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Mind the gap: aligning AI with how restaurant staff think

Joel Reynolds
DePaul University, Chicago, Illinois, USA

Abstract

Purpose – This practitioner paper translates peer-reviewed research on restaurant worker mental models into actionable strategies for implementing artificial intelligence (AI)-driven reservation and personalization systems. The paper aims to address the critical disconnect between AI technology capabilities and worker acceptance, which causes 60–70% of hospitality technology implementations to fail despite technical sophistication.

Design/methodology/approach – Drawing from pathfinder network analysis of 25 restaurant workers' cognitive structures (Iyer, Reynolds, Nam, & Jeong, 2024), this paper synthesizes findings with current AI hospitality literature to develop a human-centered implementation framework. The mental model alignment matrix evaluates AI features against workers' cognitive frameworks across operational flow, interpersonal dynamics and risk management dimensions.

Findings – Restaurant workers organize their understanding through three interconnected domains that determine technology acceptance. Workers evaluate AI systems based on their impact on the rhythm of service. Furthermore, they perceive technology that reduces human interaction as a threat to their core professional identity and incorporate these new systems into complex risk calculations that extend beyond efficiency to include reputational and service quality concerns.

Practical implications – Managers should position AI as intelligence amplifiers rather than automation tools, involve frontline workers in workflow mapping to identify non-disruptive integration points and design training that develops interpretation skills over operational compliance. Implementation requires iterative refinement with genuine worker influence over system evolution and clear accountability frameworks that preserve professional judgment.

Originality/value – This paper uniquely bridges cognitive psychology and hospitality technology implementation, providing the first framework that aligns AI deployment with worker mental models. The mental model alignment matrix (Borders, Klein, & Besuijen 2024) offers managers a practical tool for prioritizing features and sequencing implementation to maximize adoption success.

Keywords Foodservice, Hospitality training, AI tools

Paper type Technical paper

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Background

The restaurant industry stands at a critical technological crossroads where artificial intelligence promises to revolutionize operations through enhanced personalization and efficiency, yet many AI implementations fail to deliver their expected value. The disconnect lies not in the technology itself, but in the fundamental mismatch between how restaurant workers conceptualize their work and how AI systems are designed and deployed. While the industry debates whether AI represents service enhancement or merely cost reduction (Belanche, Casaló, & Flavián, 2021), the more pressing question is how to implement these technologies in ways that align with workers' cognitive frameworks and professional identities.

This practitioner paper translates findings from peer-reviewed research on restaurant worker mental models (Iyer *et al.*, 2024) into actionable strategies for managers seeking to implement AI-driven reservation and personalization systems. The original study, which underwent double-blind peer review and was published in *IISE Transactions on Occupational*

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Ergonomics and Human Factors, employed pathfinder network analysis to uncover the cognitive structures that guide restaurant workers' decision-making processes.

The push for AI adoption in the restaurant industry is driven by a compelling, if often unrealized, set of potential benefits. Proponents argue that AI can enhance service value through personalization, streamline operations with intelligent reservation systems, and increase efficiency by freeing staff from routine administrative tasks (Chi, Gursoy, & Chi, 2022; Qiu, Li, Shu, & Bai, 2020). The promise is that AI can handle data management, allowing humans to focus on hospitality—creating the memorable guest experiences that build loyalty and drive revenue (Buhalis & Moldavska, 2022). The urgency of this issue cannot be overstated, as studies consistently show that 60–70% of technology implementations in hospitality fail to achieve their intended outcomes, primarily due to human resistance and misalignment rather than technical failure (Tussyadiah, 2020). This challenge is particularly acute in hospitality, where the tension between emotional intelligence and artificial intelligence creates unique implementation challenges (Prentice, Dominique Lopes, & Wang, 2020). A common, yet flawed, interpretation is to frame this as a problem of "staff resistance." This paper challenges that perspective. This paper argues that such failures are not the result of an unwilling workforce, but of a fundamental misalignment between the design and deployment of new technologies and the sophisticated mental models that guide workers' decision-making. The central problem this research addresses is not how to overcome resistance, but how to prevent it by adopting a human-centered framework that ensures technology enhances, rather than disrupts, the delicate choreography of restaurant service.

Key findings

Our research examined how restaurant workers, specifically chefs and managers, conceptualize safety and operational efficiency in their work environment. Using pathfinder network methodology with 25 participants from a full-service restaurant, we mapped the cognitive structures that guide decision-making during service. While our original study focused on safety mental models, the underlying cognitive patterns reveal crucial insights for technology implementation that align with broader research on AI acceptance in hospitality settings. The pathfinder analysis revealed that restaurant workers organize their understanding of work around three interconnected domains: operational flow, interpersonal dynamics, and risk management (Iyer *et al.*, 2024).

The first critical finding concerns operational flow and its relationship to technology acceptance. Restaurant workers possess highly sophisticated mental models of service rhythm and timing, functioning like an internal GPS that allows them to navigate the complex, time-sensitive environment of restaurant service. Workers mentally map every action against its potential to disrupt or enhance this flow, a pattern consistent with research showing that hospitality employees evaluate AI based on its impact on operational efficiency (Vatan & Dogan, 2021). Technology that fails to align with these temporal mental models is immediately perceived as an obstacle rather than an aid. Our analysis showed that experienced workers could predict workflow disruptions with remarkable accuracy, suggesting that any new system must be evaluated through this lens of operational rhythm.

The second finding relates to the primacy of interpersonal connections in workers' mental models, a factor that significantly influences their acceptance of AI technologies. Unlike manufacturing or retail environments, restaurant work is fundamentally relational, with workers conceptualizing their roles not as task executors but as experience creators. This aligns with research demonstrating that rapport building remains crucial even when service robots are introduced into hospitality settings (Qiu *et al.*, 2020). Their mental models prioritize guest interaction, team coordination, and the subtle art of reading and responding to human needs. The pathfinder networks revealed dense clusters of connections between concepts related to guest satisfaction and worker autonomy, indicating that these elements are inseparable in workers' minds (Iyer *et al.*, 2024). This finding has profound implications for

AI implementation, as systems that reduce human interaction or create barriers between staff and guests violate core assumptions about what constitutes good service.

The third finding concerns risk perception and management within the context of technological change. Restaurant workers maintain complex mental models of potential hazards and their mitigation strategies, extending beyond physical safety to encompass reputational risk, service failures, and guest dissatisfaction. Workers constantly balance efficiency pressures against quality and safety concerns, a dynamic that becomes more complex when AI is introduced. As Webster and Ivanov (2020) note, the evolving nature of work in the AI era creates new forms of risk that workers must navigate. Any AI system introduced into this environment becomes part of this risk calculation, and if workers perceive that AI increases their exposure to blame for service failures or reduces their ability to prevent problems, resistance is inevitable.

Actionable insights for AI implementation

The following recommendations are not strategies to "sell" a pre-determined technology to a hesitant workforce. On the contrary, they are a framework for ensuring a technology is worth adopting in the first place. This starts with the position that worker hesitance is often a rational and pragmatic signal that a technology's utility has not been proven in the context of their daily work. As our findings show, AI systems that ignore or contradict workers' sophisticated mental models are "destined to fail." Therefore, the goal of a human-centered implementation is not to overcome resistance, but to make it unnecessary by co-designing and deploying tools that demonstrably enhance worker capability, improve service quality, and reduce friction. The value-add is realized only when the technology aligns with and empowers the human element of hospitality.

Understanding these mental models provides a roadmap for successful AI integration in restaurant reservation and personalization systems. The key is not to fight against existing mental models but to design implementation strategies that align with and enhance them. As Huang and Rust (2021) argue in their strategic framework for AI in marketing, successful implementation requires understanding both the capabilities of the technology and the human context in which it operates. It is crucial to state that this framework does not begin with the assumption that AI should be adopted. Rather, it provides the critical lens through which to evaluate its potential value. Before any investment, managers should use this human-centered perspective to ask not "how can we implement this AI?" but "does this AI align with and enhance our team's existing capabilities?" The goal is not to automate or replace human judgment, but to identify opportunities where AI can serve as an "intelligence amplifier" (Huang & Rust, 2021). For instance, an AI tool that frees staff from rote administrative tasks to focus on creating memorable guest experiences is one that enhances service value rather than merely reducing costs (Chi *et al.*, 2022). The technology must handle the data management so that humans can handle the hospitality. If an AI system cannot meet this standard, our framework would suggest it is not a worthwhile investment.

This section provides specific, detailed recommendations for practitioners seeking to leverage AI while respecting the cognitive frameworks of their staff. The foundation of successful implementation is reframing how AI is introduced to the team. Rather than presenting AI as a system that automates or replaces human judgment, position it as an intelligence amplifier that enhances workers' existing capabilities. This framing is crucial, as research shows that tourists' and customers' attitudes toward AI devices are significantly influenced by whether they perceive the technology as enhancing service value rather than merely reducing costs (Chi *et al.*, 2022). For instance, when introducing an AI-powered reservation system or voice assistants for customer service (Buhalis & Moldavska, 2022), emphasize how these tools free staff from administrative tasks to focus on what they do best—creating memorable guest experiences. Frame the AI as handling the data management so

humans can handle the hospitality. This approach aligns with workers' mental models that prioritize interpersonal connection and professional autonomy.

Implementation must begin with a thorough mapping of current workflows to identify integration points that enhance rather than disrupt operational flow. This process should involve frontline workers from the start, leveraging their sophisticated understanding of service rhythms. The importance of this collaborative approach is supported by McCartney and McCartney's (2020) conceptual framework for service-robot integration, which emphasizes the need for worker involvement in technology deployment. Create cross-functional teams that include servers, hosts, and managers to identify where AI-generated insights would be most valuable and least disruptive. For example, rather than forcing servers to check a tablet for guest preferences during service, integrate this information into existing touchpoints. Display relevant guest information on the POS system when orders are entered, or provide hosts with a simple heads-up display at the host stand. This approach respects workers' mental models of efficient flow while adding value without friction.

Training programs must evolve beyond operational instruction to focus on strategic interpretation and decision-making. Traditional technology training often treats workers as passive operators who must follow prescribed procedures, an approach that fails because it contradicts workers' mental models of themselves as skilled professionals who exercise judgment. Research on customer intentions to use robot-serviced restaurants suggests that the perceived "coolness" factor and meaningful human-computer interaction play crucial roles in acceptance (Cha, 2020). Design training that positions workers as data interpreters and experience architects, teaching them not just how to access AI-generated insights but how to synthesize this information with their observational skills and experience. Role-play scenarios where servers use AI insights as conversation starters rather than scripts. This training must position workers as data interpreters, not passive operators. For example, using role-play scenarios is not about teaching skilled servers how to talk to guests—a skill they have already mastered. Rather, it is about providing a safe environment to practice the complex cognitive task of synthesizing AI-generated insights with their own real-time observations and experience. The goal is to train them to use an AI insight (e.g. a guest's wine preference) as a fluid conversation starter that showcases their expertise, rather than a rigid, scripted talking point. This approach teaches them to wield the AI as a tool that augments their professional judgment, ensuring the technology enhances, rather than detracts from, authentic human connection.

The implementation timeline must respect the learning curve and allow for iterative refinement. Research on technology adoption consistently shows that forcing rapid implementation increases resistance and reduces long-term success rates (Fu, Zheng, & Wong, 2022). To avoid overwhelming staff and to allow for iterative refinement, implementation should follow a phased rollout, beginning with a temporary pilot program. It is critical that this is not perceived as management playing favorites. The pilot group should consist of respected staff members who are open to change and influential among their peers. Frame their role explicitly as that of "internal champions" or "pioneer users" whose purpose is to test the system, provide critical feedback for refinement, and then help train their colleagues. This approach transforms the initial rollout into a collaborative, peer-led process, leveraging the relational dynamics of the team rather than undermining them. This phased approach, which allows for refinement before a full-scale launch, is consistent with best practices for technology adoption in service industries (Tussyadiah, 2020).

Create robust feedback mechanisms that give workers genuine influence over the system's evolution and application. This is not about soliciting suggestions but about demonstrating that worker input directly shapes the technology's role. Establish regular forums where staff can identify pain points and propose solutions. Crucially, this feedback must be empowered to do more than simply tweak the system; it must also provide a clear pathway for staff to recommend the curtailment or outright rejection of AI features that are not helpful for specific work routines. When a change—including the removal of a feature—is made based on this

feedback, explicitly acknowledge the source. This reframes worker hesitance as rational and pragmatic feedback, aligns with their models of professional autonomy, and builds trust in the management process, not just the technology itself.

Visual framework: the mental model alignment matrix

To guide implementation decisions, we recommend using a Mental Model Alignment Matrix (Borders *et al*., 2024) that evaluates AI features against workers' cognitive frameworks. The matrix has two axes: "Alignment with Worker Mental Models" (low to high) and "Operational Value" (low to high). This creates four quadrants that help managers prioritize implementation efforts in a manner consistent with strategic AI frameworks that balance technological capabilities with human factors (Huang & Rust, 2021).

The upper right quadrant represents "Priority Implementations"—features that both align with mental models and provide high operational value. These might include AI-powered allergy alerts that enhance workers' risk management capabilities while improving safety. The upper left quadrant contains "Reframe Opportunities"—valuable features that require careful positioning to gain acceptance. For example, automated scheduling might provide operational value but needs to be framed as supporting work-life balance rather than reducing human decision-making.

The lower right quadrant identifies "Quick Wins"—features that align with mental models even if their immediate value is modest. These build trust and familiarity with the system. The lower left quadrant represents "Reconsider Features"—elements that neither align with mental models nor provide clear value. These should be eliminated or substantially redesigned. This visual tool helps managers make strategic decisions about which AI capabilities to implement and how to sequence their introduction, addressing the fundamental question of whether AI serves as service enhancement or merely cost reduction (Belanche *et al*., 2021).

Conclusion

Findings on the complexity of workers' cognitive, relational, and risk-management models could be interpreted as an argument against AI adoption in many restaurant contexts. This is a valid and crucial interpretation. These sophisticated human skills are precisely why technology-centric AI implementations fail. However, this does not preclude a role for AI altogether. Instead, it dramatically raises the bar for its successful application. The path forward lies not in replacing these successful human models, but in designing and deploying AI tools that explicitly support them. The focus must be on enhancing human capability, not supplanting human judgment (Prentice *et al*., 2020), and establishing clear accountability frameworks where professional judgment always takes precedence over an AI's suggestion.

Restaurant workers possess sophisticated mental models that guide their decision-making, shape their professional identity, and define their understanding of excellent service. AI systems that ignore or contradict these mental models are destined to fail, regardless of their technical capabilities. The growing body of research on AI in hospitality consistently points to the importance of the human element in determining implementation success (Vatan & Dogan, 2021; Prentice *et al*., 2020).

The key insights from our research point to three critical success factors. First, AI must be positioned as an enhancer of human capability rather than a replacement for human judgment, addressing the fundamental tension between emotional and artificial intelligence in service settings (Prentice *et al*., 2020). Second, implementation must respect and align with workers' mental models of operational flow, interpersonal connection, and risk management. Third, workers must be treated as partners in the implementation process, with genuine influence over how systems are designed and deployed.

For restaurant owners, while not neglecting restaurant managers input in the decision making, the practical implications are clear. Before investing in AI technology, invest in

understanding your team's mental models. Map current workflows and identify integration points that enhance rather than disrupt established patterns. Design training programs that develop interpretation skills rather than operational compliance. Create feedback mechanisms that give workers genuine influence over system evolution. Most importantly, maintain unwavering focus on the human element that defines hospitality, recognizing that even advanced AI systems like voice assistants must complement rather than replace human service (Buhalis & Moldavska, 2022).

The future of restaurant technology is not about replacing human connection with artificial intelligence but about using AI to deepen and enhance the human connections that create memorable dining experiences. As the hospitality industry continues to evolve with new technologies, from service robots to AI-powered reservation systems, the fundamental challenge remains constant: how to leverage these tools while preserving the essence of hospitality (Qiu *et al*., 2020; McCartney & McCartney, 2020). By aligning AI implementation with workers' mental models, managers can unlock the full potential of both their technology investments and their human capital. The restaurants that thrive in the AI era will be those that recognize technology as a tool for empowering people, not replacing them. The gap between AI's promise and its reality can be bridged, but only by understanding and respecting the mental models of those who bring hospitality to life every day.

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Corresponding author
Joel Reynolds can be contacted at: j.reynolds@depaul.edu