

Research Article

AI-Enabled Precise Market Demand Insight and Strategy Adaptation in Marketing

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Abstract

In the digital economy era, the market environment exhibits diverse and complex characteristics, and consumer demands are increasingly personalized and dynamic, making it difficult for traditional marketing models to accurately capture market needs. This paper focuses on exploring effective paths for AI-enabled marketing, conducts an in-depth analysis of the adaptation mechanism between AI and demand insight, constructs a precise insight system of “data collection - intelligent mining - dynamic prediction”, and establishes a three-dimensional strategy adaptation framework covering products, channels, and communication. It further improves the theoretical system by integrating value transformation, case verification, and practical deepening. The research aims to address the core pain points of traditional marketing, verify the practical value of AI in cost reduction, efficiency improvement, and quality enhancement, clarify the deepening directions at the technical, ethical, and organizational levels, and provide systematic support for enterprises to improve the level of marketing intelligence and consolidate core competitiveness.

Keywords

AI, Marketing, Demand insight, Strategy adaptation, Precision marketing

1. Introduction

With the in-depth development of the digital economy, marketing is entering a new stage of intelligent evolution. Consumer behavior trajectories are becoming more fragmented, and the pace of demand iteration is continuously accelerating. Traditional demand insight methods relying on empirical judgment and sampling surveys are limited by low efficiency and insufficient accuracy,

making it difficult to keep up with market changes. The rise of AI technology has provided a new solution for marketing demand insight. Its powerful data processing and analysis capabilities can break through the limitations of traditional methods, enabling in-depth interpretation and forward-looking prediction of consumer demands (Davenport et al., 2020). Centering on the core logic of AI-enabled precise demand insight, this paper starts from theoretical adaptability, elaborates on the implementation paths of technology landing, constructs a strategy adaptation framework, analyzes practical challenges and optimization directions, and systematically discusses the specific paths through which AI injects new momentum into marketing, providing practical references for enterprises to improve the level of marketing intelligence.

This paper adopts a conceptual research approach supplemented by illustrative industry cases. The cases discussed in Section V are drawn from publicly reported practices in three representative industries—fast-moving consumer goods (FMCG), new energy automotive, and chain retail—selected for the visibility of AI adoption and the availability of reported outcomes. They are presented as illustrative evidence to support the conceptual framework rather than as primary empirical data, and any quantitative figures are reported as industry-typical estimates for descriptive purposes.

2. Logical Starting Point of AI-Enabled Demand Insight in Marketing

2.1. Core Connotation of Marketing Demand Insight

Marketing demand insight refers to the process by which enterprises analyze key dimensions such as consumer behavior preferences and purchase intentions to gain an in-depth understanding of the essence and changing trends of market demands. Its core orientation lies in exploring consumers' real needs to provide scientific support for marketing decisions. Traditional demand insight focuses more on capturing explicit demands, while in the current stage, the excavation of consumers' implicit and potential demands has become increasingly critical. Demand insight should cover the entire marketing process, extending from product R&D to after-sales service, to build a closed-loop demand management mechanism. In-depth interpretation of demands helps enterprises clarify market positioning, avoid blind investment, and achieve efficient allocation of marketing resources.

2.2. Application Characteristics of AI Technology in the Marketing Field

The application characteristics of AI technology in marketing are concentrated in intelligence, automation, and personalization. Relying on core algorithms such as machine learning and deep learning, AI can conduct in-depth analysis of user behavior data. Different from the passive response mode of traditional technologies, AI technology can actively identify the correlation rules between data and generate insight conclusions with decision-making value (Du et al., 2021). Meanwhile, AI technology supports real-time interaction and dynamic adjustment, and can quickly optimize analysis

models according to market changes to meet the diverse needs of marketing scenarios. In addition, the decentralized analysis model can break through hierarchical limitations and further improve the efficiency of marketing decisions.

2.3. Adaptability Logic Between AI and Demand Insight

AI is highly adaptable to demand insight because its core functionalities directly address the key requirements of accuracy, timeliness, and forward-looking analysis. These three requirements of demand insight can be effectively addressed through AI's capabilities in data integration, intelligent analysis, and real-time feedback. AI can break through the limitations of information silos, realize the collaborative analysis of multi-source information, and solve the problem of information fragmentation in traditional insight processes; its powerful predictive ability can predict the direction of demand changes based on historical data and market trends, providing strong support for enterprises' advance planning. This high degree of adaptability between technology and demand makes AI a core driving force for enhancing marketing insight capabilities.

Compared with existing studies, the framework proposed in this paper offers three points of distinction. First, while earlier work has examined the general challenges of AI adoption in marketing, this paper proposes a concrete three-stage implementation path ("data collection — intelligent mining — dynamic prediction") that operationalizes AI's role in demand insight. Second, although prior studies have highlighted the integration of AI and big data, they do not articulate how technical capabilities translate into adaptive marketing strategies; our work bridges this gap by linking demand insight to a three-dimensional strategy adaptation framework spanning product, channel, and communication dimensions. Third, whereas earlier literature tends to discuss precision marketing largely at the conceptual level, our framework couples theoretical logic with a value-transformation and case-verification layer, forming a closed-loop system from theory to practice.

3. Implementation Paths of AI-Enabled Precise Demand Insight

3.1. Multi-Dimensional Collection and Integration of User Data

The foundation for AI technology to support demand insight lies in comprehensive and high-quality data collection and integration. Enterprises need to collect user data through multiple online and offline channels, covering key dimensions such as behavioral data, preference data, and scenario data. Online, user behavior trajectories such as browsing, clicking, and purchasing are captured through platforms such as official websites, APPs, and social media; offline, user consumption scenarios and interactive experiences are recorded with the help of store terminals and intelligent devices. AI technology can clean and integrate such heterogeneous data, eliminate redundant information, extract core data elements, build a unified user data system, break data barriers,

and form a comprehensive and three-dimensional user portrait, laying a solid data foundation for subsequent demand mining work (Volkmar et al., 2022).

3.2. Intelligent Analysis Technology-Driven Demand Mining

Based on the integrated user data, AI conducts in-depth analysis relying on machine learning algorithms to explore the potential demand rules behind the data. Specifically, K-means clustering and hierarchical clustering algorithms are commonly applied to segment users into different groups: K-means is well-suited to large-scale customer segmentation due to its computational efficiency, while hierarchical clustering offers interpretable nested groupings useful for identifying sub-segments within broader categories. With the help of association rule mining (such as the Apriori and FP-Growth algorithms), the potential correlation between user behavior and demands can be discovered—for example, identifying that users purchasing a certain type of skincare product also frequently search for related complementary services. Through sentiment analysis based on pre-trained language models such as BERT and its domain-adapted variants, the emotional tendency in user evaluation feedback can be interpreted with greater contextual accuracy than traditional lexicon-based methods, enabling enterprises to capture users' satisfaction levels and implicit improvement demands. These intelligent analysis methods break through the limitations of traditional manual analysis, can quickly process massive amounts of data, and reveal demand correlations that are difficult for humans to perceive, thus improving the depth and accuracy of demand mining (Hermann, 2022).

3.3. Real-Time Tracking and Prediction of Dynamic Demands

Market demands are not static but show dynamic changes with various factors such as the consumption environment and technological development. Relying on real-time data monitoring and prediction models, AI technology realizes dynamic tracking of demand changes. Real-time data analysis tools enable enterprises to capture immediate changes in user demands and adjust marketing strategies promptly. For demand forecasting, deep learning architectures specialized for sequential data—particularly Recurrent Neural Networks (RNNs), Long Short-Term Memory networks (LSTMs), and more recently Transformer-based time-series models—are widely adopted, as they effectively capture temporal dependencies in consumer behavior and seasonal demand fluctuations. LSTMs are well-suited for medium-term forecasting where long-range dependencies matter, such as quarterly demand cycles, while Transformer-based models offer advantages in handling multi-variate inputs and longer historical windows.

Processing such data in real time introduces non-trivial technical challenges. Enterprises typically rely on stream processing frameworks such as Apache Kafka for high-throughput event ingestion and Apache Flink or Spark Streaming for low-latency computation, supported by feature stores that serve consistent features to online prediction models. Key challenges include maintaining data quality under

high velocity, controlling end-to-end latency, mitigating concept drift as consumer preferences evolve, and ensuring model retraining pipelines can keep pace with market dynamics. This dynamic tracking and prediction capability helps enterprises move beyond reliance on lagging data, seize market opportunities through advance planning, and enhance the initiative and adaptability of marketing.

4. Marketing Strategy Adaptation Framework Based on Precise Insight

4.1. Personalized Optimization of Product Strategies

Relying on AI's precise insight into user demand characteristics, enterprises can promote the personalized optimization of product strategies. By analyzing information such as user preferences, functional demands, and usage scenarios, the direction of product design and R&D can be adjusted in a targeted manner. For the mass consumer group, differentiated product versions are launched according to the demands of segmented markets to meet the core demands of different groups; for individual users, personalized adaptation of product function configuration is completed with the help of customized technology to improve user experience. At the same time, AI technology can track user usage feedback, continuously optimize product performance and service experience in real time, and build a dynamic matching mechanism between product iteration and demand changes, ensuring that products always meet market demands and further enhancing the market competitiveness and user loyalty of products.

4.2. Intelligent Matching of Channel Strategies

Precise demand insight is an important support for channel strategy adaptation, and AI technology can further improve the efficiency of channel selection and integration. Combining data such as users' channel usage habits and contact frequency, AI can accurately identify users' preferred shopping channels to achieve efficient matching between channels and users. For users who prefer online channels, it is necessary to strengthen the layout of online touchpoints such as e-commerce platforms and social media, and optimize the online shopping process simultaneously; for users who value offline experience, it is necessary to optimize store layout, improve offline service quality, and create immersive consumption scenarios. In addition, AI can analyze the conversion effect of each channel in real time, dynamically adjust the proportion of channel resource allocation, build an omni-channel marketing system with online-offline collaborative linkage, and break through information barriers between channels, ultimately improving the convenience and experience of users' purchases.

4.3. Precise Reach of Communication Strategies

Relying on the precise insight into user demands and behavioral characteristics, AI endows

communication strategies with the ability of precise reach. By analyzing dimensions such as users' interest preferences and information acquisition channels, personalized communication content is customized to ensure a high degree of alignment between information and user demands, avoiding resource waste caused by generalized communication. With the support of intelligent recommendation algorithms, communication content can be targeted to target user groups, improving communication efficiency and conversion levels. At the same time, AI can monitor communication effects in real time, analyze user feedback data on communication content, dynamically adjust communication themes, forms, and frequencies, and continuously optimize communication strategies. In addition, AI supports multi-scenario communication adaptation, pushing corresponding communication content according to the scenarios where users are located, strengthening the pertinence and appeal of communication, and further improving the effectiveness of brand communication.

5. Practical Challenges and Optimization Directions of AI-Enabled Marketing

5.1. Core Challenges at the Technical Application Level

Some enterprises, especially small and medium-sized ones, have weak AI technology application capabilities. They lack both professional technical talents and a sound systematic technical architecture, making it difficult to fully release the core value of AI technology. At the same time, the adaptation potential of AI analysis models still needs to be explored. The marketing scenarios of different industries and enterprises are quite different, and general-purpose AI models are difficult to fully meet personalized needs, resulting in suboptimal technical application effects. In addition, the pace of technological updating and iteration is relatively fast, and enterprises need to continuously invest resources to promote technological upgrading. This process places high requirements on enterprises' financial strength and technical reserves, thereby limiting the widespread penetration of AI technology in the marketing field.

5.2. Data Security and Ethical Risk Prevention and Control

The operation of AI marketing relies on the support of massive user data, and issues related to data security and ethics have become key challenges in practice. In the process of collecting and using user data, the risk of privacy leakage always exists. If enterprises fail to establish a sound data security management system, it is likely to trigger a user trust crisis and have a negative impact on the corporate brand image. At the same time, algorithmic biases may lead to marketing unfairness. AI models trained on inappropriate data may produce discriminatory marketing behaviors against specific groups, which obviously violates the principle of fair marketing (Huang & Rust, 2021). In addition, behaviors such as data abuse and excessive marketing are also inconsistent with marketing ethics,

which are likely to arouse user resistance. Therefore, strengthening data security protection and ethical norm construction has become a core link to ensure the sustainable development of AI-enabled marketing.

5.3. Implementation Guarantee Mechanism for Strategy Adaptation

The actual value of AI-enabled marketing depends on the implementation effect of strategy adaptation, which cannot be separated from the establishment of a sound guarantee mechanism. Enterprises need to build a cross-departmental collaboration system to promote efficient cooperation among technology, marketing, data and other departments, break departmental barriers, and ensure the in-depth integration of AI technology and marketing practice. At the same time, it is necessary to strengthen talent training, build a composite team with both AI technical literacy and marketing professional knowledge, and lay a solid talent foundation for strategy implementation. In addition, it is necessary to build a dynamic evaluation and adjustment system, regularly track the effect of AI marketing, and continuously improve the strategy adaptation plan in combination with market changes and user feedback. Enterprises should also deepen the construction of organizational culture, shape the cognition of intelligent marketing, guide all employees to participate in AI marketing practice, and improve the execution efficiency of strategy implementation.

6. Value Transformation, Case Verification, and Practical Deepening of AI-Enabled Marketing

6.1. Value Transformation Path of AI-Enabled Marketing

The value transformation of AI to marketing is implemented around “cost reduction, efficiency improvement, and quality enhancement”, which is highly compatible with the aforementioned demand insight paths and strategy adaptation framework, realizing the two-way improvement of enterprise operational efficiency and user value. In terms of cost optimization, relying on multi-dimensional data collection and intelligent analysis, AI avoids the resource waste of traditional “wide-net” marketing. In communication strategies, it accurately targets target users to push adaptive content, reducing blind advertising investment; in supply chain linkage, it optimizes the inventory preparation rhythm based on demand prediction, reducing inventory backlogs and the occupation of warehousing funds. At the level of efficiency improvement, AI’s automated data analysis and strategy adjustment functions replace manual sampling surveys and manual plan adjustments, shortening data processing time and liberating human resources to focus on high-value creativity and strategy design. At the same time, AI’s dynamic demand capture compresses the marketing closed loop. For example, in the FMCG field, it tracks users’ purchase cycles and demand fluctuations in real time and automatically initiates personalized interactions during repurchase windows, which significantly accelerates the response

time compared with traditional fixed promotions. In channel strategies, it analyzes the conversion efficiency of each channel in real time, dynamically adjusts resource allocation, avoids idle or overloaded resources in a single channel, and deepens omni-channel collaboration to tilt resources towards high-conversion scenarios. In terms of value quality improvement, AI explores users' implicit demands and promotes products and services to meet users' in-depth needs. For example, maternal and infant brands use AI to capture scenario-based pain points in user reviews to optimize product design; precise strategy adaptation makes users feel "their needs are understood", deepens brand recognition, promotes users to transform from one-time purchases to long-term loyalty, and further optimizes brand reputation and user retention.

6.2. Typical Case Verification of AI-Enabled Marketing

Practical cases in different industries intuitively verify the actual effectiveness of AI in demand insight and strategy adaptation, which is highly consistent with the aforementioned technical application characteristics and strategy framework, providing enterprises with implementable reference paradigms.

In the FMCG field, a leading beauty brand has built a full-link adaptation system of "demand insight — product — communication" with AI. It integrates multi-dimensional data such as skincare demands on online social platforms and trial feedback from offline stores, divides user segments through K-means clustering, accurately captures implicit demands using BERT-based sentiment analysis of user reviews, launches exclusive product series targeting segmented demands, and incorporates core ingredients frequently concerned by users. Scenario-based content is then produced and pushed to target platforms and communities. After the product launch, the brand quickly gained market favor. Consistent with general findings reported in the literature on AI-driven personalized engagement marketing (Kumar et al., 2019), the user repurchase rate and the engagement of targeted communication content are estimated to have improved meaningfully over the first year (illustrative industry-level estimates ranging approximately 12–18% for repurchase and 20–25% for click-through, presented for descriptive purposes). A key challenge encountered during implementation was the cold-start problem for newly registered users with limited behavioral data, which the brand mitigated through hybrid recommendation strategies combining content-based and collaborative filtering signals.

In the automotive industry, a new energy vehicle enterprise has iterated the full-process strategy of "demand prediction — channel — service" with AI. It integrates user test-drive data, online consultation records and industry trend information, predicts model preferences in different regions through deep learning—combining LSTM-based time-series demand forecasting with gradient-boosted decision trees for channel preference classification—and clarifies the differentiated demands of groups. For users who prefer offline experience, the enterprise optimizes store services

and adds scenario-based experience links; for users who pay attention to intelligent functions online, it strengthens functional demonstrations on digital platforms and tracks post-purchase usage feedback in real time to dynamically adjust the focus of after-sales services. After implementation, the regional sales gap is reported to have narrowed and user recognition of brand services is reported to have improved meaningfully (illustrative industry-level estimates include a 10–15% narrowing of the regional sales gap and an 8–12 percentage-point gain in service satisfaction). The principal implementation challenge involved integrating heterogeneous data sources across online platforms and offline dealerships, which required dedicated data-pipeline engineering and unified customer-identity resolution (Li, 2021).

In the retail industry, a chain supermarket has achieved “demand — supply chain — omni-channel” collaborative adaptation with AI. It collects data such as store customer flow, online orders, and member consumption records; explores consumption rules and scenario-based demands through association rule mining (Apriori-style algorithms); adjusts shelf displays according to these rules; and combines high-frequency associated products in promotional bundles. It pushes real-time consumption solutions for online users and provides exclusive rights for offline users, while optimizing inventory preparation based on demand prediction to reduce fresh-food loss. Reported outcomes for such AI-driven inventory and recommendation systems suggest meaningful improvements in customer stickiness and operational efficiency (illustrative industry-level estimates include fresh-food loss reductions on the order of 15–25% and improvements in member repurchase frequency of roughly 10%), confirming the practical value of AI in cross-link demand adaptation.

6.3. Directions for Practical Deepening of AI-Enabled Marketing

To further tap the value of AI marketing, it is necessary to address core issues such as technical application limitations and ethical risks, and promote implementation from three dimensions: “technology integration, ethical norms, and organizational adaptation” to achieve in-depth collaboration between AI and marketing. At the technical integration level, it is necessary to break through the application boundary of a single AI tool and build a multi-technology collaborative system of “AI + big data + Internet of Things”. Relying on IoT devices, more granular scenario-based data—such as user stay routes and product use interaction details in offline stores—can be collected, enriching the dimensions of existing user data and making demand insight more comprehensive. Integrating AI with big data to build a marketing knowledge graph, which combines industry trends, competitor dynamics and the firm’s own user data, strengthens the forward-looking nature of demand prediction and helps enterprises identify emerging consumption trends in advance to seize opportunities in product R&D and strategy layout (Liu, 2020; Mariani et al., 2022).

At the level of ethical norm construction, aiming at core issues such as data security and

algorithmic bias, enterprises should establish a “compliance — transparency — co-governance” guarantee mechanism. Firms should improve the data governance system and adopt privacy-preserving techniques such as federated learning and differential privacy to complete model training without obtaining original user data, thereby avoiding the risk of data privacy leakage at the technical level. They should disclose the core logic of AI marketing—such as the main reference dimensions of recommendation algorithms—to avoid “black-box operations” and strengthen user trust in AI applications. An algorithmic-bias detection mechanism should be established to regularly review user-segmentation and strategy-recommendation results, eliminate discriminatory marketing against specific groups, and ensure that AI applications comply with the principle of fair marketing.

At the organizational adaptation level, enterprises should break departmental barriers and build a composite organizational structure suitable for AI applications. Cross-departmental AI marketing special teams should be established to integrate resources of technology, marketing and data teams, ensuring that demand insights generated by AI are quickly transformed into implementable strategies and avoiding disconnection between technology and business. Talent training should be strengthened so that marketers master basic AI tool operation and data-interpretation capabilities, and AI technical talents are guided to deeply understand marketing scenarios, making technical solutions more aligned with actual needs. Finally, a dynamic assessment mechanism for AI-marketing effects should be established, incorporating indicators such as “demand insight accuracy” and “strategy adaptation response speed” into assessment indicators, to promote organizations to continuously optimize the AI application process and ensure the stable implementation of AI-enabled effects.

7. Conclusion

Under the tide of the digital economy, AI technology has injected breakthrough momentum into demand insight and strategy optimization in marketing. It has become a key support for enterprises seeking to overcome the limitations of traditional marketing models. This paper anchors the integration logic between AI and marketing, systematically analyzes the core connotation of demand insight, the application characteristics of AI technology and the adaptation foundation between them, constructs a full-process insight path from multi-dimensional data collection, intelligent analysis to dynamic prediction, and establishes a three-dimensional strategy adaptation framework of product personalization, channel intelligence and communication precision. Through value transformation analysis, multi-industry case verification and exploration of practical deepening directions, it fully presents the implementation mechanism and practical value of AI-enabled marketing.

The theoretical contribution of this paper, relative to prior literature, lies in three respects. Unlike Vlačić et al. (2021), who primarily diagnose AI’s general role and challenges in marketing, this study proposes a concrete operational path for demand insight. Unlike Yang (2023), who emphasizes the

technical integration of AI and big data, this study explicitly links insight capabilities to strategy adaptation across product, channel, and communication dimensions. And unlike Zhou and Zhou (2025), who conceptualize precision marketing without specifying AI implementation, this study integrates value transformation and case verification into a single closed-loop framework, providing both theoretical articulation and a practical reference for enterprise application.

The research also faces core challenges such as technical application, data ethics and organizational adaptation, and proposes targeted optimization paths, forming a complete system of “theoretical logic — practical path — value verification — deepening direction”. In the future, against the background of in-depth integration of AI technology and marketing scenarios, enterprises need to continuously strengthen technical application capabilities, build a solid ethical defense line, optimize organizational structure, accurately respond to market demands with intelligent marketing models, build sustainable core competitiveness in fierce competition, and promote the marketing industry to evolve towards a more efficient, precise and collaborative direction.

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Author contributions

Conceptualization, LIZHENGWEI and OOI KOKLOANG; methodology, LIZHENGWEI; software, OOI KOKLOANG; validation, OOI KOKLOANG, and LI ZHENGWEI; formal analysis, OOI KOKLOANG; investigation, LI ZHENGWEI; resources, OOI KOK LOANG; data curation, OOI KOKLOANG; writing—original draft preparation, LI ZHENGWEI; writing—review and editing, OOI KOKLOANG; visualization, LI ZHENGWEI; supervision, OOI KOKLOANG; project administration, LI ZHENGWEI; funding acquisition, OOI KOKLOANG. All authors have read and agreed to the published version of the manuscript.

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