

Food Waste in the F&B Industry: Economic Impact and Employment Prospects in Vietnam

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ABSTRACT: Food waste has become an increasing challenge for the food and beverage (F&B) industry, which brings about significant economic, operational and sustainability concerns. While previous studies have mainly focused on the environmental consequences of food waste, limited attention has been given to its implications for business performance and employee career outcomes, particularly in developing countries such as Vietnam. This study aims to examine the effects of food waste on financial performance and self-perceived employability in Vietnam's F&B industry, while investigating the mediating role of financial performance and the moderating role of employee competence. Based on the Resource-Based View (RBV) and Human Capital Theory (HCT), a research model was developed and empirically tested using data collected from 309 employees working in food processing and food service businesses in Vietnam. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3. The findings indicate that ingredient waste, preparation waste, and consumption waste significantly influence financial performance. Financial performance also positively affects self-perceived employability and mediates the relationships between food waste dimensions and employees' career perceptions. Furthermore, employee competence strengthens the management of preparation and consumption waste and positively enhances employees' perceived employability. This study extends existing food waste literature by highlighting its economic and human resource implications and provides practical insights for Vietnamese F&B businesses in improving operational efficiency, developing employee capabilities, and promoting sustainable growth.

KEYWORDS: Employee competence; F&B industry; financial performance; food waste; self-perceived employability.

I. INTRODUCTION

The food and beverage (F&B) industry is one of the most critical sectors of the global economy, which meets essential nutritional needs and plays a central role in the food supply chain. According to the Food and Agriculture Organization of the United Nations (FAO), the F&B industry encompasses the production, processing, distribution, and marketing of food and beverages, from raw materials to finished products. Beyond ensuring food security, the industry drives economic growth, creates jobs, and supports related sectors such as agriculture, transportation, and retail. The World Bank reports that the F&B industry contributes approximately 10–15% to GDP in developing countries and 5–10% in developed nations, serving as a key driver of exports in agriculture-rich countries such as Vietnam (Landrigan et al., 2023). The global F&B market was valued at USD 8.85 trillion in 2025 and is anticipated to experience steady growth over the forecast period. Market revenue is expected to increase from USD 9.43 trillion in 2026 to approximately USD 16.61 trillion by 2035, reflecting a compound annual growth rate (CAGR) of 6.5%. This expansion is largely supported by rising consumer awareness of health and wellness, coupled with growing demand for convenient food options and ready-to-eat products that align with increasingly fast-paced lifestyles. In Vietnam, the F&B industry is a cornerstone of the national economy, contributing approximately 15% to GDP and providing employment for millions of workers. Supported by a population of more than 100 million and a rapidly expanding middle class, Vietnam has become one of the fastest-growing F&B markets in ASEAN. According to the F&B Vietnam Report 2025, the market was valued at USD 29 billion in 2025 and is expected to reach USD 54.27 billion by 2033, with an annual growth rate of around 10%. In addition, agricultural products generated approximately USD 37.25 billion in export revenue in 2025. While this rapid expansion creates significant economic opportunities, it also increases pressure on food production, distribution, and consumption systems, resulting in substantial food losses and waste throughout the value chain.

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Currently, food waste has become one of the major sustainability challenges worldwide, closely linked to environmental pollution, resource depletion, and food insecurity. According to Zhang et al. (2024), food and agricultural waste accounts for approximately 44% of the total urban solid waste generated globally, and this volume continues to increase each year. Agricultural and food processing by-products constitute a major proportion of food waste and are generally classified into crop residues, livestock waste, and food processing waste. Vietnam, with its tropical climate and strong agricultural production, generates substantial quantities of by-products from fruits and vegetables, particularly in the Mekong Delta region. Agricultural waste represents approximately 10–30% of total crop weight; for example, pomelo peel accounts for around 30% of fruit weight, while shallot skin represents approximately 10% (Baquer et al., 2024). Many of these by-products (banana peels, dragon fruit skins, jackfruit residues, citrus peels, and shallot skins) contain high moisture levels and valuable bioactive compounds but remain underutilized. If improperly managed, these wastes can generate pollutants that negatively affect environmental quality, public health, and economic development. Consequently, the economic potential of agricultural waste recycling remains largely overlooked by many producers. Growing environmental awareness and the transition toward a circular economy have increased interest in transforming food waste into value-added products. During the COVID-19 pandemic, consumers became increasingly interested in health-promoting and immune-enhancing products (Galanakis et al., 2021). Numerous food processing by-products, including onion peels, fruit peels, and vegetable residues, contain valuable compounds such as quercetin, dietary fiber, proteins, polysaccharides, phytochemicals, and natural flavors with antioxidant, anti-inflammatory, antibacterial, and anti-allergic properties. From the perspective of the circular economy, Rabbi et al. (2024) argued that consumer psychology and the 6Rs principles (rethink/re-decision, reduce, reuse, recycle, recovery, and residuals management) play an important role in promoting the utilization of agricultural waste. Proper waste valorization not only reduces environmental burdens but also creates additional economic value, increases farmers' and food producers' incomes, and stimulates innovation in sustainable food production systems.

Despite the growing recognition of food waste as both an environmental and economic issue, most previous studies have focused primarily on waste treatment technologies, recycling methods, environmental impacts, or consumer behavior. Comparatively limited attention has been paid to the broader economic consequences of food waste within the F&B industry, particularly regarding operational costs, business performance, productivity, and employment creation. In Vietnam, where the F&B sector continues to expand rapidly while simultaneously facing rising inflation, increasing raw material costs, higher interest rates, and intense market competition (Nguyen, 2023), reducing food waste has become increasingly important for improving business efficiency and supporting sustainable employment. Effective food waste management may reduce production costs, improve resource utilization, increase profitability, and generate new employment opportunities in areas such as sustainable supply chain management, waste recycling, circular economy practices, environmental management, and green innovation. Therefore, this study aims to examine food waste in Vietnam's F&B industry by investigating its economic impact and employment prospects. Specifically, the study seeks to evaluate how food waste affects the economic performance of F&B enterprises, explore the employment opportunities created through food waste reduction and circular economy initiatives, and propose practical strategies that simultaneously improve business competitiveness, promote sustainable employment, and support Vietnam's transition toward a more sustainable and resource-efficient F&B industry. The study is divided into 5 parts including (1) Introduction; (2) Theoretical framework and hypothesis development; (3) Methodology; (4) Results and discussion; and (5) Implications and conclusion.

II. THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Theoretical Foundations

The Resource-Based View (RBV) has become one of the most influential theories in strategic management for explaining the internal sources of a firm's sustained competitive advantage (Barney, 1991). According to Barney (Budhwar et al., 2023), firms achieve sustained competitive advantage when they possess and effectively utilize resources and capabilities that are valuable, rare, inimitable, and non-substitutable, supported by an organizational structure capable of exploiting these resources. This perspective has been further extended through related concepts, including core competencies, dynamic capabilities, and the knowledge-based view of the firm (Plekhanov et al., 2023), all of which emphasize that superior organizational performance depends largely on the effective management of internal resources and capabilities. Within the F&B industry, food waste management can be regarded as a strategic organizational capability that enables firms to utilize resources more efficiently, reduce production costs, improve operational performance, and create additional value from food by-products through circular economy practices. Consequently, organizations that successfully implement waste reduction strategies may strengthen their competitive position while simultaneously improving environmental and economic performance. Although the RBV has been widely accepted because of its strong explanatory power, scholars have also criticized the ambiguity surrounding the concepts of

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resources and value, as well as its relatively narrow explanation of competitive advantage. Therefore, it has been suggested that the RBV should be extended toward a more dynamic and adaptive perspective that recognizes continuous capability development and organizational learning (Vlačić et al., 2021).

Human Capital Theory (HCT) by Becker (1993) explains how employees become one of the most valuable strategic resources within organizations. Early discussions of human capability as a productive asset originated with Adam Smith, who recognized that improvements in education and training increase workers' productivity (Schliesser, 2017). Schultz (1961) subsequently introduced the concept of investment in human capital, arguing that expenditures on education, training, migration, and health should be viewed as investments that generate future economic returns. Becker then further developed Human Capital Theory in 1993 by suggesting that human capital is accumulated through education, training, migration, and health, enabling individuals to acquire greater knowledge, skills, and abilities that enhance both productivity and career opportunities (Lin, 2017). From an organizational perspective, firms invest in human capital because employees are regarded as strategic assets capable of generating long-term value and improving organizational performance. Abdallah et al. (2025) expanded the concept by proposing that human capital comprises knowledge, skills, abilities, talent, behavior, effort, and time. Knowledge includes intelligence and job-specific expertise, skills represent practical competencies, talent reflects innate characteristics that can be further developed, behavior encompasses ethics and attitudes, while effort represents employees' willingness to apply their capabilities to organizational objectives. These dimensions collectively determine employees' productive capacity and organizational contribution.

Integrating RBV and Human Capital Theory provides a comprehensive explanation of food waste management in Vietnam's F&B industry. From the RBV perspective, food waste reduction practices constitute valuable organizational capabilities that improve resource efficiency, reduce operational costs, and enhance firms' economic performance. From the Human Capital Theory perspective, these capabilities can only be effectively developed and implemented through investments in employee education, technical skills, sustainability awareness, and innovation capabilities. Well-trained employees are better able to perform inventory management, portion control, waste monitoring, recycling activities, and circular economy practices, thereby improving business performance while creating new employment opportunities in sustainable supply chain management, environmental management, waste recycling, and other green occupations. Therefore, the integration of RBV and Human Capital Theory offers a robust theoretical framework for explaining how effective food waste management contributes simultaneously to economic value creation and employment prospects in Vietnam's F&B industry.

Food Waste in F&B Industry

The F&B industry is one of the largest and most important manufacturing sectors worldwide because of its contribution to food security, economic growth, and employment. The industry encompasses a wide range of subsectors involved in the production, processing, distribution, and marketing of food and beverages. The food industry is classified under the two-digit numerical code C10, within which the processing and preservation of meat, fish, fruits and vegetables, the manufacture of vegetable and animal oils and fats, dairy products, grain mill products, bakery products, other food products, and prepared animal feeds are included, based on the Statistical Classification of Economic Activities in the European Community (Shrivastava et al., 2022). The economic significance of the F&B industry is reflected in its substantial contribution to industrial production and employment. The food and beverage sector has been reported to be the largest manufacturing industry in the European Union (EU) in terms of turnover, value added, and employment, surpassing both the automobile and chemical industries. Even during periods of economic recession, the sector continued to expand, generating a turnover of EUR 953 billion in the EU-27 in 2010 (Sandberg et al., 2023). More than 99% of enterprises operating in the European food industry are small and medium-sized enterprises (SMEs), while the remaining 1% of large firms accounts for approximately 48% of the sector's value added. Despite its economic importance, the F&B industry relies heavily on natural resources, particularly water and energy, while simultaneously generating substantial amounts of waste and wastewater. Approximately 1.8% of Europe's total water consumption is attributed to the food and beverage industry, where water serves as a processing ingredient, cleaning agent, and cooling medium. Wastewater generated during food processing is typically characterized by high organic content and generally requires biological treatment before discharge (Patel et al., 2025). Food waste has become one of the most significant sustainability challenges associated with the F&B industry. Although the terms food loss and food waste are frequently used interchangeably, they differ according to the stage of the food supply chain where the discarded food occurs. The FAO defined food loss as any reduction in the availability, edibility, wholesomeness, or quality of edible food occurring after harvest and before reaching the final consumer (Zambrano et al., 2019).

More recently, the European Project FUSIONS proposed a broader definition by considering food waste as any food, and inedible parts of food, removed from (lost to or diverted from) the food supply chain to be recovered or disposed, including

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composting, anaerobic digestion, bioenergy production, incineration, landfill disposal, and other recovery or disposal pathways (Ishangulyyev et al., 2019). Under this definition, any food originally intended for human consumption but removed from the food supply chain is regarded as food waste, whereas organic materials produced for non-food purposes are excluded. Food waste occurs throughout every stage of the food supply chain, from agricultural production to final consumption. During primary production, waste may arise from damaged crops, low-quality produce, harvesting inefficiencies, or products with limited commercial value. Food processing and manufacturing generate food loss through transportation damage, inappropriate storage conditions, processing inefficiencies, contamination, and packaging defects. Retailers contribute to food waste because of handling problems, inadequate preservation, and insufficient refrigeration systems. At the consumer level, food waste is commonly associated with excessive purchasing, improper storage, over-preparation, oversized portions, inappropriate cooking practices, and misunderstanding of "best before" and "use by" labels (Rockström et al., 2025).

Food waste generated within the F&B industry produces substantial environmental, social, and economic consequences. Environmentally, food loss and food waste contribute to greenhouse gas emissions during landfill disposal through uncontrolled methane release while simultaneously increasing emissions associated with food production, processing, transportation, storage, and distribution. Additional environmental impacts include excessive consumption of land, water, energy, and nutrients, as well as disruption of natural biogeochemical cycles caused by intensive agricultural production. In the social perspective, food waste raises ethical concerns regarding global food security because large quantities of edible food are discarded while food insecurity persists in many regions. Economically, food waste imposes considerable costs on producers, processors, retailers, food service businesses, and consumers through wasted raw materials, labor, transportation, storage, and disposal expenses, which ultimately reduces business profitability and household income (Michel et al., 2024).

Determinants of Food Waste

Food waste has emerged as one of the most pressing global sustainability challenges because of its significant environmental, economic, and social consequences. Approximately 1.3 billion tons of food, representing one-third of global food production, are estimated to be lost or wasted annually according to the FAO statistics (Erenstein et al., 2022). Food loss and waste occur throughout the entire food supply chain, including production, transportation, storage, processing, retailing, and final consumption. While technological advancement has substantially reduced post-harvest losses in developed countries, approximately 40% of total FLW in developing countries occurs at the household consumption stage (Junaid et al., 2024). In consequence, reducing food waste has become an international priority, reflected in the growing number of scientific publications, policy initiatives, and commitments by international organizations aimed at addressing food loss and waste.

It can be seen that food waste generates substantial environmental impacts by contributing to greenhouse gas emissions, excessive consumption of natural resources, and environmental degradation. Previous studies have shown that food waste is associated with significant emissions of greenhouse gases as well as the inefficient use of water, cropland, fertilizers, and fossil fuels (Blüher, 2019). High levels of food waste also contribute to eutrophication of water bodies, biodiversity loss, and increased carbon dioxide emissions. Since the environmental impacts accumulate throughout every stage of the food life cycle, reducing food waste at the consumption stage offers one of the greatest opportunities for environmental improvement. Prevention has been identified as a more effective strategy than waste treatment alternatives such as home composting or moisture reduction (Del Rio, 2022). Beyond environmental concerns, food waste has considerable economic and social implications. As the global population continues to increase, reducing food waste has been recognized as an effective strategy for improving food availability and strengthening food security (Abbass et al., 2022). Wasting edible food not only intensifies the challenge of feeding the world's growing population but also imposes substantial financial losses on households and society. For example, avoidable food waste costs UK households approximately 480 pound annually, which represents nearly 15% of total household expenditure on food and beverages while households in the United States lose an estimated USD 936 each year on food purchased but not consumed. Similarly, German households discard approximately 4.4 million tons of food annually, equivalent to approximately EUR 6 billion, with an average two-person household wasting food worth around EUR 150 each year (Schmidt et al., 2019). In addition to direct household losses, food waste reduces overall resource efficiency and creates significant economic costs for the wider society.

Because of these consequences, considerable attention has been devoted to identifying the determinants of food waste. Existing literature suggests that food waste results from multiple interrelated factors rather than a single cause. At the household level, major determinants include consumer preferences, limited food-related knowledge, high income, socio-cultural norms, and personal value judgments (Hermanussen et al., 2022). Although environmental impacts are severe, studies indicate that consumers often perceive food waste primarily as an economic issue rather than an environmental one. Behavioral theories also suggest that several psychosocial factors influence food waste behavior. Attitudes, subjective norms, perceived behavioral

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control, and self-efficacy have consistently been associated with food-related behaviors. However, household food waste should not be examined independently because it is embedded within the broader food provisioning process, which involves interconnected decisions regarding meal planning, food purchasing, storage, preparation, cooking, and consumption (Rozenkowska, 2023). Therefore, household routines, planning behaviors, shopping habits, cooking practices, inventory management, and individuals' perceived abilities to manage these activities all influence the amount of avoidable food waste generated. Although previous studies have considerably advanced the understanding of household food waste, empirical evidence remains limited regarding its magnitude, economic costs, and underlying determinants, particularly in developing countries]. Furthermore, inconsistencies in definitions and measurement methodologies continue to constrain comparisons across studies (Yousaf et al., 2026). Existing research has primarily emphasized household behavior, whereas relatively less attention has been devoted to food waste occurring within the F&B industry, where waste generated during procurement, storage, processing, food preparation, service, and inventory management directly affects operational costs, profitability, resource efficiency, and employment. Therefore, identifying the determinants of food waste within the F&B industry is essential for developing effective waste reduction strategies that simultaneously enhance economic performance, environmental sustainability, and employment opportunities.

Hypothesis Development

Food Waste Determinants and Financial Performance

Ingredient Waste

Ingredient waste refers to the loss of raw materials before they are utilized in food preparation because of spoilage, improper storage, inaccurate purchasing, inventory mismanagement, or ineffective demand forecasting. Within the F&B industry, ingredient waste directly increases procurement, storage, and disposal costs while reducing resource utilization efficiency. According to the Resource-Based View (RBV), organizational resources should be efficiently managed to maximize value creation and sustain competitive advantage (Lubis, 2022). Since ingredients represent valuable production resources, excessive waste reduces operational efficiency and limits firms' ability to generate economic value. Furthermore, ineffective ingredient management may lead to unnecessary operational expenses and lower cost efficiency, ultimately affecting a firm's financial outcomes. Businesses that successfully minimize ingredient waste are more likely to optimize resource allocation and improve their overall operational performance. Previous studies have also indicated that food waste generated during procurement, storage, and food service operations remains a major operational challenge within the F&B industry, requiring effective management strategies to improve organizational performance (Schanes et al., 2018). Therefore, ingredient waste is expected to significantly influence financial performance.

H1: Ingredient waste has a significant effect on financial performance in the F&B Industry.

Preparation Waste

Preparation waste refers to food discarded during processing and preparation because of trimming losses, production errors, contamination, inappropriate portioning, or inefficient food handling. Previous studies have identified food preparation as one of the major operational stages where food waste is generated. In particular, inadequate employee skills, insufficient training, and cooking errors have been recognized as important contributors to preparation waste (Filimonau et al., 2019). From the Resource-Based View, inefficient production processes reduce organizations' ability to utilize resources effectively, resulting in increased operating costs and lower productivity. Moreover, preparation waste may increase the consumption of raw materials, energy, and labor, thereby placing additional pressure on operational budgets. Improving food preparation practices through standardized procedures and employee training can help minimize waste and enhance production efficiency. As a result, organizations that effectively control preparation waste are more likely to achieve better resource utilization and improved financial outcomes. Consequently, excessive preparation waste reduces operational efficiency and may adversely affect firms' financial performance. Therefore, preparation waste is expected to significantly influence financial performance.

H2: Preparation waste has a significant effect on financial performance in the F&B Industry.

Consumption Waste

Consumption waste refers to edible food discarded after being served to customers, including leftovers, buffet waste, unsold prepared food, and food discarded because of service errors. Previous studies have shown that food waste generated during the consumption stage is associated with customer behavior, service practices, communication problems, and operational management (Kumar et al., 2025). Within food service businesses, consumption waste not only increases disposal costs but also represents a loss of organizational resources that could otherwise generate revenue. According to the Resource-Based View, inefficient utilization of organizational resources weakens firms' ability to create value and maintain competitive advantage (Tsai et al., 2026). In addition, excessive consumption waste may reduce overall operational efficiency by increasing food production

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costs and limiting the effective use of labor and materials. Businesses that implement appropriate portion control, improve customer communication, and accurately forecast demand are more likely to reduce consumption waste and optimize resource utilization. These practices can contribute to better cost control and support stronger financial performance. Therefore, organizations with higher levels of consumption waste are more likely to experience lower operational efficiency and reduced financial performance.

H3: Consumption waste has a significant effect on financial performance in the F&B Industry.

Financial Performance and Self-Perceived Employability

Financial performance represents an organization's ability to effectively utilize its financial and operational resources to achieve sustainable business outcomes. It reflects the extent to which a firm generates profitability, improves operational efficiency, and maintains its long-term competitiveness within the market (Estiasih et al., 2024). In the F&B industry, financial performance is particularly important because businesses operate in a highly competitive environment characterized by fluctuating raw material prices, changing consumer preferences, and increasing operational costs. Firms with stronger financial performance are generally better positioned to allocate financial resources toward organizational development, improve workplace conditions, and invest in human resource management practices that support employee growth and organizational sustainability. From an organizational perspective, strong financial performance provides firms with greater flexibility to invest in employee training, career development programs, performance management systems, and other initiatives that enhance workforce capabilities. Such investments create a supportive working environment in which employees have more opportunities to acquire new knowledge, develop professional competencies, and improve their long-term career prospects (Van HHartenet al., 2022). Consequently, employees are more likely to perceive themselves as possessing the knowledge, skills, and experience necessary to obtain and maintain employment both within and outside their current organizations. Self-perceived employability refers to employees' perceptions of their capability to secure and sustain employment based on their competencies, career-related skills, and professional confidence. Chughtai (2019) argued that employees' perceptions of employability are strengthened when organizations provide favorable conditions that encourage professional development and proactive career behaviors. Since financially successful firms are more capable of creating such supportive environments, improvements in financial performance are expected to strengthen employees' confidence in their employability and future career opportunities.

H4: Financial performance has a significant effect on self-perceived employability in the F&B Industry.

The Mediating Role of Financial Performance

Employee competence refers to the knowledge, technical skills, abilities, and professional capabilities that enable employees to perform their tasks effectively and contribute to organizational performance. In the F&B industry, employee competence is particularly important because operational activities, including food purchasing, storage, preparation, processing, and customer service, largely depend on employees' ability to perform tasks accurately and efficiently (Cousins et al., 2019). Competent employees are more capable of minimizing operational errors, utilizing resources efficiently, complying with food safety standards, and implementing appropriate food waste management practices. Consequently, employee competence plays an important role in improving operational efficiency and strengthening organizational competitiveness. Recent studies have emphasized the importance of employee competence in enhancing organizational outcomes within the food and beverage sector. Valdez (2026) demonstrated that competency-based learning materials significantly improved employees' knowledge, technical skills, and work effectiveness in food and beverage services, indicating that competent employees are better equipped to perform operational tasks accurately and consistently. Similarly, Hidayatulloh et al. (2026) found that human resource competence contributes significantly to improving the competitiveness of processed food enterprises by strengthening operational capability and organizational productivity. These findings suggest that organizations with more competent employees are better able to manage operational resources efficiently and reduce avoidable losses arising from ineffective operational practices.

Within the context of food waste management, employee competence is expected to strengthen organizations' ability to minimize the adverse consequences of food waste on business performance. Employees with higher competence are more likely to apply appropriate inventory management, food preparation techniques, portion control, and customer service practices, thereby reducing unnecessary waste and improving resource utilization. Furthermore, competent employees are generally more capable of identifying the causes of food waste, responding effectively to operational challenges, and adopting corrective actions to prevent unnecessary losses. Their knowledge and experience also facilitate better coordination among different operational functions, leading to more efficient resource management and improved cost control. Therefore, employee competence enables organizations to respond more effectively to food waste issues and maintain stable financial performance.

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under operational pressures. As a result, the negative impact of ingredient waste, preparation waste, and consumption waste on financial performance is expected to become weaker when employee competence is high.

H5a: Financial performance mediates the relationship between ingredient waste and self-perceived employability.

H5b: Financial performance mediates the relationship between preparation waste and self-perceived employability.

H5c: Financial performance mediates the relationship between consumption waste and self-perceived employability.

The Role of Employee Competence

Employee competence is widely regarded as a strategic organizational resource that enhances operational efficiency, service quality, and long-term organizational performance (Salman et al., 2020). It encompasses employees' knowledge, technical skills, abilities, and professional behaviors that enable them to perform job responsibilities effectively and adapt to changing work environments. According to Human Capital Theory (Becker, 1993), investments in employees' competencies increase the value of human capital, enabling organizations to improve productivity, optimize resource utilization, and sustain competitive advantage. In the food and beverage industry, employee competence is particularly critical because operational activities require strict compliance with standardized procedures, efficient inventory management, accurate food preparation, and effective waste control. Competent employees are more capable of minimizing operational errors throughout the food production process, from ingredient handling and storage to food preparation and customer service. Their knowledge and practical skills enable them to accurately forecast inventory needs, maintain appropriate storage conditions, comply with food safety regulations, and identify potential sources of waste before they become significant operational problems. As a result, higher levels of employee competence contribute to reducing ingredient waste, preparation waste, and consumption waste while improving overall operational efficiency. Employees with strong competencies are also better able to respond to unexpected operational challenges, make informed decisions, and continuously improve work processes, thereby limiting unnecessary resource losses and enhancing financial performance.

Previous empirical studies have consistently emphasized the importance of employee competence in improving organizational outcomes. Valdez (2026) reported that competency-based learning significantly enhanced employees' knowledge, practical skills, and job effectiveness in food and beverage services. Similarly, Hidayatulloh et al. (2026) found that human resource competence strengthens the competitiveness of food processing enterprises by improving operational capability, productivity, and organizational performance. These findings indicate that organizations employing more competent personnel are better positioned to implement effective food waste management practices and mitigate the negative financial consequences associated with operational waste. Therefore, employee competence is expected to weaken the adverse effects of ingredient waste, preparation waste, and consumption waste on financial performance by enabling employees to utilize resources more efficiently and execute waste reduction practices more effectively.

Beyond its operational role, employee competence also represents a key determinant of employees' self-perceived employability. Self-perceived employability refers to an individual's perception of his or her ability to obtain, maintain, or secure alternative employment based on personal qualifications, knowledge, and competencies (Rothwell & Arnold, 2007). Employees who possess stronger competencies are generally more confident in their capability to satisfy current job requirements, adapt to technological and organizational changes, and compete successfully in the labor market. Human Capital Theory further suggests that accumulated knowledge and professional skills enhance employees' market value, thereby strengthening their confidence in future career opportunities (Becker, 1993). Empirical evidence supports this positive relationship between competence and employability. Rothwell & Arnold (2007) demonstrated that individuals who perceive themselves as possessing stronger knowledge, skills, and professional capabilities also report significantly higher levels of self-perceived employability. Likewise, De Vos et al. (2011) found that competency development initiatives substantially improve employees' employability by enhancing their confidence in their ability to remain valuable in both internal and external labor markets. Similarly, Van der Heijde & Van der Heijden (2006) conceptualized employability as a competence-based construct, arguing that occupational expertise, adaptability, anticipation and optimization, personal flexibility, and corporate sense collectively determine employees' sustainable employability. These studies suggest that continuous competency development not only enhances employees' current job performance but also strengthens their confidence in maintaining and advancing their careers under changing labor market conditions. Accordingly, employees with higher competence are expected to perceive themselves as more employable.

H6a: Employee competence moderates the relationship between ingredient waste and financial performance.

H6b: Employee competence moderates the relationship between preparation waste and financial performance.

H6c: Employee competence moderates the relationship between consumption waste and financial performance.

H7: Employee competence has a significant effect on self-perceived employability.

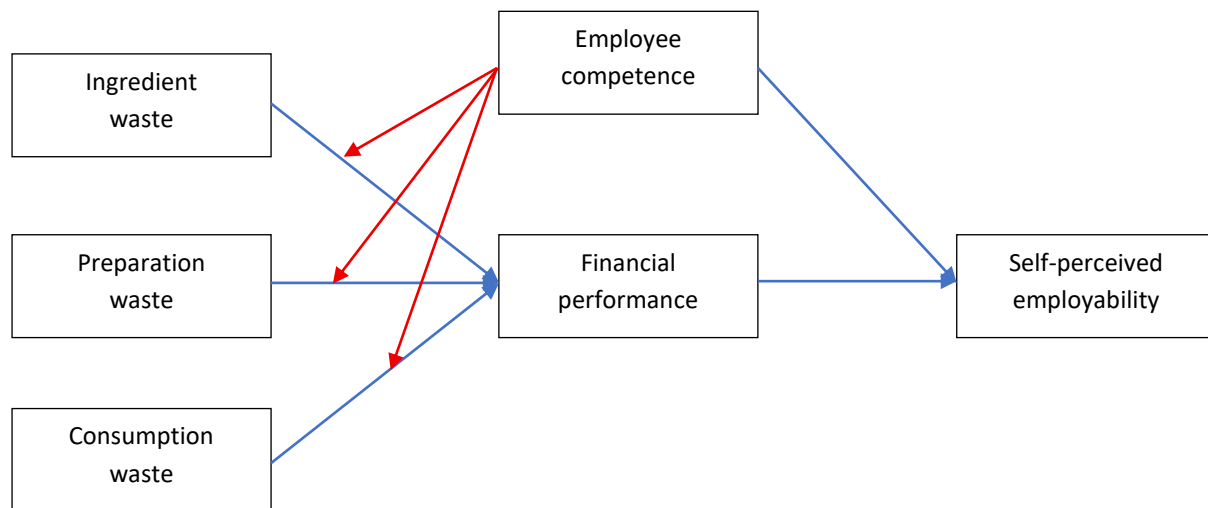


Figure 1. Research Model

III. METHODOLOGY

Measurement and Questionnaire Development

A structured questionnaire was developed based on validated measurement scales adapted from previous studies to ensure the reliability and validity of the research constructs. The measurement items were modified to fit the context of the F&B industry in Vietnam while preserving their original meanings. The questionnaire was initially prepared in English and then translated into Vietnamese, with the translated version carefully reviewed to ensure accuracy. All constructs were measured using a five-point Likert scale ranging from 1 – Totally disagree to 5 - Totally agree.

The questionnaire consisted of two sections: the first collected respondents' demographic information, while the second measured the six constructs in the proposed research model. Specifically, Ingredient Waste (IW), Preparation Waste (PW), and Consumption Waste (CW) were each measured using 4 items adapted from Tsai et al. (2026). Financial Performance (FP) was measured using 5 items adapted from Estiasih et al. (2024). Self-perceived Employability (SPE) adapted 5 items from Chughtai (2019). And Employee Competence (EC) used 4 items adapted from Valdez (2026) and Hidayatulloh et al. (2026). In total, the questionnaire comprised 26 measurement items.

Sample, Data Collection and Analysis

Data for this study were collected from employees working in food processing and food service businesses within the F&B industry in Vietnam. The unit of analysis was the individual employee. Therefore, the target respondents were employees currently working in restaurants, fast-food restaurants, bakeries, beverage shops, bars or pubs, catering service providers, and other F&B businesses. These respondents were considered appropriate because they are directly involved in daily operational activities, including food purchasing, storage, preparation, processing, and customer service, enabling them to evaluate food waste practices, organizational financial performance, and their self-perceived employability. A structured questionnaire was employed to collect the data, and the survey was administered through both online and offline distribution. Online questionnaires were distributed via social media platforms, employee communities, and professional networks related to the F&B industry, while printed questionnaires were distributed directly to employees in selected F&B businesses. Convenience sampling was adopted because it enabled efficient access to employees working across different types of F&B establishments.

A total of 350 questionnaires were distributed to employees from approximately 30 food processing and food service businesses in Vietnam. After excluding incomplete and invalid responses, 309 valid questionnaires were retained for the final analysis, representing a response rate of 88.3%. The demographic profile of the respondents included gender (male and female), age (under 18, 18–25, and above 25 years), education level (high school or below, college/bachelor's degree, and postgraduate), monthly income (less than USD 300, USD 300–500, and above USD 500), current position (employee/staff, supervisor/team leader, and manager), working experience in the F&B industry (less than 1 year, 1–3 years, 4–6 years, and more than 6 years), and the type of F&B business (restaurant, fast-food restaurant, bakery, beverage shop, bar/pub, catering service, and others). The collected data then were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3 to evaluate the measurement model and test the proposed hypotheses.

IV. RESULTS AND DISCUSSION

Demographics of Respondents

Table 1 presents the demographic characteristics of the 309 valid respondents participating in this study. Regarding gender, female respondents accounted for 54.4% of the sample, while males represented 45.6%, indicating a relatively balanced gender distribution. In terms of age, the majority of respondents were 18–25 years old (68.6%), followed by those aged over 25 (25.6%), whereas only 5.8% were under 18. This distribution reflects the predominance of young employees in Vietnam's Food and Beverage (F&B) industry. Regarding educational attainment, 63.8% of the respondents held a College/Bachelor's degree, followed by 26.2% with a high school education or below, and 10.0% possessing postgraduate qualifications. In terms of monthly income, nearly half of the respondents (47.9%) earned USD 300–500 per month, while 34.6% earned less than USD 300, and 17.5% reported monthly incomes exceeding USD 500.

Table 1. Demographics of Respondents (n = 309)

Demographics		Frequency	Percentage (%)
Gender	Male	141	45.6
	Female	168	54.4
Age	< 18	18	5.8
	18–25	212	68.6
	> 25	79	25.6
Education Level	High school or below	81	26.2
	College/Bachelor's degree	197	63.8
	Postgraduate	31	10.0
Monthly Income	< 300 USD	107	34.6
	300–500 USD	148	47.9
	> 500 USD	54	17.5
Current Position	Employee/Staff	229	74.1
	Supervisor/Team Leader	49	15.9
	Manager	31	10.0
Working Experience in the F&B Industry	Less than 1 year	67	21.7
	1–3 years	131	42.4
	4–6 years	73	23.6
	More than 6 years	38	12.3
Type of F&B Business	Restaurant	101	32.7
	Fast-food	47	15.2
	Bakery	28	9.1
	Beverage Shop (Milk Tea, Juice, Smoothie...)	62	20.1
	Bar/Pub/Lounge	24	7.8
	Catering Service	30	9.7
	Others	17	5.5
Total		309	100

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With respect to current position, the majority of respondents were employees/staff (74.1%), followed by supervisors/team leaders (15.9%) and managers (10.0%). This distribution is consistent with the organizational structure of most F&B businesses, where operational employees constitute the largest proportion of the workforce. Regarding work experience, 42.4% of respondents had 1–3 years of experience in the F&B industry, followed by 23.6% with 4–6 years, 21.7% with less than one year, and 12.3% with more than six years of experience. This indicates that most respondents possessed sufficient industry experience to evaluate food waste practices and their implications for organizational performance. Regarding the type of F&B business, respondents were drawn from a diverse range of establishments. Restaurants represented the largest proportion (32.7%), followed by beverage shops (20.1%) and fast-food restaurants (15.2%). The remaining respondents worked in catering services (9.7%), bakeries (9.1%), bars/pubs/lounges (7.8%), and other F&B businesses (5.5%). The diversity of business types suggests that the sample adequately represents different segments of Vietnam's F&B industry, thereby enhancing the generalizability of the study's findings.

Scale Reliability and Validity Assessment

Table 2 presents the reliability and convergent validity results of the measurement model. All constructs satisfy the recommended reliability criteria, with Cronbach's Alpha values ranging from 0.940 to 0.982, rho_A values from 0.953 to 0.984, and Composite Reliability (CR) values from 0.956 to 0.987, all exceeding the recommended threshold of 0.70. In addition, the Average Variance Extracted (AVE) values range from 0.819 to 0.949, well above the minimum threshold of 0.50, confirming satisfactory convergent validity. Among the constructs, Preparation Waste (PW) exhibits the highest reliability, while all remaining constructs also demonstrate excellent internal consistency and convergent validity. Overall, these findings indicate that the measurement scales are reliable and valid, supporting the suitability of the measurement model for subsequent structural model analysis.

Table 2. Construct Reliability and Convergent Validity

Variables	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
CW	0.940	0.965	0.956	0.846
EC	0.952	0.953	0.965	0.874
FP	0.944	0.955	0.957	0.819
IW	0.956	0.979	0.968	0.883
PW	0.982	0.984	0.987	0.949
SPE	0.966	0.967	0.974	0.881

Source: Data analysis by SmartPLS 3

Table 3 presents the results of the Fornell–Larcker criterion for assessing discriminant validity. In which Moderating Effect 1, Moderating Effect 2, Moderating Effect 3 reflects the moderating effects of EC on the relationships respectively between IW, PW, CW and FP. The results show that the square root of the Average Variance Extracted (AVE) for each construct (displayed on the diagonal) is greater than its correlations with all other constructs. Specifically, the diagonal values range from 0.905 to 1.000, exceeding the corresponding inter-construct correlation coefficients. These findings confirm that each construct is empirically distinct from the others and demonstrates satisfactory discriminant validity. Therefore, the measurement model meets the recommended Fornell–Larcker criterion and is appropriate for subsequent structural model analysis.

Table 3. Fornell-Larcker Criterion

	CW	EC	FP	IW	Moderating Effect 1	Moderating Effect 2	Moderating Effect 3	PW	SPE
CW	0.920								
EC	0.340	0.935							
FP	0.234	0.415	0.905						
IW	0.089	0.278	-0.089	0.940					

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Moderating Effect 1	-0.150	-0.006	0.178	-0.664	1.000				
Moderating Effect 2	-0.148	-0.351	-0.239	-0.106	0.147	1.000			
Moderating Effect 3	-0.457	-0.306	0.041	-0.154	0.203	0.394	1.000		
PW	0.284	0.375	0.456	0.264	-0.086	-0.241	-0.123	0.974	
SPE	0.179	0.420	0.550	-0.223	0.261	-0.175	0.033	0.402	0.939

Source: Data analysis by SmartPLS 3

Table 4 presents the results of the Heterotrait–Monotrait Ratio (HTMT) for assessing discriminant validity. The HTMT values range from 0.019 to 0.684, all of which are below the recommended threshold of 0.85 (Henseler et al., 2015). These findings indicate that the constructs are empirically distinct from one another and demonstrate satisfactory discriminant validity. Moreover, the relatively low HTMT values suggest that the latent constructs capture conceptually different aspects of food waste, employee competence, financial performance, and self-perceived employability. Therefore, the measurement model provides adequate discriminant validity, supporting the use of the constructs for subsequent hypothesis testing and structural model evaluation.

Table 4. Heterotrait-Monotrait Ratio (HTMT)

	CW	EC	FP	IW	Moderating Effect 1	Moderating Effect 2	Moderating Effect 3	PW	SPE
CW									
EC	0.357								
FP	0.234	0.432							
IW	0.101	0.293	0.106						
Moderating Effect 1	0.156	0.019	0.181	0.684					
Moderating Effect 2	0.152	0.359	0.238	0.112	0.147				
Moderating Effect 3	0.469	0.314	0.048	0.161	0.203	0.394			
PW	0.292	0.385	0.473	0.277	0.087	0.243	0.124		
SPE	0.184	0.438	0.566	0.230	0.265	0.179	0.033	0.413	

Source: Data analysis by SmartPLS 3

Research Model Assessment and Discussion

Table 5 presents the results of the structural model assessment. The adjusted R^2 values indicate that the proposed model explains 39.4% of the variance in Financial Performance and 34.3% of the variance in Self-perceived Employability, suggesting a moderate level of explanatory power. The model demonstrates satisfactory predictive capability in explaining employees' perceptions of financial performance and employability within the Vietnamese Food and Beverage (F&B) industry. The bootstrapping results further provide empirical evidence for evaluating the proposed direct, mediating, and moderating relationships among the research constructs.

The results indicate that Ingredient Waste has a significant effect on Financial Performance ($\beta = -0.226$, $t = 2.704$, $p = 0.007$), supporting H1. This finding suggests that ineffective management of raw materials can negatively influence firms' financial performance by increasing purchasing, storage, and disposal costs while reducing resource utilization efficiency. The result is consistent with the Resource-Based View (RBV), which emphasizes that inefficient utilization of organizational resources weakens firms' ability to create value and maintain competitive advantage. It also supports the findings of Tsai et al. (2026), who identified ingredient waste as one of the primary sources of operational inefficiency in Vietnam's food service sector. When ingredient losses increase, businesses are required to spend additional resources on replacing raw materials, which may reduce cost efficiency and profitability. Consequently, minimizing ingredient waste can improve inventory management, optimize resource utilization, and strengthen overall financial performance.

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The analysis shows that Preparation Waste significantly affects Financial Performance ($\beta = 0.352$, $t = 7.039$, $p < 0.001$), supporting H2. This finding indicates that food waste generated during preparation is significantly associated with firms' financial outcomes. Preparation waste may arise from production errors, improper portioning, inadequate food handling, and inefficient preparation processes. The result is consistent with Tsai et al. (2026), who emphasized that food preparation is a critical stage where operational practices substantially influence food waste management. Reducing preparation waste enables organizations to improve production efficiency, control operating costs, and make better use of available resources. Therefore, effective preparation management plays an important role in supporting sustainable financial performance within F&B businesses.

The results reveal that Consumption Waste has a significant effect on Financial Performance ($\beta = 0.152$, $t = 2.546$, $p = 0.011$), supporting H3. This finding suggests that food waste occurring during the consumption stage is significantly associated with firms' financial outcomes. Consumption waste includes leftovers, buffet waste, and unsold prepared food, all of which increase disposal costs and reduce resource utilization. The finding highlights the importance of implementing effective portion control, demand forecasting, and customer service practices to improve operational efficiency. By minimizing consumption waste, organizations can reduce unnecessary operating expenses and enhance the efficiency of food service operations. This contributes to better financial outcomes and supports the long-term sustainability of F&B businesses. Furthermore, effective management of consumption waste enables organizations to optimize resource allocation and improve overall service efficiency, thereby strengthening their competitive position in the F&B industry. Therefore, managers should continuously monitor consumption patterns and implement appropriate waste prevention measures to achieve long-term financial benefits.

Table 5. Structural Equation Modelling Results Estimates

Paths	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
IW -> FP	-0.226	-0.212	0.084	2.704	0.007
PW -> FP	0.352	0.354	0.050	7.039	0.000
CW -> FP	0.152	0.148	0.060	2.546	0.011
FP -> SPE	0.454	0.455	0.054	8.333	0.000
IW -> FP -> SPE	-0.103	-0.098	0.043	2.391	0.017
PW -> FP -> SPE	0.160	0.162	0.035	4.624	0.000
CW -> FP -> SPE	0.069	0.068	0.030	2.308	0.021
Moderating Effect 1 -> FP	0.038	0.045	0.067	0.576	0.565
Moderating Effect 2 -> FP	-0.144	-0.147	0.057	2.541	0.011
Moderating Effect 3 -> FP	0.205	0.204	0.057	3.595	0.000
EC -> SPE	0.232	0.231	0.055	4.244	0.000
EC -> FP	0.322	0.314	0.061	5.308	0.000
EC -> FP -> SPE	0.146	0.143	0.031	4.648	0.000
Moderating Effect 1 -> FP -> SPE	0.017	0.020	0.030	0.576	0.565
Moderating Effect 2 -> FP -> SPE	-0.065	-0.066	0.026	2.556	0.011
Moderating Effect 3 -> FP	0.093	0.094	0.031	2.982	0.003

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-> SPE

Adjusted R^2 : FP = 0.394; SPE = 0.343

Source: Data analysis by SmartPLS 3

The findings indicate that Financial Performance has a significant positive effect on Self-perceived Employability ($\beta = 0.454$, $t = 8.333$, $p < 0.001$), supporting H4. This result suggests that employees working in financially successful organizations tend to perceive greater career stability and stronger employment prospects. Organizations with better financial performance are generally more capable of providing employee training, career development opportunities, and competitive compensation, thereby strengthening employees' confidence in their future employability. This finding is consistent with Chughtai (2019), who reported that favorable organizational conditions positively influence employees' perceived employability. In addition, financially stable organizations are more likely to invest in human resource development and create supportive working environments, further enhancing employees' confidence in their long-term career opportunities.

The mediation analysis demonstrates that Financial Performance significantly mediates the relationships between Ingredient Waste, Preparation Waste, and Consumption Waste and Self-perceived Employability. Specifically, the indirect effects of Ingredient Waste ($\beta = -0.103$, $t = 2.391$, $p = 0.017$), Preparation Waste ($\beta = 0.160$, $t = 4.624$, $p < 0.001$), and Consumption Waste ($\beta = 0.069$, $t = 2.308$, $p = 0.021$) on Self-perceived Employability through Financial Performance are all statistically significant. Therefore, H5a, H5b, and H5c are supported. These findings suggest that food waste influences employees' perceptions of their employability indirectly by affecting organizational financial performance. When organizations achieve stronger financial performance through more effective food waste management, they are better positioned to provide stable employment, career development opportunities, employee training, and competitive compensation, thereby enhancing employees' confidence in their future employability. Conversely, ineffective food waste management may weaken financial performance, limiting organizational investment in human resource development and reducing employees' perceived career prospects. Overall, the findings highlight the important mediating role of financial performance in linking operational food waste management with employees' employment prospects, emphasizing that improving operational efficiency benefits not only organizational financial outcomes but also employees' long-term career development.

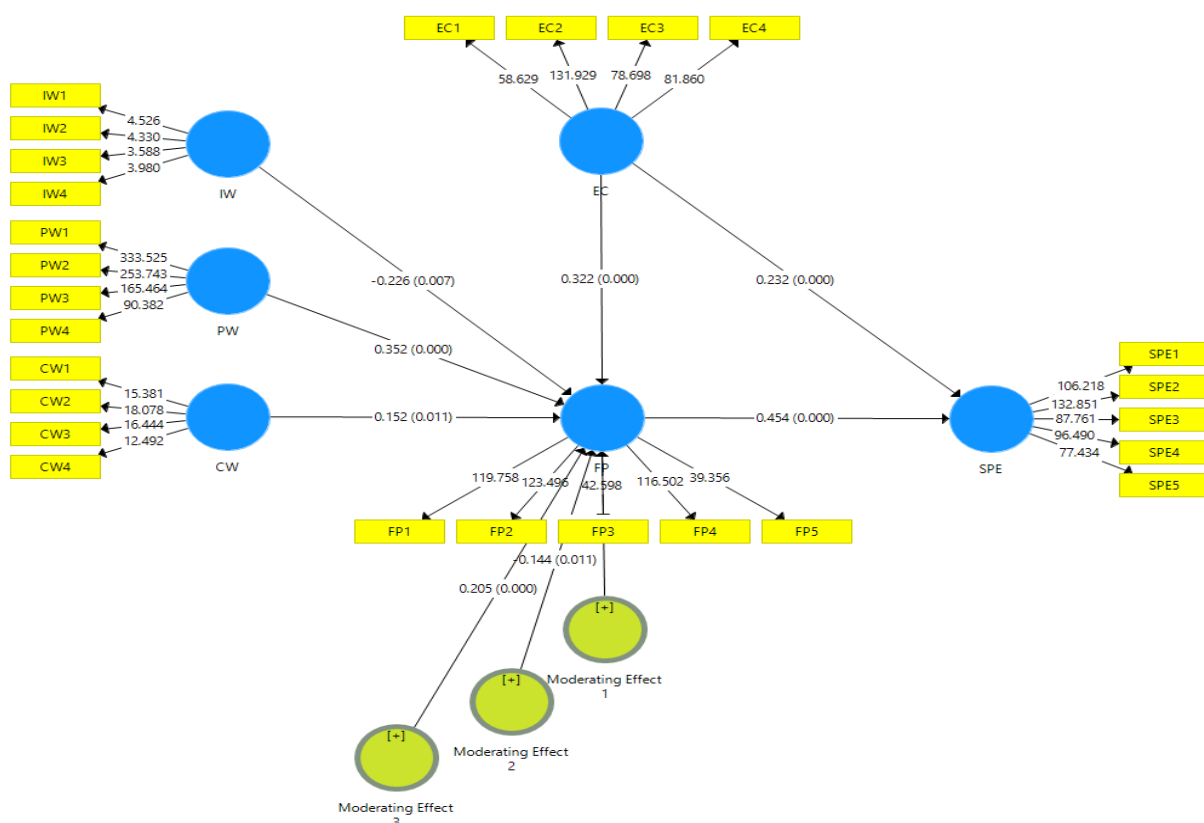


Figure 2. PLS Bootstrapping Model

Source: Data analysis by SmartPLS 3

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The moderating effect of Employee Competence on the relationship between Ingredient Waste and Financial Performance is not statistically significant ($\beta = 0.038$, $t = 0.576$, $p = 0.565$). Therefore, H6a is not supported. This finding suggests that employee competence alone may not be sufficient to mitigate the financial consequences associated with ingredient waste. Ingredient waste is often influenced by factors beyond employees' operational capabilities, such as purchasing decisions, supplier reliability, inventory management systems, and storage facilities. Consequently, improving employee competence without strengthening these organizational practices may have a limited impact on reducing ingredient waste and enhancing financial performance. The results indicate that Employee Competence significantly moderates the relationships between Preparation Waste and Financial Performance ($\beta = -0.144$, $t = 2.541$, $p = 0.011$) and between Consumption Waste and Financial Performance ($\beta = 0.205$, $t = 3.595$, $p < 0.001$), supporting H6b and H6c. These findings suggest that employee competence plays an important role in influencing how operational food waste affects organizational financial performance. Employees with higher levels of knowledge and technical skills are generally better able to apply standardized food preparation procedures, implement effective portion control, improve customer service quality, and reduce unnecessary food waste during daily operations. As a result, competent employees contribute to more efficient resource utilization and support better financial outcomes. These findings are consistent with Valdez (2026), who emphasized that competency-based training improves employees' operational effectiveness in food and beverage services, and Hidayatulloh et al. (2026), who found that human resource competence enhances organizational productivity and competitiveness. Therefore, investing in employee training and competency development can be considered an effective strategy for improving food waste management and strengthening financial performance in F&B businesses.

Finally, H7 proposed that employee competence significantly influences self-perceived employability. The results support this hypothesis ($\beta = 0.232$, $t = 4.244$, $p < 0.001$), indicating that employees with higher levels of knowledge, skills, and professional competence are more likely to perceive themselves as employable. This finding is consistent with Human Capital Theory (Becker, 1964), which suggests that investments in employees' competencies enhance their value in the labor market and strengthen their confidence in securing and maintaining employment. The finding is also in line with previous studies. Rothwell & Arnold (2007) found that individuals with stronger perceived competencies report higher levels of self-perceived employability. Similarly, De Vos et al. (2011) demonstrated that competency development significantly enhances employees' employability by increasing their confidence in adapting to changing labor market demands. The present study extends these findings by confirming the positive role of employee competence in enhancing self-perceived employability within the food and beverage industry. Therefore, organizations should continuously invest in employee training and competency development to improve not only operational performance but also employees' confidence in their long-term career prospects.

V. IMPLICATIONS AND CONCLUSION

Theoretical Contributions

This study contributes to the existing literature by integrating the Resource-Based View (RBV) and Human Capital Theory (HCT) to explain the relationship between food waste management, financial performance, and employees' self-perceived employability in the F&B industry. While previous studies have mainly focused on the environmental consequences and reduction strategies of food waste, this research extends the literature by demonstrating that food waste practices also have important organizational and human resource implications. The findings confirm that financial performance plays a mediating role in linking food waste management with employees' perceptions of employability. Furthermore, this study highlights the importance of employee competence as a strategic human resource capability that influences operational outcomes and strengthens employees' career confidence. These findings provide a more comprehensive understanding of how sustainable operational practices contribute to both business performance and workforce development in the F&B sector.

Practical Implications

The findings of this study provide several practical implications for F&B businesses in Vietnam, particularly in the context of rising operating costs, increasing competition, and growing pressure toward sustainable production practices. The results indicate that food waste management should not be considered merely as an environmental responsibility but also as an important factor affecting business efficiency and employee development. For F&B enterprises operating in Vietnam, especially restaurants, beverage shops, and food processing businesses where raw materials represent a significant proportion of operating costs, improving inventory control, purchasing planning, and storage practices can contribute directly to better financial outcomes. Businesses should strengthen demand forecasting systems, monitor ingredient usage, and apply digital inventory management solutions to reduce unnecessary losses caused by over-purchasing, spoilage, and inefficient storage. The findings also highlight the importance of improving operational practices at the preparation and consumption stages. In Vietnam's F&B sector, where a large proportion of businesses are small and medium-sized enterprises with limited resources,

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food waste often results from inconsistent preparation procedures, inaccurate portioning, and insufficient employee training. Therefore, F&B managers should develop standardized operating procedures, provide practical training on food handling techniques, and encourage employees to actively identify waste sources during daily operations. In addition, restaurants and food service providers can improve consumption waste management through appropriate portion design, customer communication, and flexible menu planning, particularly in response to changing consumer preferences and dining behaviors in urban areas such as Hanoi and Ho Chi Minh City.

The significant role of employee competence suggests that human resource development should become a central component of food waste reduction strategies in Vietnam's F&B industry. Instead of focusing only on technological solutions or waste disposal methods, businesses should invest in employees' knowledge and practical skills related to inventory management, food safety, sustainable practices, and resource efficiency. This is particularly important because many F&B employees in Vietnam are young workers with relatively short industry experience. Providing continuous training and career development opportunities can simultaneously improve operational performance, reduce avoidable waste, and strengthen employees' confidence in their future career prospects. Furthermore, the positive relationship between financial performance and self-perceived employability suggests that Vietnamese F&B enterprises should recognize the connection between business sustainability and workforce stability. Companies that successfully improve cost efficiency through effective food waste management may have greater capacity to provide better training programs, more stable employment conditions, and clearer career development pathways for employees. This is especially meaningful in Vietnam's highly dynamic F&B labor market, where employee turnover remains a common challenge. By integrating sustainability practices with human resource strategies, F&B businesses can enhance competitiveness while creating a more skilled and resilient workforce.

At the industry level, these findings suggest that policymakers and F&B associations in Vietnam should promote practical support programs for food waste reduction, including sustainability training, knowledge-sharing platforms, and incentives for businesses adopting circular economy practices. Collaboration between restaurants, food processors, technology providers, and educational institutions could facilitate the development of green skills and new employment opportunities in areas such as sustainable supply chain management, food waste recovery, and circular food production. Such initiatives would support Vietnam's transition toward a more resource-efficient F&B industry while contributing to long-term economic and employment sustainability.

Limitation and Future Research Directions

Despite its contributions, this study has several limitations. Firstly, the research employed convenience sampling and collected data from employees in Vietnam's F&B industry; therefore, future studies should apply probability sampling methods and include larger samples across different regions or countries to improve generalizability. Secondly, the study used a cross-sectional research design, which limits the ability to examine changes in food waste management practices and employee perceptions over time. Future research may adopt longitudinal approaches to investigate long-term relationships among the constructs. Finally, this study focused on three dimensions of food waste and employee competence; future studies could explore additional factors, such as organizational culture, technology adoption, sustainability practices, and leadership capabilities, to provide a more comprehensive explanation of food waste management and its impacts on organizational and employment outcomes.

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