrated the absence of multi collinearity and CMB issues, with each independent variable's VIF value remaining below 2, well below the proposed threshold of 3.3, indicating the absence of common method bias [88] .

Table 3 shows the discriminant validity of the measure. The table demonstrates how well a test measures the concept it was designed to measure. All the items are related to

their respective measures. Thus, there is no issue of discriminant validity.

In the first stage of determining the preference of groups based on particular types of distinguishing characteristics, an analysis of variance (ANOVA) was performed (see Table 4) to establish the significance of the difference between each group of distinct demographic characteristics.

Table 4. ANOVA result of comparison ChatGPT and marketing managers.

	Df	*F*-value	*P*-value	variables
	572	121.99100	0.000***	PRODUCT
	572	130.571	0.000***	PRICE
	572	86.9128	0.000***	PROMOTION
	572	484.28972	0.000***	PLACE

*$p < 0.10$; **$p < 0.05$; *** <0.01

In each scenario under marketing mix, the p-value is very close to 0, indicating significant differences of compulsive buying tendencies in product, price, promotion, and place performance between ChatGPT and human managers. In the product dimension, the F-value is 121.99100, and the P-value is 0.000. This indicates a significant difference in marketing strategies between ChatGPT and human managers in terms of products. In the price dimension, the F-value is 130.571, and the P-value is 0.000. This shows a significant difference in pricing strategies between ChatGPT and human managers. In the promotion sub-context, the F-value is 86.9128, and the P-value is 0.000. It demonstrates that there is a significant difference in promotional strategies between ChatGPT and human managers. This may involve differences in different promotional methods, marketing activities, or promotional strategies. Regarding location, the F-value of 484.28972 and the P-value of 0.000 suggest a notable disparity in the choice of location between ChatGPT and human managers. This divergence might entail discrepancies in market positioning, the selection of sales channels, or strategies related to geographical distribution. These results indicate that ChatGPT's performance in these areas differs significantly from that of human managers (see Table 5).

Table 5. ANOVA results- dependent variable: compulsive buying

Main effect	Df	*F*-value	*P*-value	
Age	4.0	9.4011224	0.001***	CPRODUCT
	4.0	12.00216	0.000***	CPRICE
	4.0	17.559689	0.000***	CPROMOTION
	4.0	5.92232	0.002**	CPLACE
	4.0	9.4011224	0.000***	MPRODUCT
	4.0	1.2270920	0.029*	MPRICE
	4.0	2.51397	0.000***	MPROMOTION
	4.0	6.743347	0.051*	MPLACE
Gender	1.0	139.017	0.000***	CPRODUCT
	1.0	106.37570	0.000***	CPRICE
	1.0	76.84565	0.000***	CPROMOTION
	1.0	45.55463	0.000***	CPLACE
	1.0	132.77	0.078*	MPRODUCT
	1.0	22.13006	0.000***	MPRICE
	1.0	4.69356	0.000***	MPROMOTION
	1.0	2.065	0.085*	MPLACE
Income	2.0	1.9378	0.014*	CPRODUCT
	2.0	0.067181	0.935	CPRICE
	2.0	0.42334	0.655	CPROMOTION
	2.0	1.672760	0.000***	CPLACE
	2.0	.132726	0.072*	MPRODUCT
	2.0	16.2954	0.000***	MPRICE
	2.0	0.068527	0.018*	MPROMOTION
	2.0	0.4423926	0.064*	MPLACE

*$p < 0.10$; **$p < 0.05$; *** <0.01

The ANOVA analysis indicates that both human managers and ChatGPT generate distinct promotional strategies impacting compulsive buying behaviors across different age groups. The significant F-value and the near-zero P-value for all product categories (PRODUCT, PRICE, PROMOTION, PLACE) underscore the pivotal role of age in shaping compulsive buying patterns from diverse marketing standpoints. The ANOVA results suggest that the ideas formulated by human managers and ChatGPT vary in their impact on different genders, particularly concerning the influences on compulsive buying behavior. This indicates that there exist significant differences in the promotional strategies tailored for distinct sexes, emphasizing the need for nuanced

marketing approaches based on the specific characteristics and preferences of male and female consumers.

In step 2, we examine the mean value of compulsive buying behaviors (CB) under PRODUCT, PRICE, PROMOTION, PLACE scenario (Table 6). The F-value for compulsive buying behavior (CB) is highly significant, indicating that there are significant differences between ChatGPT and Human Managers in their influence on CB. The total sample's mean score for CB falls between ChatGPT and Human Managers, suggesting that both human managers and ChatGPT have an impact, but the effect of Human Managers is more pronounced.

The data presented demonstrates the mean values (M) and standard deviations (SD) for various variables across the total sample, ChatGPT, and Human Managers. For the variable CB (Compulsive Buying), the mean value for Human Managers (M=5.0957) surpasses that of ChatGPT (M=4.227564) and the overall sample (M=4.5748). This suggests that Human Managers exert a more significant influence on Compulsive Buying behavior compared to ChatGPT. Similarly, in the case of the PRODUCT scenario, Human Managers (M=4.9671) exhibit a notably higher mean value compared to ChatGPT (M=4.094) and the overall sample (M=4.4026), indicating their stronger impact on product-related decisions. Concerning the PRICE variable, Human Managers (M=5.104) again demonstrate a higher mean value compared to ChatGPT (M=4.054) and the overall sample (M=4.6480), signifying their more substantial influence on pricing strategies. Likewise, for the PLACE variable, Human Managers (M=5.1643) exhibit a higher mean value compared to ChatGPT (M=4.2343) and the overall sample (M=4.9570), indicating their stronger influence on decisions related to product placement and distribution. Finally, regarding the PROMOTION variable, Human Managers (M=5.0428) once again demonstrate a higher mean value compared to ChatGPT (M=4.1949) and the overall sample (M=4.8128), suggesting their more pronounced impact on promotional strategies. These findings highlight the prominent role of Human Managers in shaping various marketing aspects, as evidenced by their consistently higher mean values across the analyzed variables.

Table 6. Mean value comparison test

Variable	N	Total sample		ChatGPT		Human Managers		
		M	SD	M	SD	M	SD	F
CB	572	4.575	1.867	4.228	1.861	5.096	1.750	41.774**
PRODUCT	572	4.403	1.874	4.094	1.906	4.967	1.737	32.2423*
PRICE	572	4.649	1.835	4.054	1.864	5.104	1.745	124.99***
PLACE	572	4.958	1.764	4.234	1.813	5.164	1.743	78.15**
PROMOTION	572	4.813	1.800	4.195	1.842	5.043	1.7501	42.5240*

*p<0.10; **p<0.05; ***<0.01

In the next step, we examine the relationship between the independent variables, namely Age, Gender, and Income, and the dependent variable, Compulsive Buying Behaviors, to ascertain how these demographic factors contribute to the variance in compulsive buying tendencies (Table 7). By assessing the influence of Age, Gender, and Income on Compulsive Buying Behaviors, we aim to elucidate the specific role played by these demographic characteristics in shaping consumer preferences and purchasing habits.

Table 7. Regression analysis

Main effect	Coefficient	Std err	P value	VARIABLES
Age	-0.1779	0.050	0.000***	CPRODUCT
	-0.1434	0.060	0.017**	CPRICE
	-0.1093	0.059	0.062*	CPROMOTION
	-0.0852	0.070	0.0223**	CPLACE
	0.62	0.053	0.0906*	MPRODUCT
	-0.375	0.060	0.0532*	MPRICE
	0.1320	0.060	0.0827*	MPROMOTION
	0.447	0.067	0.0507*	MPLACE
Gender	1.1601	0.098	0.000***	CPRODUCT
	1.2308	0.119	0.000***	CPRICE
	1.0472	0.110	0.000***	CPROMOTION
	0.9860	0.146	0.000***	CPLACE
	0.308	0.114	0.000***	MPRODUCT
	0.612	0.013	0.065*	MPRICE
	0.892	0.130	0.049**	MPROMOTION
	0.211	0.0146	0.089*	MPLACE

Income	0.1057	0.075	0.159	CPRODUCT
	-0.254	0.089	0.776	CPRICE
	-0.335	0.087	0.701	CPROMOTION
	0.1504	0.104	0.150	CPLACE
	0.567	0.078	0.046**	MPRODUCT
	0.363	0.089	0.046**	MPRICE
	-0.89	0.089	0.092*	MPROMOTION
	0.941	0.1	0.035**	MPLACE

*p<0.10; **p<0.05; ***<0.01

The results of the regression analysis reveal substantial insights into the relationship between demographic factors (Age, Gender, and Income) and various marketing variables (product, price, promotion, and place) in the context of compulsive buying behaviors. Notably, Age emerges as a key determinant, showcasing a negative association with marketing variables across product, price, promotion, and place under the marketing campaigns generated by ChatGPT. The negative coefficients for Age across all marketing variables suggest that as individuals' age increases, their engagement with marketing strategies diminishes. Notably, this trend is consistent for both ChatGPT and human managers, albeit with varying degrees of impact.

Conversely, Gender exhibits a noteworthy influence, displaying a positive association with the marketing variables, indicating that specific genders are more susceptible to marketing efforts in the areas of product, price, promotion, and place under the marketing ideas generated by ChatGPT. While both ChatGPT and human managers showcase this trend, the differences in the coefficients highlight varying degrees of influence exerted by each group.

However, the analysis indicates that Income does not significantly impact the marketing variables. This implies that variations in income levels do not notably influence responses to marketing efforts concerning product, price, promotion, and place under the ChatGPT scenario since the p-value is insignificant.

4. Discussion

This study examines the comparative impact of ChatGPT-driven and human-driven marketing campaigns on compulsive buying behaviors, offering empirical insights into their distinct approaches and outcomes. The analysis highlights significant differences

in how human managers and ChatGPT influence marketing strategies across demographic groups, such as product decisions, pricing strategies, promotional activities, and placement choices. ChatGPT offers more logical and objective insights, whereas humans tend to express more subjective opinions [89] . In the marketing context, this difference means that AI-generated campaigns can provide data-driven, neutral recommendations, while human marketers often incorporate emotional and personal perspectives that resonate with consumers on a deeper, more personal, and affectionate level.

Age emerges as a critical factor influencing marketing outcomes. Younger individuals are more responsive to ChatGPT-driven strategies, as shown by the negative coefficients associated with age across marketing variables. This suggests that ChatGPT's data-driven insights resonate more effectively with younger demographics, likely due to their greater receptivity to technology-based campaigns. In contrast, older individuals exhibit reduced engagement with marketing strategies, consistent with previous research [90, 91]. Older consumers' diminished responsiveness is linked to declines in information processing abilities (Homburg and Giering, 2001) and increased self-assurance, which mitigates anxiety-driven purchasing behaviors. This underscores the importance of tailoring campaigns to address age-specific consumer needs for effective outreach.

Gender differences also play a significant role in marketing outcomes, with distinct patterns observed between ChatGPT and human-driven strategies. Female respondents show greater responsiveness to ChatGPT-generated campaigns, reflecting their heightened susceptibility to promotional efforts. This finding aligns with prior research [92, 93], which associates females' psychological tendencies, such as reduced stress management and shopping for emotional alleviation, with increased marketing engagement. Conversely, males display stronger cognitive focus and psychological resilience, seeking enjoyment through exploratory shopping activities [94]. A similar trend is noted in human-driven strategies, where females again exhibit heightened responsiveness, emphasizing the need for gender-sensitive marketing approaches to enhance consumer engagement.

Income levels demonstrate varied effects across the two types of campaigns. ChatGPT-

driven strategies show no significant influence of income, suggesting these campaigns appeal broadly across income groups. However, human-driven campaigns are more influential among lower-income consumers, especially in pricing, product, and placement decisions. These findings align with prior research [95, 96], emphasizing the need for strategies tailored to meet the preferences and demands of lower-income groups to optimize marketing efforts.

The consistently higher mean values for human-driven campaigns across marketing variables highlight their pivotal role in shaping consumer preferences. Human managers leverage nuanced insights and experience to craft strategies that resonate effectively with diverse demographics. This underscores the importance of integrating human expertise with data-driven methods to achieve balanced and impactful marketing outcomes.

The study reveals that ChatGPT-driven strategies are particularly effective among younger and female consumers, while human-driven campaigns demonstrate greater versatility and influence across various consumer groups. These findings emphasize the need for combining human insights with algorithmic logic to develop holistic marketing strategies that drive consumer engagement and purchasing behaviors across demographics.

5. Conclusion

In conclusion, the study's findings indicate interesting results that marketing campaigns devised by seasoned human managers are more appealing than those generated by ChatGPT in shaping customers' compulsive buying behaviors. This underscores the pivotal role of human insight, experience, and understanding in crafting effective marketing strategies that resonate with consumer preferences. Furthermore, the analysis reveals that marketing campaigns formulated by ChatGPT wield a substantial influence on the compulsive buying tendencies of younger customers, suggesting a stronger receptivity among this demographic group to AI-generated marketing initiatives. Additionally, the results emphasize the significance of gender in marketing strategies, highlighting the positive impact of ChatGPT-generated campaigns on the compulsive buying behaviors of female customers. Conversely, the study reveals that marketing campaigns orchestrated by ChatGPT do not significantly impact the compulsive buying

behaviors of different income level customers, underscoring the need for tailored marketing approaches that effectively target specific income segments. These findings collectively underscore the nuanced interplay between AI-generated and human-driven marketing strategies, emphasizing the necessity for a balanced and informed approach that leverages the strengths of both human insights and AI-driven innovations to cater to diverse consumer segments effectively.

6. Limitations and future research:

Although the present study offers useful insights into the comparative examination of marketing campaigns conducted by human managers and ChatGPT, it is essential to acknowledge certain inherent limitations.

The primary limitations of this study stem from the methodology used to design the marketing questions, which were derived from the input of a limited number of human managers. While efforts were made to ensure diversity in selecting these managers, the reliance on a relatively small sample size may have constrained the variability and comprehensiveness of the presented marketing ideas. Furthermore, the research context was primarily focused on the dynamics of the Chinese market, thereby potentially limiting the transferability of the study's outcomes to other global marketplaces. Although attempts were made to account for regional and cultural nuances, the overarching emphasis on the Chinese market context may restrict the generalizability of the research findings.

Given the acknowledged limitations, future research has several potential avenues to address these constraints effectively. Expanding the pool of human managers and soliciting input from a more diverse group of industry professionals could lead to a more comprehensive and robust set of marketing questions.

Additionally, conducting comparative studies across multiple global markets and incorporating diverse cultural and socio-economic contexts may offer valuable insights into the cross-cultural variations and preferences influencing marketing strategies. Moreover, employing advanced analytical tools and artificial intelligence techniques could enhance the scope and depth of the marketing questions, facilitating a more comprehensive understanding of consumer behavior and preferences. Future studies

could also explore the potential impacts of various contextual factors, such as technological advancements and economic trends, on designing and implementing effective marketing strategies across diverse markets. Longitudinal studies focusing on the evolution of marketing trends and consumer behavior could provide valuable insights into the sustainability and adaptability of marketing strategies in response to dynamic market conditions and evolving consumer preferences.

Author Contribution Statement

Kashif Ullah Khan conceptualized the study, designed the research framework, and supervised the overall project. Lin Jiali contributed to data collection, data analysis, and interpretation of results. Fouzia Atlas assisted in developing the theoretical background, literature review, and refinement of the manuscript. Tabinda Shaheen contributed to data validation, visualization, and manuscript proofreading.

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