Dirya: Journal of Economic Management
Vol. 2, No. 1, June2025, pp. 95-101
e-ISSN 3063-6655

DATA-DRIVEN MARKETING STRATEGY: THE ROLE OF BIG DATA AND BUSINESS INTELLIGENCE AT PT PERTAMINA RETAIL FUEL MARKETING

1st John Sihotang[1 b)], 2nd R.A. Aryanti Wardaya Puspokusumo[2 a)] 3rd, Imas Komariyah[3 c)]
4th Mohamad Abduh Alfahlepi [d]

[1] *Magister Management, STIE Miftahulhuda Subang, Jawa Barat, Indonesia,*
[2] *Business Administration, Bina Nusantara University, Jakarta, Indonesia*
[3] *Magister Management, STIE Miftahulhuda Subang, Jawa Barat, Indonesia,*
[4] *Magister Management, Sekolah Tinggi Ilmu Ekonomi Miftahul Huda, Subang, Indonesia,*

jsihotang@stiemifdasubang.ac.id

Abstract

Personal and public data have become essential elements in modern business operations. The digitalization of information allows data to be used as a foundation for decision-making, particularly in business development. When properly utilized, collected data can inform strategic decisions across various functions, including marketing. Widely dispersed data can be transformed into valuable insights through the analysis of raw information (big data). Moreover, the application of business intelligence (BI) enhances these insights, converting them into strategic knowledge that organizations can apply effectively across business development areas.

This study focuses on three key variables: the independent variable (big data), the dependent variable (marketing strategy development), and the moderating variable (business intelligence). In the fuel retail industry, marketing strategy development requires a comprehensive analysis of big data and business intelligence. Companies must prioritize personal data (customer information), public data (societal sentiment), and internal data to develop effective marketing strategies.

The integration of big data as a foundational information source, combined with BI analysis, is shown to enhance the effectiveness of marketing strategy development. This research demonstrates that big data significantly influences marketing strategy formulation. Additionally, when business intelligence is effectively implemented alongside big data, it amplifies this impact.

Organizations in the fuel retail sector are especially reliant on consumer preferences and public sentiment, making the development of robust big data and BI analytics systems crucial for strategic marketing success.

Keywords: Big Data, Business Intelligence, Marketing Strategy, Fuel Retail, Strategic Decision-Making

1. Introduction

he digital transformation era has significantly altered how organizations gather and utilize data. Today, data is no longer seen as a mere byproduct of operations, but as a strategic asset capable of driving business decisions. Through big data analytics, companies can extract patterns and insights from vast and complex data sources, helping them better understand consumer behavior, anticipate trends, and design more responsive strategies.

Big data is often described by its four core characteristics—volume, variety, velocity, and veracity—which pose both opportunities and challenges in analysis. To maximize its value, organizations must implement systems that can process raw data and convert it into actionable insights. This is where business intelligence (BI) becomes critical. BI tools help present complex information in a digestible format, offering dashboards and reports that support strategic and operational decision-making.

In the fuel retail industry, where public perception and regulatory dynamics are highly influential, data-driven decision-making has become increasingly important. PT Pertamina Retail Fuel Marketing, a major player in Indonesia's fuel distribution sector, has been investing in digital platforms such as the MyPertamina app and social media monitoring systems to better understand consumer sentiment and service expectations.

Despite the adoption of these technologies, questions remain about the actual effectiveness of big data and BI in shaping marketing strategies. While data infrastructure is in place, its impact from a managerial perspective has not been empirically measured. This study aims to address that gap by evaluating how managers perceive and utilize big data and BI in the development of targeted and competitive marketing strategies within a highly dynamic and sensitive industry environment.

Despite the growing adoption of big data and business intelligence tools in various industries, there is still limited empirical evidence regarding their effectiveness in shaping strategic marketing decisions, particularly within highly regulated sectors like fuel retail. PT Pertamina Retail Fuel Marketing has made strides in implementing digital technologies, yet public sentiment surrounding product availability and service quality remains mixed. The company also faces challenges in responding swiftly to consumer feedback, particularly when such feedback is expressed through digital channels like mobile applications and social media.

Although the infrastructure to collect and process data exists, it is unclear whether this data is being utilized optimally by managerial staff to inform marketing strategy. Furthermore, the integration between big data and business intelligence—two systems designed to complement each other—has not been comprehensively evaluated in terms of its strategic impact. These gaps raise important questions: To what extent does big data influence marketing strategy development? And does the application of business intelligence enhance this influence in a measurable way?

Research Objectives

- To examine the influence of big data on the development of marketing strategies at PT Pertamina Retail Fuel Marketing.
- To analyze whether the integration of business intelligence strengthens the impact of big data in supporting strategic marketing decisions.
- To provide practical insights into how data-driven approaches can be optimized to improve market responsiveness and consumer alignment in the fuel retail sector.

2. Theoretical Framework and Hypothesis

The foundation of this study rests on the integration of big data and business intelligence (BI) as enablers of strategic marketing. In the context of data-driven decision-making, both elements play

distinct yet complementary roles. Big data refers to vast, complex datasets characterized by high volume, velocity, variety, and veracity (Erl et al., 2016). It provides the raw input needed to understand consumer sentiment, monitor market trends, and predict future demand patterns.

Business intelligence, on the other hand, acts as a bridge between raw data and actionable decisions. It comprises tools and systems designed to collect, analyze, and visualize data in formats that are easily interpreted by decision-makers. According to Mrdalj (2007), BI systems enhance organizational awareness by transforming transactional and operational data into meaningful insights, allowing managers to evaluate performance and refine strategies accordingly.

In the realm of marketing strategy, the classic framework of segmentation, targeting, and positioning (STP) provides a logical structure for reaching and influencing consumers (Kotler & Keller, 2012). These processes rely heavily on accurate, timely, and granular data—making big data analytics and BI indispensable. For instance, segmenting markets effectively requires comprehensive behavioral, geographic, and psychographic insights, which can be extracted through big data and visualized through BI dashboards.

This study posits that big data positively influences the development of marketing strategy, particularly in identifying trends and optimizing market responses. Moreover, the presence of an effective BI system is expected to strengthen this influence by improving data interpretation, reducing uncertainty, and enabling faster decision-making. The theoretical model assumes a moderated relationship, in which BI enhances the impact of big data on marketing strategy. This conceptual framework guides the formulation of hypotheses and the empirical investigation that follows.

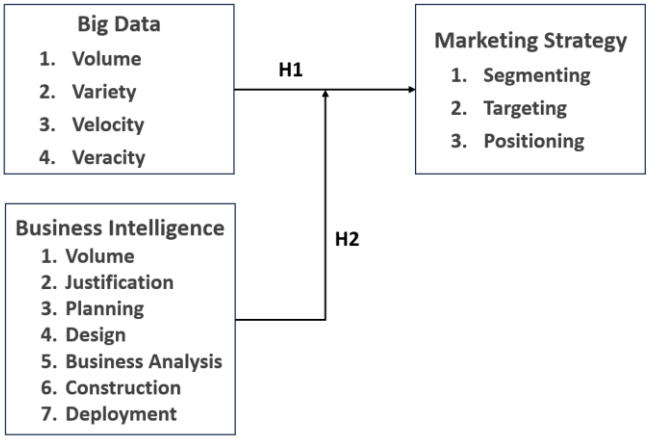

Figure 1 Conceptual Framework

Building upon the theoretical framework, this study explores the relationship between big data utilization, business intelligence implementation, and the development of marketing strategies. Drawing from existing literature and managerial best practices, two hypotheses are proposed to guide the empirical investigation:

- **H1:** Big data utilization contributes positively and measurably to the formulation of marketing strategies within PT Pertamina Retail Fuel Marketing..
- H2: The application of Business Intelligence strengthens the connection between Big Data and marketing strategy development, making Big Data's impact more effective when combined with BI.

These hypotheses reflect the assumption that data alone does not generate strategic value unless it is translated into insights through structured interpretation. By testing these relationships, the study aims

to evaluate not only the direct influence of data-driven tools but also the synergistic effect when both systems are effectively applied in tandem.

3. Methodology

This research adopts a quantitative explanatory design to examine the causal relationships between big data, business intelligence (BI), and marketing strategy development. The focus is on testing predefined hypotheses derived from theoretical constructs using statistical analysis.

The study uses primary data collected through structured questionnaires and secondary data from internal reports, application reviews (MyPertamina), and social media sentiment.

The population consists of managers and assistant managers from PT Pertamina Retail Fuel Marketing, who are directly involved in decision-making related to marketing and digital data usage.

Inclusion criteria include individuals holding positions at mid-level management or higher and with exposure to BI systems or marketing analytics. Exclusion criteria eliminate staff without strategic or analytical responsibilities.

Purposive sampling was employed to ensure that only qualified respondents participated, yielding a final sample of 102 valid responses.

Data collection began with the design and pre-testing of a survey instrument to ensure clarity and reliability. The survey was distributed both digitally and physically. Respondents were informed about the objective and confidentiality of the research.

Following collection, the data underwent cleaning and coding processes. Descriptive statistics were generated to understand respondent profiles and response patterns. Measurement model validity was assessed through convergent and discriminant validity testing, followed by hypothesis testing using path analysis.

The study employed Structural Equation Modeling (SEM) with SmartPLS 3.0 to analyze the data, examining both measurement and structural components. This approach is well-suited for studies with limited sample sizes and can effectively model relationships between unobserved variables. To ensure consistency, reliability was checked through Cronbach's alpha and Composite Reliability (CR). Validity was confirmed using Average Variance Extracted (AVE). For hypothesis testing, path coefficients and bootstrapping methods were applied, with statistical significance set at $p < 0.05$.

4. Finding

The final dataset includes responses from **102 managerial-level employees** at PT Pertamina Retail Fuel Marketing. Below is a summary of respondent characteristics:

Tabel 1 : Respondent Profile

Variable	Category	Frequency	Percentage
Gender	Male	69	67.6%
	Female	33	32.4%
Managerial Level	Manager	64	62.7%
	Assistant Manager	38	37.3%
Length of Service	< 5 years	45	44.1%
	≥ 5 years	57	55.9%

Descriptive analysis was also conducted on responses to key constructs (5-point Likert scale):

- **Big Data** (Mean: 4.12; SD: 0.51)
- **Business Intelligence** (Mean: 4.04; SD: 0.48)
- **Marketing Strategy** (Mean: 4.08; SD: 0.53)

These values suggest a generally positive perception of data-related tools among respondents.

The model was tested using **Partial Least Squares Structural Equation Modeling (PLS-SEM)** via SmartPLS. All constructs met reliability and validity thresholds:

- **Cronbach's Alpha:** > 0.7 for all constructs
- **Composite Reliability (CR):** > 0.8
- **Average Variance Extracted (AVE):** > 0.5

Hypothesis Testing Results:

Hypothesis	Path	β Coefficient	t-Statistic	p-value	Result
H1	Big Data → Marketing Strategy	0.416	4.831	<0.001	Supported
H2	Big Data × BI → Marketing Strategy	0.288	3.947	<0.001	Supported

The R^2 value for Marketing Strategy was **0.547**, indicating that the combination of big data and BI explains **54.7**% of the variance in strategy development.

Key Findings

1. **Big Data Significantly Impacts Marketing Strategy**; Respondents confirmed that data volume, speed, variety, and accuracy help shape better segmentation, targeting, and positioning decisions.
2. **BI Strengthens the Effect of Big Data**; When BI tools are effectively applied—particularly in data interpretation and visualization—the impact of big data becomes more actionable and relevant for strategic planning.
3. **Managerial Readiness Is High**; Most participants reported a positive attitude toward data-driven tools, though some noted a need for enhanced BI training and dashboard usability.

These findings directly support both research hypotheses and reinforce the strategic value of integrating big data and BI in marketing operations within the fuel retail sector.

6. Discussion

This study's results demonstrate that utilizing big data significantly contributes to improved marketing strategy development. These findings align with earlier work from Erevelles et al. (2015) and Kurniawan et al. (2014), which highlighted big data's role in uncovering consumer patterns and market dynamics. Furthermore, our research provides evidence that business intelligence (BI) enhances this connection by transforming raw data into actionable insights for strategic decision-making.

These results align with Li et al. (2008), who emphasized the importance of BI in transforming raw data into strategic knowledge. Notably, the moderating role of BI found in this study suggests that the combination of both technologies yields greater value than either system alone. This supports the argument by Šerić et al. (2014) that successful marketing strategy requires not only data collection but also advanced analytics and interpretation frameworks.

From a theoretical standpoint, this study adds empirical evidence to the growing body of literature on data-driven strategy in emerging markets. It validates the moderated model where BI enhances the effectiveness of big data, and contributes to marketing literature by integrating technological constructs into the classic STP and marketing mix framework.

Practically, the results suggest that companies operating in highly dynamic and consumer-facing sectors—such as fuel retail—should not only invest in data infrastructure but also focus on managerial capability to interpret and act upon that data. Training programs, real-time dashboards, and cross-departmental collaboration on BI systems can enhance responsiveness to consumer sentiment and market shifts.

Several limitations should be acknowledged. First, the sample was limited to 102 managerial staff from a single company, which may restrict the generalizability of the findings. Second, self-reported data introduces potential bias, as respondents might overstate their familiarity or comfort with digital tools. Additionally, the study focused only on the marketing function, while other departments (e.g., operations, finance) may also benefit from big data and BI.

Future studies could expand the sample to include multiple firms across different industries, enabling cross-sector comparisons. Longitudinal research would also be valuable to assess the sustained impact of big data and BI over time. Furthermore, incorporating qualitative interviews may provide richer insights into the organizational culture and leadership factors that influence the success of data-driven strategies.

5. Conclusion

This study set out to explore the role of big data and business intelligence (BI) in shaping marketing strategy within the context of PT Pertamina Retail Fuel Marketing. By using a quantitative explanatory approach and analyzing responses from managerial-level staff, the research confirmed that both big data and BI significantly influence strategic decision-making in marketing.

The findings clearly indicate that big data, with its capacity to process high volumes of diverse and rapidly changing information, provides valuable insights that help organizations understand consumer behavior, monitor market sentiment, and identify emerging trends. More importantly, the study highlights the role of BI as a moderating factor that enhances the strategic value of big data. When used effectively, BI tools transform raw datasets into actionable intelligence through visualization, analysis, and reporting.

These results underscore the importance of investing not only in data infrastructure but also in organizational capabilities to interpret and utilize data effectively. In fast-paced and consumer-sensitive industries like fuel retail, the ability to respond to real-time data can be a key differentiator in maintaining competitiveness and customer trust.

While the study was limited to a single organization and a specific function (marketing), its implications reach beyond that scope. It contributes to the academic discourse on data-driven strategies in emerging markets and offers practical guidance for organizations seeking to align their strategic objectives with digital transformation initiatives.

In conclusion, the synergy between big data and business intelligence is not merely technical—it is strategic. Organizations that integrate these tools thoughtfully and empower their managers to act on data-driven insights are more likely to succeed in today's dynamic business environment.

References

Darudiato, S., Santoso, S.W., & Wiguna, S. (2010). Business Intelligence: Konsep dan Metode. CommIT, 4 (1), 63–67.

Cnudde, S.D., & Martens, D. (2015). Loyal to your City? A data mining analysis of a public service loyalty program. Decision Support Systems, 73, 73-84.

Dishman, P.L., & Calof, J.L. (2008). Competitive intelligence: a multiphasic precedent to marketing strategy. European Journal of Marketing, 42 (7/8), 766-785.

Ducange P., Pecori, R., & Mezzina, P. (2017). A Glimpse of Big data analytics in the framework of marketing strategies. Soft Computing.

Dumbill, E. (2012). Planning for Big data. O'Reilly: International edition.

Erevelles S., Fukawka, N., & Swayne, L. (2015). Big data consumer analytics and the transformation of Marketing. Journal of Business Research, 69 (2), 897- 904.

Eria, K., & Subramanian, P. (2018). Illustrative BI Solution to Improve Marketing Strategies: Case Study. Journal of Applied Technology and Innovation, 2 (1), 15-21.

Thomas Erl, Wajid Khattak, and Paul Buhler. 2016. Big Data Fundamentals: Concepts, Drivers & Techniques (1st. ed.). Prentice Hall Press, USA.

Kotler, P. & Armstrong, G. (2012). Principles of Marketing. New Jersey: Prentice- Hall.

Kurniawan, Y., Gunawan, A., & Kurnia, S.G. (2014). Application of business intelligence to support marketing strategies: A case study approach. Journal of Theoretical and Applied Information Technology, 64 (1), 240-248.

Lu, Q., Li, Z., Zhang, W. et al. Autonomic deployment decision making for big data analytics applications in the cloud. Soft Comput 21, 4501–4512 (2015)

Malholtra, N, K. (2010). Marketing Research: An Applied Orientation. Pearson Global Edition.

Mrdalj, S. (2007).Teaching an applied business intelligence course. Issue in Information Systems. 8 (1). 134-138.

Rohman N., & Rachmawati, E. (2016). The Influence of Marketing Mix to Consumer Purchasing Decisions DK Donut, Cimindi, Bandung. Journal of Business and Management, 5(1), 154-168.

Seric, N., Rozga, A., & Luetic, A. (2014). Relationship Between Business intelligence and Supply Chain Management for Marketing Decision. Universal Journal of Industrial and Business Management 2(2), 31-35.

Poleto, T., Carvalho, V.D.H., & Costa, A.P.C.S. (2015). The Roles of Big data in the Decision-Support Process: An Empirical Investigation. Springer International Publishing Switzerland.

Ularu, E.G., Puican, F.C., Apostu, A., & Velicanu, M. (2012). Perspective on Big data and Big data Analytics. Database Systems Journal, 3, 3-14.