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Digital Engagement and Strategic Performance in Smes: A Predictive Model based on User Experience and Interaction Dynamics

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Abstract:- In the context of accelerating digital transformation, small and medium-sized enterprises (SMEs) face the challenge of designing effective digital marketing strategies that enhance competitiveness and strengthen customer relationships. This research proposes a

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Digital Engagement Efficiency Model that integrates four key dimensions of online performance: immersion, usability, interaction, and commitment. The model reinterprets the traditional 4F's (Flow, Functionality, Feedback, and Fidelity) under a framework of digital engagement and strategic performance.

Using a mixed-method approach, a quantitative survey was applied to SMEs in northern Mexico, complemented by qualitative interviews with marketing managers. The data were analyzed using Structural Equation Modeling to identify the predictive relationships between digital engagement factors and strategic performance outcomes.

Results demonstrate that immersion and interaction significantly predict the effectiveness of digital marketing management, while usability and commitment act as mediating variables that reinforce customer loyalty and brand perception. The study concludes by offering a set of strategic guidelines for SMEs to enhance their digital maturity and optimize marketing return on investment.

Keywords: *digital engagement, small and medium-sized enterprises, digital marketing strategy, structural equation modeling, digital transformation.*

1. Introduction

Small and medium-sized enterprises (SMEs) are fundamental contributors to employment and gross domestic product, yet they continue to face structural and technological challenges that affect their capacity to compete in increasingly digitalized markets [1], [2]. Prior studies in Mexico and Latin America have shown that while SMEs are vital to national development, their marketing management practices often remain informal and reactive, particularly in the transition toward digital ecosystems [3], [4]. This gap has motivated researchers to examine how digital tools and online platforms can enhance competitiveness through more efficient and customer-centric marketing models [5], [6].

One of the most influential contributions in this field has been the 4F model—*Flow, Functionality, Feedback,* and *Fidelity*—which conceptualizes digital marketing effectiveness through customer experience factors [7]. However, as several authors note, this framework remains largely tactical, emphasizing operational interactions rather than holistic engagement mechanisms that link digital experiences to measurable strategic outcomes [8], [9]. Furthermore, the statistical approaches commonly used—mainly linear regressions—tend to oversimplify the interdependence among these variables [10].

Recent scholarships and practice have shifted toward digital engagement and customer experience (CX) as critical levers of firm performance. Global industry reports highlight that leading organizations achieve superior results not by expanding digital presence but by

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orchestrating *end-to-end experiences* that combine immersion, usability, interaction, and commitment [11], [12], [13]. In this context, digital engagement represents a multidimensional construct encompassing cognitive absorption, intuitive usability, two-way participation, and emotional attachment [14], [15].

Empirical research from 2023 onward confirms that these engagement dimensions significantly predict strategic digital performance in SMEs when assessed through advanced modeling techniques such as Structural Equation Modeling (SEM) [16], [17]. The integration of SEM allows for the estimation of latent constructs, offering a richer understanding of causal relationships than traditional regression analysis [18]. Moreover, studies in digital transformation demonstrate that the maturity of digital processes and engagement quality jointly determine the success of SME competitiveness.

The present research introduces a Digital Engagement Efficiency Model (DEEM) as a conceptual evolution of the 4F model. DEEM reconceptualizes *flow* as immersion, *functionality* as usability, *feedback* as interaction, and *fidelity* as commitment, aligning with current UX and CX theories that link user-centered design to customer satisfaction and brand loyalty [5], [6], [19]. Methodologically, this study applies SEM to examine how these engagement drivers influence strategic digital performance—a higher-order construct capturing effectiveness, competitiveness, and perceived customer value [16], [17].

Additionally, this paper expands the geographic and empirical scope of prior studies focused solely on service SMEs in Gómez Palacio (Durango) by analyzing firms across the Northern Mexico region. The inclusion of qualitative insights from marketing managers also enhances interpretative validity, responding to calls for mixed-method designs in digital marketing research [10].

Beyond marketing, the proposed model draws inspiration from research in decision support and computational intelligence, where hybrid and data-driven approaches improve outcomes in complex systems [20], [21], [22], [23]. Similar to these studies, the DEEM framework applies structured analysis to understand multifactorial decision environments, translating them into actionable strategies for SME digital management.

Therefore, the research question of this work is: Tt what extent do *immersion, usability, interaction,* and *commitment*—conceptualized as digital engagement drivers—predict strategic digital performance in SMEs?

This study contributes by (a) introducing a reframed DEEM that modernizes the 4F logic; (b) applying structural equation modeling to test direct and mediated effects of engagement on performance; and (c) offering diagnostic guidelines that help SMEs align digital engagement with competitiveness and innovation objectives. Collectively, these advances shift the focus

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from *doing more digital* to *designing better digital experiences*, a perspective increasingly associated with sustainable performance advantages in contemporary markets [11], [12].

2. Materials and methods

2.1 Research design

This study employed a mixed-method design with a dominant quantitative component and a complementary qualitative phase. The quantitative stage sought to validate the Digital Engagement Efficiency Model through Structural Equation Modeling, while the qualitative stage provided contextual interpretation through semi-structured interviews with marketing managers. This approach follows the recommendations of [10] for concurrent triangulation, allowing the integration of numerical and interpretative evidence to strengthen construct validity and the practical applicability of findings.

The research was non-experimental and cross-sectional, as the variables were observed in their natural context without manipulation [18]. The scope was descriptive, correlational, and predictive, aiming to identify and model the relationships among the four engagement dimensions—immersion, usability, interaction, and commitment—and the dependent construct strategic digital performance.

2.2 Study area and population

The population consisted of small and medium-sized enterprises (SMEs) located in Northern Mexico, specifically within the states of Coahuila, Durango, and Nuevo León. This region was selected due to its significant concentration of service-sector SMEs undergoing digital transformation [1]. According to the National Statistical Directory of Economic Units (DENUE), this segment represents a crucial portion of the productive structure in the region, particularly in professional, technical, and educational services.

The target population was defined as SMEs operating formalized marketing activities through digital channels, including websites, social networks (Facebook, Instagram, LinkedIn, YouTube), or e-commerce platforms. The inclusion criterion required that each company had at least one employee responsible for digital communication, marketing, or data analytics.

2.3 Sample design

A probabilistic simple random sampling method was used, ensuring that each element of the population had the same probability of selection. The sample size was calculated using the standard formula for finite populations:

$$n = \frac{Z^2 pqN}{E^2(N-1) + Z^2 pq}$$

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where:

n= sample size,

N= population size,

Z= standard score corresponding to the 95% confidence level (1.96),

E= margin of error (0.05),

p= estimated proportion of success (0.5),

$q = 1 - p$.

Following these parameters, the minimum representative sample was 190 SMEs. The sampling process followed guidelines similar to those used in previous regional SME studies [3], [4].

2.4 Data collection instruments

Quantitative instrument

A structured questionnaire was developed, divided into two sections.

1. General Information section:

Collected data on company size, years of operation, main economic activity, and the existence of a marketing or digital communication department.

2. Measurement section:

Contained items assessing each dimension of the DEEM model—Immersion, Usability, Interaction, and Commitment—along with Strategic Digital Performance. All items used a five-point Likert scale ranging from *1 = strongly disagree* to *5 = strongly agree*.

The instrument was based on validated constructs from [5], [15], [19], adapted to the SME context in Mexico. Items were pretested with 30 participants to ensure clarity and reliability. Internal consistency was assessed using Cronbach's alpha, targeting coefficients ≥ 0.70 for all constructs [18].

To ensure construct validity, the Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity tests were applied prior to SEM analysis. Acceptable thresholds were KMO ≥ 0.70 and $p < 0.05$ for Bartlett's test [10].

Qualitative instrument

The qualitative phase used semi-structured interviews with 15 marketing managers from selected SMEs. The interview guide explored digital strategy design, customer interaction practices, and challenges in measuring online performance. These insights supported the

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interpretation of quantitative findings and the refinement of strategic recommendations, following the principles of explanatory sequential mixed-method research.

Variables and model specifications

The Digital Engagement Efficiency Model, DEEM, is operationalized as shown in Table 1.

Table 1. Operationalization of variables

Variable	Symbol	Definition	Source
Immersion	IM	Degree of user cognitive absorption and focused attention during digital interactions.	Csíkszentmihályi (2000); Guo et al. (2023)
Usability	US	Perceived ease of use, efficiency, and intuitiveness of digital platforms.	Guo et al. (2023); Leeflang et al. (2014)
Interaction	IN	Extent of bidirectional communication and customer participation.	Kee & Yazdanifard (2015); Selman (2017)
Commitment	CO	Emotional connection and behavioral intention toward the brand.	Fleming (2000); McKinsey & Company (2023)
Strategic Digital Performance	SDP	Level of perceived competitiveness, efficiency, and innovation derived from digital marketing.	Anabila et al. (2023); MDPI (2024)

The structural model is:

$$SDP = \beta_0 + \beta_1 IM + \beta_2 US + \beta_3 IN + \beta_4 CO + \varepsilon$$

Data analysis

Quantitative data were processed using SPSS v28 and AMOS v26. The analysis included descriptive statistics, exploratory and confirmatory factor analyses (EFA and CFA), and SEM to test the hypothesized relationships among variables. Model fit was evaluated through indices such as CFI, TLI, RMSEA, and χ^2/df, following conventional thresholds (CFI > 0.90; RMSEA < 0.08).

Qualitative data were analyzed through thematic coding using NVivo 12, focusing on recurrent patterns related to engagement practices and perceived digital transformation impact. The

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integration of both data types occurred during the interpretation phase to achieve methodological triangulation [10].

Ethical considerations

All participants received an explanation of the purpose of the research, data confidentiality, and voluntary participation rights. Written informed consent was obtained prior to data collection. No personally identifiable information was published.

Software and tools

In line with prior works emphasizing data-driven and decision-support systems [21], [24], [25], [26], computational tools were integrated to enhance analytical robustness:

- SPSS and AMOS for statistical modeling,
- NVivo for qualitative analysis, and
- Google Forms for online survey administration and data capture.

This combination of analytical environments enabled a comprehensive assessment of engagement dynamics in SMEs, reinforcing methodological reliability and reproducibility.

3. Results

3.1 Descriptive statistics

The final sample consisted of 192 valid responses from SMEs operating in the northern region of Mexico, including Coahuila (42%), Durango (35%), and Nuevo León (23%). The dominant sectors were professional and technical services (31%), education and training (27%), and health and social assistance (18%). Most firms were established for more than 5 years (62%), had between 11 and 50 employees (71%), and reported active use of at least two digital channels, primarily Facebook (87%) and Instagram (74%), followed by corporate websites (52%) and LinkedIn (38%).

Regarding internal capabilities, 54% of the firms had a formal marketing or communication department, while 46% managed digital strategies through owners or administrative personnel. This heterogeneity is consistent with previous findings indicating uneven levels of digital maturity among Mexican SMEs (MDPI, 2024; KPMG, 2024).

3.2 Reliability and validity tests

To ensure internal consistency, Cronbach's alpha and composite reliability (CR) were calculated for all constructs in the Digital Engagement Efficiency Model (DEEM). As shown in Table 2, all dimensions exceeded the recommended threshold of 0.70 (La Garza et al., 2013; Hernández Sampieri et al., 2018), indicating strong reliability.

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Table 2. Reliability and Convergent Validity of Constructs

Construct	Items	Cronbach's α	CR	AVE
Immersion (IM)	4	0.891	0.912	0.684
Usability (US)	4	0.876	0.902	0.657
Interaction (IN)	5	0.907	0.923	0.701
Commitment (CO)	4	0.895	0.910	0.678
Strategic Digital Performance (SDP)	5	0.915	0.934	0.712

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.853, and Bartlett's Test of Sphericity was significant (χ^2 = 2,147.35, $p < 0.001$), confirming suitability for factor analysis.

All Average Variance Extracted (AVE) values were greater than 0.50, indicating satisfactory convergent validity.

Discriminant validity was assessed using the Fornell–Larcker criterion, confirming that the square root of each construct's AVE exceeded its correlations with other constructs.

The Confirmatory Factor Analysis (CFA) results demonstrated good model fit across all indices:

χ^2/df = 2.38, CFI = 0.954, TLI = 0.943, RMSEA = 0.058, and SRMR = 0.046. These values indicate an acceptable representation of the theoretical structure of the DEEM model (Hu & Bentler, 1999; Hernández Sampieri et al., 2018). All standardized factor loadings were statistically significant ($p < 0.001$) and ranged from 0.72 to 0.91, further validating the constructs.

The structural model was tested to evaluate the hypothesized relationships between engagement dimensions (IM, US, IN, CO) and Strategic Digital Performance (SDP). The model achieved robust overall fit: χ^2/df = 2.61, CFI = 0.947, TLI = 0.936, RMSEA = 0.061, and SRMR = 0.049—all within acceptable limits. The Standardized Path Coefficients of the DEEM model are shown in Table 3.

Table 3. Standardized Path Coefficients of the DEEM Model

Hypothesis	Path	Estimate (β)	t-value	p-value	Supported
H1	IM → SDP	0.41	6.82	<0.001	Yes
H2	US → SDP	0.33	5.71	<0.001	Yes
H3	IN → SDP	0.27	4.39	<0.001	Yes

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H4	CO → SDP	0.36	6.03	<0.001	Yes

All four hypotheses were supported at the $p < 0.001$ level, confirming that each engagement dimension exerts a significant positive effect on strategic digital performance. The model explained 72.3% of the variance ($R^2 = 0.723$) in SDP, demonstrating strong explanatory power compared to similar studies (Anabila et al., 2023; Guo et al., 2023; MDPI, 2024).

Among predictors, Immersion ($\beta = 0.41$) emerged as the strongest determinant, followed by Commitment ($\beta = 0.36$), Usability ($\beta = 0.33$), and Interaction ($\beta = 0.27$). This pattern suggests that SMEs that succeed in creating engaging and absorbing user experiences—where visitors spend more time interacting with content—tend to achieve superior digital performance outcomes, echoing findings from KPMG (2024) and McKinsey & Company (2023).

Analysis of interview data using NVivo 12 provided interpretive support for the quantitative results. Three dominant themes emerged:

1. Customer Experience as a Differentiator:

Respondents emphasized that immersive and intuitive digital experiences directly enhance customer retention, echoing the DEEM's core premise.

2. Limited Analytical Capabilities:

Despite awareness of engagement metrics, many SMEs reported lacking tools for continuous data analysis—an observation consistent with the need for decision-support systems highlighted in Solares et al. (2025).

3. Strategic Integration of Digital Channels:

Firms with structured digital workflows—using CRM tools or analytics dashboards—showed greater alignment between marketing actions and strategic objectives, supporting findings from Fernández et al. (2023) regarding data-driven decision environments.

The results validate the Digital Engagement Efficiency Model as a robust predictive framework for understanding SME digital marketing effectiveness. The quantitative model achieved strong internal validity, high reliability, and significant predictive power, while qualitative evidence reinforced the importance of immersive design and interactive engagement.

Collectively, these findings suggest that digital engagement is not merely a communication mechanism but a strategic capability, bridging user experience and business performance. The DEEM framework provides a practical diagnostic tool for SMEs to prioritize engagement investments, guiding them toward higher levels of digital maturity and strategic competitiveness (KPMG, 2024; McKinsey & Company, 2023; MDPI, 2024).

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4. Conclusions

The objective of this study was to develop and validate a Digital Engagement Efficiency Model capable of explaining the relationship between digital user experience factors and strategic performance in small and medium-sized enterprises. Through the integration of quantitative and qualitative methods, the research confirmed that immersion, usability, interaction, and commitment are significant predictors of strategic digital performance, explaining more than 70% of its variance. These results demonstrate that engagement is not a peripheral aspect of marketing but rather a core determinant of organizational competitiveness in digital environments.

The findings empirically substantiate that immersion and commitment are the strongest drivers of performance. SMEs capable of designing digital experiences that capture users' attention, stimulate participation, and foster emotional connection achieve greater differentiation and loyalty. These results align with global reports on customer experience excellence (KPMG, 2024; McKinsey & Company, 2023) and with recent academic evidence linking engagement and usability to long-term firm performance (Anabila et al., 2023; Guo et al., 2023; MDPI, 2024).

From a theoretical standpoint, the DEEM model extends the traditional *4F framework* (Fleming, 2000) by reinterpreting its constructs through the lens of digital engagement and user experience theory. This reconceptualization provides a contemporary foundation for understanding how online interactions evolve from transactional exchanges into relational value creation. The study also demonstrates the usefulness of structural equation modeling (SEM) as an analytical approach that captures complex interdependencies among marketing variables, surpassing earlier linear approaches (Hernández Sampieri et al., 2018; Hu & Bentler, 1999).

From a methodological perspective, the integration of quantitative SEM analysis and qualitative interviews enabled a robust triangulation of results. The use of analytical software such as SPSS, AMOS, and NVivo contributed to the reliability and transparency of the findings. Furthermore, the study highlights the importance of employing data-driven tools—an aspect consistent with emerging decision-support systems in other domains (Díaz et al., 2022; Fernández et al., 2023; Solares et al., 2025).

From a managerial standpoint, this research offers actionable insights for SMEs seeking to enhance their digital maturity. First, digital engagement should be treated as a strategic capability, not merely as a marketing function. Second, firms must invest in user-centered design and usability testing to maximize the immersive quality of their platforms. Third, interaction and commitment should be nurtured through personalized communication, data

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analytics, and community management. These practices collectively foster sustainable customer relationships and improve marketing return on investment.

Finally, the study opens new avenues for future research. Future investigations could test the DEEM model across different sectors or cultural contexts, incorporate longitudinal data to examine engagement over time, or integrate machine learning approaches for predictive analytics—an emerging trend in digital decision systems (Solares et al., 2025). By positioning digital engagement as both a theoretical construct and a practical strategy, this study contributes to the ongoing evolution of marketing science in the era of digital transformation.

Refrences

[1] INEGI, "Encuesta Nacional sobre Productividad y Competitividad de las Micro, Pequeñas y Medianas Empresas," 2018.
[2] United Nations, "Day of Micro-, Small and Medium-sized Enterprises," 2019.
[3] A. Henkel Mercado, R. Arenas Valdés, and G. Aguilera Izaguirre, "Análisis legal, social y económico de los factores que permiten la creación de PYMEs en el Estado de México," *Revista Dilemas Contemporáneos: Educación, Política y Valores*, vol. 3, no. 75, pp. 1–21, 2019.
[4] S. Y. T. Cabello, "Importancia de la micro, pequeñas y medianas empresas en el desarrollo del país," *Lex-Revista de la facultad de Derecho y Ciencias Politicas*, vol. 12, no. 14, pp. 199–218, 2014.
[5] P. Leeflang, P. Verhoef, P. Dahlström, and T. Freundt, "Challenges and solutions for marketing in a digital era," *European Management Journal*, vol. 32, no. 1, pp. 1–12, 2014.
[6] H. Selman, *Marketing digital*. Ibukku, 2017.
[7] P. Fleming, *Hablemos de marketing interactivo. Reflexiones sobre marketing digital y comercio electrónico*. Esic editorial, 2000.
[8] J. S. García, *Fundamentos de marketing digital*. Comunicación Social Ediciones y Publicaciones, 2016.
[9] P. Kotler and K. Keller, *Dirección de marketing*. Pearson Educación, 2012.
[10] R. Hernández Sampieri, C. Fernández Collado, and P. Baptista Lucio, *Metodología de la investigación*. McGraw-Hill Interamericana, 2018.
[11] KPMG, "Customer Experience Excellence Report 2023–24," 2024.
[12] Verint, "State of Digital Customer Experience Report," 2023.
[13] McKinsey & Company, "Enhancing customer experience in the digital age," 2023.
[14] M. Csikszentmihalyi, *Beyond boredom and anxiety.* Jossey-bass, 2000.
[15] J. Guo, W. Zhang, and T. Xia, "Impact of shopping website design on customer satisfaction and loyalty: The mediating role of usability and the moderating role of trust," *Sustainability*, vol. 15, no. 8, p. 6347, 2023.
[16] P. Anabila and others, "The empirical study of digital marketing strategy and performance in SMEs," *Technol Forecast Soc Change*, 2023.

Power System Technology
ISSN:1000-3673
Received: 16-09-2025 Revised: 05-10-2025 Accepted: 18-11-2025

[17] A. Yela Aránega and others, "Digitalization intention in entrepreneurs and SMEs: A structural equation model of digital behavior and work–life balance," *International Entrepreneurship and Management Journal*, 2024.
[18] J. la Garza, B. Morales, and B. González, "Análisis estadístico multivariante. Un enfoque teórico y práctico," *México, DF: McGraw-Hill*, 2013.
[19] A. W. A. Kee and R. Yazdanifard, "The Review of Content Marketing as a New Trend in Marketing Practices.," *International Journal of Management, Accounting & Economics*, vol. 2, no. 9, 2015.
[20] R. Díaz, E. Solares, V. de-León-Gómez, and F. G. Salas, "Stock portfolio management in the presence of downtrends using computational intelligence," *Applied Sciences*, vol. 12, no. 8, p. 4067, 2022.
[21] J. Navarro, E. Fernández, E. Solares, A. Flores, and R. D\'\iaz, "Learning the Parameters of ELECTRE-Based Primal-Dual Sorting Methods that Use Either Characteristic or Limiting Profiles," *Axioms*, vol. 12, no. 3, p. 294, 2023.
[22] E. Fernández, J. Navarro, E. Solares, C. A. C. Coello, R. D\'\iaz, and A. Flores, "Inferring preferences for multi-criteria ordinal classification methods using evolutionary algorithms," *IEEE Access*, 2023.
[23] E. Solares, E. Fernández, C. A. C. Coello, X. S. Lozano, R. Moreno-Cepeda, and R. Diaz, "A comprehensive system to support decision making in highly complex project portfolio situations," *IEEE Access*, 2025.
[24] E. Solares, V. De-León-Gómez, F. G. Salas, and R. D\'\iaz, "A comprehensive decision support system for stock investment decisions," *Expert Syst Appl*, vol. 210, p. 118485, 2022.
[25] J. C. Leyva, S. Flores, E. Solares, M. León, R. Díaz, and A. Flores, "Multicriteria decision model to support the evaluation of common jurisdiction violence in the capital cities of the states of Mexico," *IEEE Access*, vol. 11, pp. 38753–38769, 2023, doi: 10.1109/ACCESS.2023.3268099.
[26] E. Solares, F. G. Salas, V. De-Leon-Gomez, and R. D\'\iaz, "A Comprehensive Soft Computing-Based Approach to Portfolio Management by Discarding Undesirable Stocks," *IEEE Access*, vol. 10, pp. 40467–40481, 2022.