

## Ethical AI Personalization in Smart Hospitality Service Supply Chains: A Knowledge-Driven Model for Balancing Guest Experience and Autonomy

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### ABSTRACT

Hospitality services are increasingly delivered through digitally integrated service supply chains involving hotels, technology vendors, data analytics providers, platform developers, and facility operators. As AI-enabled personalization becomes embedded within smart built environments, ethical governance of information flows across these interconnected stakeholders becomes critical for sustainable service delivery and digital supply chain resilience. The proposed model is based on developing a theoretical model about ethical personalization by using Artificial Intelligence (AI) in the luxury tourism and hospitality industry. It seeks to balance enhanced guest experience with maintaining their autonomy and privacy. A quantitative descriptive analysis method was adopted along with Structural Equation Modeling (SEM). Data was collected from 380 frequent visitors to five-star hotels in Baghdad province. The empirical evidence supported all hypotheses. The findings revealed that guest perception of AI personalization has a positive and strong effect on perceived guest knowledge autonomy. Thus, guests view AI as a means of empowerment. The most important finding is the significant mediating role of perception of mitigating competence. The findings contribute to the emerging literature on digital service supply chain governance by demonstrating how ethical AI practices and organizational risk-mitigation capabilities support sustainable stakeholder relationships within smart hospitality ecosystems.

**Keywords:** Ethical AI Personalization, Digital Service Supply Chain, AI Governance, Smart Built Environment, Sustainable Supply Chain Governance, Guest Knowledge Autonomy, Digital Risk Management.

### INTRODUCTION

Artificial intelligence (AI) has become an integral part of our daily lives, permeating various aspects of modern technology, from cars and phones to smart homes, and contributing to the development of cities around the world, even in health sector such as helping visually impaired people (Słapczyński, 2022; Yalcin & Alisawi, 2025, 2026). AI technologies provide vital information about markets, competitors, and new business trends, supporting organizational decision-making, operational risk management, product design, customer relationship

improvement, complaint handling, and service development (Vudugula et al., 2023). The shift toward AI is not just about having the right technology; it also requires a leadership strategy and teams that understand the dynamics of changing markets and how to influence them (Sposato, 2024).

Smart hospitality infrastructure has rapidly expanded and matured (Mheidat et al., 2025), and now allows the hotel to become a digitally connected service ecosystem, with a complex service supply chain (Hasanein et al., 2026). Such supply chains include the participation of accommodation providers, AI vendors, cloud service providers, data analytics companies, facility management companies, and end-users (Seow et al., 2026). In such context, guest information is continuously exchanged between various employees to provide customized services and performance of operations. Therefore, the governance of AI-powered personalization is not just an issue of customer experience management (Turki, 2025); it is a risk-enabled governance of the digital supply chain, lead to information governance and sustainable risk management. Additionally, it is understood that ethical handling of these interrelated processes is essential to ensure the trust of stakeholders and sustainability in smart built environments.

The hospitality image shaped during the old days by travel agencies or even hotel marketing is now transformed by the user-generated content of the world wide web and e-commerce platforms (Polat et al., 2023). On the other hand, various recommended systems provide basic content analysis for big data, e.g. tourism shopping patterns at airports and comparison of travel behavior to new destination search by search engines (Paulino et al., 2021). The personal data/user profiling processing industries growing up have been always targeted on via un-enforceable consent usage as the inevitable risks as well as the ramifications brought about. The popularity of social media thus, undoubtedly is also a controversy on the business model in-between the legal accountability care and its interest choosing (Langer & Gruber, 2020). Personalization and profiling are almost grey in that behaviors are framed and tuned differently by different governments on privacy/security issues.

Proliferating profiling systems for making tourists more ‘discoverable’ and ‘interactable’ at destinations for personalized tourism services. Smart/Intelligent Tourism Destination has become popular as it provides tourists with necessary tailored services, e.g. tour planner, trip itinerary delivery, choosing the right transport mode, greeting-oriented hotel for family tourists and an amusement park ticketing service with queue tickets. In addition, the growing popularity of travel blogs and the eagerness of tourism stakeholders/end-users to share travel experience pictures take advantages of specific recommender systems for content matching capabilities to transfer user profiles from opinion analysis systems to tourism services provision systems (Wang & Yan, 2022).

The personal data/user profiling processing industries growing up have been always targeted on via un-enforceable consent usage as the inevitable risks as well as the ramifications brought about (Islam, 2023). Trust-worthy and morality-committed recommender systems are necessary when it goes far beyond conventional business boundary. Machine learning technologies, by virtue of complex models/datasets/training procedures, have been shown to be hard even for the best tech company to be comprehensible and interpretable (Taye, 2023). In short, when data is purifying “truth” by un-affordable data for conventional computation requirement, it could be time to face the question of data provenance rather than data illegibility

(Muller & Strohmayer, 2022). It rhymes with the morality of AI/robotics when seen as judgment devices for human affairs decisions (Alberts, 2022). Research on ethics is crucial for human-wellbeing concerns.

This article aims to develop a conceptual model for the ethical customization of AI in the luxury tourism and hospitality sector, with a focus on balancing the enhancement of the guest experience with the preservation of their autonomy and privacy. The article seeks to explore how brands can build an ethical technological ecosystem that supports sustainability and well-being and contributes to shaping a customer-centric social contract amid rapid technological developments and associated ethical concerns.

## LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

As the basis for information tools to support personalization decisions, AI technologies alter dynamic data gathering transformation, understanding, and contextualization processes (Rane et al., 2023). AI-driven inputs improve the models' reactions, augment human beings' behavior prediction and interpretation, and act as a counterpoint to emotional manipulation in digital environments (Wen & Imamizu, 2022). In Tourism and Hospitality settings, the personalization process is explained with regard to three stakeholders: organizations, travelers, and their socio-technical settings (Calvaresi et al., 2021). Understanding AI personalization requires addition of an ethical lens to traditional literature focusing on technology, organizations and travelers, or the interactions of these three entities (Dogru et al., 2023).

There is a need for flexible AI systems in Tourism and Hospitality that are driven largely by algorithmic and autonomous entities, but with some indispensable contributions from human agents. In order to avoid drawing the line in the wrong place, ethical rice architectures are necessary for the management of complex risks associated with AI in Tourism and Hospitality personalization (Ali & Ali, 2025).

Despite numerous research and expectations in burgeoning tourism and hospitality personalization, controlled knowledge is still lacking to explain how, why, and who personalizes in a degree that makes a difference, and to set a baseline against which impacts of new personalization development can be evaluated. The framing of personalization by time horizon, user access, stakeholder involvement, and characteristics is prominent in managerial practice and external information technology research. Emergent representations are addressed to gather and present user inputs for self-explanation, customer decision-delegation and prescriptive analytics-driven actions (Ren & Clement, 2024).

Despite a growing number of studies on AI, ethical dimensions of its application and consequences in hospitality and tourism contexts remain unexplored (Hernández-Tamurejo et al., 2025). This gap precludes comprehensive understanding of AI-driven personalization, preventing advancement of knowledge on the on-going AI revolution in such settings (Zhang & Lu, 2025). Impoverished comprehension could constrain effective action about unintended consequences, limits in data-driven dependency, and systematic biases and discrimination implications (Chen et al., 2023). Integrating knowledge on AI personalization in tourism and hospitality enables contextualization of ethically driven AI technological advancement and regulation, relevant for policy makers, industry leaders, and researchers on this growing topic (Ifenthaler et al., 2024).

## Ethical AI Governance in Digital Service Supply Chains

In the current era, artificial Intelligence (AI) is becoming a key driver of digitalization within the traditional hospitality business (Al-Romeedy, 2024; Dogru et al., 2023; Shin et al., 2025), making it into digitally connected service ecosystems, where value is co-created by multiple stakeholders. Hotels have increasingly come to depend on connected ecosystems with technology providers (Halkiopoulos & Koumparelis, 2020; Iqbal, 2024), cloud service vendors, data analytics firms, facility management operators, and customers to provide the hotels with personalized experiences and seamless guest experiences. These interactions build a digital service value chain in which information, knowledge and technological resources are constantly shared between the people involved. This means that the governance of AI personalization goes beyond merely ensuring that operations run smoothly and customers are satisfied. It is about ensuring transparency, accountability, data protection and ethical decision-making along the entire service supply chain.

Ethical AI Governance involves policies, practices, and mechanisms designed to govern AI systems transparently, fairly, securely, and in a way that is accountable (Biswas & Sarkar, 2026). In digital service supply chains, AI technologies gather, analyze, and process a lot of customer data to provide personalized recommendations and services (Omar et al., 2006; Won Lee et al., 2007). These features enhance the quality and speed of service, but also introduce issues about privacy violation, data abuse, algorithmic bias, and over-surveillance. Multiple stakeholders involved in data collection and processing add to the complexity of governance as ethical responsibilities are not limited to any one service provider but are shared across interconnected service providers. Thus, good governance structures should be in place to create accountability of the stakeholders, foster trust and minimize the risk of AI-based decision-making.

This notion of ethical AI governance is especially applicable in the context of smart built environments (Skeja & Sadiku-Dushi, 2025), such as smart hotels and intelligent tourism infrastructures, where digital technologies are intricately connected to the built structure. Such contexts require customized services in the context of integrated technological systems that rely on constant information flow between different stakeholders in the value chain. There is a need for organizations to consider the trade-offs between innovation and personalization advantages and the preservation of user autonomy and privacy to support sustainable management of these systems. In addition, organizations should build the skills necessary to address technical and ethical challenges by maintaining clear communication, responsible data handling, and stringent security measures. These ways boost stakeholder trust and help ensure the sustainability of digital service supply chains in the long run. Ethical AI governance, therefore, is crucial to building trust in technology-driven hospitality ecosystems, fostering responsible innovation, and building good stakeholder relationships.

### Theoretical ground

Tourism and Hospitality 4.0 are the empowering concepts of the tourist and hospitality industry's transformation via either disruptive or radical innovations. Such disruptive innovations encompass every ground-breaking technological development to devise the wave of introductions such as IoT, Big Data, Blockchain, Machine Learning, Natural Language Processing, Augmented & Virtual Reality, Bio-technology, and Digital Twin (Păvăloaia &

[Necula, 2023](#)). The Hotel 4.0 concept describes a firm or a group of firms' migration toward smart capabilities, smart strategy, and smart business model creativity mainly via the adoption of disruptive innovation in the tourism and hospitality industry ([Buhalis et al., 2024](#)).

AI has become the key development trend in the hotel, travel, and tourism industries as a disruptive technology providing benefits to astute operators in the form of ROI and customer experience upgrade ([Kong et al., 2022](#)). The growing interest of scholars and practitioners dedicated to hotel and tourist enterprise AI applications are in line with the recognized need by academic scholars.

Research streams have devoted dedicated scholarly attention to an array of AI implementations in tourism and hospitality: accommodations and customer experience provision; online customer assistance; virtual agent; assessment of customer sentiment; automatic summarization of hotel service assessments; reputation management; price estimation; demand prediction; identifying potential frauds; and examining illegal commercial dealings. Additionally, AI applications and associated issues in the industry can be discussed using various frameworks, models, and classifications ([Jagatheesaperumal et al., 2022](#)).

### Hypothesis development

Consideration of the ethics of AI as a technology for behavior manipulation and sociotechnical systems in which AI is embedded ([Al-Mamary & Alshammari, 2026](#)). Focusing specifically on AI systems that underpin markets and marketplaces, the following ethical issues should be addressed: (a) impact of AI on employed and freelance labor and (b) social issues connected to firms' AI usage and the technology's reliance on networks and infrastructure". Markets, marketplaces, and networks are organized economic cooperation and consist of agents, firms, and customers who typically have autonomously chosen goals. In and through this cooperation, traded or sold goods and services are jointly or competitively produced, distributed, and consumed ([Tran, 2026](#)). The network structure carries the hitherto-named aspects of a market and thus underpins it in the same way as a marketplace. AI is today referred to as encompassing a broad and diverse set of technologies and systems. "For the understanding of its ethics, however, the many different structures, tasks, and functions of AI need to be left aside and the concept should be treated as technologies for behavior analysis and manipulation" ([Blauth et al., 2022](#)). AI behaviors depend not on individual technologies but also on cumulative ones that enhance single ones on the ground of the network structure and market information ([Ifedayo et al., 2025](#); [Mohammed Wahab et al., 2022](#)). Using economics to boundary AI is a more promising avenue than using a fixed technology or any other scheme.

Developments in the understanding of AI as a technology for manipulation and sociotechnical systems in which AI will be embedded and the ethics that are implied by this understanding; steps that firms and other stakeholders can take to understand, design, and implement ethical AI. AI traditionally focuses on whether AI systems perform a limited task evenly compared to their human counterparts instead of market and market-like competition. "Recent ethical work largely drew attention to abuses, violations, or unintended consequences on moral philosophers' ethical principles but not whether behavior analysis and manipulation as such is ethical". Focusing on an agenda of ethical AI in the realm of knowledge society should satisfy companies' needs for robustness and reputation. Advised, ethical imperatives specify unresolved issues that AI technology indirectly raises in terms of a challenge to society, the

economy, and firms and that can deliberately be turned into stakeholder responsibilities, investment decisions, strategic priorities, guidelines for design and implementation, and technological alliances.

### Guest Perception of AI Personalization and Perceived Guest Knowledge Autonomy Relationship

It has been shown that hotels use the personalization of services through Artificial Intelligence (AI) by leveraging data from a person's personal information (Ifekanandu et al., 2023), which includes information that may be considered as private and sensitive. Privacy issues and the possibility for any misuse of data and discrimination when using AI personalization in hotels have become serious concerns. As hotels increasingly leverage AI technologies to enhance guest experience, it becomes crucial to balance the benefits of personalized services with the need to protect individual privacy and ensure fair treatment for all (Godolja et al., 2026). Understanding guests' perceptions of AI personalization ethics is crucial for hotel managers, developers, and hospitality researchers since guests will not accept and use AI services without a proper understanding of AC, rigorously testing the systems' understanding of applied data, and respect for ethical issues. Hotel guests' ethical concerns about AI personalization have been understudied despite the strong social impacts on guests, hotels, and society (Godolja et al., 2026). This study extends and contributes to hospitality research by investigating hotel guests' perception of AI Personalization Ethics and how perceived guest knowledge about AI personalization, which has not been studied, influence their perceived autonomy toward AI personalization.

In the context of tourism and hospitality, guest perception of AI personalization significantly influences their sense of autonomy and control over the guest experience (Godolja et al., 2026). This notion is because of the capability of AI in terms of anticipating needs and desires to provide customers with better experiences. Guests will feel more engaged with the AI systems when they get a feeling of being in control of their interaction, which improves their experience further. By giving them a feeling of being autonomous in their interactions with AI systems used in hospitality providers, the connection will become stronger, making them feel good about AI personalization and its role in the whole experience of traveling.

**H1:** There is a positive impact of Guest Perception of AI Personalization on Perceived Guest Knowledge Autonomy Relationship.

### Relevance of Recommendations and Perceived Guest Knowledge Autonomy relationship

As guests must deal with an overload of recommendations, they often cannot separate what might be relevant from the information flood. Hotel guests avoid repeating tasks but do not want to miss what might be relevant (Hasanein et al., 2026; Iqbal, 2024). Hence, the presentation of curated alternatives needs to be relevant in knowledge and style, tailored to the guest. Providing irrelevant knowledge may negatively impact guest experience and even lead guests to abandon or switch channels. On the guest side, a broad understanding of the destination, hotel services, and offerings is advantageous as it facilitates guest autonomy and avoids a feeling of being overwhelmed. However, if the advice from the system does not match the guest knowledge, the perception of guest autonomy may suffer, even leading to helplessness (Hasanein et al., 2026).

There is a lack of knowledge of how differences in knowledge impact the experience of advice relevance and how the interpretation of guest knowledge affects a personalized service's perceived influence on autonomy. Understanding the perspectives of those involved and working towards solving shifting knowledge barriers enables service providers to arrive at better-adapted personalization's. Hence, there is a need for research on the dual influence of knowledge on the perception of the guest experience and the tone of agent advice. Such research may also illuminate how conversational AI influences knowledge in hotel recommender systems in the first place. On the Guest Side, while being quite high with hotel systems, the knowledge is rather fragmented. In advance, many destinations offer are unknown, whereas, with respect to hotel offerings, knowledge may be divided into 100% expert, expert with respect to individual offerings, advanced, and basic knowledge. Thus, parameters that serve as indicators for the knowledge overlap between guests and recommenders need to be developed.

**H1a:** There is a positive impact of Relevance of Recommendations on Perceived Guest Knowledge Autonomy.

### Customization of Experience and Perceived Guest Knowledge Autonomy relationship

The reviewed literature indicated that marketing is focused on satisfaction and retention of real guests (Bisui et al., 2022), as well as density and competitiveness of hotels in the city as the objectives of hotel owners. Results showed the focus on social media marketing as a marketing strategy to meet marketing objectives. Marketing managers believe that positive feedback the hotel will receive will enhance the hotel's image and boost further business. Based on this postulate, marketing managers tend to focus on managing the hotel's image even if it's not applying to business gain. Automation in pricing and distribution is rarely applied, and traditional channels such as contractual corporate deals, GDSs, and third-party websites are still dominant. Social media is growing in importance, but it's not yet effectively managed. Future AI tools should support reputation management and ethical marketing (Kumar & Suthar, 2024) and create an opportunity for a better integration of on-line feedback into marketing and sales strategies. The perceived guest knowledge autonomy had no effect on the customization of experience. This finding suggests that the perceptions regarding guest independence in choosing the accommodation influence the marketing of the establishments' services, but it does not influence the personalization of the offered experience. While customers enjoy making their own decisions and controlling their online experience in terms of service consumption, it is unclear whether it is equally satisfying to present multiple alternatives. In fact, vendors may take the shape of an unappreciated overzealous seller, and their efforts may be perceived as intrusive. Customers were regarded as active service co-creators, but they were not interested in entering the design of meal preparation. As AI examples grow, the focus is shifting from personal preferences and ways to satisfy those to the values and ethics behind the growing prevarication of known information. This collateral issue is still ignored in the AI-contexts of hospitality and tourism (Paiva et al., 2019; Rajoana, 2018). The literature on guest knowledge autonomy is sparse, and the majority of studies relate to privacy. An important observation is that most concepts are applicable in both AI and traditional technology contexts, while others are more brand or tool specific. Such considerations may enhance theoretical frameworks across disciplines and contexts.

**H1b:** There is a positive impact of Customization of Experience on Perceived Guest Knowledge Autonomy.

### Awareness of AI Involvement and Perceived Guest Knowledge Autonomy relationship

To advance the goal of humanizing and demystifying AI, hotels or technology businesses should make the AI processes actionable, transparent, and controllable (Li et al., 2019). Hotel webpages or social media platforms may offer direct lines to data engineers and AI systems and allow guests to choose which inputs to engage or withdraw from. Regularly scheduled meetings with hotel or technology business representatives may be promoted for face-to-face interaction to obtain details about how AI systems arrive at the personalized content recommendations. AI systems can be made adaptive in that they offer default settings that could be seeking user feedback on their provider-independent performance (Li et al., 2019). For instance, feedback could be collected on personalization circulation metrics, guest involvement in data collection and modeling, or the true top-down emergence of highly rated hotel review content. Guests should be offered a variety of means through which they can opt out by which results are not personalized or which content personalization is at least temporarily frozen. After providing exposure to AI technologies, charged with either a personalization-laden or a control context, guests should be asked to answer the same survey items as used in the exposure stage to examine within-individual changes in KAS autonomy. Specific assessment of content Click-Through-Rate can be captured by looking at how much personal content guests engage with after exposure to pointed personalized recommendations.

In offering a combination of destination and hotel accommodation recommendation (Aujirapongpan & Pattanasing, 2020), a more decisive causal relation would be observed. When exploring the most significant comprehension of AI technology involvement on personal relevance, and inspiration dimensions, it may change across recommendations with a more decisive effect on hotel recommendation comprehension when compared to destinations. Additionally, demographic or psychographics can be screened contextually and traced to assess within-block differences in EA and perception index means and any interaction effects with AI involvement. These would be explored based on expected Poisson distribution patterns indicating ordinal scaling. Using acknowledged perceptual gaps between across-speaking cultures, and adapting research design and explicit items, disparities in adjustments to personalization and knowledge discrepancies can be further assessed.

**H1c:** There is a positive impact of Awareness\ AI Involvement on Perceived Guest Knowledge Autonomy.

### Intrusiveness and Perceived Guest Knowledge Autonomy relationship

The current research evaluates the ethical factors of Artificial Intelligence in Personalization (AIP) and guests' trust in hotels. Analyzing 21 different variables models, the Artificial Intelligence Trust Model in Personalization (AITMP) containing ethics, influences, and trust contextual factors. Considering the user-centric approach in the Artificial Intelligence Personalization (AIP) context in hotels is essential (Chakraborty et al., 2025; Saxena et al., 2024). Although these studies significantly impacted various industries, such as banking, application providers, and e-commerce, the hospitality industry has gained minimal attention. Given the significance of the hotel industry, the current study is among the first to extend and evaluate the ethics trust model in the personalization context in hotels.

With a growing number of hotels using AIP to enhance competitive advantages (Chakraborty et al., 2025), the ethical factors of AIP personalization and trust relationships with guests need to be understood. It is essential to look at the ethical factors within the contextual factors of AIP and prior trust research. The ethical framework of AIP and related contextual factors are evaluated, followed by the development and evaluation of the hypotheses regarding interactions with trust in hotels. Finally, the contributions and implications are discussed, including topics covered by hospitality research within the ethics AIP context. As trust in AIP is emphasized, research avenues concerning the hospitality context are presented.

By utilizing AIP, hotels aim to gain trust from third parties in the hospitality context (Chakraborty et al., 2025). Trust and ethics are fundamental to improving competitiveness and performance. Evaluation of the ethics-context-trust framework to gain insights into technology development in the hospitality industry is vital. The safety and security of computer systems, data, and networks aim to protect data against unauthorized access and functional disruption. Leveraging big data involves technical processes, software tools, and data analysis accuracy to develop actionable insights from massive and complex datasets. AIP requires assessment and development of high-quality personal recommendations or services. Currently, the self-disclosure-privacy knowledge-willingness to disclose personal information path from personalization to trust in hotels is considered an accurate conceptualization approach.

**H1d:** There is a positive impact of Intrusiveness on Perceived Guest Knowledge Autonomy relationship.

### Perceived Guest Knowledge Autonomy and Perceived Ethical Concerns relationship

In order to develop the perceived guest knowledge autonomy (Yu et al., 2025), it is necessary to distinguish the factors affecting it, namely, the perceived ethical concerns. It has been argued that with the advancement of technology, such as the customization of e-service, contextualization of e-service, the guest evolves from a passive recipient to an active producer (Sumartik et al., 2022). Thus, guests perceive an increased degree of knowledge autonomy in tourism and hospitality personalization. At the same time, ethical concerns arise due to the ignorance of privacy policies or hyper-personalization. Therefore, it is hypothesized that perceived ethical concerns have a negative effect on perceived guest knowledge autonomy.

The personalization of a website involves customizing its content according to the user's needs and expectations (Saxena et al., 2024). Web-based user activity, such as ratings, product purchase history, search history, and the context of use, is collected and transformed by leveraging artificial intelligence technologies to fit the guest's needs and requirements for luxury hotels. With the advent of advanced technologies such as data mining and machine learning, personalization has increased significantly in tourism and hospitality, shifting from demographic-based to behavioral-based personalization. By initiating, moderating, and responding to interactions, guests are empowered to create personal IDs that are often adopted in a wider context.

Recent research has shown that tourists perceive an increased degree of knowledge autonomy as tourism and hospitality personalization evolves, as tourists experience heightened perception regarding their possession of knowledge regarding self-defined preferences, as well as increased perception of freedom to express preferences and curtail interaction. Ethical concerns arise when organizations collect sensitive personal data regarding preferences and

characteristics and potentially be used for purposes beyond the original stated. In this context, such concerns could be attributed to the ignorance of privacy policies which tourists unwillingly agree to during the first usage of personal assistants, hyper-personalization, and potential risks of discrimination.

**H2:** There is a positive impact of Perceived Guest Knowledge Autonomy on Perceived Ethical Concerns.

### Guest Perception of AI Personalization and Perceived Ethical Concerns relationship

Contemporary competition in hospitality is keen, and hotels constantly increase customer experience by making it creative, unique, and memorable (Kim et al., 2020; Waari, 2019). New competition vectors arise fast on the market and become either trends or fads as fast. AI personalizes guest interaction and predicts the problems of your stay at the hotel. AI can increase customer loyalty, spending, satisfaction, or happiness, but there should be more transparency or even ethical regulation. Guest interaction with AI should be reasonable, comfortable, and ethical, and any personalization could be done based on culture and experience. Transparency should be stated during user engagement with AI, and any personalization must be clearly explained. It should be easy to opt out from personal preference or personal data acquisition. The guests should be able to use non-digital channels.

To make AI interaction ethically, it must be inclusive for all types of customers, cultures and experiences (Cañas, 2022). Transparency also should work differently and provide information on the level of the user's understanding. Notably, questions about what makes AI personalization ethical and how to become ethical AI for hotels have interviews with AI-aware experts. Researchers recommend hotels keep up with modern technology, study their advantages and disadvantages, apply AI software for usual activities, and implement it according to the hotel's target audience. AI systems are expected to become serious inhabitants of hotels, but still, they require close attentiveness to ethical concerns in their application.

AI technologies are a highly profitable business (Ma et al., 2024; Olsen, 2014; Parthasarathy et al., 2005), and hotels should pay attention to them as to a powerful tool to enhance guest experience and do marketing research. AI is a tool, and like any tool it could be used with profit or with losses, depending on the user's objectives. Commenting on the follow-up question of the research into what practical steps could be taken to ensure ethical AI personalization within hospitality, the responses from AI-aware experts were extremely interesting. AI personalized services for tourism and hospitality but do not know what would make AI personalization ethical. Some comments emphasized that AI technologies have many probabilities, but they need to be highly transparent about how they work, and what data and parameters are used personalizing services.

**H3:** There is direct relationship between Guest Perception of AI Personalization and Perceived Ethical Concerns relationship.

### The moderating role of Perception of Mitigating Factors between Perceived Guest Knowledge Autonomy and Perceived Ethical Concerns

This study analyzed the diverse dimensions of guest competence in relation to the hotel business with a special focus on finding ways of balancing the use of guest knowledge

autonomy and possible ethical questions surrounding such a process. Such an analysis is important in view of growing recognition of knowledge management as one of the key factors driving innovation and success in the hotel business today. As hotels are liminal spaces of transition and transgression, the analysis of guest competence becomes extremely important in helping hotels ensure both their efficiency and their ethical conduct. This study defines some of the boundaries which will allow hotels to take advantage of guest competence (Godolja et al., 2026; Yu et al., 2025) without compromising their operations and becoming victims of any possible ethical problems caused by the uncontrolled guest power. Guest competence affects not only services rendered in a hotel but also decisions made on ethical grounds. Indeed, the problem of ethics in the hotel business is of considerable concern due to many possible issues that may arise during a guest stay at a hotel. The issue of service sabotage and overpricing should be mentioned. To help resolve these ethical dilemmas, this study decided to explore how the issue of customer orientation can be used to boost hotel performance through innovation in service provision.

**H4:** Perception of Mitigating Competence Moderate the relationship between Perceived Guest Knowledge Autonomy and Perceived Ethical Concerns.

## RESEARCH METHOD AND RESULTS

A conceptual model was developed to explain the interaction between AI personalization, ethics, and guest empowerment in the context of hotels, using a descriptive analytical approach and quantitative data. A field study was conducted to collect data from a sample of frequent visitors to luxury hotels in Baghdad Province (Figure 1).

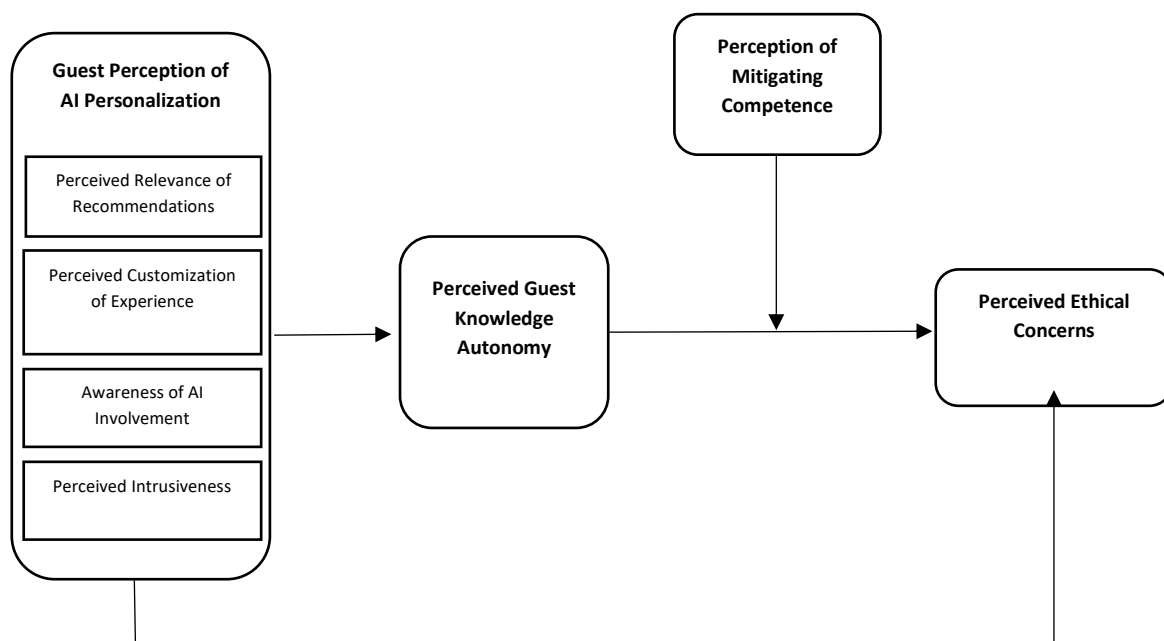


Figure 1: Conceptual models

## Data collection

Questionnaire was used in this research as the main instrument for data gathering. The items in this questionnaire have been designed based on analyzing previous studies in relation to the

impact of artificial intelligence on tourism and hospitality sectors. The degree of agreement with each statement in the questionnaire has been measured by a five-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly). In this study, the population comprised 380 customers of four five-star hotels in Baghdad: Al-Rashid Hotel, Al-Mansour Hotel, Palestine Hotel, and Baghdad Hotel. Guests' list and database have been considered as sampling frame of this study and participants are identified as frequent guests of those hotels. They are contacted by telephone, and other means, requesting them to participate in completing questionnaire. Because the total guests of these four hotels exceed 100,000, the size of sample has been estimated to be equal to 380 people taking into consideration the statistical requirements for the research as per Craig's statistical tables (1970: 608). For this purpose, 390 questionnaires have been distributed, 380 of them have been answered, which accounts for 97.44% of the respondents.

### Measurements items

Before proceeding with the analysis, the reliability of the scores was verified using Cronbach's alpha coefficient, where values exceeding 0.70 are considered statistically acceptable. The results confirmed that all study dimensions had high reliability, as the alpha coefficients for all variables were higher than the reference value of 0.70. For example, “perceived risk mitigation efficiency” scored the highest at 0.956, while “perceived experience personalization” scored 0.842 (Table 1). This confirms that the questionnaire items are internally consistent and reliably measurable across all dimensions covered by the study.

**Table 1: Reliability of study scale items**

Guest Perceptions of AI Personalization	Cronbach's alpha coefficient
Perceived Importance of Recommendations	0.954
Perceived Experience Personalization	0.842
AI Awareness	0.910
Perceived Intrusiveness	0.832
Perceived Guest Cognitive Autonomy	0.905
Perceived Ethical Concerns	0.891
Perceived Risk-Mitigating Efficiency	0.956

### Descriptive statistics

The demographic characteristics of the sample show that males represent the majority with 69.74%, while females account for 30.26%. As for age, the majority were in the 41-50 age group, accounting for 32.63%, followed by the 31-40 age group, accounting for 27.11%. In terms of educational qualifications, it was noted that the participants were highly educated, with the highest percentage holding a master's degree (31.84%), followed by a bachelor's degree (29.47%) and then a doctorate (28.42%). This sample is appropriate as it includes experienced consumers with extensive experience in hotel services, with 61.84% of them reporting that they had visited the hotels included in the study more than seven times.

In addition, the normal distribution of the data was tested by extracting the skewness and kurtosis coefficients. Based on the criterion, which considers values between +1.96 and -1.96 acceptable, the results confirmed that all study variables follow an appropriate normal distribution, as all skewness and kurtosis values fall within the acceptable range. For example, the variable

“perceived cognitive independence of the guest” recorded a skewness value of 1.715 and a kurtosis value of  $-1.544$ , both of which are within acceptable limits, thus fulfilling the crucial condition for performing parametric statistical tests (Tables 2,3).

**Table 2: Descriptive analysis of participants' opinions**

Guest Perceptions of AI Personalization	Mean	relative importance
Perceived Importance of Recommendations	3.543	70.9%
Perceived Experience Personalization	3.642	72.8%
AI Awareness	3.831	76.6%
Perceived Intrusiveness	3.761	75.2%
Perceived Guest Cognitive Autonomy	3.705	74.1%
Perceived Ethical Concerns	3.891	77.8%
Perceived Risk-Mitigating Efficiency	3.916	78.3%

**Table 3: Normal distribution of study scale items**

Guest Perceptions of AI Personalization	Kurtosis	Skewness
Perceived Importance of Recommendations	-1.651	0.914
Perceived Experience Personalization	-1.542	1.522
AI Awareness	-1.215	1.238
Perceived Intrusiveness	-1.761	1.412
Perceived Guest Cognitive Autonomy	-1.544	1.715
Perceived Ethical Concerns	-0.942	0.811
Perceived Risk-Mitigating Efficiency	-1.102	1.316

Descriptive analysis of participants' opinions revealed variation in the relative importance of variables. Perceived risk mitigation efficiency recorded the highest arithmetic mean of 3.916 and the highest relative importance of 78.3%, indicating guests' confidence in hotels' handling of potential risks associated with artificial intelligence. Perceived ethical concerns received came in second with an average of 3.891 and a relative importance of 77.8%, indicating tourists' awareness of ethical implications. The results also showed that tourists are well aware of the use of AI in hotels, with an average of 3.831, and that they do not consider the use of AI to be intrusive (with an average of 3.761). In addition, guests feel that they have autonomy in their decision-making (with an average of 3.705) and that the hotel personalization experience is useful (with an average of 3.642).

### Empirical estimations and results

Structural equation modeling (SEM) was applied using AMOS software to test the hypotheses and assumed relationships between the study variables. All tested hypotheses were accepted, based on two main criteria: a critical ratio (C.R.) greater than 1.96 and a P-value less than 0.05. The results of the path analysis showed a positive and strong statistically significant relationship between the perception of AI personalization and the cognitive autonomy of the guest ( $\beta=0.465$ ,  $P=0.000$ ), supporting hypothesis (H1). The results also indicated that cognitive autonomy positively influences ethical concerns ( $\beta=0.432$ ,  $P=0.000$ ), while perceived mitigation competence plays a negative and significant mediating role in influencing ethical concerns ( $\beta=-0.231$ ,  $P=0.000$ ), indicating its role in reducing ethical concerns (Figure 2).

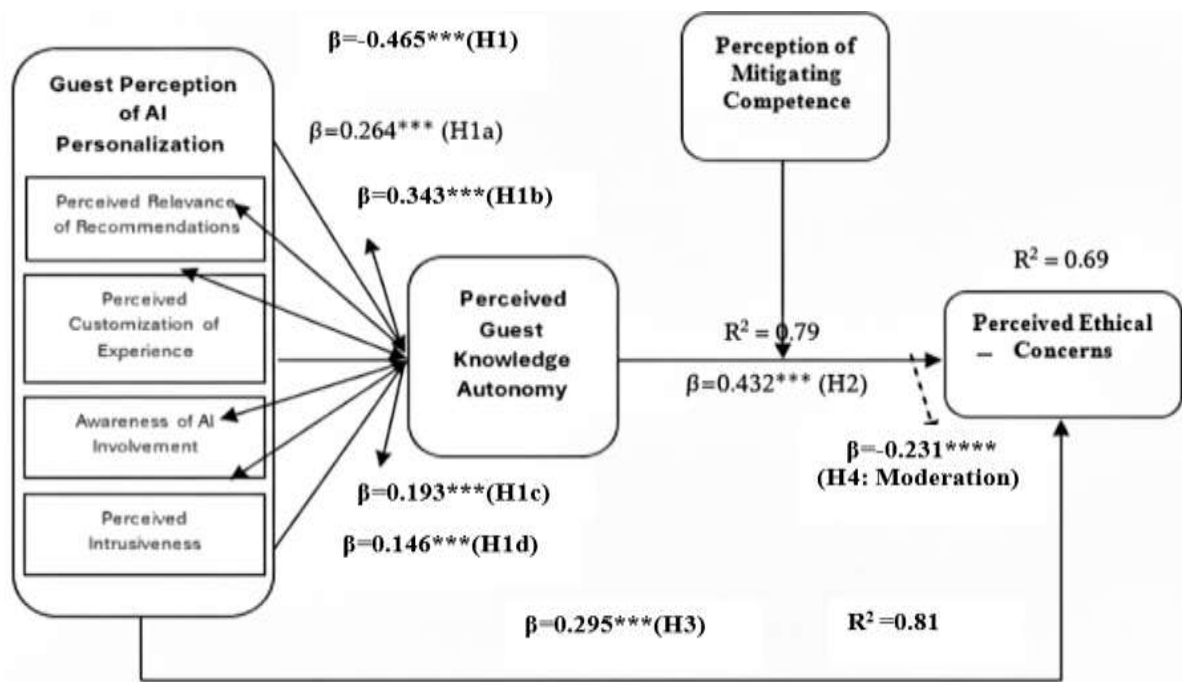


Figure 2: Results of Path Analysis and Hypothesis Testing

The Table below (Table 4) provides the findings of the path analysis for each of the study's hypotheses. It displays the major statistical values that illustrate the strength and weakness of the links between the variables.

Table 4: Shows the path analysis for each of the study's hypotheses.

Hypothesis	Path (Relationship)	(Standardized Beta)	Critical value (C.R.)	(P-value)	Decision
H1	Perception of AI Personalization -> Cognitive Autonomy	0.465	5.876	0.000	Accepted
H1a	Perceived Importance of Recommendations -> Cognitive Autonomy	0.264	5.213	0.000	Accepted
H1b	Perceived Experience Personalization -> Cognitive Autonomy	0.343	8.543**	0.000	Accepted
H1c	Awareness of AI -> Cognitive Autonomy	0.193	6.544**	0.000	Accepted
H1d	Perceived Intrusiveness -> Cognitive Autonomy	0.146	2.654*	0.012	Accepted
H2	Cognitive Autonomy -> Ethical Concerns	0.432	9.321**	0.000	Accepted
H3	Perception of AI Personalization -> Ethical Concerns	0.295	7.124**	0.000	Accepted
H4	Efficiency Mitigating Effect	-0.231	-7.335**	0.000	Decision

## EMPIRICAL DISCUSSION

The findings of this study can be interpreted through the lens of digital service supply chain governance. AI-enabled personalization is delivered through interactions among multiple stakeholders, including hotels, technology providers, data analytics firms, platform developers, and guests. The success of AI personalization relies not just on the technology itself, but also on how these service ecosystems are managed in an ethical way, with information flows and stakeholder relationships managed accordingly. Findings indicate that guests assess AI services by how they add value and maintain autonomy, privacy, and transparency. Hence, ethical AI personalization is a larger governance challenge in digital service supply chains that demands a balance between innovation goals and responsible data handling and accountability. The results also underscore the significance of organizational capacity for reducing ethical and operational dangers related to the implementation of AI, contributing to sustainable service provision in smart hospitality settings.

The empirical discussion of the field results confirmed all hypotheses. Regarding the main hypothesis (H1), a positive and strong effect of the perception of AI personalization on guest cognitive autonomy was found ( $\beta=0.465$ ). This confirms that guests do not view AI personalization as a restriction on their freedom (Batikh & Abdelnaby, 2025), but rather as a means of enabling them to make more informed and independent decisions.

The results of the sub-hypotheses for this relationship explain this effect, as perceived experience personalization had the strongest positive effect ( $\beta=0.343$ ), indicating that involving the guest in shaping their experience enhances their sense of control (Youssofi et al., 2023) and freedom. Awareness of artificial intelligence also had a positive effect ( $\beta=0.193$ ), as knowledge of how technology works gives guests greater cognitive freedom in their evaluation. Even perceived intrusiveness had a weak positive effect ( $\beta=0.146$ ), as awareness of the possibility of intrusiveness prompts guests to be more cautious and rely on their own judgments, increasing their cognitive independence as a protective mechanism.

Regarding hypothesis (H2), the guest's cognitive autonomy was the strongest direct influence on ethical concerns ( $\beta=0.432$ ). The greater the guest's awareness and ability to make decisions freely (Hassan & Eassa, 2025), the more sensitive they were to privacy and security issues. Hypothesis (H3) also confirmed that personalization through artificial intelligence directly raises ethical concerns ( $\beta=0.295$ ), as guests realize that intensive personalization requires continuous tracking and examination of their data. Finally, hypothesis (H4) showed that perceived mitigation effectiveness plays a significant negative mediating role ( $\beta=-0.231$ ), meaning that guests' confidence in the hotel's ability to manage and mitigate risks significantly reduces the ethical concerns they have due to cognitive awareness.

Perceived mitigating competence, as highlighted from a service supply chain point of view, emphasizes the need for governance mechanisms in digital risk management in interdependent hospitality service value chains. Collaboration among multiple technology and service providers is essential for AI-powered personalization, making it crucial for organizations to build trust, ensure transparency, and protect customer data. The results suggest that the adoption of sustainable AI in smart hospitality environments must be accompanied by innovations in technology, and by good coordination of stakeholders and ethical governance procedures in the wider digital service value chain.

## CONCLUSION

This study developed and empirically validated a conceptual model explaining the relationships among AI personalization, guest knowledge autonomy, ethical concerns, and mitigating competence within the hospitality service supply chains. Experience customization was the top dimension of AI personalization for increasing guest knowledge autonomy, underscoring the critical role of involving guests in their service experience. Additionally, the findings showed that a higher level of autonomy by guests leads to more awareness of ethical issues concerning privacy, transparency, and data security, highlighting that guests who are informed will be more conscious of the implications of AI-driven decision-making.

From a digital service supply chain point of view, the results indicate that personalization through AI is not limited to the customer experience management function but is also an overall governance problem with various parties involved such as hotel, technology providers, data analytics companies and platform operators. The sharing and processing of customer information on a distributed network of digitized services are increasingly essential for the successful provisioning of personalized services, and ethical governance is essential to sustain services and trust. The positive association between AI personalization and ethical issues suggests a need for a healthy mix between tech innovation and responsible data handling and communication.

The study also emphasizes the importance of reducing the level of competence to alleviate ethical issues. This is a significant moderating effect, highlighting the importance of guests' appreciation for organization skills in risk management, privacy protection, and ethical safeguards. To effectively implement AI personalization, it is essential to have advanced technological infrastructure, alongside robust governance frameworks that ensure accountability, transparency, and stakeholder trust. In general, the study adds to the existing body of knowledge in the field of ethical governance of AI and sustainable digital service supply chains in the smart hospitality sector by highlighting the potential for responsible AI use to improve guest experiences and sustainable stakeholder relationships.

### Implications of the Study

From the results, it can be concluded that service designers should focus on making use of AI as an instrument for empowering guests via a user-friendly and adaptive interface where guests can change the extent to which their experience can be personalized. In addition to making sure that recommendation algorithms are efficient in terms of both relevance and added value, hotels should introduce an option to give such recommendations in the form of advice that would enable guests to make informed choices. At the same time, it will be necessary to create advanced platforms for interactions to achieve highly personalized guest experience.

At the ethical level, there needs to be adopted a strategy of transparency with regard to AI technology used and let guests know when they communicate with a machine, as well as decrease the feeling of invasion into personal space by giving them explicit control over using smart devices in the room. Most importantly, hotels have to offer high standards of privacy and transparency in relation to processing guest's information, adopting a "minimum data" principle that would combine high-level personalization with adequate respect for personal privacy. This requires hotels to prove their ability to handle risks efficiently in terms of obtaining credible certificates and simplifying disclosures regarding the privacy policy.

## Limitations and Future Directions

This study has several limitations that provide opportunities for future research. One of the limitations of the study is that it was conducted with guests of luxury hotels in Baghdad only, reflecting a limited scope of the study and the results may not be generalized to other types of hotels and locations. Further research should be conducted into other countries, cultures and hospitality contexts to improve generalizability and provide for cross-cultural comparisons. Second, the study was a cross-sectional research design, limiting the ability to monitor the changes with respect to perceptions over time. Future studies could use longitudinal designs to explore changes in guest perception of the use of AI personalization and ethical issues as technology continues to become more widespread. Third, the model was mostly guest-centric, excluding the views of other partners in the digital service supply chain, including technology vendors, platform providers and facility management firms. Future research should take a multi-stakeholder perspective to understand governance issues and interactive risk management in networks of service supply chains. Last, the study focused on a restricted number of variables. The model could be further expanded in the future to include more constructs like trust, transparency, AI governance capability, digital resilience, stakeholder engagement, and sustainable supply chain performance to gain a deeper understanding of the ethical implementation of AI in smart hospitality environments.

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