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Understanding Smart Hotel Adoption among Generation X in China: An Expectancy, Normative, and Innovativeness Perspective

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Abstract: Smart technologies are reshaping hospitality services, and smart hotels have become a prominent setting in which travelers interact with artificial intelligence, automation, and digitally mediated service systems. Although research has largely focused on younger digital natives, much less is known about how Generation X evaluates and adopts these technologies.

This study examines how perceived expectancy, effort expectancy, and perceived descriptive norms influence the intention of Generation X consumers in China to use smart hotel services and investigates the mediating role of innovativeness. Data were collected from 450 respondents in four major cities through an online survey. Reliability and validity assessments confirmed strong measurement properties, and regression and mediation analyses revealed significant effects across all hypothesized relationships. Perceived descriptive norms emerged as the strongest predictor of intention, followed by innovativeness and effort expectancy, highlighting the relevance of social environments and usability perceptions in shaping adoption decisions. Innovativeness partially mediated the influence of all three predictors, suggesting that cognitive beliefs and social cues translate into intention through individual tendencies to explore new technologies.

Keywords: Smart hotels; Technology adoption; Generation X; Innovativenes; Descriptive norms

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1. Introduction

Smart technologies are increasingly transforming the design and delivery of hospitality services, with smart hotels representing one of the most visible manifestations of this shift. By integrating artificial intelligence, interconnected devices, and automated service systems, smart hotels enable personalized, efficient, and technology-mediated guest experiences that differ substantially from traditional service encounters. In China, the diffusion of smart hotels has accelerated alongside rapid digital infrastructure development and national initiatives promoting smart tourism. Automated check-in processes, app-based room controls, and AI-supported concierge services are now common features in urban hotels. Despite this rapid expansion, empirical understanding of how different consumer groups evaluate and adopt these technologies remains limited.

Existing research on hospitality technology adoption has largely focused on younger digital natives, who are often

assumed to be naturally receptive to technology-enabled services. However, this emphasis overlooks the continued economic significance of Generation X in China's travel market. Members of this cohort encountered digital technologies primarily in adulthood, after consumption habits and service expectations had already been established. As a result, their engagement with new technologies is often characterized by pragmatic evaluation and selective acceptance rather than habitual or intuitive use. These characteristics suggest that Generation X may assess smart hotel technologies differently from younger cohorts, making them an important yet underexplored group in hospitality technology research.

Technology acceptance literature consistently highlights the role of cognitive evaluations in shaping adoption intentions. Expectations regarding whether a system will deliver meaningful performance benefits such as improved convenience, efficiency, or comfort are central to technology use decisions. In smart hotel contexts, travelers are required to interact with automated systems and digital interfaces, which may alter established service routines. For consumers who value reliability and functional efficiency, anticipated performance outcomes are therefore likely to play a decisive role in determining adoption intention.

2. Literature review

2.1. Technology acceptance model

The Technology Acceptance Model explains technology adoption through perceived usefulness and perceived ease of use as the primary determinants of intention. These beliefs have been extensively validated in service and hospitality research and remain central to understanding technology-enabled consumption. In this study, perceived usefulness corresponds to perceived expectancy, reflecting beliefs that smart hotel technologies enhance convenience and service quality. Perceived ease of use aligns with effort expectancy, capturing judgments about the simplicity of interacting with smart hotel systems. For Generation X, who encountered digital technologies later in life, such evaluations are particularly influential. When technologies are perceived as both beneficial and manageable, TAM predicts stronger adoption intention. Extensions such as TAM2 further emphasize the role of cognitive evaluations in shaping usefulness perceptions, reinforcing the suitability of TAM for examining expectation-driven adoption of smart hotel services.

2.2. Theory of planned behavior

The Theory of Planned Behavior conceptualizes intention as a function of attitudes, subjective norms, and perceived behavioral control. These components capture evaluations of outcomes, social expectations, and perceived capability. In this study, attitudes correspond conceptually to perceived expectancy, as both reflect assessments of the benefits associated with using smart hotel technologies. Subjective norms parallel perceived descriptive norms, representing perceptions of how relevant others behave or what they consider appropriate. In China's collectivist context, Generation X consumers may rely strongly on such social cues when evaluating unfamiliar digital services. Perceived behavioral control resembles effort expectancy, reflecting confidence in one's ability to use smart hotel technologies effectively. TPB thus provides a complementary framework for explaining how cognitive, social, and capability-related evaluations jointly shape adoption intention.

2.3. Unified theory of acceptance and use of technology

The Unified Theory of Acceptance and Use of Technology integrates key elements from multiple acceptance models and identifies performance expectancy, effort expectancy, and social influence as core determinants of technology adoption. These constructs closely align with the variables examined in this study. Performance expectancy corresponds to perceived expectancy, effort expectancy reflects usability perceptions, and social influence parallels perceived descriptive norms. UTAUT offers a comprehensive perspective that simultaneously captures functional, usability, and social drivers of adoption. Its strong predictive performance across digital services and emerging technology contexts supports its relevance for examining smart hotel adoption among Generation X consumers. The conceptual alignment between UTAUT and the present research variables strengthens the theoretical foundation for analyzing intention formation in smart hospitality settings.

2.4. Perceived expectancy and intention to use smart hotel

Perceived expectancy captures the extent to which individuals believe that a technology will provide valued functional outcomes, and it has consistently emerged as a primary antecedent of adoption intention across technological contexts. Studies in digital services repeatedly demonstrate that when users anticipate meaningful performance benefits from a system, their intention to adopt it increases. Research on mobile banking, online learning and e-government services shows that perceived usefulness or performance expectancy reliably predicts intention because individuals prioritize improvements in efficiency, convenience and problem solving when evaluating new technologies . Similar patterns appear in healthcare technologies, where systems are adopted more readily when professionals recognize tangible gains such as improved workflows or enhanced service capability. These findings converge on the view that perceived benefits form a cognitive appraisal that directly guides intention formation. In the context of smart hotels, Generation X consumers evaluate digital interfaces, automated services and personalized technological features based on anticipated value, which aligns with the broader theoretical position that perceived expectancy is a central driver of adoption across demographic groups.

H1: Perceived expectancy positively relates to Generation X consumers' intention to use smart hotels.

3. Methodolody

3.1. Data collection and sample characteristics

Data were collected through a cross-sectional online survey administered over a two-month period using the WenJuanXing platform, which is widely used for academic research in China and validated in technology adoption studies . A purposive sampling strategy targeted Generation X consumers born between 1965 and 1980 who were likely to have prior exposure to smart hotel technologies, following established sampling practices in hospitality research. Screening questions ensured respondent eligibility, and responses with abnormally short completion times or patterned answers were excluded to enhance data quality. The final sample comprised 450 valid responses from Beijing, Shanghai, Guangzhou, and Shenzhen, cities characterized by advanced digital infrastructure and a high concentration of smart hotels. The sample included respondents of different genders, occupations, and income levels, with most participants aged between 41 and 50 and holding at least a high school education. Ethical standards were observed through voluntary participation, anonymity, and informed consent.

3.2. Measures

All constructs were measured using a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"), consistent with prior technology adoption research. Measurement items were adapted from established scales to ensure content validity. Perceived expectancy items were drawn , effort expectancy items perceived descriptive norms , innovativeness , and intention to use smart hotels. A pilot test with 46 respondents confirmed clarity and reliability, with all constructs demonstrating satisfactory internal consistency. Minor wording adjustments were made based on feedback, and the finalized instrument exhibited adequate reliability and validity for subsequent analysis.

4. Results

To assess data quality, frequency distributions were reviewed across all constructs, and the responses showed clear concentration toward the upper end of the scales, indicating positive evaluations of perceived expectancy, effort expectancy, perceived descriptive norms, innovativeness, and intention to use smart hotels. Descriptive statistics exhibited consistent means above the scale midpoint and acceptable variability, supporting the suitability of the data for further analysis.

Internal consistency assessment showed Cronbach's alpha values ranging from 0.862 to 0.937, with all items

demonstrating high corrected item–total correlations. Reliability diagnostics indicated no item removal would increase scale performance. These results are presented . Exploratory factor analysis reported excellent sampling adequacy (KMO = 0.935) and a significant Bartlett's test, supporting factorability. Five factors were extracted with eigenvalues above 1, accounting for 77.43 percent of the total variance, and all rotated factor loadings exceeded 0.50 without cross-loadings.

Correlation analysis revealed significant positive associations among all major constructs. Perceived descriptive norms showed the strongest correlation with intention to use smart hotels, followed by innovativeness and effort expectancy, while perceived expectancy showed a moderate but significant correlation.

Multiple regression results indicated that perceived expectancy, effort expectancy, and perceived descriptive norms significantly predicted intention to use smart hotels. The predictors also significantly influenced innovativeness, which in turn predicted intention to use smart hotels. After including innovativeness, the direct effects of the predictors decreased, indicating partial mediation. The three regression models accounted for 22.6 percent, 34.3 percent, and 25.1 percent of the variance in intention and innovativeness.

All hypotheses were supported. Perceived expectancy, effort expectancy, and perceived descriptive norms each showed significant positive effects on intention to use smart hotels. Innovativeness partially mediated all three relationships.

5. Discussions

5.1. Theoretical implications

The findings of this study offer several important theoretical implications for understanding the adoption of smart hotel technologies among Generation X consumers in China. First, the significant influence of perceived expectancy on behavioral intention reinforces the enduring relevance of the Technology Acceptance Model, which positions perceived usefulness as a primary determinant of technology adoption[1]. The results extend TAM by demonstrating that usefulness perceptions in smart hospitality contexts are strongly shaped by convenience, efficiency, and functional reliability, echoing similar observations in recent technology-enabled tourism studies. Second, the empirical support for effort expectancy aligns with the Unified Theory of Acceptance and Use of Technology, confirming that ease of use remains a foundational determinant of digital service acceptance . The significance of this construct among middle-aged Chinese consumers suggests that UTAUT retains explanatory power even in rapidly digitalizing hospitality environments, where operational simplicity affects both adoption and continued usage.

The strong effect of perceived descriptive norms provides further theoretical insight by underscoring the relevance of social influence in collectivist cultural contexts, consistent with the Theory of Planned Behavior[2]. The results suggest that descriptive norms may exert even greater predictive power than personal attitudes among Chinese Generation X consumers. This pattern reflects broader cultural tendencies in which conformity and social harmony drive technology-related decision-making. A theoretical extension emerging from this study is the demonstrated mediating role of innovativeness. Although personal innovativeness has been conceptualized as a stable individual trait[3], the findings support the view that innovativeness can also function as a perceptual mechanism shaped by social cues and utility evaluations. This positions innovativeness as a dynamic construct that transmits the effects of expectancy beliefs and social norms onto behavioral intention, thus refining existing adoption theories. Collectively, the study provides an integrated framework connecting expectancy-based cognition, normative influence, and innovation perception, offering a more holistic theoretical account of smart hospitality adoption.

5.2. Practical implications

The results of this study provide actionable implications for multiple stakeholders in the smart hospitality ecosystem, including hotel operators, technology developers, and policymakers. For hotel operators, the strong predictive effect of perceived expectancy indicates that marketing and service design efforts should emphasize clear, demonstrable benefits of smart hotel technologies. Communicating efficiency gains, personalization features, and convenience, such as automated

check-ins or intelligent environmental controls, can enhance perceived usefulness, consistent with evidence that functional value is a critical driver of adoption in service technologies. Likewise, the role of effort expectancy suggests a need for user-centered system design. Smart hotel technologies must minimize cognitive load through intuitive interfaces, step-by-step guidance, and seamless system integration. Hospitality research consistently shows that simplified digital touchpoints improve user confidence and engagement , making usability optimization essential for Generation X consumers.

6. Limitations and suggestions for future research

Future research on smart hotel adoption should extend the present study by addressing its methodological and contextual boundaries and by exploring additional theoretical mechanisms. Since the current research employed a cross-sectional design, longitudinal studies are needed to capture how perceptions and intentions evolve as smart hotel technologies become more mature and widely adopted, a pattern emphasized in technology acceptance research[4]. The demographic scope should also be broadened. This study examined Generation X in major metropolitan areas, yet younger cohorts with higher digital fluency may exhibit distinct evaluation criteria and adoption pathways, as suggested in recent consumer technology studies [5]. Including participants from smaller cities and less developed regions would also improve the generalizability of findings.

Cultural and psychological determinants deserve further investigation. Cross-cultural comparisons would help clarify how societal value systems influence responses to smart hotel technologies, building on established cultural behaviour frameworks. Perceived risk and privacy concerns, which strongly shape consumer acceptance of AI and IoT services, should be incorporated into future models to provide a more complete understanding of behavioural intentions[6]. As new technologies such as blockchain security, virtual reality interfaces, and advanced AI assistants become embedded in hospitality services, research should assess how these innovations reshape consumer expectations and service experiences.

Disclosure statement

The author declares no conflict of interest.

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