Chapter 17
Revolutionizing Responsible Consumption and Production of Food In Hospitality Industry:
Machine Learning and Deep Learning Approach Towards Zero Food Waste

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ABSTRACT

The hospitality industry is pivotal in addressing responsible consumption and food production challenges. The hotel sector is leading the way in tackling important issues related to responsible food production and consumption to lead revolutionary solutions using deep learning and machine learning technology. Integrating modern technical solutions becomes crucial in the current setting, where global poverty, malnutrition, and the complex dynamics of food adulteration considerably affect the industry's demand-supply mechanism. Keeping a close eye on the larger global scene,

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this study promotes practical actions beyond simple technology implementations. In the face of global issues such as hunger, malnutrition and food adulteration, the assimilation of advanced technological strategies becomes imperative. This chapter explores the role of ML and DL in achieving zero waste within the hospitality sector, addressing challenges and presenting innovative strategies for adequate food loss-waste management.

1. INTRODUCTION

Beyond technological applications, the study highlights critical aspects such as inventory management, employee training, customer education, and collaboration with food bank institutions (Koshariya et al., 2024; Gatto & Chepeliev, 2024; Axmann et al., 2024). The primary goal is to reduce the environmental impact of food waste, address global challenges, and promote sustainable tourism practices within the hospitality sector (Lawal et al., 2024; Font et al., 2023). This chapter marks a significant step towards aligning the industry with responsible and sustainable practices, positively shaping the future of food consumption and production (Delgado et al., 2023). In pursuit of zero waste in hospitality, the study carefully examines the roles of Machine Learning (ML) and Deep Learning (DL), offering a thorough analysis of the challenges involved and proposing innovative solutions for managing food loss and waste (Kalenjuk Pivarski et al., 2022). Food waste within the hotel industry is an escalating concern, accounting for a significant portion of all food waste. The issue of hospitality waste is particularly prominent in both developed and developing nations due to the rise in dining out, fueled by increasing incomes and tourism (Lund-Durlacher et al., 2019).

The amount of food-related waste generated in the hospitality industry is often discussed in the media, yet it has received insufficient scholarly attention (Ozturkcan & Kitapci, 2023; Han et al., 2020). A consumption pattern that aligns with sustainable development principles is considered responsible (Riva et al., 2022). Essentially, it involves obtaining products and services to support the three pillars of sustainability—economic, social, and environmental—without prioritising one over the others (Baltescu, 2022; Hwang & Kim, 2021). This approach benefits the parties involved in transactions and stimulates the economy, particularly the local economy, by facilitating the exchange of goods and services (Hall, 2010). It fosters positive social impact by ensuring that the goods or services purchased are tied to a fairly compensated workforce and work in favourable conditions, enhancing customer welfare and considering their health (Han, 2021). The responsible consumer considers all aspects of a product's life cycle—from production and shipping