

Designing a Data-Driven Model for Managing Media Processes in Online Home Appliance Marketplaces and Examining Its Effect on Improving Marketing Performance

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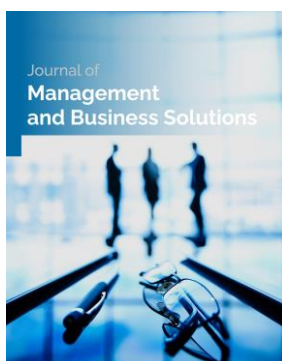
ABSTRACT

The present study was conducted with the aim of designing a data-driven model for managing media processes in online home appliance marketplaces and examining its effect on improving marketing performance. By identifying the relevant dimensions and components, the study sought to provide a scientific framework for enhancing the effectiveness of marketing activities in this industry. The research employed a mixed-methods approach using an exploratory sequential design. In the qualitative phase, semi-structured interviews were conducted with 22 managers of home appliance marketplaces, and the data were analyzed using the grounded theory method. Subsequently, a researcher-developed questionnaire derived from the qualitative model was distributed among 412 marketing managers and specialists. The validity and reliability of the instrument were confirmed using Cronbach's alpha, composite reliability, convergent validity, and discriminant validity (Fornell–Larcker criterion). Due to the non-normal distribution of the data, the bootstrap method with 5,000 subsamples was employed within the framework of Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the hypotheses and examine direct, indirect, and moderating effects. The findings of the qualitative phase led to the identification of six main dimensions (data collection and integration, predictive analytics, dynamic personalization, real-time optimization, closed-loop feedback, and data governance) along with 24 components. In the quantitative phase, the results of structural equation modeling indicated that all six dimensions had significant effects on marketing performance ($p < .001$). The strongest effect was related to dynamic personalization ($\beta = 0.28$), whereas the weakest effect was associated with closed-loop feedback ($\beta = 0.15$). Indirect effects through data integration quality ($\beta = 0.34$) and decision-making speed ($\beta = 0.29$) were also significant. Digital maturity moderated the relationship between the model and marketing performance ($\beta = 0.21$), whereas organizational size did not demonstrate a significant moderating effect. The final model explained 67% of the variance in marketing performance, and Harman's single-factor test indicated the absence of common method bias. The six-dimensional data-driven model developed in this study, with its emphasis on dynamic personalization and the enhancement of data integration quality and decision-making speed, can significantly improve the marketing performance of home appliance marketplaces.

Keywords: Management, Marketplace, Media Processes, Marketing, Data-Driven Model.

Introduction

The rapid expansion of digital commerce has fundamentally transformed the structure of markets, the logic of competition, and the mechanisms through which firms create, communicate, and deliver value to customers. Online



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marketplaces, as platform-based business ecosystems, have become central actors in this transformation because they do not merely sell products but coordinate interactions among consumers, sellers, data infrastructures, payment systems, logistics providers, and media channels. In such environments, marketing is no longer limited to advertising campaigns or promotional communication; rather, it is embedded in a continuous flow of data-driven interactions across the customer journey. The marketplace model creates value through network effects, seller participation, customer trust, and platform governance, making it structurally different from traditional reseller models (1, 2). In the home appliance sector, this complexity is particularly important because customers often engage in extended information search, product comparison, price evaluation, review reading, and post-purchase service assessment before making a decision. Therefore, the effectiveness of marketing in online home appliance marketplaces increasingly depends on the ability of platforms to manage media processes in an integrated, intelligent, and data-driven manner.

The rise of e-commerce has intensified competition among online retailers and marketplaces by increasing customer access to product alternatives, price transparency, and user-generated information. In this setting, marketing performance is influenced not only by product variety and price competitiveness but also by the quality of digital experience, personalization, trust-building mechanisms, and responsiveness to customer behavior. E-commerce systems combine business, technological, and social dimensions, and their success depends on the alignment of platform infrastructure with customer needs and market dynamics (3). At the same time, digital marketing has evolved into a strategic process that integrates search engines, social networks, websites, mobile applications, content platforms, and analytics systems to attract, convert, and retain customers (4). In online shopping environments, consumer trust is a critical determinant of purchase behavior, particularly when consumers evaluate expensive or durable goods such as home appliances (5). Thus, online marketplaces must design media processes that reduce uncertainty, increase perceived credibility, and guide customers through complex decision-making pathways.

Media processes in digital marketplaces refer to the coordinated set of activities through which platforms collect audience data, design content, deliver messages, personalize offers, monitor engagement, optimize campaigns, and use feedback for continuous improvement. These processes are increasingly shaped by large-scale media ecosystems, where customer attention is fragmented across multiple channels and where marketing messages must be timely, relevant, and context-sensitive (6). Integrated marketing communications also play an important role in aligning online and offline narratives, building preference, and creating coherence across customer touchpoints (7). In marketplace environments, the challenge is not simply to produce more media content, but to manage media processes as a dynamic system connected to customer data, seller information, behavioral analytics, and campaign performance indicators. This requires a transition from intuition-based media management to data-driven media process management.

Data-driven marketing has emerged as a response to the increasing availability of customer data and the growing need for evidence-based decision-making. Marketing analytics enables firms to extract actionable insights from data-rich environments and to improve segmentation, targeting, personalization, pricing, and performance evaluation (8). Big data analytics also helps organizations make smarter marketing decisions by integrating large, diverse, and fast-moving datasets into managerial processes (9). In this regard, data science provides the conceptual and methodological foundation for transforming raw data into patterns, predictions, and decisions through processes such as data preparation, modeling, classification, clustering, and evaluation (10). For online

marketplaces, such capabilities are particularly valuable because user interactions generate continuous streams of behavioral, transactional, social, and media data that can be used to optimize marketing actions in near real time.

The relationship between big data analytics capability and firm performance has been widely emphasized in the literature. Organizations that develop analytics capabilities can improve operational efficiency, customer responsiveness, and strategic alignment, especially when analytics are integrated with business strategy rather than treated as isolated technical tools (11). Empirical evidence also shows that big data analytics contributes positively to firm performance by enabling better decision-making, improved agility, and stronger market responsiveness (12). In marketing contexts, analytics allows firms to move from retrospective reporting to predictive and prescriptive decision-making. This shift is especially relevant for marketplace media processes, where managers must continuously decide which channels to prioritize, which customer segments to target, which content formats to use, and how to allocate advertising budgets across campaigns. Accordingly, big data analysis has become a key mechanism for improving organizational marketing decision-making (13).

Customer data management is another crucial foundation of data-driven media process management. In e-commerce businesses, customer data provide insight into browsing patterns, purchase history, product preferences, cart abandonment, customer lifetime value, and responsiveness to promotions. Effective customer data management improves business performance by enabling firms to identify profitable segments, personalize communication, and design more relevant marketing interventions (14). Similarly, customer data analysis enhances the effectiveness of digital marketing by allowing marketers to understand behavioral patterns and adjust strategies based on evidence rather than assumption (15). In online home appliance marketplaces, this issue becomes more important because customers often compare multiple product features, brands, warranties, delivery options, and seller reputations. Therefore, platforms that can integrate customer data across touchpoints are better positioned to design targeted and effective media processes.

Personalization represents one of the most visible outcomes of data-driven marketing. Contemporary marketing increasingly emphasizes the use of technology to create human-centered value, combining automation, artificial intelligence, and customer insight to deliver more relevant experiences (16). Artificial intelligence can strengthen marketing service personalization in e-commerce by analyzing user behavior, predicting preferences, and adapting recommendations and messages to individual needs (17). In platform-based marketplaces, dynamic personalization can include personalized product recommendations, adaptive promotional messages, customized content formats, and stage-based communication across the marketing funnel. Such personalization is directly linked to customer experience, which develops across multiple stages, including pre-purchase search, purchase interaction, and post-purchase evaluation (18). Therefore, managing media processes through data-driven personalization can improve engagement, conversion, satisfaction, and loyalty.

Social networks and user-generated content have also become integral to marketing performance in digital commerce. Social media channels influence electronic marketing performance by shaping customer awareness, engagement, brand interaction, and peer-based recommendation behavior (19). User-generated content can also contribute to value co-creation by increasing participation, credibility, and interactive engagement in online service environments (20). In marketplace contexts, reviews, ratings, comments, seller responses, and customer-generated media are not peripheral elements; they are part of the decision infrastructure through which customers evaluate products and sellers. This is particularly relevant in home appliance marketplaces, where customer reviews may reduce perceived risk and provide practical information about quality, durability, delivery, installation, and after-

sales service. Consequently, data-driven media process management must include mechanisms for monitoring, analyzing, and incorporating user-generated feedback into marketing decisions.

Digital transformation has also changed the strategic foundations of marketing management. Research on digital transformation emphasizes that strategy, rather than technology alone, determines transformation success (21). This means that marketplaces cannot achieve marketing improvement merely by adopting digital tools; they must develop organizational routines, managerial capabilities, and strategic alignment that enable data to inform decisions. Dynamic capabilities theory further suggests that firms must sense market changes, seize opportunities, and reconfigure resources in response to environmental turbulence (22). In online marketplaces, media processes must therefore be flexible and adaptive. Campaigns should be optimized based on real-time data, predictive insights should inform managerial decisions, and feedback loops should continuously update marketing actions. Without such dynamic capabilities, data infrastructures may remain underutilized and fail to produce measurable marketing performance improvement.

Data governance is a necessary condition for sustainable data-driven marketing. As organizations increasingly rely on large-scale customer, transactional, and behavioral data, governance mechanisms are required to define data ownership, access rights, quality standards, privacy safeguards, and accountability structures. A strong conceptual framework for data governance emphasizes the need to manage data as an organizational asset while ensuring reliability, compliance, and strategic usability (23). In marketplace environments, data governance is especially complex because multiple actors, including platform owners, sellers, customers, advertisers, and technology partners, interact within the same data ecosystem. Poor governance can lead to fragmented data, privacy risks, inconsistent reporting, weak trust, and ineffective analytics. Therefore, any model of data-driven media process management must include governance as a core dimension rather than treating it as a technical afterthought.

The service revolution has further expanded the role of intelligent technologies in marketing science. Modern marketing increasingly depends on the integration of technology, service systems, automation, and customer analytics to generate value in complex markets (24). In online marketplaces, marketing performance is not only the outcome of promotional intensity but also the result of service quality, platform responsiveness, recommendation accuracy, communication relevance, and post-purchase support. Digital marketing affects consumer buying behavior in online stores by shaping attention, perceived usefulness, trust, and purchase intention (25). Hence, marketing performance in home appliance marketplaces should be understood as a multidimensional outcome that includes customer acquisition, engagement, conversion, retention, seller satisfaction, campaign efficiency, and revenue growth. Data-driven management of media processes can potentially improve these outcomes by connecting data collection, analytics, personalization, optimization, feedback, and governance into an integrated model.

Despite the growing literature on digital marketing, big data analytics, e-commerce, personalization, and platform business models, there remains a need for context-specific models that explain how data-driven media processes can be designed and managed in online marketplaces. Much of the existing literature addresses analytics capabilities, digital transformation, customer journey management, or platform strategy separately, while fewer studies provide an integrated framework for managing media processes in marketplace ecosystems. This gap is particularly important in the home appliance industry because purchasing decisions are relatively high-involvement, information-intensive, and trust-dependent. Customers need reliable content, comparison tools, credible reviews,

relevant recommendations, and timely promotional messages. Sellers also need actionable feedback, campaign transparency, and data-based support from the platform. Therefore, a data-driven model that links media process management to marketing performance can contribute both theoretically and practically by clarifying the mechanisms through which marketplaces can improve marketing effectiveness.

In addition, the Iranian online marketplace context creates specific managerial challenges that justify the development of a localized model. Marketplaces operating in this context face intense competition, diverse seller capabilities, varying levels of digital maturity, fragmented customer data, and changing consumer expectations. While global theories of platform strategy, digital marketing, big data analytics, and customer experience provide valuable foundations, their application requires empirical adaptation to the realities of local marketplace operations. Studies in the Iranian context have emphasized the role of digital marketing, customer data management, social networks, and analytics in improving online business performance (14, 15, 19, 25). However, an integrated and empirically validated model focused specifically on media process management in online home appliance marketplaces remains underdeveloped. This study addresses this gap by combining qualitative model development with quantitative validation.

Accordingly, the theoretical logic of the present study is built on the integration of platform theory, digital marketing, customer journey theory, big data analytics capability, dynamic capabilities, personalization, and data governance. Platform theory explains the structural role of marketplaces as intermediaries that coordinate multiple actors and generate value through interactions (1, 2). Digital marketing theory explains how online channels and media tools are strategically used to influence customer behavior (4, 16). Customer journey theory clarifies how customers experience multiple touchpoints before, during, and after purchase (18). Big data analytics and data science explain how data can be transformed into insight and decision support (8, 10, 26). Dynamic capabilities theory explains why firms must continuously adapt marketing processes to environmental change (22). Finally, data governance theory ensures that the use of data remains reliable, secure, standardized, and strategically aligned (23). The integration of these perspectives provides a comprehensive basis for designing a data-driven model of media process management.

From a managerial perspective, such a model can help marketplace managers move beyond fragmented campaign management and toward an integrated system of data-based marketing control. It can support more accurate data collection, stronger integration of media and transactional data, predictive analysis of customer and campaign behavior, dynamic personalization of content, real-time optimization of marketing actions, structured feedback from customers and sellers, and stronger governance of data quality and privacy. These mechanisms are expected to improve marketing performance by increasing decision-making speed, improving data integration quality, reducing waste in media spending, enhancing customer relevance, and strengthening trust. The need for such integration is consistent with the broader movement toward analytics-based competition, where firms gain advantage by embedding data and evidence into routine decisions (9, 26). Therefore, the present study contributes to the literature by proposing and testing a comprehensive model that connects data-driven media process management with marketing performance in a specific marketplace context.

The aim of the present study was to design a data-driven model for managing media processes in online home appliance marketplaces and to examine its effect on improving marketing performance.

Methods and Materials

The present study was applied in terms of purpose and, in terms of the nature of the data, was a mixed-methods study of the exploratory sequential type, implemented in two qualitative and quantitative phases. In the qualitative phase, the grounded theory approach, based on the systematic approach of Strauss and Corbin, was used so that the components and dimensions of the model could be extracted from data derived from the real context. The research population in this phase included all senior and middle marketing managers, information technology managers, and sales managers of three major online home appliance marketplaces in Iran, which, for reasons of confidentiality, were referred to by the pseudonyms “Khaneh-Mowj,” “Electropol,” and “BazarDigi.” Sampling in the qualitative section was conducted purposively using the snowball technique. Participants were required to have at least five years of work experience related to digital marketing or platform management, as well as direct experience in working with media data and marketplace processes. The interview process continued until theoretical saturation was achieved, which occurred after the fourteenth interview; however, to ensure greater confidence, the interviews were continued up to the twenty-second participant. The data collection instrument at this stage was a semi-structured interview, the questions of which were designed based on the theoretical foundations extracted from credible studies such as Hall et al. (2013), Bar-Gill et al. (2024), Tan (2024), and Song et al. (2026). All interviews were conducted face to face in 2024–2025 at the participants’ workplaces, and the average duration of each interview was 65 minutes. All interviews were recorded after obtaining prior permission and were then transcribed verbatim. For qualitative data analysis, the three-stage coding method of open, axial, and selective coding was applied using MAXQDA 2020 software. After data analysis, the initial research model was extracted, including causal conditions, the core phenomenon (data-driven management of media processes), strategies, contextual conditions, intervening conditions, and outcomes, the most important of which was improvement in marketing performance. To evaluate the credibility and dependability of the qualitative findings, Lincoln and Guba’s criteria were used, including credibility (through peer review and participant feedback), transferability (through rich and detailed descriptions of the research context), dependability (through simultaneous auditing of codes by two independent coders), and confirmability (through accurate documentation of the research process). The agreement between the two coders was calculated at 87%.

In the quantitative phase of the study, which was conducted to validate the model and examine its effect on improving marketing performance, a cross-sectional survey approach was used. The statistical population of this phase included all marketing managers and specialists working in five online home appliance marketplaces, as well as fifty sellers (suppliers) with active sales on these platforms. Based on Cochran’s formula for unlimited populations, the sample size was estimated at 384; however, to compensate for possible attrition, 450 questionnaires were distributed. The sampling method in the quantitative section was stratified random sampling, based on two variables: duration of collaboration (less than three years, three to seven years, and more than seven years) and seller size (small, medium, and large). The data collection instrument in the quantitative phase was a researcher-developed questionnaire designed in five sections: the first section included demographic questions (gender, age, educational level, work experience, and platform type); the second section included items measuring the status of data-driven management of media processes (28 items extracted from the qualitative model); the third section included items measuring marketing performance (15 items derived from the studies of Tan, 2024, and Song et al., 2026); the fourth section included items measuring intervening and contextual indicators (10 items);

and the fifth section included items related to control variables, such as marketing budget and number of personnel. All items were scored on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. To ensure the content validity of the questionnaire, the initial version was provided to seven academic and industry experts (three marketing professors and four senior marketplace managers). After revisions were applied, the content validity ratio (CVR) and content validity index (CVI) were calculated for each item. The CVR values for all items were above 0.78, and the CVI values were above 0.80, indicating acceptable content validity. Construct validity was also examined through confirmatory factor analysis using AMOS 24 software, and the factor loadings of all items were reported to be above 0.50 and significant. The reliability of the questionnaire was calculated using Cronbach's alpha coefficient, which was 0.934 for the entire questionnaire, indicating very good reliability of the instrument. In addition, composite reliability and the average variance extracted for each construct were above 0.70 and 0.50, respectively, confirming convergent reliability.

For the analysis of quantitative data, Partial Least Squares Structural Equation Modeling (PLS-SEM) was performed using SmartPLS version 3.3.3. In the first stage, the assumption of data normality was examined using the Kolmogorov–Smirnov test. Since the data distribution was not normal, the non-parametric bootstrap approach with 5,000 subsamples was used to estimate path coefficients and examine their significance. The fit of the measurement model was evaluated by examining factor loadings, composite reliability, and average variance extracted. The fit of the structural model was also assessed using the coefficient of determination, the Stone–Geisser predictive relevance index, and the goodness-of-fit index. Indirect effects were examined using the bootstrap method. To examine the moderating effects of contextual variables such as organizational size and digital maturity, moderation analysis was used. To ensure the absence of common method bias, Harman's single-factor test was applied. In addition, to examine the discriminant validity of the constructs, the Fornell–Larcker criterion and the heterotrait–monotrait ratio test were used. All statistical analyses were conducted at a 95% confidence level and with a significance level of 0.05. Finally, the final research model, considering all components extracted from the qualitative phase and the structural relationships examined in the quantitative phase, was introduced as the data-driven model for managing media processes in online home appliance marketplaces.

Findings and Results

In the first stage of the study, the data obtained from 22 semi-structured interviews were analyzed using open, axial, and selective coding. From a total of 687 initial meaningful statements, 112 open codes were identified. After merging similar codes, 24 sub-concepts and ultimately 6 main categories were extracted. Table 1 presents the characteristics of the participants in the qualitative section.

Table 1. Demographic Characteristics of Interview Participants (n = 22)

Characteristic	Subgroup	Frequency	Percentage
Gender	Male	18	81.8
	Female	4	18.2
Age (years)	30–40	7	31.8
	41–50	11	50.0
	Over 50	4	18.2
	Under 30	0	0.0
Education	Bachelor's degree	5	22.7
	Master's degree	13	59.1
	Doctorate	4	18.2
	Diploma and associate degree	0	0.0

Work experience (years)	5–10	8	36.4
	11–15	9	40.9
	More than 15	5	22.7
Seller size (if applicable)	Less than 5	0	0.0
	Small	4	18.2
	Medium	10	45.4
	Large	8	36.4

After axial coding, six main categories (model dimensions) were identified as follows: 1) collection and integration of media data (including 5 sub-concepts), 2) predictive process analytics (including 4 sub-concepts), 3) dynamic content personalization (including 4 sub-concepts), 4) real-time campaign optimization (including 4 sub-concepts), 5) closed-loop feedback (including 3 sub-concepts), and 6) data governance (including 4 sub-concepts). Table 2 presents the sub-concepts of each main category along with the frequency of references in the interviews.

Table 2. Main Categories and Sub-Concepts Extracted from the Interviews

Main Category	Sub-Concepts (Axial Codes)	Number of References
Collection and integration of media data	Data collection from social channels, search engines, video platforms, shopping applications, and transactional data	57
Predictive process analytics	Prediction of click-through rate, prediction of conversion rate, prediction of customer churn, profit margin analysis	43
Dynamic content personalization	Alignment of advertising content with user behavior, context-based recommender system, adjustment of message tone and format, personalization based on funnel stage	39
Real-time campaign optimization	Budget allocation to high-performing channels, adjustment of message delivery time, automatic bid adjustment, automatic removal of low-performing keywords	36
Closed-loop feedback	Recording feedback from sellers, analysis of customer reviews, updating predictive models based on results	28
Data governance	Data access policies, data standardization, security and privacy, data quality	34

In the second stage, 412 valid questionnaires were analyzed. Table 3 presents the frequency distribution of respondents based on demographic variables.

Table 3. Demographic Characteristics of Questionnaire Respondents (n = 412)

Characteristic	Subgroup	Frequency	Percentage
Gender	Male	264	64.1
	Female	148	35.9
Age (years)	Under 30	58	14.1
	30–40	172	41.7
	41–50	124	30.1
	Over 50	58	14.1
Education	Diploma and below	21	5.1
	Associate degree	33	8.0
	Bachelor's degree	140	34.0
	Master's degree	169	41.0
	Doctorate	49	11.9
Work experience (years)	Less than 3	62	15.0
	3–7	174	42.2
	More than 7	176	42.7
Seller size	Small (fewer than 10 employees)	118	28.6
	Medium (10–50 employees)	186	45.1
	Large (more than 50 employees)	108	26.2

Before testing the hypotheses, the validity and reliability of the instrument were examined. Table 4 presents the values of factor loadings, Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) for

each construct. All validity and reliability indices fall within the standard ranges and even exceed the required thresholds. Therefore, the questionnaire instrument has very good internal reliability and convergent validity, and the collected data are suitable for hypothesis testing and structural model fitting. Specifically, the “marketing performance” construct, with the highest values across all indices, is one of the strongest constructs in the model, while the “closed-loop feedback” construct, although showing slightly lower values, still remains at an acceptable and good level.

Table 4. Validity and Reliability Indices of the Model Constructs

Construct	Number of Items	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)	Range of Factor Loadings
Data collection and integration	5	0.885	0.912	0.678	0.72–0.89
Predictive analytics	4	0.836	0.895	0.641	0.70–0.87
Dynamic personalization	4	0.847	0.884	0.623	0.68–0.85
Real-time optimization	4	0.871	0.903	0.652	0.71–0.88
Closed-loop feedback	3	0.805	0.856	0.601	0.65–0.82
Data governance	4	0.859	0.894	0.638	0.69–0.86
Marketing performance	5	0.902	0.925	0.713	0.76–0.91

To examine discriminant validity, the Fornell–Larcker criterion was used. Table 5 presents the correlation matrix among the constructs along with the square root of AVE values on the main diagonal. Since, for all seven constructs, the square root of AVE is greater than all corresponding inter-construct correlations, the discriminant validity of the model is fully confirmed based on the Fornell–Larcker criterion. In other words, each of the six dimensions of the data-driven model (collection and integration, predictive analytics, dynamic personalization, real-time optimization, closed-loop feedback, and data governance), as well as the marketing performance variable, constitutes a distinct construct, and the correlations among them are not high enough to indicate conceptual overlap. The highest observed correlation (0.571 between dynamic personalization and marketing performance) indicates a positive and relatively strong relationship, but it remains at a level that does not undermine the distinction between the two constructs. This finding provides the basis for testing the structural relationships in the model.

Table 5. Fornell–Larcker Matrix for Discriminant Validity

Construct	1	2	3	4	5	6	7
1. Collection and integration	0.823						
2. Predictive analytics	0.534	0.801					
3. Dynamic personalization	0.491	0.512	0.789				
4. Real-time optimization	0.467	0.483	0.522	0.807			
5. Closed-loop feedback	0.412	0.435	0.449	0.478	0.775		
6. Data governance	0.512	0.423	0.402	0.398	0.418	0.799	
7. Marketing performance	0.567	0.548	0.571	0.532	0.495	0.438	0.844

The Kolmogorov–Smirnov test was used to examine the distribution of the data, and the results showed that the data distribution was not normal; therefore, the bootstrap method with 5,000 subsamples was used in the subsequent analyses. The fit indices of the measurement and structural models, including the coefficient of determination (R^2), the Stone–Geisser predictive relevance index (Q^2), and the goodness-of-fit index (GOF), were 0.67, 0.42, and 0.59, respectively.

Table 6 presents the standardized path coefficients (β), the path involving moderating variables, and the results of indirect (mediating) effect analysis using the bootstrap method for the relationships between the dimensions of

the data-driven model and marketing performance. In this analysis, data integration quality and decision-making speed were entered into the model as mediating variables.

Table 6. Results of Research Hypothesis Testing (Path Coefficients and Significance)

Relationship (Path)	Standardized Path Coefficient (β)	t Statistic	p-value
Collection and integration → Marketing performance	0.24	4.57	0.001
Predictive analytics → Marketing performance	0.22	3.98	0.001
Dynamic personalization → Marketing performance	0.28	5.12	0.001
Real-time optimization → Marketing performance	0.18	3.25	0.001
Closed-loop feedback → Marketing performance	0.15	2.87	0.004
Data governance → Marketing performance	0.20	3.64	0.001
Data-driven model → Data integration quality → Marketing performance	0.34	6.21	0.001
Data-driven model → Decision-making speed → Marketing performance	0.29	5.43	0.001
Data-driven model → Data integration quality → Marketing performance	0.34	6.21	0.001
Data-driven model → Decision-making speed → Marketing performance	0.29	5.43	0.001

Based on the results of Table 6, all direct relationships between the six dimensions of the data-driven model and marketing performance were statistically significant ($p < 0.05$). In addition, the calculated t statistic for all paths was higher than the critical value of 1.96, confirming the significance of the relationships. The highest direct path coefficient belonged to “dynamic content personalization,” with a value of 0.28, indicating that this dimension had the greatest contribution to explaining changes in marketing performance. It was followed, respectively, by “data collection and integration” with a coefficient of 0.24, “predictive analytics” with 0.22, “data governance” with 0.20, “real-time campaign optimization” with 0.18, and finally “closed-loop feedback” with a coefficient of 0.15. Although the path coefficient of closed-loop feedback was the lowest among all dimensions, given its t statistic of 2.87 and significance level of 0.004, it still had a positive and significant effect on marketing performance. In the section on indirect effects, both mediating paths were confirmed at the significance level of 0.001. The indirect coefficient of the path “data-driven model → data integration quality → marketing performance” was 0.34, and its t statistic was 6.21, indicating that data integration quality played a strong mediating role in the relationship between the model and marketing performance. The indirect path through decision-making speed, with a coefficient of 0.29 and a t statistic of 5.43, was also significant, although its strength was slightly lower than the path through data integration quality. In the section on moderating effects, the test result for organizational size showed that the interaction coefficient was 0.08, with a t statistic of 1.42 and a significance level of 0.155, which is greater than 0.05; therefore, organizational size did not moderate the relationship between the data-driven model and marketing performance, and the effect of the model on marketing performance did not differ significantly across small, medium, and large companies. In contrast, digital maturity, with an interaction coefficient of 0.21, a t statistic of 3.56, and a significance level of 0.001, had a positive and significant moderating effect; this means that the higher the level of digital maturity in the organization, the stronger the effect of the data-driven model on improving marketing performance. Overall, all research hypotheses were confirmed except the hypothesis concerning the moderating role of organizational size.

Table 7. Results of Harman's Single-Factor Test

Factor Number	Eigenvalue	Extracted Variance (%)	Cumulative Variance (%)
Factor 1	8.03	28.7	28.7
Factor 2	3.47	12.4	41.1
Factor 3	2.49	8.9	50.0
Factor 4	1.86	6.6	56.6
Factor 5	1.52	5.4	62.0
Factor 6	1.23	4.4	66.4
Factor 7	1.01	3.6	70.0
Other factors (21 factors)	Total: 8.40	30.0	100.0

The results of Harman's test (Table 7) show that the first factor explains only 28.7% of the total variance, which is substantially lower than the critical threshold of 50%. The first seven factors had eigenvalues greater than 1 and together accounted for 70% of the variance. The remaining variance (30%) was explained by 21 other factors. Since no single factor accounted for more than half of the variance, it can be concluded that common method bias did not create a serious problem in the data of this study, and the data had sufficient validity for hypothesis testing.

Table 8. Dimensions of the Final Model and Number of Subcomponents

Main Model Dimension	Subcomponents
Collection and integration of media data	<ol style="list-style-type: none"> 1. Data collection from social channels 2. Data collection from search engines 3. Data collection from video platforms 4. Data collection from shopping applications 5. Integration of transactional data with behavioral data
Predictive process analytics	<ol style="list-style-type: none"> 1. Prediction of click-through rate (CTR) 2. Prediction of conversion rate (CVR) 3. Prediction of customer churn 4. Profit margin analysis before campaign implementation
Dynamic content personalization	<ol style="list-style-type: none"> 1. Alignment of advertising content with users' real-time behavior 2. Context-based recommender system (location, time, device) 3. Adjustment of message tone and format based on customer profile 4. Content personalization based on the marketing funnel stage
Real-time campaign optimization	<ol style="list-style-type: none"> 1. Dynamic budget allocation to high-performing channels 2. Adjustment of message delivery time based on interaction patterns 3. Automatic bid adjustment in advertising auctions 4. Automatic removal of low-performing keywords or channels
Closed-loop feedback	<ol style="list-style-type: none"> 1. Systematic recording of seller feedback after each campaign 2. Automatic analysis of customer reviews and ratings 3. Updating predictive models based on actual results
Data governance	<ol style="list-style-type: none"> 1. Data access-level policies for sellers 2. Standardization of data formats across all channels 3. Compliance with security and privacy requirements in accordance with laws 4. Continuous monitoring of data quality (completeness, timeliness, consistency)
Total	24

The data-driven model for managing media processes in home appliance marketplaces consists of six main dimensions, encompassing a total of 24 subcomponents (Table 8). The distribution of components across the different dimensions is not uniform; the dimension of "collection and integration of media data," with 5 subcomponents, has the highest number, indicating the infrastructural importance of this dimension in the model. This dimension provides comprehensive coverage of data sources, including social networks, search engines, video platforms, and shopping applications, as well as the integration of transactional data with behavioral data, indicating that without systematic data collection and the linking of data from diverse sources, the other dimensions of the

model will not have the required effectiveness. The dimensions of “predictive process analytics,” “dynamic content personalization,” and “real-time campaign optimization” each include 4 components and form a continuous processing chain: first, key indicators such as click-through rate, conversion rate, and customer churn are predicted; then, content is personalized based on users’ real-time behavior and context; and finally, campaigns are automatically optimized through budget allocation, delivery-time adjustment, bid modification, and removal of low-performing channels. Together, these three dimensions constitute the analytical and operational core of the model. The “closed-loop feedback” dimension, with 3 components (recording seller feedback, analyzing customer reviews, and updating predictive models), has the fewest components, but it plays a vital role in continuous learning and process correction and completes the final loop of the model. The “data governance” dimension, with 4 components (access policies, standardization, security and privacy, and data quality monitoring), also provides the governance framework required for the safe and sustainable implementation of the model. Overall, the six-dimensional structure of the model indicates both comprehensiveness and logical sequence: beginning with data collection, followed by predictive analytics, personalization, real-time optimization, feedback, and finally governance as a cross-cutting layer covering all stages. This combination shows that the developed model emphasizes not only technical and analytical aspects but also managerial and governance dimensions, which appear necessary for successful implementation in home appliance marketplaces.

Discussion and Conclusion

The findings of the present study demonstrated that data-driven management of media processes significantly improves marketing performance in online home appliance marketplaces. The qualitative phase led to the identification of six key dimensions, including media data collection and integration, predictive process analytics, dynamic content personalization, real-time campaign optimization, closed-loop feedback, and data governance. The quantitative phase further confirmed that all six dimensions exert significant positive effects on marketing performance. Moreover, the final structural model explained 67% of the variance in marketing performance, indicating substantial explanatory power. These findings collectively suggest that marketing success in contemporary online marketplaces increasingly depends on the systematic integration of data resources, analytical capabilities, adaptive media management mechanisms, and governance structures rather than on traditional promotional activities alone.

One of the most important findings of this study was the significant effect of media data collection and integration on marketing performance. This result highlights the foundational role of data infrastructure in digital marketplaces. Online home appliance marketplaces operate through numerous customer touchpoints, including search engines, social media platforms, video-sharing services, mobile applications, and transactional systems. When data from these sources are integrated into a unified architecture, managers gain a comprehensive view of customer behavior and market dynamics. This finding aligns with previous studies emphasizing that customer data management enhances organizational performance by enabling more accurate customer understanding and more effective strategic actions (14). It is also consistent with research demonstrating that customer data analytics significantly improves digital marketing effectiveness by generating actionable insights for decision-making (15). From a theoretical perspective, the finding supports the notion that digital platforms derive value not only from network effects but also from their ability to transform fragmented data into organizational intelligence (1, 2). Therefore,

effective data integration can be regarded as the primary enabling mechanism through which marketplace firms improve marketing outcomes.

Another significant finding concerned the positive impact of predictive process analytics on marketing performance. The results indicated that predictive capabilities contribute directly to improved marketing outcomes by enabling managers to anticipate customer behavior, forecast campaign effectiveness, estimate conversion rates, and identify churn risks before they occur. This finding is consistent with the literature emphasizing the strategic value of analytics-based competition and predictive decision-making (26). It also aligns with studies demonstrating that big data analytics capabilities enhance organizational performance through improved decision quality and strategic alignment (11, 12). Predictive analytics allows marketplace managers to move from reactive marketing approaches toward proactive and anticipatory strategies. In highly competitive home appliance markets, where customer decisions often involve substantial financial investment and extensive information search, predictive insights enable organizations to allocate resources more efficiently and intervene at critical stages of the customer journey. The findings therefore reinforce the argument that data-driven predictive capabilities are becoming essential organizational resources in digital commerce environments (10, 13).

Among all dimensions examined in the study, dynamic content personalization exhibited the strongest direct effect on marketing performance. This finding is particularly noteworthy because it demonstrates that the value of data ultimately materializes through customer-relevant actions. Data collection and analytics become meaningful when they enable firms to deliver personalized experiences that reflect individual preferences, contexts, and behavioral patterns. This result strongly supports the growing body of literature emphasizing the importance of personalization in contemporary digital marketing (16). It is also consistent with empirical evidence showing that artificial intelligence enhances marketing performance through adaptive personalization and customized service delivery (17). From the perspective of customer journey theory, personalization improves customer experience by increasing relevance across multiple touchpoints and reducing information overload during decision-making processes (18). The finding further suggests that customers purchasing home appliances are highly responsive to personalized recommendations, targeted content, and context-sensitive communication. Consequently, organizations that invest in personalization technologies and customer intelligence systems are likely to achieve superior marketing performance.

The study also confirmed the significant role of real-time campaign optimization in improving marketing performance. This result reflects the growing importance of agility in digital marketing environments. Unlike traditional marketing campaigns that are often evaluated after implementation, digital campaigns can be continuously adjusted based on ongoing performance data. Real-time optimization allows managers to redistribute budgets, modify bidding strategies, adjust communication timing, and eliminate underperforming channels while campaigns are still active. This finding aligns with the principles of dynamic capabilities theory, which emphasize the importance of sensing opportunities, seizing them, and reconfiguring resources in response to changing environmental conditions (22). It also supports the arguments of digital marketing scholars who emphasize that competitive advantage increasingly depends on the ability to rapidly adapt marketing actions based on real-time customer feedback and performance indicators (4, 9). Therefore, real-time optimization functions as a critical operational mechanism through which data-driven organizations maintain responsiveness and efficiency in highly dynamic marketplace environments.

Another important finding was the positive effect of closed-loop feedback on marketing performance. Although this dimension demonstrated the smallest direct coefficient among the six dimensions, it remained statistically significant and theoretically meaningful. Closed-loop feedback mechanisms allow organizations to learn continuously from customer reviews, seller evaluations, and campaign outcomes. This result supports the literature emphasizing the role of customer engagement, user-generated content, and continuous feedback in digital ecosystems (20). It also aligns with studies highlighting the influence of social and interactive communication processes on electronic marketing effectiveness (19). The relatively smaller coefficient may reflect the indirect nature of feedback effects. Feedback does not always generate immediate performance improvements; instead, it contributes to organizational learning, model refinement, and future decision quality. Consequently, its strategic value may become more evident over longer periods. Nevertheless, the findings confirm that sustainable marketing success requires organizations to establish mechanisms that continuously capture, analyze, and utilize stakeholder feedback.

The significant influence of data governance on marketing performance constitutes another important contribution of the study. As organizations become increasingly dependent on large volumes of customer and transactional data, issues related to data quality, standardization, access control, security, and privacy become critical determinants of organizational effectiveness. The positive effect of data governance observed in this study supports the conceptual arguments proposed by Abraham and colleagues regarding the strategic importance of governance frameworks for managing organizational data assets (23). Strong governance structures enhance trust in analytical outputs, improve data consistency, reduce operational risks, and facilitate compliance with legal and ethical requirements. In online marketplaces where multiple stakeholders interact through shared digital infrastructures, governance becomes especially important because unreliable or fragmented data can undermine both decision-making quality and customer trust. Therefore, the findings suggest that data governance should be considered a strategic capability rather than merely a technical or administrative function.

The mediation analysis provided additional insight into the mechanisms through which the data-driven model influences marketing performance. The results showed that both data integration quality and decision-making speed significantly mediated the relationship between the model and marketing performance. The stronger mediation effect of data integration quality suggests that the benefits of data-driven media management depend substantially on the organization's ability to combine information from multiple sources into coherent and reliable datasets. This finding reinforces previous research emphasizing the importance of integrated customer data management for marketing effectiveness (14, 15). Furthermore, the significant mediation effect of decision-making speed supports the notion that analytics capabilities create value partly by accelerating managerial responses to market changes (11, 26). In digital marketplaces, where customer preferences and competitive conditions evolve rapidly, faster decisions often translate directly into superior marketing outcomes. Thus, the study demonstrates that data-driven systems improve performance not only through better information but also through more timely action.

The moderation analysis revealed that digital maturity significantly strengthened the relationship between the data-driven model and marketing performance, whereas organizational size did not exert a significant moderating effect. The positive moderating role of digital maturity suggests that organizations possessing more advanced digital infrastructures, capabilities, and cultures are better positioned to exploit the benefits of data-driven media management. This finding is consistent with research emphasizing that successful digital transformation depends on strategic and organizational readiness rather than technological adoption alone (21). It also supports the

argument that technology creates value only when embedded within broader organizational processes and capabilities (16, 24). The non-significant role of organizational size is equally important because it indicates that data-driven media management can be beneficial for both small and large marketplace actors. This finding suggests that access to data and analytics may be reducing some of the traditional advantages associated with organizational scale. In other words, smaller organizations equipped with appropriate data-driven capabilities may compete effectively with larger competitors in digital marketplace environments.

Overall, the findings of this study support a comprehensive view of marketing performance improvement in online marketplaces. Rather than being driven by isolated marketing tactics, performance emerges from the interaction of data collection, analytics, personalization, optimization, feedback, governance, and organizational capabilities. This perspective aligns with contemporary theories of digital marketing, platform ecosystems, customer experience management, and analytics-driven competition (3, 8, 16). The six-dimensional model developed in this study therefore provides an integrated framework that explains how online home appliance marketplaces can transform data into marketing value. By linking technical, analytical, operational, and governance dimensions, the model offers a more holistic understanding of marketing effectiveness in platform-based business environments. The findings also contribute to the growing literature on digital transformation by demonstrating that sustainable marketing performance depends not only on technology adoption but also on the strategic management of data-driven media processes (5-7).

One limitation of the present study is that the data were collected from online home appliance marketplaces operating within a specific national context, which may limit the generalizability of the findings to other industries or geographical settings. In addition, the quantitative phase relied on self-reported questionnaire data, making it difficult to completely eliminate respondent-related biases. The cross-sectional design of the quantitative phase also restricts the ability to establish causal relationships over time. Furthermore, although several contextual variables were examined, other potentially influential factors such as organizational culture, technological investment levels, competitive intensity, and customer digital literacy were not included in the model.

Future research should examine the proposed model in other marketplace sectors such as fashion, electronics, healthcare, and online services to assess its applicability across different industries. Longitudinal studies could provide deeper insight into how data-driven media processes influence marketing performance over extended periods. Researchers may also investigate additional mediating and moderating variables, including organizational learning, innovation capability, customer trust, and technological readiness. Comparative studies across countries with different levels of digital development could further enrich understanding of contextual influences on data-driven marketing effectiveness.

From a practical perspective, marketplace managers should prioritize the development of integrated data infrastructures that connect customer, transactional, behavioral, and media information into a unified analytical environment. Organizations should invest in predictive analytics capabilities, dynamic personalization systems, and real-time optimization mechanisms to enhance marketing responsiveness and customer relevance. Establishing structured feedback systems and robust data governance frameworks is equally important for sustaining long-term performance improvements. Finally, managers should focus on increasing organizational digital maturity through employee training, process redesign, and strategic alignment initiatives, as the findings indicate that digital maturity significantly amplifies the positive effects of data-driven media process management on marketing performance.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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