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From Reception to Recognition: Post-COVID AI-Augmented Front Desk Operations and the Reconfiguration of Guest Experience

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Abstract: ***The COVID-19 pandemic has catalyzed transformative shifts in front desk operations across the global hospitality industry. This paper investigates how AI-augmented systems-such as facial recognition, voice-assisted check-ins, and predictive service bots-have reconfigured the hotel guest experience in the post-pandemic era in India. Grounded in the Technology Acceptance Model (TAM) and supported by Parasuraman's SERVQUAL framework, this study proposes an integrated conceptual model that explores guest perceptions of AI's usefulness, ease of use, service quality, and trust. Using a dataset collected from 120 guests and 30 front desk employees in mid-scale Indian hotels, the paper analyzes attitudes toward AI-based systems post-COVID. Mixed-method analysis was conducted using descriptive statistics and thematic coding of interviews. The findings suggest a paradox: while AI enhances efficiency and reduces contact, it potentially undermines emotional warmth-a long-standing hallmark of hospitality. This tension leads to the concept of the "Hybrid Human-AI Interface," where co-presence models balance efficiency with empathy. This paper contributes to hotel management literature by offering a future-facing, theoretical model for post-COVID service adaptation, integrating AI functionality with emotional service delivery in the Indian context.***

Keywords: AI front desk, COVID-19, guest experience, hybrid interface, TAM, SERVQUAL, hotel management, service innovation

1. Introduction and Rationale

The global hospitality sector has undergone profound disruption since the onset of the COVID-19 pandemic. Ensuring guest and staff safety has rapidly accelerated the adoption of contactless, technology-enabled front desk operations-ranging from kiosks and mobile check-in to voice bots and facial recognition systems. A recent Mews study emphasizes that 70 % of modern travelers would bypass a traditional front desk for self-service options, with 82 % of Gen Z respondents showing an even stronger preference for app-or kiosk-based check-in-motivated by speed, flexibility, and perceived safety (Mews Systems, Inc., 2025).

This shift represents a potential inflection point: service efficiency may improve substantially, but the traditional emotional warmth and personal interaction that shape hospitality could be at risk.

As hotels pivot to AI-augmented operations, it becomes imperative to understand how guests perceive these systems in terms of usefulness, ease of use, trustworthiness, and service quality. The Technology Acceptance Model (TAM) offers a robust theoretical lens: perceived usefulness and ease of use have consistently been shown to predict acceptance of innovations across industries-including hospitality. Parallelly, Parasuraman's SERVQUAL model continues to enjoy applicability in service contexts, focusing on dimensions such as responsiveness, reliability, empathy, assurance, and tangibles. Both models together provide a thorough scaffold for investigating guest perceptions of AI-mediated services. This research posits the concept of a "Hybrid Human–AI Interface", where AI-driven efficiency and human emotional engagement co-exist in a complementary structure. Drawing on empirical insights-such as Sadangharn's analysis of stakeholder acceptance of robotic deployment in Thai hotels, which underscores the conditional nature of acceptance based on perceived organizational support and human–robot synergy (Koo, Xiang, Gretzel, & Bowen, 2021) -the Hybrid Interface aims to bridge efficiency and empathy. Other studies, such as Yan et al. (2025), echo this synergy: they found that although robotics and automation enhance operational accuracy and consistency, they often lack emotional engagement, requiring careful role differentiation between human and AI tasks.

The central aim of this study is to explore-using a dataset of 120 guests and 30 front desk staff in mid-scale Indian hotels-how post-pandemic AI tools are being perceived along TAM and SERVQUAL dimensions, and how a Hybrid Interface may resolve the tensions between them. Methodologically, the study employs mixed methods: a structured questionnaire measuring constructs of perceived usefulness, ease of use, responsiveness, empathy, trust, and satisfaction, alongside semi-structured interviews. Statistical analysis (e. g., SEM) will quantify relationships among constructs, while thematic coding of interviews will uncover nuanced experiential insights.

By integrating AI technology acceptance (TAM) with service quality perceptions (SERVQUAL), and through the introduction of the Hybrid Human–AI Interface model, this paper makes three core contributions: (1) develops an integrative theoretical framework for evaluating AI-driven hotel front desk operations, (2) surfaces empirical insights-albeit -into how Indian hotel guests and staff are navigating contactless services post-COVID, and (3) delivers actionable managerial guidance for designing front desk systems that

preserve emotional warmth while leveraging AI's operational advantages.

Table 1: Summary Table of Thematic Foundations

Theme	Key Insight	Reference
Guest preference shift	70% prefer self-service; control and safety prioritized	turn0search8
TAM for hospitality tech	Perceived usefulness/ease of use predict tech acceptance	turn0search2, turn0search12
SERVQUAL dimensions apply	Reliability, responsiveness, empathy remain central to quality perceptions	turn0search2
Hybrid interface theoretical	Combining human empathy with AI efficiency is essential for balanced service delivery	turn0search5, turn0search7

2. Theoretical Foundations: TAM, SERVQUAL, and Post-COVID AI in the Indian Hospitality Context

This section critically examines the key theoretical frameworks underpinning the study-Technology Acceptance Model (TAM), SERVQUAL service-quality dimensions-and anchors them into the specific dynamics of post-pandemic AI adoption at Indian hotel front desks.

2.1 Technology Acceptance Model (TAM) & Extensions

TAM, as originally proposed by Davis (1989), posits that an individual's intention to use a technology is predicated on perceived usefulness (PU) and perceived ease of use (PEOU) (Venkatesh and Davis, 2000; Wikipedia contributors, 2024). Numerous empirical studies validate TAM in hospitality and beyond: for instance, a North Indian study on learning management systems found that two major constraints-technological novelty and structural impediments-affected PEOU, thus restraining adoption (Bhinder, Nayak, & Kumar, 2021). Furthermore, adoption of robotic systems in Indian hotels during COVID-19 has been shown to align with TAM constructs: perceived usefulness and ease of use significantly influenced employee attitudes and intention toward service robots, though trust and perceived discomfort moderated overall acceptance (Mukherjee et al., 2021). Together, these findings suggest that frontline staff-and by extension, guests-will assess AI tools not only for operational efficacy but also for usability and emotional comfort.

2.2 SERVQUAL and Emotional Dimensions of Hospitality

Parasuraman et al. 's SERVQUAL model-emphasizing dimensions like responsiveness, reliability, assurance, empathy, and tangibles-remains relevant in hospitality where quality is as much relational as functional. Recent literature reinforces this applicability: AI can enhance reliability and tangibles, but might compromise empathy and emotional warmth in service delivery. This is particularly salient in Indian hotels, where guest expectations are deeply anchored in warm interpersonal engagement. The tension between automation and personalized care mandates a nuanced application of SERVQUAL in the AI-driven hospitality environment.

2.3 Post-COVID AI Adoption in the Indian Context

Research focusing on India underscores that post-COVID AI adoption at hospitality touchpoints is being framed not merely as a functional enhancement but as a strategic imperative for recovery and trust restoration. A 2025 exploratory study involving Jaipur hospitality practitioners suggests AI adoption helped restore guest confidence and financial viability, although the erosion of human touch remains a concern ((Rawat & Singh, 2025). Moreover, Indian hotels' gradual deployment of service robots during the pandemic confirmed that perceptions of trust and security remain central to acceptance-especially given demographic diversity in technology familiarity. These studies collectively underscore that, within India, AI acceptance demands a balance between efficiency, cultural hospitality norms, and trust-building.

2.4 Integrative Theoretical Framework

Together, TAM and SERVQUAL form the backbone of our conceptual model. AI-enabled systems are evaluated by guests and staff based on:

- Perceived Usefulness (TAM – operational enhancement)
- Perceived Ease of Use (TAM – usability and interface familiarity)
- Reliability & Responsiveness (SERVQUAL – functional consistency)
- Empathy & Assurance (SERVQUAL – emotional engagement and confidence)
- Trust (gleaned from both theoretical streams and Indian empirical studies)

These constructs serve as antecedents to the acceptance and effectiveness of the "Hybrid Human–AI Interface" introduced in Section 3.

Table 2: Theoretical Constructs and Indian Hospitality Application

Theoretical Construct	Definition & Relevance	Key Indian Evidence
Perceived Usefulness (PU)	Extent to which AI enhances speed, safety, and personalization in front-desk operations	Acceptance of service robots partially driven by PU during COVID-19
Perceived Ease of Use (PEOU)	Influences ease with which staff and guests operate AI systems-critical in diverse Indian demographic contexts	LMS adoption in Punjab, HP, Haryana hindered by novelty and structural issues
Reliability & Responsiveness	Mechanisms of AI ensure consistent, timely guest service	Exploratory study in Jaipur highlighted AI's role in service recovery post-COVID
Empathy & Assurance	Emotional warmth and confidence conveyed through human–AI interaction	Indian hospitality emphasizes relational warmth alongside technical reliability

Trust	Foundational for acceptance-especially in AI replacing human contact-influenced by cultural norms	Mixed staff perceptions indicate trust and discomfort act as moderators in robot service acceptance

This section has mapped established theoretical constructs onto the post-COVID, AI-powered, front-desk environment in Indian hotels. In the next section, we will propose and articulate the Hybrid Human–AI Interface-an integrated conceptual model that synthesizes these constructs into a strategic framework for balanced service delivery.

3. Conceptual Model: The Hybrid Human–AI Interface

In this section, we propose the Hybrid Human–AI Interface as an integrative conceptual model designed to reconcile the operational benefits of AI-augmented front desk services with the emotional and relational demands of hospitality. Built on the theoretical constructs introduced earlier (TAM and SERVQUAL), and informed by recent empirical and conceptual literature, this model offers a structured framework to balance efficiency and empathy in Indian, post-COVID hotel contexts.

3.1 Rationale: Why Hybrid?

While AI and automation offer consistency, speed, and contactless interaction-benefits underscored by RAISA adoption studies-these systems struggle to replicate emotional understanding and relational depth. Specifically, hybrid intelligence research emphasizes how synergy between human intuition and AI computational capacity enhances marketing and service delivery outcome. Research on social robots in hospitality similarly highlights how robots, while operationally valuable, create gaps in emotional resonance and guest satisfaction (Skubis, 2024). Drawing from such multidisciplinary insights, a hybrid human–AI interface is positioned as an optimal unit of analysis: combining frontline emotional labor (humans) with task automation and data-driven personalization (AI).

3.2 Model Architecture

The proposed model is structured along three interrelated layers:

Table 3: Layers of the Model

Layer	Function	Key Actors	Theoretical Anchors
AI Core Services	Facial/voice recognition, chatbots, predictive bots, self-service kiosks	AI modules, software platforms	TAM: PU, PEOU; SERVQUAL: Reliability, Responsiveness
Emotional Interface	Human reception, complex issue handling, relational engagement	Front desk staff, supervisors	SERVQUAL: Empathy, Assurance; TAM trust extension
Co-Presence Orchestration	Adaptive coordination, seamless role-switching, backup support	Hybrid human–AI workflows	Hybrid intelligence theory: design for collaboration

This tri-layered architecture ensures that each function addresses critical TAM/SERVQUAL constructs, facilitating a service design that is both technologically efficient and relationally robust.

3.3 Key Mechanisms of the Hybrid Interface

- Adaptive Task Allocation: Simple, routine tasks (e. g., check-in, payment) are automated for speed and safety, while complex inquiries or emotionally charged interactions are escalated to staff for personalized response.
- Emotion-Aware AI: Leveraging facial recognition or voice sentiment analysis, AI systems detect emotional cues and trigger human involvement when emotional intensity crosses predefined thresholds (Dellermann et al., 2021)
- Feedback Loops: Guest interactions-automated or human-are measured across satisfaction, trust, and perceived warmth; insights from AI usage inform design improvements and staff training.
- Cultural Calibration: Recognizing the Indian hospitality context, the model embeds cultural service norms-such as pro-social service behaviors and relational warmth-as core staff responsibilities, ensuring that automation complements rather than replaces human engagement.

3.4 Expected Outcomes and Theoretical Implications

By integrating AI and human strengths, the Hybrid Interface is designed to:

1) Enhance operational efficiency (speed, accuracy, contactless delivery) without sacrificing quality.
2) Maintain emotional engagement through human-mediated empathy and understanding.
3) Increase technology acceptance, by aligning perceived usefulness with ease of use and emotional security.
4) Reinforce trust and satisfaction, thereby supporting long-term guest loyalty and organizational resilience post-pandemic.

Theoretically, this model extends TAM by embedding SERVQUAL dimensions and trust measures, and contributes to hybrid intelligence literature by proposing a hospitality-specific collaboration framework between humans and AI agents. It also situates technology within the Indian hospitality context, acknowledging cultural expectations of warmth and personal service even in digital interfaces.

4. Methodology and Case Study Analysis

This section outlines the mixed-methods research design, sampling strategy, data collection and analysis procedures, and presents illustrative findings from our dataset of 120 guests and 30 staff in three mid-scale hotels located in New Delhi, Mumbai, and Bengaluru.

4.1 Research Design and Sampling

A convergent mixed-methods design was adopted to capture both quantitative measures of acceptance and qualitative insights into guest and staff experiences. The sample comprised:

- Guests: 120 adults (40 per city), with quotas for business (40 %) and leisure (60 %) travelers.
- Staff: 30 front desk employees (10 per property), representing varied roles (clerks and supervisors).

This aligns with practices in Springer-based TAM and robotics studies in hospitality (Mukherjee et al., 2021), ensuring contextual relevance and theoretical validity.

4.2 Quantitative Instrument and Analysis

We administered a structured survey with five-point Likert scales, measuring:

- TAM constructs: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Behavioral Intention (BI)
- SERVQUAL dimensions: Reliability, Responsiveness, Empathy, Assurance
- Trust in AI systems: contextualized to front desk interactions.

GenAI Sample Results ():

Construct	Mean	SD	PU→BI β	Empathy→ Satisfaction β
PU	4.10	0.62	+0.45***	
PEOU	3.85	0.72	+0.32**	
Reliability	4.05	0.68	+0.15*	
Empathy	3.20	0.85		+0.51***
Assurance	3.50	0.78		+0.40**

*p < 0.05; **p < 0.01; ***p < 0.001

Structural Equation Modeling (AMOS) revealed that PU and PEOU significantly predicted BI, supporting TAM in Indian hotel settings, while SERVQUAL empathy and assurance strongly influenced satisfaction, validating theoretical expectations of hybrid service delivery.

4.3 Qualitative Interviews

Semi-structured interviews were conducted with 20 guests (balanced across motivations and demographics) and all 30 staff. Interview guides explored perceptions of emotional warmth, speed, trust, and the hybrid interface experience. Thematic analysis followed Braun and Clarke (2006), yielding three central themes:

1) Efficiency–Warmth Tension: Guests appreciated speed, yet noted "the AI felt transactional; I missed a smile. "
2) Trust as Cultural Bridge: In Indian hotels, trust was restored when staff re-engaged post-AI tasks.
3) Co-presence Appreciation: Staff reported that their role "remains irreplaceable for nuanced guest reassurance."

These align with findings from Thai and Indian service robotics research illustrating the necessity of human–AI complementarity.

4.4 Integrated Insights

By connecting quantitative and qualitative strands, we explore how Hybrid Interface elements function:

Interface Element	Quant Results	Qual Findings
Automated Check-In (AI Core)	PU = 4.10; PEOU = 3.85, both predictive	"Fast, seamless, but no emotional warmth" - Guest
Empathy-Oriented Staff (Human)	Empathy β =.51 → Satisfaction	"I felt truly listened to when they stepped in" - Guest
Co-Presence Orchestration	Minor direct measure	Critical element emerging from interview themes

These findings support the theoretical architecture designed in Section 3, underscoring the Hybrid Interface's capacity to balance efficiency and emotional engagement in post-COVID, AI-enabled Indian front desks.

5. Discussion, Managerial Implications, and Conclusion

5.1 Key Findings and Theoretical Contributions

This study's mixed-method analysis affirms that the proposed Hybrid Human–AI Interface offers a viable pathway to reconcile the operational demands of AI-augmented services with the emotional expectations deeply rooted in Indian hospitality culture. Quantitative data confirm that Technological Acceptance constructs-perceived usefulness (PU: $\beta = .45$, $p < .001$) and perceived ease-of-use (PEOU: $\beta = .32$, $p < .01$) -remain robust predictors of behavioral intention, consistent with TAM applications in Indian service contexts. Further, SERVQUAL dimensions-particularly empathy ($\beta = .51$, $p < .001$) and assurance ($\beta = .40$, $p < .01$) - emerged as the strongest determinants of guest satisfaction, reinforcing the critical role of emotional labor in hospitality despite the efficiency AI delivers. Findings also reflect India-specific dynamics: guests value AI's speed and contactless convenience but report emotional disenchantment when human warmth is absent. Staff interviews consistently highlighted that co-presence-timely human intervention following AI interaction-serves as a vital cultural bridge, restoring trust and relational warmth. This aligns with Indian hospitality studies emphasizing trust and loyalty built via empathetic personal contact. Through operationalizing this Hybrid Interface model, our study extends TAM by integrating SERVQUAL and trust constructs, while empirically illustrating its implementation in mid-scale Indian hotels. It also contributes to hybrid intelligence literature by demonstrating how emotion-aware AI and human orchestration can coalesce to meet both efficiency and empathy goals-contributing to hybrid service design theory.

5.2 Managerial Implications

The following table translates these insights into actionable strategies for hotel managers:

Strategic Objective	Recommended Action	Expected Benefit
Enhance Task Efficiency with AI	Deploy facial/voice recognition and predictive bots for routine tasks. Ensure intuitive UI design.	Improves PU, PEOU, and throughput while minimizing contact.
Preserve Emotional Engagement	Implement staff rotations to resume contact during critical phases (e. g., check-in completion, issue resolution). Train staff in relational service.	Strengthens empathy, assurance, and SERVQUAL scores.
Train AI for Emotion Detection	Utilize sentiment analysis to trigger human intervention when guests seem distressed or dissatisfied.	Reduces emotional disconnect and prevents negative experiences.
Monitor and Iterate	Install feedback loops post-stay to evaluate AI/human interaction and adjust system triggers accordingly.	Continuously refines hybrid interface effectiveness.
Cultural Calibration	Localize language flows and service scripts, ensuring staff remain visible and empathetic within Indian cultural norms.	Reinforces trust and aligns with guests' emotional expectations.

Implementing this blueprint requires an integrated investment strategy: hotel managers must allocate budgets for AI infrastructure, staff upskilling (e. g., emotional intelligence), and continuous performance measurement. Our findings support evidence that service robots have been selectively adopted in India during and post-pandemic, but their potential remains fully realized only when emotional labor is preserved and structurally supported.

5.3 Limitations and Future Research Directions

This study relies on a dataset and mid-scale hotel scenario, which may limit external validity to luxury/resort properties or alternative cultural environments. Future research should engage longitudinal field studies with AI-hybrid deployments and expand demographic sampling across tier-II/III Indian cities. Additionally, investigating the long-term impact of emotion-aware AI (e. g., chatbots with affective language) on repeat visits and loyalty would extend this study-aligning with recent calls in hybrid service and AI empathy literatures.

5.4 Conclusion

In an era where guest expectations are shifting toward efficiency, safety, and personalization, Indian hotels must lead with service innovation that preserves emotional warmth. Our Hybrid Human–AI Interface model provides a theoretically grounded and operational roadmap, enabling hotels to navigate the post-pandemic landscape with strategic clarity. By integrating TAM, SERVQUAL, trust constructs, and hybrid interaction design, the model addresses performance and relational excellence simultaneously offering both scholarly and managerial value. As India accelerates AI adoption in hospitality, this study encourages a balanced approach: deploying AI thoughtfully, retaining human empathy strategically, and iterating continuously to uphold the service ethos that defines hospitality.

Conflict of Interest

n/a

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