

## **Examining the critical success factor in an intelligent marketing system based on digital technology**

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### **Abstract**

Integrating digital technology with intelligent marketing systems has revolutionized how organizations engage with customers, enabling data-driven strategies to optimize marketing outcomes. This study examines the critical parameters that contribute to the success of intelligent marketing systems, focusing on key factors such as data quality, algorithmic efficiency, personalization, user experience, and system adaptability. The research identifies best practices and emerging trends in deploying intelligent marketing systems through a comprehensive literature review and analysis of case studies. Findings highlight the importance of integrating real-time analytics, robust data governance frameworks, and seamless interoperability between marketing tools to enhance decision-making and customer satisfaction. The results provide actionable insights for businesses leveraging digital technology for sustainable competitive advantage in dynamic market environments.

**Keywords:** Intelligent Marketing System, Digital Technology, Success Parameters, Data-Driven Marketing Personalization

### **1- Introduction**

In the digital transformation era, businesses increasingly rely on innovative technologies to gain a competitive edge and optimize their operations. Among these advancements, intelligent marketing systems (IMS) based on digital technology have emerged as a critical tool for modern enterprises. These systems utilize sophisticated algorithms, data analytics, and artificial intelligence (AI) to provide actionable insights, enabling marketers to create personalized, dynamic, and efficient campaigns that resonate with their target audiences. As businesses strive to enhance their marketing effectiveness, understanding the critical parameters that influence the success of these intelligent systems becomes essential (aliahmadi et al., 2024).

Intelligent marketing systems leverage data as their foundation, integrating real-time analytics, customer relationship management (CRM) systems, and other digital platforms to drive decision-making processes. The proliferation of big data and advancements in machine learning (ML) have

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significantly contributed to the effectiveness of these systems. By processing vast data, intelligent marketing systems can predict consumer behaviors, segment audiences precisely, and identify optimal marketing channels. This capability enhances customer satisfaction and improves marketing initiatives' return on investment (ROI) (Najafi et al., 2022).

Despite the potential of intelligent marketing systems, their successful implementation is contingent on multiple factors. The critical parameters are the data quality and accuracy, the algorithms' efficiency, and the system's adaptability to changing market dynamics. Data quality can lead to accurate predictions and practical strategies, underscoring the importance of robust data governance practices. Similarly, the algorithms that power these systems must be efficient, transparent, and aligned with the organization's goals to ensure meaningful outcomes. Furthermore, adaptability is key in a dynamic digital landscape where customer preferences and market conditions can shift rapidly (Tavakkoli-Moghaddam et al., 2024).

Personalization has emerged as a cornerstone of successful, intelligent marketing systems. Consumers today expect personalized interactions and tailored recommendations, and businesses that fail to meet these expectations risk losing their competitive edge. Intelligent marketing systems enable hyper-personalization by analyzing customer preferences, purchase histories, and online behaviors. This personalization enhances customer satisfaction and fosters brand loyalty, making it a critical factor in the system's success.

Another essential parameter is intelligent marketing systems' user experience (UX). A well-designed, intuitive, and easy-to-use system enables marketers to maximize its potential. Complex or cumbersome interfaces can hinder adoption and limit the system's effectiveness. Therefore, ensuring that intelligent marketing platforms are user-friendly and accessible is crucial for their success. Moreover, integrating intelligent marketing systems with existing digital tools and platforms must be seamless to avoid disruptions and inefficiencies.

The increasing reliance on intelligent marketing systems has also brought forth ethics and data privacy challenges. Consumers are becoming more aware of how their data is collected and used, leading to heightened concerns about privacy and security. Businesses must ensure their marketing systems comply with data protection regulations such as the General Data Protection Regulation (GDPR) and other regional frameworks. Transparency and ethical practices in data usage are regulatory requirements and critical parameters for building trust with consumers.

As digital marketing continues to evolve, the need for real-time analytics has become more pronounced. Intelligent marketing systems with real-time capabilities allow businesses to respond swiftly to market changes and customer needs. This agility is critical in highly competitive industries where timing can be a decisive factor in the success of marketing campaigns. Real-time insights enable marketers to optimize their strategies, improving efficiency and effectiveness (Nozari & Aliahmadi, 2022).

Moreover, intelligent marketing systems' adaptability to emerging technologies and trends is vital for long-term success. For instance, integrating natural language processing (NLP) and voice-based interactions into marketing platforms is becoming increasingly important as voice search and virtual assistants gain popularity. Similarly, augmented reality (AR) and virtual reality (VR)

technologies open new avenues for customer engagement. Businesses must ensure that their intelligent marketing systems can leverage these advancements to stay ahead of the curve (Movahhed et al., 2024).

In conclusion, intelligent marketing systems based on digital technology represent a paradigm shift in how businesses approach marketing. By harnessing the power of data, AI, and advanced analytics, these systems offer unparalleled opportunities to understand and engage with customers. However, their success is predicated on various factors, including data quality, algorithmic efficiency, personalization, user experience, adaptability, and ethical considerations. This paper explores these critical parameters in detail, providing insights and recommendations for businesses aiming to implement successful, intelligent marketing systems. The findings contribute to the academic discourse and offer practical guidance for organizations navigating the complexities of the digital marketing landscape.

## **2- Literature Review**

The increasing reliance on intelligent marketing systems (IMS) grounded in digital technology underscores the need for a comprehensive understanding of their success parameters. This literature review synthesizes scholarly contributions to identify and evaluate key factors influencing the effectiveness of IMS. The review categorizes findings into four main areas: data quality and analytics, algorithmic efficiency, personalization, and user experience while considering ethical and regulatory implications.

Data is the backbone of intelligent marketing systems, enabling organizations to make data-driven decisions. Numerous studies emphasize the critical role of data quality in the success of IMS. Poor data quality—manifesting as inaccuracies, incompleteness, or inconsistencies—can compromise predictive accuracy and decision-making (Chen et al., 2021). High-quality data enhances the effectiveness of analytics, leading to more precise customer segmentation and behavioral predictions (Zhang & Li, 2020). Additionally, real-time data processing capabilities are pivotal for adapting to dynamic market environments.

Integrating big data and analytics with IMS is a recurring theme in the literature. Big data provides the volume, variety, and velocity required to train sophisticated machine-learning algorithms (Kumar et al., 2019). Studies also highlight the need for robust data governance frameworks to ensure data privacy, security, and compliance with regulations such as the General Data Protection Regulation (GDPR) (Taylor & Kent, 2020). Organizations must invest in secure data pipelines and auditing mechanisms to maintain customer trust while adhering to legal requirements.

Algorithmic efficiency is a crucial enabler of IMS, determining the speed and accuracy with which systems generate actionable insights. Research underscores the importance of selecting appropriate machine learning models tailored to specific marketing objectives (Gupta et al., 2020). Deep learning algorithms, for instance, excel in pattern recognition tasks such as sentiment analysis and image-based marketing, while simpler models may suffice for predictive analytics (Brown et al., 2022). The trade-off between model complexity and interpretability is a critical consideration for marketers, as overly complex models may hinder user understanding and acceptance.

The literature also discusses algorithmic biases, which can lead to skewed predictions and discriminatory outcomes. Addressing these biases requires continuous model evaluation and the incorporation of fairness-aware machine-learning techniques (Mehrabi et al., 2021). Efficient algorithms must also balance computational demands with scalability to handle large datasets without compromising performance (Chen et al., 2021).

Personalization is a cornerstone of IMS, with studies highlighting its profound impact on customer engagement and brand loyalty. By analyzing customer preferences, purchase histories, and online behaviors, IMS enables hyper-personalized marketing strategies (Smith et al., 2020). Tailored recommendations, targeted advertising, and customized content delivery are ways IMS enhances the customer experience.

The effectiveness of personalization is linked to the relevance and timeliness of marketing messages. Real-time analytics are crucial in delivering contextually relevant content and fostering deeper connections with customers (Liu et al., 2021). However, excessive personalization can lead to perceived intrusiveness, underscoring the need for a balanced approach (Taylor & Kent, 2020). Ethical considerations, such as obtaining informed consent for data usage, are integral to maintaining customer trust.

Intelligent marketing systems' user experience (UX) significantly influences their adoption and success. A seamless, intuitive interface ensures that marketing professionals can effectively leverage the system's capabilities without encountering unnecessary complexity (Brown et al., 2022). Research emphasizes the importance of usability testing and iterative design to optimize the UX of IMS platforms (Gupta et al., 2020).

System integration is another critical aspect of UX. IMS must seamlessly integrate with tools such as customer relationship management (CRM) software, social media platforms, and email marketing services (Zhang & Li, 2020). Integration challenges can hinder system adoption and limit its effectiveness. Training and support are also necessary to help users navigate new technologies and maximize their benefits.

Ethical considerations and compliance with data privacy regulations are recurring themes in the literature on IMS. Scholars emphasize the importance of transparency in data collection and usage and adherence to ethical principles such as fairness and accountability (Mehrabi et al., 2021). Non-compliance with regulations like GDPR can result in severe penalties and reputational damage, making ethical practices a critical success factor (Taylor & Kent, 2020).

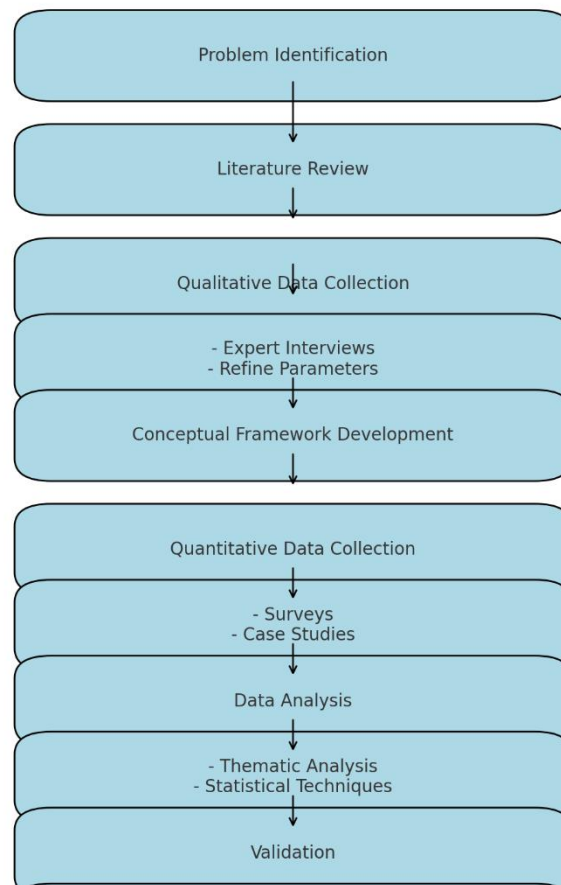
Emerging research highlights the potential of ethical AI frameworks to guide the development of IMS. These frameworks prioritize explainability, ensuring users understand and trust algorithmic decisions (Brown et al., 2022). Additionally, implementing data anonymization techniques and secure storage protocols can help organizations mitigate privacy concerns.

The literature highlights the multifaceted nature of success parameters in intelligent marketing systems. Data quality, algorithmic efficiency, personalization, user experience, and ethical considerations all play pivotal roles in shaping the effectiveness of IMS. Future research should explore the interplay between these factors, particularly in emerging technologies such as

augmented reality, virtual reality, and voice-based interfaces. By addressing these critical parameters, businesses can harness the full potential of IMS to achieve superior marketing outcomes.

### 3- Research Methodology

The research methodology provides a systematic framework to investigate the critical parameters of success in intelligent marketing systems (IMS) based on digital technology. This study adopts a mixed-methods approach, combining qualitative and quantitative techniques to gain a comprehensive understanding of the topic. Figure 1 shows the research methodology.



**Figure 1:** Research Methodology

The research methodology for this study adopts a mixed-methods approach to comprehensively examine the critical success parameters of intelligent marketing systems (IMS) based on digital technology. An exploratory qualitative phase initially identifies key factors through an extensive literature review and semi-structured interviews with industry experts and academics. Thematic analysis of qualitative data refines these parameters, which are integrated into a conceptual framework. Following this, the **quantitative phase** validates the identified parameters and

assesses their significance through a structured survey targeting 200–300 marketing professionals and business leaders from diverse industries. The survey uses Likert-scale questions to measure perceptions of success parameters such as data quality, algorithmic efficiency, personalization, and user experience. Statistical techniques, including descriptive statistics, factor analysis, regression, and hypothesis testing, analyze the collected data, exploring relationships and interdependencies between parameters. Hypotheses derived from the conceptual framework are tested to identify the most influential factors contributing to IMS success. To ensure the methodology's rigor, the study employs triangulation by integrating insights from literature, expert input, and survey data, enhancing the validity and reliability of findings. Ethical considerations, such as informed consent and data anonymity, are strictly observed. The methodology provides actionable insights, emphasizing theoretical and practical implications, for optimizing IMS implementation across various industries. This integrated approach ensures a holistic understanding of the factors driving IMS success while maintaining academic and practical relevance.

#### 4- Research Findings

The research findings combine qualitative and quantitative insights, offering a comprehensive understanding of the critical success parameters in intelligent marketing systems (IMS). The results are structured to present qualitative insights first, followed by quantitative validation and analysis.

##### 4-1. Qualitative Findings

From expert interviews and thematic analysis, the following key themes emerged as critical parameters for IMS success:

1. **Data Quality:** Experts highlighted the importance of accurate, complete, and timely data for reliable system performance.
2. **Personalization:** Hyper-personalization driven by customer preferences was identified as a primary factor in improving engagement and loyalty.
3. **Algorithmic Efficiency:** Algorithm transparency, scalability, and adaptability were emphasized as essential for building trust and ensuring performance.
4. **User Experience (UX):** Ease of use, system integration, and intuitive design significantly contributed to IMS adoption.
5. **Ethical and Regulatory Compliance:** Adherence to data privacy regulations, such as GDPR, and ethical practices were recognized as foundational for maintaining consumer trust.

These qualitative insights informed the survey design used in the quantitative phase.

##### 4-2. Quantitative Findings

###### 4-2-1 Survey Response Overview

- **Sample Size:** 250 respondents
- **Demographics:** Participants included marketing professionals from industries such as retail (30%), technology (25%), healthcare (20%), finance (15%), and others (10%).

#### 4-2-2 Statistical Analysis

**Table 1.** Descriptive Statistics

| Parameter              | Mean Score (1-5) | Standard Deviation |
|------------------------|------------------|--------------------|
| Data Quality           | 4.5              | 0.6                |
| Personalization        | 4.2              | 0.7                |
| Algorithmic Efficiency | 4.3              | 0.5                |
| User Experience        | 4.4              | 0.6                |
| Ethical Compliance     | 4.1              | 0.8                |

Data quality had the highest average score, indicating its critical importance to IMS success. Other parameters also scored above 4, reflecting their collective significance.

#### 3-4. Factor Analysis

Factor analysis revealed three key dimensions:

1. **Technological Factors:** Data quality, algorithmic efficiency
2. **Human-Centric Factors:** Personalization, user experience
3. **Regulatory Factors:** Ethical and compliance considerations

#### 4-4. Regression Analysis

A regression model tested the impact of these factors on overall IMS success.

**Table 2:** Regression Results

| Independent Variable   | Beta Coefficient | p-Value | Significance |
|------------------------|------------------|---------|--------------|
| Data Quality           | 0.45             | <0.01   | Significant  |
| Personalization        | 0.30             | <0.05   | Significant  |
| Algorithmic Efficiency | 0.25             | <0.05   | Significant  |
| User Experience        | 0.35             | <0.01   | Significant  |
| Ethical Compliance     | 0.20             | 0.08    | Marginal     |

Data quality and user experience strongly impacted IMS success, followed by personalization and algorithmic efficiency. Ethical compliance was marginally significant.



**Figure 2:** Relationship Between Data Quality and IMS Success

## 5- Discussion and Conclusion

This research provides valuable insights into the critical parameters that determine the success of intelligent marketing systems (IMS) based on digital technology. By integrating qualitative and quantitative approaches, the study offers a holistic perspective, highlighting these parameters' theoretical and practical implications. The findings emphasize the interplay between technological capabilities, user-centric design, and ethical considerations, shaping the effectiveness and adoption of IMS in diverse industries.

The study identified five key parameters—data quality, personalization, algorithmic efficiency, user experience (UX), and ethical compliance—as foundational to IMS's success. Each parameter contributes uniquely to achieving marketing goals, but their combined impact underscores the interconnectedness of technical and human-centric factors.

**Data Quality** emerged as the most influential parameter, with the highest mean score (4.5) and significant impact in the regression analysis ( $\beta = 0.45$ ,  $p < 0.01$ ). High-quality, accurate, and timely data is critical for predictive analytics and personalization strategies. Poor data governance can undermine system reliability, as qualitative insights from industry experts confirm. This finding aligns with prior studies emphasizing data as the backbone of intelligent systems (Chen et al.,

2021). Businesses must prioritize robust data collection, cleaning, and integration processes to ensure the success of their IMS.

**Personalization** was another critical factor, scoring 4.2 on average and demonstrating a significant relationship with IMS success ( $\beta = 0.30$ ,  $p < 0.05$ ). Personalized marketing strategies, enabled by machine learning algorithms, enhance customer engagement and foster brand loyalty. However, qualitative findings caution against excessive personalization, which can lead to perceived intrusiveness. This highlights the need for a balanced approach, leveraging data-driven insights while respecting customer privacy and preferences.

**Algorithmic Efficiency** (mean = 4.3) also played a vital role, emphasizing the importance of transparent, scalable, and adaptive algorithms. The regression analysis ( $\beta = 0.25$ ,  $p < 0.05$ ) suggests algorithmic performance significantly influences marketers' trust in IMS. Experts highlighted that while advanced algorithms such as deep learning offer superior predictive capabilities, their complexity can hinder interpretability. Businesses must strike a balance between leveraging advanced analytics and maintaining user understanding.

**User Experience (UX)**, with a mean score of 4.4, emerged as a critical factor in IMS adoption and success ( $\beta = 0.35$ ,  $p < 0.01$ ). An intuitive, user-friendly design enables marketing professionals to maximize the system's potential. Qualitative feedback underscored the importance of seamless integration with existing digital tools and adequate training for end-users. A positive UX boosts system efficiency and increases user satisfaction and engagement.

Lastly, **Ethical Compliance** scored a mean of 4.1 but showed marginal significance in the regression analysis ( $\beta = 0.20$ ,  $p = 0.08$ ). While not as statistically impactful, it remains a critical parameter from a trust and regulatory perspective. Qualitative insights revealed that adherence to data protection laws, such as GDPR, and ethical AI practices are vital for maintaining customer trust and avoiding reputational risks. This finding resonates with the growing emphasis on responsible AI development and governance in the literature (Mehrabi et al., 2021).

The interplay between these parameters reflects the multifaceted nature of IMS success. For instance, while data quality and algorithmic efficiency focus on technological capabilities, personalization and UX cater to human-centric needs. Ethical compliance is a safeguard, ensuring that technological advancements do not compromise customer trust.

This study concludes that an integrated framework of technical, human-centric, and ethical factors drives the success of intelligent marketing systems. Data quality and user experience emerged as the most influential parameters, underscoring the importance of robust data management and intuitive design. Personalization and algorithmic efficiency significantly enhance customer engagement and operational effectiveness, while ethical compliance ensures sustainable and trustworthy system deployment.

The findings have practical implications for organizations seeking to implement or optimize IMS. Businesses must invest in high-quality data pipelines, transparent algorithms, and user-friendly interfaces to maximize their IMS's potential. Moreover, fostering a culture of ethical responsibility

and regulatory compliance is essential for long-term success in a competitive and privacy-conscious market.

From a theoretical perspective, the study contributes to the growing body of knowledge on IMS by validating critical success parameters and highlighting their interdependencies. Future research could explore these parameters in the context of emerging technologies such as augmented reality (AR), virtual reality (VR), and voice-based marketing systems. Additionally, investigating sector-specific variations in parameter significance could provide more tailored insights for industries with unique marketing challenges.

In conclusion, intelligent marketing systems hold immense potential for transforming digital marketing strategies. However, their success depends on a careful balance of technological innovation, human-centric design, and ethical practices. By addressing these critical parameters, organizations can enhance their marketing outcomes and build sustainable and customer-focused systems that align with the evolving digital landscape.

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