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Challenges for marketing analytics application in Algerian enterprises: An empirical analysis

Soraya Sedkaoui
Ph.D. Prof, University of Khemis Miliana, Faculty of Economy, Khemis Miliana, Algeria
ORCID ID: 0000-0002-7134-2871
Email: s.sedkaoui@univ-dbkm.com

Mounia Khelfaoui
Ph.D. prof, University of Khemis Miliana, Faculty of Economy, Khemis Miliana, Algeria
Email: m.khelfaoui@univ-dbkm.com

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Abstract

This study examines the difficulties encountered by Algerian enterprises in effectively employing marketing analytics. The research examines the influence of internal organizational factors, such as limited resources, investment in IT, and organizational culture, as well as external factors like regulatory constraints and economic conditions, on the probability of using marketing analytics. This analysis is based on a survey of 43 organizations. The results indicate that resource limitations, insufficient investment in IT, and a deficiency in a culture that values data-driven decision-making are significant obstacles to the application of marketing analytics. Regulatory considerations pose obstacles to the utilization of these analytical tools, especially in companies that handle sensitive client data. However, the perceived economic impact is not seen as the main factor driving the application of marketing analytics.

1. Introduction

In the current dynamic business climate, companies face persistent issues related to uncertainty in the planning process (El-Gohary, 2010). Having access to precise and up-to-date information is essential for enhancing performance. The advent of the digital age has brought about a period of data gathering that is unparalleled, resulting in a significant shift in the marketing environment (Sedkaoui & Khelfaoui, 2020; Hoffman & Novak, 1997; Keeny & Marshall, 2000).

Traditional ways of analyzing customers, including segmentation and market research, offer fixed insights that can become obsolete as time passes (Lynn & Cortez, 2002). To tackle these difficulties, researchers have used predictive analytics and marketing analytics, utilizing past data to reveal patterns and forecast future client behavior. This technique offers a competitive edge by enabling organizations to anticipate customer wants and modify their marketing efforts accordingly (Artun & Levin, 2015).

Marketing analytics has developed as a vital tool for harnessing the power of data to acquire actionable insights, optimize marketing tactics, and drive business growth (Ngai et al., 2009). By employing sophisticated analytical techniques, such as predictive modeling, customer segmentation, and sentiment analysis, businesses can delve deeper into customer behavior, identify patterns and trends, predict future outcomes, and personalize marketing campaigns with greater precision (Alyahya et al., 2023; Halper, 2011). This, in turn, leads to greater client acquisition and retention, enhanced marketing ROI, and eventually increased profitability and business success.

However, despite the revolutionary potential of marketing analytics, its implementation in Algerian firms is still in its fledgling phases. Several factors contribute to this latency, including a lack of awareness and comprehension of marketing analytics approaches, restricted access to trained data analysts, and concerns over data privacy and security. Additionally, traditional marketing tactics may still prevail in some firms, slowing the transformation towards data-driven decision-making.

This study intends to analyze the challenges of the application of marketing analytics methodologies within the Algerian company setting, building upon current research. By analyzing the hurdles and enablers of usage, we can provide significant insights for firms wishing to leverage marketing analytics and for governments seeking to build a data-driven corporate environment in Algeria.

The paper is structured as follows: Section 1 provides a brief overview of marketing analytics and its relevance to the Algerian business environment. Section 3 presents our conceptual framework and the methodology adopted. Section 4 discusses the research findings, highlighting the key challenges and opportunities identified. Section 5 concludes with a discussion of the implications of our findings and suggests avenues for future research.

2. Literature review and research background

2.1. The analytics revolution in marketing

With the growth of data-centric marketing landscapes, marketing analytics has emerged as a vital tool. By grasping the nuances of customer psychology, it helps marketers make data-driven decisions that effectively target and engage their audience (Huang & Rust, 2021). Marketing analytics, a vital part of marketing, comprises the systematic collection, analysis, and interpretation of data in data-rich situations. These insights help marketers spot industry trends, analyze market dynamics, and make informed decisions that drive marketing success.

Businesses today have access to large quantities of client information, spanning demographics, online behavior, purchase history, and social media connections. This amount of data poses both a burden and an opportunity for Algerian firms. In this perspective, the core of marketing analytics can be captured by addressing the following critical aspects:

Table 1. Keys aspect of marketing analytics

Aspect	Description
What	The process of collecting, analyzing, and reporting marketing-related data to extract meaningful insights
Where	Data-rich environments, such as customer relationship management (CRM) systems, web analytics platforms, social media, and market research data
Who	Marketing professionals, data analysts, and business leaders responsible for making data-

	driven marketing decisions
When	Periodically, depending on the specific goals and objectives of the analysis. This could range from real-time monitoring to quarterly or annual reviews.
How	Utilizing big data technologies and tools, such as statistical software, data mining algorithms, machine learning models, and data visualization platforms
Purpose	Identifying and understanding market trends Gaining insights into market phenomena and customer behavior Informing marketing decisions and strategies Enhancing marketing outcomes and achieving business objectives

Research in marketing has shown that a company's marketing capabilities are highly linked to its total marketing performance (Wegner et al., 2023). However, deploying marketing analytics involves organizational and process improvements to fully exploit the insights gained from big data. As Erevelles et al. (2016) argue, physical, human, and organizational capital resources have a moderating role in translating consumer actions into a sustained competitive advantage.

IT tools enhance the adoption of this technique in marketing procedures (Shamout, 2023). Marketers must embrace new ways that go beyond standard research methodologies to acquire a deeper understanding of customer interactions with products and processes. The ability to capture client data and incorporate it into operational decision-making is revolutionizing the marketing profession.

Marketing analytics, which combines predictive and prescriptive analytics (Sedkaoui, 2018a), empowers marketers to forecast future events and build strategies to impact them. As part of business analytics, marketing analytics focuses on evaluating marketing data to obtain insights that drive performance improvement and decision-making (Grover, 2022; Mainardes et al., 2023).

As described by Wedel and Kannan (2016), marketing analytics involves "the gathering, management, analysis, and exploitation of marketing data to generate insights for decision-making and performance optimization.".

This approach is gaining traction among companies of all sizes due to several factors (Artun & Levin, 2015): (i) customers demand more personalized and meaningful relationships with brands; (ii) early adopters have demonstrated the significant value of predictive marketing; and (iii) advancements in big data and machine learning technologies have made predictive marketing more accessible.

2.2. Marketing analytics: A growing field of research

Marketing analytics, as a unique subject of study, boasts a publishing track record extending over the previous decades, demonstrating a clear rising trajectory that underscores its established position and expanding importance in the academic and commercial sectors (see Figure 1). Banerjee & Banerjee (2000), the field's founding paper, emphasized the importance of increasing access to customer transaction data at the point of sale, recognizing the potential for this data to transform marketing decision-making through advanced analytics approaches.

As demonstrated in Figure 1, despite the early groundwork created by this important study, the expansion of marketing analytics research was initially gradual and intermittent. In the years following 2000, less than 10 articles were produced annually up to 2018.

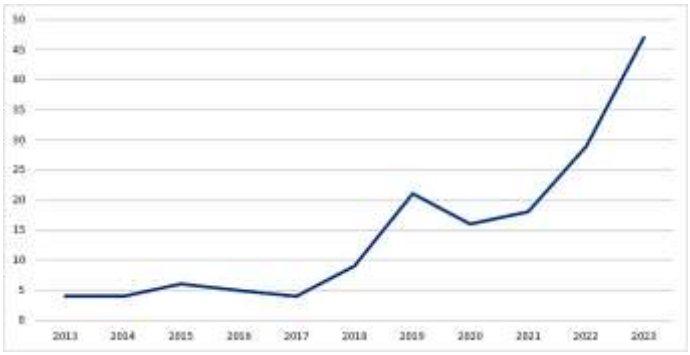

Figure 1. Publication trend (2013-2023)

However, a dramatic shift happened in 2019, signaling the beginning of an accelerated growth period for marketing analytics research. Remarkably, approximately 70% of all papers in the discipline have come within the past four years, witnessing a surge in research productivity. This increasing interest and production can be attributed to several converging factors:

Table 2. Factors driving the growth of marketing analytics research

Factor	Description	Impact on marketing analytics
Rise of Big Data and Fourth Industrial Revolution	Advancements in AI, big data analytics, and interconnected technologies	Propelled marketing analytics into the mainstream; created an environment conducive to exploring data-driven marketing strategies
Expansion of the Digital Environment	Proliferation of mobile apps, social media, and other digital channels	Generated vast amounts of customer data; created opportunities for understanding consumer behavior and personalizing marketing efforts
Challenges of the Digital Age	Emergence of issues like cyberbullying, election manipulation, fake news, and social media addiction	Underscored the need for sophisticated analytical approaches to understand and address the complexities of online consumer behavior
Impact of the COVID-19 Pandemic	Shift to online commerce and increased need for personalized customer interactions	Highlighted the importance of marketing analytics for business adaptation and resilience during times of uncertainty; emphasized the role of data-driven tools for optimizing online customer engagement and sales

The expansion of marketing analytics research has been spurred by numerous converging factors. The emergence of big data and the Fourth Industrial Revolution, with its advancements in artificial intelligence and networked technology, have offered a fertile ground for researching data-driven marketing techniques (Sedkaoui & Khelfaoui, 2020). The increasing digital environment, comprising mobile apps, social media, and varied internet platforms, has generated massive volumes of customer data, enabling new potential to study consumer behavior and customize marketing activities.

However, the digital age has also produced difficulties such as cyberbullying, election manipulation, and social media addiction, further underscoring the need for sophisticated analytical tools to negotiate the complexity of online consumer behavior. Interestingly, the COVID-19 pandemic coincided with a surge in marketing analytics research, highlighting its vital role in helping firms adjust to volatility and changing consumer needs. The epidemic underscored the necessity of tailored, real-time consumer contacts (Loftis, 2021) and the value of data-driven solutions like conversion rate optimization in maximizing online sales effectiveness (Bond, 2022). These

combined dynamics have driven marketing analytics into the mainstream, confirming its status as a crucial tool for firms in the digital age.

2.3. Determinants of marketing analytics

The application of marketing analytics has huge potential for organizations to obtain a competitive edge and prosper in today's data-driven economy (Agag et al., 2024; Liang et al., 2022). Early adopters of these novel approaches and technology stand to gain large dividends, as research has continually proven the multiple benefits associated with implementing analytics into marketing tactics and overall corporate operations. Predictive marketing, fueled by analytics, offers a number of strategic advantages, including:

- *Enhanced customer value:* Analytics enables enterprises to develop targeted campaigns that cater to specific customer segments and needs, such as post-purchase campaigns, replenishment programs, repeat purchase incentives, new product introductions tailored to customer preferences, and customer appreciation initiatives. This focus on customer-centricity fosters loyalty and drives long-term value.
- *Improved decision-making:* By leveraging data-driven insights, enterprises can make more informed decisions regarding resource allocation, marketing investments, and campaign optimization. Analytics provide a clearer understanding of what works and what doesn't, enabling enterprises to refine their strategies for maximum impact.
- *Competitive advantage:* In today's dynamic and competitive marketplace, enterprises that embrace marketing analytics gain a significant edge by anticipating market trends, understanding customer behavior, and proactively responding to changing market conditions. Agility and foresight are crucial for sustainable growth and success.

Table 3. Keys aspect of marketing analytics

Challenge	Specific challenges	Relevant literature
Internal barriers	Lack of resources & expertise (especially in smaller firms)	Giovanni & Mario (2003); Shiels et al. (2003); McConville (2008)
	Insufficient investment in ICT infrastructure	Simmons et al. (2011); Jones et al. (2014)
	Lack of data-driven culture & organizational resistance	Liang et al., 2022 ; Chaudhuri et al., 2021
External barriers	Legal & regulatory issues (data privacy & security concerns)	Dar et al. (2021)
	Economic downturns & financial constraints	Zahoor et al., 2022

To effectively exploit the power of marketing analytics and tackle the accompanying hurdles, organizations must adopt a multidimensional approach. This includes establishing a data-driven culture within the firm, where workers understand the importance of analytics and actively engage in employing data-driven insights for decision-making. Investing in the appropriate technology infrastructure and knowledge is vital, spanning data management platforms, analytics software, and professional data analysts.

Addressing legal and ethical considerations around data privacy and security is crucial to building customer trust and maintaining compliance with relevant rules. Furthermore, organizations should follow a tiered approach to deployment, starting with key marketing sectors and gradually expanding their analytics programs as they acquire expertise and demonstrate value. By implementing these thorough steps, firms can effectively manage the difficulties and uncover the revolutionary potential of marketing analytics to drive development, deepen customer connections, and achieve sustainable success in today's data-driven business context.

3. Data and methodology

3.1. Conceptual model and research hypotheses

While current literature addresses difficulties influencing marketing analytics in many contexts, research especially focused on Algerian firms remains restricted. To address this gap, our study adopted a survey-based methodology using Google Forms as the data gathering instrument. This methodology was chosen for its efficiency, cost-effectiveness, and ease of dissemination compared to other methods.

A questionnaire was prepared based on a detailed examination of relevant literature and in consultation with industry professionals. The questionnaire aims to study the interaction between key organizational and market aspects. Five relevant characteristics were found and divided into two groups based on the conceptual framework shown in Figure 2.

Figure 2. Conceptual model

This study focuses on assessing the problems of the adoption of marketing analytics in Algerian firms; hence, this method is influenced by a combination of internal organizational characteristics and external market elements. So, the hypotheses can be summarized as follows:

- *H1. Smaller firms with limited resources and expertise are less likely to adopt marketing analytics compared to larger firms with greater access to financial and human capital.*
- *H2. Enterprises with insufficient investment in information and communication technology (ICT) infrastructure are less likely to adopt marketing analytics due to the technological requirements associated with data collection, analysis, and utilization.*
- *H3. Enterprises lacking a data-driven culture and facing internal resistance to change are less likely to adopt marketing analytics as their organizational mindset may not be conducive to embracing data-driven decision-making.*
- *H4. Concerns regarding data privacy, security, and compliance with legal regulations can hinder the application of marketing analytics, particularly in industries with sensitive customer data or strict regulatory oversight.*
- *H5. Economic downturns and financial constraints can negatively impact the application of marketing analytics as enterprises may prioritize cost-cutting measures over investments in new technologies and marketing approaches.*

A convenience sample of 43 Algerian enterprises from diverse sectors and geographic locations located in Algiers was selected for participation in the survey.

3.2. Conceptual model and research hypotheses

The data collected through the survey will be analyzed using R and adopting appropriate statistical techniques, including descriptive statistics to summarize the characteristics of the sample, inferential statistics, and logit regression analysis to test the hypotheses outlined in the conceptual framework. The logit analysis was conducted to examine the impact of five key variables: resource constraints, IT investment, organizational culture, regulatory constraints, and economic impact, on the binary outcome of marketing analysis uses.

Table 4 illustrates descriptive statistics and Cronbach's alpha values for the five variables measured on a 5-point Likert scale (from 0 to totally disagree to 5 to totally agree).

Table 4. Descriptive statistics and reliability analysis

Variable	Mean	SD	Cronbach
Resource constraints	4.256	0.758	0.885
IT investment	3.837	1.173	0.842
Organizational culture	3.814	1.096	0.719

Regulatory constraint	3.651	0.922	0.701
Economic impact	3.907	1.150	0.762
Total	**3.893**	**-**	**0.789**

The findings provide fascinating insights into the organizational aspects that influence the application of marketing analytics. The mean score of 4.256 (resource constraints variable) suggests that, on average, the respondents perceive a somewhat high level of resource restrictions inside their businesses. This means that the participating organizations may face hurdles in terms of financial, human, and technological resources when it comes to implementing and employing marketing analytics. The standard deviation of 0.758 shows a moderate degree of heterogeneity in the responses, showing that resource restrictions are experienced to varied degrees across the sample.

Turning to the IT investment variable, the mean score of 3.837 implies that, on average, the firms have a relatively high level of investment in information and communication technology (ICT) infrastructure. This finding aligns with the assumption that technology capabilities are vital for the efficient adoption and application of marketing analytics. The standard deviation of 1.173 indicates a somewhat high degree of variability in the replies, showing that the level of IT expenditure may fluctuate greatly across the participating firms.

Regarding organizational culture, the mean score of 3.814 implies that, on average, the respondents perceive a moderately supportive organizational culture towards data-driven decision-making. This is an important factor, as a culture that encourages the use of data and analytics can facilitate the adoption and continued application of marketing analytics within the firm. The standard deviation of 1.096 implies a moderate degree of diversity in the responses, indicating that the corporate culture may be more or less receptive to the application of marketing analytics.

The mean score of 3.651 for regulatory constraint shows that, on average, the respondents perceive a moderate level of regulatory restraint within their firms. This study resonates with the assumption that concerns over data privacy, security, and compliance with legal laws can represent substantial hurdles to the employment of marketing analytics, particularly in industries with sensitive customer data or tight regulatory monitoring. The standard deviation of 0.922 indicates a relatively low degree of variability in the responses, hinting that those regulatory limitations may be experienced more consistently across the sample.

The mean score of 3.907 for economic impact shows that, on average, the respondents perceive a reasonably high level of economic impact linked with the application of marketing analytics. This conclusion implies that the perceived benefits, whether financial or otherwise, may play a role in molding the organization's decision to invest in and employ certain analytical tools. The standard deviation of 1.150 suggests a somewhat high degree of diversity in the responses, indicating that the perceived economic impact may vary greatly across the participating organizations.

The aggregate Cronbach's alpha for items, measured across all variables, is 0.789. This result is above the frequently accepted criterion of 0.7 (Hair et al., 2010; Sedkaoui, 2018b), indicating strong overall internal consistency and reliability of the measurement scale. This shows that the items inside each variable are tightly connected and measure the desired components well. When evaluating the individual variable-level Cronbach's alpha values, resource constraints (0.885), IT investment (0.842), and economic effect (0.762) reveal strong internal consistency, exceeding the 0.7 criterion. The organizational culture (0.719) and regulatory constraint (0.701) variables likewise indicate acceptable levels of internal consistency, although they are somewhat below the 0.7 requirement.

4. Results and discussion

The logit regression model was fitted using the glm() function in R with a binomial family. Table 5 summarizes the analysis output and provides the coefficient estimates, standard errors, z-values, and p-values for each predictor variable. By studying the coefficients, standard errors, z-values, p-values, and variance inflation factors (VIFs), we can determine the links between the predictor variables and the likelihood of marketing analytics.

The coefficient for 'resource constraints' is -0.54284, with a p-value of 0.03, which is statistically significant at the 0.05 level. This shows that when perceived resource restrictions increase, the log-odds of adopting marketing analytics drop. In other words, firms with limited resources and experience are less likely to employ marketing analytics compared to those with more access to financial and human capital. This study supports the idea that smaller organizations have higher hurdles to implementing marketing analytics due to resource restrictions. The negative coefficient implies that resource-constrained firms may struggle to invest in the necessary technology

infrastructure, hire expert individuals, or commit time and effort towards implementing and exploiting marketing analytics successfully.

Table 5. Logit analysis results

Variable	Coeff	Std. Error	z-value	p-value	Sig	VIF	Interpretation
Resource Constraints	-0.54284	0.75009	0.724	0.0300	Significant	2.1878	Higher perceived resource constraints are associated with lower application likelihood.
IT Investment	0.09917	0.45399	0.218	0.0171	Significant	2.0052	Higher IT investment is associated with higher application likelihood.
Organizational Culture	0.73618	0.49669	1.482	0.0383	Significant	2.2112	A supportive organizational culture is associated with higher application likelihood.
Regulatory Constraint	-1.33080	0.66581	-1.999	0.0456	Significant*	2.8249	Higher perceived regulatory constraints are associated with lower application likelihood.
Economic Impact	0.77846	0.51757	1.504	0.1326	Not significant	2.3736	The perceived economic impact does not have a significant effect on application of marketing analytics.
AIC: 54.553				*Null deviance: 54.266 on 42 degrees of freedom*			
Number of Fisher Scoring iterations: 5				*Residual deviance: 42.553 on 37 degrees of freedom*			

** Significant at the 0.05 level*

VIF: Variance Inflation Factor (values below 3 indicate no significant multicollinearity concerns)

The coefficient for 'IT investment' is 0.09917, with a p-value of 0.0171, which is statistically significant at the 0.05 level. This positive association shows that when firms invest more in information and communication technology (ICT) infrastructure, the log-odds of adopting marketing analytics grow. This finding supports the idea that firms with significant IT investment are more likely to application marketing analytics due to the technology needs connected with data gathering, processing, and utilization. Adequate IT resources, such as data storage, analytical tools, and data management capabilities, can assist firms in overcoming the technological challenges of deploying and efficiently using marketing analytics.

The coefficient for 'organizational culture' is 0.73618, with a p-value of 0.0383, which is statistically significant at the 0.05 level. This positive link shows that firms with a more supportive and data-driven culture are more likely to application marketing analytics. This finding supports the idea that firms lacking a data-driven culture and suffering internal resistance to change are less likely to application marketing analytics. A culture that values data-informed decision-making, encourages the application of analytics, and offers the required training and support can be a major component in promoting the application of marketing analytics.

The coefficient for 'regulatory constraint' is -1.33080, with a p-value of 0.0456, which is statistically significant at the 0.05 level. This negative association shows that as perceived regulatory restraints increase, the likelihood of using marketing analytics drops. This research supports the idea that concerns over data privacy, security, and compliance with legal laws can hamper the adoption and application of marketing analytics, particularly in industries with sensitive consumer data or tight regulatory monitoring. Enterprises operating in highly regulated

environments may be cautious about investing in marketing analytics due to the risks of data breaches, privacy violations, and potential legal penalties.

The coefficient for 'economic impact' is 0.77846, with a p-value of 0.1326, which is not statistically significant at the 0.05 level. This implies that the perceived economic impact of marketing analytics, whether favorable or negative, does not have a substantial effect on the likelihood of adoption. This finding does not support the theory that economic downturns and financial restrictions can negatively impact marketing analytics application, as firms may prioritize cost-cutting measures over investments in new technology and marketing tactics. The non-significant association implies that the perceived economic impact of marketing analytics is not the primary motivator for its use.

In addition, the variance inflation factors (VIFs) obtained for the predictor variables indicate that multicollinearity is not a big concern in the model. The VIFs range from 2.005168 to 2.824941, significantly below the generally used threshold of 10, demonstrating that the independent variables are not highly linked to each other. The total model fit statistics provide more insights into the explanatory power of the logit analysis. The model's Akaike Information Criterion (AIC) is 54.553, which is a measure of the model's quality of fit, with lower values indicating better fit. The AIC number shows that the model provides a relatively decent fit to the data, while there may be room for improvement in terms of model performance.

Based on these data, the hypotheses H1, H2, H3, and H4 are supported and exhibit statistical significance. In contrast, H5 demonstrates that economic downturns and financial constraints might negatively impact the adoption of marketing analytics.

5. Conclusion

The findings of this study provide a full understanding of the organizational elements impacting the adoption and application of marketing analytics in the Algerian corporate context. The logit analysis suggests that resource restrictions, insufficient IT investment, and a lack of data-driven corporate culture are key impediments to the deployment of marketing analytics. Additionally, regulatory issues around data privacy and security offer a substantial problem, particularly for firms working in highly regulated industries. Interestingly, the perceived economic benefit of marketing analytics does not appear to be a significant motivator for its adoption. This shows that Algerian firms may understand the strategic significance of these analytical tools, independent of immediate financial reasons.

The insights gathered from this research offer significant assistance for Algerian firms looking to improve their data-driven decision-making capabilities. Furthermore, the findings give policymakers the policymakers the potential to establish supportive frameworks and infrastructure that might stimulate the expansion of marketing analytics within the Algerian business sector. By overcoming the identified problems, Algerian companies may leverage the revolutionary potential of marketing analytics and acquire a competitive edge in the expanding digital industry.

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