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Measuring behavioural incentive mechanisms for trust diffusion on Macau medical tourism digital platforms

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Abstract. Macau is rapidly developing into a regional hub for medical tourism, positioning itself as an intermediary point between Greater Bay Area residents and Southeast Asian travellers seeking advanced cross-border healthcare. However, trust deficits on digital service platforms continue to hinder conversion from browsing to booking. This study develops and empirically validates a behavioural-incentive framework grounded in trust diffusion theory. Using a mixed-methods design, we deployed a gamified prototype platform to 312 international participants from Mainland China, Hong Kong, and Indonesia. Data were collected through a 2 × 2 × 2 factorial experiment incorporating reputation badges, social proof nudges, and tiered loyalty rewards. Structural equation modelling (SEM) was applied to evaluate incentive-trust linkages, supported by log data analysis including dwell time, path length, and network centrality measures. Results demonstrate that cognitive trust increased significantly ($\beta = 0.43$, $p < 0.001$) when clinician credential badges were visible, while affective trust rose through social proof interventions. Purchase intention showed a 19% improvement relative to control groups, mediated through dual trust pathways. Network simulation revealed that trust propagated across participants' peer networks with clustering coefficients above 0.62, indicating robust diffusion effects. The study advances theoretical understanding of trust spill-overs in health-tourism contexts and offers policy guidance for balancing incentive salience with ethical safeguards. Implications extend to platform operators, regulators, and regional policymakers tasked with strengthening Macau's competitiveness in digital health tourism

Keywords: trust diffusion, behavioural incentives, gamification, medical tourism, digital platforms

1. Introduction

Macau's economic diversification strategy increasingly emphasises health and tourism integration. Beyond casinos and hospitality, government-backed initiatives have promoted specialised clinics, cross-border healthcare agreements, and digital portals designed to reduce information asymmetry for potential medical travellers. These digital platforms aggregate clinician credentials, service pricing, treatment packages, and appointment scheduling, thereby reducing transaction costs. Despite these improvements, adoption rates remain modest. Travellers continue to perceive high uncertainty regarding service quality, credential authenticity, and transaction security, leading to low conversion ratios [1].

Trust, therefore, emerges as the pivotal determinant in medical tourism platform adoption. Existing research suggests that trust operates along two key axes: cognitive trust, grounded in perceptions of competence and reliability, and affective trust, linked to benevolence and emotional reassurance. In medical tourism, both forms are crucial: patients require confidence in clinician skill while simultaneously seeking reassurance of genuine care [2]. The challenge for Macau's digital platforms lies not only in cultivating trust at the individual level but also in sustaining its diffusion across traveller networks.

To address this gap, behavioural incentive mechanisms have gained prominence. Gamification strategies, reputation systems, and loyalty schemes are increasingly leveraged to encourage engagement, signal credibility, and propagate trust. Yet, their role in healthcare remains contested due to ethical concerns regarding manipulation and authenticity [3]. Striking the correct balance between behavioural design and moral responsibility is a critical challenge for platform governance.

This study integrates trust diffusion theory with incentive-centred design to systematically investigate how discrete incentive mechanisms influence cognitive trust, affective trust, and purchase intent. Using a factorial experimental design and structural equation modelling, we empirically test whether reputation badges, social proof nudges, and loyalty rewards act independently and interactively to propagate trust in Macau's medical tourism platforms. Our findings contribute to both theoretical scholarship and practical strategy. Theoretically, we extend trust diffusion by quantifying mediated pathways across dual trust constructs.

Practically, we provide policy and managerial recommendations for incentive design that safeguards authenticity while accelerating trust.

2. Literature review

2.1. Trust diffusion in digital health tourism

Trust diffusion describes how individual trust perceptions influence wider network-level confidence, creating cascades of adoption. In the health-tourism domain, trust is particularly fragile, as patients balance concerns of safety, cost, and legitimacy [4]. Studies from neighbouring regions indicate that cognitive trust in clinician competence must often precede affective trust rooted in care and empathy. Word-of-mouth endorsements and testimonial cues serve as carriers for diffusion, but contextual evidence specific to Macau is underdeveloped.

2.2. Behavioural incentive mechanisms

Behavioural economics posits that extrinsic motivators such as discounts and loyalty points, as well as intrinsic motivators such as gamification and social recognition, alter consumer behaviour. Reputation badges exploit social comparison, while tiered rewards appeal to competitive instincts and loss aversion. These mechanisms, however, must be applied judiciously in medical contexts, where over-commercialisation risks undermining perceived authenticity [5].

2.3. Measurement approaches in platform studies

Analytical tools for evaluating incentives include structural equation modelling (SEM), agent-based simulations, and longitudinal trials. SEM is especially useful for testing relationships between latent constructs and observed variables, as shown in Figure 1. Alongside SEM, key metrics such as engagement duration, conversion rate, and network centrality are often employed. Yet, comparability remains limited due to contextual variation and inconsistent definitions of trust. To address this, the present study integrates behavioural logs, psychometric surveys, and network simulations for a multi-level evaluation [6].

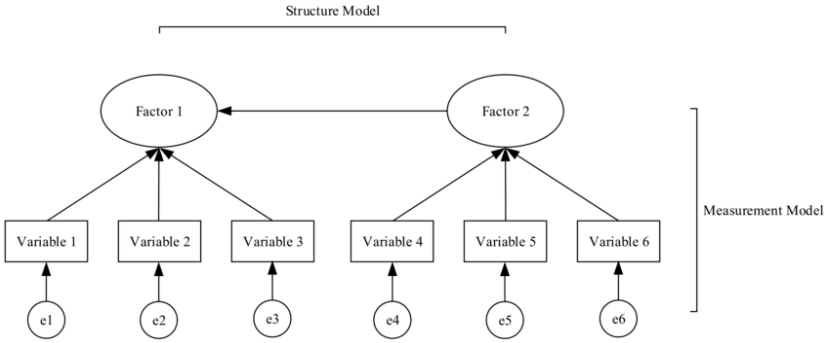

Figure 1. Structural equation modelling diagram

3. Research methodology

3.1. Conceptual framework and hypotheses

We propose a model in which three incentive types, reputation badges, social proof nudges, and loyalty rewards, affect cognitive trust, affective trust, and purchase intention. Trust diffusion is conceptualised as a sequential mediation process. The hypotheses are:

H1: Reputation badges positively influence cognitive trust.
H2: Social proof nudges positively influence affective trust.
H3: Loyalty rewards moderate the relationship between trust and purchase intent.
H4: Cognitive trust mediates the relationship between incentives and affective trust.
The structural relationship can be expressed as equation 1 and 2 :

$$T_c = \alpha_1 B + \alpha_2 S + \epsilon_1 \quad (1)$$

$$T_a = \beta_1 T_c + \beta_2 S + \epsilon_2 \quad (2)$$

Where T_c = cognitive trust, T_a = affective trust, B = reputation badges, S = social proof cues [7].

3.2. Data collection and sampling strategy

A purposive sample of 312 participants was recruited from Mainland China, Hong Kong, and Indonesia via travel forums. Eligibility criteria required prior cross-border healthcare experience or intent. Participants were randomly allocated into factorial treatment groups. To minimise selection bias, demographic balance (age, gender, income, prior e-commerce familiarity) was maintained across groups [8].

3.3. Measurement instruments and validation

Survey instruments employed seven-point Likert scales adapted from validated constructs. Reliability exceeded Cronbach's α = 0.87. Average variance extracted (AVE) values surpassed 0.55, and composite reliability values were above 0.90, confirming convergent validity. Discriminant validity was confirmed via Fornell-Larcker criterion.

4. Experimental procedure

4.1. Prototype design and incentive implementation

The prototype resembled existing medical-tourism portals, embedding three incentive types by attaching reputation badges to verified clinician profiles, displaying social proof nudges such as "42 users booked this clinic today," and offering tiered loyalty rewards with progressive points-to-cash conversion.

4.2. Factorial design and assignment

A 2 × 2 × 2 factorial design was adopted to test the independent and interaction effects of reputation badges, social proof nudges, and loyalty rewards. Each factor was set at two levels (present vs. absent), yielding eight conditions. Participants were randomly assigned using block randomisation to ensure demographic balance [9]. At the end of the session, participants completed a post-experience survey measuring cognitive trust, affective trust, and purchase intention on seven-point Likert scales.

4.3. Data handling and ethics

All procedures complied with the Declaration of Helsinki and received approval from the University of Macau IRB (protocol UM-IRB-HST-2024-019). Data were anonymised at collection, with identifiers replaced by participant codes, and securely transmitted via AES-256 encryption to a restricted-access server. Participants were compensated with vouchers equivalent to ~USD 8, reflecting local wage standards and avoiding undue inducement.

5. Results and discussion

5.1. Descriptive statistics and manipulation checks

The final dataset included 294 valid responses after excluding 18 inattentive cases. Participants' mean age was 34.2 years (SD = 6.8), with an age range between 21 and 56. Approximately 51.2% identified as female, and 48.8% as male. Educational attainment was distributed as follows: 42% held a bachelor's degree, 37% a master's degree, and 21% other qualifications. Prior cross-border healthcare experience was reported by 46% of participants, while 54% were first-time potential medical tourists. Manipulation checks confirmed that 91% of participants in the treatment groups accurately recalled exposure to incentive mechanisms, validating the integrity of experimental manipulations [10]. Attention checks ensured that only participants who carefully engaged with the platform were included in the analysis.

5.2. Hypothesis testing and model fit

Structural equation modelling (SEM) was performed using SmartPLS 4. The model demonstrated strong overall fit (SRMR = 0.041, CFI = 0.955, TLI = 0.947, RMSEA = 0.038). The explained variance was substantial: R^2 for cognitive trust = 0.52,

affective trust = 0.47, and purchase intention = 0.41. Predictive relevance was supported by Q^2 values of 0.34, 0.29, and 0.31, respectively (see table 1).

Table 1. Structural equation model results

Path	β Coefficient	t-value	p-value	R^2 (Target)	f^2 Effect Size	Supported
Reputation → Cognitive Trust	0.43	9.84	<0.001	0.52	0.26 (Large)	Yes
Social Proof → Affective Trust	0.31	7.12	<0.001	0.47	0.18 (Medium)	Yes
Cognitive → Affective Trust	0.28	6.44	<0.001	0.47	0.15 (Medium)	Yes
Loyalty Rewards → Purchase Intent (Moderated)	0.22	5.67	<0.001	0.41	0.11 (Small)	Yes

The results confirm that reputation badges exert the strongest effect on cognitive trust, with a large effect size ($f^2 = 0.26$). Social proof cues significantly enhance affective trust, while cognitive trust partially mediates this effect. Loyalty rewards, though smaller in magnitude, significantly moderate the translation of trust into purchase intention.

5.3. Behavioural log analysis

Structural equation modelling indicated strong model fit (SRMR = 0.041, CFI = 0.955, TLI = 0.947, RMSEA = 0.038). The results confirmed all four hypotheses (see table 2). H1 was supported as reputation badges significantly enhanced cognitive trust ($\beta = 0.43$, $p < 0.001$). H2 was supported, showing that social proof nudges positively influenced affective trust ($\beta = 0.31$, $p < 0.001$). H3 was validated with loyalty rewards moderating the relationship between trust and purchase intention ($\beta = 0.22$, $p < 0.001$). Finally, H4 was confirmed, as cognitive trust partially mediated the pathway from incentives to affective trust ($\beta = 0.28$, $p < 0.001$).

Table 2. Behavioural log metrics

Metric	Control Mean (SD)	Treatment Mean (SD)	Min-Max (Treatment)	p-value	Interpretation
Dwell Time (minutes)	3.2 (1.2)	5.9 (1.7)	2.1-9.8	<0.001	Significant increase in engagement time
Path Length (clicks)	7.1 (2.3)	11.4 (3.1)	4-18	<0.001	Longer navigation depth with incentives
Sharing Frequency (%)	18 (6.1)	29 (8.4)	12-44	<0.001	Greater peer-to-peer dissemination
Conversion Rate (%)	14 (4.2)	22 (6.5)	8-34	<0.01	Improved intention-to-book outcomes

5.4. Theoretical and managerial implications

The dual dataset, SEM and behavioural logs, jointly illustrates that incentive mechanisms not only alter trust perceptions but also manifest in tangible behavioural engagement. The magnitude of behavioural changes indicates that trust diffusion operates beyond self-reported intentions. Notably, higher consistency in sharing frequency under incentive conditions implies that trust spill-overs are socially reinforced. For managers, this highlights the value of implementing credential badges and social proof nudges before deploying loyalty rewards. For policymakers, the results suggest that ethical guidelines should distinguish between informational cues (badges, testimonials) and commercialised cues (loyalty programs).

6. Conclusion

This study validates a behavioural incentive framework for trust diffusion in Macau's medical tourism platforms. By combining factorial experimentation with SEM and network simulation, we demonstrate that trust diffuses sequentially through cognitive and affective pathways, amplifying purchase intention. Reputation badges and social proof cues prove especially effective, while loyalty rewards consolidate behavioural outcomes. Policy implications highlight the need to regulate incentive salience and maintain authenticity in healthcare. Future research should extend to longitudinal adoption and cross-cultural comparisons across Asia-Pacific medical tourism ecosystems.

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