Article

A Conceptual Framework Proposal Regarding the Engagement of Hotels in the Modern Fight against Unsustainable Food Practices

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Abstract: The ecological crisis that emerged rapidly in the 2000s because of vertiginous economic growth is still one of the dominant themes today. This unprecedented phenomenon has led to intense political-economic and social tensions over reconsidering the priorities of "post-industrial capitalism". The main issues here are increasing inequalities in the distribution of resources and high dependence on non-renewable energies. In response, valuable policies have been developed with the intention of creating new economic models that satisfy environmental and ecological needs. However, the literature shows that the effectiveness of the global schemes proposed to achieve sustainable behaviors and techniques has been very low. In the hospitality sector, particularly in the food and beverage department, pollution and consumption of scarce resources remain issues. In this paper, we propose a structural framework for analyzing the commitment of hotels regarding sustainable practices in the F&B department, centered on standards set by relevant institutions. To enhance understanding, an extension of the theory of planned behavior (TPB) is proposed. The use of this conceptual framework will enable us firstly to gain a perception of how a hotel acts through its F&B administrator in the light of relevant standard practices. Secondly, it will allow us to understand the role of the common internal and external factors behind the theories describing the behavior adopted. In this way, this research aims to contribute to a global understanding of the factors that influence the commitment of hotels to sustainable practices in their F&B department.

Keywords: hotel F&B; hotel sustainability; unsustainable value chain; food sustainability; conceptual framework; CASHP model

1. Introduction

In recent years, the hotel industry has increasingly recognized the importance of addressing sustainability issues, particularly in the food and beverage (F&B) department. However, while environmental problems remain pressing, sustainability is a complex concept that is often subject to varying interpretations and lacks a clear, consistent definition [1]. This has led to a lack of consensus on how to measure sustainability in the context of the hotel industry, and has hindered efforts to promote sustainable practices [1]. To address this challenge, this paper proposes a theoretical framework for analyzing the commitment of hotels, specifically their F&B department, to sustainable food practices. The framework

is built on the four pillars of planning, purchasing, preparation, and presentation (the 4 Ps) proposed by Gosling (2013), and incorporates the concept of the food–energy–water (FEW) nexus. This model represents an extension of the theory of planned behavior (TPB), which has been widely used to explain human behavior in the context of environmental sustainability.

Based on a comprehensive review of existing literature, this paper argues for the importance of sustainability and highlights the significant impact of the hotel industry on the environment.

In Section 2, the literature review discusses areas of focus for sustainability research, including energy efficiency, water conservation, waste management, and overall sustainability performance, and identifies challenges to implementing sustainable practices in the industry.

In Section 3, we describe the methodology and approach used in this study focusing on sustainable food practices in the hotel industry. Our goal is to develop a conceptual framework to help better understand the factors influencing the commitment of hotel F&B departments to establishing sustainable food practices as specified by official entities. In Section 4, "Unsustainability", we argue that there is a discrepancy between the official sustainability statistics presented by responsible entities on the one hand, and empirical examinations and academic literature on the other. This indicates a disconnection between the desire for sustainability and the willingness to make behavioral changes to achieve it. The lack of consideration for sustainability in the early stages of the decision-making process leads to less effective and efficient sustainable practices, potentially resulting in weak sustainability and greenwashing. This section also highlights the significant environmental impact of tourism, which makes a greater contribution to climate change than it does directly to the global economy. Subsequently, Section 5, "The Modern Campaign Against Unsustainable Food Practices", describes the collaboration between Turismo de Portugal I.P. and the Environment Fund to promote sustainable tourism practices in Portugal. It also discusses the CASHP constructs, which are the main constructs of the theory of planned behavior (TPB) influencing behavioral intention: attitude, subjective norms, and perceived behavioral control are the three main constructs that influence a hotel manager's behavioral intention towards sustainable F&B practices.

2. Literature Review

The hospitality industry has recognized the importance of sustainability in recent years, and the F&B department of hotels plays a crucial role in this context [2]. The F&B operations, including food service, food preparation, and food waste management, have significant environmental, social, and economic impacts [3]. Engaging the F&B department in sustainability practices has become a key focus for hotels aiming to minimize their environmental footprint, conserve resources, and contribute to social responsibility [4,5]. Therefore, the literature review aims to provide a comprehensive overview of the existing empirical studies and best practices on hotel F&B department engagement with sustainability, highlighting the benefits, challenges, and strategies for promoting sustainable practices.

Engaging the F&B department in sustainability practices can yield numerous benefits for hotels [6]. One of the primary benefits is the reduction of environmental impacts. Sustainable sourcing and menu optimization practices can help reduce the carbon footprint of F&B operations by acquiring food from local, organic, and sustainable sources and optimizing menu offerings to include seasonal, locally available ingredients and plant-based options [3,7]. This can contribute to biodiversity conservation, promote sustainable food production, and reduce the emissions associated with transportation and processing of food products. Water conservation practices, such as implementing water-efficient fixtures and water reuse systems, can also help by effectively reduce water consumption in the F&B department and contribute to sustainable water management [8]. This is particularly relevant in water-stressed areas where hotels can play a role in conserving a valuable

resource. Energy-efficient practices, such as using energy-efficient appliances, optimizing equipment usage, and promoting energy-saving behaviors among staff, can help reduce energy consumption and therefore greenhouse gas emissions in the F&B department [9,10], contributing to mitigate climate change impacts and reducing operational costs for hotels. Waste management practices, including source separation, recycling, and composting, can minimize waste generation and promote recycling, leading to reduced environmental impacts of waste disposal [11]. Last, engaging the staff in sustainability initiatives can increase their awareness, knowledge, and behaviors, leading to more sustainable F&B operations and promoting a culture of conscience within the organization [12,13].

2.1. Challenges of Hotel F&B Department Engagement with Sustainability

Despite the benefits, engaging the F&B department in sustainability practices presents several challenges for hotels. One of the main challenges is the need for financial investments. Implementing sustainable practices often requires upfront costs for infrastructure upgrades, equipment purchases, and staff training, which may pose financial challenges for hotels, particularly for small and medium-sized establishments [14]. This may require careful financial planning and budget allocation to support sustainability initiatives in the F&B department. Food and beverage operations are subject to strict food safety and hygiene regulations, which may pose challenges in adopting sustainable practices, such as composting or food donation programs, due to concerns about food safety and liability issues [15,16]. Hotels need to ensure that sustainability practices are in compliance with food safety regulations and take necessary precautions to mitigate any potential risks. Resistance to change and lack of awareness and understanding among staff about the importance and benefits of sustainability practices hinder their engagement and participation in sustainability initiatives [17,18]. Overcoming these challenges requires effective communication, staff training, and engagement strategies to create a shared understanding and commitment towards sustainability among the F &B department staff.

Another challenge of engaging the F&B department in sustainability practices is the complex and global nature of food supply chains [19,20]. Ensuring sustainable sourcing of food products, including traceability, certifications, and standards, can be challenging due to the complexity and diversity of food supply chains, especially for large hotels with multiple suppliers and distributors [21–23]. It may require significant efforts to establish and maintain sustainable sourcing practices, including supplier selection, monitoring, and auditing, to ensure that food products are procured from sustainable sources. Changing consumer preferences and demands pose a challenge for hotels in adopting sustainable practices in the F&B department [24]. While there is growing awareness and demand for sustainable food options among consumers, there may still be resistance to higher prices or changes in menu offerings, particularly in price-sensitive market [25]. Hotels need to carefully balance sustainability goals with customer satisfaction and financial considerations to ensure that sustainability initiatives are economically viable and acceptable to consumers.

2.2. Strategies for Promoting Hotel F&B Department Engagement with Sustainability

We find in the literature several strategies that hotels can adopt to promote engagement of the F&B department in sustainability practices such as:

Leadership commitment and support are crucial for driving sustainability initiatives in the F&B department [2,26,27]. Top management should communicate the importance of sustainability, set sustainability goals, allocate resources, and provide necessary training and support to ensure that sustainability becomes an integral part of the organizational culture [28].

Staff engagement and training is essential for creating a shared understanding and commitment towards sustainability [26]. Training programs can be conducted to raise awareness, build knowledge and skills, and promote sustainable behaviors among staff [29]. Staff should be encouraged and incentivized to participate in sustainability initiatives and provide feedback and ideas for improvement [30,31];

Collaboration with suppliers is a critical step for ensuring sustainable sourcing of food products. Hotels can establish partnerships with local, organic, and sustainable food suppliers, set up supplier selection criteria based on sustainability standards, and regularly monitor and audit suppliers for compliance [32,33];

Infrastructure upgrades and technology adoption: Hotels may need to invest in infrastructure upgrades and technology adoption to implement sustainable practices in the F&B department. This may include installing energy-efficient appliances, water-efficient fixtures, waste segregation and recycling systems, and food waste management technologies [34–37]. Life cycle cost analysis can be used to assess the economic viability of such investments [38].

Communication and marketing: Effective communication and marketing can raise awareness among consumers about the sustainability initiatives of the F&B department and promote customer demand for sustainable food options [39]. Hotels can use various communication channels, such as websites, social media, menus, and signage, to communicate their sustainability efforts and educate consumers about the benefits of sustainable food choices [40].

Monitoring and reporting: Hotels should establish mechanisms to track the progress and impacts of sustainability initiatives in the F&B department. Key performance indicators (KPIs) can be established to measure and report on environmental, social, and economic performance, and regular reporting can help identify areas for improvement and celebrate successes [41,42].

2.3. The State-of-the-Art Regarding Sustainable Food Practices in the Hotel F&B Department

By analyzing the aforementioned items, the literature indicates that hotels in general are increasingly prioritizing sourcing of food from local, organic, and sustainable sources [43]. Practices which involves building relationships with local farmers and producers, using organic and sustainably grown ingredients, and prioritizing fair trade and ethically sourced products [44]. Using this approach allows to support not only local communities and sustainable food production, but also reducing the carbon footprint associated with transportation and processing of food products [45]. In this matter, hotels are focusing on menu optimizations to include seasonal, locally available ingredients and plant-based options [46,47]. This promotes biodiversity conservation, reduces the environmental impact of food production, and provides healthier and more sustainable dining choices for guests [48]. Regarding the waste reduction and management, hotels are implementing effective practices in their F&B operations. Such practices includes source separation of waste, recycling, and composting programs to minimize waste generation and promote recycling [15]. Hotels are exploring innovative solutions such as food donation programs to reduce food waste and address social responsibility [49,50]. They are also implementing water-efficient fixtures, water reuse systems, and promoting water-saving behaviors among staff to minimize water consumption are measures that contribute to effective water management [51–53]. In regard to energy reduction and greenhouse gas emissions, hotels are using energy-efficient appliances, optimizing equipment usage, and promoting energy-saving behaviors among staff [10]. The staff engagement and training are critical for the successful implementation of sustainable food practices so that providing training and education programs it's possible to create awareness, knowledge, and behaviors towards sustainability among their staff. This includes regular staff training sessions, workshops, and ongoing communication about the importance and benefits of sustainable food practices [54–58]. Regarding the stakeholder collaboration, hotels are working with suppliers, vendors, and local communities to promote sustainable food practices by involving close communication and looking for someone that shares similar sustainability values and engagement to support local food systems and promote sustainability initiatives [59–61]. The monitoring and measurement is assured by hotels systems that track and evaluate the effectiveness of their sustainable food practices by setting up key performance indicators (KPIs), conducting regular audits and using sustainability certifications and labels to demonstrate their commitment to sustainability [62,63]. Through the

implementation of smart kitchen technologies, food waste tracking and management tools, and sustainable packaging solutions, hotels are leveraging innovation and technology to promote sustainable food practices in their F&B department [64–66]. Communication and education initiatives represent other important steps that hotels are engaging with their guests to raise awareness about their sustainable food practices, through the provision of information about sustainable menu options, sharing the hotel's sustainability initiatives through marketing and communication channels, and encouraging guest participation in sustainability programs [40,67,68].

3. Materials and Methods

This study presents a systematic review of the literature on sustainable food practices in the hotel industry and argues the main issues of implementing sustainable food practices in the F&B department. In this matter, the aim of the study is to develop a conceptual framework that can help to better understand the level of commitment of hotel F&B departments in establishing sustainable food practices as specified by official entities. The research question that guides this study is: Which determinants influence the hotel industry's commitment to sustainable food practices? To answer this question, we conducted a comprehensive search of academic databases and official entities to identify relevant literature on sustainable food practices in the hotel industry. We then conducted an analysis of the most relevant published papers, and we present them here in the form of a systematic analysis to make the problem more understandable. This step also allows us to establish the basis of our proposed framework, which interrelates the triad of unsustainability, tourism, and food. That basis then enables us to generate a conceptual model identifying the general unsustainable dimensions and mechanisms of hotel F&B departments.

As mentioned, we conducted a systematic search of academic as well as technical documentation to identify the best sustainable practices advised by official entities and platforms. After this step, we realized that this framework could gain a deeper insight into behavioral theories, as it implies one. Therefore, we propose that our framework should integrate the well-known and much used theory of planned behavior (TPB), creating an extension of it. By incorporating the theory of planned behavior (TPB), the proposed framework can be further developed by considering the attitudes, subjective norms, and perceived behavioral control of individuals and organizations within the hospitality sector regarding sustainable food practices. The proposed framework, as an extension of TPB, is called the Commitment Analyses of Sustainable Hotel food Practices (CASHP) model. The CASHP model includes the constructs "intellectual" and "affective", which are not typically considered in the TPB. By including these additional dimensions, the proposed framework captures a more holistic understanding of behavior, including the cognitive and emotional factors that influence the potential barriers and facilitators in the adoption of sustainable food practices in hotels.

The final section of this study presents a summary of the literature review and the proposed framework, highlighting the implications of this work for future research and practice.

4. Unsustainability: Arguing a New Approach

Although the literature review points to the application of sustainable practices among hotels in general, there is a noticeable difference between the official sustainability statistics presented by the responsible entities and the observations made in empirical examinations and academic literature. Further observation reveals a diversity of perspectives among some authors. While there is general agreement on the need for a more sustainable planet, there is less consensus on the specific actions and behaviors needed to achieve this goal, mainly because of the different consequences and impacts in everyone's life. This highlights a disconnection between the desire for sustainability and the willingness to make behavioral changes to achieve it. For Hausknost [69], for example, since 1972, most of the population has been unwilling to change their lifestyles or comply with any eco-political imperatives.

The priority of the dominant citizen-consumer since the 1950s has always been (he claims) to maximize their material standard of living and to rely on the state to deal with the ensuing environmental problems in terms of technological and regulatory solutions.

From the moment that global economic systems are built on the exploitation of scarce resources that pollute and damage the environment, bringing harmful consequences to the population, we assume, based upon the most recent scientific understanding, that all human behaviors (in general) are unsustainable. This raises the question of what is *total sustainability*? When will we achieve a neutral ecological impact? The answer is probably never, at least not until we have the technology to transform and eliminate the processes, materials, and methods that are unsustainable, or—the best but disruptive way—to turn the system antifragile ("Antifragility is beyond resilience or robustness. The resilient resists shocks and stays the same; the antifragile gets better."). Until these solutions emerge, and based on this idea, the policies adopted by individuals, governments, or companies only contribute towards combating unsustainability; they should not be considered (as the idea suggests) as leading to any sustainable product, material, or process. Knowledge about sustainability is not sufficiently structured, nor is the economy prepared to establish itself on a sustainable principle.

In the light of today's scientific literature, we can strongly argue that sustainability is applied today, essentially, as a behavior mitigating ecological and environmental damage. In other words, it is a measure to combat unsustainability, which is described by Ashford and Caldart [70] as practices or systems that deplete resources or cause damage to the environment in a way that is not sustainable in the long run. Such practices can be measured and acted upon, since science recognizes the limits of the planet and the practices that are harmful to it. The central issue that arises is that sustainable behavior and procedures should be based on the principle of preserving human and environmental capital. However, it is often observed that analysis is conducted retrospectively, focusing on an outcomes-solving strategy, rather than being incorporated into the planning process from the beginning. This suggests a lack of consideration for sustainability in the early stages of the decision-making process, potentially leading to less effective and efficient sustainable practices. On the other hand, the creation of policies and measures to combat unsustainability immediately assumes the appearance of a non-disruptive correction: while it is understood that the process is not sustainable, this approach is a more malleable, adaptive idea that does not "shock" the strategies already implemented. The decrease in unsustainability will depend on explicit information on the core activities of companies, including their consumption, revenues, and impacts. This quantitative information on technological processes and various aspects of sustainability rarely exists, or if it does, systematized in a way that is appropriate for effective decision-making [71]. This situation thus contributes to deceptively sustainable behavior, called weak sustainability, since it allows for less sustainable practices in exchange for some generally monetary penalties, or even greenwashing.

4.1. The Triad: Unsustainability—Tourism—Food

Often described as the largest economic sector [72], tourism consists of a human activity involving the economy, environment, and society [73]. Flanked by its large and consequent exponential significance to the world economy, it is deeply rooted in the atmosphere of tourism deception and, moreover, subject to growing environmental deterioration [13,74]. Over the past decade, tourism has seen continued global annual growth in international visitors, reaching around 1500 million international arrivals (51% in Europe) in 2019, generating more than €1.7 trillion in revenues [75]. With the resounding growth in 2020 and 2021 as a result of the Covid-19 pandemic, which proved the fragility of the sector despite its resilience, these figures resulted in 8% of global CO_2 emissions, (see Figure 1 [76]), totaling nearly 4.3 trillion metric tons per year [77]. And according to UNWTO forecasts there will be a 25% growth in the period 2016–2030, which will continue to increase taking into account the correlation between the increase in the world popula-

tion and the number of annual tourists. Due to this significant source of carbon dioxide (CO_2) emissions—the main greenhouse gas that is causing climate change—comes from tourism [78], it is claimed that tourism contributes a larger share to climate change than it does directly to the global economy. In other words, it harms the environment to a greater extent than it is economically prosperous.
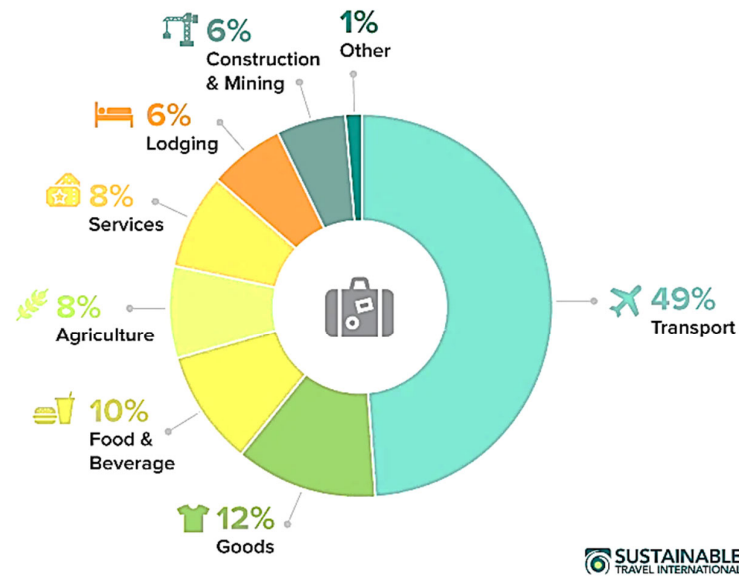
Figure 1. Carbon footprint of global tourism.

According to the United Nations World Tourism Organization, the hospitality industry is one of the most employment-intensive sectors, but at the same time, an energy-intensive one. The majority of these emissions come from transportation and activities at the destination, such as accommodation, food, and tourist activities [79]. This highlights the urgent need for stronger efforts to address behaviors impacting climate change in the tourism industry, as emissions could quickly surge again when operations continue to rise. In the long term, failing to act on climate change will be more costly than any other crisis [80].

The world population count that has tripled in the last 60 years [81] is projected, according to FAO [82], to result in 10 billion individuals living on the planet by 2050 (see Figure 2).
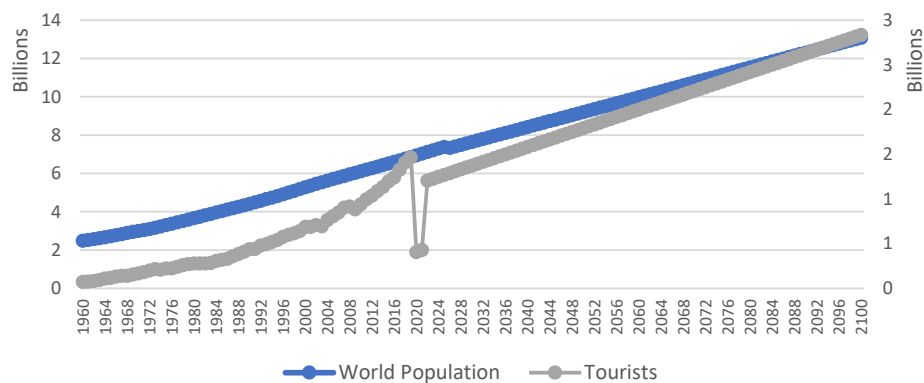

Figure 2. Projection of the growth of the world population and the number of tourists up to 2100.

In view of this scenario, and to comply with the needs of so many people, it is indisputable that more goods should be produced to meet the requirements of a population

of this magnitude. FAO, for example, estimates that 60% more food is needed [83]. However, considering the characteristics of the technology available at this time, it is predicted that the escalation of food production, distribution, and consumption will inevitably have negative repercussions for the environment.

Concerning specifically the food sector, food production is another area where unsustainability is a major concern. This is because agriculture is an intensive activity that requires a huge number of resources (land, energy, water, among others) and often depends on monoculture, the use of chemical fertilizers, and heavy machinery, which have a negative impact on the environment [84]. Intensive use of these methods also leads to soil degradation, biodiversity loss, and increased greenhouse gas emissions. The dramatic scenario is that approximately 30% of all production is wasted [85], meaning that all the emissions generated were unnecessary. In addition, the transport and distribution of food products also contribute to these problems, with the result that the disastrous operational carbon footprint of the industry puts it among the most polluting amenities [86].

The food and beverage industry is a vital part of our daily lives, yet it also has significant environmental impacts that can lead to unsustainability. One of the most pressing issues is food waste, which occurs at various stages of the food value chain, including production, processing, distribution, and consumption (see Figure 3). This not only contributes to environmental degradation, but also results in economic losses.
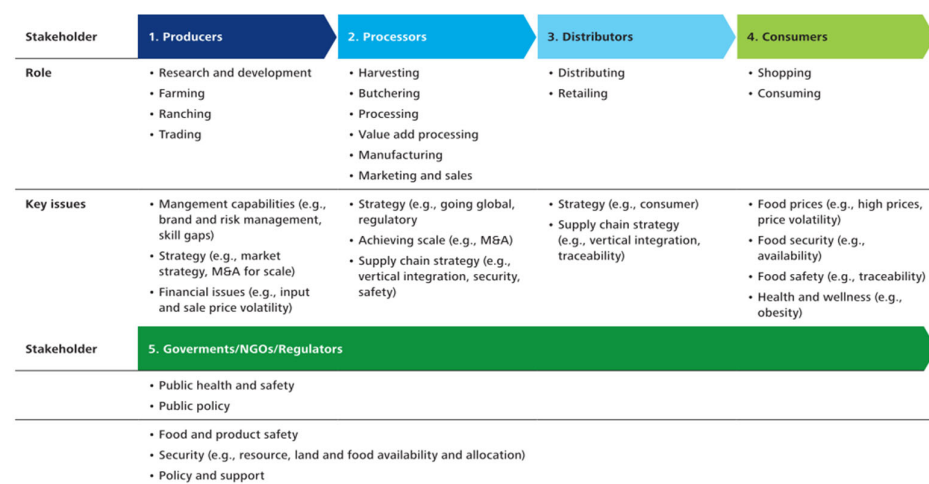

Figure 3. The food value chain [87].

4.1.1. Dimensions of Unsustainability

Recent technical and academic literature consensually reveals that the main unsustainable dimensions of hotels are: (i) food waste; (ii) energy use; (iii) water use; and (iv) carbon dioxide emissions [12,88–90]. Peeters [72] points out that "The most important GHG emission is carbon dioxide (CO_2), it is responsible for most radiative forcing (RF) caused by humans and responsible for the increase in average temperature. Carbon dioxide is emitted in tourism through the operation of accommodations (heating, cooling, washing, cooking, etc.), activities (energy use for transportation of tourists from their accommodations to the sites of activities, for operating restaurants, bars, disco's, cinemas, cable-cars, scenic tours, et cetera)". These four dimensions are not rarely ignored or out of the spotlight of scientific research, perhaps because they are still "hidden" in the diversity and complexity of the products and services of a hotel unit [91]. Perhaps this circumstance explains so many years of scarce scientific work, which has been far from an urgent in-depth study of the above-mentioned critical points. Largely by virtue of the enormous pertinence of the topic, a certain body of research is already focusing more systematically on sustainability in the tourism industry, by now on almost all its fronts. It is, however, a late "enterprise" and, for this reason, has a limited and parsimonious background. As a result, among

tourism operators there is still a lack of knowledge about the practical application of strong sustainability measures. What has been built up in academia, and has just come to light, seems to be unclear to them [92].

Another major problem is the high energy use required for the production, processing, transportation and storage of food and beverages. This energy consumption can lead to greenhouse gas emissions and contribute to climate change. Food and beverage production can also be very water-intensive. Unsustainable water use can lead to water scarcity and environmental degradation. In addition, the expansion of agricultural land for food production can lead to deforestation and the destruction of biodiversity. Packaging is a further concern, as unsustainable packaging made from plastic can contribute to pollution and waste accumulation in landfills and oceans. Climate change is also affecting agriculture and food production, leading to crop failure, water shortages, and other negative impacts on food security. Food waste should ideally be considered when assessing the carbon footprint of a hotel. This applies particularly if it is a large-scale facility (and promotes the all-you-can-eat buffet), because such hotels hold large stocks of products and services in order to satisfy demand, thereby generating more environmental externalities, such as greenhouse gas emissions, and contributing greatly to environmental degradation [93].

Another problem regarding the F&B department is the intensive usage of energy to process, transport, prepare, and consume the food (see Figure 4). The most serious environmental consequences of hotel operations pertain to major dimensions in the hotel business, "such as energy consumption, food waste, and suboptimal use and pollution of water" [86]. Although using water does not contribute (at least not directly) to the F&B carbon footprint, it is a scarce resource that should be used sparingly. "The impact of tourism on water use, and vice versa, is still an understudied and often overlooked area (Gössling, 2005; Gössling, 2006; Gössling et al., 2012). This is partly because environmental sustainability in recent years appears to have become almost synonymous with taking action to limit carbon emissions. On-going attention to climate change has led to an increasing body of research on carbon emissions from tourism, and in particular from air travel (Becken, 2002; Chenoweth, 2009; Gössling, 2000; Gössling et al., 2010b)" [94]. However, as a comparative example, the "relation to accommodations, that has been seen as the major factor in water consumption (including water use in hotel rooms and swimming pools, and for cleaning and gardens), is small in comparison to the water footprint of food" [95]. That is why it forms part of the important nexus approach or FEW approach (Food–Energy–Water). This approach is a relatively recent concept that has been developed by several different researchers and organizations. It has its roots in the field of systems thinking and the recognition that food, energy, and water are interconnected and interdependent [96]. It is a way of looking at the interrelationship of these three essential resources (food, energy, and water) and how they affect each other, since they all are necessary for human survival and well-being, and they are also closely linked in terms of production, distribution, and consumption. For example, the production of food and energy often requires water, and the delivery of water and energy is necessary for food production. In addition, changes in the availability or quality of one resource can affect the availability or quality of others. The approach was initially proposed and developed by different researchers and academic professionals in the field of water resources, agriculture, and energy. It was also recognized by international organizations such as the United Nations and the World Bank, which stressed the importance of integrated management of these resources to achieve sustainable development [97]. The FEW nexus concept has been developed by various academic research groups, think tanks, and international organizations, such as the World Water Council, the International Water Association, and the International Food Policy Research Institute. They have been working on developing methods and tools to analyze and manage these nexuses, such as integrated modeling, scenario planning, and stakeholder engagement.
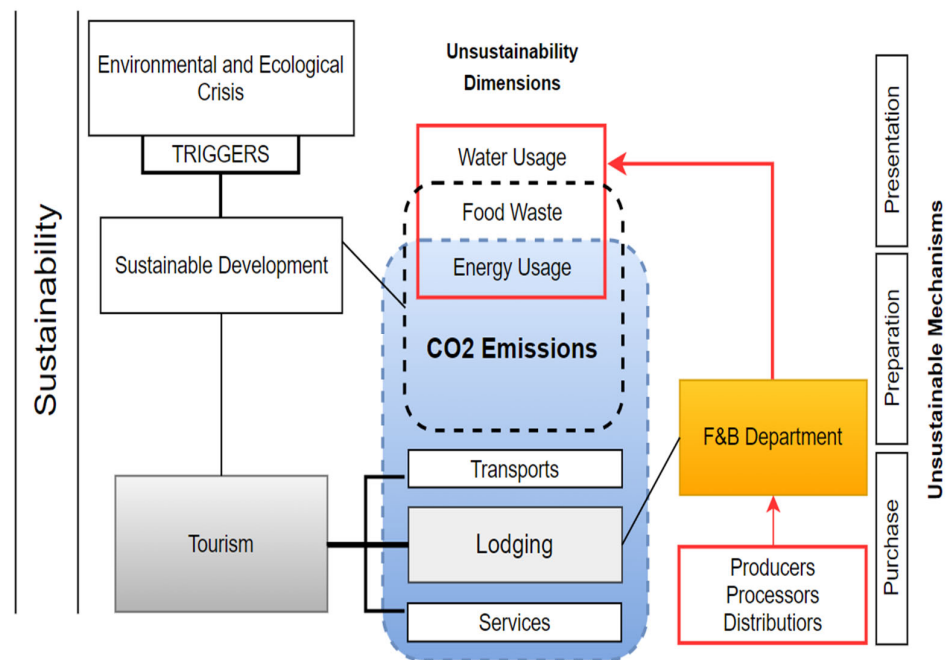
Figure 4. Model of unsustainable main dimensions in F&B department.

This model becomes fundamental to understanding the problematic internal and external imperatives surrounding the hotel F&B department, as well to guiding and orientating their incorporation in the final model proposed. Next, we will provide a more in-depth insight into the dimensions and mechanisms and their relationship with this figure.

4.1.2. Mechanisms of Unsustainability

Through this research, we realized that the food value chain (Figure 5) could be the foundation for analyzing the mechanisms of unsustainable F&B practices. The most serious environmental consequences of hotel operations pertain to major dimensions in the hotel business, such as energy consumption, food waste, and suboptimal use and pollution of water [86].

Figure 5. Simplified overview of the stages of a food value chain [79].

These mechanisms can be summarized by the "3 Ps" presented by Gössling, Garrod [98]: *Purchasing*, *Preparation*, and *Presentation*. This paper argues that there are too many ways for establishments to reduce CO$_2$ emissions, and in that regard several practices can

be pointed out regarding food management. To address this issue, the paper presents the "3 Ps" in which food service providers have considerable scope to reduce the carbon intensity of the food they provide (*idem*). Next, we present and define each construct that represents the mechanisms listed:

Planning

It is known that proper planning is essential not only for the economic, but also for the environmental success of a food service business. It can make the difference between a thriving establishment and one that struggles to stay afloat or even sustainable. Unfortunately, many businesses fail to fully understand the importance of planning and the negative consequences that can result from poor planning or no planning at all. One of the most significant negative impacts of poor planning is food waste. The concept of menu planning is a crucial element in the culinary arts. A major consideration in this process is to consider the current season and the natural crops that are available. This allows for the incorporation of fresh, locally sourced ingredients that are at their peak of flavor and nutritional value. In addition, menu planning also involves the strategic use of less expensive cuts of meat, allowing for the creation of delicious and satisfying dishes without breaking the budget. When menus are not planned, it can lead to overbuying ingredients, resulting in increased food waste. This can be costly for the business, not only financially, but also in terms of environmental impact. Food waste not only takes a toll on the business's bottom line, but it also contributes to the larger problem of food insecurity and environmental degradation. Effective menu and inventory management systems can minimize these negative impacts by reducing food waste. This can be done by planning menus in advance, more accurately predicting ingredient needs and ensuring that ingredients are used before they expire, thereby reducing the amount of food that is thrown away. Moreover, it is important to design menus that use surplus ingredients, feature more plant-based dishes, and send all unavoidable food waste to compost or other forms of recycling. Furthermore, it is important to use renewable energy to power the business, while replacing outdated and inefficient equipment to reduce energy consumption. Other ways to combat unsustainability are to use regeneratively grown ingredients and food, reusable packaging for products, and raw materials wherever possible, as well as electric vehicles or other forms of sustainable transport to receive raw materials and make deliveries [99]. Another important aspect of menu planning is the incorporation of a wide variety of vegetable ingredients. This not only increases the nutritional value of the dishes, but also allows for more creative and diverse menu offerings.

Purchase

Purchase is an essential step towards assuring the economic and environmental success of a food service business; it encompasses the acquisition of ingredients and materials needed for the preparation of meals. This can include purchasing raw ingredients, such as fruits, vegetables, meats, and grains, as well as other items, such as kitchen equipment, utensils, and packaging materials. In terms of environmental impact, purchase can be detrimental in several ways, e.g., relying on imports that have traveled long distances, buying products out of season, and buying products that are not grown locally. Additionally, not giving priority to organic, fair-trade, or local suppliers can be another unsustainable mechanism.

The main problems arising at this stage are attributable to:

- The origin of ingredients: ingredients that are locally sourced, in season and produced using sustainable methods can have a lower environmental impact than ingredients that are imported, out of season and produced using intensive methods.
- The packaging of ingredients: ingredients that are purchased in bulk and with minimal packaging can have a lower environmental impact than ingredients that are packaged in single-use plastics and other non-recyclable materials.

- Food waste: overbuying or overproduction of ingredients can lead to food waste, and consequently to an increase in the environmental impact of the purchase stage.

Preparation

Sustainability in the food industry is an important aspect that encompasses the entire food preparation process, from ingredient sourcing to the final dish. Unsustainable food preparation mechanisms include wasteful practices, such as overproduction and over-buying, that lead to excessive food waste; using energy-intensive cooking methods; not promoting healthy eating; not considering cultural diversity; and not considering food allergies. The preparation stage is crucial as it can affect the taste, texture, and nutritional value of the final dish, and can also have an impact on the environment. In the food preparation process, the choice of ingredients used is crucial in terms of sustainability:

- Using locally sourced, in-season, and sustainably produced ingredients can minimize the environmental impact of food. Similarly, waste management is a crucial aspect of sustainability in the food industry. Composting food scraps, recycling, and reusing materials can help minimize waste and its environmental impact.
- The amount of water used during the preparation process can also have an impact on sustainability. Using water-efficient appliances, collecting rainwater, and reusing gray water for irrigation can help minimize the environmental impact of water use. In addition, the techniques and methods used in food preparation also play a crucial role in sustainability. Energy-efficient techniques and appliances, as well as traditional or cultural methods that have a lower environmental impact, can help minimize the impact of food preparation on the environment.
- Food safety is also an important aspect of sustainability in the food industry. Proper cleaning, storage, and handling of food can help prevent foodborne illness and ensure that food is safe for consumption.

Presentation

The presentation of food and beverages to customers, known simply as food presentation, is a critical aspect of the meal provision process. It encompasses a wide range of factors, including packaging, use of decorative elements, transportation, plating, and food safety. These factors can have a significant impact on the overall customer experience as well as the sustainability of the food service industry.

A key aspect of food presentation is food packaging and serving. The use of non-biodegradable packaging, disposable plates, and cutlery can contribute to waste and pollution. To mitigate this impact, it is recommended to use biodegradable or reusable materials and avoid single-use packaging. In addition, the use of decorative elements, such as flowers and garnishes, can also contribute to waste and pollution if not used responsibly. Using biodegradable or edible elements and avoiding non-biodegradable decorations can help minimize this impact.

Transporting food from the kitchen to the customer, by means such as delivery or table service, can also have an impact on sustainability. Using sustainable transportation options, such as electric vehicles or bicycles, can minimize the carbon footprint of food provision.

Plating, i.e., the way food is arranged on the plate, is another aspect that can affect the customer experience and food waste. It is important to consider using smaller plates and reducing portion sizes to minimize food waste.

5. The Modern Campaign against Unsustainable Food Practices

In a collaborative effort to promote sustainable tourism practices, Turismo de Portugal I.P. and the Environment Fund joined forces in October 2020 by signing a Protocol of Technical and Financial Collaboration for the implementation of the project "Sustainable Tourism: better tourism for (with) everyone". The aim served by the project was to increase the skills of tourism professionals, enhance existing initiatives and dynamics, give visibility to good practices, and inspire everyone to do better to achieve improved results in terms

of revenue, tourist satisfaction, and preservation of our planet. To achieve these goals, Turismo de Portugal signed protocols with several partners, including AHRESP, as well as with the Universidade Nova de Lisboa, the Portuguese Golf Federation, and Travel Without Plastic, as entities responsible for implementing the six actions of the project. The result of this work culminated in a series of guides and tools aimed at promoting sustainable tourism practices throughout the sector.

We use one of these guides: *Guia de boas práticas para uma restauração circular e sustentável* to create an index of best practices (Table 1) relating to the mechanisms identified above.

Table 1. Best practices to respond to the mechanisms of unsustainable F&B practices in hotels based on the 3 Ps of and [99].

Item	Description
Planning	- Pay attention to the season and the naturally available crops. - Include fewer noble meats in menus. - Use a wide variety of vegetable ingredients. - Make vegetarian options available. - Systematize good practices in training manuals and make them available to the team. - Promote the use of different parts of a single ingredient in various menu items (e.g., the white part of the leek is used in a soup and the dark green part in a sautéed vegetable dish). - Identify and adopt strategies to reduce food waste. - Write down the preheating times of the kitchen equipment and keep them visible to the whole team. - Make employees aware of planning and train them to plan meals better, especially regarding portion sizes in preparation and service. - Use stock management systems and techniques such as FIFO or LIFO. - Implement an "equipment off" routine to ensure that equipment is only turned on when strictly necessary. - Install motion sensors for space lighting.
Purchase	- Buy low-caliber fruit and vegetables. - Buy certified meat. - Buy fish certified with the MSC (Marine Stewardship Council) or ASC (Aquaculture Stewardship Council) seal. - Promote own-grow vegetables or fruits. - Create aromatic beds. - Buy local/regional products. - Privilege the purchase of national products. - Buy when needed considering the expiration date. - Buy in bulk. - When purchasing equipment, always take its energy performance into consideration. - Choose to buy smaller plates to promote a sense of balance in the amount of food provided to the customer per meal.
Preparation	- Monitor refrigeration equipment and make sure it is working properly. - Monitor proper temperatures to preserve food quality and prevent bacterial growth. - Try to use the same ingredients several times throughout the menu. - Reuse the ingredients left over from other meals and use them to recreate the menu. - Regularly monitor food waste from inside and outside the kitchen in order to define and implement reduction measures. - Use technology to deal with food waste (e.g., monitoring tools). - Before it becomes waste, send leftover food, which has not been served or displayed, to charities or more economical institutions (such as Phenix, Fair Meals and Too Good To Go). - If the cooking time is longer than an hour, there is no point in preheating the equipment. - Check that the electric hob, or the flame on the stove, is no bigger than the base of the container. - Regulate the climate control system to stabilize the average room temperature at around 22 °C. - Set thermostats according to the needs and times of the year: between 3 °C and 5 °C for the refrigerator and between −18 °C and −15 °C for the freezer. - In the dishwashers, select economical and low temperature programs.
Presentation	- Use biodegradable or reusable materials for packaging and serving food. - Do not waste energy when transporting food within the hotel. - Use smaller plates to reduce portion sizes. - Ensure that food is kept at the correct temperature. - Use decorative elements that are biodegradable and/or edible. - Introduce half-portions and/or children's menus. - Display food under protective cover in display cabinets.

We consider these to be the main practices constituting the modern campaign against unsustainable food practices in the hotel sector. Compliance with these practices will be interpreted as the main indicator of the commitment of hotels to sustainable practices regarding food.

Conceptual Framework Proposal—CASHP

Creating a conceptual framework is an important aspect of research design. It assists as a roadmap for understanding the research problem and the underlying relationships between variables. It allows researchers to design a study that is well aligned with the research question, effectively communicate their understanding of the problem, and propose a solution to others. In addition, a conceptual framework can identify gaps in knowledge and provide a theoretical basis for the study.

In this study, since we aim to examine the level of commitment of hotels towards sustainable food practices, our initial analysis sought to identify the specific practices that are being implemented by hotels. However, as we delved deeper into the topic, we realized the potential usefulness of existing theories in not only predicting, but also understanding the underlying causes of such behaviors.

Considering this, we chose to use the theory of planned behavior (TPB) as a starting point for our analysis. TPB is a widely accepted psychological theory that can be used to understand and predict human behavior, particularly in the context of sustainability. The model posits that an individual's attitude, subjective norms, and perceived behavioral control influence behavior. However, we recognize that the TPB model has limitations, and that additional data collection may be necessary to fully understand the behavior in question.

Although our goal is not to identify the causes of behaviors, or even predict them, we have included two additional variables, namely "intellectual" and "affective" considerations, in our framework called CASHP (Commitment Analyses of Sustainable Hotel food Practices) just to provide a more comprehensive understanding of the phenomenon under study.

Next, in Table 2, we present our framework constructs:

Table 2. CASHP constructs.

Construct	Description
Attitudes	Refers to the belief regarding the consequences of a behavior (positive or negative), in this case hotel attitudes towards sustainable behaviors, mainly in relation to the F&B department. Hotel attitudes towards sustainable food practices can influence the hotel's decision to implement them. Positive attitudes towards sustainable food practices, such as understanding the benefits of reducing food waste or sourcing locally produced ingredients, can increase the likelihood that the hotel will implement them.
Subjective Norms	Refers to the perceived social pressure to engage or not engage in certain behaviors. Social influences, such as the expectations of customers, regulators, or industry peers, can also play a role in the hotel's decision to implement sustainable food practices. A hotel may be more likely to implement sustainable food practices if it perceives that doing so will be positively viewed by its customers or industry peers.
Perceived Behavioral Control	Refers to an individual's or organization's belief about their ability to perform a behavior. The hotel's perceived ability to implement sustainable food practices, such as access to suppliers, financial resources, and staff training, can influence its decision to actually do so. A hotel that perceives that it has the resources and capability to implement sustainable food practices is more likely to do so.
Intellectual	Refers to the level of knowledge and understanding that hotels have about sustainable food practices. It includes factors such as education and training on the subject, access to information and resources, and the ability to critically evaluate and apply that information to decision-making.
Affective	Refers to the emotional or affective connection that hotel staff have with sustainable food practices. It could include factors such as personal values and beliefs, perceived social norms, and the emotional impact of implementing sustainable practices.
Behavioral Intention	Refers to the intention to engage in a specific behavior, such as putting sustainable food-related attitudes into practice.

Attitude, subjective norms, and perceived behavioral control are the main constructs of the theory of planned behavior (TPB) that influence behavioral intention.

Attitude refers to the belief regarding the consequences of a behavior (positive or negative). In the context of sustainable F&B practices, a hotel's attitude towards these practices will be shaped by the underlying beliefs regarding the consequences of implementing them, such as the benefits of reducing food waste and supporting local farmers. A positive attitude towards sustainable F&B practices will increase the likelihood of a positive behavioral intention towards these practices.

Subjective norms refer to the perceived social pressure to engage or not engage in a behavior. In the context of sustainable F&B practices, this construct will include factors, such as the expectations of customers, regulators, or industry peers. A hotel staff member who perceives that there is strong social pressure to engage in sustainable F&B practices will be more likely to have a positive behavioral intention towards these practices.

Perceived behavioral control refers to an individual's or organization's belief about their ability to perform a behavior. In the context of sustainable F&B practices, this construct will include factors such as access to suppliers, financial resources, and staff training. A hotel staff member who perceives that they have the resources and ability to implement sustainable F&B practices will be more likely to have a positive behavioral intention towards these practices.

Taken together, attitude, subjective norms, and perceived behavioral control influence a hotel staff member's behavioral intention towards sustainable F&B practices. A positive attitude, strong perceived social pressure, and a high perceived ability to perform the relevant behavior increase the likelihood of a positive behavioral intention towards sustainable F&B practices. These positive behavioral intentions increase the likelihood that sustainable F&B practices will be implemented in the hotel.

In this sense, we propose in Figure 6 the framework determining the engagement of hotels in sustainable food practices.
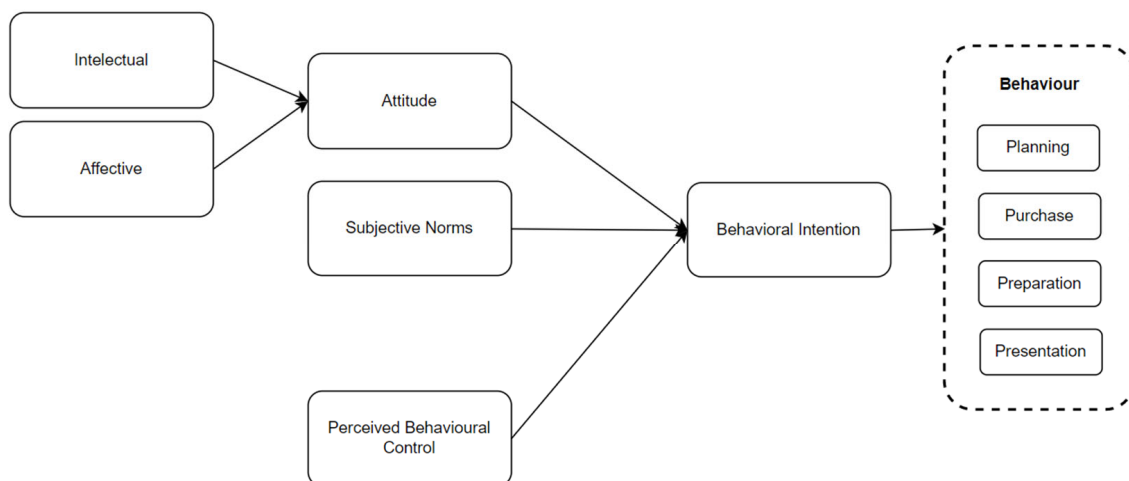

Figure 6. Conceptual framework CASHP.

The "intellectual" construct, which refers to the level of knowledge and understanding that hotel staff have about sustainable F&B practices, can influence attitude in several ways. First, having a higher level of knowledge about sustainable F&B practices can lead to a greater understanding of the benefits of these practices, such as reducing food waste and supporting local farmers. This understanding can then lead to a more positive attitude towards sustainable F&B practices. In addition, having access to information and resources about sustainable F&B practices, and the ability to critically evaluate and apply this information to decision-making, can also lead to a more positive attitude towards these practices. This is because having access to more information and resources may increase the perceived feasibility and desirability of sustainable F&B practices. This, in

turn, may lead to a more positive attitude towards these practices. On the other hand, the "affective" construct, which refers to the emotional or affective connection that hotel staff have with sustainable F&B practices, can also influence attitude. Factors, such as personal values and beliefs, as well as the emotional impact of implementing sustainable practices, can shape attitudes towards sustainable F&B practices. For example, if a staff member has strong personal values that align with sustainability, they are likely to have a more positive attitude towards sustainable F&B practices. Similarly, the emotional impact of implementing sustainable practices, such as feeling good about contributing to a more sustainable world, may also lead to a more positive attitude towards sustainable F&B practices. In general, "intellectual", and "affective" constructs can play a key role in shaping attitudes towards sustainable F&B practices. By increasing knowledge, access to information and resources, as well as emotional connection to sustainable practices, hotels can increase the likelihood of positive attitudes towards sustainable F&B practices. Ultimately, this will lead to more sustainable practices in the hospitality industry generally.

6. Discussion

The goal of this study is to propose a conceptual framework called CASHP, which aims to analyze the commitment of hotels to sustainable practices in their F&B departments. This is achieved by examining the factors that influence their decision to implement sustainable food practices. The framework builds upon the theory of planned behavior (TPB) by incorporating intellectual and affective considerations in addition to the traditional TPB constructs, namely attitudes, subjective norms, and perceived behavioral control. By doing so, the study aims to provide a more comprehensive understanding of the engagement of hotels in sustainable practices, and to offer insights into how to increase this engagement. To develop the CASHP model, a study will be conducted to assess the attitudes, subjective norms, perceived behavioral control, and intentions of hotel staff and management regarding sustainable practices in the F&B department. This study will include surveys, interviews, and observations of actual practice. Specifically, it will address the following research questions:

- What are the attitudes, subjective norms, perceived behavioral control, and intentions of hotel staff and management regarding sustainable practices in the F&B department?
- How do these factors interact to influence the engagement of hotels in sustainable practices in their F&B department?

To enhance the validity and reliability of its findings, the study must acknowledge some potential limitations, such as the possibility of selection bias due to the sample size and representativeness of the hotels included. To address these limitations, the study plans to use a stratified random sampling technique to ensure a diverse and representative sample of hotels across different regions and sizes. Additionally, the study will triangulate the data collected through surveys, interviews, and observations of actual practice.

7. Conclusions

The proposed extended model, CASHP, provides a comprehensive understanding of the commitment of hotels to sustainable practices in their F&B departments. To achieve this, it incorporates intellectual and affective considerations in addition to the traditional TPB constructs. By understanding these factors and how they interact, the CASHP model provides a powerful tool to achieve the study's goal of better explaining the engagement of hotels in sustainable practices, while offering insights into how to increase this engagement.

The CASHP framework offers a valuable contribution to the field of sustainable tourism by providing a more nuanced analysis of the commitment of hotels to sustainability. It provides a useful tool for researchers and practitioners to measure commitment to sustainability and to design interventions to promote sustainable food practices in the hospitality industry.

By addressing potential limitations and using a stratified random sampling technique as well as the triangulation of data, the study aims to enhance the validity and reliability

of its findings. Overall, the study provides a clear and concise answer to the research question and highlights the contribution of the CASHP framework to the existing literature on sustainable practices in the F&B department of hotels.

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