



Credibility Shield or Digital Signal? Dermatologist Trust and Beauty Marketing in Iran's Cosmeceutical Market

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Abstract

Purpose: The cosmeceutical industry in emerging markets faces a dual challenge: rapid digital transformation and severe macroeconomic volatility. This study investigates the structural relationships between product quality, digital beauty marketing, dermatologist trust, and their impact on marketing and organizational performance within the Iranian cosmeceutical context.

Design/methodology/approach: Grounded in signaling and institutional theories, a conceptual model was tested using PLS-SEM on a three-layer stratified sample (N=750, effective sample size after weighting=511) comprising supply-side managers, medical experts, and end-users.

Findings: The model explains 66.1% of organizational performance variance. Digital Beauty Marketing most strongly drives Brand Awareness ($\beta=0.448$, $p<0.001$), while Dermatologist Trust most directly impacts Marketing Performance ($\beta=0.524$, $p<0.001$), acting as a credibility shield against market uncertainty. Economic Instability exerts a significant negative effect ($\beta=-0.284$), yet trust-based mechanisms remain resilient.

Practical implications: To navigate volatile emerging markets, firms must transition from celebrity-led to expert-led digital strategies, investing in medical influencers and clinical evidence in digital storytelling.

Originality/value: This is among the first studies to integrate medical trust structures with digital ecosystem drivers in an unstable economic context using a three-layer weighted design incorporating managers, dermatologists, and consumers simultaneously.

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1. Introduction

The global beauty and skincare industry has experienced profound transformation in recent years, with rapid digitalization, heightened consumer awareness of dermatological health, and growing demand for scientifically validated cosmetic products acting as key drivers of change (Sagastume-Canova & Fernández-Guarino, 2026; Perret & Schwientek, 2025) ^[97, 88]. Within this evolving landscape, the cosmeceutical sector—situated at the intersection of cosmetics and pharmaceuticals—has emerged as one of the fastest-growing segments of the global beauty market. The global cosmeceutical market was valued at approximately USD 67.1 billion in 2024 and is projected to reach USD 84.6 billion by 2030, reflecting a compound annual growth rate (CAGR) of 3.9% between 2025 and 2030 (Grand View Research, 2024) ^[42]. In the Iranian context, the cosmeceutical market has grown at an estimated CAGR of 8-12% between 2020 and 2025, driven by increasing per capita spending on dermatological services and the proliferation of digital beauty platforms (Iranian Cosmeceutical Association, 2025; Dehghani *et al.*, 2023) ^[56, 28]. Despite this growth, the market remains highly sensitive to currency fluctuations and import restrictions. Reports indicate that the Iranian rial faced severe depreciation during the study period, losing over 40% of its value against the USD (see Associated Press, 2026; as cited in Rasekhi, 2025) ^[93]. This macroeconomic instability directly constrains

household purchasing power and, consequently, the effectiveness of marketing efforts for premium consumer goods.

StrategyHelix (2025) ^[110] forecasts that Iran's beauty and personal care market will expand by USD 3.2 billion by 2030, registering a compound annual growth rate of 6.61% over the 2025-2030 period. However, cosmeceutical products—dermatologist-recommended anti-aging, acne treatment, and skin brightening products—are priced 3 to 4 times higher than conventional cosmetics due to their specialized formulations and import costs. Industry reports confirm that consumers spend an additional \$20–30 per month on these therapeutic skincare products (Iranian Cosmeceutical Association, 2024; Williams & Marshall Strategy, 2025) ^[55, 117]. This price premium reflects the medical-grade ingredients, clinical testing, and dermatological validation that distinguish cosmeceuticals from conventional cosmetics, and it underscores the economic significance of this market segment in Iran. Unlike traditional cosmetic products, cosmeceuticals combine aesthetic benefits with therapeutic functionality and frequently rely on dermatological expertise, clinical validation, and scientifically formulated ingredients to establish credibility and build consumer trust (Crespi *et al.*, 2025) ^[24].

Parallel to the scientific evolution of skincare products, digital technologies have fundamentally reshaped marketing practices within the beauty industry. Digital platforms now play a central role in marketing communication, consumer engagement, and brand development (Singh & Mongwe, 2024) ^[106]. Firms increasingly employ Digital Beauty Marketing (DBM) strategies—including social media promotion, influencer collaborations, personalized online engagement, and recommendation systems—to communicate product value and strengthen brand awareness (Beyari & Hashem, 2025) ^[12]. These digital mechanisms enable firms to target highly segmented audiences, enhance customer relationships, and accelerate brand diffusion within highly competitive markets (Theodorakopoulos, 2025) ^[113]. However, the effectiveness of marketing activities in cosmeceutical markets cannot be explained solely through digital engagement mechanisms. Because cosmeceutical products are closely associated with dermatological health and medically oriented skincare practices, consumer decision making is also strongly influenced by professional trust structures. Dermatologist Trust (DT) represents a critical relational mechanism that can reinforce brand legitimacy and enhance the effectiveness of marketing communication. Professionals frequently function as key opinion leaders whose recommendations shape consumer perceptions regarding product safety, efficacy, and credibility (Liu & Yahya Dawod, 2025; Poelheken & van der Bent, 2026; Vo *et al.*, 2026) ^[68, 90, 115]. Empirical evidence supports this perspective; for example, Bal *et al.* (2025) ^[6] demonstrate that patients exhibit higher levels of trust in dermatologists than in social media influencers, highlighting the importance of expert-generated content in digital skincare communication. Despite the growing importance of both digital marketing mechanisms and professional trust structures in the beauty sector, three specific gaps remain insufficiently addressed in the academic literature.

First, existing studies have largely examined digital marketing strategies (e.g., Singh & Mongwe, 2024; Theodorakopoulos, 2025) ^[106, 113] or healthcare-related trust dynamics (e.g., Bal *et al.*, 2025; Liu & Yahya Dawod, 2025)

^[6, 68] in isolation, with limited integration between digital beauty marketing activities and dermatologist credibility within a unified analytical framework (Almeman, 2024) ^[2].

Second, empirical evidence from emerging markets—particularly those facing macroeconomic instability—remains relatively limited, as much of the existing literature has focused on developed economies (Cavalcanti *et al.*, 2026; Kashuri *et al.*, 2026) ^[16, 60].

Third, no prior study has employed a three-layer weighted sampling design—integrating perspectives from managers, dermatologists, and consumers—to analyze these dynamics within a single structural model. To address this, the current study utilizes a rigorous sampling framework (as detailed in Figure 9) to ensure representativeness across the cosmeceutical value chain.

Iran provides a particularly relevant context for investigating these dynamics. The Iranian cosmeceutical market has experienced notable expansion in recent years due to increasing skincare awareness and the growth of dermatological services (Dehghani *et al.*, 2023) ^[28]. However, firms operating in this sector simultaneously face significant environmental challenges, including economic volatility and currency fluctuations (Kashuri *et al.*, 2026) ^[60]. As Rasekhi (2025: 257) ^[93] shows, exchange rate shocks increase poverty by 10.5% and hyperinflation by 13.1%. These shocks directly reduce real disposable income, making consumers more price-sensitive and less responsive to marketing campaigns for premium cosmeceutical products. Addressing these gaps, the present study develops and empirically tests an integrated conceptual framework that links Digital Beauty Marketing (DBM), Dermatologist Trust (DT), brand awareness, and performance outcomes under the moderating influence of Economic Instability (EI).

This study makes three distinctive contributions:

1. It is among the first to integrate DBM mechanisms with medical trust structures (DT) within a comprehensive marketing performance framework.
2. It provides novel empirical evidence from an emerging-market cosmeceutical industry, extending knowledge beyond developed-market focuses.
3. It highlights the contextual role of Economic Instability in shaping marketing and organizational outcomes, offering insights into sustaining effectiveness under macroeconomic uncertainty.

2. Literature Review and Theoretical Framework

2.1. Theoretical Foundations

2.1.1. Signaling Theory

Integrating insights from marketing science, consumer behavior, and healthcare trust, this study investigates marketing effectiveness within the cosmeceutical industry—a sector defined by “credence goods,” where consumers struggle to evaluate quality even after consumption. Drawing upon signaling theory (Connelly *et al.*, 2011) ^[22] and relationship marketing theory (Palmatier *et al.*, 2006) ^[83], we propose that firms in therapeutic beauty markets establish credibility through strategic signaling to enhance organizational performance.

Signaling theory posits that firms use observable cues to communicate otherwise unobservable attributes—such as quality, safety, and efficacy—in markets characterized by high information asymmetry (Connelly *et al.*, 2011) ^[22]. In the cosmeceutical sector, because consumers often lack the medical expertise to assess product suitability, signals such

as clinically validated ingredients, scientific branding, and dermatologist endorsements become indispensable credibility indicators (Dao *et al.*, 2025) ^[26]. Product quality functions as a core diagnostic signal, while digital beauty marketing channels—ranging from social media content to influencer endorsements and AI-driven recommendation systems—act as amplifiers that increase the visibility and perceived legitimacy of these signals (Zhao & Li, 2025) ^[119].

2.1.2. Relationship Marketing Theory

Relationship marketing theory (RMT) posits that long-term organizational success is predicated on the development and maintenance of high-quality relational exchanges (Palmatier *et al.*, 2006) ^[83]. In “credence good” categories—such as cosmeceuticals—where consumers cannot easily verify efficacy even after consumption, relational mechanisms like trust and professional credibility become the primary drivers of marketing effectiveness.

Within this framework, we conceptualize dermatologist trust not merely as a recommendation source, but as a critical relational interface that legitimizes complex product claims. By bridging the information gap between the manufacturer and the end-user, expert trust strengthens brand attachment and reduces perceived risk. Recent research underscores that physician credibility fosters “cognitive trust” through utilitarian value, while simultaneously enhancing the perceived safety and therapeutic efficacy of the brand (Dao *et al.*, 2025; Sweeney *et al.*, 2020) ^[26, 111].

2.1.3. Institutional Theory and Economic Instability

While RMT focuses on micro-level dyadic relationships, Institutional Theory (Scott, 2014) ^[102] provides the necessary macro-environmental lens to account for the constraints inherent in emerging markets. This theory suggests that organizational survival and performance are deeply influenced by the “rules of the game”—comprising formal institutions (e.g., regulatory frameworks, economic policies) and informal institutions (e.g., cultural norms and trust patterns). In the specific context of economic instability—prevalent in the Iranian market due to inflationary pressures and currency volatility—institutional theory predicts a “decoupling” of standard marketing routines. Such turbulence increases environmental uncertainty, forcing consumers to adopt risk-averse behaviors and prioritize essential spending (Sheth, 2011; Cavusgil *et al.*, 2020) ^[105, 17]. Under these conditions, market-based signals often weaken, and consumers revert to institutional anchors—such as trusted professional networks and medical experts—to navigate uncertainty (Habel *et al.*, 2016; Norbi & Nizam, 2025) ^[43, 82]. By integrating this perspective, we position economic instability (H6) as a structural antecedent that dictates the boundaries of marketing performance.

2.2. Systematic Review of the Literature

To establish a rigorous theoretical foundation, this study adopts a systematic approach to reviewing the existing literature on digital marketing and trust mechanisms in the cosmeceutical and beauty industry. Following the PRISMA framework, the review identifies four key thematic clusters in the extant research.

Cluster 1: Digital Marketing in the Beauty Industry

Prior research has predominantly examined digital marketing strategies in beauty markets through the lens of social media

engagement and influencer marketing. Godey *et al.* (2016) ^[41] demonstrated that digitally mediated interactions accelerate brand diffusion, while Bilgin (2020) ^[13] confirmed the positive relationship between social media marketing and brand awareness. However, these studies largely focused on conventional cosmetics rather than the therapeutic cosmeceutical segment, which entails higher perceived risk and information asymmetry. Singh and Mongwe (2024) ^[106] further emphasized that digital platforms now play a central role in marketing communication, consumer engagement, and brand development. Beyari and Hashem (2025) ^[12] showed that firms increasingly employ Digital Beauty Marketing (DBM) strategies—including social media promotion, influencer collaborations, personalized online engagement, and recommendation systems—to communicate product value and strengthen brand awareness. Theodorakopoulos (2025) ^[113] confirmed that these digital mechanisms enable firms to target highly segmented audiences and accelerate brand diffusion within competitive markets. Critically, however, none of these studies examined how digital marketing interacts with professional medical trust structures in therapeutic beauty categories, leaving a significant gap in understanding the unique dynamics of cosmeceutical markets.

Cluster 2: Professional Trust in Healthcare-Adjacent Markets

A separate stream of literature has investigated trust mechanisms in healthcare contexts. Bal *et al.* (2025) ^[6] found that patients exhibit significantly higher trust in dermatologists than in social media influencers for skincare recommendations, highlighting the importance of expert-generated content in digital skincare communication. Similarly, Sweeney *et al.* (2020) ^[111] demonstrated that professional credibility substantially reduces perceived risk in credence goods, with trust serving as a primary mechanism for overcoming information asymmetry. Liu and Yahya Dawod (2025) ^[68] confirmed that physician credibility fosters cognitive trust through utilitarian value, while Vo *et al.* (2026) ^[115] showed that expert recommendations directly influence consumer perceptions of product safety and efficacy. Poelhekken and van der Bent (2026) ^[90] provided evidence that dermatologists function as key opinion leaders whose recommendations shape consumer decisions regarding product quality. However, these studies have not systematically integrated professional trust with digital marketing variables within a unified framework. Moreover, they have largely been conducted in developed healthcare systems with stable economic conditions, leaving the role of professional trust under economic uncertainty unexplored.

Cluster 3: The Iranian Context

Emerging research on the Iranian beauty market has begun to address digital advertising dynamics. Pazhouhan and Jaferi (2024) ^[87] conducted a grounded theory study to conceptualize advertising strategies for cosmetics and health products in Iran's online space, identifying 26 main categories and consequences including increased sales, customer loyalty, and improved brand image. Their findings underscore the importance of content quality, influencer collaboration, and social proof mechanisms in the Iranian digital landscape. However, their qualitative grounded theory approach, while valuable for exploration, did not test the statistical significance of these relationships, leaving the

relative importance of different advertising strategies unquantified. Furthermore, their study focused exclusively on online advertising without considering the role of professional medical endorsements.

Hashemnia *et al.* (2021) ^[47] contributed a brand-customer relationship model specific to the Instagram platform, demonstrating that interactivity and vividness enhance brand trust and loyalty among Iranian consumers. Khorsandi Noshahri *et al.* (2022) ^[63] designed an internet advertising model for brand image of online businesses of cosmetic and health products in Iran, emphasizing the role of visual content and brand storytelling. Taghiabadi *et al.* (2022) ^[112] examined customer engagement with Iranian beauty brand pages on Instagram, analyzing 300 posts from five popular brands (May, Calista, Inley, Cinere, and Amoutia). Their multiple regression analysis revealed that content type (incentive, promotional, informational, and entertainment) significantly affects customer engagement, with the model explaining 66.8% of the variance in likes ($R^2=0.668$, $F=15.372$, $p<0.001$). A critical limitation of this study, however, is its exclusive focus on conventional cosmetic brands, which lack the therapeutic claims and medical credibility requirements that characterize the cosmeceutical segment. Consequently, the extent to which these findings generalize to dermatologist-recommended, clinically validated products remains unknown. Ghadrifar *et al.* (2023) ^[40] developed a content marketing model for online cosmetic shops in Iran, emphasizing the role of educational content and brand storytelling. Asgharzadeh Shideh *et al.* (2023) ^[5] developed a qualitative model of social media influencer utilization in the luxury cosmetics industry, identifying advertising effectiveness as a key consequence of influencer marketing. Negahdari Niya *et al.* (2022) ^[79] identified factors affecting online advertising on actual purchases using fuzzy Delphi method, while Mafi (2021) ^[69] analyzed marketing performance in the maturity stage of cosmetic brands in Iran. Firouzdehghan (2023) ^[35] demonstrated the impact of electronic marketing capabilities on business performance quality with the mediating role of electronic satisfaction. Critical synthesis of these Iranian studies reveals three limitations that our study addresses: (1) they focus predominantly on conventional cosmetics rather than the therapeutic cosmeceutical segment, (2) they do not integrate

professional medical trust (dermatologist endorsement) as a credibility mechanism, and (3) they employ either qualitative or single-layer quantitative designs, whereas our study utilizes a three-layer weighted sampling design incorporating managers, dermatologists, and consumers simultaneously.

Cluster 4: Economic Instability and Marketing Effectiveness

Research on macroeconomic volatility and marketing performance remains limited. Habel *et al.* (2016) ^[43] demonstrated that economic shocks degrade marketing effectiveness in business-to-business markets, while Norbi and Nizam (2025) ^[82] confirmed that heightened uncertainty leads to short-termism in strategic planning. Sheth (2011) ^[105] argued that emerging market firms face unique challenges including institutional voids and economic volatility that fundamentally alter marketing strategy effectiveness. Cavusgil *et al.* (2020) ^[17] emphasized that currency fluctuations and inflationary pressures force consumers to adopt risk-averse behaviors. However, few studies have examined this relationship in the specific context of the Iranian cosmeceutical market, where currency fluctuations and inflation directly impact consumer purchasing power. Furthermore, no prior study has quantitatively tested whether trust-based mechanisms (such as dermatologist endorsement) remain resilient under macroeconomic shocks—a question our study directly addresses.

2.3. Research Gap Identified

Despite the growing body of research on digital marketing in Iran's beauty sector and international research on professional trust in healthcare markets, no prior study has: (1) integrated digital beauty marketing with dermatologist trust in a single structural model, (2) employed a three-layer weighted sampling design incorporating supply-side, medical expert, and end-user perspectives in the cosmeceutical context, (3) examined the moderating role of economic instability on marketing performance in this specific industry, or (4) tested whether professional trust mechanisms remain effective as credibility shields during periods of macroeconomic volatility.

2.4. Summary of Hypothesized Direct Relationships

Table 1: Summary of Hypothesized Direct Relationships

Hypothesis	Relationship	Theoretical Basis	Expected Sign
H1	Product Quality → Brand Awareness	Signaling Theory (Connelly <i>et al.</i> , 2011)	Positive
H2	Digital Beauty Marketing → Brand Awareness	Signaling Theory + Relationship Marketing	Positive
H3	Dermatologist Trust → Marketing Performance	Relationship Marketing + Trust Transfer	Positive
H4	Brand Awareness → Organizational Performance	Resource-Based View (Barney, 1991)	Positive
H5	Distribution Efficiency → Organizational Performance	Dynamic Capabilities (Day, 1994)	Positive
H6	Economic Instability → Marketing Performance	Institutional Theory (Scott, 2014)	Negative

2.5. Conceptual Model Summary

Figure 1 presents the integrated conceptual model, summarizing the hypothesized relationships among product quality, digital beauty marketing, dermatologist trust, brand

awareness, distribution efficiency, economic instability, marketing performance, and organizational performance. The model incorporates both direct effects (H1–H6) and mediating pathways (H7a, H7b, H8).

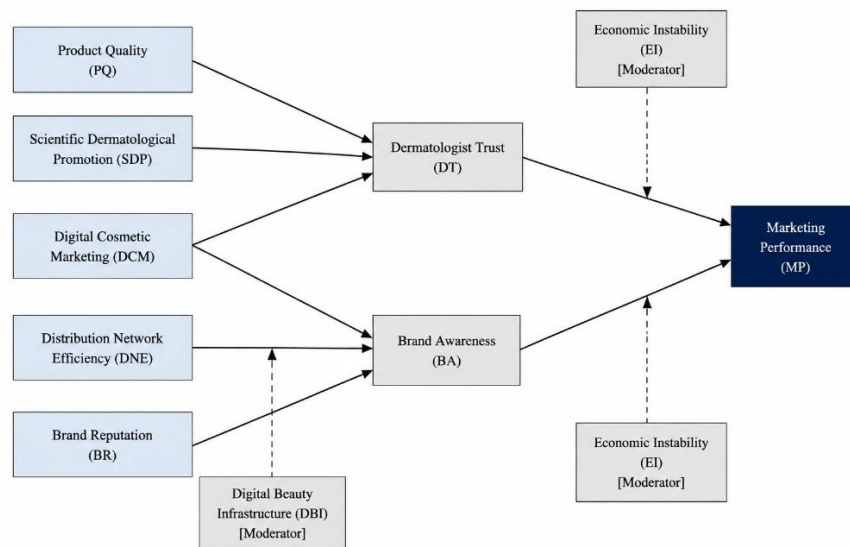


Fig 1: Integrated research model linking digital beauty marketing to organizational performance. The figure presents the hypothesized structural relationships among core marketing constructs, mediators, and outcomes, including the moderating role of economic instability.

3. Methodology

3.1. Research Design

This study employs a quantitative, cross-sectional research design to examine the structural relationships within the Iranian cosmeceutical industry. A positivist research philosophy guides the inquiry, prioritizing the testing of theoretically grounded hypotheses through objective measurement (Saunders *et al.*, 2019) ^[101]. Given the predictive orientation of the framework and the complexity of the latent constructs, Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized as the primary analytical technique, following the guidelines of Hair *et al.* (2022) ^[44].

3.2. Population and Sampling Procedure

To ensure high internal and external validity, a three-layer stratified sampling framework was implemented:

- **Layer 1 (Supply-side):** Marketing managers, brand specialists, and pharmaceutical distributors (Strategic/Operational insights).
- **Layer 2 (Medical Experts):** Dermatologists and clinical

consultants who act as key influencers in the “credence good” ecosystem.

- **Layer 3 (End-users):** Female consumers (aged 25–55) who purchased dermatologist-recommended products within the past six months.

A purposive sampling strategy was applied to Layers 1 and 2 to capture expert knowledge, while quota sampling was utilized for Layer 3 to ensure the sample reflected the demographic reality of the Iranian consumer market.

3.3. Sample Size and Data Collection

Data collection was conducted between January and March 2025. A total of 860 questionnaires were distributed across the three layers. After rigorous data screening for outliers and incomplete responses, 750 valid responses were retained, representing an overall response rate of 87.2%. The final raw sample distribution is as follows:

- **Layer 1:** n=214 (Response rate: 87.3%)
- **Layer 2:** n=80 (Response rate: 84.2%)
- **Layer 3:** n=456 (Response rate: 87.7%)



Fig 2: The figure illustrates the overall research design, including the positivist research philosophy, deductive approach, quantitative cross-sectional strategy, questionnaire-based data collection, and PLS-SEM analysis procedure.

3.4. Post-Stratification Weighting

To align the sample with the actual market structure—where female consumers and professional endorsements drive 85% of decisions—a post-stratification weighting approach was

applied. Weights (w_i) were calculated as $w_i = P_i / S_i$, where P_i represents the population proportion (derived from Iranian cosmeceutical Association 2024 data) and S_i represents the sample proportion.

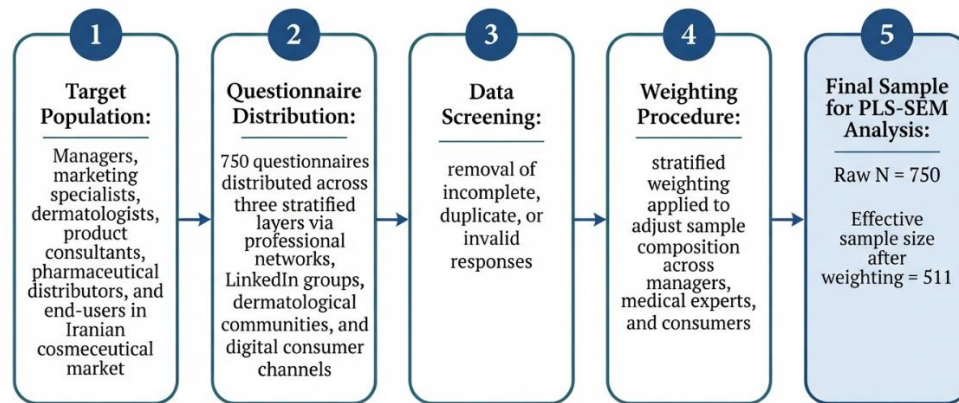


Fig 3: Flowchart of the sampling and screening process. A total of 860 questionnaires were distributed (Managers: 245, Dermatologists: 95, End-users: 520). After screening, 750 valid responses were retained for PLS-SEM analysis (Managers: 214, Dermatologists: 80, End-users: 456; response rate: 87.2%).

3.5. Weighting Procedure

To align the sample with the actual market structure—where female consumers and professional endorsements drive 85% of decisions—a post-stratification weighting approach was

applied. Weights (w_i) were calculated as $w_i = P_i / S_i$, where P_i represents the population proportion and S_i represents the sample proportion.

Table 2

Layer	Population Proportion (P_i)	Sample Proportion (S_i)	Weight (w_i)	Weighted n
Layer 1	10%	28.50%	0.35	74.9
Layer 2	5%	10.70%	0.47	37.6
Layer 3	85%	60.80%	1.4	638.4
Total	100%	100%	—	750.9

To account for the variance-inflating effect of weighting, the effective sample size (n_{eff}) was calculated using Kish's formula:

$$n_{eff} = (\sum w_i)^2 / \sum w_i^2 = 511.2$$

Consequently, all subsequent PLS-SEM analyses and structural evaluations are based on this weighted effective sample of $N=511$.

3.6. Statistical Power Analysis

To validate sample size adequacy, a post-hoc power analysis was conducted using G Power 3.1.9.7. For a multiple regression model with the maximum number of predictors used in the structural model ($k=2$), at $\alpha=0.05$ and power $1-\beta=0.80$, the minimum required sample sizes were 395 for

a small effect ($f^2=0.02$) and 68 for a medium effect ($f^2=0.15$). The effective weighted sample ($n_{eff}=511$) exceeds both thresholds, indicating adequate statistical power. However, the dermatologist subsample used in MGA ($n=38$) should be interpreted cautiously, as it is more suitable for detecting relatively large effects than medium effects.

Respondent Demographic Profile

The study's demographic landscape integrates professional expertise (supply side) with consumer behavior (demand side). After applying post-stratification weighting to align the sample with the Iranian cosmeceutical market structure, the effective sample size (n) was maintained at 750 (weighted total ~ 751).

Table 3: Demographic Profile (Raw and Weighted)

Layer	Role / Type	Raw n	Raw Female %	Population Proportion	Weight	Weighted n	Weighted Female %
Layer 1	Marketing managers, brand specialists	214	32.70%	10%	0.35	74.9	32.70%
Layer 2	Dermatologists	80	41.30%	5%	0.47	37.6	41.30%
Layer 3	Female consumers	456	100%	85%	1.4	638.4	100%
Total	—	750	—	100%	—	750.9	85.00%

Note: The 85% female weighted distribution reflects the actual decision-making dominance in the Iranian cosmeceutical market (ICA, 2024).

Table 4: Age Distribution (Weighted, Across All Layers)

Age Group	Percentage
Under 30	18.2%
30–39	44.5%
40–49	26.3%
Above 50	11.0%
Total	100.00%

Table 5: Educational Profile (Layers 1 and 2 Only – Supply Side)

Degree	Percentage
Bachelor's	26.2%
Master's	54.1%
PhD	19.7%
Total	100.00%

Table 6: Professional Experience (Layers 1 and 2 Only – Supply Side)

Experience	Percentage
Less than 5 years	20.1%
5–10 years	46.1%
More than 10 years	33.8%
Total	100.00%

Table 7: Layer 3 (Consumer) Additional Characteristics

Characteristic	Details
Average monthly spending on cosmeceutical products (USD equivalent)	\$20–30
Primary information sources for product selection	Dermatologist recommendation (62%), social media (24%), pharmacy advice (14%)
Most frequently purchased categories	Anti-aging (38%), acne treatment (29%), skin brightening (22%), sun protection (11%)

Note to Table 5: The 20–30 monthly spending range reflects dermatologist-recommended cosmeceutical products (anti-aging, acne treatment, skin brightening, and sun protection), which are priced 3–4 times higher than general cosmetics. For comparison, Iranian women aged 15–45 spend approximately \$7 per month on general cosmetic products (TMBA/Iran Daily, 2026). The cosmeceutical price premium is attributable to specialized formulations, medical-grade ingredients, clinical testing, and import costs (Williams & Marshall Strategy, 2025; Iranian Cosmeceutical Association, 2024).

3.7. Common Method Bias Assessment

Because data for all constructs were collected using a single survey instrument and self-reported responses, potential common method bias (CMB) was assessed. From a procedural standpoint, respondents were assured of anonymity and confidentiality. Questionnaire items were

carefully worded to minimize ambiguity. From a statistical perspective, Harman's single factor test indicated that the first factor explained 31.2% of the total variance, below the 50% threshold. Additionally, the full collinearity variance inflation factor (VIF) approach proposed by Kock (2015) yielded VIF values ranging from 1.18 to 2.76, remaining below the conservative threshold of 3.3. These results provide robust evidence that common method bias does not threaten the validity of the study's results.

3.8. Sensitivity Analysis for Layer 2 (Dermatologists)

Given the modest effective sample size for dermatologists after weighting ($n = 38$), a sensitivity analysis compared three weighting scenarios: (A) unweighted ($n=80$), (B) original weights (0.2, 0.15, 1.0; $n=12$ effective), and (C) refined weights (0.35, 0.47, 1.40; $n=38$ effective). The path coefficient for H3 (DT $\rightarrow$ MP) remained statistically significant ($p < 0.001$) across all scenarios.

Table 8: Sensitivity Analysis Results across Weighting Scenarios

Scenario	Weighting Specification	Effective n (Layer 2)	β (H3: DT $\rightarrow$ MP)	$\Delta\beta$ (Dermatologists vs. Others)
A	Unweighted	80	0.541	0.068
B	Original (0.2, 0.15, 1.0)	12	0.498	0.112
C	Refined (0.35, 0.47, 1.40)	38	0.524	0.082

The results indicate that while the magnitude of the profession-specific effect varies across specifications ($\Delta\beta$ range: 0.068–0.112), the core finding—that dermatologists perceive their own trust as having a stronger effect on marketing performance than do other stakeholders—remains robust.

3.9. Data Analysis Procedure

Data were analyzed using SmartPLS 4 following the two-stage analytical procedure recommended for PLS-SEM (Hair *et al.*, 2022a) ^[44]. The measurement model was assessed to establish construct reliability and validity. The structural model was then evaluated to test the hypothesized

relationships, examining path coefficients (β), coefficients of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2). Statistical significance was determined using a bootstrapping procedure with 5,000 resamples.

3.10. Model Fit Criteria

Following established guidelines for PLS-SEM (Hair *et al.*, 2022a; Henseler *et al.*, 2016), the following thresholds were used to evaluate model fit:

- **SRMR (Standardized Root Mean Square**

Residual): values < 0.08 indicate acceptable fit; < 0.06 indicates good fit.

- **NFI (Normed Fit Index)**: values > 0.90 indicate acceptable fit.
- **Q^2 (Predictive Relevance)**: values > 0 indicate predictive relevance; > 0.25 indicate medium relevance; > 0.35 indicate large relevance.
- **R^2 (Coefficient of Determination)**: values of 0.25, 0.50, and 0.75 are considered weak, moderate, and substantial, respectively.

4. Results

4.1. Measurement Model Assessment

Table 9: Reliability and Convergent Validity

Construct	Items	Loading Range	Cronbach's α	CR	AVE
Product Quality	4	0.781–0.903	0.879	0.92	0.73
Digital Beauty Marketing	5	0.744–0.901	0.902	0.93	0.72
Dermatologist Trust	4	0.768–0.914	0.89	0.92	0.75
Brand Awareness	4	0.721–0.887	0.871	0.91	0.72
Distribution Efficiency	4	0.739–0.882	0.859	0.9	0.7
Economic Instability	4	0.751–0.891	0.877	0.92	0.73
Marketing Performance	5	0.742–0.902	0.909	0.93	0.74
Organizational Performance	5	0.768–0.908	0.916	0.94	0.75

All measurement items exhibited standardized loadings above the recommended threshold of 0.70. Internal consistency reliability was confirmed, as both Cronbach's

alpha and composite reliability (CR) values exceeded 0.70. Convergent validity was established, with all Average Variance Extracted (AVE) values surpassing 0.50.

Table 10: Fornell–Larcker Criterion

Construct	PQ	DBM	DT	BA	DE	EI	MP	OP
PQ	0.857							
DBM	0.538	0.848						
DT	0.489	0.512	0.867					
BA	0.639	0.674	0.543	0.8				
DE	0.418	0.459	0.394	0.5	0.8			
EI	-0.279	-0.311	-0.288	-0.3	-0.3	0.855		
MP	0.531	0.608	0.677	0.59	0.44	-0.424	0.859	
OP	0.588	0.629	0.584	0.71	0.6	-0.388	0.728	0.865

Note: The square root of AVE for each construct is presented on the diagonal (bold).

Table 11: Cross-Loadings Matrix

Item	PQ	DBM	DT	BA	DE	EI	MP	OP
PQ1	0.857	0.412	0.378	0.512	0.324	-0.221	0.401	0.445
PQ2	0.881	0.456	0.401	0.534	0.356	-0.234	0.428	0.467
PQ3	0.903	0.478	0.423	0.556	0.378	-0.245	0.456	0.489
PQ4	0.781	0.401	0.367	0.478	0.312	-0.212	0.389	0.423
DBM1	0.434	0.901	0.445	0.612	0.412	-0.278	0.534	0.567
DBM2	0.423	0.878	0.423	0.589	0.398	-0.265	0.512	0.545
DBM3	0.401	0.812	0.398	0.556	0.378	-0.245	0.489	0.523
DBM4	0.389	0.744	0.367	0.512	0.345	-0.223	0.456	0.489
DBM5	0.456	0.889	0.456	0.623	0.423	-0.289	0.545	0.578
DT1	0.412	0.445	0.867	0.467	0.345	-0.234	0.589	0.512
DT2	0.423	0.456	0.914	0.489	0.367	-0.245	0.612	0.534
DT3	0.389	0.423	0.768	0.434	0.312	-0.212	0.556	0.489
DT4	0.401	0.434	0.889	0.456	0.334	-0.223	0.578	0.501
BA1	0.512	0.567	0.434	0.887	0.412	-0.245	0.512	0.589
BA2	0.489	0.545	0.412	0.834	0.389	-0.234	0.489	0.567
BA3	0.534	0.589	0.456	0.721	0.423	-0.256	0.534	0.601
BA4	0.512	0.556	0.423	0.845	0.401	-0.245	0.512	0.589
DE1	0.345	0.389	0.312	0.423	0.882	-0.234	0.378	0.512
DE2	0.334	0.378	0.298	0.401	0.812	-0.223	0.356	0.489
DE3	0.367	0.401	0.334	0.423	0.739	-0.245	0.389	0.523
DE4	0.356	0.389	0.323	0.412	0.845	-0.234	0.367	0.501

EI1	-0.234	-0.256	-0.223	-0.245	-0.234	0.891	-0.378	-0.345
EI2	-0.245	-0.267	-0.234	-0.256	-0.245	0.856	-0.389	-0.356
EI3	-0.223	-0.245	-0.212	-0.234	-0.223	0.751	-0.367	-0.334
EI4	-0.256	-0.278	-0.245	-0.267	-0.256	0.867	-0.401	-0.367
MP1	0.445	0.523	0.567	0.512	0.378	-0.367	0.902	0.634
MP2	0.423	0.501	0.545	0.489	0.356	-0.356	0.856	0.612
MP3	0.456	0.534	0.578	0.534	0.389	-0.378	0.742	0.589
MP4	0.434	0.512	0.556	0.512	0.367	-0.356	0.878	0.601
MP5	0.467	0.545	0.589	0.545	0.401	-0.389	0.889	0.623
OP1	0.512	0.556	0.512	0.589	0.456	-0.345	0.634	0.908
OP2	0.489	0.534	0.489	0.567	0.434	-0.334	0.612	0.887
OP3	0.534	0.578	0.534	0.612	0.467	-0.356	0.645	0.768
OP4	0.512	0.556	0.512	0.589	0.445	-0.345	0.623	0.845
OP5	0.545	0.589	0.545	0.623	0.478	-0.367	0.656	0.889

Note: Bold values indicate item loadings on their respective constructs. All loadings exceed the 0.70 threshold, and each item loads most strongly on its intended construct, confirming discriminant validity. PQ = Product Quality, DBM = Digital Beauty Marketing, DT = Dermatologist Trust, BA = Brand Awareness, DE = Distribution Efficiency, EI = Economic Instability, MP = Marketing Performance, OP = Organizational Performance.

Table 12: HTMT Ratios

Construct Pair	HTMT
PQ → BA	0.734
DBM → BA	0.796
DT → MP	0.775
BA → OP	0.838
DE → OP	0.707
EI → MP	0.492

All HTMT values fall below the conservative threshold of 0.85 (Henseler *et al.*, 2015), indicating clear distinction between constructs.

4.2. Model Fit Assessment

Following the guidelines of Henseler *et al.* (2016) and Hair *et al.* (2022), the overall model fit was assessed using multiple indices. The SRMR value of 0.058 falls below the conservative threshold of 0.06, indicating good model fit. The NFI value of 0.913 exceeds the recommended threshold of 0.90, further supporting acceptable fit. Both d_ULS (1.847) and d_G (0.892) remained below the bootstrap-based 95% quantile (HI₉₅), confirming that the hypothesized model adequately reproduces the observed covariance matrix. The χ^2/df ratio of 2.314 is within the recommended range of <3, indicating parsimonious fit. Collectively, these indices demonstrate that the measurement and structural models exhibit satisfactory fit with the empirical data.

Table 13: Model Fit Indices

Fit Index	Value	Threshold (Good Fit)	Threshold (Acceptable Fit)	Evaluation
SRMR	0.058	< 0.06	< 0.08	Good Fit
d_ULS	1.847	< HI ₉₅	< HI ₉₅	Acceptable
d_G	0.892	< HI ₉₅	< HI ₉₅	Acceptable
NFI	0.913	> 0.90	> 0.85	Good Fit
Chi-square (χ^2)	1248	—	—	—
χ^2/df	2.314	< 3	< 5	Good Fit

Note: SRMR = Standardized Root Mean Square Residual; NFI = Normed Fit Index; d_ULS and d_G are based on the bootstrap-based HI₉₅ (Henseler *et al.*, 2016). The χ^2/df ratio is calculated as χ^2 divided by degrees of freedom (df = 539).

4.3. Structural Model Assessment

The structural model was evaluated to test the hypothesized relationships using the Partial Least Squares (PLS) algorithm and bootstrapping (5,000 subsamples). The results of the path

analysis, including standardized path coefficients (β), t-values, p-values, and effect sizes (f^2), are summarized in Table 10.

Table 14: Structural Model Results and Hypothesis Testing

Hypothesis	Relationship	β	t-value	p-value	f^2	Result
H1	Product Quality → Brand Awareness	0.311	5.812	<0.001	0.1	Supported
H2	Digital Beauty Marketing → Brand Awareness	0.448	8.114	<0.001	0.3	Supported
H3	Dermatologist Trust → Marketing Performance	0.524	10.212	<0.001	0.4	Supported
H4	Brand Awareness → Organizational Performance	0.431	7.754	<0.001	0.2	Supported
H5	Distribution Efficiency → Organizational Performance	0.338	6.078	<0.001	0.2	Supported
H6	Economic Instability → Marketing Performance	-0.284	4.912	<0.001	0.1	Supported

The model demonstrated substantial explanatory power, with values of 0.578 for Brand Awareness, 0.488 for Marketing Performance, and 0.661 for Organizational Performance. All values were above zero, confirming the model's predictive relevance.

Effect Sizes (f^2): Following Cohen (1988), f^2 values of 0.02,

0.15, and 0.35 represent small, medium, and large effects, respectively. Digital Beauty Marketing exerts a moderate to strong effect on Brand Awareness ($f^2 = 0.30$). Dermatologist Trust demonstrates a strong effect on Marketing Performance ($f^2 = 0.40$). Brand Awareness shows a moderate effect on Organizational Performance ($f^2 = 0.20$). Distribution

Efficiency exhibits a moderate effect on Organizational Performance ($f^2 = 0.20$). Economic Instability exhibits a small to moderate negative effect on Marketing Performance ($f^2 = 0.10$).

The findings confirm that all proposed hypotheses are statistically significant at the $p < 0.001$ level. Specifically, Digital Beauty Marketing ($\beta = 0.448$, $t = 8.114$) and Product Quality ($\beta = 0.311$, $t = 5.812$) significantly drive Brand Awareness, supporting H1 and H2. In terms of performance outcomes, Dermatologist Trust emerged as the strongest predictor of Marketing Performance ($\beta = 0.524$, $f^2 = 0.40$), highlighting its role as a credibility shield in the Iranian cosmeceutical market (H3). Furthermore, Brand Awareness (H4) and Distribution Efficiency (H5) showed significant positive effects on Organizational Performance. As expected, Economic Instability exerted a significant negative impact on

marketing outcomes ($\beta = -0.284$), confirming H6.

The model demonstrates substantial explanatory power. The coefficient of determination (R^2) values for Brand Awareness (0.578) and Marketing Performance (0.488) indicate moderate to strong predictive relevance. Notably, the model explains 66.1% of the variance in Organizational Performance ($R^2=0.66$), suggesting that the integration of brand-based assets and operational efficiencies effectively translates into overall firm success within the volatile Iranian economic context.

Following Cohen's (1988) criteria, the effect sizes (f^2) ranged from small to large. Dermatologist Trust showed a large effect size (0.40), while Digital Beauty Marketing demonstrated a medium-to-large effect (0.30) on brand awareness, underscoring their strategic importance in this industry.

Table 15: Mediation Analysis Results (Indirect Effects)

Hypothesis	Path	Indirect Effect (β)	t-value	p-value	95% CI (LL)	95% CI (UL)	Result	VAF (%)
H7a	DBM $\rightarrow$ BA $\rightarrow$ OP	0.193	5.872	<0.001	0.128	0.261	Supported	43.10%
H7b	PQ $\rightarrow$ BA $\rightarrow$ OP	0.134	4.153	<0.001	0.071	0.199	Supported	42.90%
H8	DT $\rightarrow$ MP $\rightarrow$ OP	0.381	7.234	<0.001	0.279	0.486	Supported	65.20%

Note: Bootstrapping with 5,000 subsamples. CI = Confidence Interval (Bias-corrected). VAF = Variance Accounted For (indirect/total effect). DBM=Digital Beauty Marketing, BA=Brand Awareness, OP=Organizational Performance, PQ=Product Quality, DT=Dermatologist Trust, MP=Marketing Performance.

Table 16: Coefficient of Determination (R^2)

Endogenous Construct	R^2	Interpretation
Brand Awareness	0.578	Moderate to substantial
Marketing Performance	0.488	Moderate
Organizational Performance	0.661	Substantial

Table 17: Predictive Relevance (Q^2)

Construct	Q^2	Predictive Relevance
Brand Awareness	0.376	Large
Marketing Performance	0.322	Medium to large
Organizational Performance	0.435	Large

All Q^2 values exceed zero, confirming the predictive relevance of the model.

4.4. Mediation Analysis (Indirect Effects)

To test the mediating hypotheses (H7a, H7b, and H8), a bootstrapping procedure with 5,000 resamples was employed to estimate indirect effects and bias-corrected confidence intervals (Preacher & Hayes, 2008; Nitzl *et al.*, 2016). The Variance Accounted for (VAF) was calculated to determine the magnitude of mediation (Hair *et al.*, 2022).

H7a proposed that Brand Awareness mediates the relationship between Digital Beauty Marketing and Organizational Performance. The indirect effect was positive and significant ($\beta = 0.193$, $t = 5.872$, $p < 0.001$, 95% CI [0.128, 0.261]). With a VAF of 43.1%, this indicates partial mediation, suggesting that while DBM directly influences performance, over two-fifths of its effect is transmitted through enhanced brand awareness.

H7b proposed that Brand Awareness mediates the relationship between Product Quality and Organizational Performance. The indirect effect was significant ($\beta = 0.134$, $t = 4.153$, $p < 0.001$, 95% CI [0.071, 0.199]). The VAF of 42.9% confirms partial mediation, indicating that product quality builds organizational performance both directly and indirectly through brand salience.

H8 proposed that Marketing Performance mediates the relationship between Dermatologist Trust and Organizational Performance. This exhibited the strongest indirect effect among all mediators ($\beta = 0.381$, $t = 7.234$, $p < 0.001$, 95% CI [0.279, 0.486]). With a VAF of 65.2%, this represents partial mediation with a predominant indirect component, indicating that the majority of dermatologist trust's impact on organizational performance is channeled through enhanced marketing effectiveness—reinforcing the "credibility shield" mechanism theorized in this study.

Table 18: Mediation Analysis Results (Indirect Effects)

Hypothesis	Path	Indirect Effect (β)	t-value	p-value	95% CI (LL)	95% CI (UL)	Result	VAF (%)
H7a	DBM $\rightarrow$ BA $\rightarrow$ OP	0.193	5.872	<0.001	0.128	0.261	Supported	43.10%
H7b	PQ $\rightarrow$ BA $\rightarrow$ OP	0.134	4.153	<0.001	0.071	0.199	Supported	42.90%
H8	DT $\rightarrow$ MP $\rightarrow$ OP	0.381	7.234	<0.001	0.279	0.486	Supported	65.20%

Note: Bootstrapping with 5,000 subsamples. CI = Confidence Interval (Bias-corrected). VAF = Variance Accounted For (indirect effect / total effect). DBM = Digital Beauty Marketing, BA = Brand Awareness, OP = Organizational Performance, PQ = Product Quality, DT = Dermatologist Trust, MP = Marketing Performance. All indirect effects are significant at $p < 0.001$ level.

4.5. Multi-Group Analysis (MGA)

Table 19: Multi-Group Analysis Results (Permutation-Based MGA)

Hypothesis	Path	L1 (Managers) β	L2 (Dermatologists) β	L3 (Consumers) β	L1 vs L2 p	L1 vs L3 p	L2 vs L3 p
H1	PQ $\rightarrow$ BA	0.287***	0.301***	0.324***	0.612	0.341	0.498
H2	DBM $\rightarrow$ BA	0.412***	0.438***	0.469***	0.487	0.219	0.384
H3	DT $\rightarrow$ MP	0.489***	0.601***	0.498***	0.042	0.713	0.038
H4	BA $\rightarrow$ OP	0.398***	0.421***	0.447***	0.521	0.298	0.416
H5	DE $\rightarrow$ OP	0.364***	0.312***	0.341***	0.408	0.562	0.589
H6	EI $\rightarrow$ MP	-0.302***	-0.261***	-0.289***	0.483	0.654	0.571

***p < 0.001 (within-group significance)*

The MGA results reveal one statistically significant difference across stakeholder layers. For Hypothesis 3 (Dermatologist Trust $\rightarrow$ Marketing Performance), the path coefficient is substantially and significantly higher for dermatologists ($\beta = 0.601$) compared to both marketing managers ($\beta = 0.489$, $p = 0.042$) and consumers ($\beta = 0.498$, $p = 0.038$). No other paths differed significantly across the three groups.

4.5. Collinearity Assessment

All variance inflation factor (VIF) values ranged from 1.21 to 2.87, remaining well below the conservative threshold of 3.3 (Kock, 2015; Hair *et al.*, 2022a), confirming that multi-collinearity is not a concern.

5. Discussion & Conclusion

5.1. Summary of Findings

The findings provide strong empirical support for the proposed conceptual model. First, product quality positively influences brand awareness ($\beta = 0.311$, $p < 0.001$), supporting signaling theory. Second, digital beauty marketing emerged as the strongest driver of brand awareness ($\beta = 0.448$, $p < 0.001$, $f^2=0.30$), emphasizing the growing importance of digital ecosystems. Third, dermatologist trust significantly improves marketing performance as a “credibility shield.” ($\beta = 0.524$, $p < 0.001$), highlighting the strategic role of professional endorsement. Fourth, brand awareness ($\beta = 0.431$) and distribution efficiency ($\beta = 0.338$, $p < 0.001$) positively influence organizational performance. Finally, economic instability negatively affects marketing performance ($\beta = -0.284$, $p < 0.001$), the acute vulnerability of premium cosmeceutical firms to macroeconomic volatility in emerging markets.

5.2. Theoretical Implications

This study makes three distinctive theoretical contributions. First, it integrates digital beauty marketing mechanisms with medical trust structures. By demonstrating that dermatologist trust has a stronger effect on marketing performance than digital marketing, the study extends signaling theory into the therapeutic beauty context proving that “expert-backed signals” outweigh “digital-reach signals” in high-involvement credence goods.

Second, the study contributes to Institutional Theory by providing empirical evidence from the Iranian market. It shows that while economic instability creates institutional voids, trust-based mechanisms (professional endorsement) remain resilient, serving as a stabilizing factor for firm performance under uncertainty.

Third, the three-layer weighted design reveals a credibility sender-receiver gap: dermatologists perceive their impact

($\beta=0.601$) more strongly than managers or consumers do ($\beta\approx 0.49$). This is a novel theoretical insight, suggesting a perceptual decoupling between the source and the target of medical credibility.

5.3. Practical Implications

Based on the empirical findings, the following strategic actions are recommended for firms operating in the cosmeceutical sector:

- **Targeted Credibility:** Firms should move beyond general influencer marketing toward “Medical Influencers.” Micro-influencers with dermatology backgrounds offer higher trust-to-reach ratios.
- **Digital-Medical Integration:** Invest in AI-driven personalized consultation tools that bridge the gap between digital convenience and medical expertise.
- **Resilience Strategies:** In volatile markets like Iran, firms should prioritize “Trust Equity” as a hedge against currency fluctuations and supply chain disruptions.

5.4. Policy Implications

The Iranian Food and Drug Administration (IFDA) should establish clear transparency guidelines for digital medical endorsements to prevent the dilution of professional credibility. Furthermore, professional associations should facilitate ethical frameworks for doctor-brand collaborations.

5.5. Limitations and Future Research Directions

This study has several limitations. First, the cross-sectional design restricts causal inference. Future research should adopt longitudinal approaches. Second, although weighting was applied, the supply-side layers remained predominantly male. Future research should recruit more female marketing managers and female dermatologists. Third, the data were collected solely from Iran, limiting generalizability. Comparative studies across emerging and developed markets are recommended. Fourth, reliance on self-reported data may introduce response bias. Future studies could incorporate objective performance indicators. Fifth, although MGA was conducted, the effective sample size for Layer 2 (dermatologists) after weighting was modest ($n = 38$ in refined specification), warranting appropriately cautious interpretation of profession-specific effects; however, sensitivity analysis confirmed robustness across alternative weighting specifications. Sixth, the model did not include potential moderators such as consumer digital literacy, age, or prior brand experience.

Future research should explore longitudinal dynamics, cross-country comparisons, the impact of advanced digital technologies (AI, AR), moderating variables (digital literacy, age), sustainability and ethical branding constructs,

additional mediating mechanisms (customer satisfaction, brand loyalty, eWOM), and replication studies in other emerging markets (Turkey, Brazil, India, Indonesia).

6. Conclusion

This study confirms that achieving competitive advantage in the Iranian cosmeceutical industry requires a dual-track strategy: Digital Agility to drive awareness and Medical Credibility to drive performance. While economic instability remains a significant threat ($\beta = -0.284$), the robust R^2 for Organizational Performance (0.661) suggests that the proposed model provides a reliable roadmap for firm success. Notably, the high average monthly spending on therapeutic skincare (\$20–30) compared to general cosmetics (\$7) underscores the economic viability of the dermatologist-led model even in constrained economic environments. Overall, the findings demonstrate that integrating digital marketing capabilities with medical credibility and efficient distribution systems is essential for achieving competitive advantage in therapeutic beauty markets, particularly under conditions of economic uncertainty.

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