

Deep Analysis of Digital Marketing Trends and Social Media Strategies: Case Studies in Short-Video Promotion, E-commerce Advertising, and AI-Personalized Marketing

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Abstract. Purpose: This study proposes a comparative research framework designed for systematic analysis of effect differences and mechanisms of three mainstream digital marketing strategies in social media platform settings, addressing the research gap in cross-strategy comparative analysis. **Methodology:** A research design with a data analysis paradigm originated from specific cases and industry datasets available on the Kaggle competition website, covering three social marketing platforms, namely TikTok's promotion of short videos, ecommerce ads marketing among Facebook users, and A/B group testing datasets derived from an A/B testing engine involving artificial intelligence. **Findings:** Results showed story-driven content performed better in terms of social interaction effects than merchandised content in a comparison of social marketing strategy effects for promoting short videos, click-through rates being a significant determinant in ecommerce ads conversion, and a significant performance difference in conversion effectiveness with leading internet users preferring personalized marketing advice offered by the A/B engine when compared with existing platforms. **Conclusion:** This study generates empirical findings fused with principles seeking synergistic marketing strategy characteristics by comprehending content properties' role in marketing strategy deployment with specific growth mechanisms influencing Internet marketing space performance. **Practical Applications:** Every business needs to use differentiated strategy configurations according to defined objectives, namely narrative-driven video content for brand engagement objectives and AI-personalized recommendation systems for conversion objectives. A promising area is the combination of high interactivity content with precise algorithmic recommendation systems with a view to maximize marketing effectiveness.

Keywords: Digital Marketing; Social Media Strategy; Short-video Promotion; E-commerce Advertising; AI-personalized Marketing

1. Introduction

With the rise of the digital economy era, the scale of the international digital marketing industry continues to grow, and social platforms have increasingly become an important pathway for businesses to connect with consumers. This has brought about a profound change in the operation logic and value chain of traditional marketing models [1]. With this background, three marketing models concerning the promotion of short videos, e-commerce, and personalized marketing with artificial intelligence have shown differentiated growth paths and effectiveness fluctuations on the ground level, prompting in-depth theoretical discussion among scholars on why and how different marketing models in the digital marketing industry work.

Existing studies have addressed the above marketing strategies from a variety of angles. The ever-changing pace of artificial intelligence technology is deeply influencing marketing decision-formulation efficiency and the execution efficiency of marketing decisions itself, with algorithmic-assisted personalized recommendation platforms realizing precise content matching according to users' behavior tracks [2]. Short video content with strong dissemination capabilities and high levels of interactivity has become a significant channel form for establishing brand-user ties, and preliminary evidence has been found concerning the link existing between content qualities and users' engagement levels [3]. Investigations into users' behavior within social platforms have further

revealed intricate mediation roles of platform qualities in influencing users' intentions to buy goods, with a variety of consecutive mediation effects demonstrated in the related researches [4]. Even so, it is apparent that a lack exists within existing researches concerning systematical empirical analyses intertwined with the three marketing strategy integrations of short video marketing, e-commerce marketing, and artificial intelligence-assisted personalized marketing, in terms of comparative analyses among these marketing strategy researches themselves.

Starting with these gaps in research, the objectives of this proposed research include developing a comparative analysis framework and investigating the difference effects and mechanisms of influences in three leading digital marketing campaigns via data analysis with a cases emphasis. The objectives of the proposed research include three main parts, which comprise the difference of social interaction effects among those content strategies in promoting a short video, the influential factors among conversion effectiveness in the e-commerce marketing, and the degree of improvement in effectiveness of the AI marketing strategy against the traditional marketing strategy in personalized marketing campaigns. The theoretical contributions included within this proposed research include surpassing previous strategy-level researches about understanding the applicability range of each marketing strategy within the characteristics of the social media platforms, concerning reference evidence within empirical researches with publicly available datasets for decision-making within enterprise-level digital marketing campaigns.

2. Methodology

2.1 Case Selection and Research Design

This study adopts a data analysis strategy with a strong focus on cases, with an in-depth analysis of typical cases of digital marketing practice to identify the effect difference and mechanism among various marketing approaches. Three typical cases were chosen for systematic analysis, including Case A involving the use of short videos in marketing on the TikTok platform, with a content ecosystem and user behavior fully representative of the global industry of short videos; Case B involving social e-commerce marketing ads on the Facebook platform, with an optimal and precise user targeting function fully ideal for e-commerce marketing ad sampling; and Case C involving data from A/B tests of personalized marketing by artificial intelligence, with a commonly used paradigm of causality inference in marketing effectiveness research [5]. The logic of analysis progresses in a progressive manner from in-depth analysis of single cases, followed by comparison of patterns of cases, culminating in synthesis of conclusions comprehensively, so that research findings can be endowed with a level of both depth and scope within a wide range of marketing strategy fields.

2.2 Data Sources and Variable Definitions

All the research data used in this project were extracted from the Kaggle open data platform, including three public datasets concerning the Popular TikTok Videos Dataset, the Sales Conversion Optimization Dataset, and the Marketing A/B Testing Dataset. All three of these datasets have been de-identified and meet the ethics standards required in academic research. With regard to variable definition, Case A defines content type (challenge, product show, tutorial, story) as the independent variable and total interaction rate including both like rate and comment/share rate as the dependent variable. For Case B, the independent variable is defined by advertising costs and click-through rates, with the purchase conversion rate used for the dependent variable. For Case C, the grouping criterion is defined with personalized recommendation received or not, analyzing group comparison for conversion rates including both control and experiment groups, in accordance with existing research concerning user purchase intent factors [6].

2.3 Analysis Strategies and Research Procedures

For the three research questions, distinctive approaches were taken for statistical analysis: RQ1 uses descriptive statistics and one-way analysis of variance to analyze the effect of social interaction

on different content types, RQ2 relies on Pearson correlation analysis and multiple linear regression analyses to determine significant predictive factors influencing the conversion effectiveness of e-commerce advertising conversion, and RQ3 uses independent sample t-tests and effect sizes with Cohen's d statistics to assess the improvement brought about by artificial intelligence-based personalized marketing on traditional marketing. The research methodology will involve five different phases, including data acquisition, data processing, intra-case statistical analysis, pattern comparison for cases, and synthesis of overall research conclusion. While undertaking the statistical analysis, the use of SPSS 26.0 and Python 3.9 software would be applied.

3. Results

3.1 Short Video Promotion: Content Strategy and Social Interaction Effects

For analyzing RQ1 related to the comparative impact of content strategies on the outcomes of social interactions, statistical analysis was carried out on the data related to short videos on the TikTok social platform with reference to four types of content: challenge, product demonstration, tutorial, and story content types. The comparison outcomes for the types of content are given in the Figure 1 below.

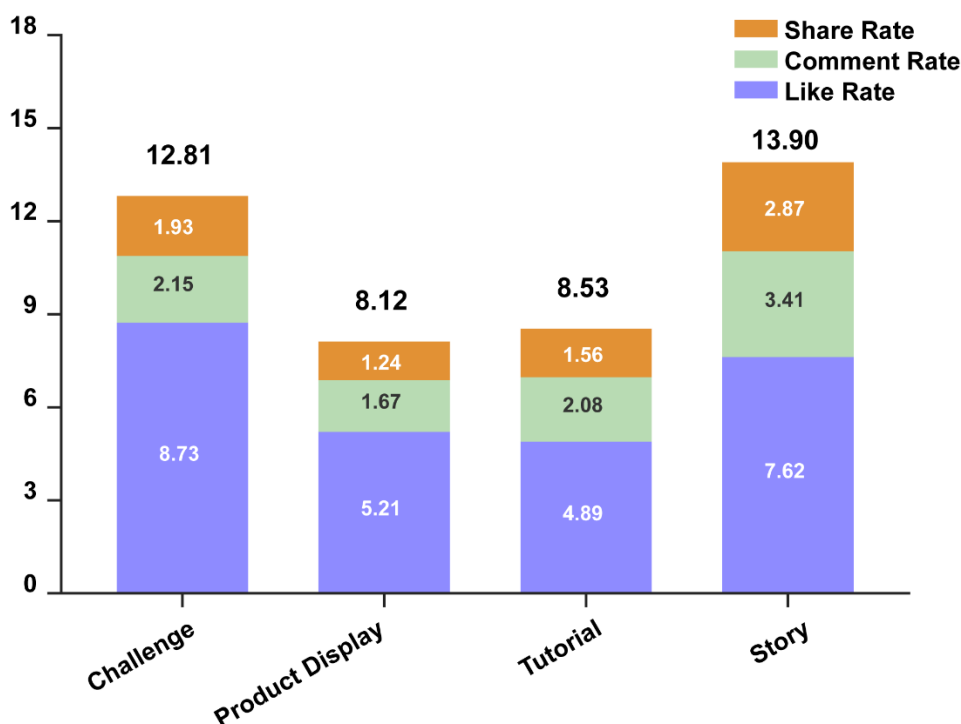


Figure 1. Social Interaction Effects across Content Types.

Figure 1 exposes different dynamics related to content types and user engagement behaviors. For likes, challenge content emerged with better performance, with a average of 8.73%, which is significantly better than those of product display content (5.21%) and tutorial content (4.89%) ($F=23.47, P<0.001$). However, although slightly lower than challenge content's performance in terms of the average like ratio of 7.62%, story content performed best in terms of both the average ratio of comments left (3.41%) and sharing ratio of 2.87%. Product display content performed the weakest in terms of average ratio for both likes, comments, and sharing ratio among other aspects, implying that brand marketers need to be cautionary about balancing content with marketing intent in video marketing content strategy.

3.2 E-commerce Advertising: Characteristics of Placement and Conversion Effects

Moving on to answer RQ2, regression analysis was conducted on Facebook E-commerce Ads data by isolating key predictive factors influencing conversion outcomes. The data consisted of a series of ads with features such as advertisement spend, click-through rates, timing of ads, and age demographics of users. The dependent variable used in the multiple linear regression analysis is the conversion rate of purchases made, as shown in Table 1.

Table 1. Regression Results of Advertising Conversion Factors.

Variable	β	SE	t	P
Click-through Rate	0.524	0.107	4.90	<0.001***
Ad Spending	0.287	0.093	3.09	0.002**
Placement Time	0.156	0.069	2.26	0.025*
User Age	0.089	0.058	1.53	0.127
R ²	0.412			
F	18.36***			

Note: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

The regression analysis in Table 1 shows a moderate level of explanatory adequacy reached by the model ($R^2=0.412$, $F=18.36$, $P<0.001$). Of the independent variables, click-through rate is shown to be the most significant factor in determining conversion effectiveness, followed by the positive predictive factor of advertising cost, with a weaker but significant link evidenced for placement timing, although the non-significance of user age stood out and appeared contrary to some previous studies in terms of the specific user demographics represented on the platform in question.

3.3 AI Personalized Marketing: Comparison of Effects between the Experimental Group and the Control Group

For the purpose of answering RQ3, the data generated from the A/B testing was used in a comparison of the conversion efficiency of both the artificial intelligence-driven personalized recommendation strategy and the non-personalized strategy. The study design included randomly assigning users to a treatment group where users were given personalized recommendations and a control group where users were given standard recommendations. The independent samples t-test is shown in Figure 2.

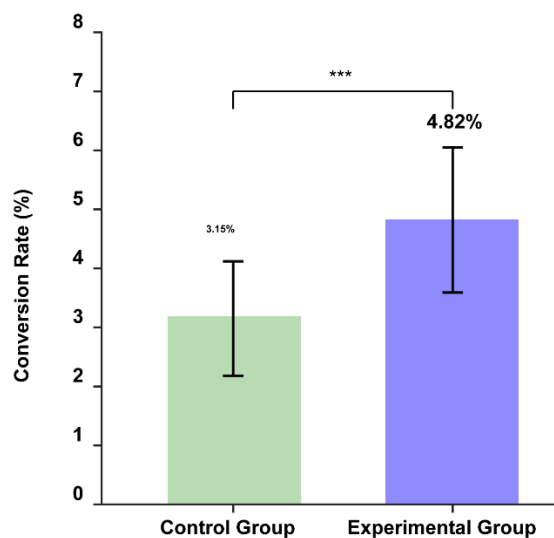


Figure 2. Conversion Rate Comparison: Personalized vs. Traditional Marketing.

Figure 2 shows the difference of effects caused by the two conditions. For conversion rates, the average conversion rate of the experimental group is 4.82%, while the average conversion rate of the control group is 3.15%. The difference is significant with a value of $t=5.73$, $P < 0.001$. Using the

equation of Cohen's d , the effect size is $d=1.50$, which means a 52.9% improvement over traditional marketing for AI personalized marketing with a large effect size. It is seen that although the new strategy is much better than the previous one, its standard deviation of 1.23 is slightly higher than the standard deviation of 0.97 in the control group, proving a degree of heterogeneity among users in the effectiveness of the personalized recommendation strategy.

4. Discussion

The empirical outcomes of this study show the differentiated features of the performance of the three digital marketing strategies, which is a significant dialogue with the existing literature. Based on the promotion of short videos, the high like rate performance of challenging videos supplements the benefits of plot videos in terms of comment rates and sharing rates. This finding confirms that content features of short videos exert a significant moderating impact on consumers' engagement, with the degree of emotional arousal and the specific moment of publication collectively defining users' level of content interaction [7]. The relatively low overall interaction rate of product display content corresponds with the preference of successful entrepreneurs on the TikTok platform for storytelling strategies instead of direct product promotion, clarifying that overtly commercial content presentation may reduce users' willingness to engage [8].

Based on the factor analysis concerning the conversion effect performance of e-commerce ads, click-through rates emerging as the most significant factor emphasizes the central importance of users' active participation behaviors within the conversion process. This finding aligns with existing research on social media marketing effectiveness, which suggests that influencer marketing strategies should progressively concentrate on user engagement rather than mere exposure metrics [9]. The horizontal comparison of the three marketing strategies demonstrates that AI personalized marketing achieves a 52.9% increase in conversion rates, representing a substantially larger effect magnitude compared to the differences observed through content strategy adjustments in short video promotion.

Based on the previous empirical findings, these results have profound implications for both digital marketing theory and practice. From a theoretical standpoint, this study validates that artificial intelligence technology can substantially enhance customer engagement capabilities through real-time data analysis and precise content recommendation, with algorithmic precision marketing fundamentally transforming conversion patterns throughout the traditional AIDA conceptual paradigm [10]. In terms of practice, enterprises must conduct differentiated configurations according to specific objectives when selecting digital marketing approaches: when targeting brand promotion and user engagement, video content with narrative elements possesses high dissemination value; when targeting direct conversion outcomes, artificial intelligence-based personalized recommendation strategies demonstrate superior performance. For small and medium-sized enterprises with constrained resources, implementing and fully utilizing social media platforms demands comprehensive consideration of organizational capabilities and technological readiness, with step-by-step construction of digital marketing capability systems [11]. Future trends in marketing practice may display a tendency towards strategic synergy and combination, namely organic integration of the strong interactivity of video content with the precise conversion capabilities of AI-based personalized recommendations to maximize marketing effectiveness.

5. Conclusion

This paper adopts a case-oriented data analysis strategy, with three types of public datasets involving TikTok short videos, Facebook e-commerce ads, and AI marketing A/B tests, to conduct a systematic analysis on the difference and mechanism of effectiveness of marketing strategy in the digital era. The findings of this study indicate that, for the promotion of short videos, challenge and story-based videos have a significantly greater social interaction effect than product display videos ($F=23.47$, $p<0.001$), and the conversion effect of e-commerce ads is primarily promoted by click-

through rates ($\beta=0.524$, $p<0.001$). There was a 52.9% increase in conversion rates produced by AI personalized marketing against traditional marketing approaches ($d=1.50$, $p<0.001$). Conclusions drawn from the above findings can serve as empirical evidence for enterprises' design of distinctive marketing approaches on social platforms, showing simultaneously the synergistic mechanism underlying content characteristics, participant behaviors, and algorithmic recommendation for the realization of marketing effects in the digital marketing field.

This study has some limitations. The sources of data used here are mainly based on one platform, and the design used is cross-sectional. The future scope of this study can be expanded to a longitudinal tracking study analysis for cross-platform and cross-culture verification of the research conclusion drawn in this study.

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