Chapter 19
Artificial Intelligence (AI) Technology-Enabled Housekeeping: Setting a Roadmap

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ABSTRACT

The integration of Artificial Intelligence (AI) into housekeeping is transforming task management across industries. This research provides a roadmap for implementing AI-enabled housekeeping, focusing on process optimization, service enhancement, and operational efficiency. AI technologies like automated cleaning predictive maintenance streamline operations, improve guest satisfaction, and reduce costs. The roadmap explores smart devicesdata analytics in housekeeping, addressing workforce adaptations, and technological infrastructure in hotels, retail, hospitals, and airports. It offers insights into AI's benefits and integration strategies. Facility management leads in AI adoption, favoring limited AI assistance with human interaction. This research highlights AI's transformative impact on housekeeping, promoting efficiency and customer-centricity. The methodology includes descriptive analysis, reliability tests, and correlation analysis based on 472 expert responses. Future research could explore national vs. international scope, larger samples, and sector-specific objectives.

DOI: 10.4018/979-8-3693-7447-4.ch019

INTRODUCTION

In recent years, hospitality industry has witnessed a rapid integration of technology and artificial intelligence (AI) into various aspects of its operations. One area where this transformation is particularly pronounced is housekeeping management. From automated cleaning robots to smart room controls, technology is revolutionizing the way housekeeping tasks are performed, monitored, and optimized. Digitization will significantly impact routine tasks, resulting in substantial changes in work processes and necessitating shifts in skills (Nagl, Titelbach & Valkova, 2017). This research explores the impact of technology and AI on housekeeping management in various sectors, focusing on reshaping traditional practices and enhancing efficiency, guest satisfaction, and sustainability.

AI-powered systems can analyze data to predict occupancy levels, cleaning schedules, and allocate resources more effectively, leading to cost savings and improved productivity (Lee, Wu, Yun, Kim, Jun, & Sutherland, 2019). Moreover, advancements in smart sensors and Internet of Things (IoT) devices enable real-time monitoring of cleanliness standards, ensuring that areas or guestrooms are always maintained to the highest standards (Social Tables, 2017). However, alongside the benefits, there are also challenges and considerations to be addressed, such as data security, staff training, and the need for human oversight. The integration of Artificial Intelligence (AI) into housekeeping services has become increasingly prevalent, revolutionizing the way tasks are managed and executed in various industries. This research aims to outline a roadmap for the implementation of AI-enabled housekeeping services, addressing key aspects such as process optimization, service enhancement, and operational efficiency. AI technologies offer a wide range of capabilities that can significantly streamline housekeeping operations, from automated room cleaning to predictive maintenance and inventory management (Stringam & Gerdes, 2021). By leveraging AI, hotels and other establishments can improve guest satisfaction thereby reducing operational costs and enhancing overall service quality (Mazars, 2020).

This roadmap will explore various dimensions of AI-enabled housekeeping services including the adoption of smart devices, data analytics, and machine learning algorithms. It will delve into the challenges and opportunities associated with AI implementation in the housekeeping services, considering factors such as workforce adaptation, ethical considerations and technological infrastructure.

LITERATURE REVIEW

Artificial Intelligence (AI) is revolutionizing various industries, and the housekeeping sector is no exception. AI-based housekeeping services harness advanced technologies to enhance efficiency, accuracy, and convenience in household tasks. This study explores the integration of AI into housekeeping, examining its impact on routine activities such as cleaning, maintenance, inventory management, and customer service.

Housekeeping, traditionally reliant on manual labor, faces challenges regarding time consumption, consistency, and human error. With the advent of AI, innovative solutions are emerging to address these challenges. AI-powered devices and systems are designed to perform tasks autonomously or semi-autonomously, reducing the burden on human effort while improving service quality. The scope of AI-based housekeeping extends beyond simple automation; it encompasses a range of intelligent systems capable of learning, adapting, and optimizing their functions. These systems include cleaning and maintenance robots, smart home integrations, predictive maintenance technologies, and AI-driven customer service platforms (El Makhloufi, 2023).

According to Lai & Hung (2018) the hospitality sector has been talking about cloud technology for the past ten years, but little real progress has been made; instead, the debates have remained in paper talk mode. Given the enormous potential of the market for intelligent hospitality, there are currently very few academic research publications concerning virtualized cloud architecture, AI technology, and intelligent virtual housekeeping systems in this sector. Digitalization and automation transforming housekeeping services, enhancing efficiency, precision, and overall service quality. Task scheduling, inventory tracking, and employee performance monitoring are ways digital