Original Article

FROM OMNICHANNEL JOURNEY DESIGN TO RECOMMENDATION INTENTION: PSYCHOLOGICAL NEEDS AND TRUST IN DENTAL CARE

Nguyen Ha Thach[1]*

[1]*Faculty of Business Administration, Industrial University of Ho Chi Minh City, Ho Chi Minh City, Vietnam. nguyenhathach@iuh.edu.vn*

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ABSTRACT

Digitalization is reshaping how private dental clinics organize the patient journey, yet the psychological mechanism that converts omnichannel experience into trust and recommendation behavior remains underexplained in emerging markets. This study developed and tested an integrated model grounded in the Stimulus-Organism-Response framework, in which seven omnichannel journey design attributes act as stimuli, three basic psychological need satisfactions specified by self-determination theory (autonomy, competence, and relatedness) together with trust in the clinic act as organism states, and recommendation intention is the behavioral response. Survey data from 573 patients of omnichannel dental clinics in Ho Chi Minh City, Vietnam, collected between March and April 2026, were analyzed with partial least squares structural equation modeling in SmartPLS 4. All eleven hypotheses were supported. Relatedness satisfaction was the strongest antecedent of trust ($\beta = 0.346$), exceeding competence ($\beta = 0.154$) and autonomy ($\beta = 0.158$); trust was the strongest predictor of recommendation intention ($\beta = 0.459$). Interactivity was the most influential stimulus ($\beta = 0.492$) and had the largest indirect effect on recommendation. This hierarchy indicates that human connection, rather than technological convenience, is the most durable foundation of trust in dental care, where perceived risk is high. The study extends the Stimulus-Organism-Response framework and self-determination theory to omnichannel dental services and offers concrete priorities for clinic managers seeking to strengthen patient trust and advocacy.

Key words: Omnichannel patient journey, Self-determination theory, Patient trust, Recommendation intention, Dental care.

Introduction

Digitalization is steadily dissolving the boundary between online and on-site channels in healthcare delivery and reshaping patient expectations regarding the seamlessness, transparency, and personalization of the care journey [1-3]. Within Vietnam's private healthcare sector, dentistry is among the segments with the fastest pace of digital transformation. A patient may book through an application, receive advice through Zalo or a Facebook page, obtain appointment reminders and post-treatment guidance by message, and then attend the in-chair visit, with every contact linked inside one integrated journey [4-6]. As the number of touchpoints grows, each touchpoint becomes both an opportunity to strengthen the brand relationship and a risk that may erode it when consistency is lacking. Because dental care couples high perceived risk with strong dependence on professional judgment, patient trust has long been treated as central to the dentist-patient relationship [7-9].

This research utilizes customer journey design—defined as the strategic orchestration of touchpoints spanning from initial information gathering to post-service engagement—as a framework to analyze these professional dynamics [2, 10, 11]. Within a dental context, patients navigate a tripartite risk structure: physical hazards from invasive procedures, psychological distress regarding dental phobias or overtreatment, and informational vulnerabilities stemming from significant expertise disparities between practitioners and patients. Such compounding risks necessitate trust as a fundamental prerequisite for sustained patient loyalty and advocacy [12, 13]. However, scholarship concerning customer journey design remains heavily skewed toward retail and e-commerce sectors [2, 7, 10]. Consequently, there exists a notable deficit in empirical evidence regarding the internal psychological drivers influencing omnichannel healthcare journeys, particularly within the distinct socioeconomic landscapes of emerging markets that require further academic exploration and rigorous investigation.

To bridge this gap, this research utilizes the Stimulus-Organism-Response framework [14, 15] as a foundational architecture, incorporating self-determination theory's three psychological needs—autonomy, competence, and relatedness [16, 17]—alongside commitment-trust theory [18, 19]. By positioning trust centrally within the causal sequence from journey attributes to recommendation intention, we frame design features as stimuli, psychological satisfaction and trust as internal organism states, and behavioral intent as the response. Consequently, this study provides a patient-centered perspective, shifting the focus

away from traditional provider-centric models to better understand the dynamics of patient experience and advocacy.

On this basis, the study pursues three objectives: to identify which omnichannel journey design attributes satisfy each psychological need of dental patients; to test the mechanism through which the three needs build trust and, through trust, lead to recommendation intention; and to establish the relative weight of the three needs so that managerial priorities can be focused. The remainder of the paper presents the theoretical background and hypotheses, the materials and methods, the combined results and discussion, and the conclusion.

Theoretical background and hypotheses

S-O-R framework and integrated model

The Stimulus-Organism-Response framework, originating in environmental psychology [14, 20], explains behavior through three layers: an environmental stimulus acts on the internal state of the organism, which then gives rise to a behavioral response. The framework has been applied widely in research on digital behavior, including influencer marketing [21, 22] and the omnichannel customer journey [2, 23], and recent work has extended it to health-related behavior [24, 25]. The present study brings the framework into dental services and integrates self-determination theory with commitment-trust theory to specify the organism layer: the three need satisfactions operate as intrinsic motivational states, whereas trust in the clinic operates as a relational state that crystallizes from those satisfactions. To keep the data structure consistent with this theoretical layering, every indicator was recoded with one of three prefixes: ST_ for the stimulus set, OG_ for the organism set, and RS_ for the response.

Stimuli and autonomy satisfaction

Within self-determination theory, autonomy is characterized as the fundamental necessity for individuals to perceive themselves as the authors of their own behaviors, possessing authentic agency [17, 26]. In clinical settings, fostering autonomy by providing transparent information, acknowledging patient viewpoints, and offering viable decision-making opportunities correlates with increased psychological need fulfillment and superior health results [27, 28]. Three specific journey attributes address this need through varied mechanisms. Transparency (ST_TRA)—the reliable conveyance of costs, care pathways, and provider qualifications via digital platforms—minimizes ambiguity, enabling informed patient choices [29, 30]. Personalization (ST_PER), involving the customization of guidance and alerts based on unique medical histories, bolsters a sense of agency that reflects individual priorities [2, 31]. Finally, seamlessness (ST_SEA), which ensures data synchronization across digital and in-person touchpoints, empowers patients by eliminating repetitive disclosures, thereby maintaining a consistent experience of personal control [2, 32, 33].

H1. Transparency (ST_TRA) positively affects autonomy satisfaction (OG_AUT).

H2. Personalization (ST_PER) positively affects OG_AUT.

H3. Seamlessness (ST_SEA) positively affects OG_AUT.

Stimuli and competence satisfaction

Competence reflects the desire to feel effective and capable of mastering a situation [17], and it is especially salient in dentistry because of the pronounced information asymmetry. Evidence in healthcare indicates that competence support, achieved by communicating expectations clearly and providing guidance for self-management, matters as much as autonomy support during care interactions [27, 34]. Thematic coherence (ST_COH), the consistency of imagery and ethical commitments from the online space to the clinic, helps the patient form a coherent and confident understanding [35, 36]. Convenience (ST_CON), the simplification of booking, look-up, and payment on digital platforms, lowers cognitive load and raises the sense of mastering the journey [2, 37]. Complementarity (ST_COM), online self-care guidance that complements the clinician's chairside instructions, increases the patient's capacity for self-care [2, 38].

H4. Thematic coherence (ST_COH) positively affects competence satisfaction (OG_CMP).

H5. Convenience (ST_CON) positively affects OG_CMP.

H6. Complementarity (ST_COM) positively affects OG_CMP.

Stimuli and relatedness satisfaction

Relatedness is the need to feel connected, cared for, and that one belongs [17]. In care settings marked by high anxiety, the bond with the clinical team is closely tied to a sense of safety [9]. Interactivity (ST_INT), the real-time two-way exchange between the patient and the dental team through digital channels, does more than convey information—it creates the feeling of being heard and personally attended to [39-41] and thereby satisfies the need for relatedness.

H7. Interactivity (ST_INT) positively affects relatedness satisfaction (OG_REL).

Need satisfaction and trust

When a dental practice simultaneously fulfills the three fundamental psychological requirements, the clinician-patient dynamic transcends mere commercial exchange, evolving into a foundation of trust. Prior studies indicate that digital healthcare interactions significantly influence this perception, ultimately dictating a patient’s inclination toward future physical appointments [42-44]. According to the commitment-trust theory, trust serves as the cornerstone of enduring professional relationships, rooted in benevolence, integrity, and competence, acting as a critical

asset for fostering long-term loyalty [18, 45, 46]. Within the dental environment, relatedness is anticipated to be the primary driver of trust; strong interpersonal connections with clinicians directly address this need [17], further supported by research linking relatedness to relational trust development [47, 48]. Although autonomy and competence remain positive contributors, they exert a comparatively minor influence, as the final diagnostic and technical authority naturally remains with the professional practitioner, limiting the patient's role in clinical decision-making processes.

H8. OG_AUT positively affects trust in the clinic (OG_TRU).

H9. OG_CMP positively affects OG_TRU.

H10. OG_REL positively affects OG_TRU.

Trust and recommendation intention

Once trust is established, the patient is willing not only to return but also to vouch for the clinic through social media, review platforms, and word of mouth [22, 49]. Recommending a healthcare provider carries a high level of committed responsibility because the recommender stakes personal reputation and the health of close others; it is therefore activated only when trust reaches a sufficiently firm threshold [18]. This expectation is consistent with evidence that motivational, need-satisfying customer experiences drive engagement and advocacy [50, 51].

H11. OG_TRU positively affects service recommendation intention (RS_REC).

Conceptual model

Figure 1 depicts the theoretical model following the Stimulus-Organism-Response framework. At the stimulus layer, the seven journey design attributes are grouped into three clusters corresponding to the three needs (H1 to H7); at the organism layer, the three need satisfactions jointly direct toward trust (H8 to H10); and at the response layer, trust leads to recommendation intention (H11).

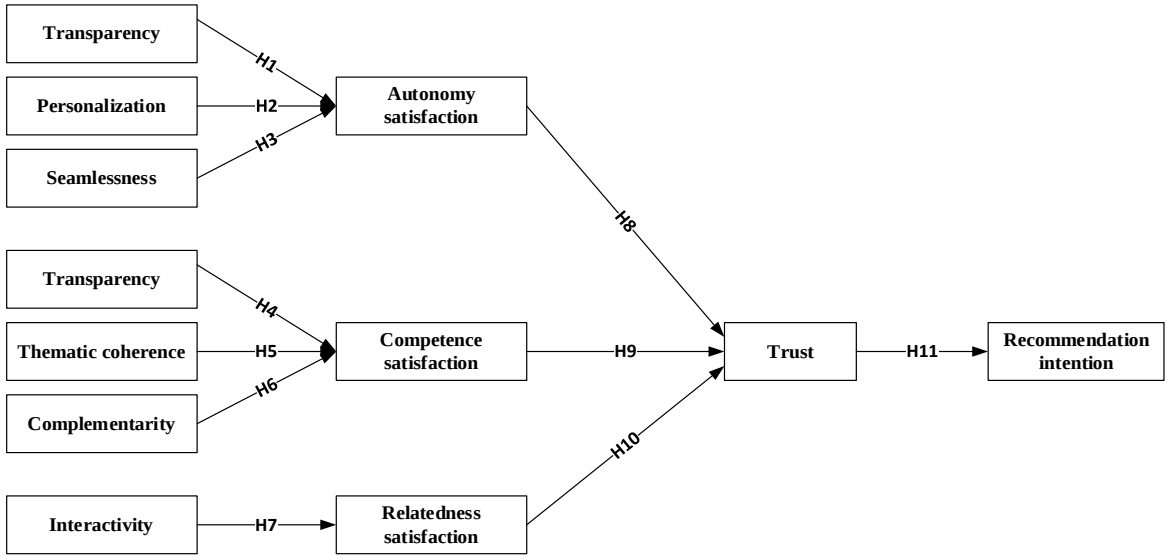

Figure 1. Conceptual model based on the Stimulus-Organism-Response framework integrating self-determination theory and commitment-trust theory.

Materials and Methods

Study design and data collection

The study used a cross-sectional design with a quantitative survey. An omnichannel dental clinic was operationally defined as a private dental practice that simultaneously operates at least two distinct patient-facing digital channels, such as a booking application, a social messaging platform (e.g., Zalo or Facebook Messenger), or a clinic website, and integrates patient information and communication across these channels within a single service journey. The target population was patients who had used services at such clinics within the previous six months and who had interacted through at least one online channel combined with an on-site visit on the same service journey. Two screening questions at the start of the questionnaire confirmed this condition, and only respondents who satisfied both criteria proceeded to the main assessment.

Data were collected from patients of omnichannel dental clinics in Ho Chi Minh City between March and April 2026. Clinics were recruited through purposive sampling, targeting private practices that demonstrably operated across at least two digital touchpoints combined with on-site visits within an integrated journey. The online component was distributed via the clinics' social media channels and messaging platforms; the on-site component involved self-administered questionnaires completed by patients in clinic

waiting areas. Of the 750 questionnaires distributed, 573 met the eligibility and completion criteria and were retained for analysis, yielding a valid response rate of 76.4%.

Among the 573 valid patients, women accounted for 57.9% (332) and men for 42.1% (241). The largest age group was 26 to 40 years (44.5%, 255), followed by 18 to 25 years (27.5%, 158), 41 to 55 years (20.3%, 116), and over 55 years (7.7%, 44). For education, 33.5% (192) held a postgraduate qualification, 53.1% (304) a university degree, and 13.4% (77) a high school diploma. Notably, 77.8% (446) confirmed interaction through at least two different channels during their most recent service journey, and 30.4% (174) had experienced three or more channels. **Table 1** summarizes the sample profile **(Table 1)**.

Table 1. Demographic profile of respondents.

Characteristic	Category	f	%
Gender	Female	332	57.9
	Male	241	42.1
Age group	18 to 25	158	27.5
	26 to 40	255	44.5
	41 to 55	116	20.3
	Over 55	44	7.7
Education	Postgraduate	192	33.5
	University	304	53.1
	High school	77	13.4
Channels used on most recent journey	At least two channels	446	77.8
	Three or more channels	174	30.4
Note. f = frequency; % = percentage. N = 573.			

Measures

The questionnaire comprised 36 indicators measuring 12 constructs on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Scales were adapted from peer-reviewed sources and contextualized for the omnichannel dental clinic setting through independent back-translation by two bilingual experts, expert panel review, and a pilot test. Indicator codes carry the prefix ST_ (stimulus), OG_ (organism), or RS_ (response), consistent with the theoretical architecture.

Among the stimulus constructs, transparency (ST_TRA) was adapted from Gao *et al*. [29]; personalization (ST_PER), convenience (ST_CON), complementarity (ST_COM), and interactivity (ST_INT) were adapted from Zheng and Li [2]; seamlessness (ST_SEA) was adapted jointly from Gao *et al*. [29] and Chang and Li [32]; and thematic coherence (ST_COH) was adapted from Kuehnl *et al*. [36] and Zheng and Li [2].

The three basic psychological need satisfactions—autonomy (OG_AUT), competence (OG_CMP), and relatedness (OG_REL)—were each measured with three items adapted from Zheng and Li [2], who reconceptualized Thomson's [52] attachment items within a self-determination theory framework for omnichannel contexts. The present study further contextualized these items for the dental setting, aligning wording with the three layers of perceived risk—physical, psychological, and informational—consistent with operationalizations of basic psychological needs in service and technology research [51, 53, 54].

Trust in the clinic (OG_TRU) was adapted from Sirdeshmukh *et al*. [45], capturing credibility, benevolence, and integrity. Recommendation intention (RS_REC) was adapted from Xia and Bechwati [55] and Alcántara-Pilar *et al*. [22], both of which validated recommendation scales within service and digital contexts grounded in the same theoretical framework adopted here.

Table 2 lists all constructs, indicators, outer loadings, reliability statistics, predictive relevance (Q^2), and source attributions.

Table 2. Measurement model: outer loadings, internal consistency, convergent validity, predictive relevance, and scale sources.

Construct	Item	Load	α	ρc	AVE	Q^2	Source
Transparency (ST_TRA)	ST_TRA1	0.856	0.785	0.874	0.699	0.199	Gao *et al*. [29]
	ST_TRA2	0.805					
	ST_TRA3	0.846					
Personalization (ST_PER)	ST_PER1	0.864	0.797	0.880	0.710		Zheng & Li [2]
	ST_PER2	0.836					
	ST_PER3	0.827					
Seamlessness (ST_SEA)	ST_SEA1	0.855	0.792	0.878	0.706		Gao *et al*. [29]; Chang & Li [32]
	ST_SEA2	0.863					
	ST_SEA3	0.801					
Thematic coherence (ST_COH)	ST_COH1	0.873	0.790	0.876	0.703		Kuehnl *et al*. [36]; Zheng & Li [2]
	ST_COH2	0.831					

	ST_COH3	0.810					
Convenience (ST_CON)	ST_CON1	0.853	0.789	0.876	0.702		Zheng & Li [2]
	ST_CON2	0.822					
	ST_CON3	0.839					
Complementarity (ST_COM)	ST_COM1	0.836	0.788	0.876	0.702		Zheng & Li [2]
	ST_COM2	0.828					
	ST_COM3	0.850					
Interactivity (ST_INT)	ST_INT1	0.834	0.776	0.870	0.691		Zheng & Li [2]
	ST_INT2	0.817					
	ST_INT3	0.843					
Autonomy satisfaction (OG_AUT)	OG_AUT1	0.864	0.782	0.873	0.696	0.199	Zheng & Li [2]
	OG_AUT2	0.847					
	OG_AUT3	0.789					
Competence satisfaction (OG_CMP)	OG_CMP1	0.826	0.792	0.878	0.705	0.172	Zheng & Li [2]
	OG_CMP2	0.867					
	OG_CMP3	0.826					
Relatedness satisfaction (OG_REL)	OG_REL1	0.843	0.795	0.880	0.709	0.168	Zheng & Li [2]
	OG_REL2	0.866					
	OG_REL3	0.817					
Trust in the clinic (OG_TRU)	OG_TRU1	0.857	0.819	0.893	0.735	0.147	Sirdeshmukh *et al*. [46]
	OG_TRU2	0.858					
	OG_TRU3	0.857					
Recommendation intention (RS_REC)	RS_REC1	0.851	0.795	0.879	0.709	0.147	Xia & Bechwati [55]; Alcántara-Pilar *et al*. [22]
	RS_REC2	0.822					
	RS_REC3	0.851					

Note. α = Cronbach's alpha; ρc = composite reliability; AVE = average variance extracted; Q^2 = Stone-Geisser predictive relevance (blindfolding, omission distance = 7); $Q^2 > 0$ confirms predictive relevance.

Analytical approach

To evaluate the research framework, partial least squares structural equation modeling (PLS-SEM) was performed using SmartPLS 4 [56]. This approach is ideal for the study, as it handles complex serial and parallel mediation pathways, bypasses strict normality requirements, and excels in predictive and explanatory tasks [57]. The analysis was executed in two phases. Initially, the measurement model was validated by examining internal consistency (Cronbach's alpha and composite reliability ρc), convergent validity (average variance extracted), discriminant validity (Fornell-Larcker criterion and heterotrait-monotrait ratio [58]), and collinearity (variance inflation factor). Predictive relevance was confirmed using the Stone-Geisser Q^2 metric via a blindfolding procedure with an omission distance of seven [57]. Finally, the structural model was examined through path coefficients, determination coefficients (R^2), effect sizes (f^2), and bootstrap-derived significance levels utilizing 5,000 resamples alongside bias-corrected confidence intervals.

To address the potential threat of common method variance, all items were collected in a single survey administration. As a post-hoc diagnostic, a Harman's single factor test was performed by constraining an exploratory factor analysis of all 36 items to one factor; the single factor explained less than 50% of the total variance, falling below the commonly used threshold for problematic common method bias [57].

Results and Discussion

Measurement model

Table 2 summarizes the measurement model. The outer loadings of all 36 indicators ranged from 0.789 to 0.873, all above the 0.708 threshold [57]. Cronbach's alpha ranged from 0.776 to 0.819 and composite reliability (ρ_c) from 0.870 to 0.893, confirming internal consistency reliability. The average variance extracted ranged from 0.691 to 0.735, all above 0.50, establishing convergent validity.

Discriminant validity was confirmed in two ways. Under the Fornell-Larcker criterion, the square root of the average variance extracted of each construct exceeded its correlation with every other construct. Under the heterotrait-monotrait ratio reported in **Table 3**, the highest value was 0.625, between interactivity and relatedness satisfaction, well below the 0.85 threshold [58]. The variance inflation factors of the inner model ranged from 1.00 to 1.26, ruling out

collinearity. The standardized root mean square residual of the estimated model was 0.048, below the 0.08 threshold, indicating acceptable model fit [57].

Table 3. Discriminant validity: heterotrait-monotrait ratio (HTMT)

	AUT	CMP	REL	TRU	REC	COH	COM	CON	INT	PER	SEA	TRA
OG_AUT												
OG_CMP	0.198											
OG_REL	0.142	0.192										
OG_TRU	0.273	0.287	0.479									
RS_REC	0.147	0.208	0.272	0.567								
ST_COH	0.216	0.360	0.233	0.108	0.091							
ST_COM	0.211	0.461	0.198	0.134	0.078	0.313						
ST_CON	0.256	0.544	0.145	0.160	0.103	0.378	0.514					
ST_INT	0.218	0.290	0.625	0.328	0.202	0.286	0.360	0.323				
ST_PER	0.600	0.176	0.218	0.199	0.119	0.214	0.257	0.243	0.342			
ST_SEA	0.502	0.226	0.215	0.161	0.077	0.227	0.262	0.335	0.384	0.474		
ST_TRA	0.369	0.151	0.217	0.132	0.106	0.220	0.122	0.181	0.308	0.400	0.368	

Predictive relevance was assessed through blindfolding (omission distance = 7). Stone-Geisser Q^2 values exceeded zero for all endogenous constructs: OG_AUT = 0.199, OG_CMP = 0.172, OG_REL = 0.168, OG_TRU = 0.147, RS_REC = 0.147, confirming that the model has predictive relevance for each dependent construct [57]. These values fall in the weak-to-moderate range, consistent with the model's parsimonious specification.

Structural model

Table 4 reports the test of eleven hypotheses based on bootstrapping with 5,000 subsamples. All hypotheses were supported at a significance level of $p \leq 0.002$, with 95% bias-corrected confidence intervals that excluded zero. The model explained 29.7% of the variance in OG_AUT, 25.1% in OG_CMP, 24.2% in OG_REL, 20.5% in OG_TRU, and 21.1% in RS_REC. These R^2 values fall in the moderate range by the benchmarks of Hair *et al*. [57]. The moderate explained variance for OG_TRU and RS_REC reflects the parsimonious specification of the model, which assigns a single stimulus cluster to each need and excludes known covariates such as dental anxiety severity and prior digital health experience.

Table 4. Structural model Results.

H	Path	β	SD	t	p	95% CI	f^2	Result
H1	ST_TRA → OG_AUT	0.110	0.036	3.043	0.002	[0.035; 0.175]	0.014	Supported
H2	ST_PER → OG_AUT	0.357	0.037	9.569	<0.001	[0.284; 0.432]	0.147	Supported
H3	ST_SEA → OG_AUT	0.233	0.040	5.815	<0.001	[0.152; 0.307]	0.062	Supported
H4	ST_COH → OG_CMP	0.146	0.038	3.820	<0.001	[0.068; 0.218]	0.024	Supported
H5	ST_CON → OG_CMP	0.309	0.039	8.012	<0.001	[0.229; 0.382]	0.101	Supported
H6	ST_COM → OG_CMP	0.204	0.039	5.176	<0.001	[0.126; 0.278]	0.047	Supported
H7	ST_INT → OG_REL	0.492	0.033	15.077	<0.001	[0.425; 0.553]	0.320	Supported
H8	OG_AUT → OG_TRU	0.158	0.037	4.298	<0.001	[0.084; 0.230]	0.030	Supported
H9	OG_CMP → OG_TRU	0.154	0.040	3.900	<0.001	[0.075; 0.230]	0.029	Supported
H10	OG_REL → OG_TRU	0.346	0.037	9.346	<0.001	[0.271; 0.417]	0.146	Supported
H11	OG_TRU → RS_REC	0.459	0.033	13.931	<0.001	[0.391; 0.520]	0.268	Supported

Note. β = standardized path coefficient; SD = bootstrap standard deviation; CI = bias-corrected 95% confidence interval; f^2 = effect size (0.02 small, 0.15 medium, 0.35 large).

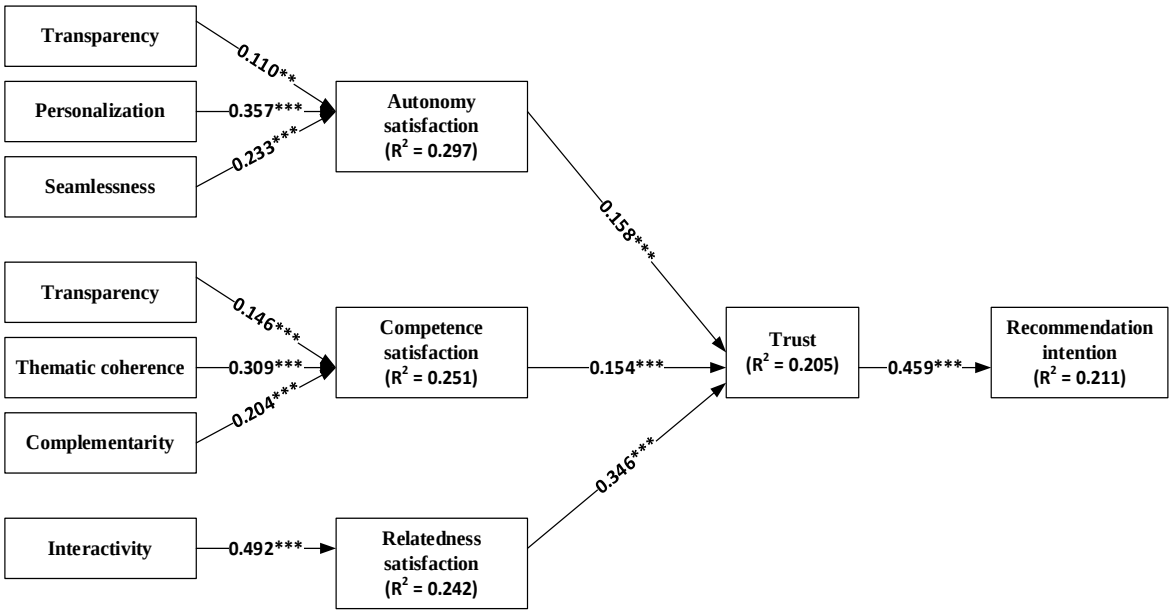

Figure 2. Structural model results with standardized path coefficients, significance levels, and explained variance.

Figure 2 presents the estimated structural model, summarizing the standardized path coefficients, significance levels, and the variance explained for each endogenous construct. The core result emphasizes that relatedness satisfaction serves as the primary driver of trust. The impact of OG_REL on OG_TRU was significant (β = 0.346; t = 9.346; f^2 = 0.146, reflecting a medium-to-large effect), surpassing the combined force of the OG_AUT to OG_TRU (β = 0.158; f^2 = 0.030) and OG_CMP to OG_TRU (β = 0.154; f^2 = 0.029) paths by more than double. When patients navigate concurrent physical, psychological, and informational risks, the requirement for perceived benevolence—the conviction that the clinic prioritizes patient welfare over financial gain—becomes the fundamental pillar of trust. This outcome aligns with commitment-trust theory, which identifies benevolence as the crucial element for sustaining long-term trust [18], and corroborates dental literature highlighting empathy, active listening, and rapport over technical proficiency for anxious patients [8, 9]. Motivationally, this supports the view that high-quality interactions satisfy the need for relatedness more effectively than other psychological requirements [17], a finding reinforced by research linking relatedness with relational trust [47]. This hierarchy, where relatedness outweighs autonomy and competence, contrasts with Zheng and Li's retail findings [2], highlighting the context-specific nature of need satisfaction and the significant moderating influence exerted by both perceived risk and the inherent asymmetry of professional authority in clinical settings. Such distinctions suggest that the weight of these needs fluctuates depending on the specific environment and the nature of the provider-patient dynamic involved.

Both OG_AUT to OG_TRU and OG_CMP to OG_TRU were statistically significant but yielded markedly smaller effect sizes (f^2 = 0.030 and 0.029, respectively), pointing to a nuanced mechanism. For autonomy, the patient's decision rights in healthcare are moderated by a delicate balance: patients want enough information to take part in the decision, yet most defer the final technical choice to professional judgment, and overstating autonomy can shift the decision burden onto a person who lacks clinical expertise and can heighten anxiety [27]. For competence, a patient's own sense of mastering the situation does not equate to trust in the clinic, because trust depends more on the perceived benevolence and integrity of the provider than on the patient's self-efficacy [45].

Within the autonomy cluster, personalization led (β = 0.357; f^2 = 0.147), followed by seamlessness (β = 0.233; f^2 = 0.062) and transparency (β = 0.110; f^2 = 0.014). The comparatively small effect of transparency warrants discussion: in the dental context, clear disclosure of fees and treatment plans functions more as a hygiene factor whose absence damages trust but whose presence does not substantially elevate the sense of autonomous choice. This interpretation aligns with healthcare consumer research suggesting that patients appreciate transparency but rarely experience it as empowering when it merely confirms existing expectations [47]. Personalization, by contrast, directly expands the sense of agency by adapting the journey to the individual's dental history and anxiety profile. Within the competence cluster, convenience dominated (β = 0.309; f^2 = 0.101) over complementarity (β = 0.204; f^2 = 0.047) and thematic coherence (β = 0.146; f^2 = 0.024), indicating that reducing procedural friction is the most effective lever for competence. Interactivity recorded the largest path coefficient in the entire stimulus layer (β = 0.492; f^2 = 0.320) and the largest indirect effect on recommendation intention (specific indirect effect = 0.078 through the chain ST_INT

to OG_REL to OG_TRU to RS_REC), establishing it as the most strategically efficient point in the model.

The path OG_TRU to RS_REC had the largest t-statistic in the model ($\beta = 0.459$; $t = 13.931$; $f^2 = 0.268$, large effect), confirming the irreplaceable role of trust in producing advocacy behavior. Recommending a dental clinic to family members is a high-commitment act that stakes personal reputation and the health of the recommended person, so it is activated only when trust is sufficiently firm [18]. This result extends the scope of commitment-trust theory to digital healthcare and converges with evidence from other digital service contexts that trust is a stable bridge between experience and recommendation behavior [22, 41].

Theoretical contributions

The study contributes on three fronts. First, integrating the Stimulus-Organism-Response framework, self-determination theory, and commitment-trust theory in an omnichannel dental setting within an emerging market extends three frameworks that were developed and tested mainly in retail and digital marketing [2, 22]. While Zheng and Li [2] first applied the autonomy-competence-relatedness model to omnichannel retailing and demonstrated that the three needs mediate the journey design-loyalty link, the present study extends this line of inquiry to a high-risk professional service context in which the distribution of need importance shifts meaningfully. This asymmetry adds nuance to the model's generalizability and suggests that the relative weight of the three needs is context-dependent, modulated by perceived risk and professional authority asymmetry. Second, the empirical hierarchy in which relatedness exceeds autonomy and competence in building trust adds nuance to self-determination theory when applied to high-risk services. Third, the central position of trust on the path to recommendation intention reinforces the generality of the trust-to-recommendation mechanism in commitment-trust theory for digital healthcare environments.

Managerial implications

For managers of omnichannel dental clinics, the results suggest three priorities with different weights. The highest priority is investment in interactivity and relatedness: establishing multichannel response procedures with clear time commitments, post-treatment check-ins, and personalized care reminders, because this is the most direct route to trust and, through trust, to recommendation. This priority is reinforced by healthcare evidence that the quality of staff and service interactions strongly shapes patient satisfaction and trust [59, 60], and by the broader digital health literature emphasizing that responsible digital adoption must be guided by a patient-first orientation rather than by operational efficiency alone [61]. The second priority is personalization and the reduction of procedural friction through integrated health records, treatment-specific recall, and simple booking and payment flows. The third priority is maintaining consistent imagery and ethical commitments across channels and synchronizing patient information across units to preserve a seamless and trustworthy experience.

Conclusion

This study tested an integrated Stimulus-Organism-Response model incorporating self-determination theory and commitment-trust theory, explaining the causal chain from seven omnichannel journey design attributes through the satisfaction of three psychological needs and trust in the clinic to service recommendation intention at dental clinics in Vietnam. Data from 573 patients supported all eleven hypotheses. Three results define the contribution of the study: relatedness satisfaction is the strongest antecedent of trust, exceeding autonomy and competence; trust is the strongest predictor of recommendation intention; and interactivity is the most effective stimulus, both directly and indirectly. The core implication is that human connection, rather than technological convenience alone, is the most durable foundation of trust in dental care, where perceived risk is high.

The study has several limitations. The cross-sectional design constrains causal inference over time; the sample, collected in an urban Vietnamese context, calls for caution when generalizing to other cultural and health-system settings; the moderate R^2 values for trust (20.5%) and recommendation intention (21.1%) indicate that additional constructs, such as dental anxiety level, treatment type, or prior digital health experience, may improve predictive accuracy; and potential moderators such as dental anxiety and treatment type were not controlled. Future research should adopt a longitudinal design, broaden the geographic scope, and test the moderating role of patient characteristics, including dental anxiety and cultural dimensions such as collectivism, which may partly explain the dominance of relatedness in a Vietnamese high-context setting, to establish the generality of the model.

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Ethics statement: The study was conducted in accordance with the principles of the Declaration of Helsinki. Participation was voluntary, all respondents provided written informed consent prior to taking part, and all data were collected anonymously. The study was approved by the Scientific Research Ethics Committee of the Industrial University of Ho Chi Minh City under Decision No. 296/QD-DHCN dated 24 February 2023.

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