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Data-Driven Marketing Management Competencies: Strategies for Performance Optimization in the Big Data Era

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***Abstract*—The proliferation of big data technology has fundamentally changed the paradigm of marketing management, requiring a new competency framework for optimal performance outcomes. Despite extensive technological advances, significant gaps remain in understanding how data analytic competencies translate into measurable improvements in marketing performance. This study investigates the relationship between data-analytic-based marketing management competencies and performance optimization strategies in contemporary business environments, with particular emphasis on identifying critical competency dimensions and their impact on organizational marketing effectiveness. A mixed-methods approach was used, combining quantitative analysis of 847 marketing professionals from 156 Indonesian companies with qualitative interviews of senior marketing executives. Data collection employed validated instruments measuring analytic competencies, technology adoption, and performance metrics in Q2–Q4 2024. Findings revealed four critical competency dimensions: technical analytic proficiency (β=0.43, p<0.001), strategic data interpretation (β=0.38, p<0.001), cross-functional collaboration (β=0.32, p<0.01), and ethical data governance (β=0.28, p<0.01). Organizations with high analytic competency scores reported 34% higher marketing ROI and 28% greater efficiency in customer acquisition compared to low-competency counterparts. Data analytic competencies significantly influence marketing performance outcomes, with technical proficiency and strategic interpretation serving as primary drivers. This study provides empirical evidence supporting the adoption of competency-based frameworks in marketing management practice.**

***Index Terms*—Big Data, Data Analytics, Digital Transformation, Marketing Competencies, Performance Optimization**

I. Introduction

THE contemporary marketing landscape has undergone unprecedented transformation, driven by exponential data growth and advances in analytical technologies [1],[2] Global data creation reached 79 zettabytes in 2021 and is projected to exceed 180 zettabytes by 2025, fundamentally reshaping how organizations approach marketing strategy and execution, which is significant in uncovering the implications and essence of every data point that is collected and collated [3]. This proliferation of data presents both opportunities and challenges for marketing practitioners, requiring new competency frameworks to effectively leverage analytic capabilities.

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Traditional marketing competencies, though foundational, have proven insufficient in addressing the complexities of the big data era [4]. There have been several pieces of data that are collected by the company that need to be analyzed, but most companies ignore its significance and fail to utilize them to take advantage of what is essential and beneficial for the company. Contemporary marketing success increasingly depends on professionals' ability to integrate analytical thinking, technological expertise, and strategic insight in data-rich environments [5]. The effectiveness of the utilization of data through a technology-mediated environment is necessary to allow companies to make decisions and analyze complex data, enabling digital interconnectedness that advances marketing strategy and actions towards better performance. However, substantial competency gaps persist across organizations, with 67% of marketing leaders reporting inadequate analytic capabilities among their teams [6]. The convergence of these competencies facilitates more precise market segmentation, dynamic pricing, personalized customer engagement, and predictive demand forecasting, thereby enhancing both efficiency and effectiveness in marketing decision-making. Moreover, the integration of analytics and strategy supports adaptive marketing practices, enabling organizations to respond rapidly to shifting consumer preferences and market conditions. In this context, marketing expertise is increasingly defined not by isolated functional skills, but by the ability to synthesize data, technology, and strategy into coherent, evidence-based actions that drive sustainable competitive advantage.

II. Problem Statement

Despite substantial investments in marketing technology and analytics infrastructure, many organizations continue to experience pronounced analytics–performance gap. Although the majority of firms (approximately 89%) have implemented marketing analytics platforms, only a small fraction (23%) report meaningful improvements in performance outcomes, indicating that technology adoption alone does not guarantee value creation [7]. This disparity suggests that the effective use of analytics depends less on the availability of tools and more on complementary organizational capabilities, including analytical skills, strategic integration, and decision-making processes that translate data insights into actionable marketing strategies. This performance gap highlights fundamental shortcomings in how organizations develop and apply data-driven marketing competencies. With this, the study investigates the relationship between data-analytic-based marketing management competencies and

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performance optimization strategies in contemporary business environments, with particular emphasis on identifying critical competency dimensions and their impact on organizational marketing effectiveness.

III. Research Gap

Existing literature largely focuses on technological aspects of marketing analytics while underestimating the development of human competencies [8],[9]. Few studies have systematically examined the relationship between specific competency dimensions and measurable performance outcomes in the context of big data. Moreover, limited research addresses competency framework implementation in emerging markets, where technology adoption patterns and organizational structures may differ significantly from those in developed markets.

IV. Research Novelty

This study contributes new insights by: (1) developing a comprehensive competency framework tailored to the big data marketing environment, (2) providing empirical evidence linking competency dimensions with measurable performance metrics, (3) examining the competency–performance relationship in the Indonesian business context, and (4) proposing actionable strategies for competency development and organizational implementation.

V. Research Review

A. Evolution of Marketing Management Competencies

Marketing Orientation as part of the details from the marketing competencies and competencies has shown the necessary behaviours that shows dynamism and strategic assets that allows sustainable advantage that carries competitive result [10]. Research on marketing competencies has evolved from an early behavioral focus on market orientation, where success was defined by how organizations generate, disseminate, and respond to market intelligence, toward a capability-based perspective that views marketing as a strategic, hard-to-imitate organizational asset. Building on the resource-based view and dynamic capabilities theory, contemporary studies emphasize marketers' ability to integrate knowledge, technology, and learning to continuously adapt in rapidly changing, digitalized environments. This shift reflects a broader understanding of marketing not merely as information processing, but as a value-creating, technology-enabled capability that underpins sustainable competitive advantage. Early models emphasized traditional skills such as brand management, promotion planning, and customer relationship development [11]. Furthermore, the study emphasized that the capabilities of market-driven organizations aim to diagnose capabilities, anticipation of the needs for future capabilities, bottom-up redesign of underlying processes, top-down direction and commitment, creative use of information technology, and continuous monitoring of progress. This means that process is expected when an organization has a concrete utilization of the data based on the achieved and sustained organization. However, the intervention of digitalization in the business has introduced innovation that has changed the expectations, results, behaviors, processes, and marketing. The digital transformation in businesses presents unconventional structure and performance and presents challenges and advantages that stimulate productivity and growth [12].

Contemporary frameworks recognize data analytics as a core organizational capability rather than a support function [13]. In modern businesses, big data analytics are necessary in providing the trajectory of the future performances based on the empirical data that have been generated. This is helpful in the decision-making because it has a basis based on the part and present performances. Organizations with superior analytical competencies achieve 5–6% higher productivity and profitability compared to competitors, underscoring the significant performance implications [14]. The analytics follows certain patterns that allow the organization to figure out what needs to be improved and what needs to be sustained to ensure that the company is moving towards the goal and closer to the target that it set. However, the companies should embrace these changes because they will alter the course of their culture in the different organizational transactions and processes.

B. Big Data Analytics in Marketing

Big data analytics encompasses volume, velocity, variety, and veracity dimensions that collectively challenge traditional analytic approaches [15]. The process of using the technology in big data analysis allows ease in the process due to the digital processes. The ability to analyze data in a shorter period of time makes the generation of the analytics possible and may create a long-term impact to the company. Marketing applications include customer segmentation, predictive modeling, real-time personalization, and attribution analysis—each requiring distinct sets of competencies [16]. These are all necessary in providing the company with significant data that will be very helpful in decision making, prompting activity, developing training, and providing utmost advantage to the customers.

Recent studies highlight the importance of analytic literacy among marketing professionals, defined as the ability to interpret, evaluate, and apply data-driven insights for strategic decision-making [17]. The most beneficial in this decision-making process is its data driven decision that can be applied based on the result of the big data analytics, which will mitigate the poor-decisions made and shall increase the potency of the changes that may be introduced for the improvement of the performance. Organizations with high analytic literacy demonstrate superior customer acquisition (32% increase) and retention performance (28% increase) compared to low-analytic-literacy counterparts [18]. Productivity of the company will increase as well because of the satisfaction that the customers may experience along with the data-based decisions and integration in the processes that will generate more positive result to the company.

C. Competency-Performance Linkages

The resource-based view of the firm provides a theoretical foundation for understanding the competency–

performance relationship [19]. Resource-Based View posits that firms achieve sustained superior performance when they possess resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN), enabling them to implement strategies that competitors cannot easily replicate. Within this framework, competencies—such as analytical expertise, market-sensing ability, and strategic integration—are conceptualized not as isolated skills, but as complex, socially embedded capabilities that emerge from the coordinated deployment of human capital, organizational routines, and technological assets. Because these competencies are path-dependent and often tacit, they are difficult for rivals to imitate, thereby serving as enduring sources of competitive advantage. Applied to marketing and analytics contexts, RBV suggests that performance gains arise not from technology ownership per se, but from a firm's ability to transform data, tools, and knowledge into strategically aligned actions, reinforcing the central role of competencies in driving sustained performance differentials. Marketing competencies, particularly those involving complex knowledge integration and organizational learning, represent valuable, rare, inimitable, and organization-specific resources that drive sustainable competitive advantage [3]. These competencies are valuable because they enable firms to sense market changes, interpret customer and environmental signals, and translate insights into superior value propositions. They are rare and difficult to imitate due to their socially embedded nature, cumulative development over time, and reliance on tacit knowledge, routines, and shared mental models rather than codified procedures alone. Importantly, their organization-specific character ensures that competitive benefits cannot be easily transferred or replicated by competitors, even when similar technologies or data are available. As such, marketing competencies function not merely as operational skills but as dynamic, learning-based capabilities that allow firms to continuously reconfigure resources, sustain differentiation, and adapt strategically in rapidly evolving, data-intensive markets.

Empirical studies consistently reinforce the strategic value of analytic competencies in enhancing organizational performance across multiple dimensions. [20] provides quantitative evidence that firms with advanced analytic capabilities outperform their counterparts, reporting approximately 15% higher revenue growth and 25% superior profit margins, which they attribute to improved decision quality, more accurate demand forecasting, and better resource allocation. Complementing these findings, LaValle et al. [6] show that high-performing organizations are twice as likely to embed analytics into core strategic processes, using data-driven insights not merely for operational efficiency but as a source of competitive differentiation. Together, these studies suggest that analytic competencies function as enabling mechanisms that translate data availability into strategic action, allowing firms to anticipate market changes, personalize offerings, and optimize performance outcomes. This growing body of evidence supports the view that analytics-driven capabilities are a critical determinant of sustained competitive advantage, particularly in environments characterized by high uncertainty and rapid technological change.

VI. Conceptual Framework and Hypotheses

A. Theoretical Foundation

This research adopts a competency-based perspective grounded in dynamic capabilities theory [21]. Dynamic capabilities represent organizational abilities to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. In marketing, data-analytic competencies function as dynamic capabilities enabling organizations to sense market opportunities, seize competitive advantages, and transform operational processes. These dynamic capabilities push forward the development of new concepts and improve the processes that may give positive results in their sustainable run, for it is ever improving and will continue to bring changes that may impact the company and the community as a whole.

B. Proposed Competency Dimensions

Based on a comprehensive literature review and preliminary qualitative research, four key competency dimensions emerged:

1) Technical Analytic Proficiency.Skills in statistical analysis, programming ability, data visualization expertise, and platform utilization [22].
2) Strategic Data Interpretation. Ability to translate analytic findings into actionable business insights, identify strategic implications, and communicate recommendations effectively [23].
3) Cross-Functional Collaboration. Capacity to work effectively with diverse stakeholders, integrate analytic insights across organizational functions, and facilitate data-driven decision-making [17].
4) Ethical Data Governance. Understanding of privacy regulations, principles of ethical data use, and responsible analytic practices [24].

C. Research Hypotheses

1) H1: Technical analytic proficiency positively influences marketing performance outcomes.
2) H2: Strategic data interpretation positively affects marketing performance measures.
3) H3: Cross-functional collaboration competencies enhance marketing performance effectiveness.
4) H4: Ethical data governance practices contribute positively to sustainable marketing performance.
5) H5: Combined competency dimensions exhibit synergistic effects on performance outcomes.

VII. Research Methodology

A. Research Design

This study used a mixed-methods approach combining quantitative survey research with qualitative interviews. This design enabled a comprehensive examination of the competency–performance relationship while providing contextual understanding of implementation challenges and success factors.

B. Sample and Data Collection

Data collection occurred between June and November 2024, targeting marketing professionals across Indonesian organizations. The final sample consisted of 847 respondents from 156 companies across industries, including financial services (23%), retail (19%), telecommunications (16%), manufacturing (15%), and technology (12%).

TABLE I. SAMPLE CHARACTERISTICS

Character	Group	N	%
Organization Size	Less than 100 employees	189	22.3
	Between 100 and 500 employees	312	36.8
	More than 500 employees	346	40.9
Industrial Sector	Financial Services	195	23.0
	Retail/E-commerce	161	19.0
	Telecommunication	135	15.9
	Manufacturing	127	15.0
	Technology	102	12.0
	Others	127	15.1
Analytics Experiences	Less than 2 years	203	24.0
	Between 2 and 5 years	389	45.9
	More than 5 years	255	30.1

**Source: Primary data (2024)*

C. Measurement Instruments

Competencies were measured using adapted validated scales:

1) Technical Proficiency (α=0.89) – adapted from Ransbotham et al. [25].
2) Strategic Interpretation (α=0.87) – adapted from Kiron et al. [17].
3) Collaboration Competency (α=0.85) – based on Cross and Parker [26].
4) Ethical Governance (α=0.82) – based on Martin [24].

Performance measures included marketing ROI (12-month average), customer acquisition cost efficiency, campaign conversion rates, customer lifetime value growth, and brand awareness metrics.

D. Data Analysis

Quantitative data were analyzed using SPSS 28.0 and AMOS 24.0 for descriptive statistics, reliability tests, confirmatory factor analysis, and structural equation modeling. Qualitative data were coded thematically to identify implementation patterns and success factors.

VIII. RESULTS AND ANALYSIS

A. Descriptive Statistics and Correlation Analysis

Correlation results showed moderate to strong positive relationships between all competency dimensions and performance measures.

TABLE II. DESCRIPTIVE STATISTICS AND CORRELATION

Variable	M	SD	1	2	3	4
TP	3.42	0.89	1.00			
SI	3.67	0.76	0.61	1.00		
C	3.55	0.82	0.54	0.58	1.00	
EG	3.89	0.71	0.48	0.52	0.56	1.00
MP	3.38	0.94	0.67	0.63	0.59	0.51

**α<0.01*
***TP = Technical Proficiency; SI = Strategic Interpretation; C = Collaboration; EG = Ethical Governance; MP = Marketing Performance*
****Source: Primary data analysis (2024)*

B. Measurement Model Assessment

Confirmatory factor analysis indicated acceptable model fit (χ^2=892.45, df=348, p<0.001; CFI=0.94; TLI=0.93; RMSEA=0.062; SRMR=0.058). All factor loadings exceeded 0.60, with composite reliability values between 0.82 and 0.91.

C. Structural Model Results

All hypotheses were supported empirically, with technical proficiency showing the strongest performance effect (β = 0.43, p < 0.001).

TABLE III. RESULTS OF STRUCTURAL EQUATION MODELING

Hypotheses	β	SE	t-value	p-value	Result
H1	0.43	0.08	5.38	<0.001	Supported
H2	0.38	0.09	4.22	<0.001	Supported
H3	0.32	0.10	3.20	0.001	Supported
H4	0.28	0.09	3.11	0.002	Supported

**Model Fit: χ^2 = 1.247,82, df = 428, CFI = 0,92, TLI = 0,91, RMSEA = 0,068*
***Source: Primary data analysis (2024)*

All hypotheses received empirical support, with technical analytic proficiency showing the strongest performance impact (β = 0.43, p < 0.001).

D. Performance Impact Analysis

Organizations with high analytic competency outperformed those with low competency across all metrics. Specifically, Marketing ROI +34.5%, Customer acquisition cost −28%, Conversion rate +54.8%, Customer lifetime value +32.7%, and Brand awareness growth +41.4%.

TABLE IV. PERFORMANCE COMPARISON BY COMPETENCY LEVEL

Performance Metric	Competency		Difference	p-value
	High	Low		
Marketing ROI (%)	18.7	13.9	+34.5%	<0.001
Customer Acquisition Cost ($)	247	343	-28.0%	<0.001
Conversion Rate (%)	4.8	3.1	+54.8%	<0.001
Customer Lifetime Value ($)	1,847	1,392	+32.7%	<0.001
Brand Awareness Growth (%)	12.3	8.7	+41.4%	<0.001

**High Competency = top quartile; Low Competency = bottom quartile*
***Source: Primary data analysis (2024)*

E. Mediation Effects

Strategic interpretation mediated the relationship between technical proficiency and performance (indirect effect=0.16, 95% CI [0.08, 0.25]), indicating technical skills require strategic application to maximize impact.

IX. Discussion

A. Theoretical Implications

This study advances the marketing competency literature by providing empirical validation of the data-analytic competency framework in the context of big data. The finding that technical proficiency demonstrated the strongest performance impact ($\beta = 0.43$) challenges traditional marketing wisdom, which emphasizes soft skills over technical capabilities. This result aligns with the predictions of the resource-based view, which argues that valuable, rare, and inimitable resources drive sustainable competitive advantage.

The significant mediating role of strategic interpretation underscores the importance of analytic translation capabilities. Technical proficiency alone proves insufficient without the complementary ability to derive actionable business insights. These findings suggest that effective development of analytic competencies must integrate technical training with the cultivation of strategic thinking.

B. Practical Implications

Organizations seeking to enhance marketing performance through analytics should prioritize competency development across the four identified dimensions. Substantial performance differences between high- and low-competency organizations justify significant investment in analytic capability building.
The recommended actions for these are as follows:

1) Develop technical skills through training in statistics, programming (Python, R), and visualization tools (Tableau, Power BI).
2) Strengthen strategic interpretation through case-based learning, focusing on business insight generation.
3) Foster cross-functional collaboration via integrated workflows for data-driven decision-making.
4) Implement ethical frameworks for responsible data use and privacy protection.

C. Limitations and Future Research

Several limitations warrant consideration. First, the cross-sectional design restricts causal inference regarding the competency–performance relationship. Longitudinal studies would strengthen causal understanding of the concepts in this study. Second, the use of self-reported competency measures may introduce social desirability bias. Objective skill assessments could enhance measurement validity. Third, the focus on Indonesian organizations may limit the generalizability of findings to other cultural and economic contexts; thus, a need for further review in future studies related to this.

Future research should examine competency development trajectories, investigate industry-specific competency requirements, and explore the role of organizational culture in the effectiveness of analytic competencies.

X. Conclusion

This study demonstrates that data-analytic-based marketing management competencies significantly influence organizational performance outcomes in the big data environment. The four-dimensional competency framework—comprising technical proficiency, strategic interpretation, cross-functional collaboration, and ethical governance—provides actionable guidance for practitioners seeking to enhance marketing effectiveness through analytic initiatives.

The substantial performance advantages achieved by high-competency organizations underscore the strategic importance of systematic competency development. As data volumes expand and analytic technologies continue to evolve, organizations must prioritize building comprehensive analytic competencies to sustain competitive advantage in an increasingly complex marketing landscape.

This research contributes both a theoretical understanding of the competency–performance relationship and a practical framework for implementation. By addressing critical gaps in the existing literature and providing empirical evidence from an emerging market context, the study advances knowledge while offering actionable insights for marketing practitioners navigating the challenges of big data transformation.

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