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A Qualitative Insights of AI Sleep Pods for Stress Relief:
Boosting Passenger Well-Being in Chinese Airports

Mingjing Qu
https://orcid.org/0000-0002-0905-8212
Xi'an International University, China

ABSTRACT

This qualitative study explores the effect of artificial intelligence (AI)-managed sleep pods on passenger stress and satisfaction in Chinese airports. Thirty interviews at Xi'an International Airport revealed that personalization, comfort, and privacy were significant qualities to possess. The findings indicate decreased stress, increased well-being, and the crucial role of cultural acceptance and trust in technology. Hence, a theoretical model generated by grounded theory plays the role of linking AI personalization to well-being, implying valuable knowledge for airport operators and AI-service designers. This study highlights the potential for AI to create personalized, stress-reducing environments, potentially offering practical solutions to enhance airport hospitality.

KEYWORDS

AI-Managed Sleep Pods, Stress Reduction, Passenger Satisfaction, Airport Hospitality, Qualitative Methodology, Grounded Theory

INTRODUCTION

Artificial intelligence (AI) technologies are transforming global service delivery, thereby profoundly disrupting various industries, especially the aviation industry (Ziakkas et al., 2023). AI-powered solutions, leveraging real-time biofeedback (Barati et al., 2023; Hamdan et al., 2012) and machine learning algorithms (e.g., reinforcement learning for dynamic environmental adjustments), are widely adopted in airports (Liu et al., 2022). These technologies uniquely address passenger stress by personalizing sleep environments through Internet of Things (IoT) sensors (e.g., heart rate monitors) and adaptive interfaces (Panindre et al., 2021). Among these innovations, AI-managed sleep pods are anticipated to be particularly targeted at transfer passengers with the purpose of alleviating fatigue and stress (Lee et al., 2023). These technology and hospitality-incorporating pods are notable in Chinese airports, providing a unique context for evaluating their applicability given that the high number of passenger usage implies a wider acceptance of AI technologies (Vorobeva et al., 2024). Nonetheless, to date, relatively little published academic research exists regarding how these AI-managed sleep pods are affecting the well-being and satisfaction of passengers.

Most current research on AI applications in airport settings focus on general passenger satisfaction and some operational purposes, with few details developed toward personalized services dealing specifically with emotional well-being and stress reduction without looking in-depth at the broader benefits of technology to these specifics (Birillo & Yannovski, 2023; Kim et al., 2022). This gap is

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more pronounced in research specifically investigating AI usage within high-stress environments due to the rising importance of passenger emotions as key service success factors (Dike et al., 2024). Most studies used quantitative methodologies (mainly with a need for defining results) focusing on passenger satisfaction and technological performance, often neglecting in-depth qualitative insights into how passengers perceive and feel about the technologies around them (Chen, 2022; Ouf, 2023). This leads to gaps in literature on emotions and the well-being of passengers when services are managed by AI, such as sleep pods, particularly amidst the unique socio-culturally shaped context of service expectation and emotion in China (Yao & Liang, 2023).

This study aims to fill this research gap by using grounded theory through semi-structured interviews to explore the perceptions and experiences of passengers regarding AI-managed sleep pods at Xi'an International Airport. By conducting in-depth interviews with 30 users of these pods, we seek to understand the design features of these rest environments that help to reduce stress and improve passenger satisfaction. Additionally, the study develops a theoretical model of how AI-powered personalization and passenger well-being are interrelated in high-stress travel scenarios (Sheth et al., 2022). This detailed, qualitative focus serves both a more nuanced understanding of passenger experiences and a richer theoretical perspective on the role of AI in contributing to personalized, stress-reducing service environments. Specifically, the study seeks to:

1. Explore passengers' perceptions and experiences of AI-managed sleep pods in Chinese airports, focusing on their impact on overall travel well-being.
2. Identify and critically assess the specific features of personalized rest environments that contribute to stress reduction among passengers.
3. Develop a grounded theory model that explains the relationship between AI-managed sleep pods and passenger well-being within the context of airport hospitality.

To achieve these objectives, the following research questions are addressed:

1. How do passengers perceive and experience the use of AI-managed sleep pods in enhancing their overall travel well-being in Chinese airports?
2. Which specific aspects of the personalized rest environments provided by AI-managed sleep pods contribute to stress reduction, and how do passengers evaluate their effectiveness?
3. What underlying mechanisms emerge from passenger experiences that explain how AI-managed sleep pods impact well-being, and how can these inform the development of a new theoretical model using grounded theory?

This study is important because it adds to the extant body of literature on AI applications in airport hospitality, benefiting the theoretical and practical sides accordingly. The study theoretically contributes to existing literature on technology-enabled passenger experiences by presenting an original framework outlining psychological and emotional states of passengers when using AI-driven sleep pods. From a practical perspective, the results provide real-world knowledge to airport operators and service designers, facilitating AI-driven strategies to improve passengers' well-being in a large-scale travel context, such as those prevalent in China (Würfel et al., 2023). By moving beyond solely operational efficiency, this study paves the way for further work in research on integrating passenger emotions into design and management processes when it comes to AI-enhanced airport services.

LITERATURE REVIEW

Currently, the incorporation of AI within the aviation sector has significantly transformed airport functionalities and the way travelers engage with their journeys. This literature review is