

Chapter 2


The Digital Chef: Future-Proofing Hotel Kitchens With AI

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ABSTRACT

Using the “Digital Chef” model, which integrates intelligent technologies for enhanced efficiency, sustainability, and guest personalization, this study explores the transformative role of artificial intelligence (AI) in hotel kitchens. Food preparation, inventory control, and menu customization are being revolutionized by AI-driven solutions such as robotic cooking assistants, sensor-based safety systems, and predictive analytics. By automating tedious tasks and enabling data-driven decision-making, AI fosters chefs' creativity rather than replacing them. AI's effects on operations, customer interaction, and profitability are demonstrated through case studies of global hospitality chains. The balance between human knowledge and intelligent

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systems offers a scalable and sustainable path forward, despite obstacles like cost, cultural, and ethical concerns. By ensuring that innovation and tradition coexist peacefully in kitchens of the future, this convergence redefines culinary greatness.

INTRODUCTION

The modern hospitality landscape is undergoing a paradigm shift, driven by rapid advancements in digital technology and artificial intelligence (AI). One of the most significant transformations is occurring in hotel kitchens, where AI is being leveraged to optimize culinary operations, streamline workflows, and enhance guest satisfaction. This digital evolution, often conceptualized as “The Digital Chef,” represents the integration of intelligent systems that support food preparation, inventory control, hygiene compliance, and personalized service delivery (M. G. A. Bautista, 2023).

AI adoption in hospitality kitchens is becoming a trend and strategic response to contemporary challenges such as food safety and hygiene demands, waste management, energy efficiency, sustainability and the growing expectation for customized dining experiences. With AI-driven tools like smart ovens, robotic cooking assistants, smart appliance, Voice Assistance, Robotic Sous chefs and predictive analytics for menu planning, hotel kitchens are becoming smarter, more sustainable, and resilient to operational disruptions. AI is increasingly becoming instrumental in enhancing menu designs and improving profitability by utilizing data-driven insights,” states Jean-Georges Vongerichten, the chef and owner of more than 50 restaurants worldwide. He defines the way AI tools been used in the hotel kitchens to enhance both topline revenue and total profitability with entering simple data and getting the details for future perditions.

The case studies presented in this chapter illustrate the variety of possibilities for automation: from automating separate tasks to completely automating the back of the house (Spyce robotic kitchen, Miso Robotics, PreciTaste, Rational, Unox, Suvie and Chefing are best examples). The companies like Miso Robotics have developed automated cooking systems capable of preparing high-volume meals with minimal supervision, while AI-powered platforms like PreciTaste enable real-time kitchen monitoring and decision-making through data analysis. Although, the restaurant industry has adopted chatbots; voice and biometric technology; robots used in hosting, food running, cooking, and bartending; table ordering; conveyer belt; and robotic food delivery (Stephens, 2025). Furthermore, sensor-based systems are also adopted by the now strict adherence to hygiene and food safety protocols by monitoring temperature, humidity, and contamination risk (WHO). Simultaneously, AI’s ability to analyze guest preferences, dietary restrictions, and consumption

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