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Investigating the Impact of Business Intelligence on Digital Marketing with the Mediating Role of Collaborative Learning (Case Study: Employees of Refah Bank Branches in Mashhad)

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Abstract

This study was conducted with the aim of examining the impact of business intelligence on digital marketing, considering the mediating role of collaborative learning (case study: employees of Refah Bank branches in Mashhad). In terms of nature and method, this research is descriptive-survey, and in terms of purpose, it is applied. The statistical population of this study includes all employees of Refah Bank branches in Mashhad, totaling 600 individuals. A sample of 240 individuals was selected using the Morgan table. Documentary sources were used to collect information related to the literature and background of the study, and a standardized questionnaire was employed to gather field data. Finally, the data obtained from the sample were analyzed using SPSS and PLS software. The results of this study indicated that business intelligence has a significant effect on digital marketing through the mediating role of collaborative learning among employees of Refah Bank branches in Mashhad, with an effect size of 0.520. Business intelligence has a significant direct effect on digital marketing among the employees of Refah Bank branches in Mashhad. Additionally, business intelligence has a significant effect on collaborative learning among the employees of these branches. Collaborative learning also has a significant effect on digital marketing among the employees of Refah Bank branches in Mashhad.

Keywords: Digital Marketing, Business Intelligence, Collaborative Learning

1. Introduction

In the dynamic landscape of the digital age, the fusion of data-driven decision-making and evolving marketing strategies has transformed the way businesses interact with their environment. Business intelligence (BI), a powerful tool for collecting, processing, and analyzing data, plays a pivotal role in enhancing strategic marketing efforts, particularly within digital ecosystems. The proliferation of digital platforms and the necessity to respond quickly to consumer behavior shifts have positioned digital marketing at the heart of organizational competitiveness. Amid this evolution, the integration of collaborative learning within organizations offers a fertile ground for strengthening the link between business intelligence and marketing effectiveness, particularly in environments such as the banking sector where information symmetry and knowledge sharing are critical to market responsiveness.

Business intelligence, by definition, involves leveraging technologies and processes that convert raw data into actionable insights for strategic decision-making. The integration of BI systems has become increasingly significant with the advancement

of Industry 4.0, driving organizations toward sustainable and data-driven practices (Ahmad et al., 2020). BI facilitates the real-time monitoring of key performance indicators, prediction of market trends, and personalization of customer experiences, thereby providing a competitive edge in digital marketing environments (Chen & Lin, 2021). In the financial services sector, including banks, the utilization of business intelligence aids in customer segmentation, fraud detection, and targeted marketing, which are central to enhancing customer engagement and service personalization (Hamad et al., 2021).

Digital marketing, characterized by the use of online platforms, data analytics, and interactive technologies, has undergone significant transformation in recent years. Its evolution has been marked by the integration of artificial intelligence (AI), blockchain, and personalized content delivery mechanisms that optimize campaign effectiveness and customer loyalty (Verma, 2025; Verma & Fatma, 2025). The role of digital marketing extends beyond traditional advertising, encompassing relationship building, behavioral targeting, and real-time engagement through channels such as social media, search engines, and mobile applications (Faruk et al., 2021; Sathya, 2017). Consequently, digital marketing has become a strategic lever in ensuring brand visibility, customer acquisition, and business sustainability in a hypercompetitive environment.

In this context, the adoption of business intelligence systems has demonstrated a profound impact on digital marketing performance. BI enables marketers to access customer insights, analyze campaign outcomes, and adjust marketing strategies in real time, thereby improving both operational efficiency and customer experience (Akhgari & Ahmadi Sharif, 2022; Huang et al., 2022). As Arabi and Amin Bidokhti (2023) emphasize, the strategic role of BI is reinforced when accompanied by a culture of collaborative learning, which facilitates organizational agility and knowledge sharing (Arabi & Amin Bidokhti, 2023). Collaborative learning—defined as a pedagogical and organizational approach wherein individuals actively share knowledge and learn from each other—plays a critical mediating role in enhancing the effectiveness of BI in digital contexts (Jacobs et al., 2023). In a similar vein, Kolajahi (2023) and Huang et al. (2022) assert that collaborative learning serves as a catalyst in maximizing the impact of BI on marketing by enhancing knowledge integration and innovation in marketing campaigns (Huang et al., 2022; Kolajahi, 2023).

The interplay between BI, collaborative learning, and digital marketing is particularly significant in service industries such as banking, where the success of customer engagement strategies is closely tied to the availability of accurate, timely, and shared data. The increasing digitalization of banking services necessitates robust BI capabilities and a culture of continuous learning to adapt to customer preferences and regulatory environments (Triono & Jaya, 2021). Moreover, BI systems in banking must be leveraged in conjunction with employee competencies and interdepartmental cooperation to yield marketing strategies that are both data-driven and human-centered (Krisnanto et al., 2023). As highlighted by Hofacker et al. (2020), digital marketing in business-to-business contexts, including financial institutions, benefits significantly from well-orchestrated BI frameworks that support cross-functional collaboration (Hofacker et al., 2020).

Furthermore, research indicates that digital marketing success in contemporary enterprises is increasingly dependent on the personalization of content, the automation of customer interactions, and the optimization of digital touchpoints—all of which require robust BI systems (Ashaari & Yusoff, 2025; Talha, 2025). AI-driven marketing tools, underpinned by BI capabilities, allow for the execution of targeted campaigns that respond in real time to customer behavior, preferences, and feedback (Verma & Fatma, 2025). In the same regard, Pramudana et al. (2025) demonstrate that trust and engagement in online marketplaces are heavily influenced by data-driven digital marketing strategies, further illustrating the necessity of integrating BI in marketing practices (Pramudana et al., 2025).

Despite the technical capabilities of BI systems, their success in enhancing digital marketing is contingent upon the organizational culture and the extent to which knowledge sharing and collaborative problem-solving are embedded in practice. Vafaei Basir and Farajpour (2022) point out that innovation in marketing is more effectively achieved when BI is accompanied by a systematic approach to collaborative learning, especially in competitive sectors such as food and consumer goods (Vafaei Basir & Farajpour, 2022). This insight is equally relevant to the banking industry, where customer expectations evolve rapidly, and the need for agile, data-informed decision-making is imperative.

Collaborative learning not only fosters organizational adaptability but also contributes to enhanced decision-making quality in BI contexts. Yaghli et al. (2022), using the Delphi method and DEMATEL technique, identify collaborative indicators as significant determinants of decision-making effectiveness in BI systems (Yaghli et al., 2022). Thus, organizations aiming to derive maximum value from BI in digital marketing must invest in human resource development and learning platforms that facilitate interdisciplinary knowledge exchange. Such investments promote the alignment of BI insights with strategic marketing objectives and enhance the responsiveness of marketing teams to emerging customer trends.

Moreover, business intelligence and collaborative learning have broader implications for institutional innovation and sustainable development. Muntean et al. (2021) argue that BI frameworks can support sustainable practices, particularly when analytical insights are distributed through collaborative learning structures that empower stakeholders to act collectively (Muntean et al., 2021). In banking institutions where organizational learning is often siloed, integrating collaborative learning processes can dismantle barriers to information flow and support the development of integrated marketing solutions that align with long-term strategic goals.

In sum, the synergy between business intelligence and collaborative learning offers a promising pathway for enhancing digital marketing performance in banking organizations. By leveraging BI systems to extract actionable insights and fostering a learning culture that encourages knowledge sharing and innovation, banks can better adapt to digital disruptions and evolving customer needs. This study, therefore, seeks to examine the impact of business intelligence on digital marketing performance with a specific focus on the mediating role of collaborative learning among employees of Refah Bank branches in Mashhad. Building upon the existing literature, this research aims to fill a critical gap in understanding how internal learning mechanisms can amplify the strategic value of BI in service-oriented marketing frameworks.

2. Methods and Materials

The present research is applied in terms of its objective and descriptive-survey in terms of data collection method. The statistical population of the study includes the employees of Refah Bank branches in Mashhad, totaling 600 individuals. Given the size of the population, the sampling method in this study was convenience sampling. According to the Morgan Table, the sample size was determined to be 240 participants.

Documentary methods were used for the literature review and background of the research, and a questionnaire was employed for collecting field data. The instruments used included the Digital Marketing Questionnaire by Mousavi et al. (2022), the Business Intelligence Questionnaire by Hong et al. (2022), and the Collaborative Learning Questionnaire by Stephen, Jo, and Baoli (2007). Face and content validity were confirmed through expert and academic review, and construct and convergent validity of the questionnaires were assessed and approved using Smart PLS software. In addition, Cronbach's alpha test was employed to evaluate the reliability of the questionnaires. As a result, the reliability coefficient for the Business Intelligence Questionnaire was 0.755, for the Collaborative Learning Questionnaire 0.843, and for the Digital Marketing Questionnaire 0.762, indicating acceptable reliability of the research instruments.

For data analysis, both descriptive and inferential statistical methods were used. Descriptive statistics included frequency distribution tables, descriptive forms, means, and other measures of central tendency and dispersion such as standard deviation. In the inferential part, SPSS and PLS software along with various statistical tests were used. The Kolmogorov–Smirnov test was employed to assess the normality of the data distribution. Structural equation modeling (SEM) was used to examine the level of explanatory power and to test the research hypotheses.

3. Findings and Results

Descriptive analysis of the demographic characteristics of the sample showed that out of the 240 participants, 11.2% were under 30 years old, 32.9% were between 30 and 40 years old, 39.6% were between 40 and 50 years old, and 16.3% were over 50 years old. Accordingly, the age group of 40 to 50 years represented the largest portion of the sample. In terms of education, 12.9% had an associate degree or lower, 50.0% held a bachelor's degree, 35.8% held a master's degree, and 1.3% had a doctoral degree. Hence, individuals with a bachelor's degree made up the largest proportion of the sample.

Table 1. Normality Test of Variables Using the Kolmogorov–Smirnov Test

Variable	Sample Size	Test Statistic	Significance Level

Digital Marketing	240	0.974	0.298
Business Intelligence	240	1.25	0.87
Collaborative Learning	240	1.37	0.55

According to the results in Table 1, the distribution of all variables in the statistical sample is normal. Therefore, PLS software was used to test the hypotheses.

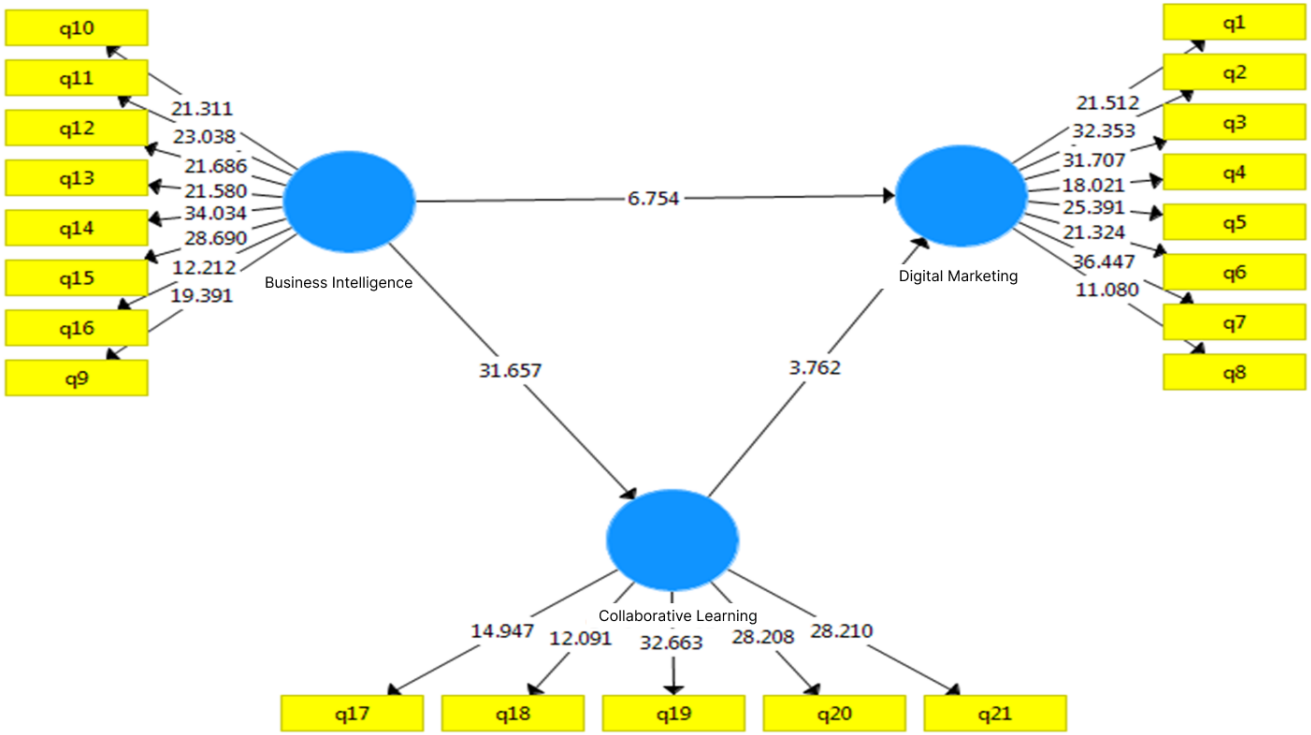

Figure 1. Main Fitted Model

Based on Figure 1, the main model fit was confirmed. Therefore, to analyze the overall model, three measurement models needed to be assessed. To evaluate the fit of the measurement models, three criteria were used: reliability, convergent validity, and discriminant validity.

After evaluating the measurement models, the structural model of the study was examined. As previously mentioned, the structural model focuses solely on latent variables and the relationships between them, unlike the measurement models which deal with observed variables. The most basic criterion for evaluating the relationship between variables in the structural section of the model is the t-value. If the value of this statistic is less than 1.96, the relationship between the variables is not confirmed, and thus the hypothesis is not supported at the 0.95 confidence level. It is important to note that the t-value indicates the significance of the relationship but not its strength.

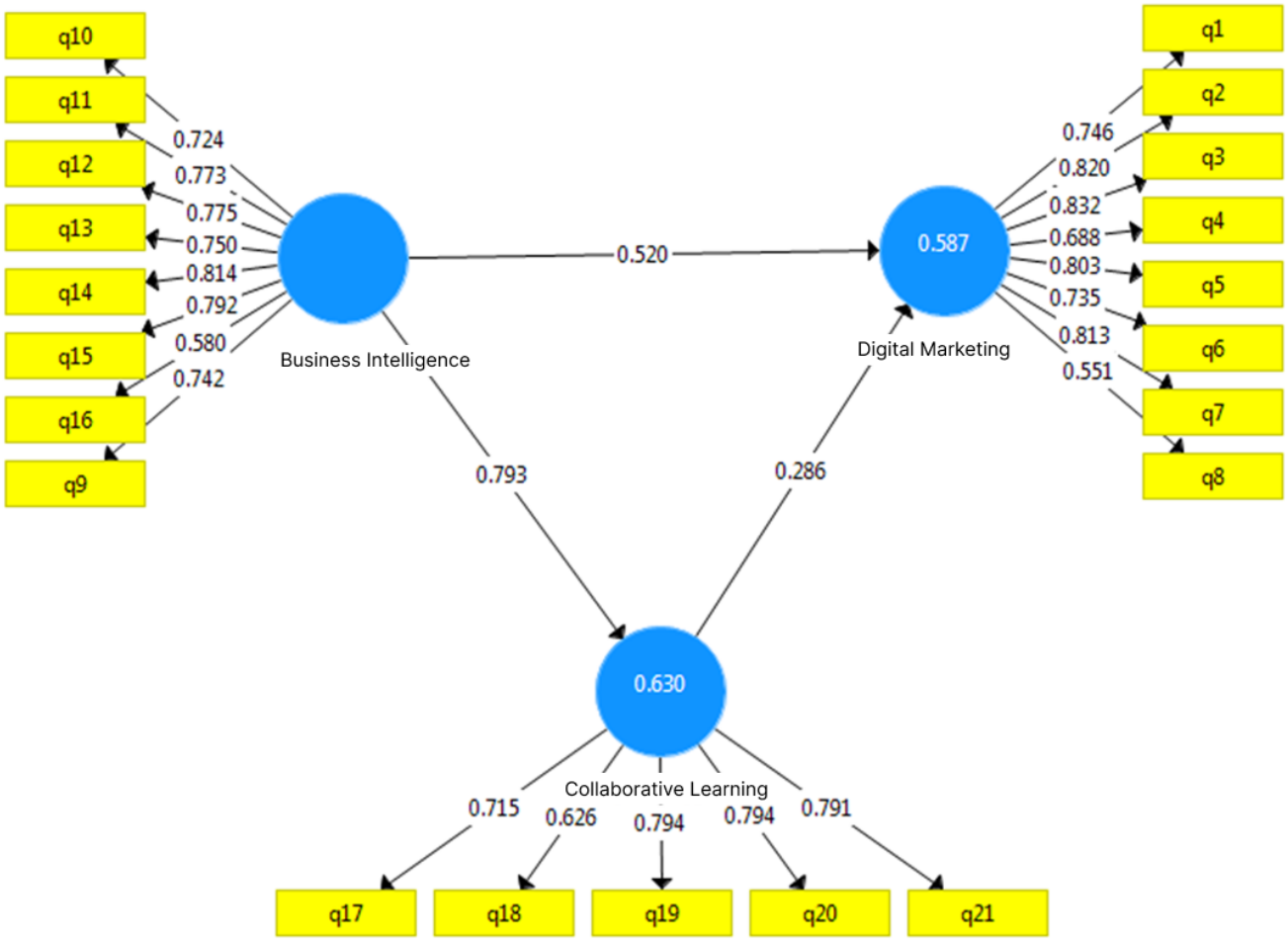

Figure 2. Structural Equation Modeling Fit with T-Values

According to Figure 2, the T-Values for the two main hypotheses and for each sub-index in relation to its corresponding main index were all greater than 1.96, indicating that all relationships were confirmed. This confirms a good and comprehensive model fit. Therefore, based on the structural equation model presented in Figure 2, the following relationships can be inferred:

Table 2. Hypothesis Testing Results

Hypothesis	Standardized Path Coefficient	T-Value	Hypothesis Confirmation
Business intelligence has a significant impact on digital marketing	0.520	3.657	Confirmed
Business intelligence has a significant impact on collaborative learning	0.793	6.754	Confirmed
Collaborative learning has a significant impact on digital marketing	0.286	3.762	Confirmed
Business intelligence has a significant impact on digital marketing through the mediating role of collaborative learning among employees of Refah Bank branches in Mashhad	0.226	3.194	Confirmed

4. Discussion and Conclusion

The findings of the present study revealed that business intelligence (BI) significantly affects digital marketing, both directly and indirectly through the mediating role of collaborative learning. Specifically, the path coefficient from BI to digital marketing was 0.520 (T = 3.657), indicating a strong direct relationship. Additionally, BI was found to significantly influence collaborative learning (β = 0.793, T = 6.754), and collaborative learning, in turn, positively affected digital marketing (β = 0.286, T = 3.762). Moreover, the indirect effect of BI on digital marketing via collaborative learning was statistically significant (β = 0.226, T = 3.194), confirming the mediating role of collaborative learning.

These findings reinforce the proposition that business intelligence plays a vital role in enhancing digital marketing capabilities by offering deep, data-driven insights into customer behavior, market trends, and strategic opportunities. This is consistent with the results of Ahmad et al. (2020), who highlighted the pivotal role of BI in supporting sustainable operations

and marketing efficiency within Industry 4.0 contexts, emphasizing its importance for real-time strategic responses and campaign personalization (Ahmad et al., 2020). Similarly, Chen and Lin (2021) noted that firms with advanced BI capabilities are more agile and better equipped to adjust their digital marketing strategies to align with rapidly evolving consumer demands (Chen & Lin, 2021).

The current study's results also align with Arabi and Amin Bidokhti (2023), who demonstrated that BI substantially enhances marketing effectiveness, especially when organizations adopt collaborative learning frameworks that facilitate internal knowledge transfer and cross-functional coordination (Arabi & Amin Bidokhti, 2023). This interdependence suggests that data alone is not sufficient; the way in which knowledge derived from BI is shared, interpreted, and applied within the organization matters significantly. In this regard, collaborative learning acts as a bridge that transforms analytical outputs into actionable marketing strategies.

The finding that BI strongly influences collaborative learning ($\beta = 0.793$) highlights the bidirectional relationship between data systems and human capital. As Huang et al. (2022) noted in their study of insurance companies, BI implementation is most effective when coupled with cooperative learning environments where employees are encouraged to share interpretations, experiences, and suggestions, thus enhancing organizational responsiveness and innovation (Huang et al., 2022). Kolajahi (2023) similarly emphasized that in dynamic market environments, the combination of BI with collaborative learning increases employee engagement and improves the interpretability and usefulness of marketing data (Kolajahi, 2023).

The mediating role of collaborative learning is particularly crucial in service sectors like banking, where the relationship between BI systems and marketing performance is not linear. As supported by Jacobs et al. (2023), collaborative learning enhances employees' autonomy and responsibility in utilizing data insights, which leads to more personalized and strategic customer engagement practices (Jacobs et al., 2023). In the context of Refah Bank, where customer interaction is highly relational and trust-based, leveraging collaborative learning ensures that the bank's employees not only receive insights but also co-construct meaning and align strategies in ways that directly influence digital marketing outcomes.

The empirical support for the impact of collaborative learning on digital marketing ($\beta = 0.286$) is also in line with findings by Krisnanto et al. (2023), who concluded that marketing performance in public enterprises is highly dependent on digital marketing capabilities, which in turn are influenced by organizational learning and teamwork (Krisnanto et al., 2023). This reinforces the view that knowledge-based collaboration allows marketing teams to adapt content and communication strategies to align more effectively with target customer segments, thereby increasing campaign relevance and conversion rates.

Furthermore, the indirect effect of BI on digital marketing through collaborative learning provides new insights into the internal mechanisms that enhance the utility of business intelligence systems. While BI provides technical capacity and analytical depth, collaborative learning cultivates the interpretive flexibility and adaptive application of this information. This aligns with the argument of Vafaei Basir and Farajpour (2022), who asserted that innovation in marketing is maximized when BI insights are disseminated and discussed collaboratively across teams, especially in sectors like food and banking where agility is vital (Vafaei Basir & Farajpour, 2022).

From a technological standpoint, the findings correspond with the perspectives of Verma (2025), who emphasized that AI-enhanced BI tools are most effective when embedded within socially interactive organizational cultures that prioritize cooperative problem-solving (Verma & Fatma, 2025). Talha (2025) also confirmed that advanced digital marketing outcomes—such as campaign optimization, personalization, and consumer prediction—depend not only on machine learning algorithms but also on human interpretation and strategic application of insights derived from BI (Talha, 2025).

These outcomes suggest that digital marketing does not function optimally in isolation from BI or collaborative learning. Rather, the convergence of the three—BI systems, collaborative learning, and digital marketing—creates a synergistic framework for data-driven decision-making and customer-centric innovation. As Hofacker et al. (2020) noted, this triadic interaction supports the evolution of business-to-business and business-to-consumer relationships in digitally transformed industries (Hofacker et al., 2020).

Additionally, the study's findings contribute to the broader understanding of how organizational learning mechanisms mediate technological adoption in marketing. In the banking context, Triono and Jaya (2021) argued that the performance of startups and service-based institutions in digital markets is largely dependent on the alignment between BI capability and

collaborative culture (Triono & Jaya, 2021). Ashaari and Yusoff (2025) further corroborated this view by showing that digital marketing adoption in small businesses is significantly enhanced by the presence of collective understanding and learning among employees (Ashaari & Yusoff, 2025).

Overall, the findings of this study have both theoretical and practical implications. Theoretically, it extends existing literature by empirically validating the mediating role of collaborative learning in the relationship between business intelligence and digital marketing. Practically, it emphasizes the need for managers to not only invest in BI technologies but also cultivate collaborative learning cultures that empower employees to engage with and act upon data insights effectively.

Despite the valuable insights generated, this study is not without limitations. First, the research was conducted within a specific organizational context—Refah Bank branches in Mashhad—which may limit the generalizability of the findings to other sectors or geographical regions. Second, the reliance on self-report questionnaires introduces potential biases related to social desirability and respondent interpretation. Third, while the structural model accounts for the mediating role of collaborative learning, it does not consider other possible mediators such as organizational culture, leadership style, or technological readiness, which may also influence the relationship between BI and digital marketing.

Future studies can explore this model in different industries, including manufacturing, healthcare, or e-commerce, to enhance external validity and draw sector-specific insights. Researchers should consider longitudinal designs to examine how changes in BI systems or collaborative learning structures over time impact digital marketing effectiveness. Additionally, incorporating qualitative methods, such as interviews or focus groups, can provide a deeper understanding of how employees interpret and apply BI insights in collaborative settings. Exploring moderating variables like digital literacy or leadership support could further enrich the theoretical framework.

Organizations should invest simultaneously in advanced business intelligence systems and training programs that foster collaborative learning among employees. Managers are encouraged to design cross-functional teams that facilitate the interpretation and application of data in marketing initiatives. Furthermore, fostering a culture of trust, shared learning, and continuous feedback can enhance the organization's ability to translate business intelligence into effective digital marketing strategies. This approach will not only improve operational efficiency but also strengthen customer engagement and competitive positioning in digital markets.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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