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BACHELOR OF HOTEL MANAGEMENT THESIS

DETERMINANTS OF CUSTOMER BEHAVIOR TOWARD REDUCING FOOD WASTE IN VIETNAM FOOD SERVICE INDUSTRY

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Completing the graduation thesis is the most crucial phase in every student's life, equipping us with research skills and knowledge - this is a valuable asset before we embark on our future careers. After studying together for three years, spending a year brainstorming, and then four months working on the thesis, we have completed our graduation thesis entitled "Determinant of adult consumer behavioral intention toward food waste in Viet Nam food service industry." To accomplish this project, in addition to the four members' study efforts, we also received dedicated guidance from our professors.

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Authors of the thesis

EXECUTIVE SUMMARY

About: Food waste is a growing problem around the world, and also in Vietnam. Besides, many factors lead to food waste behavioral intentions. Moreover, to find out what factors can influence behavioral intentions to reduce food waste in the food service industry in Vietnam.

Purpose: This study aims to identify factors influencing food waste reduction in Vietnam's foodservice industry. We deciding to choose quantitative question to collect data from survey participants. Information was collected through a survey including 527 samples from consumers above 18 years old and use foodservice in Vietnam.

Results: The study shows that the factors that influence behavioral intentions to reduce food waste in the food service industry in Vietnam are Attitude (ATT), Subjective norms (SN), Perceived behavioral control (PBC), Habit (HAB), Emotion (EMO), Awareness and knowledge about food waste (AWA), Financial motives (FIN), Lack of time (TIM), Going for planned buying (PLA).

Research Implications: This study provides implications for businesses and governments to reduce food waste's behavioral intention or the food service industry in Vietnam

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ABBREVIATION AND ACRONYMS LIST

FAO	Food and Agriculture Organization
UNEP	United Nations Environment Programme
CEL Consulting	Supply Chain and Agriculture Operation Consultancy Organization
WRAP	Waste and Resources Action Programme
NRDC	Natural Resources Defense Council
SPSS	Statistical Package for the Social Sciences.
COI Communication	Central Office of Information

TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TIB	Theory of Interpersonal Behavior
MOA	Motivation-Opportunity-Ability model
SEPA	Scottish Environment Protection Agency
EPA	Environmental Protection Agency
EFA	Exploratory Factor Analysis
ANOVA	Analysis of Variance
KMO	Kaiser - Meyer - Olkin
SDGs	Sustainable Development Goals
IMF	International Monetary Fund

CHAPTER 1: INTRODUCTION

1.1 Topic background

1.1.1 Food Waste

The world has paid more attention to the increasing food waste problem and its consequences. Food waste is a global and complicated issue that impacts the environment, the economy, and social development. It is widely agreed that food waste needs to be reduced (Papargyropoulou *et al.*, 2016). Around 1.3 billion tons of food are wasted annually, equal to nearly one-third of all food produced for human use. Inevitably, this also entails that a significant portion of the resources utilized in food production is wasted, as the production of wasted food brings on greenhouse gas emissions, unstable climate, and severe weather events like droughts and flooding by emitting 8 to 10 percent. According to the FAO's recent report, 828 million persons worldwide experienced hunger in 2021. An estimated 3.1 billion individuals worldwide lack access to a nutritious diet. Meanwhile, around 14 percent of the world's food (valued at $400 billion per year) continues to be wasted after it is harvested and before it reaches the shops (Rigillo, 2022). It is vital and urgent that the United Nations include it in one of the factors of Sustainable Development Goals (SDGs) by 2030 to halve the amount of wasted food.

The food service industry is closely related to food, so it is not difficult to understand that food waste in this industry is very significant. The recent UNEP Food Waste Index 2021 (2022) report estimated that 26% of all food waste generated in 2019 came from food service. One estimate places the garbage produced by UK hotels, bars, restaurants, and QSRs (quick service restaurants, for instance) at a little over 3.4 million tons in 2009 (WRAP, 2011). As a result, the service industry is crucial to solving the problem of global food waste.

Consumers are considered to be a significant role in food waste in this business (UNEP, 2022) and in the problem of food waste globally (Corné van Dooren *et al.*, 2014). The authors were particularly impressed by the effects of food waste on the consumption stage by consumer behavior. An estimated 931 million tons of food, or 17% of all food supplied to consumers in 2019, ended up in the trash of households, retailers, restaurants, and others food services. At the global per capita level, 121 kg of food at the consumer level is wasted each year (UNEP, 2022). In another study, consumers were blamed for up to 35% of the food waste (Chalak *et al.*, 2016).With such an actual situation, food waste is always a burning issue; further research on food waste affected by the consumers is necessary for a

perspective overview. Therefore, the authors focus on food waste by consumers' behavioral intentions in this study.

1.1.2 Food Waste in Vietnam

Food waste affects all countries worldwide, and Vietnam is no exception. The entire amount of food wasted in Vietnam is projected to be 8.8 million tons, or US$3.9 billion, or 2% of the country's GDP, according to a 2018 survey by CEL Consulting. Vietnam is a developing country but has a greater rate of food waste in its solid trash than any developed country (Nguyen, 2020). The rate of food waste in Vietnam is twice as much as that of other advanced and wealthy economies worldwide (Nguyen, 2022). Currently, most studies on food waste focus on waste in rich economies like Europe and the United States (WRAP, 2011; Silvennoinen *et al.*, 2015). The impact of food waste is also severe; therefore, more study on this subject is necessary for Vietnam.

Studies have proved food waste at the consumption stage, but the quantity is limited and localized by region; in addition, studies on the behavioral intentions of customers in the food service industry in Vietnam are still lacking quite a lot, so there needs to be more study on this issue. More than that, studies on customer food waste behavior in the food service business are less common compared to research on the impaction of food wasted on a household and the global impact of the food system, particularly in Vietnam. Thus, this article aims to fill the research gap and focus on the influence of consumer behavior on food waste issues in Vietnam.

We contend that more studies must be conducted to thoroughly understand the factors influencing people's decisions to throw away food. The conclusions drawn from this work will serve as a solid foundation for initiatives to reduce food waste in Vietnam. Therefore, the authors have chosen "Determining customer behavior towards reducing food waste in Vietnam Food service industry" to conduct our research.

1.2 Practical problem

The food services industry in Vietnam is increasingly developing, leading to food waste problems that have many serious consequences. Rapid urbanization and the development of the economy promoted the food service industry to skyrocket. Accelerated economic growth (GDP per capita more than doubled by 2.7 times between 2002 and 2018), rapid urbanization (rising from 29% in 2008 to 38.4% in 2018), and the emergence of an urban middle-class (rising from 7.7% in 2014 to 13.3% in 2016) (GSO, 2019) which means the

development of economic and urbanization with a larger middle class will require a more significant proportion and quantity of food needed for living. According to World Bank (2020), the average waste generation rate per capita in Vietnam's large urban centers, where incomes are higher, is over double that of rural areas, reflected by the fact that the five most prominent cities in Vietnam, with only 35% of the population, contribute 70% of the country's total waste generation.

Statistics show that the third-highest amount of food waste occurs at food services all over the world; WRAP (2018) estimates that food services will generate approximately 10% of all food waste generated by 2025. With the quick expansion of Vietnam’s Food and Beverage industry, food services have skyrocketed to become an inevitable trend. In 2022, the Foodservice industry in Vietnam recorded a total revenue of more than VND 609 trillion, up 39% over the previous year (Statista, 2023).

Food waste negatively impacts every aspect of life. Food waste causes financially damaging to both individuals and communities. The first loss is the waste of labor; when we have to create products every day, all the resources that were used to produce them, such as water, energy, land, and labor, are also wasted, while inadvertently "throwing" every hard-earned money into the trash which represents a significant economic loss for the business. Second, when food is wasted, money spent on purchasing that food is also destroyed. Food waste increases the cost of food sold; when food is wasted, the food service business needs to cover their profit before tax and contribution margin lost by setting up higher prices for the menu.

Food waste significantly impacts the environment, affecting natural resources, climate change, and ecosystem health (Parizeau, von Massow and Martin, 2015). Food waste substantially contributes to greenhouse gas emissions, mainly methane, produced when organic matter decomposes in landfills. In Vietnam, landfills are the most common way of disposing of food waste, which can lead to significant emissions of methane and other greenhouse gases; when food waste decomposes in landfills, a potent greenhouse gas that is about 25 times more potent than carbon dioxide in terms of its global warming potential. Another way to deal with food waste usually used in Vietnam's Foodservice industry is selling leftovers for pig farms. This can be economical and less harmful to the environment, but this can interrupt the operating process and make it smelly.

Besides, food waste is the waste of water resources (FAO, 2013). By wasting food, we are wasting fresh water. The NRDC (2017) established that food waste wastes a quarter of our water supply in the form of uneaten food, which equates to $172 billion in wasted water. In Vietnam, when food waste is not adequately disposed of, it can contaminate water sources and affect water quality. Moreover, water is an important thing that impacts the Foodservice business's success. Water is needed for all stages of the food production process. In all types of food produced, the food has to be washed carefully before being put in food processing; also, water is necessary for handling food waste.

Moreover, Vietnam is not yet a wealthy economy; there are still many needy people in Vietnam. From 2013-2017, there were nearly 283,200 poor households and 1,185,000 needy people (GSO, 2020). The report released by the FAO (2013) says that about 30% of global food, or 1.3 billion tons, is lost and thrown in the trash every year; this wasted food is enough to feed an estimated 830 million poor people worldwide and save the lives of 3.1 million babies a year.

Food waste can damage a restaurant's image and reputation. Customers today are increasingly aware of environmental issues and may also have ethical concerns about food waste; these people may view a restaurant that generates significant food waste as environmentally irresponsible. This can lead to negative perceptions of the restaurant and decreased customer loyalty. Besides, when a restaurant reduces the enormous amount of food waste, customers can question whether this restaurant makes not tasty food. In addition, in the age of social media, negative perceptions of a restaurant that produces lots of food waste or hands in the wrong way can quickly spread online, leading to a potential backlash that can damage the restaurant's reputation.

1.3 Research gap

Although food waste in Vietnam is a climacteric problem and has left many consequences, research about food waste causes customer consumption in Vietnam's Food Service industry is founded limited. Remarkably the case study in Viet Nam only focuses on household waste, and some in the early to mid stages of the supply chain. In addition, consumer behavior is defined as a critical determinant of restaurant food waste pp (; L. en Wang *et al.*, 2017; Martin-Rios *et al.*, 2018). Much international research about food waste through behavior has been highly appreciated and is highly valued in practice. Moreover, Vietnam is an outstanding culture with many unique characteristics, several researchers in

other countries have addressed this topic, but due to differences in culture and society, food system, infrastructure, policy, and geography, we cannot presume how these findings might translate to Vietnam. Hence Vietnam needs to catch up with the progress of the world.

International research about Food waste currently only breaks off into several common factors: Attitude, Subjective Norms, and Perceived Behavior Control, but we don't see that these factors can express enough the engine of customers in reducing food waste. So to clarify the engine of customers toward Food waste, we implement some other factors and assess the level of influence on customers' Behavior. These include Emotion, Habit, Awareness and Knowledge, Lack of time, Financial motives, and Going for planned Using Foodservice.

Our study will help increase awareness and knowledge about food waste in Vietnam. The consumers' food waste behavior reports high rates of unawareness among consumers towards the issue (Hamilton, Denniss and Baker, 2005; WRAP, 2006; Lyndhurst, Cox and Downing, 2007). The current developments in food waste indicate that the public has to be aware of the effects of their consumption and wasting behavior (Morgan, 2009; Stuart, 2009). Gauging the awareness levels of consumers concerning food waste and knowing how knowledgeable they are about the whole food waste phenomenon will be a step in the right direction to help Vietnamese people reduce food waste and help Vietnam become more and more sustainable. So we conclude that research intention leads to the Behavior of wasting food in Viet Nam, an indispensable issue that needs more people to know and understand.

1.4 Research question

The questions posed to accomplish the objectives of the study are:

Question 1: What factors influence consumers' behavioral intention toward reducing food waste in Vietnam's Foodservice industry?

Question 2: How do those factors affect the consumer's reducing food waste behavioral intention?

Question 3: What are the possible recommendations and implications for reducing food waste behavioral intentions of customers in Vietnam's Foodservice industry?

1.5 Research Objectives and Research Scope

1.5.1 Research objectives

The main objective of this study is to delve into the reality of food waste in Vietnam and, at the same time, point out the food waste behavioral intentions of Vietnamese people when using food service. In the case of food waste, behavioral intention can be a significant factor that leads to the wastage of food. So to find those factors, we set out three objectives to explore in this study:

Objective 1: Identify the factors influencing consumers' behavioral intention toward reducing food waste in Vietnam's Foodservice industry.

Objective 2: Find out how the factors affect the consumer's reducing food waste behavioral intention.

Objective 3: To propose recommendations for reducing food waste behavioral intentions of customers in Vietnam's Foodservice industry.

1.5.2 Scope of the Research

The scope of the research may be limited to only studying consumer behavioral intentions rather than actual behavior. This could be due to time constraints, limited resources, or the study's specific objectives in addition to methodology; the research is based on a survey and questionnaire and only captures consumers' intentions rather than their actual behavior. In this study, the authors surveyed people over 18 years old about their behavioral intention to reduce food waste when using food service, due to people under 18 years old do not yet have complete legal rights and have a stable source of money to manage their behavioral intention.

The primary purpose of this study is to identify the determinants of customer behavioral intention toward reducing food waste in the food service industry in Vietnam. To provide data for this study, the survey will focus on people who use food services, their eating behaviors, and their intention when using food services.

1.6 Research method

The researcher wants to determine what influences customer behavior's determinants toward reducing food waste in Vietnam's food service industry. This study employed a structured questionnaire to gather data using a descriptive research approach. The Likert scale, which ranges from 1 (Strongly disagree) to 5 (Strongly agree), is used to measure the observable variables. People who live in Vietnam are considered to be among the estimated

research sample subjects. Our samples are comprehensive because food waste behavior can occur in every gender and every career field. etc. This survey was carried out to set response time measurement criteria, gather replies from respondents, and evaluate the overall coverage of all questions in the survey scenario.

1.7 Methodology and Data Overview

This study used primary research, including quantitative methods, to collect through surveys and then analyze by SPSS. SPSS is used to analyze demographics and assess the normality of data. Multiple interview questions were created during the survey to help the participants stay on track with the results and gather much case-specific data about their behavioral intention. From there, we evaluate the analysis results and determine which factors are essential, which must be improved, and which factors must be maintained. Secondary research is done through research articles, newspapers, websites, and internal data.

1.8 Outline of Thesis

The research is structured into five main chapters, excluding the abstract, references, tables, figures, abbreviations, and appendices. These chapters are Introduction, Literature Review, Methodology, Findings and Analysis, and Recommendations and Conclusion.

Chapter 1: The introduction concisely overviews the research background, including the research objectives and questions. It also outlines the scope of the study and briefly touches upon the methodology used for data collection and analysis.

Chapter 2: Literature Review and Theoretical Framework defines the research keywords and summarizes prior related papers to establish possible relationships between variables. This chapter identifies the literature gap and builds research models with hypotheses based on the reviewed literature.

Chapter 3: Methodology, briefly discusses the research philosophy, ethical considerations, and research process. It also explains the data collection and analysis methods chosen for the study.

Chapter 4: Findings and Analysis, summarizes the results obtained from analyzing the data using the methods discussed in Chapter 3. This chapter answers each research question and hypothesis, particularly about how various factors influence the Determinant of adult consumer behavioral intention toward food waste in Viet Nam's food service industry.

Chapter 5: Conclusion and Recommendations, summarizes the main findings and proposes recommendations for reducing food waste consumers' behavioral intention in Viet Nam

food service industry. The chapter also discusses the limitations and implications of the research.

1.9 Summary

After providing background information and some critical points relevant to this study, this chapter will cover the topic background, practical problem, research objective, research question, research scope, research method, and data overview. It also kicks off the main idea of the study. The following chapter will highlight technical terms used in the research.

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Theoretical Framework

2.1.1 Food Waste

Food initially intended for human consumption but diverted from the food chain to non-food use is still considered food waste also explicitly to food spilled, spoiled, or degraded in quality before reaching its final product stage during production, postharvest, processing, or distribution stages (Busetti and Pace, 2022). On the other hand, food waste refers to food that has completed the food supply chain and is fit for consumption but remains uneaten and is discarded, regardless of whether it has spoiled or not. Food is wasted along the whole food supply chain; Gustavsson, Christel and Sonesson Ulf (2011) divided food waste into five generation sources based on each stage: agricultural production, postharvest handling and storage, processing, distribution, and consumption. In this study, we mainly consider the food waste problem in the context of studying consumer behavioral intention in the consumption phase. As a result, the appropriate definition of food waste in this study could be as stated by Parfitt et al., (2010), who defined it as "food losses occurring at the end of the food chain (retail and final consumption), which is related to retailers' and consumers' behavior," or by Lipinski *et al.*(2013)who stated it as follows: “food that is of good quality and fit for human consumption but that does not get consumed because it is discarded either before or after it spoils. Food waste typically, but not exclusively, occurs at the retail and consumption stages in the food value chain and is the result of negligence or a conscious decision to throw food away.”

2.1.2 Food Service

For this paper, food service is defined as providing food and beverages purchased out of the home but which may be consumed both in and out of the house (Meiselman, 2009). Dhir *et al.* (2020) pointed out that eating out is becoming increasingly popular in developed and developing nations, which is excellent news for the food service business. Such a tendency puts food waste challenges at the forefront for restaurants, fast food, cafés, cafeterias, canteens and dining halls, catering, and other food service institutions. In Italy, restaurants make up approximately 21% of total food waste cc . For example, the food provided in the school canteen and the hospital is also understood as a food service. Ready-to-eat food can be purchased at supermarkets (ready-to-eat lunch boxes), with catering

elements in the meal preparation and at the checkout counter. In food service, however, the service component tends to be more comprehensive, provided throughout the meal, and in many cases, just as important as the food itself.

Categorizing the food service industry can be done in several ways, including dividing and grouping the drive into two broad segments or categories. State sector and commercial (also known as profit or private sector) (also called Not for Profit Sector, Cost Sector, Subsidised or Welfare – but generically referred to as Institutions). Universities, schools, the military, hospitals, prisons, and employee feeding fall under the latter group (Figure 2.1: a graphical representation of this general classification). First is the profit-making, private, or commercial sector, which consists of businesses like eateries, cafes, and fast-food restaurants. It dominates the UK market with about 70% of all locations (COI, 2008).

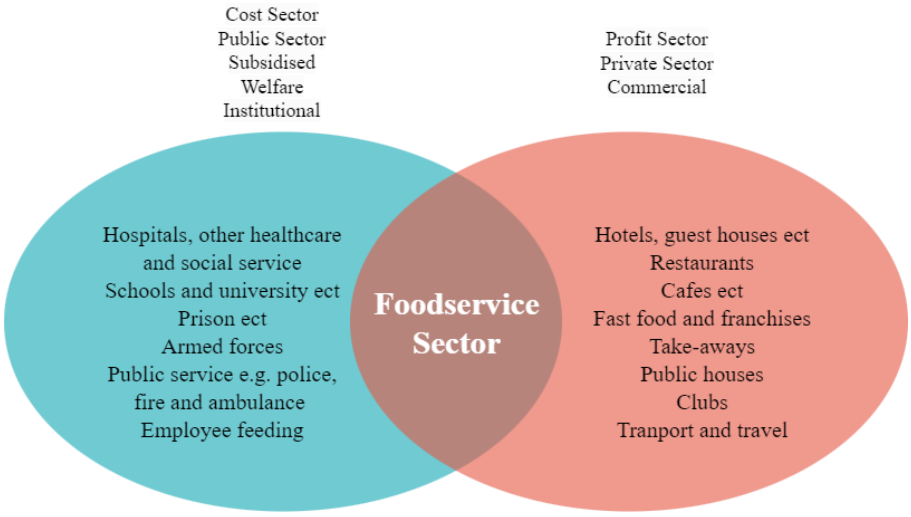

Figure. 2.1 Classifying the foodservice industry

2.1.3 Customer Behavioral Intention

The driving force behind volitional conduct is behavioral intention, which is closely related to the activity (Jang & Feng, 2007). Engel et al. (1995) defined consumer behavior as "those activities immediately involved in the acquisition, consumption, and disposal of goods and services, as well as the decision processes that precede and follow these actions." In other words, consumer behavioral intention is the intention that leads consumers to engage in activities to identify, obtain, use, evaluate, and discard goods and services they think will satisfy their needs.

A better knowledge of consumer foodservice behavioral intention through research and identification of these behaviors can yield substantial long-term benefits for food waste

studies. However, as noted by Kotler et al. (1999), it is crucial to keep in mind that despite the considerable effort being put into learning about and comprehending customer behavior, pinpointing the precise reasons why customers choose a particular product or service, as well as the reasons they waste food, it complicated. Customers occasionally make decisions based on emotional factors they may not be completely aware of.

2.1.4. Literature gap in the theoretical framework

Current research on food waste in the food service industry has covered a wide range of subjects, including food waste quantification, waste composition, waste handling, the attitude of consumers, demographic factors, governmental regulations, interventions, nudges composting and landfills, ect. Although researchers have explored the visible part of food waste subdomains, much of their findings focus on small fields, lacking generalizable and limited geographic reach. Papargyropoulou *et al.* (2019) contend that the existing literature is biased towards rich countries even if the problem is more evident in emerging economies. Some research papers studying a small food service segment, like Malefors (2021) found causes and risk factors contributing to waste generation, focusing on preschool and school catering units. Due to the connection between reducing food waste and food sustainability (Thamagasorn and Pharino, 2019) and the implications for increased use of natural resources (Wunderlich and Martinez, 2018), reducing food waste is an essential goal at both the national and international levels. Therefore, the fact that there is so little academic literature in this area is quite alarming, and more funding needs to be allocated for research in this field.

In the research papers on consumer food waste behavior, it is easy to find the factors that are given to influence it, such as Attitude, Subject norm, Perceived behavioral control, Habit, and Emotion (Visschers, Wickli and Siegrist, 2016; Aktas *et al.*, 2018; Mumtaz *et al.*, 2022; Jabeen *et al.*, 2023). When researchers learn about customers' food waste behavioral intentions, these factors are often considered. However, to make this study more valuable, the authors have added a few factors, such as Lack of time, Financial motives, and Going for planned using foodservice to the study on the intention to waste food of food service consumers in Vietnam to become more in-depth and inclusive, and besides, compared with other research papers that only survey standard demographics such as age, gender, income, education level, etc. In the survey of demographic factors, we also measured the Scarcity experience to see if it affects the factors that lead to food waste intentions.

2.2 Review Of Related Literature To Models

2.2.1 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is a well-known social psychology theory that was developed by Icek Ajzen (Ajzen, 1991) as an extension of the Theory of Reasoned Action (TRA). TRA posits that an individual's Behavior is determined by their attitude towards the Behavior and subjective norm, which is their perception of social pressure from significant others to engage or not engage in the Behavior (Hill, Fishbein and Ajzen, 1977). TPB further expands on TRA by including perceived behavioral control as a third factor determining an individual's Behavior. Perceived behavioral control refers to the individual's perception of the ease or difficulty of performing the Behavior.

The Theory of Planned Behavior (TPB) is a popular framework in research for understanding the factors that influence an individual's decision to engage in a particular behavior. TPB examines attitudes, subjective norms, and perceived behavioral control as behavior predictors and has helped predict behavioral intentions and actual behavior. TPB is particularly prominent in research related to industries such as healthcare and environmental sustainability (Sarkar and Bhardwaj, 2020). TPB has also been applied to study behaviors such as regular exercise, healthy eating, quitting smoking, and reducing food waste (Ajzen and Madden, 1986; Visschers, Wickli and Siegrist, 2016). Numerous articles have contributed to its success and continue to explore its applicability in different contexts.

However, the TPB has limitations despite its usefulness in predicting and understanding customer and food waste behavior. One limitation is that it does not account for Behavior's emotional and affective components. The TPB does not consider the impact of emotions, such as guilt or pleasure, on food waste or purchasing behavior. Another limitation is that it assumes that individuals have complete control over their Behavior, which may not always be accurate. For instance, addiction or mental illness or using stimulants, and narcotics may limit an individual's perceived control over their Behavior.

While the TPB has been successfully applied to understand and predict various behaviors, including food waste and customer behavior, researchers should be aware of its limitations and consider additional factors that may impact behavioral intention.

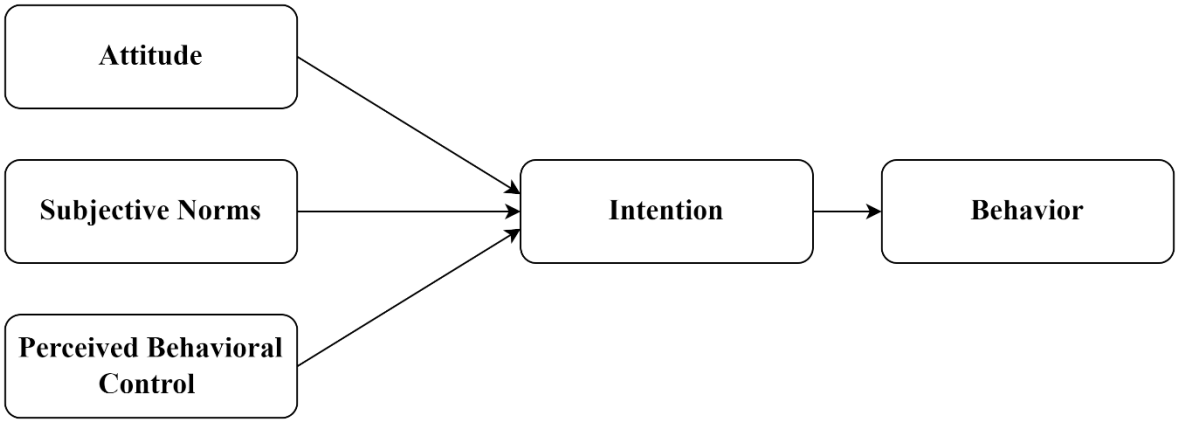

Figure 2.2: Theory of Planned Behavior by Icek Ajzen (1991)

2.2.2 Theory of Interpersonal Behavior (TIB)

TIB was first developed by Triandis (Triandis, 1977). The TIB stipulates that intention is a result of affect, cognition of consequences, social norms and personal norms (Jackson, 2005). The theory further postulates that the probability of performing a behaviour depends on the individual's habits, on conditions that facilitate the behaviour and on the individual's intention to perform the behaviour (Sung, Cooper and Kettley, 2019).

Compared with other theoretical models, the TIB theoretical model has been applied in many different fields, such as behavioral psychology, user behavior research in business (Dang Vu and Nielsen, 2022), education (Li *et al.*, 2020). This model is also widely used indirectly in the marketing industry when analyzing business strategies and users (Arango-gonzález *et al.*, 2022). Besides being used in many research directions on human behavior in the above fields, this theoretical model – TIB has specific advantages and benefits such as theory; we can apply this same theoretical model as a theoretical basis for research or analysis.

While the model has some strengths, there are also several limitations. The TIB model tends to view behavior simplistically and linearly, which may not capture the complexity of human interactions. The model also focuses primarily on universal human needs, motivations, and may not consider individual differences in personality, temperament, or life experiences that can impact behavior. It is essential to recognize its limitations and use it with other models and approaches to understand human behavior comprehensively.

Although the theory of planned behaviour has received strong empirical support in explaining environmentally relevant behaviours, one of the key criticisms is that it under

represents the contribution of the non-cognitive determinants of behaviour, particularly habits and emotions (Russell *et al.*, 2017). The variables of both TIB and TPB models are mostly the same. In TPB (Ajzen, 1991), this model shows individuals making justified actions or choices. In TIB, the only difference is that there are two more variables Habit and Emotion. This model specializes in studying human behavior and habits when adding emotional factors will bring results. Therefore, many previous research papers acknowledge that the TPB model is not enough to predict and study behaviors formed and dependent on emotions or formed from habits (repetitive behaviors with high frequency).

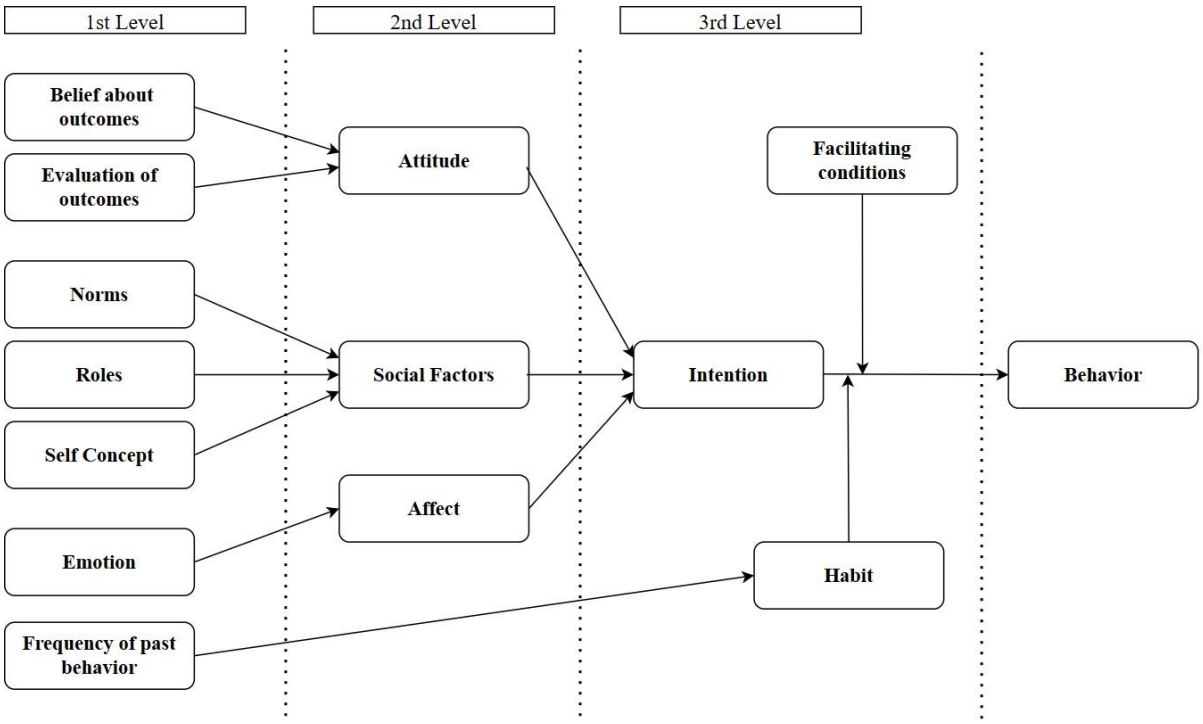

Figure 2.3: Theory of Interpersonal Behavior by Harry Triandis (1977)

2.2.3 Motivation-Opportunity-Ability model (MOA)

The Motivation-Opportunity-Ability model was proposed by Macinnis & Jaworski (2012), is used and developed mainly in marketing. As the name suggests, the model is used when studying the motivations, abilities, and opportunities that influence an individual's actions. We analyze each of the above aspects to understand this theoretical model better.

Motivation (M): People all have specific goals and needs that they want. So they need a motivating force or something that makes them want to achieve their goals. When you set your goal, all the things that appear to make you move toward your tangible and intangible objects are called motivation. Variable Awareness and knowledge about food waste in this section is considered as one of the motivations for behavioral intention.

Opportunities (O): Take advantage of favorable or unfavorable factors or situations such as available time, large budgets, or abundant human resources. The element of Opportunity (O) in this research pattern includes Financial motives and Lack of time.

Ability (A): Consider factors such as qualifications, awareness levels, finances, people, and skills to perform an action or project. The Ability factor proposed in this study is Going for planned using food service.

From MOA model below, we choose 4 factors suitable for our research, which are Awareness and Knowledge, Financial motives, Lack of time, Going for planning using foodservice.

When someone has the motivation, opportunity, and ability to make a particular choice, the chance of such a choice being selected increases (Cui et al., 2020). There are also many research papers using this theoretical model that is not in the field of marketing; related fields can be mentioned, such as social sciences (Baumhof et al., 2017), consumer behavior (Li et al., 2019), risk reduction (Hendriks and Stokmans, 2020). Many researchers also show that focusing on three factors in the MOA model will achieve specific benefits and effects: profitable productivity, customer satisfaction, quality of deliverables, and market share growth (Olander & Thogersen, 1995). The MOA theoretical model below adapted by Matharu, Gupta and Swarnakar (2022) from orginal MOA.

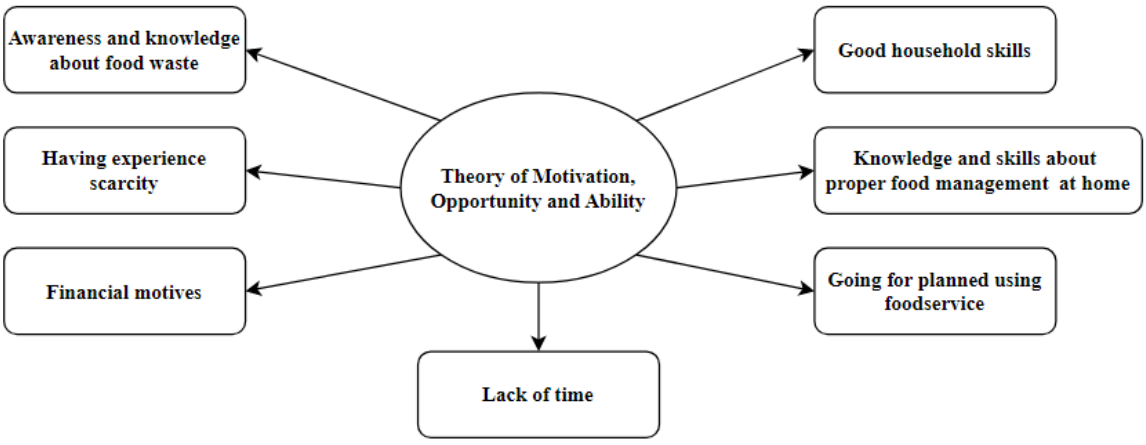

Figure 2.4: The MOA model adopted by Matharu, Gupta and Swarnakar (2022)

Besides the strength of the Motives - Opportunity - Abilities (MOA) model, there are some limitations to consider. The model may not apply to all cultures or contexts, as cultural and social factors can significantly impact all cultures or contexts, as cultural and social factors

can significantly impact behavior. The model focuses primarily on individual motives but may overlook differences in personality, nature, or life experiences that can impact behavior. Inaccurate or incomplete assessments of factors such as motives, opportunities, and abilities may limit the model.

2.2.4 Literature summary table

No	Article	Authors	Factors
1	The theory of Planned Behavior	(Ajzen, 1991)	Attitude, Subject norm, Perceived Behavior Control
2	Theory of Interpersonal Behaviour	Triandis (1977)	Habit, Emotion
3	Bringing habits and emotions into food waste behaviour	Russell *et al.* (2017)	Habit, Emotion
4	Information Processing from Advertisements: Toward an Integrative Framewor	Macinnis and Jaworski (2012)	Motivations, Opportunity, Abilities
5	Efforts are made but food wastage is still going on: a study of motivation factors for food waste reduction among household consumers	Matharu, Gupta and Swarnakar, (2022)	Awareness and knowledge about food waste, Financial motives, Going for planned using foodservice, Lack of time

Figure 2.5: Literature summary table

2.3 Literature gap

The literature gap between the TPB model, the TIB model, and the MOA model to the specific factors that influence behavioral intention and behavior change.

The TPB and TIB are similar in that they focus on individual Attitudes, Subjective norms, and Perceived behavioral control as determinants of behavioral intention. About the TIB model tends to view behavior simplistically and linearly, which may not capture the

complexity of human interactions. The TIB is considered an alternative theory that counters the shortcomings of the TPB. However, Bamberg & Schmidt (2003) argued that TIB has received little attention, whereas TRA and TPB were more frequently used and cited in research. The TPB does not account for the emotions involved when performing a given behaviour and specifically overlooks the contribution of non-cognitive determinants of behaviour, particularly habits and emotions (Jackson, 2005; Sung, Cooper and Kettley, 2019; Issock Issock, Roberts-Lombard and Mpinganjira, 2020). About the TIB model tends to view behavior simplistically and linearly, which may not capture the complexity of human interactions.

In contrast, the MOA model emphasizes the role of situational factors, such as opportunities and resources, in shaping behavior. The MOA model suggests that individual motives, external opportunities, and abilities influence behavior change. The MOA model has been used primarily in the context of environmental behavior and sustainability. However, it has also been applied to other domains, such as health behavior and organizational behavior.

Despite the differences between these models, there is a growing recognition of the need to integrate multiple theoretical perspectives to understand complex behaviors better. For example, recent studies have explored the combination of the TPB and MOA models to predict sustainable travel behavior, demonstrating that including situational factors can improve the predictive power of the TPB.

However, further research is still needed. Further research is still needed to explore the potential benefits of combining different models to understand behavioral intention and behavior change better. Specifically, research is needed to identify the specific factors most salient in different contexts and develop integrated models that can account for the interplay of individual, social, and situational factors in shaping behavior.

2.4 Hypothesis development

This essay is analyzed based on previously defined definitions, theories, and research. This article is about the Determinants of customer behavioral intention toward reducing food waste in the Vietnam Food Service industry. This model comprises a combination of nine main factors that affect people's Food Waste behavioral intention, including Attitude, Subjective Norms, Perceived Behavioral Control, Emotion, Habit, Awareness and Knowledge, Financial motives, Lack of time, and Going for planned using Foodservice.

2.4.1 Attitude

According to Ajzen (1991), the father of TPB theory, attitude is the extent to which the individual has a favorable or unfavorable evaluation of the behavior to be enacted. Personal attitudes toward behavior are used to evaluate the behavior that further turns into the intention to perform a specific behavior (Ajzen, 1991). In executing a particular behavior, a positive attitude can augment an individual's desire for knowledge, abilities, and confidence resulting in the anticipation that drives intention and behavior. Accordingly, a favorable attitude creates a stronger intention to perform in a certain way, while an unfavorable attitude creates a stronger intention not to act confidently.

A study on food waste behavior found a strong and substantial association between attitude and food waste behavior, which is crucial for understanding why food waste happens and consumer food waste behaviors (Secondi, Principato and Laureti, 2015). On the other hand, attitude towards a particular behavior, especially food waste, is an active precursor of behavioral intention and the adoption of environmental behavior, including reducing food waste. Onel & Mukherjee (2017) deduce in their study that attitude significantly affected domestic waste recycling intentions. Moreover, the research found that attitude positively and significantly affects the intention to reduce food waste. Also, the intention to decrease food waste significantly impacts food waste behavior Guchi & Anon (2022). Based on theory, a positive attitude creates a stronger intention to behave in a certain way. In comparison, a negative attitude creates a stronger intention not to act in a certain way, which makes consumers feel bad or guilty about wasting food (Evans, 2012; Watson and Meah, 2012; Visschers, Wickli and Siegrist, 2016) and were concerned when threw food away (Abeliotis, Lasaridi and Chroni, 2014) lead to their action about food waste. Thus, having a favorable attitude towards particular behavior improves behavioral intention. Hence, the following hypothesis is proposed.

- Hypothesis 1 (H1): Attitudes toward food waste positively impact Reducing food waste Behavioral Intention.

2.4.2 Subjective Norms

Subjective Norms are defined as shared beliefs on how a person should behave and mean a sense of perceived social pressure to perform a specific behavior (Ajzen and Sheikh, 2013). According to Rivis and Sheeran (2003), significant others want them to perform a behavior again, multiplied by one's motivation to comply with those people's views. Which are shared beliefs of how one should behave and affects the intention to perform a behavior

(Stancu, Haugaard and Lähteenmäki, 2016). The subjective norms in the Theory of Planned Behavior can be seen as injunctive norms (Thogersen, 2006) as they account for the perceived social pressure to undertake the behavior, which assists an individual in determining acceptable and unacceptable social behavior.

Based on Vabo & Hansen (2016), Subjective Norms extend a person feeling of social pressure to perform the behavior; people intend to waste less food if wasting food is disapproved by essential others. Studies have shown that the subjective norm can significantly reduce food waste behavior in the household (Vabø and Hansen, 2016) and dining-out situations (Yu *et al.*, 2021). However, some prior studies about food waste behavior in households have pointed out that subjective norms have a weak or no effect on food waste behavior (Stefan *et al.*, 2013; Visschers, Wickli and Siegrist, 2016). Quested *et al.* (2013) suggested that people in households could not judge one another since household food waste is not visible to others, and therefore subjective norms were not significant in these studies. However, a restaurant and using food service is public, and people can judge the behavior of one another, so subjective norm maybe have an essential role in this study.

According to Ajzen (1991), a person's close relatives, friends, neighbors, and community members are the leading social influencers in their life. In other words, because food waste is more of a social problem, it moves from a personal standard to an obligatory (injunctive) social norm. So we have the following hypothesis:

- Hypothesis 2 (H2): Subjective norms positively impact Behavioral Intention.

2.4.3 Perceived behavioral control

The conceptualization of perceived behavioral control in the TPB is based on the work of Bandura (1978). The Perceived behavioral control in TPB focuses on how much people believe they can perform a specific behavior. The more people believe they can complete an intended behavior, the more likely they will persist (Ajzen, 1991).

Adding the final antecedent of intention into the TPB was to extend the theory's applicability to behaviors that cannot always be classified based entirely on one will. This construct refers to experience and potential barriers or facilitators of the behavior and represents the perceived ease or difficulty of behaving in a certain way. It contributes to stronger intentions and adds to the prediction of behavior in case of reduced volitional control (Ajzen and Sheikh, 2013). This is also confirmed by other studies (Stefan *et al.*, 2013; Visschers, Wickli and Siegrist, 2016)

In the case of food waste behavior, the perceived behavioral control of consumers' food waste behavior relates to consumers' perceptions of their ability to control their amount of food waste (Visschers, Wickli and Siegrist, 2016). Perceived behavioral control significantly influences the intention not to waste food (Lorenz, Hartmann and Langen, 2017; Coşkun and Yetkin Özbük, 2020). For instance, unpredictable meal sizes and large packaging can lower perceived behavioral control levels (Evans, 2012), promoting food waste.

However, consumers might have limited perceived behavioral control in a restaurant setting, as they have little control over restaurant management. However, they can control their plate waste behavior. It is believed that situational factors similar to perceived behavioral control could be used instead.

- Hypothesis 3 (H3): Perceived behavioral control positively impacts Behavioral Intention.

2.4.4 Emotion

Emotions can be defined as a reaction to an object or an event, and they comprise both a feeling and a cognitive component (Forgas, 1994). Emotions signal an issue's importance and provide an impetus for action (Lerner and Keltner, 2000). The TIB identified emotion as a critical driver of behavior in 1977, yet to date, the role of emotion has been largely neglected. The neglect of emotion is somewhat surprising given the importance of emotion for decision-making and its potential to impact behavior (Graham-Rowe, Jessop and Sparks, 2014).

Watson & Meah (2012) conducted an ethnographic study of consumers' relationship to food waste. Their findings showed that participants reported a sense of guilt about wasting food. Quested *et al.* (2013) also conducted qualitative research and found that guilt was present when consumers waste food. Stefan and colleagues (2013) also discussed guilt as part of 'moral attitudes' and suggested that most consumers feel bothered or guilty when engaging in wasteful behavior.

Other studies have also examined the relationship between emotion and intention in the context of food waste behavior. Amato (2014) found that emotion is of great value for designing effective anti-consumer food-waste interventions, which significantly impact people's intention to reduce food waste. Furthermore, interventions that target emotions are effective in reducing food waste behavior.

In conclusion, the relationship between emotion and intention in the context of food waste behavior is essential in the literature. It provides valuable insights into this relationship; other studies have supported these findings.

- Hypothesis 4 (H4): Emotion positively impacts Behavioral Intention.

2.4.5 Habit

Verplanken & Holland (2002) defines habits as "relatively stable behavioral patterns, which have been reinforced in the past, are executed without deliberate consideration, and result from automatic processes, as opposed to controlled processes like consciously made decisions."

Eating and drinking are frequently performed low involvement behaviors, and habit often influences them (Ronis, 1989). Triandis (1977)suggested that past behaviors, or habits, are significant in explaining current or future behavior. Given that the creation and disposal of food waste is a repeated and often habitual behavior, we considered these insights particularly relevant.

Regarding food waste, habits are likely to play an important role. Given their frequency and automaticity, we argue that food waste will likely have a solid habitual element (Darnton, 2011). Additionally, Quested *et al.* (2013) argued that food waste behaviors were usually performed for reasons unrelated to other waste prevention on pro-environmental objectives and that food waste behavior has a marked habitual and pronounced emotional component.

Consumers' shopping routines can be a significant determinant in identifying their food waste behavior and are included in most food waste studies (Jörissen, Priefer and Bräutigam, 2015; Visschers, Wickli and Siegrist, 2016; Schanes, Dobernig and Gözet, 2018). For most people, purchasing more than needed is part of the shopping routine (Evans, 2011). Moreover, several researchers showed that consumers, who make shopping lists and purchase only necessary items, waste less food (Diaz-Ruiz, Costa-Font and Gil, 2018; Bravi *et al.*, 2019). Another routinized activity that can influence food waste is eating habits (Gjerris and Gaiani, 2013). Consumers' tendency to finish all the food served on the plate can be an essential determinant of how much food they waste (Wansink and Johnson, 2015).

In food waste behavior, it is crucial to understand the role of habit and how it can be disrupted to facilitate behavior change. Developing interventions that disrupt habitual

behavior and create new habits that align with sustainability goals may be a promising approach to reducing food waste behavior.

- Hypothesis 5 (H5): Habit positively impacts Behavioral Intention.

2.4.6 Awareness and Knowledge

Scholars reported that consumers' awareness and educational level significantly affected their food waste behaviors (Chalak *et al.,* 2016). While some did not consider food waste a big problem, others said it was inescapable, so there was little purpose in seeking to eliminate it (Matharu, Gupta and Swarnakar, 2022). Being aware of the surrounding problem and being fully equipped with knowledge is the factor that helps the problem to be solved faster. Knowledge and attitudes can determine the speed at which restaurants adopt a "green" approach (Martin-Rios *et al.*, 2018). Parizeau, von Massow and Martin (2015) found that increased awareness of food waste and food wastes impact on the environment leads to lower food waste production.

While many individuals are still unaware or unconcerned about food waste Quested *et al.* (2013) messages that enter the public eye must be persuasive enough to motivate behavior change. While the perceptual barrier is low awareness, it means many consumers believe their level of waste is low (Graham-Rowe, Jessop and Sparks, 2014), and they lack an understanding of the consequences of food waste (Quested *et al.*, 2013).

In conclusion, consumer awareness of food consumption, thus affecting the consumer's internal state and shaping his purchasing behavior, has pointed out that awareness of external stimuli, hunger, environmental, economic, landfill, and water shortage concerns is critical (Attiq *et al.,* 2021).

Economic

Food waste happens essentially at all phases of the food supply chain, from the initial production processes to the final consumer behavior. However, in low-income countries, there is empirical evidence of consistent quantities of food waste at upstream stages (Fine et al., 2015). In high and medium-income countries, food is largely wasted at the retail and consumer level due to customer attitudes and behaviors (Gustavsson, 2011).

Although food waste and loss occur along the whole supply chain, from primary production to consumption, most of the researchers' attention has until now been given to consumers because of their high propensity to waste food (92 kg yearly per capita) with an associated high economic cost (Fusion, 2016).

Recent research revealed that food waste results in an economic loss of 23% of the food purchased (Papargyropoulou *et al.*, 2019; Dhir *et al.*, 2020). Moreover, food waste has different economic losses, such as the cost of food production, the cost of wasted food management, and the cost of human health due to food waste.

Buzby et al. (2011) and Morone et al. (2019) state that food waste generates significant global inequity, poverty, and economic losses. Consequently, consumer awareness toward responsible production and consumption is increasing, and it is essential to achieve long-term sustainability (Buerke et al., 2017).

Environment

Environmental concerns are the degree to which consumers are aware of environmental damage (Dhir *et al.*, 2021). Also, food wastage is a significant source of environmental pollution (Dhir *et al.*, 2020; Chauhan *et al.*, 2021). Globally, food waste produces several gases that prove detrimental to the environment (FAO, 2013). Regarding greenhouse gas emissions, the lost food is associated with around 1.5 gigatons of CO2 equivalent every year (FAO, 2020). Furthermore, several other gasses produced from food waste all over the world, such as nitrogen N2, nitrous oxide N2O, nitrogen dioxide NO2, and ammonia NH3, also cause global warming but in a more serious way, about 296–340 times higher than that of CO2 (Nielsen et al., 2003; Grizzetti et al., 2015).

Aomari (2014) explained that now consumers are tremendously conscious of the significant changes for the planet and accept and make a gesture favoring the environment. At this stage, socially responsible consumption is only at its beginning, and it is collectively responsible, progressive, and increasing consumer awareness to respect environmental degradation (Aomari, 2014). Kumar (2021) demonstrated that health consciousness and environmental concerns highly influence customer behavior toward natural products, including food.

Landfills

EPA (2010) stated that wasted food was the sole most significant component of solid waste sourced from landfill. The wasted food consists of uneaten food and food preparation leftovers from houses and commercial establishments such as restaurants and institutional sources such as schools, colleges, and university cafeterias (ZHANG et al., 2007).

Bloom (2011) studied that a massive quantity of food is wasted due to consumer socially irresponsible consumption and disposed of in landfills. Gunders (2012) stated that large heaps of garbage consisted of food waste reaching landfill and incineration started, which transformed into methane gasses. Moreover, according to the FAO (2011), increased

awareness can help minimize food waste. Indeed, higher awareness of food waste and its environmental impact leads to better purchase behaviors, lower food waste generation and waste in landfills (Parizeau, von Massow and Martin, 2015). It is expected that consumers who have a high level of perception of landfill concerns are more likely to have a high degree of awareness toward food waste.

Hunger

Rigillo (2022) reported that as many as 828 million people were undernourished in 2021 – 46 million more than a year earlier and 150 million more from 2019, and food waste is one of the core elements of decreasing hunger worldwide. If we stopped wasting food, we could save enough food to feed 2 billion hungry people. Recent research has also shown an increased awareness and changes in consumer behavior can end hunger and ensure sustainable consumption (Jribi et al., 2020).

Water Shortage

Humans and their well-being require water as a primary resource (Vörösmarty *et al.*, 2010). According to Lee (2020), water scarcity challenges have been compounded by the recent fast population increase, economic development and compounded disaster risk, and climate change. Notably, Rijsberman (2007) discussed the issue of water shortage as follows: "The world water crisis has caught us unawares, with a series of local hydrological pinch-points rapidly escalating into a global pandemic of empty rivers, dry boreholes, and wrecked wetlands as profound as, and often linked to climate change."

The comprehension of world water shortage crises may be seriously enlarged by investigating the three types of crises: safe drinking water, pollution and degradation, and water scarcity (Lal, 2008). According to Gómez Llanos (2020), the water footprint is suitable for highlighting responsible water use knowledge and increasing consumer awareness about sustainable water consumption.

One-fourth of freshwater consumed in global food production is effectively wasted since the food produced with this water is never consumed (Kummu *et al.*, 2012). Global crop production's blue water footprint (i.e., consumed fresh surface water and groundwater) is 723 km3/year, meaning uneaten plant-based food represents 174 km3 of wasted blue water each year (Kummu *et al.*, 2012).

- Hypothesis 6 (H6): Awareness and knowledge about food waste positively impact Behavioral Intention.

2.4.7 Financial motives

One of the main motivations to minimize food waste was the desire not to waste money. Financial attitudes reflect the price consciousness of the consumer and positively affect planning routines (Graham-Rowe, Jessop and Sparks, 2014; Visschers, Wickli and Siegrist, 2016). This ties in with Lyndhurst (2007) finding that the top reasons for being concerned about food waste were that it was a waste of money and good food.

Saving money is among the main objectives of people participating in food-sharing initiatives. However, as Ganglbauer et al. (2013) stated in their qualitative analysis of the German community platform (foodsharing.de), few members acknowledged their economic motivation. Additionally, Aschemann-Witzel et al. (2015) showed that consumers were more motivated to buy food close to the expiration date when food waste-preventing messages were used for promotion in contrast to promotion only focusing on financial benefits.

Furthermore, financial benefits (due to special discounts: buy two get one, combo) can also cause bulk purchases, probably resulting in higher food waste (Graham-Rowe, Jessop and Sparks, 2014; Porpino, Wansink and Parente, 2016). Studies also indicated lower amounts of household food waste when consumers tend to buy discounted food or consider low prices an essential factor when buying food (Williams *et al.*, 2012; Jörissen, Priefer and Bräutigam, 2015). This is also a factor we need to consider in the context of when consumers use food services.

- Hypothesis 7 (H7): Financial motive positively impacts Behavioral Intention.

2.4.8 Lack of time

These studies have shown that poor pre-shopping planning is the primary behavior responsible for producing food waste (Gustavsson, Christel and Sonesson Ulf, 2011). Creating a list of things to buy and sticking to it may help consumers avoid buying products impulsively and overbuying foods (Stefan *et al.*, 2013).

People who wasted less food said they had more effective food management strategies and had better shopping planning routines (Parizeau, von Massow and Martin, 2015). Usually, they did not over-purchase through the discount (Evans, 2011; Stefan *et al.*, 2013).

Moreover, Stefan (2013) proved that planning shopping and shopping routines were essential for avoiding food waste. In the purchase stage, people often follow shopping

routines (Maubach, Hoek and McCreanor, 2009) and report routinely buying more food than they need (Evans, 2012). Other planning routines, such as making shopping lists or planning meals, may also help consumers to decrease unplanned purchases and limit food waste (Bell, Corsten and Knox, 2011).

- Hypothesis 8 (H8): Lack of time negatively impacts behavioral intention.

2.4.9 Going for planned using Foodservice

Specific factors that make consumers careless or lack concern for food waste include insufficient time for food shopping and preparation (Aschemann-Witzel *et al.*, 2015) and dissatisfaction with the flavor or freshness of previously bought foods.

Some consumers say they are most likely to avoid cooking when alone and moderately likely to snack in place of a meal, and predilection for ready meals and takeaway food may be related to their reports of poor culinary skills and limited time spent in the kitchen (Mallinson, Russell and Barker, 2016). Besides, family members are often in the wrong place at set mealtimes for reasons that are either planned or unintended. In this argument, the reason for reliance on food service is shifted from time and labor-saving to time scheduling (Warde, 1999).

Ethnographic studies noted that the time-scheduling issue manifested during the negotiation of daily routines and that unpredicted plan changes were the primary structural causes of food waste (Evans, 2012; Watson and Meah, 2012).

- Hypothesis 9 (H9): Going for Planned using Foodservice positively impacts Behavioral Intention.

2.5 Proposed research model

The Theory of Planned Behavior and the Theory of Interpersonal Behavior are both well-established psychological models that explain human Behavior in terms of attitudes, subjective norms, and perceived behavioral control while taking into account the social context and interpersonal interactions.

The MOA (Macinnis and Jaworski, 2012) model builds upon these theories by emphasizing the importance of motivational and situational factors in shaping Behavior and the cognitive factors emphasized by TPB and TIB.

Combining these three models provides a comprehensive framework for understanding human behavior, encompassing both individual and social factors and motivational and

situational factors. This integrated approach can be instrumental in designing interventions to promote behavior change by identifying the key factors that must be addressed to achieve the desired outcomes.

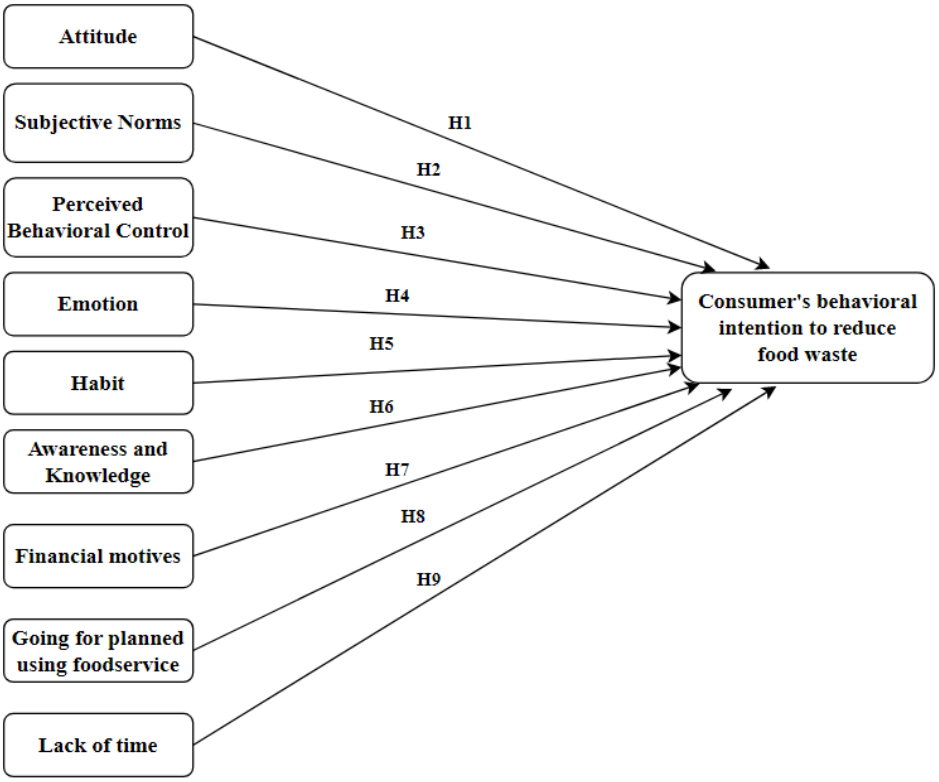

Figure 2.6: Proposed research model

2.6 Hypothesis

This chapter details the theories related to customer behavior toward reducing food waste in Vietnam's food service industry. The concepts are given about reducing food waste behavioral intention and the factors affecting it. Moreover, this chapter also proposes a model to show relationships and measure food waste behavioral intention with eleven factors following the conceptual model and the model we built. Based on the previous research related to this issue, the research model is presented that includes factors of the customer behavior toward reducing food waste in the Vietnam food service industry: Attitude, Subjective Norms, Perceived Behavioral Control, Emotion, Habit, Awareness and Knowledge, Financial Motives, Going for planed using Foodservice, Lack of time. The nine hypotheses follow these factors which are:

- Hypothesis H1: Attitude toward food waste has a positive impact on Behavioral Intention.

- Hypothesis H2: Subjective norms positively impact Behavioral Intention.
- Hypothesis H3: Perceived behavioral control has a positive impact on Behavioral Intention.
- Hypothesis H4: Emotion has a positive impact on Behavioral Intention.
- Hypothesis H5: Habit has a positive impact on Behavioral Intention.
- Hypothesis H6: Awareness and knowledge about food waste positively impact Behavioral Intention.
- Hypothesis H7: Financial motives has a positive impact on Behavioral Intention.
- Hypothesis H8: Lack of time has a negative impact on Behavioral Intention.
- Hypothesis H9: Going for Planned using Foodservice has a positive impact on Behavioral Intention.

2.7 Summary

This chapter presents the fundamental theories about food waste, food service, and customer behavioral intention, explores the research related to the study, then proposes a research model and develops hypotheses of Determinants of customer behavioral intention toward reducing food waste in Vietnam's Foodservice industry.

CHAPTER 3: METHODOLOGY

3.1 Research Philosophy

When considering research philosophy for a study on reducing food waste, all four categories - realism, positivism, interpretivism, and pragmatism - have been considered.

Realism research philosophy is based on the idea that there is a reality that exists independently of human consciousness. It emphasizes the use of scientific methods and empirical observation to develop knowledge (Kumar, 2021). Realists argue that reality is objective and can be studied and understood through objective measurements and analysis (Kumar, 2021). This approach has been influential in various fields, including natural and social sciences.

Positivism is a research philosophy that emphasizes scientific methods and empirical observation to develop knowledge. It assumes that the world consists of objective, observable, and measurable phenomena (Woods, 2006). Positivists argue that knowledge should be based on objective facts and not subjective interpretations (Woods, 2006). This philosophy has been influential in natural and social sciences and has significantly contributed to the advancement of knowledge.

Interpretivism is a research philosophy that emphasizes the subjective experience and meaning in understanding human behavior(Loscialpo, 2017). It assumes that the world is complex and cannot be reduced to simple, objective facts (Loscialpo, 2017). Interpretivists argue that research should focus on the subjective experiences of individuals and the meanings they attach to their actions (Loscialpo, 2017). This philosophy has been influential in various fields, including sociology, anthropology, and psychology.

Pragmatism is a research philosophy that emphasizes the practical application of knowledge. It assumes that knowledge is constantly evolving and subject to change (Easterby-Smith, 1981). Pragmatists argue that research should focus on solving practical problems, and knowledge should be evaluated based on its usefulness in achieving practical goals (Easterby-Smith, 1981). This approach has been influential in various fields, including education, social policy, and management

The goal of our research is to identify the key factors that influence consumer behavior regarding food waste and to provide actionable insights that can be used to develop effective interventions to reduce food waste in this sector. Ultimately, we aim to contribute

to creating a more sustainable and environmentally conscious food service industry in Vietnam. For this purpose, we decided Positivism is suitable philosophy for this thesis.

Positivism, focusing on scientific methods and rigorous experimentation, could help test the effectiveness of interventions designed to reduce food waste. Researchers using this approach could design controlled experiments to test the impact of various interventions, such as composting programs or food recovery initiatives. However, positivism may be criticized for ignoring the social and cultural factors contributing to food waste, which may require an interpretive approach (Saunders, 2019).

3.2 Research Process

Binaymin S. (2019) describes the research process as a systematic and structured approach involving several steps, each important for producing valid and reliable results. According to Binaymin S. (2019), there are nine steps in the research process:

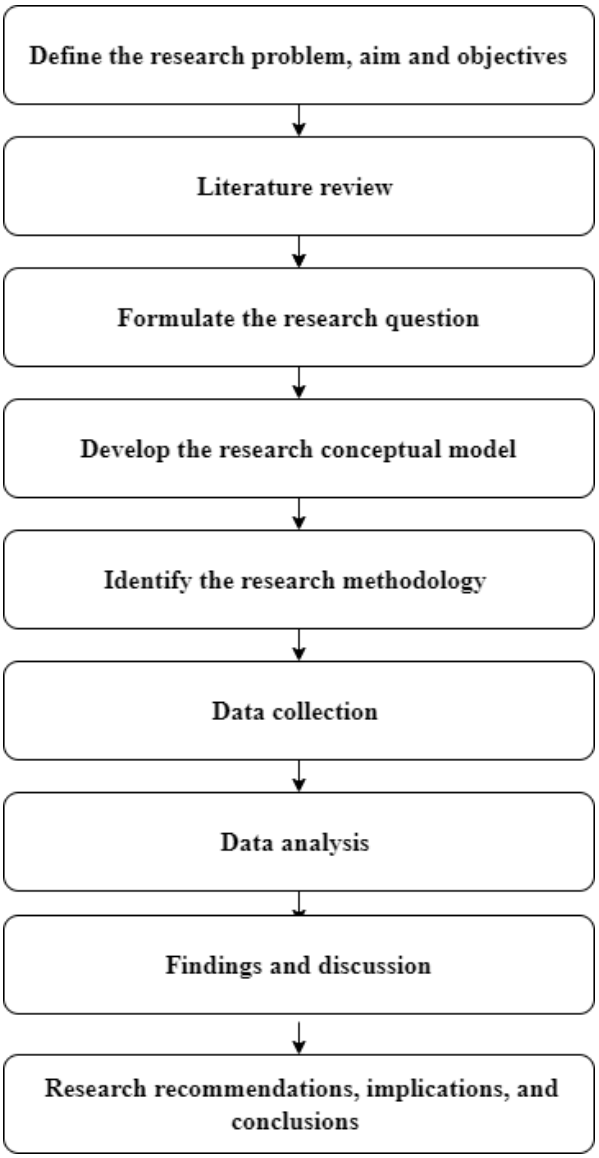

Table 3.1: Research process

Step 1: Define the research problem, aim, and objectives

In this research, the authors strongly emphasize the evaluation of the customer's behavioral intention toward food waste in Vietnam's food service industry in adults aged 18 years old and up.

Step 2: Literature review

In this step, the previous studies on food service, food waste, customer behavioral intention, and others have been carefully reviewed. In short, ten factors will be used to analyze: Attitude, Subjective Norms, Perceived Behavioral Control, Emotion, Habit, Awareness and Knowledge, Financial Motives, Going for planned using Foodservice, Lack of Time, and Intention.

Step 3: Formulate the research question

The researchers pose questions to address the problems the research paper addresses.

Step 4: Develop the research conceptual model

The authors assess several models in the fourth step to define the best study design. Afterward, the authors used three models TPB, TIB, and MOA and defined the most suitable one with ten dimensions: Attitude, Subjective Norms, Perceived Behavioral Control, Emotion, Habit, Awareness, Financial Motives, Going for planned using Foodservice, Lack of Time and Intention.

Step 5: Identify the research methodology

The authors use the quantitative methodology to offer and more thorough knowledge of the research information and data list.

Step 6: Data collection

The authors have collected primary data through Survey through Google Forms to pursue the research paper. The first and foremost objective of the surveys is to reach customers who have used food service before. These authors sent a Survey through Google Forms to forums and groups about food service and surveys about their consumption behavior and expected to receive 500 answers. These questions are divided into different groups and also ask about demographics.

Step 7: Data analysis

In this step, the authors decided to analyze the collected data through six methods: Descriptive analysis, Reliability analysis, Exploratory factor analysis, Correlation Coefficient analysis, Regression analysis, and One-way ANOVA.

Step 8: Findings and discussion

Step 9: Research recommendations, implications, and conclusions

Overall, the research process ensures that research is conducted rigorously and produces reliable and valid results.

3.3 Research Methodology and Research Approach

3.3.1 Research Approach

Research approaches are the strategy for concluding and deciding if it is correct or incorrect. There are two fundamental sorts of research approaches: inductive and deductive.

3.3.1.1 Deductive

Deductive research is a research approach that involves testing a hypothesis or theory through data collection and analysis (Babbie, 2016). It starts with a clear and testable hypothesis based on existing theories or assumptions and then uses data to confirm or reject it.

Firstly, the researcher formulates a clear and testable hypothesis based on existing theories or assumptions. The next step is data collection, which involves gathering data through surveys, experiments, or secondary data sources. The researcher then analyzes the data to test the hypothesis and either confirms or rejects it based on the findings (Trochim and Donnelly, 2008).

Deductive research is often used in quantitative research, allowing for precise measurement and statistical data analysis and it is helpful in hypothesis-driven research or when the research question is specific and requires testing a particular theory or assumption (Creswell and Creswell, 2018). It can also help predict future events or behaviors based on existing theories. However, the process of deductive research may overlook unexpected findings or data that do not fit the original hypothesis. Additionally, the results generated through deductive research may be less exploratory and limited to the specific context and sample of the study (Babbie, 2016).

3.3.1.2 Inductive

Inductive reasoning is a fundamental research approach that involves generating theories or explanations based on observations and data collected during the research process (Sharlene Nagy Hesse-Biber and Leavy, 2011). Unlike deductive reasoning, inductive reasoning begins with specific comments and gradually develops a more general theory or explanation.

Inductive reasoning is often used in qualitative research, where the goal is to understand the complexity of a phenomenon and develop a nuanced understanding of the participants' experiences. Researchers using inductive reasoning start with an open mind and do not

have preconceived notions about the phenomenon being studied. Instead, they allow the data to guide their thinking and form theories and explanations based on the patterns and themes that emerge from the data. Inductive reasoning is a flexible and creative approach that allows exploring novel ideas and perspectives. It is well-suited for studying complex phenomena that are not well-understood and for generating new theories that can be further tested through future research.

However, there are also some challenges associated with inductive reasoning. Because it is based on observations and data collected during the research process, it can be subjective and influenced by the researcher's biases and perspectives. Additionally, it can be time-consuming and resource-intensive because it involves generating theories and explanations from data.

In comparison between the two research approaches, the deductive approach offers several advantages, including establishing causal relationships between variables and concepts and the opportunity to measure concepts quantitatively. Furthermore, this approach has the potential to generalize study results to some degree, making it a helpful tool for conducting research in a wide range of fields. Because of these above standing out characteristics, researchers shall apply the deductive approach to define the factors affecting the determinant of adult consumer behavior toward food waste in the Viet Nam Food service industry.

3.3.2 Research Methodology

When evaluating, the evaluator must consider the available resources and select an appropriate methodology (Greene., 2007). The chosen methodology not only determines the scope of the evaluation but also shapes the assessment process itself (Jones, Bird and Haynes, 2019). There are two types of research methodology: quantitative and qualitative.

- Quantitative techniques appear in high demand, maybe because surveys are quick and straightforward to create. In reality, most assessments and research experts will argue that utilizing a survey or questionnaire does not automatically make the results legitimate (Jones et al., 2019)
- Qualitative research methods cannot simply involve converting data into numerical values for aggregation (Jones et al., 2019). Researchers must be able to build themes, conceptual frameworks, and hypotheses to explain complex events comprehensively.

Our research question requires a precise measurement of numerical data and statistical analysis. In addition, Quantitative research is better suited for measuring and quantifying the extent and patterns of food waste (Eriksson, Berglund and Stenmarck, 2019). Because of that, in this study, the authors choose Quantitative research.

3.4 Research Design

A well-designed research methodology is crucial for obtaining reliable and valid results in any study. The authors argue that a properly constructed research design allows researchers to achieve their research objectives, control external variables that may impact the outcomes, and ensure that the findings apply to theory and practice. Researchers may use three basic types of research designs: descriptive, exploratory, and causal, separately or in combination, to accomplish their research objectives.

- Descriptive research: This type of research describes phenomena, such as behaviors, attitudes, or characteristics. Descriptive research can be conducted through surveys, observations, or secondary data analysis. Descriptive research can describe ways to collect information and answer questions in research to see better consumer attitudes, preferences, and customer intentions (Neuman, 2013).

- Exploratory research: This type of research is used to gain a preliminary understanding of a research problem, develop hypotheses, or identify variables to be measured. Experimental research can be conducted through literature reviews, case studies, or pilot studies (Creswell and Creswell, 2018).

- Causal research: This type of research determines cause-and-effect relationships between variables. Causal research can be conducted through experiments, quasi-experiments, or longitudinal studies (Shadish, W. R., Cook and Campbell, 2002).

The above three research methods have different purposes and strengths, helping researchers find the best solution. Considering this thesis's framework and research model, descriptive is suitable to tackle the research questions.

The study has selected the quantitative research approach as its primary investigation technique to ensure scientific rigor. The study will gather data from consumer surveys and questionnaires. After that author used SPSS software for analysis to perform some statistics:

- Frequency analysis: summarize categorical data and identify patterns and trends. (Include analysis and Descriptive analysis).

- Cronbach's alpha: assesses the extent to which the items in a test are related and measure the same construct.
- EFA (Exploratory Factor Analysis): Identify the factors or dimensions common to variables.
- Correlation: Examine the strength and direction of the relationship between two or more variables.
- Regression analysis: Predict the dependent variable's value based on the independent variables' values.
- ANOVA (Analysis of Variance): test hypotheses about the equality of means across different groups or conditions.

3.5 Data sources

3.5.1 Secondary data

They are collected and synthesized from published articles and research articles. Sources are cited and carefully censored. In addition, we also selected theories and previous studies, including data available on the Internet, to strengthen the idea more firmly. Thanks to the available reliable data and information sources, the information in this research paper is more authentic.

3.5.2 Primary data

For this study, secondary data provided only pre-existing corroborating information. Primary data is information collected through interviews or surveys for a particular topic. Primary data is selected and used through questions included in a survey or interview. The collected information will be filtered and considered the answers provided by the participants. In the research paper "Determinant of Consumer behavior toward food waste in Vietnam food service industry," primary and secondary data are selected to provide essential data and data processing.

3.6 Data Collection Method

3.6.1 Target sample

This study aims to study the factors and motives leading to food waste behavioral intentions in Vietnam. Therefore, the sample is the users of the food service at the food market in Vietnam. About the characteristics of the samples collected through the survey:

- Type of survey: Online
- Scarcity: Have/Have not experienced food scarcity.
- Age: Above 18 years old.
- Gender: Male/Female and Others.
- Expected respondents: 500.
- Education: High school, Vocational, College, University, After University.
- Research scope: Viet Nam.
- Occupation: Students, Manufacturing, Service Sector, Freelance, Homemaker, Retired, and Others.

3.6.2 Sampling design

In keeping with the study's objectivity, we collected the data by posting the survey and sifting the data from the survey participants. The survey data is taken directly and ensures no one can manipulate the data. Survey participants were wholly random and unstructured. The survey also provides definitions to help participants understand the frequently used keywords or the survey topic. The questions in the survey will go into depth and detail to help survey participants stay on track and have more objective data. Not only but also the questions we designed to reveal how individuals feel and think when acting like this.

3.7 Questionnaire design

3.7.1 Sampling method

Primary data was collected by survey method with the questionnaire. This method is commonly used and mostly with previous quantitative research papers. Also, one advantage of online survey research is that it takes advantage of the ability of the Internet to provide access to groups and individuals who would be difficult, if not impossible, to reach through other channels (John, 1988). Those who do not have time to participate in a face-to-face interview or more sophisticated methods will often choose the survey method to save as much time as possible.

Moreover, this survey method with questionnaires almost costs nothing to operate. They primarily focus on cheap data collection and processing costs (Bowling and Veloso, 2002). We found that combining questionnaires with surveys optimizes data collection and responses. Participants will also be more willing to participate in a study than in a face-to-face or indirect interview.

The sample includes individuals who are currently or will be using food and beverage services in Vietnam and are over 18. Previous research papers used survey questions to make data collection easier. The survey ensures the confidentiality of survey participants because it does not ask for personal information such as name, email, phone number, etc.

Online Surveys: Call and post surveys on Facebook, study groups, and food groups, and send them directly to friends or family. Moreover, we also discussed with the Management and Training Department of FPT University so that we could send the survey to the students in the school. Especially in the current digital technology era, this is a very optimal data collection method without cost. This method also allows us to collect data from survey participants living in Vietnam without difficulty regarding geographical distance. To complete this online survey only takes 5-7 minutes to participate.

According to the survey structure, we first provide definitions of concepts included in the study, such as Food Service, Food Waste. Next, we asked practical questions, delving into the behavior of food service users and situational questions that put us in the situation. Finally, there is the demographic section with related questions such as gender, age, education, occupation, income, marital status, etc.

3.7.2 Sample size

A minimum subject-to-item ratio of at least 5:1 (Osborne and Costello, 2004). So the minimum size of this study is at least five times depending on the quantitative questions. For example, in this study, we have 37 questions (37*5=185). So, the minimum size of this study is 185 respondents.

3.7.3 Questionnaire design

There are seven steps in Questionnaire design:

- Step 1: Decide what needs to be found.
- Step 2: Create a rough draft of the questions.
- Step 3: Refine the questions.
- Step 4: Decide the format of the response.
- Step 5: Order the questions appropriately.
- Step 6: Confirm the questionnaire layout.
- Step 7: Implement the surveys and pre-test data collected.

To collect survey data optimally and delve into the behavioral intentions of food service users, we divide the survey into three parts:

- Part 1: We define Food Waste and Food Service. In addition to the degree of agreement with the above two definitions, we can filter the data at this stage of the survey participants.
- Part 2: In this section, we design 37 questions. The questions were related and sufficient to collect details of their intentions for each variable. The general answers to these questions have five levels in order: 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree
- Part 3: Unlike regular surveys, we leave the demographic section at the end because we want survey participants to be able to focus on the definition and questions related to the variables. This section focuses on gender, age, education, income, occupation, frequency of using food services in one week, and experienced scarcity.

3.8 Data Analysis Method

3.8.1 Descriptive analysis

Descriptive studies look at a population's characteristics, pinpoint issues within a unit, organization, or group, or look into character variances. In descriptive statistics, replies are analyzed using the variables' percentage, mean, minimum, maximum, and standard deviation. The findings from analyzing these data can describe the knowledge discovered.

3.8.2 Reliability analysis

When evaluating measurement instrument, validity and reliability are two fundamental elements. Validity concerns the extent to which an instrument measures what it intends to measure. Reliability is concerned with the ability of an instrument to measure consistently. Alpha was invented by Lee Cronbach in 1951 to quantify the internal consistency of a questionnaire or measurement scale, a number between 0 and 1 and the report's reliability increases when Cronbach's alpha index approaches 1 (Cronbach, 1951). Rules for Cronbach‘s Alpha is the measurement very reliable to show the results of this study:
Cronbach’s Alpha Internal consistency

- $\alpha \geq 0.98$ excellent
- $0.9 > \alpha \geq 0.8$ good
- $0.8 > \alpha \geq 0.7$ acceptable
- $0.7 > \alpha \geq 0.6$ questionable

- $0.6 > \alpha \geq 0.5$ poor
- $0.5 > \alpha$ unacceptable

The measure of confidence is to be able to consider measurability in a test when using this test. The measurement error index is calculated by squaring this correlation and subtracting it from 1.00 (for example, a scale that has Cronbach's Alpha of 0.7 will have a 0.51 random error in the scores because 1-0.7*0.7=0.51). The percentage of an item score due to error will decrease (Tavakol and Dennick, 2011)

3.8.3 Exploratory factor analysis (EFA)

Factor analysis is a collection of methods for explaining the correlations among variables in terms of more fundamental factors. The Exploratory Factor Analysis model is a statistical method for investigating familiar but unobserved sources of influence in a collection of variables (Cudeck, 2000). For a suitable EFA analysis, there are certain initial conditions. First, the KMO (Kaiser-Meyer-Olkin) value must be more significant than 0.5, and Barlett's test significance must be less than 0.05 (Tabachnick and Fidell, 2007). And with Factor loading:

If 0.3 <=Factor loading <= 0.4 is considered as a statistically significant observed variable reaching the minimum level.

If Factor loading >= 0.5 is considered an observed variable of practical significance.

If Factor loading >= 0.7: The observed variable has very good statistical significance.

3.8.4 Correlation coefficient analysis

Correlation coefficient analysis is one of the most widely used and reported statistical methods in summarizing medical and scientific research data (Taylor, 1990). Determining a relationship between two variables exists (Taylor, 1990). The letter "r" represents the correlation between the two variables, represented by a number ranging from -1 to +1. If the correlation coefficient (r) between two components, X and Y, equals 1, then X and Y will change similarly. It may take on a range of values from -1 to 0 to +1, where the values are absolute and nondimensional with no units involved ≤ 0.35 are generally considered to represent low or weak correlations, 0.36 to 0.67 modest or moderate correlations, and 0.68 to 1.0 strong or high correlations with r coefficients > 0.90 very high correlations (Taylor, 1990).

3.8.5 Regression analysis

Regression analysis is a statistical technique that helps to identify and quantify the relationship between two or more variables. It is commonly used in various fields, such as economics, finance, social sciences, and engineering, to analyze and predict the behavior of a dependent variable based on changes in one or more independent variables. The objective of regression analysis is to find the best-fit line or curve that represents the relationship between the variables and use it to make predictions or estimate the values of the dependent variable for specific values of the independent variables. The connection is represented by a formula or model that links the dependent factor to one or more explanatory or predicting factors (Chatterjee and Hadi, 2006). Therefore, Regression Analysis will evaluate and measure the effects of the given variables on the intention of food waste behavior in Vietnam.

3.8.6 One-way ANOVA

This function is applied to test the difference in mean to the case where the qualitative variable has two output values or more. ANOVA has three methods: 1-way ANOVA, 2-way ANOVA, and MANOVA. However, within the scope of this study, the authors only apply the one-way ANOVA method. In this method, the Levene Statistic value is significant.

When Levene Statistic ≥ 0.05: The next step considers the ANOVA table as follows:

- If the sig value of the F test in the table ANOVA < 0.05, we claim that: There is a difference in the intention to purchase green products of customers by different output values of the qualitative variable.
- If the sig value of the F test in the table ANOVA ≥ 0.05, we claim that: There is no difference in the intention to purchase green products of customers by different output values of the qualitative variable.

When Levene Statistic < 0.05: The next step considers the sig value of the Welch test in the Robust Tests table.

- If the sig value of the Welch test in the Robust Tests table < 0.05, we claim that: There is a difference in the intention to purchase green products by different output values of the qualitative variable.
- If the sig value of the Welch test in the Robust Tests table ≥ 0.05, we claim that: There is no difference in the intention to purchase green products by different output values of the qualitative variable.

3.9 Research Ethics

Research ethics are a crucial component of any study. They involve principles and guidelines that promote the responsible conduct of research and the protection of human and animal subjects involved in research (American Psychological Association, 2017). To ensure that research is conducted ethically, three crucial rules must be followed:

Firstly, researchers must avoid exploiting vulnerable groups. Researchers must ensure that their research design does not exploit these groups, and participants must be treated with respect and dignity (Resnik, 2015)

Secondly, researchers must respect the autonomy of respondents by allowing them to choose their answers based on their experiences. The research design must not influence participants' responses, and they should have the freedom to choose their answers based on their experiences (American Psychological Association, 2017).

Thirdly, researchers must take necessary steps to protect participants' personal and sensitive information by encrypting data, limiting access to data, and using secure storage methods. Informed consent must also be obtained from participants, explaining how their data will be used and who will have access to it. Researchers can ensure ethical and responsible research by prioritizing participants' data privacy and security (WMA, 2013; EC, 2018).

3.10 Summary

Although our team put in great effort to complete this research topic, we must acknowledge that the study has certain limitations. Firstly, the research was constrained by time as the authors had only three months to complete the study, from January to March 2023. Due to the limited time frame, the study only utilized a small number of samples, which could limit the accuracy of the findings. Secondly, the authors faced challenges in collecting data through questionnaires because some participants lacked sufficient knowledge to understand the survey. As a result, responses may have been dishonest, imprecise, or biased, which could impact the validity of the results. However, these limitations provide valuable insights for future research to address and improve upon to advance our understanding of the topic.

CHAPTER 4: FINDING AND ANALYSIS

4.1. Data Analysis

4.1.1. Survey information analysis

After surveying Google Forms from March 1st, 2023, to March 20th, 2023, we gathered 527 responses, including 76 invalid samples. Therefore, we excluded them as invalid results, the remaining 451 samples reaching 85.6%. Satisfactory data were coded and put into data processing using SPSS software for analysis. We categorize 451 respondents according to demographic factors: Scarcity, Gender, Age, Education, Income, Marriage status, Occupancy, and Frequency. With descriptive statistics, we will use the principal value of Frequency in the frequency table to calculate the quantity and comment on the percentage based on the pie chart.

4.1.1.1 Sample characteristics by Scarcity group

“Have you ever experienced food shortages before?”. The proportion accounted for the most is 32.6% for Sometimes, equivalent to 147 people. Second place is Rarely, with 13.8%, equivalent to 138 people. Third place is Never with 19.5%, equivalent to 88 people. Fourth place is Often with 11.5%, equivalent to 52 people. The last place is Always with 5.8%, equivalent to 26 people.

4.1.1.2 Sample characteristics by Gender group

The proportion accounted for the most is 59% for Females, equivalent to 266 people. Males accounted for 39.7%, corresponding to 179 people. Moreover, we have Others equivalent to 6 people accounting for 1.3%.

4.1.1.3 Sample characteristics by Age group

The proportion accounted for the most is 40.4% for 27 - 42 years old, equivalent to 182 people. Second place is 19 - 26 years old with 33.3%, equivalent to 150 people. The third place is 43 - 64 years old with 19.3%, equivalent to 87 people. From Above 65 years old only account for 7.1% of the total number of this survey, equivalent to 32 people.

4.1.1.4 Sample Characteristics by Education Group

The proportion accounted for the most is 42.4% for University, equivalent to 191 people. Second place is College with 21.5%, equivalent to 97 people. Third place is After University with 21.3%, equivalent to 96 people. Fourth place is Vocational Training with

9.1%, equivalent to 41 people. The last place is High School with 5.8%, equivalent to 26 people.

4.1.1.5 Sample Characteristics by Income Group

The proportion accounted for the most is 30.6% for 5 - 10 million VND, equivalent to 138 people. Second place is 11 - 20 million VND with 20.2%, equivalent to 91 people. Third place is Below 5 million with 18.4%, equivalent to 83 people. Fourth place is 21 - 30 million VND with 16.4%, equivalent to 74 people. The last place is Above 30 million VND with 14.4%, equivalent to 65 people.

4.1.1.6 Sample characteristics by Marriage Status group

The proportion accounted for the most is 47.7% for Single, equivalent to 215 people. Second place is Married with 46.8%, equivalent to 211 people. The last place is Others with 5.5%, equivalent to 25 people.

4.1.1.7 Sample Characteristics by Occupation Group

The proportion accounted for the most is 40.1% for Service Sector, equivalent to 181 people. Second place is Manufacturing with 19.5%, equivalent to 88 people. Third place is Freelancers with 10.6%, equivalent to 48 people. Fourth place is Students with 10.2%, equivalent to 46 people. Fifth place is Housewife/Homemaker with 7.8%, equivalent to 35 people. Sixth place is Others with 6.7%, equivalent to 30 people. The last place is Retired with 5.1%, equivalent to 23 people.

4.1.1.8 Sample Characteristics by Frequency Group

“Frequency of dining out in the past week?”. The proportion accounted for the most is 60.1% for 2-5 times, equivalent to 271 people. Second place is Less than one time with 23.7%, equivalent to 107 people. Third place is 5-10 times with 10.9%, equivalent to 49 people. The last place is More than ten times with 5.3%, equivalent to 24 people.

4.1.2 Descriptive analysis

Descriptive analysis is a statistical method used to describe and summarize the characteristics of a dataset. It is used to gain insight into the data and to understand its underlying structure, patterns, and relationships. Descriptive analysis is often the first step in data analysis, as it provides a basic understanding of the data before more advanced statistical techniques are applied.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
ATT1	451	1	5	3.99	0.943
ATT2	451	1	5	3.95	0.959
ATT3	451	1	5	3.88	1.010
ATT4	451	1	5	3.87	1.007
SN1	451	1	5	4.08	0.879
SN2	451	1	5	3.94	0.874
SN3	451	1	5	3.90	0.946
SN4	451	1	5	3.93	1.000
PBC1	451	1	5	3.80	0.986
PBC2	451	1	5	3.83	0.983
PBC3	451	1	5	3.86	1.012
EMO1	451	1	5	4.16	0.868
EMO2	451	1	5	3.92	0.950
EMO3	451	1	5	4.06	0.960
HAB1	451	1	5	4.06	0.711
HAB2	451	1	5	4.11	0.893
HAB3	451	1	5	4.12	0.759
HAB4	451	1	5	4.18	0.762
AWA1	451	2	5	4.43	0.684
AWA2	451	1	5	4.30	0.799
AWA3	451	1	5	4.23	0.841
AWA4	451	1	5	4.15	0.876
AWA5	451	1	5	4.37	0.774
FIN1	451	1	5	4.37	0.815
FIN2	451	1	5	4.15	0.916
FIN3	451	1	5	4.47	0.798
PLA1	451	1	5	3.37	1.131
PLA2	451	1	5	3.51	1.112
PLA3	451	1	5	3.35	1.217
PLA4	451	1	5	3.87	0.989

TIM1	451	1	6	3.71	0.976
TIM2	451	1	5	3.73	0.952
TIM3	451	1	5	3.69	0.947
INT1	451	2	5	4.08	0.805
INT2	451	1	5	3.93	0.865
INT3	451	1	5	4.19	0.803
INT4	451	1	5	3.86	0.937
Valid N (listwise)	451				

Table 4.9: Descriptive statistic

As seen in the table above, we can conclude the variables in the table as follows: The remaining survey items have average values of 3.35 - 4.47.

4.1.3 Reliability test

Cronbach's alpha measures the homogeneity within the items of a particular group, i.e., how closely related the items are within a group. The purpose of Cronbach's alpha is to test and consider the scale's reliability (Cronbach, 1951).

The values satisfy the following conditions:

- Cronbach's Alpha coefficient > 0.7: the factors of each item mean when Cronbach's alpha is greater than or equal to 0.7. Cronbach's alpha greater than 0.7 indicates a more reliable item.
- Corrected Item-total Correlation > 0.3: The Corrected Item-total Correlation of each

  The variable must have a minimum of 0.3.

4.1.3.1 Measurement scales of "Attitude" factor (ATT)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.814	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ATT1	11.70	6.021	0.640	0.764
ATT2	11.73	6.040	0.617	0.774
ATT3	11.81	5.760	0.637	0.765
ATT4	11.81	5.762	0.640	0.764

Table 4.9: Reliability statistic and Item-total statistic of ATT

Cronbach's Alpha coefficient of ATT is 0.814 (greater than 0.7), indicating a high internal consistency level ATT1, ATT2, ATT3, and ATT4 are also greater than 0.3. As a result, these variables are valid.

4.1.3.2 Measurement scales of "Subject Norms" factor (SN)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.769	4

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SN1	11.77	5.202	0.531	0.734
SN2	11.91	5.029	0.589	0.705
SN3	11.95	4.764	0.592	0.702
SN4	11.92	4.637	0.572	0.714

Table 4.10: Reliability statistic and Item-total statistic of SN

Cronbach's Alpha coefficient of SN is 0.769 (greater than 0.7), indicating a high internal consistency level SN1, SN2, SN3, and SN4 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.3 Measurement scales of "Perceived Behavioral Control" factor (PBC)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.801	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PBC1	7.69	3.172	0.630	0.745
PBC2	7.65	3.067	0.675	0.698
PBC3	7.62	3.080	0.634	0.742

Table 4.11: Reliability statistic and Item-total statistic of PBC

Cronbach's Alpha coefficient of PBC is 0.801 (greater than 0.7), indicating a high internal consistency level PBC1, PBC2, and PBC3 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.4 Measurement scales of "Emotion" factor (EMO)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.882	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
EMO1	7.98	3.177	0.751	0.851
EMO2	8.23	2.842	0.785	0.820
EMO3	8.08	2.816	0.781	0.824

4.12: Reliability statistic and Item-total statistic of EMO

Cronbach's Alpha coefficient of EMO is 0.882 (greater than 0.7), indicating a high internal consistency level. EMO1, EMO2, and EMO3 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.5 Measurement scales of "Habit" factor (HAB)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.731	4

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
HAB1	12.41	3.429	0.573	0.645
HAB2	12.35	3.641	0.295	0.815
HAB3	12.34	3.128	0.648	0.596
HAB4	12.29	3.152	0.633	0.605

Table 4.13: Reliability statistic and Item-total statistic of HAB

Cronbach's Alpha coefficient of HAB is 0.731 (greater than 0.7), indicating a high internal consistency level. However, the scale of HAB2 shows a low outcome in the Corrected item-total Correlation (lower than 0.3). As a result, HAB2 is not satisfied with one condition, HAB2 is considered invalid and is removed.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.815	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
HAB1	8.29	1.862	0.656	0.757
HAB3	8.23	1.720	0.675	0.737
HAB4	8.18	1.723	0.669	0.743

Table 4.14: Reliability statistic and Item-total statistic of HAB after removing HAB2

After removing HAB2, Cronbach's Alpha coefficient of EMO is 0.815 (greater than 0.7), indicating a high internal consistency level HAB1, HAB3, and HAB4 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.6 Measurement scales of "Awareness and knowledge" factor (AWA)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.894	5

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AWA1	17.06	7.766	0.768	0.868
AWA2	17.18	7.451	0.704	0.879
AWA3	17.25	7.270	0.702	0.880
AWA4	17.34	7.019	0.727	0.875
AWA5	17.11	7.157	0.822	0.853

Table 4.15: Reliability statistic and Item-total statistic of AWA

Cronbach's Alpha coefficient of AWA is 0.894 (greater than 0.7), which indicates a high level of internal consistency AWA1, AWA2, AWA3, AWA4, AWA5 also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.7 Measurement scales of "Financial motive" factor (FIN)

Reliability Statistics

Cronbach's Alpha	N of Items
0.481	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FIN1	8.62	1.503	0.492	0.037
FIN2	8.84	1.324	0.468	0.036
FIN3	8.52	2.464	0.020	0.779

Table 4.16: Reliability statistic and Item-total statistic of FIN

Cronbach's Alpha coefficient of FIN is 0.481 (lower than 0.7), which indicates a high level of internal consistency. But the scale of FIN3 shows a low outcome in Corrected item-total Correlation (lower than 0.3). As a result, FIN3 is not satisfied with one condition. FIN3 is considered not valid and will be removed.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.779	2

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
FIN1	4.15	0.839	0.643	.
FIN2	4.37	0.664	0.643	.

Table 4.17: Reliability statistic and Item-total statistic of FIN after removing FIN3

After removing FIN3, Cronbach's Alpha coefficient of FIN is 0.779 (greater than 0.7), indicating a high internal consistency level FIN1 and FIN2 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.8 Measurement scales of “Going for planned Using Foodservice” factor (PLA)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.717	4

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PLA1	10.73	6.025	0.624	0.580
PLA2	10.59	5.878	0.677	0.546
PLA3	10.75	5.679	0.622	0.577
PLA4	10.24	8.927	0.146	0.828

Table 4.18: Reliability statistic and Item-total statistic of PLA

Cronbach’s Alpha coefficient of PLA is 0.717 (greater than 0.7), which indicates a high level of internal consistency. However, the scale of PLA4 shows a low outcome in Corrected item-total Correlation (lower than 0.3). As a result, PLA4 is not satisfied with one condition, so remove that variable and run again.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.828	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PLA1	6.86	4.476	0.663	0.786
PLA2	6.72	4.299	0.735	0.716
PLA3	6.89	4.149	0.665	0.787

Table 4.19: Reliability statistic and Item-total statistic of PLA after removing PLA4

Cronbach's Alpha coefficient of PLA is 0.828 (greater than 0.7), which indicates a high level of internal consistency PLA1, PLA2, and PLA3 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.9 Measurement scales of "Lack of time" factor (TIM)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.844	3

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
TIM1	7.43	3.001	0.694	0.798
TIM2	7.41	2.922	0.759	0.734
TIM3	7.45	3.132	0.677	0.813

Table 4.20: Reliability statistic and Item-total statistic of TIM

Cronbach's Alpha coefficient of TIM is 0.844 (greater than 0.7), which indicates a high level of internal consistency TIM1, TIM2, and TIM3 are also greater than 0.3. As a result, these variables can be used in this research.

4.1.3.10 Measurement scales of "Behavioral Intention" factor (INT)

Reliability Statistics	
Cronbach's Alpha	N of Items
0.868	4

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
INT1	11.98	5.091	0.724	0.831

INT2	12.12	4.820	0.737	0.824
INT3	11.86	5.002	0.757	0.818
INT4	12.19	4.744	0.672	0.855

Table 4.21: Reliability statistic and Item-total statistic of INT

Cronbach's Alpha coefficient of INT is 0.868 (greater than 0.7), which indicates a high level of internal consistency. INT1, INT2, INT3, and INT4 are also greater than 0.3. Consequently, these variables are applicable for utilization in this study

4.1.4. Exploratory Factor Analysis

Exploratory factor analysis (EFA) reduces a set of observed variables into a more meaningful set of factors. EFA was conducted after testing Cronbach Alpha to determine whether the question posed by the authors truly represented the element the organization was affecting or if it conflicted with all other factors. The condition for the discovery factor analysis is to satisfy the following requirements:

- Factor loading greater than 0.5
- $0.5 \leq KMO \leq 1$: KMO coefficient (Kaiser, 1974) is the index used to consider the appropriateness of factor analysis. The closer the KMO value is to 1, the more valuable the factor analysis is.
- Bartlett test is statistically significant (Sig. <0.05): This is a statistical quantity used to assess hypotheses that the variables are not correlated. The observed variables are correlated with each other overall if this test is statistically significant (Sig. 0.05).
- Percentage of variance (> 50%): This shows the percentage variation of the observed variables. If we consider it 100%, this value will tell how much percentage the factor analysis can explain.

Following is the result of EFA for independent variables.

KMO and Bartlett's Test for Independent factors		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.846
Bartlett's Test of Sphericity	Approx. Chi-Square	6613.594
	df	435

	Sig.	0.000

Table 4.22: Exploratory KMO and Bartlett's Test results for independent factors

Table 4.22 shows the result of KMO is .846 > 0.5. According to Kaiser (1974), if KMO > 0.80 means GOOD, then the KMO value in the table is 0.917 should be implemented for EFA. Additionally, the correlation matrix is the unit matrix, which indicates that the variables are related and interconnected, and the value of Sig. is .000 < 0.05 can reject this hypothesis. As a result, the use of this material for EFA is appropriate.

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	7.142	23.808	23.808	7.142	23.808	23.808
2	2.581	8.605	32.413	2.581	8.605	32.413
3	2.437	8.124	40.536	2.437	8.124	40.536
4	2.168	7.227	47.763	2.168	7.227	47.763
5	2.039	6.796	54.559	2.039	6.796	54.559
6	1.776	5.921	60.480	1.776	5.921	60.480
7	1.585	5.284	65.764	1.585	5.284	65.764
8	1.339	4.462	70.226	1.339	4.462	70.226
9	0.658	2.194	72.420			
10	0.654	2.180	74.600			
11	0.614	2.046	76.646			
12	0.591	1.971	78.617			
13	0.557	1.856	80.473			
14	0.506	1.687	82.160			
15	0.490	1.634	83.794			
16	0.458	1.525	85.319			
17	0.431	1.438	86.757			
18	0.420	1.401	88.158			
19	0.407	1.357	89.515			
20	0.388	1.293	90.808			

21	0.368	1.227	92.035			
22	0.363	1.209	93.244			
23	0.331	1.102	94.346			
24	0.299	0.998	95.345			
25	0.297	0.989	96.333			
26	0.279	0.931	97.264			
27	0.262	0.872	98.137			
28	0.257	0.858	98.994			
29	0.216	0.721	99.716			
30	0.085	0.284	100.000			

Table 4.23: Total Variance Explained for Independent Factors

SPSS divided the items into eight factors, with all eigenvalues > 1, and the total cumulative % of the variance is 70.226% > 50%, which means that the EFA model is suitable. The eight factors together accounted for 70.226% of the total variance. The model can explain the 70.226% variance of the dependent variable of consumer behavioral intention in reducing food waste in Vietnam's food service industry.

Rotated Component Matrix								
	Component							
	1	2	3	4	5	6	7	8
AWA5	0.880							
AWA1	0.837							
AWA4	0.790							
AWA2	0.761							
AWA3	0.758							
FIN1	0.701							
FIN2	0.676							
ATT3		0.786						
ATT4		0.785						
ATT1		0.767						
ATT2		0.760						
SN2			0.785					
SN3			0.754					

SN4			0.730					
SN1			0.684					
EMO3				0.904				
EMO2				0.903				
EMO1				0.888				
TIM2					0.862			
TIM1					0.853			
TIM3					0.809			
PLA2						0.882		
PLA1						0.849		
PLA3						0.846		
HAB4							0.809	
HAB1							0.809	
HAB3							0.802	
PBC2								0.841
PBC3								0.803
PBC1								0.779

Table 4.24: Rotated Component Matrix result

In Table 4.24, The rotation matrix shows that all 30 factors are grouped into eight, with all factor loading > 0.5. AWA1, AWA2, AWA3, AWA4, AWA5 and FIN1, and FIN2 combined to form a group of factors, AWA factors make up most of the group, so we named that element group AWA. The reason for combining these two factors will be explained in the discussion.

To verify the reliability of the scale for the newly formed group, the authors have re-checked the Awareness and Knowledge factor and the results are valid.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.909	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
AWA1	25.58	16.494	0.758	0.893
AWA2	25.70	15.961	0.716	0.896
AWA3	25.77	15.815	0.695	0.898
AWA4	25.86	15.341	0.738	0.894
AWA5	25.63	15.545	0.823	0.885
FIN1	25.64	15.894	0.709	0.897
FIN2	25.85	15.476	0.673	0.902

Table 4.25: Reliability statistic and Item-total statistic of newly AWA

In addition, Table 4.26 shows the results of EFA for the dependent factor.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.815
Bartlett's Test of Sphericity	Approx. Chi-Square	885.546
	df	6
	Sig.	.000

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.886	72.142	72.142	2.886	72.142	72.142
2	0.473	11.828	83.970			
3	0.358	8.946	92.916			
4	0.283	7.084	100.000			

Component Matrix[a]	
	Component
	1

INT3	0.873
INT2	0.858
INT1	0.854
INT4	0.811

Table 4.26: Exploratory factor analysis results for dependent factor

The authors will also perform a Behavioral Intention to use factor analysis to ensure the consistency and reliability of the factors of the intention to reduce food waste provided in the theoretical foundation. The authors anticipate combining these elements to create a category with an Eigen Value higher than 1. Therefore, the intention to reduce food waste when using food services in Vietnam is represented by four behavioral intentions to use remarkably cohesive factor measures. Four observed factors of the agricultural supply chain adaptation were combined into one factor after EFA analysis. No variables noticed were left in.

After analyzing EFA, table 4.25 shows that the KMO index is 0.815 > 0.5, and Barlett's test significance is 0.000 < 0.05, which is suitable for exploratory factor analysis. EFA returns only 1 factor, with an eigenvalue equals to 2.886 > 1, and the total % of the variance is 72.142% > 50%, which means the factor accounted for 72.142% of the total variance.

4.1.5 Correlation analysis

Correlations

		INT	HAB	AWA	EMO	SN	ATT	PBC	PLA	TIM
INT	Pearson Correlation	1	.597**	.456**	.443**	0.024	.405**	-0.001	.491**	.485**
	Sig. (2-tailed)		0.000	0.000	0.000	0.618	0.000	0.981	0.000	0.000
	N	451	451	451	451	451	451	451	451	451
HAB	Pearson Correlation	.597**	1	.336**	.370**	-0.003	.349**	-0.037	.365**	.345**
	Sig. (2-tailed)	0.000		0.000	0.000	0.950	0.000	0.438	0.000	0.000
	N	451	451	451	451	451	451	451	451	451

AWA	Pearson Correlation	.456**	.336**	1	0.084	0.006	.225**	0.060	.305**	.280**
	Sig. (2-tailed)	0.000	0.000		0.074	0.897	0.000	0.201	0.000	0.000
	N	451	451	451	451	451	451	451	451	451
EMO	Pearson Correlation	.443**	.370**	0.084	1	0.012	.205**	-0.071	.332**	.279**
	Sig. (2-tailed)	0.000	0.000	0.074		0.798	0.000	0.130	0.000	0.000
	N	451	451	451	451	451	451	451	451	451
SN	Pearson Correlation	0.024	-0.003	0.006	0.012	1	0.027	0.052	0.022	0.053
	Sig. (2-tailed)	0.618	0.950	0.897	0.798		0.564	0.271	0.649	0.257
	N	451	451	451	451	451	451	451	451	451
ATT	Pearson Correlation	.405**	.349**	.225**	.205**	0.027	1	-0.083	.206**	.220**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.564		0.077	0.000	0.000
	N	451	451	451	451	451	451	451	451	451
PBC	Pearson Correlation	-0.001	-0.037	0.060	-0.071	0.052	-0.083	1	-0.025	-0.071
	Sig. (2-tailed)	0.981	0.438	0.201	0.130	0.271	0.077		0.602	0.132
	N	451	451	451	451	451	451	451	451	451
PLA	Pearson Correlation	.491**	.365**	.305**	.332**	0.022	.206**	-0.025	1	.271**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.649	0.000	0.602		0.000
	N	451	451	451	451	451	451	451	451	451
TIM	Pearson Correlation	.485**	.345**	.280**	.279**	0.053	.220**	-0.071	.271**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.257	0.000	0.132	0.000	
	N	451	451	451	451	451	451	451	451	451

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.27: Correlation coefficient analysis result

The figure shows that all the independent factors correlate with the dependent factors with a significance level < 0.05 except EMO and PLA (sig.EMO=0,618, sig.PLA=0.981). With

sig < 0.05, Habit, Awareness, Social Norm, Attitude, Perceived Behavioral Control, and Lack Of Time correlate with Behavioral Intention. So Emotions and Going for planned using food service do not correlate with Behavioral Intention. This says that these two factors are unexplained for the consumer Behavioral Intention of the consumer when using food service in Vietnam.

In more detail, factor Awareness has the strongest correlation, with r equal to 0.597, followed by Habit and Personal behavioral control, with r equal to 0.491 and 0.485, respectively. Attitude and Social norm show a weaker correlation with Intention, with r equal to 0.456. Lack of Time shows the weakest correlation among the six factors, with r equal to 0.194.

4.1.6 Regression Analysis

The simple linear regression method was used to find the relationship between the hypothesis and food waste behavioral intention. In addition, we also consider the effect of control variables. The multicollinearity indicator will also be measured using the VIF index.

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.764[a]	0.584	0.577	0.47057	1.955
a. Predictors: (Constant), TIM, EMO, PLA, HAB, PBC, ATT, SN, AWA					
b. Dependent Variable: INT					

Table 4.28: Model summary

In the model summary table, the adjusted R-square is 0.577 (greater than 50%), which means 57.7% variation of the dependent variable Food waste behavioral intention is explained by eight independent factors (TIM, EMO, PLA, HAB, PBC, ATT, SN, AWA). Otherwise, The Durbin-Watson index is 1.953 (which ranges from 1 to 2), indicating no autocorrelation in the sample.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	137.488	8	17.186	77.611	0.000[b]
	Residual	97.876	442	0.221		

	Total	235.364	450			
a. Dependent Variable: INT						
b. Predictors: (Constant), TIM, EMO, PLA, HAB, PBC, ATT, SN, AWA						

Table 4.29: ANOVA

In the ANOVA test, the significance of the F-test is 0.000 < 0.05, which means that the independent factors can explain the dependent factors.

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-0.841	0.235		-3.576	0.000		
	HAB	0.212	0.040	0.186	5.333	0.000	0.773	1.294
	AWA	0.304	0.041	0.276	7.428	0.000	0.680	1.472
	EMO	-6.698E-05	0.027	0.000	-0.003	0.998	0.992	1.008
	SN	0.181	0.035	0.178	5.135	0.000	0.785	1.274
	ATT	0.183	0.032	0.198	5.783	0.000	0.800	1.250
	PBC	0.176	0.029	0.204	5.978	0.000	0.805	1.243
	PLA	0.030	0.023	0.041	1.323	0.187	0.976	1.025
	TIM	0.127	0.029	0.147	4.415	0.000	0.846	1.182
a. Dependent Variable: INT								

Table 4.30: Coefficients

Table 4.30 refers to the regression analysis results, with key measures such as beta index, standardized error, p-value, and VIF. The result shows that six factors have the Sig. value less than 0.05: Attitude, Subjective Norms, Perceived Behavioral Control, Habit, Awareness and Knowledge, and Lack of Time, which means these factors affect Food waste Behavioral Intention.

- Awareness is the most impact factor, with a standardized beta β = 0.276 and p ≤0.01.
- The second is Perceived Behavioral Control, with β = 0.204 and p ≤0.01.
- The third is Attitude with β = 0.198 and p ≤0.01.
- The fourth is Habit with β = 0.186 and p ≤0.01.
- The fifth is Subjective Norms with β = 0.178 and p ≤0.01

- The last is Lack of time with β = 0.147 and p ≤0.01.
- Going for planned using Foodservice and Emotion do not significantly affect exporting companies' satisfaction since their p-value > 0.05.

Also, the multicollinearity will not happen because the VIF values of the factors are lower than 2.

From the result of the Coefficients, the linear regression equation is:

INT = 0.276*AWA + 0.204*PBC + 0.198*ATT + 0.186*HAB + 0.178*SN + 0.147*TIM

In which:

βi: Regression coefficients (i=1, 2, 3, 4, 5, 6)

AWA, PBC, ATT, HAB, SN, TIM: the independent factors (Awareness and Knowledge, Perceived Behavioral Control, Attitude, Habit, Subjective Norms, and Lack of Time)

INT: the dependent factor (Behavioral Intention)

4.1.7 One–way ANOVA

One–way ANOVA was employed to compare the means of more than two groups or levels of an independent variable. In this research, One-way ANOVA will investigate whether there is a significant difference between the levels of this study.

4.1.7.1 Scarcity

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
INT	Based on Mean	5.411	4	446	0.000
	Based on Median	6.745	4	446	0.000
	Based on Median and with adjusted df	6.745	4	418.903	0.000
	Based on trimmed mean	5.903	4	446	0.000

Sig Levene's Test of Homogeneity of Variance is 0.000 < 0.05. We use the results of the sig test F in the table Robust Test.

Robust Tests of Equality of Means				
INT				
	Statistic[a]	df1	df2	Sig.
Welch	62.697	4	141.658	0.000

a. Asymptotically F distributed.

Table 4.31: Test of Homogeneity of Variances and Robust Tests of Equality of Means for Scarcity

Sig Welch is 0.000 < 0.05, so there is a difference in Behavioral Intention to Reduce Food Waste. Average statistics and graphs show that people who have experienced food scarcity before tend to produce less food waste than people who do not or less.

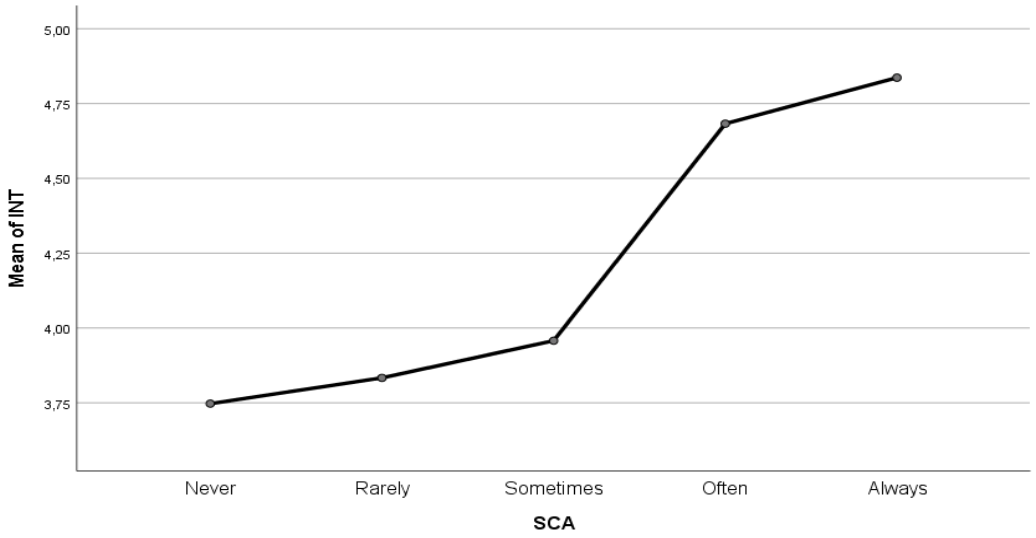

Chart 4.1: Scarcity Chart

4.1.7.2. Age

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
INT	Based on Mean	30.683	3	447	0.000
	Based on Median	31.047	3	447	0.000
	Based on Median and with adjusted df	31.047	3	382.777	0.000
	Based on trimmed mean	32.875	3	447	0.000

The table above shows the result of Levene's Test of Homogeneity of Variance, which tests for similar variances. Sig Levene's Test is equal to 0.000 < 0.05. We use the results of the sig test Welch in the table Robust.

Robust Tests of Equality of Means				
INT				

	Statistic[a]	df1	df2	Sig.
Welch	246.004	3	201.150	0.000
a. Asymptotically F distributed.				

Table 4.32: Test of Homogeneity of Variances and Robust Tests of Equality of Means for Age

Sig Welch is 0.000 < 0.05, so there is a difference in Behavioral Intention to reduce Food Waste between people of different ages. Average statistics and graphs show that older people intend to reduce more Food Waste than younger people.

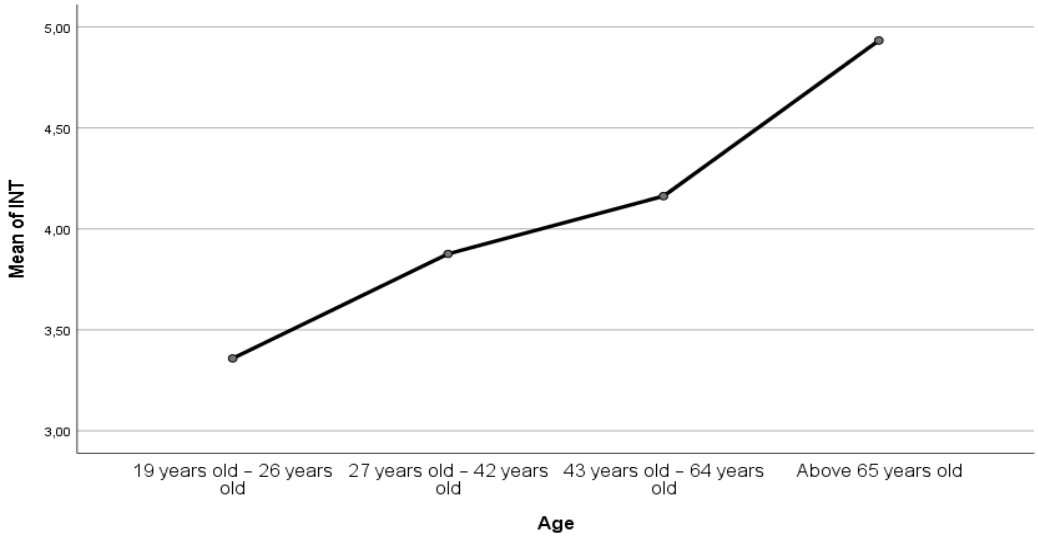

Chart 4.2: Age Chart

4.1.7.3 Education

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
INT	Based on Mean	13.094	4	446	0.000
	Based on Median	6.880	4	446	0.000
	Based on Median and with adjusted df	6.880	4	325.670	0.000
	Based on trimmed mean	12.499	4	446	0.000

The table above shows the result of Levene's Test of Homogeneity of Variance, which tests for similar variances. Sig Levene's Test is equal to 0.001 < 0.05. We use the results of the sig test Welch in the table Robust.

Robust Tests of Equality of Means

INT				
	Statistic[a]	df1	df2	Sig.
Welch	25.807	4	110.525	0.000
a. Asymptotically F distributed.				

Table 4.33: Test of Homogeneity of Variances and Robust Tests of Equality of Means for Education

Sig Welch is 0.000 < 0.05, so there is a difference in Behavioral Intention to reduce Food Waste between people of different education levels. Average statistics and graphs show that people in the Post-graduate education level intend to reduce more Food Waste than others, then follow the order from the best to the least in Post-graduated, University, College, Vocational, and High School.

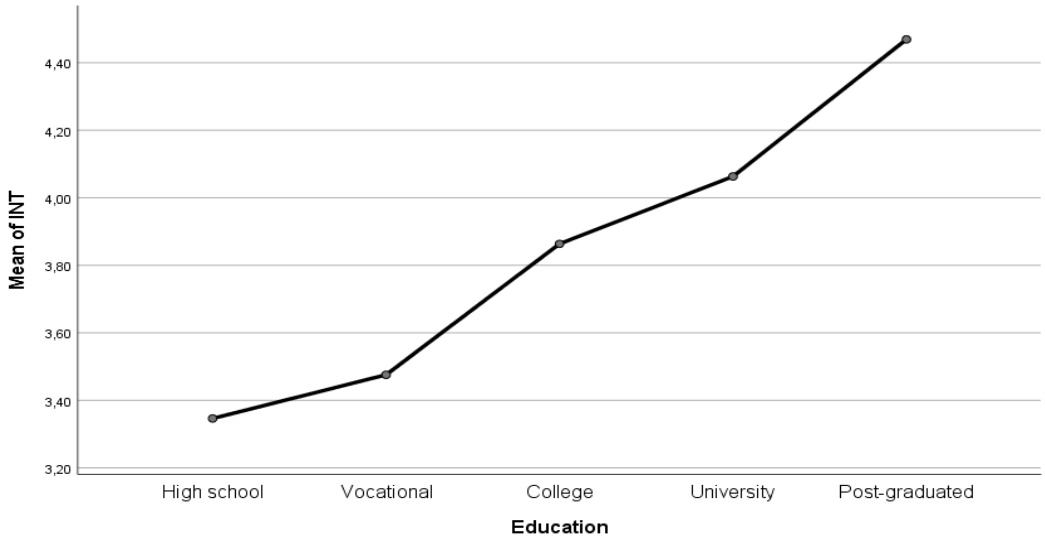

Chart 4.3: Education Chart

4.1.7.4 Income

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
INT	Based on Mean	11.602	4	446	0.000
	Based on Median	7.824	4	446	0.000
	Based on Median and with adjusted df	7.824	4	374.155	0.000
	Based on trimmed mean	10.934	4	446	0.000

The table above shows the result of Levene's Test of Homogeneity of Variance, which tests for similar variances. Sig Levene's Test is equal to 0.000 < 0.05. We use the results of the sig test Welch in the table Robust.

Robust Tests of Equality of Means				
INT				
	Statistic[a]	df1	df2	Sig.
Welch	12.136	4	202.319	0.000
a. Asymptotically F distributed.				

Table 4.34: Test of Homogeneity of Variances and Robust Tests of Equality of Means for Income

Sig Welch is 0.000 < 0.05, so there is a difference in Behavioral Intention to reduce Food Waste between people with different incomes. Average statistics and graphs show that people in the Post-graduated education level intend to reduce more Food Waste than others, then follow the order from the best to the least is Above 30 million VND, Below 5 million VND, 20 – 30 million VND, 11 – 20 million VND and 5 – 11 million VND.

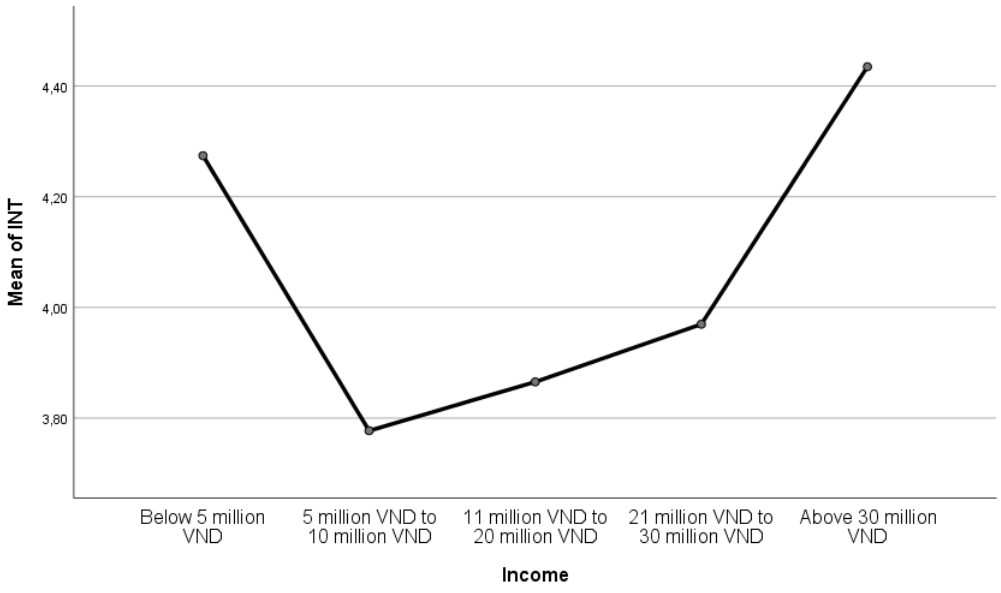

Chart 4.4: Income Chart

4.1.7.5 Occupation

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.

INT	Based on Mean	3.307	6	444	0.003
	Based on Median	2.995	6	444	0.007
	Based on Median and with adjusted df	2.995	6	422.500	0.007
	Based on trimmed mean	3.397	6	444	0.003

The table above shows the result of Levene's Test of Homogeneity of Variance, which tests for similar variances. Sig Levene's Test is equal to 0.003 < 0.05. We use the results of the sig test Welch in the table Robust.

Robust Tests of Equality of Means				
	Statistic[a]	df1	df2	Sig.
Welch	7.375	6	114.675	0.000
a. Asymptotically F distributed.				

Table 4.36: Test of Homogeneity of Variances and Robust Tests of Equality of Means for Occupation

Sig Welch is 0.000 < 0.05, so there is a difference in Behavioral Intention to reduce Food Waste between people in different jobs. Average statistics and graphs show that homemaker is the most intent on reducing Food Waste. Then follow the order from the best to the least: Homemaker, Service, Others, Retired, Manufacture, Freelancer, Student.

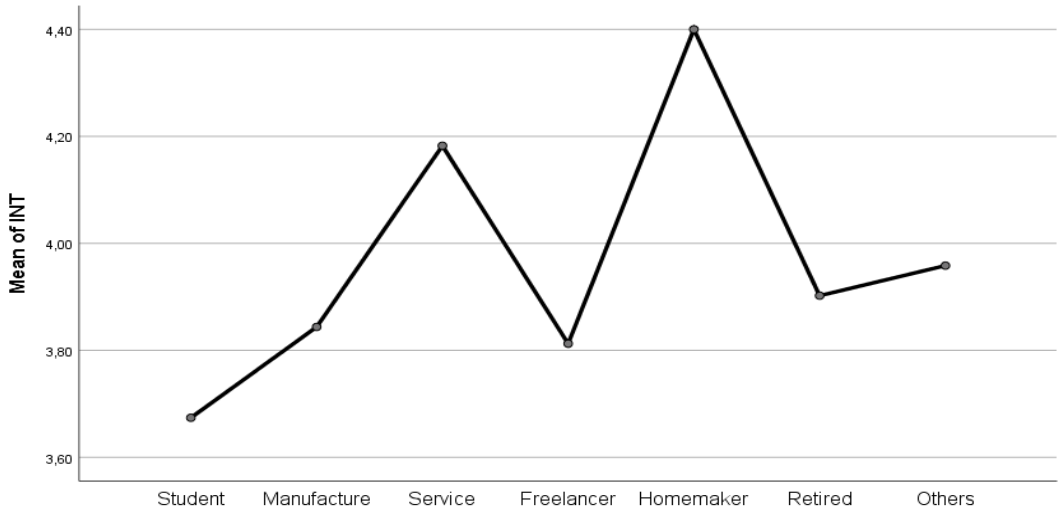

Chart 4.5: Occupation Chart

4.1.8 Hypothesis conclusion

The results of our hypothesis testing will be summarized in the following figure. To summarize, 8 of 10 hypotheses were accepted.

Hypothesis	Code	Result
Attitudes toward food waste have a positive impact on Behavioral Intention.	H1	Accepted
Subjective norms have a positive impact on Behavioral Intention.	H2	Accepted
Perceived behavioral control has a positive impact on Behavioral Intention.	H3	Accepted
Emotion has a positive impact on Behavioral Intention.	H4	Rejected
Habit has a positive impact on Behavioral Intention.	H5	Accepted
Awareness and Knowledge about food waste have a positive impact on Behavioral Intention.	H6	Accepted
Lack of time has a negative impact on Behavioral Intention.	H8	Accepted
Going for planned using food service has a positive impact on Behavioral Intention.	H9	Rejected

Figure 4.7: Hypothesis conclusion

4.2 Discussion

4.2.1 Factors

4.2.1.1 Attitude

It's clear to see that Attitude has a positive impact and strong rapport with Food Waste Behavioral Intention, rating third from six hypotheses. It means an individual's Attitude towards food waste can shape their intentions and actions regarding food waste reduction. This study is in line with previous research such as Coşkun & Yetkin Özbük (2020), Stancu et al., (2016), Graham-Rowe, Jessop and Sparks (2014) found that Attitude has a significant influence on customer intention to reduce food waste.

A positive attitude towards food waste can lead to a greater behavioral intention to reduce it. For example, when people have a positive attitude towards food, they are more likely to appreciate it and not take it for granted. A positive attitude towards food waste can lead to a greater behavioral intention to reduce it, according to their thinking, which has been measured in the survey: unsatisfying, unpleasant, bad, and harmful when engaging in FW

behavior. In this study, 72% of people think that engaging in food waste is unsatisfying or dispponited, 68% believe that is unpleasant, and 65% think that is bad and harmful.

The more consumers think that way, the better for reducing. On the other hand, individuals with a negative attitude towards food waste may not see it as a significant problem or may not understand its impact on the environment and society. Also, people with a negative attitude can feel of hopelessness or pessimism. This can lead to a lack of motivation to reduce food waste and a tendency to over-purchase or discard food unnecessarily.

4.2.1.2 Subjective Norms

According to the survey conducted in this research, Subjective Norms positively impact Food Waste Behavioral Intention, which ranked fifth among six factors. This finding is consistent with the study conducted by Maria et al. (2019), and Russell et al. (2017).

Exporting from the survey result, these authors witnessed that 74.8% percent of respondents choose to strongly agree and agree with people around them who think that reducing food waste is necessary. In comparison, only 3.5% of disagree people intend to waste less food if wasting food is disapproved by essential others. It refers to perceived social pressure when wasting food. When an individual perceives social pressure while wasting food, they have a greater intention to reduce food waste.

Contrary to the results of this study, Behavior (2019) and Visschers (2016) showed that subjective norms had no effect on intention. This can be explained by two reasons. First, Subjective Norms refer to perceived social pressure when wasting food; if food waste can not be seen by others, people don’t have the pressure when they leave food. However, if we use food service in restaurants and public areas, it could affect consumer eating intention behavior. Second, Vietnam in our study, a country with a high power distance (70%) means that other people’s values and suggestions play an important role when it comes from intention to their own behavior. In addition, with the development of social media and the Foodservice industry, the job named “influencers” have been popular, and they affect our choices every. Have you ever gone to a restaurant or ordered food because you look a video on tik tok or your idol was eating it in the live stream? If yes, maybe you are influenced by the power of subjective norms. Otherwise, when others disapprove food waste, consumers tend to reduce it or not have wasting behavior in public.

4.2.1.3 Perceived behavioral control

The results of the regression analysis show that Perceived behavioral control positively affects Food Waste Behavioral Intention and ranks second among the six factors. This

result is in line with previous research such as Coşkun & Yetkin Özbük (2020), and Visschers (2016), and it is considered to be the essential driver of the intention to reduce food waste Mondéjar-Jiménez (2016) and Russell (2017).

Individuals who feel they can control their actions have a better intention to reduce food waste and the opposite. For example, an individual who feels confident about their action will contribute to reducing food waste, even though it is a little thing like using leftovers, storing food, and controlling their size portion, … will promote them to do it efficiently. On the contrary, when consumers think food waste is a significant and of their control problem, only they change their behavior and do not have an effect on the consequences of FW, then they will intend to ignore it and still waste food.

According to the results of our survey, 64.1% of respondents strongly agree and agree with the fact that they think that they can contribute to reducing the amount of food left over in the restaurant; these people have the intent to reduce food waste more than people who do not. This result is consistent with the finding of Coşkun & Yetkin Özbük (2020); if restaurant customers believe that they are in control over the amount of food wasted in restaurants, their intention to reduce food waste will increase. The results also demonstrated that the more perceived behavioral control an individual has over their eating behavior in restaurants, the less food waste occurs.

4.2.1.4 Emotion

According to Russell (2017) and Qi & Hu (2016), the relationship between the negative Emotion dimension and Food Waste Behavioral Intention is positive. However, based on the survey results, negative emotion is one of the factors that does not affect behavioral intention for several reasons.

In our study, we mentioned three emotions to measure the emotion of consumers frustration, anxiety, and guilty. And the responses a very high number who strongly agree and agree with they do feel these emotions when they throw away food. However, consumers do feel these emotions, but they still have a bad intent in reducing Food waste. This can be explained by various reasons, including factors like they do feel guilty, but their habit makes them repeat doing so. Or, due to lack of time, they have no choice but to throw away food they are eating or leftover food in a restaurant because they have to leave for business.

4.2.1.5 Habit

According to the survey conducted by these authors, habit has a positive impact on Food Waste Behavioral Intention, which ranked in fourth place among six factors. This result is in line with previous research such as Russell et al. (2017) and Yu et al. (2021).

For example, an individual who has a food waste habit, such as usually buying more food than they need, routinely throwing away leftovers, or ordering too much food, may continue to do it even if their intention want to change it. Many consumers may feel their action is natural and normal because they do them every day. Refers to characteristics of habit as frequency and automaticity, their brain defaults the food waste behavior is unavoided.

When it comes to our study, there are 82% of people strongly agree and agree with the term. They often put enough food on their plate, which refers to their intention is more positive than others who strongly disagree and agree. Moreover, a high number of people, 84.7% agree with if they order too much food at a restaurant/cafe, they usually take it away to reuse it at home. This is a good habit of the consumer, leading to reducing food waste.

4.2.1.6 Awareness and Knowledge

According to the survey conducted by these authors, awareness and knowledge have the highest positive impact on Food Waste Behavioral Intention, which came in the first place, showing that this factor has the most considerable influence among other factors. This finding is consistent with the study conducted by Bravi et al. (2019), and Matharu et al. (2022).

For example, an individual who is aware that food waste contributes to greenhouse gas emissions and climate change, hunger, and water issue, … may be more likely to take action to reduce waste. Together with the rapid increase of social media, we can see that many non-government and government fan pages and websites know about this factor can affect consumers' behavioral intention, so they spread awareness about how the environment is damaged. Many children had been lack nutrition, and many inspiring pictures and articles with the message also pollute the water. Moreover, when the consumer can see the consequences and know what food waste can cause and even their little action can help the world improve, their intention changes.

In our particular survey, there are five awareness problems mentioned measuring the Awareness and knowledge of consumers about the consequences of food waste, including economic problems, environmental problems, hunger problems, landfills problems, and

shortage of water problems, and the result in order is 89.8%, 86%, 81.6%, 78.3%, 87.1% people strongly agree and agree that they know these problems are happening. This lead to their intention to reduce food waste being higher than people who do not. Moreover, when we run the EFA test, the Financial Group has computed in the Awareness and knowledge group. It stresses that personal finance has relationships with the first problem, which is economics is the highest problem that consumer care and both of it could change their intention to reduce food waste. It also refer that consumers know the economic problems of the country and the world can affect to their personal finance too.Also, awareness and knowledge are not the thing that people have borne with the gifted. People have to study and through experiences to accumulate it.

4.2.1.7 Lack of time

According to the result of this study, lack of time is one of the factors that affect Food Waste Behavioral Intention, which ranked in sixth place among six factors. This result is in line with previous research, such as by Matharu et al. (2022).

57.8% of people strongly agree and agree that they do not have time to cook at home, and 58.1% agree that they use a lot of fast food to save cooking time. When individuals feel pressed for time, they may be more likely to choose convenience foods or order food on an online app, or go to buy something that is not healthy just to soothe their hunger,… those food are quick and easy to find but may have a shorter shelf life and generate more waste. Also, when people have limited time, they will eat fast as they can and maybe leftover food by chance. Moreover, time lower the quality of the food, so in many situations, consumers try to save food by taking it home, but as time passes, the food goes bad. They don’t want to eat that food anymore and still throw it away.

On the other hand, individuals who have more time may be able to prioritize cooking and meal planning, which can help to reduce food waste. They may also have more time to store food and use up leftovers before they spoil properly.

4.2.1.8 Going for planned using Foodservice

The research of Stefan et al. (2013) points out that planning and shopping routines explain most of the variance in food waste, with the latter having the largest influence. However, the result of the survey indicates that there is no significant positive relationship between going for planned and behavioral intention.

Planning the meal or doing inventory checks, creating a list of things, planning for the next time your family goes to a restaurant, plan to organize a birthday party may help consumers reduce Food waste. But while planning can be a useful tool for reducing food waste, it may not be effective for everyone due to individual lifestyle, cultural, and social factors.

For example, some individuals may not have the time or resources to plan meals in advance, or they may prefer to be more spontaneous in their food choices. Additionally, some individuals may have a tendency to over-purchase food, and this can be seen in our result surveys that 52.6% of people strongly agree and agree that they buy food according to how they feel at the time.

4.2.2 One-way ANOVA

4.2.2.1 Scarcity

According to the One-way ANOVA test, it can see that people who experience scarcity more frequently have more positive behavioral intentions than people who never experience or less. When people have experienced scarcity in the past, they may become more aware of the value of food and more motivated to use it efficiently, encouraging people to be more mindful and resourceful in their consumption habits, leading to reduced food waste.

4.2.2.2 Age

According to our survey, there is a positive relationship between age and scarcity, and people who have experienced scarcity also are people at a high age. These people also have more positive behavioral intentions in reducing food waste than others age groups. Different experiences can influence this compared to the rest of the population: these influences could include austerity and food rationing around the era of the Vietnam War, which lasted more than 100 years. People of higher age who have experienced the war or economic recovery period are encouraged to save much as possible, not waste food, and share food with other family members or their communities.

On the contrary, younger people may have less experience with cooking and food preservation and may be more likely to rely on convenience foods and fast food that are more prone to spoilage. They may also face financial constraints that make purchasing or storing food efficiently brutal. Moreover, the more robust social media and the more the

spread of the food service industry, the younger people want to try new food and leftover food at the consumption level by chance.

4.2.2.3 Education

Based on the results of the ANOVA analysis by the authors, we found that people with higher education tend to reduce more food waste than others with education level, then follow the order from the best to the least is Post-graduated, University, College, Vocational, and High School.

Individuals with higher levels of education may be more aware of food waste's environmental and social impacts. They may be more motivated to take action to address these issues. Moreover, individuals with higher levels of education may be more likely to share their knowledge and skills with others and to promote a culture of sustainability and waste reduction in their communities.

While people with lower education tend to reduce Food Waste, individuals with lower levels of education may be less likely to be aware of the environmental and social impacts of food waste. They may not have the same level of motivation to take action to address these issues, and they can think it is a natural and inevitable consequence of food consumption.

4.2.2.4 Income

As can be seen from the outcome of the ANOVA test, there is a difference in Behavioral intention to reduce Food Waste between people in different income groups.

Above 30 million VND have the most positive behavioral intention in reducing Food Waste. They may have greater access to resources that can help them reduce food waste, such as larger kitchens with more storage space and better food preservation equipment, and access to higher quality and more diverse foods. Also, they might waste less food when they dine out than others' income level due to being more likely to dine at high-class restaurants (fine-dining, five stars hotels, etc.) that have implemented strategies to reduce food waste, such as offering smaller portion sizes, using leftover ingredients in creative ways, or composting food scraps.

The second group has positive intentions below 5 million VND. Their finances can explain this. They have to save money and food as much as possible. Low-income people are more resourceful and creative in finding ways to use up food scraps and leftovers.

4.2.2.5 Occupation

The result of the ANOVA analysis indicates that there is a difference in Behavioral intention to reduce Food Waste between people in people in a different occupation groups, following the order from the best to the least is Homemaker, Service, Others, Retired, Manufacture, Freelancer, Student.

The highest positive intention is homemaker as they may have more control over household food consumption and waste. As the primary food preparer in the household, the homemaker's meal planning and food management habits can significantly impact the amount of food waste generated. Homemakers may also be more likely to freeze or preserve excess food for future use, repurpose leftovers into new meals, or compost food scraps, which can help to reduce overall food waste. In addition, homemakers rarely dine out or use food service instead of home cooking. They have time to stay at home and prefer cooking by themselves, which makes reducing food waste at a higher rate compared to individuals in other jobs.

The second place is the Service sector, such as food service, hospitality, and tourism, education, hospital, which generate less food waste than other jobs due to several factors. The service sector does work for communities and meet the needs and desire of customers. When they care about society, they are aware of the consequences of food waste to their communities and try to avoid it. Another way that service careers can contribute to reducing food waste is by educating and engaging customers and clients. This can involve raising awareness about food waste and its impacts and encouraging diners to take action to reduce their own food waste through strategies such as ordering smaller portion sizes or taking leftovers home; and teacher can teach their student about the importance of left food and how to reduce it. By empowering diners with the knowledge and tools to reduce their food waste, restaurants can help to create a more sustainable food system overall.

The occupation group with less behavioral intention in reducing food waste is the student. Some factors, such as limited financial resources, lack of awareness or education on food waste consequences and reduction, and social norms around food consumption, may contribute to higher levels of food waste among student populations. For example, many college students are on tight budgets and may prioritize getting their money's worth over minimizing waste when dining out. Additionally, some students may not have had opportunities to learn about the environmental and social impacts of food waste or may not

view it as a pressing concern compared to other issues. Also, the student is at an age which can be affected by other people; they can think takeaway food leftover to home is unnecessary because their friends do not.

CHAPTER 5: CONCLUSION AND RECOMMENDATION

5.1 Summary of findings - Answer the research questions

5.1.1. Summary of findings

Our study was based on three theory to find what impact consumer's behavioral intention in reducing Food waste: The Theory of Planned Behavior model, the Theory of Interpersonal Behaviour, and The Motivation-Opportunities-Ability.

After conducting a quantitative study with 451 samples, we employed linear regression analysis in SPSS to evaluate our hypotheses about the influence of nine dimensions on the satisfaction of Food Waste Behavioral Intention. Furthermore, we investigate whether there are many differences in behavioral intention between age, scarcity, education, job, and income through the ANOVA test. The final results show that 6/9 factors significantly impact consumers' behavioral intention, namely Attitude, Subjective Norms, Perceived Behavioral Control, Habit, Awareness and Knowledge, and Lack of time. Awareness and Knowledge is the most vital factor influencing behavioral intention, followed by Perceived behavioral control, Attitude, Habit, Subjective Norms, and Lack of time. At the same time, Financial motives are computed with the Awareness factor.

5.1.2. Answer the research questions

Q1: What factors influence consumers' behavioral intention towards reducing food waste in Vietnam's Foodservice industry?

Q2: How do those factors affect the consumer's food waste behavioral intention?

After studying research documents and theoretical models affecting customer behavioral intentions such as TPB, TIB, and MOA, we have removed some factors unsuitable for the food service industry in Viet Nam. In summary, the following table shows the relevant factors that we have selected:

Factor	Standardized Beta Coefficients	Sig.
AWA	0.276	0.000
PBC	0.204	0.000
ATT	0.198	0.000
HAB	0.186	0.000
SN	0.178	0.000

TIM	0.147	0.000

Table 5.1: Factor affecting customer behavioral intentions

Based on the standardized beta coefficient, the order of their factors affecting customer behavioral intention from high to low is AWA (β = 0.276), PBC (β = 0.204), ATT (β = 0.198), HAB (β = 0.186), SN (β = 0.178), TIM (β = 0.147). According to *Table 5.1*, AWA (Awareness and Knowledge) has the most potent effect on customers' food waste behavioral intention. TIM (Lack of time) is the weakest factor among the six factors that affect customers' behavioral intention.

Overall, we will conclude six factors above in order including "Awareness and knowledge, Perceived behavioral control, Attitudes towards food waste, Habit, Subjective norms, and Lack of time" and how these factors affect the food service industry in Vietnam:

- AWA: Greater awareness and knowledge about food waste will lead to stronger Hypothesis intentions to reduce food waste
- PBC: The higher the lack of perceived behavioral control, the lower will be the behavioral intention to reduce food waste
- ATT: Positive personal attitudes towards food waste are associated with a higher level of behavioral intentions to reduce food waste
- HAB: Habit directly affects food waste behavior.
- SN: Subjective norms significantly impact behavioral intentions in restaurants
- TIM: Lack of time significantly impacts reducing food waste behavioral intentions in food service.

5.2 Recommendation Through The Results

Based on the above analysis results, this thesis provides several policy recommendations for businesses, the government, and consumers to promote the behavioral intention to reduce customers' food waste in Vietnam's food service industry.

5.2.1 Recommendation for Business

Awareness and Knowledge

According to the research results, Awareness and Knowledge is the variable that has the most significant influence on customers' behavioral intention, from which we can see that businesses need to promote strategies to provide Food waste awareness and understanding to customers.

Fristly, the business can raise awareness as soon as customers use the service in the service area. Poster, standee on the table and signs encouraging to reduce food waste, or about impact of food waste in the dining area might be useful. Restaurant can set up small booklet on table for reading while waiting for the food, coloring pictures for kid. It can highlight the content could be about impact of food waste, SDGs, hunger around Vietnam and provide tips on reducing it. They can also include information on how the business works to reduce its food waste. Most of food service managers do not pay attention on this issue because they think it does not contribute to the benefit of the business. However, mitigating food waste by increasing awareness can help to promote the business as a sustainable development contributor, gaining supports from the society and government, which is crucial for long-term growth. The finance resource for these activities can accounted for operating cost as it will contribute to reduce the loss of the restaurants' operation; it can also be accounted to marketing cost, if the operation's target focuses on enhancing the business image. The food service business can run awareness campaigns to inform customers that the food service business is engaged in the fight against food. For example, the introduction of the "Take all you can eat - but remember to eat all you take" campaign at the canteen or restaurant buffets. Let customers understand that wasting food is bad behavior, thereby gradually improving consumers' attitudes.

In addition, sharing information on the food service's social media channels about food waste reduction can reach a wider audience and help educate customers who may not have visited the business before. Not only is it a channel to convey information and marketing, it also helps to market the service facility and also a way to contribute to the community.

The involvement of both employees and customer is essential. Staff and managers should be involved in developing training programs and awareness-raising activities so that employees can understand and jointly influence customer perceptions.

When educating customers about food waste, it is important to keep the messaging positive and non-judgmental. Consumers should feel empowered to make a difference and not feel guilty about their past behaviors. By educating customers about the impact of food waste and providing them with simple, actionable tips, businesses can help reduce food waste and create a more sustainable food system.

Perceived Behavioral Control

Perceived behavioral control has a positive impact on the customer's behavioral intention, food service should pay attention on strategy to influence this factor. Staff training is a vital link; along with increasing customers' awareness of food waste, staff also helps customers increase perceived control behavior. Businesses should ensure that front-of-house staff can communicate with customers in all the processes consumers use the service to advise, inspire and encourage not to left food. Providing information about portion size, ingredient weights, and calories will help customers decide which dishes are right for their needs and create a comfortable experience for customers when they feel they are cared for. Nudging techniques can help to influence the customer's decision and prevent food left-over or unconsumed. Staff must have knowledge in nutrition, customer dietary and allergic, and especially communication skill to improve the perceived behavioral control of customers.

Attitude

Consumer attitude is something that the business can decide, but it adsolutely can be affected. Customers' attitude may affect their taste, eating mood, and the amount of food consumed. Food service provider should ensure the dining room's ambience and facilities, and service staff is trained to be able to create and maintain a positive attitude during the whole meal experience.

Businesses that allow customers to order less or share a meal, by allowing flexibility of their menu. But because change in portion size or elasticity in recipe will directly affect the cost, this flexibility should be properly studied and go hand in hand with precise guidance, policy and elaborate staff training.

In order to create negative customer attitudes towards food waste so that they avoid waste, food service establishments can adopt payment policies that match their operations and profile; for example, pay by the weight of food, and charge customers for plate waste in buffets ect.

Subjective Norms

Subjective Norms extend a person feeling social pressure to perform the behavior; if wasting food is frowned upon by significant others, people will try to reduce their food loss. The application of fines for food waste, propaganda about harmful effects, and urging people not to waste food also shape society's view that food waste is harmful. Individuals will become more conscious and move towards behavioral intentions by gradually raising

awareness of society's food waste. It is wonderful to organize a community to lessen wasted food.

The judgment of people around reduce the intention to fight food waste. Therefore, staff should create a feeling of comfort and encourage customers to use up the food they have ordered, not have an attitude of judgment and evaluation with the actions of packing take-away of customers, that will make consumers afraid.

Lack of time

For customers who do not have time to eat properly, they often waste food, the business can encourage takeout. Many consumers may not have time to sit down and eat a full meal, so offering takeout options can be a great way to reduce waste. Depending on the customer file and each business size, businesses can prepare many option of packaged food servings so that customers can make the right choices. Also consider giving discounts to customers who choose less wasteful options, such as ordering smaller portions or bringing their own containers.

5.2.2. Recommendation for Consumers

Awareness

Consumers who are directly using food services should improve their understanding of the harms and measures to avoid food waste. Attending more workshop, participating in charity programs to donate food is not only a good way to increase knowledge but also increase motivation to act.

Perceived Behavioral Control

Because consumers are the ones who understand what they want and what suits them best, so when using food services, choose what is right for you. If you have trouble choosing, ask the staff for help.

Many people think that they will do nothing to improve the current situation of food waste. but small actions will also help if you take action, believe that you always have the ability to improve it.

Attitude

Appreciate the food because around you there are many hungry people because there is no food. Gratitude and appreciation for food will help reduce a lot of waste. Bringing home leftovers is another great way to reduce. If you can not finish your meal, ask the waiter to

pack leftovers into takeout containers. This way, you can enjoy the rest later or share them with others, instead of throwing them away. However, please limit the use of too many food packaging tools, especially plastic ones to avoid polluting the environment.

It is also a good idea to share food with friends or family to avoid waste, foster affection, and simultaneously enjoy a variety of dishes. In addition, planning ahead can be a simple but effective strategy. Before going to a restaurant, take a moment to review the menu and decide what you want to order. This can help you avoid ordering too much and ensure that you only order what you will actually eat. Also, consider asking for smaller portions, as this can help you control the sizes.

Subjective Norms

Each individual will be influenced by the society and environment of adulthood. Families, schools and people around should have an early education and form good thoughts. From a young age, parents can let their children choose the foods they like and encourage them to eat all the foods they choose. Combined with the education of the school and the awareness of the whole society, that will cause a good influence on each individual.

By following these recommendations, consumers can play an active role in reducing food waste when eating out and contributing to a more sustainable food system. Every effort counts and together we can make a positive impact on the environment and our community.

5.2.3. Recommendation for Government

Besides consumers and businesses, governments also have a responsibility to reduce food waste. Governments can implement policies that encourage businesses and individuals to reduce food waste, such as tax incentives for businesses to donate excess food or tough regulations requiring businesses to Food tracking and reporting their food waste.

The government can support programs to recover excess food and make donations to those in need, such as food banks and shelters. This may include providing funding, logistical support and legal assistance.

The results also show that the more educated people are, the more aware they are of the problem of food waste. The role of government in disseminating knowledge about this global issue is therefore all the more important. Starting by educating individuals to realize the importance and awareness of the actions they are taking is the first step towards improving this problem. Governments should fund educational initiatives to spread

knowledge about food waste and support healthy eating habits. Campaigns that are specifically targeted to specific audiences, such as families, companies, or schools, fall into this category.

The government has launched campaigns to encourage healthy eating and planned eating on social networking platforms such as Facebook, Tiktok, etc. This is also an indirect but extremely effective way of educational propaganda today's society.

5.2.4 Others recommendation

A good action is only temporary if it is not repeated and becomes a habit. Therefore, both individuals, businesses and governments must maintain good habits for it to have long-term effects, create a more sustainable ecosystem and help solve an important global problem..

The important advice to give businesses is to always understand their customers because a set of customers can apply different methods. For example, the result of the report analysis relationship of demographic factors with behavioral intention also shows that the age group of older people (from 45 years of age and older), usually those who have had previous experiences of food scarcity, the rate of behavior to reduce the amount of food leftovers is better than that of young people who often have not experienced food deprivation because they may have more knowledge, value food and save more. Therefore, businesses can apply the suggestions on methods to enhance behavior to reduce food waste as mentioned above. However, this group of people often has more difficulty accessing social networks and more advanced technologies, so businesses can consider more options for direct communication while using the service.

As for young people, most of them have not experienced the feeling of food deprivation, so the behavioral intention to reduce food waste according to our survey has a lower rate. This group of people learns very quickly, loves novelty and fast access to technology, so businesses can promote communication plans via social networks, and practical educational activities. In addition, it should be combined with measures to limit the intention to waste food such as paying for leftovers etc.

5.3 Limitation

Although this study has great potential and has achieved its stated objectives, there are still some limitations. Firstly, the results have a small quantitative sample, so the results may not be as good as the larger sample. With a scale of more than 500 survey participants, it

will not be possible to evaluate all types of customers in the Vietnamese market. We hope that further studies can test the measurement in larger sample sizes to see if there is any change in the results.

Secondly, the present study focuses only on the behavioral intentions of customers. Its next step is to study the actual behavior of consumers. However, to do this takes time and practical observation. So we hope in the future there will be research based on our results to investigate the topic more deeply and develop more objective and insightful conclusions about the food waste behavior of consumers when using food service in Vietnam.

Besides, from this topic, there are many directions for future research to exploit such as research in specific regions in Vietnam, food waste behavior in agricultural processing or household and in smaller niches of food service such as in hotels, canteens. ,...

5.4. Conclusions

This research focuses on identifying the factors affecting the determinant of consumer behavioral intention toward food waste in Viet Nam Food service industry. The authors have proposed a research model based on the original Theory of Planned Behavior, Theory of Interpersonal Behavior, and Motivation-Opportunity-Ability models. After collecting 451 valid responses from many different sources of customers in the food service market in Vietnam, the collected data are used for Frequency analysis, Cronbach's alpha, Exploratory Factor Analysis, Correlation, Regression analysis, and Analysis of Variance. Thereby, the authors have found that there are six out of a total of nine variables that affect behavior intention (“Awareness and Knowledge” and “Financial motives” have been integrated into “Awareness and Knowledge”), including Attitudes, Subjective norms, Perceived behavior control, Habit, Awareness and knowledge, Lack of Time. Moreover, the authors make some recommendations for Foodservice industry in Vietnam, including for businesses, consumers, and for government to improve and develop its service quality. Despite some limitations in terms of time and scale, the authors aim to make a meaningful contribution to the development of not just the Foodservice industry in Vietnam but also to similar industries worldwide with the findings of this research.

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APPENDIX

APPENDIX 1: Scale Construction

Attitudes:

It was developed based on the author's scale (Coşkun and Yetkin Özbük, 2020), which included four observed variables denoted ATT1 to ATT4.

Question	Variable‘s notation
I think engaging in food waste is unsatisfying.	ATT1
I think engaging in food waste is unpleasant.	ATT2
I think engaging in food waste is bad.	ATT3
I think engaging in food waste is harmful.	ATT4

Subjective Norms:

It was developed based on the author's scale (Linnea et.al., 2017), which included four observed variables denoted SN1 to SN4.

Question	Variable‘s notation
When I use food service, the people around me (family, friends, restaurant staff,...) think that reducing food waste is necessary.	SN1
When I use food service, people around me (family, friends, restaurant staff,...) think I'm not greedy trying to finish the food I ordered.	SN2
When I use food service, the people around me (family, friends, restaurant staff,...) think that I'm not greedy when packing and taking home the leftovers I ordered.	SN3
When I use food service, the people around me (family, friends, restaurant staff,...) encourage me to try to finish the food I ordered.	SN4

Perceived Behavioral Control:

It was developed based on the author's scale (Coşkun and Yetkin Özbük, 2020), which included three observed variables denoted PBC1 to PBC3.

Question	Variable‘s notation

I can predict the exact portion size that I can eat.	PBC1
I am able to eat all the portion size that I order.	PBC2
I have the feeling that I can contribute to reducing the amount of food waste in the restaurant.	PBC3

Emotion:

It was developed based on the author's scale (Jabeen *et al.*, 2023), which included three observed variables denoted PBC1 to PBC3.

Question	Variable‘s notation
I feel frustrated when I throw away food.	EMO1
I feel anxious when I throw away food.	EMO2
I feel guilty when I throw away food.	EMO3

Habit:

It was developed based on the author's scale (Aydin and Yildirim, 2022), which included three observed variables denoted HAB1 to HAB4.

Question	Variable‘s notation
I usually take food that is just enough for what I can eat	HAB1
If more food than I can eat is put on my plate, I will object to it (Reverse)	HAB2
I usually buy higher amounts of food than I need when they offer good value for money.	HAB3
If I order too much food at a restaurant/cafe, I usually take it away.	HAB4

Awareness and Knowledge:

It was developed based on the author's scale (Jarjusey, 2017), which included five observed variables denoted AWA1 to AWA5

Question	Variable‘s notation

I know that food waste causes economic problems.	AWA1
I know that food waste causes environmental pollution	AWA2
I know that reducing food waste can help to solve the increase of starvation in the world	AWA3
I know that the land is continuously covered with garbage caused by food waste	AWA4
I know that many people worldwide have died from a lack of drinking and running water.	AWA5

Financial motives:

It was developed based on the author's scale (Visschers, Wickli and Siegrist, 2016), which included three observed variables denoted FIN1 to FIN3

Question	Variable‘s notation
I think wasting food is wasting money	FIN1
Saving money motivates me to reduce food waste	FIN2
I think about money when I waste food	FIN3

Going for planned using Foodservice:

It was developed based on the author's scale (Rook, 1987; Rook and Fisher, 1995), which included four observed variables denoted PLA1 to PLA4.

Question	Variable‘s notation
I plan most of my food service visits	PLA1
I buy food according to how I feel at the moment.	PLA2
“I see it, I buy it” describes my food-buying behavior.	PLA3
I think before I decide to buy food.	PLA4

Lack of time:

It was developed based on the author's scale (Mallinson, Russell and Barker, 2016), which included three observed variables denoted TIM1 to TIM3.

Question	Variable‘s notation
I usually do not have time to cook at home.	TIM1
I use a lot of fast food to save cooking time.	TIM2
I'm looking to save time by using food service.	TIM3

Behavioral intention to reduce food waste:

It was developed based on the author's scale (Visschers, Wickli and Siegrist, 2016; Coşkun and Yetkin Özbük, 2020), which included three observed variables denoted INT1 to INT4.

Question	Variable‘s notation
I am willing to eat all the food I order.	INT1
I am willing to use leftovers to avoid food waste.	INT2
I try to reduce the number of leftovers as much as possible.	INT3
I try to help those around me reduce the number of leftovers as much as possible.	INT4

APPENDIX 2

SURVEY ON DETERMINANT OF CONSUMER BEHAVIOR TOWARD FOOD WASTE IN THE VIETNAM FOOD SERVICE INDUSTRY

Dear Sir/Madam,

We are a research group from the Hospitality Management major at FPT University Hanoi. Our survey aims to collect data for a research study on "Determinants of adult consumer behavioral intention toward food waste in Vietnam food service industry.

We kindly ask for some personal information to ensure the survey's objectivity. The survey will take about 5-10 minutes to complete. We assure you that all the information you provide will be kept strictly confidential and used solely for the research study.

Thank you for your contribution!
Best regards.

1. Before taking the survey, we would like to provide a definition of the concept of "Food service" and the concept of "Food waste":

"Food service" refers to all services that provide food and beverages for consumption outside of households (USDA, 2022) which can be consumed on-site or packaged for takeout. These services are primarily provided by restaurants, fast-food chains, cafes, corporate or educational institution canteens, and catering services….

☐ Strongly disagree
☐ Disagree
☐ Neutral
☐ Agree
☐ Strongly agree

"Food waste" refers to any food lost due to spoilage or waste. It may be due to food spoilage, market oversupply, or individual consumer shopping/eating behavior

☐ Strongly disagree
☐ Disagree
☐ Neutral
☐ Agree
☐ Strongly agree

2. Please indicate your assessment of behavior related to "food waste."

No	Encode	Description	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
2.1. Attitude toward "food waste" behavior							
1	ATT1	I think engaging in food waste is unsatisfying.					
2	ATT2	I think engaging in food waste is unpleasant.					
3	ATT3	I think engaging in food waste is bad.					
4	ATT4	I think engaging in food waste is harmful.					
2.2. Subjective Norms							
1	SN1	When I use food service, the people around me (family, friends, restaurant staff,...) think that reducing food waste is necessary.					
2	SN2	When I use food service, people around me (family, friends, restaurant staff,...) think I am not greedy trying to finish the food I ordered.					
3	SN3	When I use food service, the people around me (family,					

		friends, restaurant staff,...) think that I'm not greedy when packing and taking home the leftovers I ordered.					
4	SN4	When I use food service, the people around me (family, friends, restaurant staff,...) encourage me to try to finish the food I ordered.					
2.3. Perceived Behavioral Control towards Food Waste							
1	PBC1	I can predict the exact portion size that I can eat.					
2	PBC2	I am able to eat all the portion size that I order.					
3	PBC3	I have the feeling that I can contribute to reducing the amount of food waste in the restaurant.					
2.4. Emotion towards Food Waste							
1	EMO1	I feel frustrated when I throw away food.					
2	EMO2	I feel anxious when I throw away food.					
3	EMO3	I feel guilty when I throw away food.					
2.5. Habit toward Food waste:							

1	HAB1	I usually take food that is just enough for what I can eat.					
2	HAB2	If more food than I can eat is put on my plate, I will object to it.					
3	HAB3	I usually buy higher amounts of food than I need when they offer good value for money.					
4	HAB4	If I order too much food at a restaurant/cafe, I usually take it away.					
2.6. Awareness and knowledge about the food waste problem							
1	AWA1	I know that food waste causes economic problems.					
2	AWA2	I know that food waste causes environmental pollution					
3	AWA3	I know that reducing food waste can help to solve the increase of starvation in the world.					
4	AWA4	I know that the land is continuously covered with garbage caused by food waste.					
5	AWA5	I know that many					

		people worldwide have died from a lack of drinking and running water.					
2.7. Financial motives							
1	FIN1	I think wasting food is a waste of money.					
2	FIN2	Saving money motivates me to reduce food waste.					
3	FIN3	I think about money when I waste food.					
2.8. Going for planned using Foodservice							
1	PLA1	I plan most of my food service visits.					
2	PLA2	I buy food according to how I feel at the moment.					
3	PLA3	“I see it, I buy it” describes my food-buying behavior.					
4	PLA4	I think before I decide to buy food.					
2.9. Lack of time							
1	TIM1	I usually do not have time to cook at home.					
2	TIM2	I use a lot of fast food to save cooking time.					
3	TIM3	I am looking to save time by using food service.					
2.10. Intention to reduce food waste							
1	INT1	I am willing to eat all					

		the food I order.					
2	INT2	I am willing to use leftovers to avoid food waste.					
3	INT3	I try to reduce the number of leftovers as much as possible.					
4	INT4	I try to help those around me reduce the number of leftovers as much as possible.					

3. Personal information

We kindly ask for some personal information, and we assure you that all the information you provide will be kept strictly confidential and used solely for the research study.

3.1 Have you experienced food shortages before? (Encode: SCA)

❑ Never

❑ Rarely

❑ Occasionally

❑ Regularly

❑ Always

3.2 Gender *(one-answer question)*

❑ Male

❑ Female

❑ Others

3.3 Age *(one-answer question)*

❑ From 19 - 26 years old

❑ From 27 - 42 years old

❑ From 43 - 64 years old

❑ Above 65 years old

3.4 Education *level (one-answer question)*

▢ High school

▢ Vocational Training

▢ College

▢ University

▢ After university

3.5 Current income for one month *(one-answer question)*

▢ Below 5 million VND

▢ 5 - 10 million VND

▢ 11 - 20 million VND

▢ 21 - 30 million VND

▢ Above 30 million VND

3.6 Marriage status *(one-answer question)*

▢ Single

▢ Married

▢ Others

3.7 Occupation *(one-answer question)*

▢ Students

▢ Manufacturing

▢ Service Sector

▢ Freelancer

▢ Homemaker

▢ Retired

▢ Others

3.8 How often do you use food service in 1 week? *(one-answer question)*

▢ Less than one time

▢ Two - five times

▢ Five -Time times

▢ More ten times

Once again, we would like to thank you for taking the time to participate in the survey! Wish you have a productive day of studying and working!