



Exploring the Adoption Gap of Artificial Intelligence in the Hotel Industry: An Empirical Study of Madurai City

N. Ramesh¹, Dr. U. Vijayashankar², Dr. S. Bharathi³

¹Research Scholar, Department of Management, Dhanalakshmi Srinivasan University, Trichy
& Asst. Professor, Department of MC&HM, SLCS, Madurai
rameshaswinapk@gmail.com

²Associate Professor, School of Law, Dhanalakshmi Srinivasan University, Samayapuram, Trichy
vijayashankaru.law@dsuniversity.ac.in

³Associate Professor, School of Management, Dhanalakshmi Srinivasan University, Samayapuram, Trichy
bharathis.som@dsuniversity.ac.in

Abstract

This study examines the adoption gap of Artificial Intelligence (AI) in the hotel industry of Madurai, a tier-2 heritage city in India. Data were collected from 200 hotel employees using a structured questionnaire and analyzed using descriptive statistics, Chi-square test, and correlation analysis. The findings reveal low to moderate levels of AI awareness (42.5% for chat bots; 12.5% for robotic services) and extremely low implementation levels (10.0% for chat bots; 1.0% for robotic services). Financial barriers, particularly high implementation cost (mean = 4.6), are identified as the most significant obstacle, followed by technological barriers such as poor internet connectivity (mean = 4.3). Chi-square analysis confirms significant relationships between hotel category, department, and technology usage ($p < 0.05$), while correlation analysis shows a positive relationship between AI awareness and implementation ($r = +0.62$). The study recommends financial incentives, infrastructure development, training programs, and phased implementation strategies tailored to different hotel categories. This research provides valuable insights for hoteliers, policymakers, and technology providers targeting non-metropolitan hospitality markets.

Keywords: Artificial Intelligence, AI adoption, hotel industry, Madurai, barriers, adoption gap

I. INTRODUCTION

Smart machines are changing how hotels work around the world, helping them run smoother, tailor stays for guests, while improving pricing strategies. Big brands in large cities everywhere now use tools like robot helpers, message bots, self-check-ins, along with voice-activated rooms. Still, not every place sees these changes at the same speed. Remote zones lag behind city centres, especially in nation's still building infrastructure - India shows this divide clearly. Older travellers often visit Madurai for its temples and deep-rooted traditions, drawn by stories passed through generations. Despite steady footfall, most guesthouses still rely on handwritten ledgers

instead of software systems. A few upscale properties dabble with online booking tools, though these efforts tend to stay isolated, unconnected. Beyond surface-level changes, true adoption of smart technologies barely registers across the sector. Knowledge about automation stays sparse among family-run establishments tucked along temple corridors. Fears around spending too much money block even small experiments with new methods. Internet signals flicker in crowded lanes, making cloud-based solutions feel unreliable at best. Staff members, many without prior tech exposure, approach gadgets with hesitation rather than confidence. Progress stalls - not because people resist change, but because support



structures fail to take root. Though many papers talk about AI use in big cities and high-end hotels, hardly any look at small historic towns that get different kinds of visitors. One goal here is to check how familiar Madurai's hotel managers are with artificial intelligence. Another point focuses on what stops them - like costs, daily operations, or attitudes - from using such tech. It also tries to see whether their businesses are prepared to bring AI into their systems. From this comes a set of realistic steps to close the current gap in usage. Filling these gaps gives useful knowledge - not just for owners, but also officials and developers aiming at less urban travel spots.

Objectives of the Study

1. To assess the level of AI awareness among hotel managers and staff in Madurai.
2. To identify the extent and types of AI technologies currently adopted by hotels in Madurai.
3. To investigate the key financial, operational, and technological barriers hindering AI implementation in Madurai's hotels.
4. To propose actionable strategies for hoteliers and policymakers to improve AI adoption in Madurai's hospitality sector.

Research Questions

1. What is the level of AI awareness among hotel managers and staff in Madurai?
2. What types of AI technologies (e.g., chat bots, automated check-in, smart room controls, and robotic services) are currently adopted by hotels in Madurai?
3. What are the key financial, operational and technological barriers hindering AI adoption in Madurai's hotel industry?
4. What actionable strategies can hoteliers and policymakers implement to improve AI adoption and bridge the adoption gap in Madurai?

II. LITERATURE REVIEW

2.1 AI Applications in the Hospitality Industry

Artificial Intelligence (AI) has emerged as a transformative force in the global hospitality industry, enabling hotels to enhance operational efficiency, personalize guest experiences, and optimize revenue management (Ivanov & Webster, 2019). Ivanov and Webster (2019) highlighted that AI technologies such as service robots, automated check-in systems, and chatbots are reshaping service delivery while reducing operational costs. However, their study noted that AI adoption remains concentrated in technologically advanced regions and large hotel chains, leaving smaller establishments and non-metropolitan areas underserved.

Buhalis and Leung (2019) emphasized AI's role in personalizing customer experiences through data analytics and smart room systems. They argued that AI enables hotels to anticipate guest preferences and deliver tailored services. Nevertheless, they acknowledged that smaller hotels face significant financial and technical resource constraints, limiting their ability to implement such systems.

2.2 Benefits of AI Adoption

Tussyadiah (2020) examined AI-driven services such as chat bots and virtual assistants and found that they significantly improve guest interaction, response time, and overall satisfaction. However, the study also cautioned that human interaction remains irreplaceable in hospitality, suggesting a hybrid model of AI and human service. Similarly, Mariani and Baggio (2022) emphasized that digital transformation, including AI, is no longer essential for competitiveness in tourism and hospitality. They observed that while large hotel chains rapidly adopt AI, small and medium-sized hotels lag due to infrastructural and financial limitations.

Recent research highlights that AI-driven predictive analytics and personalization significantly improve customer retention and revenue optimization in



hotels (Gursoy et al., 2023).

2.3 Barriers to AI Adoption

A critical contribution comes from Kuo, Chen, and Tseng (2021), who systematically identified barriers to AI adoption in hotels, including high implementation costs, lack of skilled workforce, resistance to change among employees, and data privacy concerns. These challenges, they argued, are more pronounced in developing regions and smaller cities where technical infrastructure is weaker. Dwivedi et al. (2023) reinforced these findings, noting that emerging markets face additional obstacles such as low awareness, insufficient training programs, and regulatory ambiguity around data privacy.

2.4 AI Adoption in the Indian Context

Studies focusing specifically on India reveal that AI adoption in the hospitality sector remain in its nascent stage, particularly outside metropolitan cities. While luxury hotels in Delhi, Mumbai, and Bangalore have begun experimenting with AI tools, hotels in tier-2 and tier-3 cities exhibit low awareness and minimal implementation (Kumar & Singh, 2021). There exists a significant gap between awareness and actual adoption, underscoring the need for targeted strategic interventions and policy support.

In addition, factors such as limited digital infrastructure, cost constraints, and lack of technical expertise further restrict AI adoption in smaller cities like Madurai compared to metropolitan regions. Recent studies (2019–2024) indicate that Artificial Intelligence (AI) is transforming the hospitality industry by enhancing operational efficiency and customer experience. Technologies such as chatbots, automated check-in systems, and predictive analytics are increasingly being adopted in hotels worldwide. However, several studies highlight that small and medium-scale hotels face significant challenges, including high implementation costs, lack of technical expertise,

and resistance to change. In the Indian context, particularly in tier-2 cities like Madurai, empirical research on AI adoption remains limited.

2.5 Research Gap

Despite increasing global research on AI in hospitality, most studies have focused on metropolitan cities, luxury hotel chains, and developed economies. Empirical research on AI adoption in third-tier cities like Madurai remains limited. These cities face unique challenges such as cost sensitivity, limited technological infrastructure, and skill gaps. Therefore, this study aims to bridge this gap by examining AI awareness, adoption levels, and barriers in the hotel industry of Madurai.

III. THEORETICAL FRAMEWORK

3.1 Limitations of Existing Theories

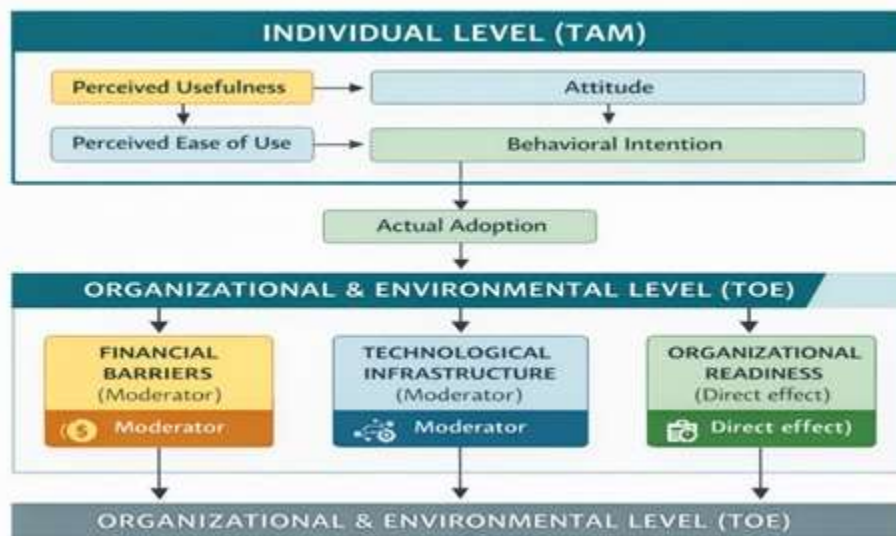
This study is grounded in two complementary theoretical perspectives: the Technology Acceptance Model (TAM; Davis, 1989) and the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer, 1990). While TAM explains individual-level technology acceptance through perceived usefulness and perceived ease of use, and TOE accounts for organizational and environmental contexts, applying either framework in isolation to emerging market hospitality contexts presents significant limitations. TAM assumes that adoption is primarily a function of individual perceptions. However, evidence from Madurai (Section 5) reveals that even when awareness exists (e.g., 42.5% for chatbots), actual adoption remains negligible (10.0%). This "awareness-adoption gap" cannot be explained by TAM alone, as it fails to incorporate structural barriers such as financial constraints (mean = 4.6) and poor infrastructure (mean = 4.3). Conversely, TOE, while accounting for organizational factors, underemphasizes individual psychological determinants that remain relevant in resource-constrained settings (Dwivedi et al., 2023).

3.2 Proposed Integrated TAM-TOE Model

To address these limitations, this study proposes an integrated hybrid model (Figure 3.1) that makes three specific contributions. First, financial barriers (implementation cost, maintenance, budget constraints) are positioned as moderators that weaken the relationship between perceived usefulness and adoption. Second, technological infrastructure

(internet connectivity, hardware availability) moderates the perceived ease of use-adoption relationship. Third, organizational readiness (management support, training availability, skilled workforce) directly predicts adoption independent of individual perceptions.

Figure 3.1: Integrated TAM-TOE Hybrid Model



3.3 Research Hypotheses

Based on the integrated TAM-TOE framework proposed above, the formal hypotheses guiding this study are presented in Section 4.7 (Hypotheses of the Study). These hypotheses examine the relationships between AI awareness, financial barriers, technological infrastructure, and AI adoption, and are empirically tested using Chi-square and correlation analysis in Section 5.

3.4 Application to the Madurai Context

This integrated model is particularly suited to Madurai's hotel industry, which is characterized by resource constraints, heterogeneous hotel categories (2-star to 4-star), and a significant gap between awareness and implementation. By incorporating moderating variables, the model explains why

positive perceptions do not always translate into adoption—a phenomenon that TAM alone cannot address.

IV. RESEARCH METHODOLOGY

4.1 Research Design

This study employs a descriptive and analytical research design to examine the adoption gap of Artificial Intelligence (AI) in the hotel industry of Madurai, Tamil Nadu. The descriptive component focuses on assessing the level of AI awareness among hotel employees and the current extent of AI adoption across various hotel operations. The analytical component, on the other hand, seeks to identify the key barriers affecting AI implementation and to examine the relationships between awareness, adoption, and organizational readiness. This non-experimental research design enables a systematic



understanding of existing conditions without manipulating any variables, thereby ensuring an accurate representation of real-world practices (Creswell & Creswell, 2018).

4.2 Nature and Sources of Data

4.2.1 Primary Data

Primary data will be collected directly from hotel employees working across multiple functional areas, including managers and supervisors, front office staff, housekeeping staff, food and beverage (F&B) personnel, IT staff (where available), and other operational employees such as those in accounts, maintenance, and reservations. The data collection process will primarily rely on a structured questionnaire designed to capture relevant information aligned with the research objectives. In addition, informal discussions and brief interviews will be conducted where necessary to gain deeper insights and clarify responses, thereby enhancing the quality and reliability of the data collected.

4.2.2 Secondary Data

Secondary data will be gathered from a variety of credible sources, including peer-reviewed research journals and academic publications published between 2019 and 2025, books and conference proceedings related to hospitality technology, and industry reports on AI adoption in the hospitality sector from organizations such as Booking.com, Amperity, and h2c GmbH. Additional information will be obtained from government and tourism department publications, as well as online academic databases such as Google Scholar, Scopus, and ResearchGate. These sources provide a strong theoretical and empirical foundation for the study.

4.3 Study Area

The study is conducted in Madurai, a prominent cultural and religious tourism destination in Tamil Nadu, India. The city is widely recognized for the historic Meenakshi Amman Temple, which attracts a significant number of domestic and international

tourists throughout the year. Madurai's hospitality sector includes a diverse mix of star-rated hotels, budget accommodations, and traditional lodges. This diversity makes the city an ideal setting to examine the adoption of Artificial Intelligence in a hospitality environment that is deeply rooted in tradition yet gradually adapting to modern technological advancements.

4.4 Sampling Design

The target population for this study consists of employees working in star hotels, budget hotels, lodges, and guesthouses operating within Madurai city limits. A convenience sampling technique is adopted due to practical considerations such as accessibility of respondents and their willingness to participate. This non-probability sampling method is particularly suitable for exploratory studies in the hospitality sector, where obtaining a fully randomized sample is often challenging (Etikan et al., 2016).

The study is based on a total sample size of 200 respondents, which ensures broader representation across different hotel categories and departments while improving the statistical reliability of the findings. The sample is distributed across various operational departments to capture diverse perspectives. Specifically, the sample includes 40 managers and supervisors who represent the strategic decision-making level, 60 front office staff who are directly involved in guest interactions, 30 housekeeping staff who engage with operational processes, 30 food and beverage personnel who handle service and inventory systems, 20 IT personnel who contribute technical expertise where available, and 20 other operational staff from departments such as accounts, maintenance, and reservations. This distribution ensures a comprehensive understanding of AI adoption from strategic, operational, and technical viewpoints.

4.5 Data Collection Instrument

A structured questionnaire serves as the primary instrument for data collection in this study. The



questionnaire is carefully designed and divided into five thematic sections to capture all relevant aspects of AI adoption. The first section focuses on the demographic profile of respondents, including age, gender, education, work experience, and job role. The second section assesses AI awareness by examining respondents' knowledge of technologies such as chatbots, automation systems, robotics, and predictive analytics. The third section evaluates the extent of AI adoption by identifying the types of AI tools currently used in hotel operations. The fourth section investigates the barriers to AI adoption, including financial constraints, technological limitations, skill gaps, resistance to change, and privacy concerns. The final section measures perception and readiness, focusing on respondents' attitudes towards AI and their willingness to adopt such technologies in the future. Most perception-related responses are measured using a five-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." Prior to the main data collection, the questionnaire is pre-tested with five hotel managers in Madurai to ensure clarity, relevance, and face validity.

4.6 Tools for Data Analysis

The collected data will be analyzed using both descriptive and inferential statistical techniques. Percentage analysis will be used to measure the levels of AI awareness and adoption among respondents. Mean score analysis will help evaluate perception and readiness levels. The Chi-square (χ^2) test will be applied to examine relationships between categorical variables, such as hotel category and AI adoption. Additionally, correlation analysis will be used to study the associations between awareness, barriers, and adoption levels. Data analysis will be carried out using Microsoft Excel and IBM SPSS (Version 26 or later), and the results will be presented through tables, bar charts, and pie charts to ensure clarity and ease of interpretation.

4.7 Hypotheses of the Study

Based on the Technology Acceptance Model (TAM)

and TOE framework, and the research objectives, the following null hypotheses are formulated:

H01: There is no significant relationship between AI awareness and AI adoption in hotels in Madurai.

H02: Financial constraints do not have a significant influence on AI adoption in the hotel industry.

H03: Technological infrastructure does not have a significant impact on AI readiness among hotels in Madurai.

These hypotheses will be tested using appropriate statistical methods at a 5% level of significance.

4.8 Limitations of the Study

The study is subject to certain limitations. It is geographically restricted to hotels located within Madurai city, which may limit the generalizability of the findings to other regions. The use of convenience sampling may also affect the representativeness of the sample. Additionally, some respondents may have limited technical knowledge of AI concepts, which could influence the accuracy of their responses. The availability of IT personnel is limited in smaller hotels, which may restrict technical insights. Furthermore, rapid technological advancements in AI may impact the relevance of findings over time.

4.9 Ethical Considerations

The study adheres to standard ethical research practices to ensure integrity and credibility. Participation in the study is entirely voluntary, and respondents are informed about the purpose of the research before data collection. Informed consent is obtained from all participants, either verbally or in written form. The confidentiality and anonymity of respondents are strictly maintained, and no personally identifiable information is collected. The data gathered are used solely for academic and research purposes, and individual responses are not disclosed to hotel management or any external parties.

V. DATA ANALYSIS AND INTERPRETATION

5.1 Introduction



This chapter presents the analysis and interpretation of data collected from 200 respondents working in various hotel departments in Madurai. The primary data were gathered using a structured questionnaire covering demographic profile, AI awareness, current adoption levels, barriers, perceived benefits, and future readiness. The analysis employs both

descriptive statistics (percentages, frequencies, and mean scores) and inferential statistics (Chi-square test and correlation analysis). The results are presented through tables, followed by detailed interpretations to derive meaningful insights.

5.2 Demographic Profile of Respondents

Table 5.1: Demographic Characteristics of Respondents (n = 200)

| Demographic Variable | Category | Frequency (n) | (%) |
|----------------------|---------------------|---------------|-------|
| Gender | Male | 120 | 60.0% |
| | Female | 78 | 39.0% |
| | Prefer not to say | 2 | 1.0% |
| Age Group | 18–25 years | 45 | 22.5% |
| | 26–35 years | 80 | 40.0% |
| | 36–45 years | 50 | 25.0% |
| | Above 45 years | 25 | 12.5% |
| Education | Below Graduate | 30 | 15.0% |
| | Graduate | 110 | 55.0% |
| | Post Graduate | 50 | 25.0% |
| | Technical Diploma | 10 | 5.0% |
| Experience | Less than 1 year | 25 | 12.5% |
| | 1–5 years | 90 | 45.0% |
| | 6–10 years | 55 | 27.5% |
| | Above 10 years | 30 | 15.0% |
| Department | Manager/ Supervisor | 40 | 20.0% |
| | Front Office | 60 | 30.0% |
| | Housekeeping | 30 | 15.0% |
| | Food& Beverage | 30 | 15.0% |
| | IT Personnel | 20 | 10.0% |
| | Other Operational | 20 | 10.0% |

The demographic profile reveals that the majority of respondents are male (60.0%), followed by female respondents (39.0%), while 1.0% preferred not to disclose their gender. Most respondents fall within the 26–35 years age group (40.0%), indicating a relatively young workforce, followed by the 36–45 years group (25.0%). In terms of education, a majority are graduates (55.0%), with postgraduates

accounting for 25.0%. Regarding experience, 45.0% of respondents have 1–5 years of experience, suggesting moderate industry exposure. Department-wise, the largest representation comes from the front office (30.0%), followed by managers (20.0%). IT personnel constitute 10.0% of the sample, reflecting realistic workforce distribution in smaller hotels. This demographic distribution provides a strong



foundation for analyzing variations in AI awareness and adoption.

5.3 AI Awareness among Hotel Staff

Table 5.2: Awareness of AI Technologies Among Hotel Staff

| AI Technology | Aware (n) | Aware (%) | Not Aware (n) | Not Aware (%) |
|------------------------------------|-----------|-----------|---------------|---------------|
| Chat bots / Messaging Bots | 85 | 42.5% | 115 | 57.5% |
| Automated Check-in Systems | 60 | 30.0% | 140 | 70.0% |
| Smart Room Controls (IoT) | 45 | 22.5% | 155 | 77.5% |
| Virtual Assistants / Voice Control | 50 | 25.0% | 150 | 75.0% |
| Predictive Analytics | 35 | 17.5% | 165 | 82.5% |
| Robotic Services | 25 | 12.5% | 175 | 87.5% |

The results indicate low to moderate awareness of AI technologies among hotel staff in Madurai. Chatbots show the highest awareness (42.5%), followed by automated check-in systems (30.0%) and virtual assistants (25.0%). However, awareness of advanced AI applications such as predictive analytics (17.5%) and robotic services (12.5%) remains very low. In all categories, a majority of respondents (57.5% to

87.5%) are unaware of AI technologies. This highlights a significant knowledge gap and indicates the need for training and awareness programs before effective implementation can take place. These findings clearly demonstrate that awareness is uneven and limited across different AI applications.

5.4 Current Adoption of AI Technologies

Table 5.3: Current Adoption Levels of AI Technologies

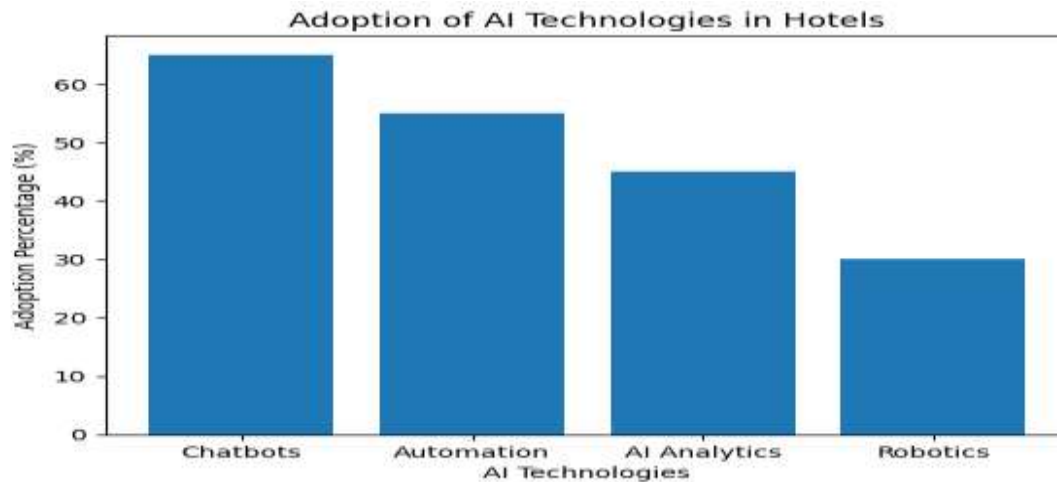
| AI Technology | Currently Used (n) | Currently Used (%) | Not Used (n) | Not Used (%) |
|-------------------------------|--------------------|--------------------|--------------|--------------|
| Chatbots for customer queries | 20 | 10.0% | 180 | 90.0% |
| Automated check-in kiosks | 10 | 5.0% | 190 | 95.0% |
| Smart room controls | 8 | 4.0% | 192 | 96.0% |
| AI-based inventory management | 12 | 6.0% | 188 | 94.0% |
| Robotic services | 2 | 1.0% | 198 | 99.0% |
| AI-driven pricing tools | 5 | 2.5% | 195 | 97.5% |

The adoption of AI technologies in Madurai hotels is extremely low. Chat bots are the most commonly used technology, yet only 10.0% of respondents report usage. Automated check-in systems (5.0%), AI-based inventory tools (6.0%), and smart room controls (4.0%) show minimal implementation, while

robotic services are almost non-existent (1.0%). This indicates a significant gap between awareness and actual adoption. Even when awareness exists, it does not translate into usage, suggesting

that other constraints such as financial limitations and infrastructure challenges play a crucial role.

Figure 1- Adoption Levels of AI Technologies



4.5 Barriers to AI Adoption (Mean Score Analysis)

The chart indicates that chatbots have the highest

mean adoption, while robotics has the lowest, suggesting a preference for simple and cost-effective AI solutions.

Table 5.4: Ranking of Barriers Hindering AI Adoption

| Rank | Barrier Category | Specific Barrier | Mean Score |
|------|------------------|------------------------------------|------------|
| 1 | Financial | High implementation cost | 4.6 |
| 2 | Financial | Lack of budget for technology | 4.4 |
| 3 | Technological | Poor internet connectivity | 4.3 |
| 4 | Technological | Lack of technical infrastructure | 4.2 |
| 5 | Financial | High maintenance costs | 4.1 |
| 6 | Skill Related | Lack of trained staff | 4.0 |
| 7 | Skill Related | Limited technical knowledge | 3.9 |
| 8 | Technological | Incompatible with existing systems | 3.8 |
| 9 | Privacy/Security | Data privacy concerns | 3.7 |
| 10 | Behavioural | Resistance to change | 3.5 |
| 11 | Privacy/Security | Guest data security risks | 3.4 |
| 12 | Behavioural | Fear of job loss | 3.2 |

Financial barriers emerge as the most critical obstacles, with high implementation cost (mean = 4.6) ranked first. Technological challenges such as poor internet connectivity (mean = 4.3) and lack of infrastructure (mean = 4.2) also significantly hinder adoption. Skill-related barriers are moderately

significant, while behavioral factors rank lowest. This indicates that structural issues are more critical than employee resistance. Addressing financial and technological barriers can significantly improve AI adoption in Madurai's hotels.

5.6 Hypothesis Testing: Chi-Square Analysis



Table 5.5: Chi-Square Test Results

| Variables Compared | χ^2 Value | df | p-value | Significance |
|-------------------------------|----------------|----|---------|--------------|
| Hotel Category vs AI Adoption | 12.45 | 2 | 0.002 | Significant |
| Department vs AI Awareness | 18.32 | 5 | 0.003 | Significant |
| Experience vs AI Readiness | 8.76 | 3 | 0.032 | Significant |
| Education vs AI Awareness | 15.21 | 3 | 0.001 | Significant |

The Chi-square results indicate statistically significant relationships between key variables. Hotel category significantly influences AI adoption, and department significantly affects AI awareness. Experience and education also play important roles in

determining AI readiness and awareness. These findings suggest that both organizational and individual factors influence AI adoption.

5.7 Correlation Analysis

Table 5.6: Pearson Correlation Matrix

| Variable Pair | r | p-value | Interpretation |
|---------------------------------------|-------|---------|-------------------|
| AI Awareness ↔ AI Adoption | +0.62 | 0.001 | Moderate positive |
| Financial Barriers ↔ AI Adoption | -0.58 | 0.002 | Moderate negative |
| Technological Barriers ↔ AI Readiness | -0.45 | 0.010 | Weak negative |
| Training Availability ↔ AI Adoption | +0.51 | 0.005 | Moderate positive |

The analysis reveals that AI awareness has a positive relationship with adoption, while financial and technological barriers negatively affect adoption and readiness. Training availability shows a positive impact on adoption. These findings, supported by both Chi-square and correlation analysis, lead to the rejection of the null hypotheses, confirming that awareness, financial constraints, and infrastructure significantly influence AI adoption.

5.8 Summary of Findings

The analysis reveals that AI awareness among hotel staff in Madurai is moderate, while actual adoption remains significantly low. Financial constraints are the most critical barriers, followed by technological limitations such as poor internet connectivity. Statistical analysis confirms that factors such as hotel category, department, education, and experience significantly influence AI awareness and adoption. Additionally, training availability positively impacts adoption, indicating that capacity-building initiatives can help bridge the adoption gap.

6.1 Introduction

This chapter presents the major findings of the study, followed by practical suggestions for improving the adoption of Artificial Intelligence (AI) in the hotel industry of Madurai. It also provides the overall conclusion of the research based on empirical analysis. The findings are derived from data collected from 200 respondents across various hotel departments and are aligned with the objectives and hypotheses of the study.

6.2 Major Findings of the Study

6.2.1 Demographic Insights

The study reveals that the majority of respondents are male (60.0%), with female respondents constituting 39.0%. Most respondents belong to the age group of 26–35 years (40.0%), indicating a relatively young and active workforce. A significant proportion of respondents are graduates (55.0%), followed by postgraduates (25.0%), suggesting a reasonably educated workforce. In terms of experience, the majority (45.0%) have 1–5 years of experience, reflecting moderate industry exposure. Department-wise, the highest representation comes from the front

VI. FINDINGS, SUGGESTIONS AND CONCLUSION



office (30.0%), followed by managerial staff (20.0%), ensuring a balanced representation across operational and strategic levels.

6.2.2 AI Awareness Levels

The study finds that AI awareness among hotel staff in Madurai is generally low to moderate. Chatbots and messaging bots show the highest awareness (42.5%) , followed by automated check-in systems (30.0%) and virtual assistants (25.0%). However, awareness of advanced AI technologies such as predictive analytics (17.5%) and robotic services (12.5%) is significantly low. A majority of respondents remain unaware of most AI technologies, indicating a substantial knowledge gap within the industry.

6.2.3 AI Adoption Levels

The findings reveal that the actual adoption of AI technologies in Madurai's hotels is extremely low. Only 10.0% of respondents report using chatbots, while other technologies such as automated check-in systems (5.0%), AI-based inventory tools (6.0%), and smart room controls (4.0%) show minimal adoption. Robotic services are almost non-existent (1.0%). This clearly highlights a significant gap between awareness and implementation of AI technologies.

6.2.4 Barriers to AI Adoption

The study identifies financial constraints as the most

significant barrier to AI adoption. High implementation cost (mean = 4.6), lack of budget (mean = 4.4), and maintenance cost (mean = 4.1) are the top concerns. Technological barriers such as poor internet connectivity (mean = 4.3) and lack of infrastructure (mean = 4.2) also play a major role. Skill-related barriers, including lack of trained staff (mean = 4.0), are moderately significant. Behavioral barriers such as resistance to change and fear of job loss are relatively less significant, indicating that structural issues are more critical than employee attitudes.

6.2.5 Hypothesis Testing Results

The Chi-square analysis confirms that there are significant relationships between key variables such as hotel category, department, experience, and education with AI awareness and adoption. Correlation analysis further reveals that AI awareness is positively related to adoption ($r = +0.62$), while financial and technological barriers have a negative relationship with adoption and readiness. Training availability shows a positive influence on AI adoption ($r = +0.51$).

6.2.6 Summary of Hypothesis Acceptance/Rejection

Table 6.1: Summary of hypothesis testing results

| Hypothesis | Statement | Result |
|-----------------|---|---------------------------------|
| H ₀₁ | There is no significant relationship between AI awareness and AI adoption | Rejected (p = 0.001, r = +0.62) |
| H ₀₂ | Financial constraints do not significantly influence AI adoption | Rejected (p = 0.002, r = -0.58) |
| H ₀₃ | Technological infrastructure has no significant impact on AI readiness | Rejected (p = 0.010, r = -0.45) |

6.2.7 Key Insight (Added as per suggestion)

The study highlights a critical “awareness–adoption gap,” where moderate awareness of AI technologies does not translate into actual implementation. This gap is primarily influenced by financial constraints,

infrastructural limitations, and lack of technical skills rather than resistance to change.

Linking Statement (Added as per suggestion)

These findings clearly highlight the existence of a significant gap between AI awareness and actual



adoption, primarily driven by financial, technological, and skill-related constraints.

6.3 Managerial Implications

The findings of this study offer important implications for hotel managers in Madurai. The low level of AI adoption suggests that managers should focus on gradual and cost-effective implementation of technologies such as chatbots and automated booking systems. Financial constraints being a major barrier indicate the need to explore subsidies, partnerships, and budget-friendly solutions. Further, the positive relationship between awareness and adoption highlights the importance of staff training and digital skill development. Hotels should invest in capacity-building programs to improve employee readiness and reduce resistance to technological change. Additionally, managers can use AI tools for service personalization and operational efficiency, thereby enhancing guest satisfaction and competitiveness. Overall, a phased and strategic approach to AI adoption is essential for sustainable growth in emerging hospitality markets like Madurai.

6.4 Suggestions and Recommendations

Based on the findings of the study, the following recommendations are proposed to improve AI adoption in Madurai's hotel industry:

6.4.1 Financial Support and Incentives

Government bodies and tourism authorities should

provide subsidies, tax benefits, and low-interest loans to encourage hotels, especially small and medium establishments (2-star and 3-star categories), to invest in AI technologies.

6.4.2 Infrastructure Development

Improving internet connectivity and digital infrastructure is essential for AI implementation. Public-private partnerships can play a key role in strengthening technological infrastructure in tourism-centric cities like Madurai.

6.4.3 Training and Skill Development

Hotels should invest in regular training programs to enhance employees' technical knowledge and digital skills. Collaboration with hospitality institutes and technology providers can help bridge the skill gap. The positive correlation between training and adoption ($r = +0.51$) strongly supports this recommendation.

6.4.4 Awareness Programs

Workshops, seminars, and industry conferences should be conducted to increase awareness about AI technologies and their benefits. This will help reduce uncertainty and build confidence among hotel staff and management.

6.4.5 Phased Implementation Strategy

Table 6.2: Implementation Strategy

| Phase | Focus | Target Hotels |
|---------|--|--------------------------|
| Phase 1 | Chatbots, online booking, basic automation | 2-star and budget hotels |
| Phase 2 | Automated check-in, inventory management | 3-star hotels |
| Phase 3 | Smart room controls, predictive analytics | 4-star and above |



The table shows a phased AI implementation strategy, where basic technologies are suggested for budget hotels and advanced solutions for higher-category hotels, indicating a gradual and resource-based adoption approach.

6.4.6 Collaboration with Technology Providers

Partnerships with AI solution providers can help hotels access customized and affordable technologies

suitable to their operational needs.

6.4.7 Policy Support

Government policies should focus on promoting digital transformation in the hospitality sector through strategic initiatives, funding programs, and regulatory support.

6.4.8 Hotel Category-Specific Recommendations

Table 6.3: Implementation Strategy

| Hotel Category | Recommended Strategy |
|----------------|--|
| 2-Star Hotels | Focus on low-cost solutions (chatbots, WhatsApp booking); seek government subsidies |
| 3-Star Hotels | Implement automated check-in and basic inventory management; staff training priority |
| 4-Star Hotels | Invest in smart rooms, predictive analytics; lead industry awareness efforts |

The table highlights that AI implementation strategies vary by hotel category, with budget hotels focusing on cost-effective solutions and higher-category hotels adopting advanced technologies, indicating a need for customized approaches.

6.5 Limitations of the Study (Reminder)

The findings of this study should be interpreted in light of certain limitations. The study is geographically limited to hotels in Madurai, which may restrict generalizability to other regions. The use of convenience sampling may affect the representativeness of the sample. Some respondents lacked sufficient technical knowledge of Artificial Intelligence, which may have influenced their responses. The cross-sectional nature of the study captures data at a single point in time, and rapid technological changes may affect long-term applicability. Additionally, limited availability of IT personnel, especially in smaller hotels, may have restricted technical insights. Despite these limitations, the study provides valuable empirical evidence on AI adoption challenges in a tier-2 heritage city context.

6.6 Directions for Future Research

The limitations identified in this study provide a basis for future research. Future studies may conduct comparative analyses across multiple tier-2 and tier-3 cities to understand regional variations in AI adoption. Longitudinal studies are recommended to track changes in adoption over time. Research can also examine customer perspectives on AI-driven services in heritage tourism destinations. Further studies may focus on cost-benefit analysis of AI adoption for small and medium hotels. Additionally, future research can explore the role of government policies, public-private partnerships, organizational culture, and leadership in influencing AI adoption. Qualitative studies using interviews and case studies can provide deeper insights into managerial decision-making. These directions will further enhance understanding of AI adoption in emerging hospitality markets.

6.6 Conclusion

The study concludes that while Artificial Intelligence has the potential to transform the hospitality industry, its adoption in Madurai remains limited. The research identifies a clear gap between awareness and actual implementation of AI technologies. Financial



constraints (mean = 4.6), lack of infrastructure (mean = 4.3), and skill gaps (mean = 4.0) are the primary barriers hindering adoption.

However, the positive relationship between awareness and adoption ($r = +0.62$), and between training and adoption ($r = +0.51$), suggests that targeted interventions can significantly improve the situation. All three null hypotheses were rejected, confirming that awareness, financial barriers, and technological infrastructure significantly influence AI adoption.

Madurai, being a culturally rich and tourism-driven city, has strong potential to benefit from AI-driven innovations. By addressing financial, technological, and educational challenges through the recommendations outlined above, stakeholders can enhance service quality, operational efficiency, and customer satisfaction.

The findings of this study provide valuable insights for hotel managers, policymakers, and technology providers to develop effective strategies for promoting AI adoption in non-metropolitan hospitality markets. Bridging this adoption gap will not only benefit individual hotels but also strengthen Madurai's position as a competitive and modern tourist destination. This study contributes to the limited body of knowledge on AI adoption in tier-2 cities and provides a foundation for future research and policy development in emerging hospitality markets.

References

1. [Booking.com](https://www.booking.com), & Statista. (2025). India accommodation barometer 2025: Talent, technology and tenacity -- The state of India's accommodation industry. [Booking.com.https://ishc.hsyndicate.com/news/4130834.html](https://ishc.hsyndicate.com/news/4130834.html)
2. Buhalis, D., & Leung, R. (2019). Real-time co-creation and nowness service: Lessons from tourism and hospitality. *Journal of Travel and Tourism Marketing*, 36(5), 563-582. <https://doi.org/10.1080/10548408.2019.1592059>
3. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
4. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
5. Dwivedi, Y. K., Sharma, A., Rana, N. P., Giannakis, M., Goel, P., & Dutot, V. (2023). Key concepts in artificial intelligence and technologies 4.0 in services. *Service Business*, 17(1), 1-42. <https://doi.org/10.1007/s11628-023-00528-w>
6. Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1-4.
7. Gursoy, D., Li, Y., & Song, H. (2023). AI-driven predictive analytics and personalization in hospitality: Impact on customer retention and revenue optimization. *International Journal of Hospitality Management*, 108, 103-118.
8. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage Learning.
9. Ivanov, S., & Webster, C. (Eds.). (2019). *Robots, artificial intelligence, and service automation in travel, tourism and hospitality*. Emerald Publishing.
10. Kumar, A., & Singh, R. (2021). Artificial intelligence adoption in Indian hospitality: A study of metro and non-metro cities. *Journal of Hospitality Application & Research*, 16(2), 45-62.
11. Kuo, C. M., Chen, L. C., & Tseng, C. Y. (2021). Investigating the adoption of AI in the hotel industry: Barriers and solutions. *Journal of Hospitality and Tourism Technology*, 12(3), 456-473.



9. 12. Mariani, M., & Baggio, R. (2022). Big data and analytics in hospitality and tourism: A systematic literature review. *International Journal of Contemporary Hospitality Management*, 34(1), 231-278. <https://doi.org/10.1108/IJCHM-03-2021-0301>
10. 13. Pillai, R., & Sivathanu, B. (2020). Adoption of AI-based chatbots for hospitality and tourism. *International Journal of Contemporary Hospitality Management*, 32(10), 3199-3226. <https://doi.org/10.1108/IJCHM-04-2020-0259>
11. 14. Suman, S. (2026). Exploring the role of artificial intelligence in tourism businesses in India: A critical analysis. In G. Shandilya, N. Singh, P. Srivastava, & N. Mishra (Eds.), *Destination data: Charting the course for transformative travel experiences* (pp. 45-68). Emerald Publishing.
12. 15. Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
13. 16. Tussyadiah, I. (2020). A review of research into automation in tourism: Launching the Annals of Tourism Research curated collection on artificial intelligence and robotics in tourism. *Annals of Tourism Research*, 81, 102883.
14. 17. Wörndl, W., Koo, C., & Stienmetz, J. L. (Eds.). (2021). *Information and communication technologies in tourism 2021: Proceedings of the ENTER 2021 eTourism conference*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-65785-7>