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MASTER'S THESIS - MASTER SUSTAINABLE BUSINESS AND INNOVATION

CONGRUENCY, SUSTAINABLE INNOVATION, AND COMPANY VALUATION WITHIN THE HOTEL AND RESTAURANT SECTOR

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Abstract

Introduction. The hospitality industry is known to contribute to the depletion of natural resources, consume large amounts of water and energy, and produce large amounts of waste. This research focuses on how congruency affects the extent to which sustainable innovations are adopted by the hospitality industry, focusing on restaurants and hotels within the city of Utrecht and the province of Utrecht, respectively.

Theory. Because restaurants and hotels are impacted by social and cultural factors, the research took a congruency approach. This approach asssumes that companies belong to organizational categories with related core characteristics. It is expected that offering vegetarian food, operating in a lower price class, having a sustainability-congruent name, having a Michelin star, and being situated in a newer building are characteristics that are seen as congruent with the categories of sustainable restaurants and hotels. This is because these characteristics are cognitively close to the idea of sustainability. It is expected that restaurants and hotels with these characteristic show more sustainable innovations and are evaluated higher when they implement sustainable innovations.

Methods. The primary analyses were done through zero-inflated negative binomial regression models, ordinal logistic regression models, and ordinary least square regression models. The zero-inflated negative binomial regression model was used to examine the effect of restaurant's characteristics on the extent to which sustainable innovations were adopted, and the ordinal logistic regression model was used to explore the same effect on the extent to which hotels adopted sustainable innovations. The ordinary least square models were used to examine the effect of the 'super congruency' on both restaurant and hotel mean review scores and price levels.

Results. The main findings include that having sustainability-congruent characteristics does affect the level of sustainable innovations within the restaurant sector. However, having both sustainability-congruent characteristics and implementing sustainable innovations does not affect a restaurant's mean price level or mean review score. Within the hotel sector, the effect of having sustainability-congruent characteristics could not be found in a similar way.

Conclusion. Overall, these findings indicate that the categorization theory is applicable to examining why innovations appear in certain companies rather than other companies. However, because the social and cultural context heavily impacts categorization theory and the informational clues related to the notion of congruency, it is important to consider these contexts. Further research is recommended to examine the congruency effects in other cultural contexts.

Table of contents

List of Figures and Tables

List of Figures

List of Tables

1. Introduction

Societal background

Human-induced climate change is causing negative impacts and adversely affecting food and water security, thereby increasing malnutrition in many communities (IPCC, 2022). Change must be made in and to many industries and sectors to keep these adverse effects to a minimum. Generally, businesses play an essential role in the economy and are therefore in a position where they can increase sustainability and communicate their value to stakeholders (Horng et al., 2017). The hospitality industry is known to consume significant amounts of natural resources and produce large amounts of waste and pollutants (Asadi et al., 2020). The hotel industry specifically is responsible for high amounts of water consumption, energy usage, and waste generation. The restaurant industry, similarly, is known for its high amounts of food waste and environmentally unsustainable practices (Hu et al., 2010; Kasim & Ismail, 2012), throwing away 643 million meals in the United States in 2018 alone (Cochran et al., 2018). Food justice, food ethics, and food sovereignty have become important topics of discussion (Higgins-Desbiolles & Wijesinghe, 2019).

Therefore, both restaurants and hotels need to engage in sustainability. Restaurants can do this in multiple ways, such as by introducing environmental management systems or green technical practices (Jang & Zheng, 2020). It has been shown that restaurants can make valuable contributions to the UN Sustainable Development Goals (SDGs) (Higgins-Desbiolles & Wijesinghe, 2019). This can be done through implementing specific SDGs, educating stakeholders about sustainability, providing sustainable alternatives, and using food and food cultures to unite and empower people. Restaurants are places of gathering and can, therefore, play an important role in ensuring a more sustainable future beyond the usual channels. Still, it remains to be difficult for the restaurant and food service sector to adopt sustainable practices (Kim & Hall, 2019). For hotels, it is also important to engage in sustainability because it allows them to maintain their competitive advantage and because it is shown that their financial well-being and growth depend on how well they implement their environmental policies (Horng et al., 2017). Additionally, sustainability measures provide cost-savings and increased word-of-mouth marketing for hotels (Wang et al., 2018).

Literature gap

Innovation is an important factor in mitigating CO_2 emissions and diverting global climate change (Xin et al., 2022). Sustainable innovation should account for the triple bottom line by incorporating economic, social, and environmental goals (Elkington, 1998). Much research has been done concerning innovation within the manufacturing sector, but innovation within the services sector differs for different reasons. Innovation within the hospitality industry is different from other industries because of the intangibility of services, the inseparability between the production and consumption of services, and the high involvement of human resources. Sustainable innovation within the restaurant and hotel sector has become increasingly important.

While there has been much research concerning the drivers of sustainable innovation in general, we still lack an understanding of sustainable innovation within the hospitality industry and which factors affect their implementation based on a consumer perspective. The most significant focus of sustainable hospitality research has been from a manager's or stakeholder's perspective (Higgins-Desbiolles et al., 2019). For hotels, it is known that green innovation is affected by economic performance and environmental and social performance. Specifically for restaurants, it is known that adopting green products and services is affected by internal antecedents, moderators, consumer behavior variables, and perception of external factors (Arun et al., 2021). The focus of the current research is on the latter.

The restaurant business is a specific type of industry as it is a service industry with a solid cultural and psychological component (Barbas, 2003). It is shown that the process of transforming food products into more luxurious products, known as gourmetiziaton, is an important part of integrating sustainability (Nascimento, 2023). This is because sustainability measured within the restaurant sector should be connected to social status and recognition within different contexts, so that sustainability can be nurtured. In practice, this means that sustainability innovations first have to be accepted by hospitality staff, incorporated into the hospitality culture, and after maintained by the hospitality staff as well. Because of this big focus on social and cultural components within sustainability implementation in the hospitality industry, a categorization approach is used in the present research, specifically focusing on congruent characteristics.

While all restaurants satisfy the basic need for food, a wide variety exists within the restaurant sector in terms of prices, kitchens, interiors, location, and service. The same reasoning applies to hotels. All hotels satisfy the need to host guests in a room and allow them to stay for the night. However, hotels also differ greatly in terms of prices, interior, exterior, focus points, etc. This leads to the question of whether and why some types of restaurants and hotels are more prone to engage in sustainable innovation than others. Specifically, in the eyes of the consumers, one may expect that sustainable innovation is seen as more congruent with some types of restaurants and hotels than others. This means that sustainable innovations fit better with consumer expectations for some types of restaurants and hotels than others. This notion of congruency and the implementation of innovations has not been researched yet, thus creating the literature gap.

Research question

As a result, the following research question is the focus of the present research:

"How does congruency affect the extent to which sustainable innovations are implemented by the hospitality industry, and what are the effects of acting in a congruent way on the company valuations?"

This question is addressed for both the restaurant and hotel sectors, which are the two main sub-sectors within the hospitality sector. The restaurant sector part focused on restaurants within the city of Utrecht, whereas the hotel sector part focused on hotels within the province of Utrecht. The overall question itself consists of two sub-questions that are answered for both restaurants and hotels. The two-sub questions are as follows:

"To what extent does the presence of sustainability congruent characteristics affect the implementation of sustainable innovations?"

"To what extent does congruency between having sustainability characteristics and implementing sustainable innovations affect a company's valuation?"

Congruency, as mentioned in the main research question, refers to whether a company's characteristics match its organizational identity (Cudennec & Durand, 2022). The relevance of acting in a congruent way is grounded in categorization literature, which states that companies with characteristics that are incongruent with their organizational category face negative economic consequences. As a result, it is in a company's best interest to act in a congruent way. The characteristics of interest for the present research are characteristics that are seen as being congruent with sustainability. As will be elaborated below, the following characteristics are expected to be congruent with sustainable innovation: having a cuisine type related to vegetarian food, having a lower price class making the restaurant socially more accessible, having sustainability-congruent restaurant name, having a Michelin star, being situated in a newer building. Because these variables are congruent with sustainability, it was expected that these restaurants and hotels show more sustainable innovations because that is congruent with the category of sustainable restaurants and sustainable hotels.

Sustainable innovations were examined for both the restaurant and the hotel industry to study this. The most important thing to consider when examining sustainable innovations is the environmental, social, and economic aspects (Cillo et al., 2019). For restaurants, a sustainability checklist was created based on an earlier checklist by Maynard et al. (2020). Afterward, per restaurant, it was examined which sustainable innovations were implemented. This was then summed up to create the dependent variable. For hotels, sustainable innovations were analyzed by looking at hotels' sustainability scores as presented on Booking.com.

Lastly, a company's valuation is rooted in how much consumers value a company. Acting in a congruent way is operationalized by having sustainability congruent characteristics and implementing sustainable innovations simultaneously, showcasing a form of 'super congruency'. It is expected that the valuation is higher for companies that act in this way because, by doing this, companies make sure that their characteristics and actions both align with the category of being a sustainable company. The valuation of hotels or restaurants is reflected by both their mean review score and mean price level in the present research. This is because the more a guest appreciates a restaurant or hotel, the more likely they will award the restaurant or hotel with a higher review score and the more they are likely willing to pay.

Scientific relevance

The scientific relevance of the research is grounded in the fact that a novel approach is examined by combining categorization literature with sustainable innovation literature. The question of why innovations appear in certain places remains a topic of interest in current research. It has been shown in the present research that the categorization approach and its theoretical notion of congruency can be applied to deepen our understanding of where innovations take place.

By looking at it from this point of view, more information has become available concerning sustainable innovation practices within the hospitality industry. It has been found that the categorization approach is applicable to the restaurant sector but less to the hotel sector. This provides valuable insights for future research by indicating that the categorization and congruence literature is an angle that can be used to explain where innovations are taking place.

Moreover, the data collection concerning the sustainable innovation variable for the restaurants allowed insight into which specific sustainable innovations have been implemented within the restaurant sector in Utrecht. Overall, more insight has been created concerning why innovations emerge in specific places. As a result, the scientific relevance is mainly based on deepening our understanding concerning sustainable innovations within the hospitality sector.

Societal relevance

The societal relevance of this research is based on the improved understanding concerning sustainable innovations within restaurants and hotels, which leads to being able to encourage more sustainable innovations within the restaurant and hotel sector policy-wise. As Galkina and Hultman (2016) argue, initiatives of a sustainable entrepreneurial nature can lead to a collective increase in sustainable practices in politics. In this way, policymakers could encourage categories of restaurants related to sustainable innovations, thereby fostering the adoption of sustainable innovations. Additionally, because restaurants can make such valuable contributions to a more sustainable world (Higgins-Desbiolles & Wijesinghe, 2019), it is important to know how to facilitate that policy and managerial wise through knowing which factors influence the adoption of sustainable innovations.

Moreover, the research provides valuable insights for restaurateurs and hotel managers concerning factors impacting their mean review score and mean price levels. This is because the mean review score of a restaurant encourages consumers to choose a specific restaurant (Ali et al., 2021), and it is also positively related to its revenues (Luca, 2016). Additionally, a company's mean price level is, by definition, positively related to its revenue levels. Lastly, the research is also helpful for sector-based organizations, such as Koninklijke Horeca Nederland, to encourage sustainability within their sector.

Outline

Chapter 2 discusses the theoretical framework covering innovation in general, as well as service innovation, innovation within the hospitality sector, and sustainable innovation. Additionally, the emergence of innovation is explored, along with categorization and how categorization could explain the spread of sustainable innovation within the hospitality industry. Chapter 3 delves into the methodology and focuses on the research design, data collection, operationalization, sampling strategy, data analysis, and data quality indicators. Chapter 4 lays out the results related to the restaurant and hotel sectors. Lastly, Chapter 5 offers a discussion on the findings, followed by the conclusion in Chapter 6.

2. Theoretical framework

2.1 What is innovation?

Innovation refers to the implementation or introduction of something new or significantly improved, as defined by Carlino and Kerr (2015). This 'something new' can encompass a change or improvement concerning a product, process, marketing, or organizational method (Martin-Rios & Ciobanu, 2019). Innovating is critical for an organization in today's world (Singh et al., 2020), because it is considered a driver of firm performance (Gürlek & Koseoglu, 2021; Lee et al., 2019). It is also a critical source of competitive advantage (Gomezelj, 2016), and positively related to a firm's survival chances (Ortiz-Villajos & Sotoca, 2018). Therefore, it is imperative for firms to foster innovations. Moreover, innovation also plays a vital role in averting global climate change (Xin et al., 2022).

Innovations come in many different shapes and sizes. One of the oldest distinctions is the one between radical and incremental innovation. This difference emerges because innovation can either involve inventing something wholly new or adding minor changes to an existing product or service. Incremental innovation refers to innovations based on variations of the same theme, whereas radical innovation challenges the status quo and causes existing products or services to become obsolete (Carlino & Kerr, 2015). Moreover, innovation can also be considered from multiple perspectives: as an outcome, as a process, or as a mindset (Kahn, 2018). Innovation as an outcome includes product, process, business model, organizational, supply chain, and marketing innovation. Innovation as a process focuses on changing how innovation is organized, thus referring to a change in the overall innovation or innovative development process. Lastly, innovation as a mindset is focused on the internalization of innovation within individual members of an organization.

2.2 Service innovation

While most emphasis in the innovation literature has been on innovation in the manufacturing sector, there is also a sizeable body of literature on innovation within the service sector (Horng et al., 2017). Innovation activities from firms in different sectors vary from one another because various types of knowledge and technologies are present in specific sectors (Li et al., 2021). Several approaches have been proposed to deal with these differences, including the assimilation approach, which treats services similarly to manufacturing (Hauknes, 1996); the demarcation approach, which treats services as something distinctively different than manufacturing (Drejer, 2004); and the integration approach, which combines these approaches (Castellacci, 2008). For the sake of discussing service innovation, the integration approach is discussed here because it is deemed the most influential approach (Martin-Rios & Ciobanu, 2019).

The integration approach states that the service sector can be divided into supplier-dominated services, such as hospitality services; supporting infrastructure services, such as telecommunications and finance services; and knowledge-intensive business services, such as software, R&D, engineering, and consultancy services (Castellacci, 2008). These different sectoral categories are associated with different technological regimes and, therefore, different technological trajectories related to implementing innovation. For hotels and restaurants, it is implied that innovation usually emerges from adopting new technologies.

This contrasts with other sectors because they tend to focus more on internal Research & Development activities. Moreover, it is highlighted that innovation within the supplier-dominated service industry should increase the overall quality of the service provided.

Essential characteristics of innovation within the service industry are the intangibility of services, the inseparability between production and consumption, the heterogeneity of services, and the high relevance of human resources (Fitzsimmons & Fitzsimmons, 1999; Gomezelj, 2016). The intangibility results from services having no physical shape, making services challenging to count, measure, or describe (Fitzsimmons & Fitzsimmons, 1999). The inseparability of services refers to the fact that the marketing, sale, delivery, and consumption of services all happen simultaneously. On the other hand, products are categorized by being produced and inventoried and subsequently sold and consumed. The heterogeneity of services emerges because the valuation and outcomes of different service systems differ from each other. The relevance of human resources arises because jobs within the service industry concern a high level of interaction with customers and colleagues, thereby increasing the value of human resources.

2.3 Innovations within the hospitality sector

Innovation is deemed especially important within the hospitality industry because consumers are more selective and because of the highly competitive and dynamic environment (Lee et al., 2019; Ozturkoglu et al., 2021). The hospitality industry is unique because of its focus on people, experiences, and the place it takes up within society and the environment (Kandampully et al., 2022). Other characteristics of the hospitality industry that account for differences between innovation within the hospitality firms and other supplier-dominated service firms include the fact that it is a labor-intensive, largely seasonal, and cost-driven industry (Martin-Rios & Ciobanu, 2019). Lastly, another critical factor central to innovations within the hospitality industry is the importance of upholding a good hospitality experience needed to make innovations succeed (Kandampully et al., 2022).

Within the hospitality sector, the restaurant sector is also unique in terms of innovation implementation for several reasons. These reasons include that it is a low-technology sector, that innovations are often incremental rather than radical, and that food innovation often emerges in smaller companies or restaurants. Additionally, novel food technologies are often patented by multinational companies, thereby excluding smaller companies from adopting these innovations (Yun et al., 2020). Innovations within the restaurant sector are often generated by imitating leading competitors or by taking customer feedback into account (Lee et al., 2019).

This is highlighted by Ivkov et al. (2016), who performed an exploratory study focusing on innovations within the restaurant industry. They argue that it is crucial to involve all departments within a restaurant and all other stakeholders in the innovation process. Additionally, they state that the restaurant market is a constantly changing market. This is because of changes in demographics, consumer needs, and global economic changes. These changes tend to be challenging to adhere to because many of them happen in silence.

Moreover, innovations within the restaurant sector are very specific because many factors influence a customer's experience, which makes innovation a complex and multidimensional process (Ivkov et al., 2016).

There are five main areas in the restaurant sector where innovation can occur: design and atmosphere, food and beverages, technology application, human resources, and responsible business. Interestingly, the least focus is placed on the area of responsible business.

Next to the restaurant sector, the hotel sector is also unique compared to other supplier-dominated service sectors because of its high level of client intensity (Martínez-Ros & Orfila-Sintes, 2009). This means hotel guests and employees have a high level of interaction. Another important aspect of innovation within the hotel sector is that hotels are likely to engage in continuous innovations. This means that innovation is considered a process that is continuously happening rather than a discrete event (Cooper, 1998). Additionally, environmental sustainability and green innovation have become increasingly important within the hotel industry (Duric & Topler, 2021; Horng et al., 2017). It has been found to attract many guests, establish efficiency, and improve hotel performance (Duric & Topler, 2021). Specifically, environmental protection and green awareness are shown to increase a hotel's competitive advantage, economic performance, and overall performance.

2.4 Sustainable innovation

Both the restaurant and hotel sectors implement sustainable innovations, referring to innovations that integrate economic, environmental, and social goals (Cillo et al., 2019). The economic goals should cover increasing wealth, the environmental goals should incorporate protecting the natural environment, and the social goals should include creating and sustaining beneficial relationships (Cohen et al., 2008). It has been argued that existing literature concerning the hospitality sector needs more focus on the social dimension (Higgins-Desbiolles et al., 2019). By focusing on sustainable business models, restaurants can improve their competitive advantage (Cillo et al., 2019; Goodman, 2000), can induce economic profits (Blanco et al., 2009; Eiadat et al., 2008; Ma & Ghiselli, 2016), and can attract niche customers (Raab et al., 2018). Similarly, adopting sustainability measures also supports maintaining one's competitive advantage (Reem et al., 2022).

According to Ozturkoglu et al. (2021), the three most important criteria concerning sustainability-oriented hospitality service innovation are carbon management, waste management, and green technology. Companies can use these three categories to increase their competitive advantage the most. Moreover, Maynard et al. (2020) produced a checklist of sustainability indicators specifically for the restaurant sector based on the ISO 14000, 14001, and 14004 standards, as well as other certifications from the Sustainable Restaurant Association, the Green Restaurant Association, and the American Dietetic Association. The three main categories used included: water, energy, and gas supply; menu and food waste; and waste reduction, construction materials, chemicals, employees, and social sustainability. These were the three main categories used in the operationalization of *sustainable innovation* for the part of the research focusing on restaurants.

Reem et al. (2022) also highlight the importance of incorporating both economic, environmental, and social goals for sustainability within the hotel sector. They argue that the social pillar is defined through the satisfaction level of the guests and employees, social well-being, and stakeholder relationships.

In contrast, the economic pillar incorporates ensuring the economic benefits to all stakeholders, which includes ensuring employment, income-earning, and profitability. The environmental pillar involves decreasing the consumption of natural resources, focusing on recycling and reusing, and decreasing the land use and land pollution associated with firm activities.

Multiple certifications exist that show that hotels are adhering to specific sustainability standards, such as green building design certifications, green product certifications, and other green standards (Reem et al., 2022). They also allow hotels to benchmark their performance against competitors. These standards are often based on sustainability indicators, which consist of environmental sustainability indicators, economic sustainability indicators, socio-cultural sustainability indicators, and management sustainability indicators. The most important benefits of adopting sustainability measures in hotels include reducing operational costs, additional revenues, long-term financial stability, increased consumer satisfaction, better brand reputation, and preserving the environment (Duric & Topler, 2021).

2.5 How does sustainable innovation emerge?

Generally speaking, factors positively influencing green innovation have been found to include the greening of suppliers, market demand, and new regulations (Song & Yu, 2018). It has also been found that green facilitating conditions and strong green leadership positively affect the adoption of green technologies specifically within the hospitality sector (Mejia, 2019). For hotels, another important factor influencing the adoption of green innovation is environmental performance (Asadi et al., 2020). Additionally, economic and social performance are also positively related to the adoption of green innovation. Furthermore, it is argued that environmental regulations, a green innovation strategy focusing on energy savings, and a green organizational culture positively affect the adaptation to green innovation by hotels.

On the other hand, sustainability decisions by restaurant managers are mostly affected by pressures from suppliers and customers and, to a lesser extent, by pressures from their employees and society (Raab et al., 2018). During a thematic literature review, Arun et al. (2021) found that important aspects affecting the adoption of green practices within restaurants and other hospitality companies include internal antecedents, the studied consumer behavior, and the perception of external factors. The internal antecedents are grounded in the importance of attitudes, values, and expectancies internal to a company concerning the adoption of green practices. The studied consumer behavior includes the willingness of consumers to pay a price premium for sustainability, willingness to wait and travel, and intention to visit or revisit a specific restaurant. The perception of external factors is related to subjective norms, a restaurant's marketing communications, and the restaurant's performance. Interestingly, it has been shown that marketing messages affect whether a consumer perceives a restaurant as a green restaurant or as a regular restaurant. Additionally, it is highlighted that green restaurants should continue focusing on providing good quality of food, service, and ambiance besides focusing on green practices.

2.6 Categorization

This finding that restaurants need to focus on still providing their core services at a good quality level when they do decide to engage in sustainable behavior is similar to the idea that innovation within the hospitality industry needs to increase the overall quality of the service provided in order to ensure successful implementation of innovation (Castellacci, 2008). Both findings can be related to the notion of categorization. In order to understand why certain restaurants adopt sustainable innovations more than others, the theories related to categorization and the notion of congruency are examined in the next part. Organizational theory states that firms belong to specific organizational categories, which could explain why certain companies are more likely to innovate than other companies.

These organizational categories refer to social constructs that serve as a conceptual system that allows organizational identity to be recognized (Glynn & Navis, 2013). Categories are based on entities that share similar attributes and characteristics. They act as lenses through which companies can be categorized and identified. Through these lenses, people can compare complex organizations and shape beliefs about an organization's characteristics and offerings (Durand & Paolella, 2013). Categories include different industrial sectors, scientific disciplines, political camps, and artistic genres (Cudennec & Durand, 2022). Examples of categories for restaurants include fast food, pub food and regular restaurants, burger, fish, vegetarian or vegan restaurants, and Italian, French, Spanish, Latin-American, Indian, and Asian restaurants. Examples of categories within the hotel industry are less straightforward but include examples such as bed & breakfasts, chain hotels, hostels, and luxury hotels.

Categories have 'centers', meaning they have core characteristics that are seen as most central or emblematic of specific organizational categories (Hannan et al., 2019). As mentioned, guests come to a restaurant to eat, socialize, and have a good experience (Ivkov et al., 2016). These are the central characteristics of the restaurant category. The hotel industry's central characteristics focus on providing guests with a night of good sleep and a pleasant stay (Martínez-Ros & Orfila-Sintes, 2009). It is important for these characteristics to be congruent with the category in which a company is placed (Cudennec & Durand, 2022).

One situation in which the characteristics of a company are only partially congruent with its category is when companies adopt category spanning, which refers to the simultaneous presence of an organization in multiple categories (Cudennec & Durand, 2022). This means that an organization spans two or more different category groups, such as a bike shop that also serves as a café or a restaurant serving both Chinese and Indian food. A possible reason to do this is to attempt to meet expectations from different types of customers. It has, however, been found that category spanning can have adverse social and economic effects on a company (Kovács & Johnson, 2014). Not all category spanning occasions are (de)valued the same, depending on the type and characteristics of the categories that are being spanned by a company (Cudennec & Durand, 2022).

The potential adverse effects related to category spanning stem partly from the producer side, as category spanning companies are likely to produce lower-quality output because they lack expertise in any of the categories in which they are operating (Kovács & Johnson, 2014). The category spanning discount can also be explained from the consumer side as category spanning companies are considered atypical of each category they span in, thereby creating conflicting expectations.

This last explanation is highlighted by Kovács and Hannan (2010), who argue that the adverse effects caused by category spanning are due to the violation of people's expectations concerning the core characteristics of a specific category.

In a similar line of thinking, it is argued that category spanning and perceived congruence depend on how customers perceive and process informational cues about categorical characteristics (Cudennec & Durand, 2022). However, congruence can also change on a macro-level through a considerable societal change concerning which attribute combinations become the dominant way of categorizing a company. For example, a hotel or restaurant that was considered very modern and sophisticated fifty years ago would be classified as such. However, if it has stayed the same, it can be considered outdated in the present day and also classified as such. Additionally, it is also, for example, argued that a fast-food restaurant is a category on its own, with characteristics confirming to the mental recognition of fast-food restaurants. In contrast, vegan fast-food restaurants are, thus far, not a category on their own because they have not been integrated well enough into society yet. Therefore, the mental processes affecting categorization also include a significant cultural component. Additionally, valuing which category a firm belongs to depends on the individual valuing the company and its information processing capacities. People with different sets of knowledge value the same company in different categories because they process the information differently based on their own mental models. Overall, categorization and congruence have significant psychological and cultural components to them.

In conclusion, based on the categorization approach, the valuation of a company is determined by the customer's perception of congruence between a firm's categorical features and its identity (Cudennec & Durand, 2022). When informational clues concerning these features are not congruent with an organization's identity, it creates confusion, which leads to lower company valuations. Additionally, it is argued that conformity to existing categories in itself positively affects the company valuation because it enhances the cognitive identification process of a company. Therefore, it makes sense for companies to want to match their characteristics with the category that they are part of while simultaneously trying to stand out from the competition (Janisch & Vossen, 2022).

2.7 Conceptual framework

Restaurants and hotels acting in a more sustainable manner can be viewed as a separate category compared to conventional restaurants and hotels. (Cudennec & Durand, 2022). This is similar to how fast-food restaurants can be considered its own category compared to conventional restaurants. Conventional restaurants focus on delivering good food and a good hospitality experience as their core characteristics. In contrast, sustainable restaurants focus both on delivering a good hospitality experience while also ensuring sustainability (Enthoven & Brouwer, 2019). The same reasoning applies to the distinction between sustainable and conventional hotels as separate categories. Conventional hotels focus on providing guests with a comfortable hotel room and allowing them a comfortable night's sleep. In contrast, sustainable hotels also focus on decreasing their environmental footprint and increasing their sustainability level.

This idea that sustainable restaurants and hotels have different (additional) central characteristics compared to conventional restaurants and hotels is highlighted by Contzen et al. (2021). They argue that sustainable innovations are usually meant to have less harmful and more positive environmental impacts, yet they are also likely to be more expensive and provide less comfort. These latter characteristics do not necessarily fit the central characteristics of conventional restaurants and hotels, thereby enforcing the idea that the additional characteristics associated with sustainability may be at odds with the conventional characteristics of restaurants and hotels. This further supports the argument that conventional hotels and restaurants can be considered as different organizational categories compared to sustainable restaurants and hotels.

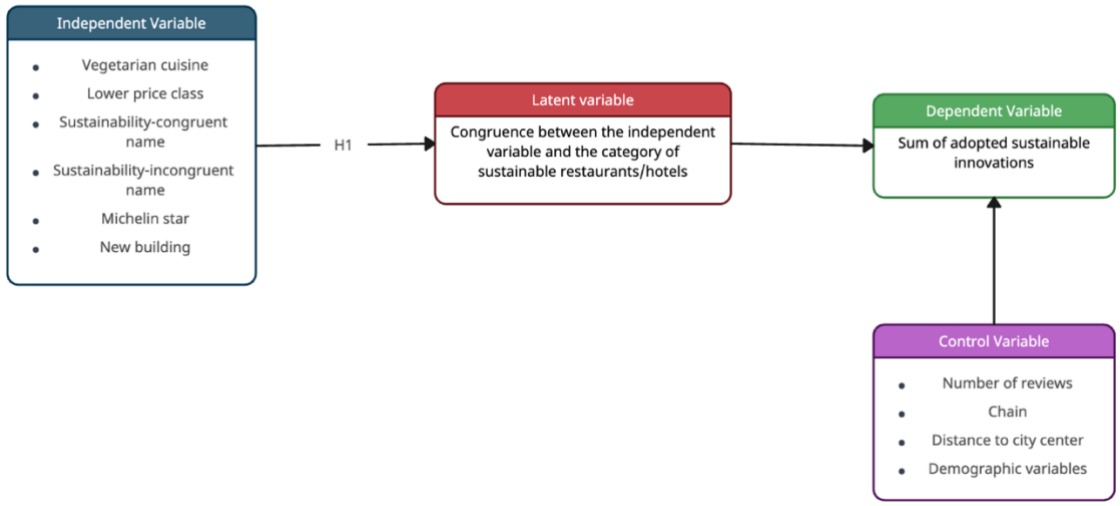
All in all, one can assume that restaurants and hotels introducing sustainable innovations aim to avoid incongruence between their characteristics and their perceived category because of the adverse effects related to category spanning (Cudennec & Durand, 2022; Kovács et al., 2013; Kovács & Hannan, 2010). Some characteristics of restaurants are closer to the idea of sustainability than other conventional characteristics. It is expected that restaurants with these sustainability-congruent characteristics adopt more sustainable innovations because they are closer to the central characteristics of the category of sustainable restaurants. The relationship between firm characteristics, category congruence, and sustainable innovations can be seen in Figure 1, which depicts the main conceptual model examined in the present research. The hypotheses center around the fact that specific characteristics affect the congruence of a restaurant or hotel positively or negatively and are as follows:

H1A: Having characteristics that are related to sustainability positively affects the extent to which sustainable innovations are adopted by restaurants.

H1B: Having characteristics that are related to sustainability positively affects the extent to which sustainable innovations are adopted by hotels.

Figure 1

Conceptual framework covering H1



The characteristics of interest for Hypothesis 1 are related to a restaurant's cuisine type, price class, having a sustainability-(in)congruent name, whether a restaurant has a Michelin star, and being situated in a newer building. These characteristics are chosen because of their theoretical relevance as well as their straightforward empirical measurement based on the available public information about hotels and restaurants. The theoretical relevance is explained next. In this section, the focus is on the 'adoption' of sustainable innovations. For the empirical part of the research, both the adoption of sustainable innovation and the initial implementation of sustainable innovation activities from companies originally founded as sustainable companies are taken into account. This is because, for both types of sustainable innovation adoption/implementation, the categorization theory holds concerning the congruency of a firm's core characteristics with its organizational identity. Additionally, both types of adoption can be considered to have been innovations at one point.

Firstly, it is expected that restaurants that offer cuisine types known for offering vegetarian food are more likely to adopt sustainable innovations. This is because the type and amount of food we consume hugely impact the environment (Chai et al., 2019). The agricultural sector especially causes an increase in environmental degradation because of its land use, water use, and related greenhouse gas emissions. Serving vegetarian food is expected to be congruent with the category of sustainable restaurants because vegetarian and plant-based foods are more sustainable than meat-based food (Pimentel & Pimentel, 2003; Stoll-Kleemann & O'Riordan, 2015). Therefore, serving more vegetarian dishes or serving a vegetarian cuisine type is related to sustainability and therefore congruent with implementing more sustainable innovations as well. Additionally, it is argued that the principles of sustainability can coincide with certain features of specific cuisines, thus indicating that specific cuisines are more correlated with sustainability than others (Nascimento, 2023). All cuisine types present in the data sample are discussed in Appendix A and classified as being vegetarian or not.

Secondly, restaurants and hotels with a lower mean price level are expected to adopt more sustainable innovations because performing in a lower price class is congruent with sustainability. This is because sustainability is associated with sufficiency and reduced consumption instead of decadence and overconsumption. Alternatively, put more generally, sustainability is linked to the understanding that economic growth should not be an end but rather a means to ensure human well-being and freedom (Quental et al., 2011). Additionally, sustainability also focuses on societal welfare and development. Among other things, this implies that low-wage consumer groups should also be able to engage in similar opportunities as the middle- or high-wage consumer groups. This can be achieved through restaurants specifically focusing on these groups and offering low-cost meals for them.

Thirdly, it is expected that restaurants or hotels having a sustainability-congruent name are more likely to adopt sustainable innovations (i.e., typical sustainability terms like 'green', 'earth', 'pure', 'organic' and so forth). This is because it is known that linguistics can affect the interpretation of a firm's sustainability claims by stakeholders (Crilly et al., 2015), thereby impacting congruency. There are also restaurants with names typically incongruent with sustainability (for example, 'car', 'endless', 'big' and so forth), which are less likely to adopt sustainable innovations.

A list of names considered to be sustainability-congruent can be seen in Appendix B, and a list of names considered sustainability-incongruent can be seen in Appendix C.

Fourthly, restaurants with a Michelin star are expected to implement more sustainable innovations. This is because it has been found that chefs working in Michelin-star restaurants think that innovation is a fundamental part of haute cuisine (Mrusek et al., 2021). Innovations within haute cuisine can be defined in multiple ways. It can involve implementing product-related novelties, using novel products, creating more sophisticated dishes, or applying new cooking methods. This indicates that restaurants that have a Michelin star have the capability to nurture innovations. Chefs do mention that sustainability is not one of the main focuses of their restaurants. However, because of the rising pressures from society to focus on sustainability, it is still expected that restaurants with a Michelin star show more sustainable innovations because of the innovative capability inherent to these restaurants and their staff.

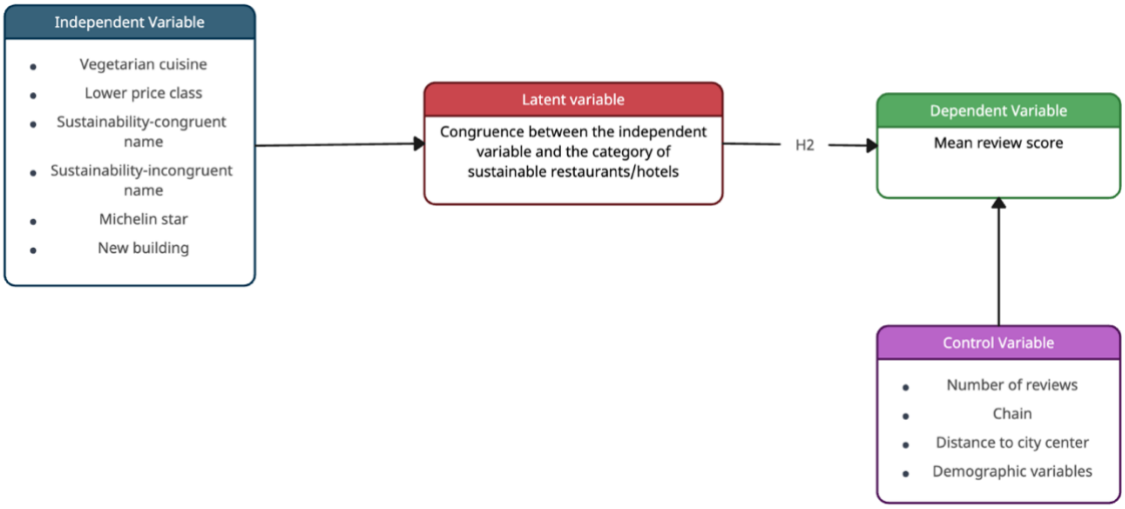
Lastly, restaurants and hotels situated in newer buildings are expected to show more sustainable innovations. This is because one of the criteria for a building to be sustainable is to be adaptable throughout its service life (Berardi, 2013). Because many old buildings in the city of Utrecht are part of the historical city center, it is more difficult to adapt those buildings to new standards due to building permits. For newly built buildings, obtaining a permit to make changes to a building or build them sustainably from the start is likely easier because these buildings appear less often in the historic city center. Additionally, newer buildings are often built on newer standards, such as being better isolated, and are therefore inherently more sustainable.

It is likely that the tested congruence in H1 also affects the mean review score of hotels and restaurants. This is because congruence between a company's category and its characteristics positively affects a company's evaluation (Kovács & Johnson, 2014). It is expected that the higher the congruency between the restaurant characteristics examined in H1 and the extent to which sustainability is implemented, the higher the mean score of a restaurant's review score. A restaurant's review score is an indication of the value of a restaurant to the consumer. A similar relationship between green innovation and company performance has also been found to be present within the hotel industry (Asadi et al., 2020). Therefore, concurrent congruency between sustainability-congruent characteristics and sustainable innovation implementation can be expected to influence company performance within the hotel industry. This leads to the following hypotheses and conceptual framework, as depicted in Figure 2 on the next page:

H2A: Congruency between a restaurant's (sustainable) characteristics and the extent to which sustainable innovations are adopted is positively related to a restaurant's mean review score.

H2B: Congruency between a hotel's (sustainable) characteristics and the extent to which sustainable innovations are adopted is positively related to a hotel's mean review score.

Figure 2
Conceptual framework covering H2

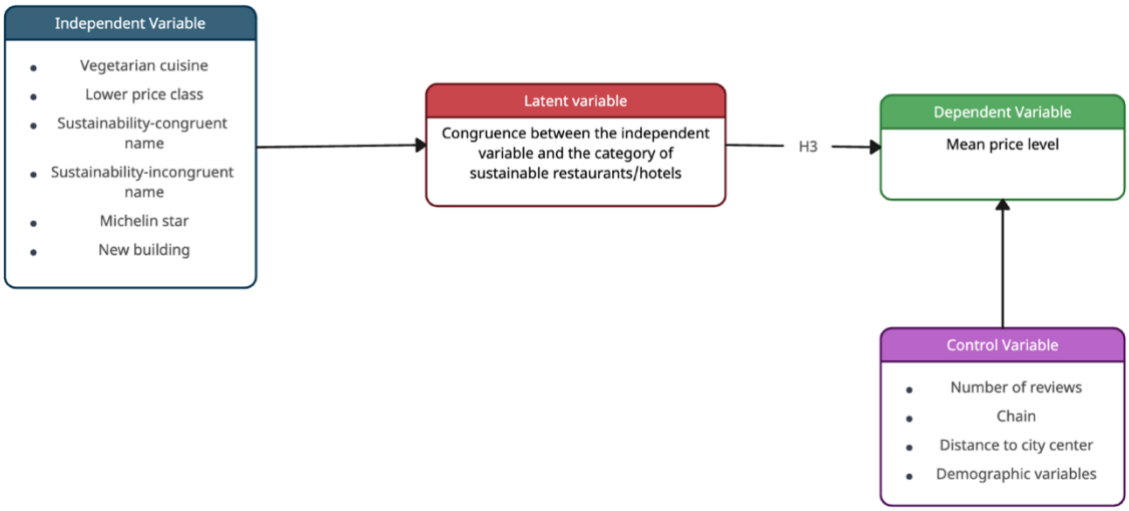


Lastly, it is expected that the tested congruence in H1 also affects a restaurant's mean price level. The same reasoning as before holds: a company that is congruent with its characteristics and apparent category has a higher company valuation (Cudennec & Durand, 2022). Additionally, average price level has been used in previous research to estimate the effect of category spanning and its negative effect on company valuation (Kovács & Johnson, 2014). Therefore, it makes sense to include it in the present research as well. As a result, the conceptual model is as stated in Figure 3, and Hypothesis 3 is as follows:

H3A: Congruency between a restaurant's (sustainable) characteristics and the extent to which sustainable innovations are adopted is positively related to a restaurant's mean price level.

H3B: Congruency between a hotel's (sustainable) characteristics and the extent to which sustainable innovations are adopted is positively related to a hotel's mean price level.

Figure 3
Conceptual framework covering H3



Chapter 3 Methodology

3.1 Research design

In order to test the hypotheses stated in Chapter 2.7, the research design involved running multiple types of regression analyses. Different hypotheses required different regression analyses due to their varying distributions and characteristics. Overall, the nature of the performed study is of a quantitative and deductive one. Such a design allows results to be more generalizable and applicable to policy measures (Bryman, 2012), which can be helpful for both the city and the province of Utrecht to encourage more sustainable innovation activities. Additionally, the cultural aspects of the hospitality industry in the Netherlands are similar across different regions, which means that the results can be applied to areas beyond Utrecht. Therefore, the results are generalizable to a broader area than just Utrecht. The design of the entire study was of a cross-sectional nature because the data was collected at one point in time and did not include different measurement points throughout time.

In the initial phase of the study, H1 was investigated, which aimed to determine if the inclusion of sustainability-related attributes in hotels and restaurants had a positive impact on the adoption of sustainable innovations. The subsequent phase, which involved investigating H2 & H3, delved into whether the alignment between these sustainability-related traits and a company's overall sustainability performance impacted its valuation.

In practice, this ‘super congruency’ effect was examined by creating a product variable through multiplying the variables related to the firm characteristics and sustainable innovations. After, this product variable was taken as the independent variable of interest. When both of these variables have a value greater than zero, it indicates that the specific company possesses both the sustainability congruent characteristic, as well as at least one sustainable innovation. The greater the number of sustainable innovations, the higher the product variable and the stronger the ‘super congruency’. This term is referred to as ‘super congruency’ because it reflects how both a company's characteristics are congruent with their category as well as their innovation activities being congruent with the category of sustainable hotels or restaurants. Subsequently, whether this ‘super congruency’, i.e., the product term variable, affected a company’s valuation was examined. The latter was reflected by their mean review scores and mean price levels, as outlined in Chapter 2.7.

Examining this effect of the ‘super congruency’ on the mean price level of a restaurant or hotel is a specification of a hedonic pricing model. Hedonic pricing theory assumes that heterogeneous goods, such as housing or hotel rooms, can be broken down into homogeneous attributes (Andersson, 2010). As a result, goods can be viewed as the bundle of objective attributes. Based on consumer demand analysis, it is thought that the price of a good is some function of the underlying attributes of that good. This has been studied in great depth in both the restaurant sector (Fogarty, 2012; Yim et al., 2014), as well as the hotel sector (Andersson, 2010; Sánchez-Ollero et al., 2014; H. Zhang et al., 2011). In the present study, the underlying attribute of interest concerns the ‘super congruency’ product term variable and whether the presence of sustainable innovations affects a restaurant’s or hotel’s mean price level.

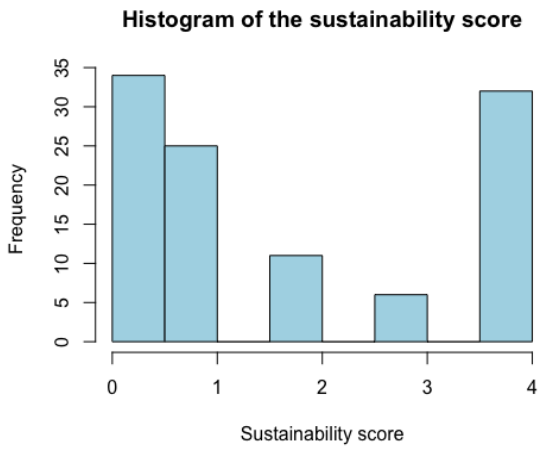
The following baseline regression equations were analyzed in the research. Note that the specifications of the equations differ per regression model, i.e., ZINB, OLS, and OLR, depending on the dependent variable:

$$\text{R1: } Sustainable\ Innovations_i = \beta_0 + \beta_1 Firm\ Characteristic_i + \beta_2 Control\ Variables_i + \varepsilon_i$$

This first regression was used to examine H1, taking an indicator for sustainable innovations as the dependent variable. R1, which focuses on the restaurants dataset, was analyzed using a zero-inflated negative binomial (ZINB) regression model. This is because, as will be explained in the operationalization, the dependent variable sustainable innovations was concerned with a count variable. When a count outcome variable shows an excess amount of zero values and an over-dispersed distribution, the zero-inflated negative binomial regression model is recommended to be used (Calvin, 1998). A zero-inflated regression model assumes that the excess zeroes can be modeled independently from the count values through a logit model, thereby creating two regression outcomes: one table modeling the count values and one table modeling the excess zero values. The combination of the two processes determines the expected outcome. The analyses concerning the part of the research focusing on hotels and their sustainability scores, H2, consisted of Ordinal Logistic Regressions (OLR). OLR is used when the dependent variable of a model contains more than two categories that have a relevant ranking to it. This was the case for H2 because the sustainability rating of hotels contained an order that implies that the higher the score, the more a hotel is acting on sustainability. The distribution of the sustainability score variable is pictured in Figure 4. As can be seen, the distribution peaks around 0 and 4. This emphasizes why a different model than OLS should be used because the distribution is nonnormal. The regressions used to analyze H2 and H3 can be seen on the next page.

Figure 4

Histogram of the distribution of the sustainability scores for hotels



R2: $Mean\ Review\ Score_i$
$$= \beta_0 + \beta_1 Firm\ Characteristic_i + \beta_2 Sustainable\ Innovations_i + \beta_3 (Firm\ Characteristic_i * Sustainable\ Innovations_i) + \varepsilon_i$$

R3: $Mean\ Price\ Level_i$
$$= \beta_0 + \beta_1 Firm\ Characteristic_i + \beta_2 Sustainable\ Innovations_i + \beta_3 (Firm\ Characteristic_i * Sustainable\ Innovations_i) + \varepsilon_i$$

The models analyzing R2 and R3, concerning the effects of 'super congruency' on a restaurant's and hotel's mean review scores and mean price levels, were analyzed through the Ordinary Least Squares (OLS) regression method. OLS is a valuable analysis tool used for estimating a linear regression model when the dependent variable is normally distributed.

3.2 Data collection

In order to examine these regressions, quantitative, already-existing data was used. The data collection was based on desk research and was done by taking observational data concerning the variables of interest and extracting data from existing data sources. The advantage of taking observational data is that it enabled direct observation of the sustainable innovation behavior of restaurants and hotels (Bryman, 2012). The advantage of taking already-existing data was that it decreased the time and costs associated with the data collection (Chappin, 2022). This was useful for the research because of the time constraints regarding the thesis guidelines. However, using already-existing data posed a lack of familiarity with the data and a lack of control over the data quality. Considering that the data collection took eight weeks, excluding the data collection phase regarding the hotel data sample, a lack of familiarity was regarded as irrelevant.

The data used to examine the part of the research concerning restaurants involved both discrete and continuous data. The sample included the following variables: sum of sustainable innovations, number of reviews, and dummy variables concerning the presence of a vegetarian cuisine, Google Maps price category, whether they had a sustainability congruent name, sustainability incongruent name, Michelin star, whether they were situated in a new building, and whether they were part of a chain. The continuous data concerned the share of vegetarian dishes, the average price level, the distance to the city center, the intensity of leftist voting, and the percentage of people with a Dutch background. The anonymized dataset can be made available upon request.

The data sources used to analyze the hypotheses concerning restaurants included restaurants' websites, Google Maps, Kadaster (2023), data.overheid.nl (Utrecht, 2022), and the CBS (2021) (Centraal Bureau Statistiek). The initial restaurant sample was based on OpenStreetMap (2023), an open-source spatial database consisting of a large ecosystem of data, software systems, and other web-based information used by developers, industry actors, and researchers (Mooney & Minghini, 2017). The data taken from restaurant websites concerned the number of sustainable innovations implemented, which sustainable innovations were implemented, the mean price level, and the share of vegetarian dishes.

The data from Google Maps focused on restaurant names, cuisine types, price class, number of reviews, and mean review scores. The data taken from Kadaster was related to the building year of the buildings in which the restaurants are situated. The data taken from the CBS (2021) concerned average income and ethnicity in specific zip codes. This data was later linked to the zip codes of the restaurants. The data collection stopped once a complete sample of restaurants in the city of Utrecht had been created based on the entire initial list provided by OpenStreetMap.

The data used to analyze the part of the research focusing on hotels also concerned both discrete and continuous data. The discrete data included the sustainability scores, the number of reviews, and the dummy variables concerning whether a hotel is part of a chain, situated in the province capital city, sustainability congruent name, and new building. The first variable, the sustainability scores of hotels, is also a quantitative ordinal data type. Lastly, the only continuous variable is the mean price level.

The data used to test the hypotheses related to the hotels was gathered from a variety of sources, including Booking.com, Google Maps, hotels' websites, and Kadaster (2023). Booking.com is an international website on which you can book accommodation, flights, or even car rentals. The sample was created by searching for any hotel within the province of Utrecht for two adults for one night at any time. This led to a sample of 111 accommodations. The advantage of using Booking.com is the fact that Booking.com has developed its own Travel Sustainable program. The disadvantage to using Booking.com is that it does not provide a complete list of all hotels in Utrecht. Therefore, some hotels may have been excluded from the sample, which could have provided interesting data. However, a sanity check was performed by first gathering a complete list of hotels in the same way as a full list of restaurants was created through OpenStreetMap (2023) and afterward examining whether most hotels listed on the complete sample list were also included in the Booking.com sample. The data collection stopped once all hotels located in the province of Utrecht, according to Booking.com, were analyzed.

3.3 Operationalization

Dependent variable

The operationalization of sustainable innovations for restaurants centered around innovation as an outcome, being operationalized by which sustainable innovations could be found on a restaurant's website based on a checklist inspired by Maynard et al. (2020). The definitions, indicators, and measurements of the dependent variables concerning the restaurants are described in Table 1A. The final score for the variable sustainable innovations was calculated as the sum of the values indicated in the measurement column, creating a count variable. The complete list of sustainable innovations proposed by research by Maynard et al. was used to form an initial checklist. Eight websites from sustainable restaurants were examined based on this. These eight initial restaurants included the following restaurants: The Green House, Gys, BROEI, Wilde Wortels, Jasmijn en ik, Werkspoor Cafe, Life's a peach, and Van Planten.

During the data collection, iteration occurred between the operationalization and possible new definitions and dimensions. When a restaurant showed a sustainable innovation that had yet to be included in the list, it was added to the operationalization table.

Table 1A

Operationalization of the dependent variables for restaurants

(Sub)variable	Indicators	Measurement
1. Water, energy, and gas supply	1. Applying pay-for-use energy, pay-for-use water or pay-for-use gas	1. Yes (1) – No (0)
	2. Using renewable energy	2. Yes (1) – No (0)
	3. Having a Website Carbon tester	3. Yes (1) – No (0)
	4. Operating 100% fossil fuel free or climate neutral	4. Yes (1) – No (0)
	5. Decreasing water consumption	5. Yes (1) – No (0)
2. Menu and food waste	1. Cultivating plants, herbs, or water locally	1. Yes (1) – No (0)
	2. Using biological food	2. Yes (1) – No (0)
	3. Having local suppliers	3. Yes (1) – No (0)
	4. Offering vegan options	4. More than 75% vegan/vegetarian (1) – Less than 75% (0)
	5. Using seasonal products	5. Yes (1) – No (0)
	6. Using vegetarian fish	6. Yes (1) – No (0)
	7. Using Fairtrade products for the food or Fairwear for employee's clothing	7. Yes (1) – No (0)
	8. Using revolutionary techniques to offer vegetarian/vegan food	8. Yes (1) – No (0)
	9. Raising product CO2 awareness	9. Yes (1) – No (0)
	10. Using product/process LCAs	10. Yes (1) – No (0)
3. Waste reduction, construction materials, chemicals, employees, and social sustainability	1. Efforts to be in a sustainable building	1. Yes (1) – No (0)
	2. Using sustainable building materials or textiles	2. Yes (1) – No (0)
	3. Having a modular building plan	3. Yes (1) – No (0)
	4. Employing people with a distance to the labor market	4. Yes (1) – No (0)
	5. Offering sustainable workshops	5. Yes (1) – No (0)
	6. Aiming for waste reduction	6. Yes (1) – No (0)
	7. Donating to charity	7. Yes (1) – No (0)
	8. Being in contact with the local community and supporting it	8. Yes (1) – No (0)
	9. Not having a profit goal	9. Yes (1) – No (0)
	10. Using waste material as a new resource	10. Yes (1) – No (0)
	11. Having partnerships with sustainable companies	11. Yes (1) – No (0)
	12. Encouraging female leadership	12. Yes (1) – No (0)
	13. Offering a discount to people living beneath the poverty threshold	13. Yes (1) – No (0)
	14. Encouraging supply chain transparency	14. Yes (1) – No (0)
Economic wellbeing of a restaurant	Mean review score	Mean review score as stated on Google Maps

	Average price level	Average price level according to restaurant's menus[a, b, c, d, e]

[a] When a restaurant had more than 15 main dishes on their menu, an estimate was made concerning the average price level.
[b] When a restaurant only offered a price indication for a three-course menu, the average price level was calculated as follows: $AveragePrice_i = MenuPrice_i * \frac{2}{3}$.
[c] When a restaurant only offered a price indication for a four-course menu, the average price level was calculated as follows: $AveragePrice_i = MenuPrice_i * \frac{1}{2}$.
[d] Only main dishes were taken into account when calculating the average price level, therefore excluding lunch meals, breakfast meals, children's menu items, snacks, salads, side dishes, sweets, and drinks.
[e] When a restaurant only offers breakfast or lunch meals, the average price of the sandwich or lunch meals is used to calculate the average price level.

Table 1B
Operationalization of the dependent variables for hotels

Variable	Indicators	Measurement
Sustainable innovations		Dummy variable, which was 0 when the Travel Sustainable Badge was nonexistent, otherwise 1
Valuation of a hotel	Mean review score	Mean review score as stated on Booking.com
	Average price level	Average price level based on Booking.com, based on a stay during the week of 2nd until the 8th of October 2023

Afterward, the already analyzed restaurants were rechecked to determine whether they had also adopted this innovation. This way, the table was updated through an iterative and inductive process throughout the data collection process.

Concerning the second and third research question, a restaurant's valuation was used as the dependent variable, operationalized by a restaurant's mean meal price and mean review score. The average meal price was based on the average cost for a restaurant's main meal because most restaurants provided information concerning this. Therefore, using such data increased the reliability of the dataset. Also, starters and desserts are complementary goods to a main dish. Therefore, when a restaurant has a higher mean price for its main dishes, it is likely that the price for its starters is also higher. In this sense, starters and desserts fall into the same price category for each specific restaurant. Therefore, data concerning these meals does not add additional information to the dataset. Additionally, the mean review score was also included because when people are more satisfied with a restaurant, they are likely to leave a higher review score. Also, a higher mean review score can motivate more people to visit a restaurant, increasing its economic well-being and valuation.

The operationalization of sustainable innovations for hotels was based on the Travel Sustainable program by Booking.com and can be seen in Table 1B. At first, a similar approach was attempted as was used for the operationalization of sustainable innovations for restaurants. However, it was found that no clear checklist concerning sustainable innovations within the hotel sector exists, such as the one created by Maynard et al. (2020) for the restaurant sector. This made it more challenging to create an initial checklist of sustainability measures. Also, hotel websites provided less information concerning their sustainability activities than restaurants did. Therefore, the sustainability score, as provided by the Travel Sustainable program, was used as a proxy variable for sustainable innovations within the hotel sector.

This Travel Sustainable program was co-created with the companies Travalyst and Sustainalize, improving the program's credibility. Properties are awarded either no badge or a Sustainable badge ranging from level 1 to 3. The level depends on the sustainability steps a property has already taken. The properties have been asked to inform Booking.com whether they have achieved 32 sustainability steps. Based on this, a property's environmental and social impact is calculated, taking its size and location into account. Booking.com has started to validate these scores based on customer feedback as well as through a third-party auditor. When a property has been awarded one or more third-party sustainability certifications, it obtains a level 3+ badge.

For the part of the research concerning congruency and the valuation of a hotel, the mean review score and the average price level were used for the same reasons as why these variables were used for the restaurant part of the research. The average price level was operationalized as the mean daily price for a double room, excluding breakfast, calculated based on a stay during the week of the 2nd until the 8th of October 2023. This week is relatively far away from the summer, Christmas, and the moment of data collection (end of August). Therefore, it is likely that the data was not influenced by any of these events. By basing the mean daily price on the same week for all hotels, potential bias related to time was minimalized. This approach of taking a mean daily price to operationalize the mean price level of a hotel stay is similar to the approach by Sánchez-Ollero et al. (2014), who examined a hedonic pricing model for hotels, taking environmental effects into account.

Independent variables

As mentioned, the independent variables for both the hotel and the restaurant part of the research centered around the following: vegetarian cuisine type, price class, sustainability-(in)congruent names, whether they have a Michelin star, and whether the restaurant or hotel is located in a new building. The operationalization of these variables for both hotels and restaurants can be seen in Table 2.

In the part of the research concerning the cuisine type of restaurants, an attempt was first made to determine this through Google Maps. If Google Maps did not directly state the cuisine type, the restaurant's description on Google Maps was examined to determine whether the cuisine type was stated there. Afterward, the restaurant's website was examined to see whether the website itself states the cuisine type. Then, the restaurant's name was googled to see if another (review) website stated its cuisine type. The menu was considered a last resort to see if the dishes matched a specific cuisine most fittingly.

Table 2

Operationalization of the independent variables for hotels and restaurants

Variable	Indicators	Measurement
Vegetarian cuisine (only for restaurants)	Whether the cuisine of a restaurant belongs to cuisines cognitively linked to vegetarianism	Yes (1) – No (0)
	Share of vegetarian dishes	Percentage (%) of vegetarian dishes on a restaurant's menu
Price category	The euro signs stated on Google Maps	€-€€€€
	Mean price level	€ per meal/night[a]
Sustainability congruent name	Whether a restaurant's name included one of the following: 'green', 'eco-', 'world', 'climate' or anything nature related[b]	Yes (1) – No (0)
Sustainability incongruent name	Whether a restaurant's name includes one of the following: 'car, 'endless', 'big, 'mean' or anything unsustainability related[c]	Yes (1) – No (0)
Michelin star (only for restaurants)	Whether a restaurant had 1, 2, or 3 Michelin stars, or a Bib Gourmand title[d]	Yes (1) – No (0)
New building	Whether the building a restaurant or hotel was located in a building built after 1945	Yes (1) – No (0)

Note. Some independent variables were not applicable to hotels, i.e., share of vegetarian dishes, euro sign stated on Google Maps, and Michelin star. Other independent variables were calculated in a slightly different manner; see below.

[a] See Table 1A for the calculation of the mean price level for restaurants; see below for the calculation of the mean price level for hotels

[b] See Appendix B for a complete list of names that were considered sustainability congruent.

[c] See Appendix C for a complete list of names that were considered sustainability incongruent.

[d] This was based on the Michelin Guide website

Definitions of the different cuisine types can be found in Appendix A, alongside the reasoning behind why only the Indian and the vegetarian cuisine types are considered as *vegetarian cuisine* during the data analysis. Next to just looking at cuisine types, the share of vegetarian dishes was also used as an independent variable. This is because, for some restaurants, it was difficult to distinguish the cuisine type correctly; therefore, the effect of having more vegetarian dishes on a restaurant's menu on their sustainable innovation score was also examined. This serves as a robustness check for the vegetarian cuisine model. Mathayomchan and Taecharungroj (2020) argue that offering a variety of dietary options on a restaurant's menu improves customer experience, thereby validating taking vegetarian cuisine and share of vegetarian dishes as the independent variable.

The price category was operationalized by the euro signs stated on Google Maps, which range from one to four. This approach is similar to the approach by Zhang and Luo (2023), who examined the effect of restaurant characteristics on firms' survival rates. Additionally, the average price level was also considered as another measurement definition of the price category.

This is because not every restaurant had information available concerning the euro signs on Google Maps. By also considering the average price level as an independent variable, these restaurants were not excluded from the analysis.

Concerning the independent variables used in the part of the research focusing on hotels, a few minor changes in terms of the measurement were applied. The vegetarian cuisine variable was based on whether an in-house hotel restaurant was cooking in a vegetarian or Indian style. Information concerning cuisine types was available on Booking.com when an in-house restaurant was present. The price category variable was operationalized only by the mean price level because neither Booking.com nor Google Maps provided information concerning a price category. The sustainability congruent name, sustainability incongruent name, and new building variables were all created the same way as they were for restaurants.

Control variables

The control variables used for the regression analyses concerning restaurants can be seen in Table 3A and included the following: number of reviews on Google Maps, whether the hotels or restaurants were part of a chain, the distance to the city center, and demographic factors such as percentage of high incomes, leftist voting intensity, and percentage of inhabitants with a Dutch background. The number of reviews was taken as a proxy for the size of restaurants because, in essence, it reflects the number of guests and their willingness to leave a review. Therefore, although the number of reviews also reflects something other than just the size of a restaurant, it can still be used as a proxy to control for the size of a restaurant. This is because it was not possible to find information concerning the number of tables or full-time equivalent (FTE) employee hours, which would be variables better suited to reflect the size of a restaurant.

In green restaurant research, demographic factors are often used as control variables (Arun et al., 2021). Therefore, it also made sense to include these in the present research. The choice was made to focus on leftist voting intensity rather than progressive voting intensity because left-wing parties are found to be pro-environmental (Neumayer, 2004). Therefore, the link between leftist voting intensity and sustainability is likely stronger than that of progressive voting intensity. Because the sample was limited to the city of Utrecht, the international context and other external macro factors were the same for all restaurants. As a result, no specific attention was paid to these factors.

For H2A and H3B, the main question concerned whether the ‘super congruency’ between restaurant’s characteristics and sustainability affected its valuation, which was operationalized by a restaurant’s mean review score and mean price level. The control variables incorporated in this part of the research are the same as those stated in Table 3A. Additionally, it has been found that, among other factors, a restaurant’s location within a building determines the average meal price of a restaurant, as well as the types of cuisine served, whether a restaurant is part of a chain, the number of reviews, and the presence of parking facilities affect the average meal price (Yim et al., 2014). These findings emphasize that the control variables stated in Table 3A should also be used as control variables to determine a restaurant’s menu price.

Table 3A

Operationalization of the control variables for restaurants

Variables	Indicators	Measurement
Number of reviews		Total number of Google Maps reviews
Chain	Whether a restaurant is part of a chain[a]	Yes (1) – No (0)
Distance to city center	Distance based on the Haversine distance between the coordinates of the restaurant and the coordinates of Utrecht central station (5.11, 52.09)	Distance in meters
Percentage of high incomes	Percentage of households that earn the income included in the top 20% of incomes calculated based on the entire Netherlands (CBS, 2021)	Percentage of high incomes
Leftist voting intensity	Weighted average of percentage of people voting for left parties based on neighborhood polling stations and the left intensity of parties' programs based on the Kieswijzer matrix[b]	Statistic of how many people voted for a specific party, multiplied by that party's leftist orientation
Percentage of inhabitants with a Dutch background	Ethnicity in a neighborhood	Percentage of people with a Dutch background during 2018

[a] A restaurant is defined as being part of a chain when more than 3 restaurants in the sample have the same name, similar to the approach by Zhang and Luo (2023), or when they mention they are part of a chain on their website

[b] This calculation approach is similar to Voorn (2021), who researched voting behavior throughout the Netherlands

For the hotel models, similar control variables as those stated in Table 3A were used, and they can be seen in Table 3B. This was done to enable comparing the analyses for both restaurants and hotels with one another. Additionally, the analyses are based on the same theoretical framework; therefore, it makes sense to include similar control variables. However, some variables were not applicable to the hotel sample because for several reasons. For example, the sampling area for hotels, the province of Utrecht, was bigger than the sampling area for restaurants, the city of Utrecht. Therefore, using the distance to the city center did not make sense. Instead, whether the hotel was situated in the city of Utrecht was included as a control variable. Furthermore, it did not make sense to include the demographic variables because usually guests stay at hotels because they do not live nearby.

Therefore, the demographics of the location in which a hotel is situated do not provide much useful information. The number of reviews and whether the hotel is part of a chain were included as control variables.

Table 3B
Operationalization of the control variables for hotels

Variables	Indicators	Measurement
Number of reviews		Total number of reviews on Booking.com
Chain	Whether a hotel is part of a chain	Yes (1) – No (0)
Capital city	Whether a hotel is situated in the city of Utrecht or not	Yes (1) – No (0)
Star rating		Number of stars provided by Booking.com

Moreover, an additional control variable was used for the second part of the hotel analysis concerning the mean review score and mean price level. It is argued that environmental characteristics, such as competitor diversification, and organizational characteristics, such as star rating, an ISO certificate, and size, affect hotel performance (Duric & Topler, 2021). Based on this, the star rating of a hotel is taken into account as a control variable. Furthermore, it has been shown that a hotel's mean review score also affects its economic valuation (Xie et al., 2014). As a result, the mean review score is included as a control variable in the hedonic pricing model rather than the number of reviews.

3.4 Sampling strategy

The collected data sample concerning the restaurants included a full sample of all restaurants in the city of Utrecht, excluding fast-food restaurants, permanently or temporarily closed restaurants, clubs, event centers, student associations, university buildings, political centers, concert halls, coffeeshops, and sports canteens. This is because these companies belong to entirely different categories than restaurants. As a result, no other sampling strategy than looking at every single restaurant was needed because all applicable restaurants were included in the database. The database did not include Vleuten, De Meern, and Haarzuilens, which belong to the municipality of Utrecht but not the city of Utrecht. This was done because of time constraints.

Similar to the restaurant data sample, the collected data sample concerning hotels also included a full sample of hotels within the province of Utrecht. As mentioned, this full sample was based on the information available on Booking.com, and a sanity check was performed afterward to ensure that it was indeed a full sample. Moreover, for both hotels and restaurants, companies with less than three reviews were excluded from the sample in order to ensure that such outliers did not impact the outcome of the research.

A full sample fit the research aim in the sense that it captured every restaurant and hotel of interest, thereby creating an extensive database concerning the restaurant's characteristics, hotel's characteristics, and sustainable innovations. Moreover, it decreased the chances of any external factors, such as policy factors, affecting the dependent variable.
This is because, within both the city and the province of Utrecht, there is not much difference in terms of macro-environmental factors. After all, it is a relatively small area, especially in comparison to much larger areas such as entire countries.

The city of Utrecht made sense to take as a sample because Utrecht was declared the most sustainable municipality in the Netherlands (Stadszaken, 2019); therefore, the macro environment is expected to be supporting of sustainable innovations. The province of Utrecht was chosen as the sample area for the hotels because this allows for some of the macro factors to be the same for both restaurants and hotels for at least a part of the sample. This enables the comparison between the different congruency effects on the extent to which sustainable innovations are implemented.

3.5 Data analysis

Firstly, descriptive analyses were performed to explore the data and ensure that the assumptions of the different regression models were met. Afterward, the data was transformed, and several variables that were needed to run the regressions were created. For the restaurant data sample, this included the creation of the dummy variables, as explained in Paragraph 3, and the distance variable. Additionally, the distance variable was standardized because the initial range was large compared to that of other variables. Furthermore, the number of reviews was divided by 1000 to decrease the variable's range and allow for a more straightforward interpretation of the coefficient during the regression analyses.

Moreover, the dependent variables analyzed in the regression models concerning the hedonic price model (R3) had to be log-transformed. This is because this is the usual approach in previous research as well (Andersson, 2010; Fogarty, 2012; Sánchez-Ollero et al., 2014; Yim et al., 2014; H. Zhang et al., 2011). The theoretical background as to why this is necessary centers around the fact that a linear model requires constant marginal implicit prices (Andersson, 2010). This is only feasible when there are constant returns to scale or when two or more bundles of attributes can be rearranged without costs. Because these are not realistic conditions, log-linear functions are often used in hedonic pricing models. Moreover, the percentage of vegetarian dishes in different cuisine types was also checked. Afterwards, the regression models were analyzed.

All quantitative data was analyzed through multivariate regression analyses in RStudio. Besides the three baseline regression equations stated in Chapter 3.1, regressions concerning just the control variables were run, and also regressions concerning the full models were examined. The results for the full models can be found in Appendix D. For all regression models focusing on restaurants (H1A, H2A, H3A), the standard errors were clustered based on the zip codes. This is because the data points concerning the demographic factors were related or even the same for multiple observations.

H1A was further investigated by examining R1 while taking the sum of Category 1 and 2 sustainable innovations as the dependent variable and the sum of Category 3 sustainable innovations as the dependent variable in another regression analysis. These results can be found in Appendix E and provide information concerning whether the congruency effect is different for different types of sustainable innovation categories. The sum of Category 1 & 2 sustainable innovations was taken because running the regressions based on having the sum of either one of those categories as the dependent variable resulted in an error stating “system is computationally singular”. This error likely occurred because the sum counts of the separate categories are relatively low compared to the number of observations.

For the analysis of the ZINB model, which was used to research H1A, the package used in RStudio was the *pscl* package, which is adept at handling zero-inflated models that do not include repeated measures or longitudinal studies (X. Zhang & Yi, 2020). If the dataset would have included this, another package would have to have been used. The negative binomial distribution was used rather than the Poisson distribution because the negative binomial model incorporates an additional term to take excess variance into account, accounting for over-dispersed data (Malek-Ahmadi, n.d.). An indicator of overdispersion is when the variance of a variable is greater than the mean. In this case, the dependent variable had a variance of 3.57 and a mean of 0.93. This indicates that overdispersion was present, therefore justifying the use of the negative binomial distribution.

The assumptions of a zero-inflated negative binomial regression model include the fact that there should be an excess number of zero values, that the dependent variable values should be count values, that these count values should be non-negative integers, that the parameters approximately have a log-linear relationship with the expected value, and independence of individual observations (Pew et al., 2020). These assumptions were all checked and verified. Additionally, the ZINB model resulted in the best model fits compared to a zero-inflated Poisson model, regular Poisson model, and regular negative binomial model, thereby justifying the use of this specific model.

Concerning the OLR model, which was used to examine H1B, one of the crucial assumptions is the proportional odds assumption. This assumption implies that none of the independent or control variables disproportionately affect the dependent variable. This was verified by running a Brant test. The Brant test examines whether the observed deviations from the model are larger than deviations that would occur by chance. Most variables had a p value greater than 0.5, indicating that the proportional odds assumption holds. However, the Omnibus variable had a p value lower than 0.5. Therefore, the assumption cannot be fully verified. Still, because of the data characteristics of the dependent variable, OLR is still the best model to use. The package *polr* was used to run the OLR models. Lastly, concerning the OLS models, which were used to examine R2 and R3, it is important for the dependent variables to have a normal distribution. This, among the other OLS assumptions, was checked and verified.

3.6 Research quality indicators

The validity of the data concerning the restaurants was assured in multiple ways. Firstly, face validity was ensured by, prior to the data collection phase, discussing the operationalization and the research design with the restaurateur of Restaurant Café In de Waag (Interviewee 2, 2023), to ensure that they made sense for someone with expertise in the industry (Bryman, 2012). Additionally, convergent validity was ensured because the operationalization of cuisine type, price class, and chain affiliation was done similarly to the research by Zhang and Luo (2023). Additionally, the left voting intensity variable was calculated in a similar way as it was in the research by Voorn (2021).

Similarly, the hedonic pricing models concerning both the hotels and the restaurants were also performed in a similar way as previous research by Andersson (2010), Fogarty (2012), Sánchez-Ollero et al. (2014), Yim et al. (2014), and H. Zhang et al. (2011). However, the construct validity of the research does pose a threat.

A central assumption of the research is that when specific characteristics are present, the congruency between those characteristics and their category increases, which leads to an increase in the adoption of sustainable innovations. The latent variable congruency could not be measured in the present research. However, because the expected relationship is well grounded in theory, the threat to the validity is of minimal concern.

Moreover, the data extracted from the CBS is reliable because the CBS is an official government institution; therefore, they should provide consistent data. The present research did carry a risk of failing inter-observer consistency because deciding which sustainable innovations are implemented by restaurants is of a subjective nature (Bryman, 2012). Therefore, it could not be guaranteed that the results from this research would be the same if someone else were to recreate the dataset again. In order to decrease this risk of inter-observer consistency, the main descriptive results in terms of which sustainable innovations were found most often were checked against the Entree terrace and trend guides (Entree Magazine, 2023a, 2023b), and also discussed with the owner of a sustainable restaurant as well as the restaurateur from Restaurant Café In de Waag (Interviewee 1, 2023; Interviewee 2, 2023). The latter also provided an opportunity to hold an exploratory interview. The short exploratory interviews and the Entree trend guides were analyzed in NVivo through an open coding process.

Moreover, parts of the data used to analyze restaurants were extracted from Google Maps. The stability of this data cannot be guaranteed because the information could easily be changed by restaurateurs (Bryman, 2012). However, because customers also base their cognitive congruence on the data available on Google Maps, it remains sensible to extract data from Google Maps because the theoretical framework is based on the notion of congruency. To increase the stability of the data, data values concerning the mean review score and the number of reviews were checked and updated on the 29th of May 2023, to ensure that the passing of time during the data collection phase of the restaurant data set did not influence these values.

The data concerning the hotels was extracted from Booking.com and afterward checked on the hotel's own websites. Gathering all information from one website ensured that the information was comparable with each other and measured in the same way. However, information on Booking.com, especially concerning price levels, changes daily depending on room availability and demand. Therefore, it was not easy to ensure the reliability of the data sample. However, by basing the mean price level of all hotels on one specific week, an effort was made to keep the data as reliable as possible. Additionally, the sustainability ratings, locations, and whether hotels were part of a chain are factors that do not change daily.

Specifically, the data concerning the dependent variable was based on their Sustainable Badge program. The advantage of using this badge as an indicator of a hotel's sustainability level is that every hotel was evaluated in the same way, ensuring consistency throughout the sample. The disadvantage is that the badge is an indicator of a hotel's sustainability level, meaning that the badge does not provide information concerning the extent to which sustainable innovations are adopted but merely concerning the static state of sustainability within a property. Still, it serves as a proxy for sustainable innovation, and the time constraints related to the thesis deadline did not allow further investigation. Moreover, the properties themselves provided the information used to determine the sustainability level, which might cause a bias.

This is why the property's website itself was also examined to determine whether the sustainability claims held. Additionally, the fact that Booking.com is starting to validate the provided information through third-party auditing parties also increased the validity of the data.

3.7 Ethical issues

All data used in the performed regression analyses had already been published publicly online. Therefore, no special attention had to be paid to the GDPR for the datasets used for this part of the research because no private data was used. The ethical issues that did arise included the fact that the restaurants did not know they were being observed. Fortunately, because restaurant owners had initially already published the data online, the ethical threat was not of a real concern. To further protect the privacy of restaurants, a unique identifier number was created and used instead of their names and addresses. This ensured ethical data handling and storage. If a third party requests to access the dataset, the information concerning the restaurants' names will be removed, and the dataset will be anonymized.

However, the two exploratory interviews conducted with the restaurateur from Café-Restaurant In de Waag and the sustainable restaurant did pose a few ethical issues concerning the data collection, handling, and storage. In order to ensure an ethical process, the exploratory interviews were held after informed consent concerning was obtained and the participants were ensured of participating on a voluntary base. The restaurateur from Café-Restaurant In de Waag stated that the restaurant itself could be named in the research, and anonymity was assured to the owner of the sustainable restaurant. Confidentiality was ensured by storing the files concerning the exploratory interviews on a private laptop outside of any cloud service. Additionally, the files will be destroyed once they are no longer necessary to hold onto.

Chapter 4 Results

4.1 Descriptive results

Descriptive results concerning the restaurant data sample

As mentioned, a full sample consisting of all restaurants in the city of Utrecht and of all hotels in the province of Utrecht was examined. A total of 664 restaurants were included in the initial sample taken from OpenStreetMap concerning restaurants. Establishments that fell into the following categories were excluded from the sample, leaving a total of 521 restaurants: being permanently closed, being temporarily closed, clubs, fast food restaurants, event centers, political centers, student associations, being double mentioned, not being on Google Maps, university buildings, concert halls, and coffeeshops. Afterward, restaurants with less than four reviews were excluded from the sample, leaving 516 analyzable restaurants. After the dataset was merged with the dataset concerning the demographic factors, 512 restaurants were left.

In Table 4, the descriptive statistics of the dependent, independent, and control variables that were used to test the hypotheses related to the restaurant sector can be seen.

Table 4

Descriptive statistics of the variables used to analyze the restaurant sector

	N	Mean	SD	Median	Min	Max
Sum of sustainable innovations	512	0.93	1.89	0	0	17
Vegetarian cuisines	512	0.03	0.16			
Share of vegetarian dishes	419	0.35	0.24	0.31	0	1
Average price level	411	17.31	6.93	16.83	4.67	43.75
Google Maps price category	356	0.91	0.28			
Sustainability congruent name	512	0.04	0.19			
Sustainability incongruent name	512	0.02	0.14			
Michelin star	512	0.02	0.13			
New building	512	0.29	0.45			
Number of reviews	512	503.7	601.73	319	4	7009
Chain	512	0.22	0.42			
Distance to city center (m)	512	1359.17	1018.48	1019.6	42.58	6555
Percentages of people with a Dutch background	512	20.58	6.77	18.6	4	37.7
Leftist voting intensity	512	61.44	2.27	61.33	54.58	67.81
Percentage of people with a Dutch background	512	69.2	8.44	70	40	80
Mean review	512	4.28	0.37	4.3	2.3	5

Note. The NA values were ignored for the calculation of the standard deviation.

As can be seen, most variables included data for all 512 restaurants, containing no missing data. However, the following variables did include NA values: share of vegetarian dishes, average price level, and price segment. This was due to missing information concerning these factors on restaurants' websites. However, the restaurants that did not provide information for the price category on Google Maps often provided information concerning their average price level and vice versa. This is why looking at both Google Maps price indications and the average price level are important as independent variables in the regression analyses. As can be seen, the variables number of reviews and distance to the city center initially had a relatively large range, grounding why these variables needed to be standardized or transformed. The average number of sustainable innovations was 0.94 (*SD* = 1.94), indicating that, on average, restaurants adopted a little less than one sustainable innovation.

Table 5

Descriptive statistics of the share of vegetarian dishes grouped by cuisine type

	N	Mean	SD	Min	Max	Median
African	3	0.2567	0.1501	0.17	0.43	0.17
(North) American	8	0.2275	0.2027	0	0.64	0.21
Asian	14	0.2893	0.1218	0.13	0.48	0.295
Chicken	2	0.05	0.0707	0	0.1	0.05
Chinese	14	0.0779	0.0255	0.03	0.12	0.08
Coffee	44	0.5189	0.2361	0.17	1	0.44
Fish	4	0.055	0.0681	0	0.14	0.04
French	29	0.2545	0.1863	0	1	0.25
German	2	0.4150	0.1202	0.33	0.50	0.415
Greek	11	0.154	0.1738	0	0.6	0.13
Hawaiian	4	0.29	0.0693	0.21	0.33	0.33
Indian	6	0.4283	0.2963	0.21	1	0.31
Indonesian	8	0.265	0.1297	0	0.39	0.27
International	97	0.3773	0.2127	0	1	0.33
Italian	40	0.4172	0.1786	0.13	1	0.33
Japanese	19	0.2047	0.0961	0	0.38	0.18
Korean	3	0.1633	0.0907	0.13	0.23	0.20
Lunch	35	0.5424	0.2225	0.11	1	0.60
Mediterranean	9	0.3262	0.1651	0.19	0.58	0.265
Mexican	5	0.27	0.0442	0.25	0.33	0.25
Middle Eastern	8	0.4163	0.3108	0.09	1	0.315
Pub	98	0.3549	0.2381	0	1	0.33
Spanish	9	0.3688	0.0841	0.27	0.52	0.36
Steak	8	0.1187	0.0633	0.05	0.21	0.10
Surinamese	6	0.198	0.1040	0.14	0.38	0.14
Thai	10	0.203	0.1356	0	0.47	0.2
Turkish	3	0.2667	0.3259	0	0.63	0.17
Vegetarian	8	0.983	0.0495	0.86	1	1
Vietnamese	5	0.2475	0.2055	0	0.48	0.255

Note. The NA values were ignored during the calculation of the standard deviation

Additionally, the average share of vegetarian dishes equals 0.35 (*SD* = 0.24), meaning that, on average, 35% of a restaurant's menu consisted of vegetarian dishes. Moreover, the mean of vegetarian cuisines equals 0.03 (*SD* = 0.16), indicating that only 3% of the total sample belongs to a cuisine related to vegetarian food.

The cognitive association between different cuisine types and vegetarianism is investigated in Appendix A. This resulted in the finding that only the Indian cuisine is related to vegetarianism, while all other cuisines are related to pescetarianism or omnivorism. Table 5 shows the descriptive statistics for the share of vegetarian dishes per cuisine type, allowing insight into which type of kitchen truly serves more vegetarian dishes. As can be seen, the vegetarian cuisine type shows the highest mean percentage of vegetarian dishes (*M* = 0.25, *SD* = 0.21). After that, the cuisine types of lunch and coffee show the highest mean percentages of vegetarian dishes, respectively 0.54 (*SD* = 0.22) and 0.52 (*SD* = 24). The lowest mean percentage of vegetarian dishes can be seen in the chicken, fish, and Chinese cuisines, respectively 0.05 (*SD* = 0.07), 0.06 (*SD* = 0.07), and 0.08 (*SD* = 0.03). Interestingly, nine cuisine types have a maximum score of 1, indicating that at least one restaurant belonging to these cuisine types has a menu consisting of 100% vegetarian dishes. These cuisine types are the following: coffee, French, Indian, international, Italian, lunch, Middle Eastern, pub, and vegetarian.

In Chapter 3.3, it is explained that the variable sustainable innovations was divided into three categories based on the framework by Maynard et al. (2020). These categories are as follows: water, energy, and gas supply; menu and food waste; and waste reduction, construction materials, chemicals, employees, and social sustainability. Below, Table 6 shows the frequency table, which depicts how many sustainable innovations were found on the restaurants' websites, divided by category. It should be noted that a high frequency of zero-values is present in all rows, and specifically in the sum of total innovations row. As previously explained, this excess of zeroes justifies the use of a zero-inflated regression model. Note that the sum of values within the columns of the second to fifth rows does not equal the value in the same column in the first row. This is because a restaurant showing both one innovation in Category 1 and one in Category 2, shows a value of 2 for the sum of total innovations.

Table 6

Frequency table depicting the distribution of total innovations and innovations within Category 1-3

	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**11**	**17**
Sum of total innovations	337	74	38	18	12	13	7	4	4	3	1	1
Sum of Category 1 innovations	492	9	9	1	1							
Sum of Category 2 innovations	364	84	32	18	12	2						
Sum of Category 3 innovations	425	46	16	11	6	5	2	-	1			

Interestingly, Category 2 was seen most often, summing to a total of 260 occurrences. Category 1 was depicted least often, summing to a total of 34 occurrences, whereas Category 3 was depicted a total of 180 times. In total, 474 sustainable innovations were found throughout the restaurants included in the sample.

Within Category 1, the innovation adopted most often is using renewable energy, which 16 restaurants adopted. Within Category 2, the innovation that was implemented most often was the use of local suppliers. A total of 75 restaurants mentioned that they got their products from local suppliers. The second most implemented sustainable innovation was the use of biological food. In total, 64 restaurants declared that they were using biological food. The third most implemented sustainable innovation within Category 2 was using seasonal products or changing their menus based on what is seasonally available. This was done by 54 restaurants. Within Category 3, most restaurants adopted the practice of aiming for waste reduction. A total of 43 restaurants did this in multiple ways, for example, by actively encouraging guests to decrease food waste.

Cupp is an example of a coffee shop with a good waste management program. They actively focus on decreasing the use of plastics, using coffee cups made of coffee grounds, and working with Fungi Factory, a company that yields oyster mushrooms on coffee grounds (Cupp, n.d.). Cupp is a coffee place; thus, the cuisine type does not specifically match the hypothesis. Additionally, the average price is €10.-, which is relatively low compared to the mean price level of the entire sample. The name is neither sustainability congruent nor incongruent nor does Cupp have a Michelin star. Moreover, the building Cupp is located in was built after 1950. Therefore, some characteristics of Cupp are congruent with sustainability, but some are not.

As explained, through an exploratory interview with the owner of a sustainable restaurant, it was checked whether the operationalization and the use of the variables mentioned in Chapter 3.3 made sense for industry experts. Subsequently, several trends were discussed within the hospitality industry. It was mentioned that offering more vegetarian options, using biological products, and getting one's products from local suppliers is becoming increasingly popular (Interviewee 1, 2023). This is also confirmed by the Terrasgids (Entree Magazine, 2023a) and the Trendguide (Entree Magazine, 2023b), which both mention vegan food a total of five times. Additionally, they highlight the importance of including sustainability as a core feature for a restaurant in general.

The frequency table shows two main outliers: one restaurant adopting 17 sustainable innovations and another one adopting 11 innovations. Three restaurants adopted nine sustainable innovations, while four restaurants adopted eight sustainable innovations. The restaurant that shows the most sustainable innovations is The Green House, a circular restaurant that focuses on sustainability, showing 17 sustainable innovations in total. Their ingredients are either from the region of Utrecht or from their own Urban Farm (The Green House, n.d.). Additionally, they focused on creating a fully circular building for their restaurant, which encompasses the use of many reusable materials for its creation and renewable energy for its business operations.

Lastly, The Green House also focuses on employing people at a distance from the labor market by cooperating with The Colour Kitchen. Interestingly, the Green House is a temporary restaurant meant to quit after 15 years. The Green House has a cuisine related to vegetarianism, a sustainability-congruent name, a share of 100% vegetarian dishes on their menu, and an average price level of €21.25, with a Google Maps price indicator of 2 €-signs. The Green House is 324 meters away from Utrecht central station, having a central location in the city close to de Jaarbeurs and de Rabobank. The building in which The Green House is situated was built in 2018 and looks modern. Therefore, some characteristics of The Green House, i.e., the share of vegetarian dishes, sustainability-congruent name, and having a cuisine related to vegetarianism, are in line with the hypotheses that these characteristics are positively related to the adaptation of sustainable innovations.

The restaurant that showed the second most sustainable innovations is KEEK, which has adopted 11 sustainable innovations. These innovations include using renewable energy, attempting to produce zero waste, using bio fair wear shirts, and using 100% biological products. KEEK does not have a cuisine related to vegetarianism nor a sustainability-congruent name. However, it does have a share of 100% vegetarian dishes on its menu, and its average price level is €10.63, with a Google Maps price indicator of 2 €-signs. KEEK is 1.15 kilometers away from Utrecht central station, which is still less than the mean distance of restaurants in the sample to the central station. KEEK's characteristics are also partly in line with Hypothesis 1, namely that restaurants with a high percentage of vegetarian dishes, a lower price level, or situated in an old building show a higher number of sustainable innovations. Pictures of both The Green House and KEEK can be found in Appendix G to highlight how the exterior differs for the two most sustainable restaurants in the data sample. The Green House is situated in a very modern building, whereas KEEK is situated in a classic old building in the city center of Utrecht.

Table 7 shows the correlation matrix for the dependent, independent, and control variables used to test Hypotheses related to the restaurant sector. Interestingly, the variables on the neighborhood level, distance to the city center, percentage of high incomes, political orientation, and percentage of people with a Dutch background have a higher correlation with one another than any other variables do. However, because these data points are used as control variables, the high correlation does not pose a threat of multicollinearity.

Table 7

Correlation matrix concerning the dependent, independent, and control variables related to the restaurant data set

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Sum of sustainable innovations	-													
2 Vegetarian cuisines	0.27	-												
3 Share of vegetarian dishes	0.50	0.30	-											
4 Average price level	-0.06	-0.03	-0.25	-										
5 Google Maps price category	0.08	0.05	0.04	0.13	-									
6 Sustainability congruent name	0.23	0.05	0.28	0.10	0.07	-								
7 Sustainability incongruent name	-0.05	-0.03	-0.15	-0.01	0.05	-0.04	-							
8 Michelin star	0.06	-0.03	0.00	0.27	0.04	0.19	-0.02	-						
9 New building	0.11	0.06	0.05	-0.01	0.08	0.01	0.04	-0.03	-					
10 Number of reviews	-0.05	-0.00	-0.07	0.13	0.07	-0.04	-0.05	-0.05	-0.02	-				
11 Chain	0.16	0.14	0.18	-0.23	-0.11	-0.07	0.04	-0.09	0.12	0.11	-			
12 Distance to city center	-0.02	-0.07	-0.00	-0.01	0.04	0.01	-0.01	-0.02	0.34	-0.21	-0.03	-		
13 Percentage of high incomes	0.16	-0.04	0.00	-0.06	0.04	0.02	0.03	-0.00	0.15	-0.14	0.14	0.33	-	
14 Leftist voting intensity	-0.11	-0.07	0.01	0.01	-0.05	-0.04	-0.04	-0.03	0.02	0.02	-0.19	-0.25	-0.68	-
15 Percentage of people with a Dutch background	0.04	-0.03	0.07	-0.05	-0.09	0.07	-0.06	0.07	-0.32	-0.03	0.01	-0.24	0.41	-0.28

Descriptive results concerning the hotel data sample

For the analyses concerning the hotel sector, a full sample of hotels within the province of Utrecht was analyzed based on the hotels listed on Booking.com. The descriptive statistics can be seen in Table 8, and the correlation matrix can be seen in Table 9. The initial sample included 391 accommodations. However, once only hotels were selected, 111 accommodations were left. Three hotels were excluded from the sample because they had either not been opened yet or had already been shut down. As a result, the final sample included 108 hotels.

As can be seen, the average sustainability score was 1.79 (*SD* = 1.65). The specific sustainability steps that a hotel was evaluated upon were also depicted on Booking.com. The main sustainability categories were the following: waste, water, energy and greenhouse gases, destination and community, and nature. The waste category included measures such as not using single-use plastic or having recycling bins. The water category, on the other hand, involved measures such as having water-efficient toilets and showers. The energy and greenhouse gases step focused on using 100% renewable energy, having an electric car charging station, and offering vegetarian and vegan menu options. The destination and community part included measures such as investing a percentage of the profits back into the community or sustainability projects and providing guests with information about the local ecosystems, culture, and history. This category is especially important because it focuses on the social dimension of sustainability. Lastly, the nature column focused on offsetting a part of the hotel's carbon footprint, having green spaces at the property, and not keeping wild animals.

Initially, data was also collected concerning the (vegetarian) cuisines of in-house hotel restaurants and whether hotels had a sustainability incongruent name. However, it was found that only one hotel had an in-house restaurant with a vegetarian cuisine, and only three hotels had a sustainability-incongruent name.

Table 8

Descriptive statistics of the variables used to analyze the hotel sector

	N	Mean	SD	Min	Max	Median
Sustainability score	108	1.79	1.65	0	4	1
Mean review score	107	8.23	0.68	5.7	9.6	8.3
Average price level	108	147.08	44.16	74.43	290	141
Sustainability congruent name	108	0.14	0.35			
New building	108	0.49	0.50			
Number of reviews	107	1299.2	1416.36	29	10079	841
Chain	108	0.30	0.46			
Capital city	108	0.40	0.49			
Star rating	88	3.51	0.74	1	5	4

Note. The NA values were ignored for the calculation of the standard deviation

Table 9

Correlation matrix concerning the dependent, independent, and control variables related to the hotel data set

	1	2	3	4	5	6	7	8	9
1 Sustainability score	-								
2 Mean review score	0.07	-							
3 Average price level	0.03	0.42	-						
4 Sustainability congruent name	0.06	0.04	0.02	-					
5 New building	0.16	-0.14	-0.16	-0.01	-				
6 Number of reviews	0.40	-0.04	0.12	-0.07	0.34	-			
7 Chain	0.30	-0.20	-0.06	-0.17	0.61	0.41	-		
8 Capital city	0.13	0.02	0.49	-0.15	-0.11	0.32	0.05	-	
9 Star rating	0.30	0.42	0.43	-0.12	-0.03	0.13	0.15	0.06	-

As a result, it was decided that these variables would not be included in the regression analyses and are therefore not included in the descriptive statistics either. Interestingly, the one hotel that did have an in-house restaurant that focused on the vegetarian cuisine also had a sustainability score of 4. Lastly, it is also notable that one hotel missed a mean review score, one hotel missed the number of reviews, and 22 hotels missed a star rating on Booking.com. As can be seen in Table 8, 14% (*SD* = 0.35) of all hotels had a sustainability congruent name, and 49% (*SD* = 0.50) of all hotels were located in a building built after 1950.

The correlation matrix can be seen in Table 9. It is important to note that whether a hotel is situated in the capital city, i.e., the city of Utrecht, and the average price level of a hotel are moderately positively correlated. This indicates that a hotel situated within the capital city is associated with having a higher price level. Additionally, whether a restaurant is part of a chain and whether it is situated in a newer building is also moderately positively correlated.

4.2 Regression results concerning Hypothesis 1

Regression results concerning Hypothesis 1A

The results of the count regressions related to Hypothesis 1A can be seen in Table 10A, and the results of the zero-inflation model coefficients can be seen in Table 10B. The count model coefficients show the effects of the independent and control variables on the sum of adopted sustainable innovations. In contrast, the zero-inflation model coefficients show the effects of the independent and control variables on the excess zeroes. The effects of specific variables discussed in this section are all considering that all other variables are held constant.

The log-likelihood values of the models range between -456.3 and -616.6, indicating that Model 2B has the best fit to the data and Model 4 has the worst fit. The AIC values range from 946.51 to 1267.22, whereas the BIC values range from 1070.85 to 1339.27. These minima and maxima values also indicate that Model 2B has the best fit of data and Model 4 the worst. All models incorporating the independent variables have scores closer to zero for Log-Likelihood, AIC, and BIC compared to the control variables model.

Table 10A

Count regression results concerning H1A

	CV	**Model 1A** Vegetarian cuisine	**Model 1B** Share of vegetarian dishes	**Model 2A** Average price level	**Model 2B** GM price category	**Model 3** Sustainability congruent name	**Model 4** Sustainability incongruent name	**Model 5** Michelin star	**Model 6** New building
Intercept	-3.86	-5.80	-5.77	-3.05	3.10	-3.69	-4.97	-4.34	-4.37
	(6.58)	*(5.65)*	*(4.72)*	*(6.30)*	*(16.14)*	*(6.59)*	*(7.06)*	*(7.03)*	*(3.54)*
Independent variable									
		1.09**	2.03***	-0.02	0.84	1.02***	-1.00*	0.65	0.70**
		(0.33)	*(0.32)*	*(0.02)*	*(2.77)*	*(0.27)*	*(0.44)*	*(0.44)*	*(0.22)*
Control variables									
Number of reviews	0.28	0.30	0.49**	0.29	0.38	0.37*	0.28	0.30	0.37
	(0.22)	*(0.21)*	*(0.16)*	*(0.15)*	*(0.31)*	*(0.18)*	*(0.29)*	*(0.22)*	*(0.19)*
Chain	0.37	0.38	0.29	0.23	0.78	0.56	0.37	0.41	0.35
	(0.39)	*(0.34)*	*(0.26)*	*(0.41)*	*(1.61)*	*(0.34)*	*(0.38)*	*(0.42)*	*(0.33)*
Distance to city center	-0.12	-0.11	-0.08	-0.13	-0.21	-0.09	-0.09	-0.12	-0.16
	(0.12)	*(0.10)*	*(0.08)*	*(0.12)*	*(0.32)*	*(0.11)*	*(0.13)*	*(0.12)*	*(0.10)*
Percentage of high incomes	0.03	0.04	0.06**	0.03	0.05	0.03	0.04	0.04	0.02
	(0.03)	*(0.03)*	*(0.02)*	*(0.06)*	*(0.07)*	*(0.03)*	*(0.04)*	*(0.03)*	*(0.02)*
Leftist voting intensity	0.07	0.10	0.08	0.06	0.01	0.06	0.09	0.08	0.06
	(0.09)	*(0.08)*	*(0.06)*	*(0.09)*	*(0.17)*	*(0.09)*	*(0.10)*	*(0.10)*	*(0.05)*
Percentage of inhabitants with a Dutch background	-0.01	-0.01	-0.02	-0.01	0.01	-0.01	-0.01	-0.01	0.00
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.02)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Ln(theta)	-0.21	0.01	1.04**	-0.27	-0.16	0.07	-0.11	-0.17	-0.04
	(0.38)	*(0.39)*	*(0.36)*	*(0.37)*	*(0.49)*	*(0.35)*	*(0.41)*	*(0.38)*	*(0.36)*
LogLik	-617.5	-611.5	-484.1	-525.4	-456.3	-602.8	-616.6	-615.3	-612.6
AIC	1265.02	1257.07	1002.20	1084.97	946.51	1239.53	1267.22	1264.60	1259.26
BIC	1328.59	1329.12	1070.85	1153.29	1012.39	1311.58	1339.27	1336.65	1331.31
Obs	512	512	419	411	356	512	512	512	512

Table 10B

Zero-inflation model coefficients concerning H1A

	CV	**Model 1A**	**Model 1B**	**Model 2A**	**Model 2B**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		Vegetarian cuisine	Share of vegetarian dishes	Average price level	GM price category	Sustainability congruent name	Sustainability incongruent name	Michelin star	New building
Intercept	-4.61	-5.55	-14.60	-10.94	11.36	-10.51	-5.87	-4.34	-4.02
	(11.1)	*(8.46)*	*(10.40)*	*(22.22)*	*(19.35)*	*(9.46)*	*(8.41)*	*(10.44)*	*(9.33)*
Independent variables									
		-0.74	-4.69***	-0.01	0.57	-8.63*	-11.70	-1.42	0.75
		(0.90)	*(1.00)*	*(0.05)*	*(19.20)*	*(4.30)*	*(7.18)*	*(0.97)*	*(0.63)*
Control variables									
Number of reviews	0.24	0.24	0.22	0.38	0.78	0.28	0.24	0.27	0.34
	(0.29)	*(0.24)*	*(0.24)*	*(0.23)*	*(1.23)*	*(0.22)*	*(0.33)*	*(0.27)*	*(0.26)*
Chain	-1.72	-1.41*	-0.48	-1.54	1.03	-1.23	-1.61	-1.66	-1.61
	(1.12)	*(0.70)*	*(0.41)*	*(1.04)*	*(2.92)*	*(0.65)*	*(1.39)*	*(1.02)*	*(0.57)*
Distance to city center	-0.19	-0.15	-0.16	-0.33	-1.03	-0.15	-0.10	-0.19	-0.23
	(0.20)	*(0.18)*	*(0.18)*	*(0.49)*	*(2.92)*	*(0.22)*	*(0.18)*	*(0.19)*	*(0.25)*
Percentage of high incomes	-0.06	-0.05	0.01	0.07	-0.02	-0.04	-0.04	-0.06	-0.07
	(0.08)	*(0.05)*	*(0.04)*	*(0.13)*	*(0.07)*	*(0.06)*	*(0.09)*	(0.07)	*(0.05)*
Leftist voting intensity	0.06	0.08	0.22	0.14	-0.30	0.14	0.08	0.06	0.04
	(0.14)	*(0.11)*	*(0.14)*	*(0.28)*	*(1.38)*	*(0.12)*	*(0.11)*	*(0.13)*	*(0.13)*
Percentage of inhabitants with a Dutch background	0.02	0.02	0.03	0.05	0.08	0.03	0.02	0.02	0.03
	(0.04)	*(0.03)*	*(0.03)*	*(0.10)*	*(0.59)*	*(0.04)*	*(0.03)*	*(0.04)*	*(0.03)*

As can be seen, Hypothesis 1A is partly confirmed through the regression analyses. Both versions of Model 1 show a significant result: the variable vegetarian cuisines is positively significant at a .01 level, and the share of vegetarian dishes is positively significant at a .001 level. This indicates that these variables positively affect the extent to which sustainable innovations are implemented and are, therefore, significant predictors. The results are similar to those from the full model, as seen in Tables D1 & D2. The main difference is that the full model new building is no longer a significant predictor, indicating that caution should be taken when interpreting the result for that variable.

A restaurant cognitively related to vegetarian cuisines, i.e., either the Indian or vegetarian cuisine, has an expected log sum of sustainable innovations of 1.09 higher than that of restaurants that are not cognitively congruent with these cuisines. Also, the expected change for the log of the number of sustainable innovations for a one-unit increase in vegetarian dishes is 2.03. However, a one-unit increase in vegetarian dishes would be a 100% increase, which is often not possible unless a restaurant's initial position is to have zero vegetarian dishes on its menu. Therefore, it is more sensible to interpret this result as the log of the number of sustainable innovations increasing by 0.20 with every 10% increase in vegetarian dishes on a restaurant's menu.

Both versions of Model 2 show a non-significant result, meaning that neither the Google Maps price category nor the average price level significantly affects the extent to which sustainable innovations are implemented by restaurants. Moreover, having a sustainability congruent name displays a positive significant result at a .001 level, providing evidence for Model 3. This means that having a sustainability congruent name is a significant predictor of the number of sustainable innovations a restaurant presents on its website. When a restaurant carries a sustainability-congruent name, they have a log of sustainable innovations that is 1.02 times higher compared to restaurants that do not have sustainability-congruent names.

Additionally, having a sustainability incongruent name is also significant at a .05 level, confirming the significance of Model 4. Restaurants with such a name adopted a log of sustainable innovations that were -1.00 lower compared to restaurants that did not have a sustainability incongruent name. Lastly, new building is also significant at a .01 level, indicating that restaurants situated in newer buildings have a significant positive effect on the number of implemented sustainable innovations. Restaurants situated in buildings built after 1945 have a log of sustainable innovations 0.70 times higher than those built before 1945.

It is interesting to note that one of the theta coefficients is significant at a .01 level. This indicates that, for this model, overdispersion is present even after the zero-inflation model accounted for the excess zeroes. Therefore, this highlights the importance of using a (zero-inflated) negative binomial distribution rather than a (zero-inflated) Poisson distribution.

Concerning the zero-inflation model, as depicted in Table 10B, it is interesting to note that the share of vegetarian dishes and carrying a sustainability congruent name both show a significant negative result, respectively, at a .001 level and a .05 level. This indicates that the share of vegetarian dishes and having a sustainability congruent name negatively affect the excess zeroes present in the data concerning the sum of sustainable innovations. This means that the higher the share of vegetarian dishes, the less likely it is that a restaurant has no single sustainable innovation.

Similarly, the log odds of being an excessive zero significantly decreases by 8.63 when a restaurant has a sustainability-congruent name, compared to not having a sustainability-congruent name. Therefore, having a sustainability congruent name is positively related to having a non-zero value.

Moreover, the same regressions as stated in Tables 10A & 10B were run, taking the sum of Category 1 and 2 sustainable innovations as dependent variables and the sum of Category 3 sustainable innovations as the dependent variables. The results can be seen in Appendix E. The results in Tables E1 and E2 confirm that the variables vegetarian cuisine, the share of vegetarian dishes, having a sustainability congruent name, having a sustainability incongruent name, and being in a new building are all significant positive predictors of the sum of Category 1 & 2 sustainable innovations, similar to the results in Table 10A. It is interesting to note that the coefficients in the count model are all of a lesser magnitude than the ones stated in Table 10A. Additionally, in Table E1, it is shown that the Google Maps price category and having a Michelin star are both positive significant predictors of the sum of adopted Category 1 & 2 sustainable innovations. Furthermore, all tables have a better model fit than the models in Table 10A. The variables significantly affecting the zero counts are the share of vegetarian dishes and the Google Maps price category. This highlights that these variables greatly impact the dependent variable because they are included in both the count model and the zero-count model.

Moreover, Tables E3 & E4 show that specific characteristics, such as vegetarian cuisine, the share of vegetarian dishes, sustainability congruent name, and sustainability incongruent name, also significantly affect the sum of Category 3 sustainable innovations. Interestingly, being in a newer building ceased to be a significant predictor, while the average price level did show a significant adverse effect. For every one-unit increase in the average price level, the log of the sum of sustainable innovations decreases by 0.05. Compared to the models stated in Tables E3 & E4, the models stated in Tables 10A, 10B, E1 & E2, have the best model fit.

The specifications for Model 1A can be seen in Tables 11A & 11B, depicting the specific effect of having an Italian cuisine, French cuisine, or being a pub, coffee café, or lunch café. All models are based on 512 observations, and their Loglikelihood values range from -612.3 to 616. Additionally, the AIC values range from 1265.34 to 1257.2, whereas the BIC values range from 1330.7 to 1338.07. The variables Italian cuisine, Indian, and French cuisine all show significant results: the first two show a significant negative result for the count model, whereas the latter shows a significant negative result for the zero-inflation model. This indicates that restaurants associated with the Italian or Indian cuisine tend to adopt less sustainable innovations. Restaurants associated with the French cuisine tend to have a negative effect on the excess-zeroes present in the data. Therefore, restaurants with the French cuisine are more likely to exhibit values for sustainable innovations higher than zero.

Table 11A

Count regression results concerning the specification of Model 1A

	Italian cuisine	**French cuisine**	**Indian cuisine**	**Pub**	**Coffee**	**Lunch**
Intercept	-4.49	-3.99	-3.94	-3.50	-4.05	-3.34
	(6.19)	*(5.59)*	*(6.57)*	*(6.16)*	*(7.00)*	*(5.99)*
Independent variable						
Cuisine type	-1.42*	-0.44	-1.92**	0.02	0.12	0.28
	(0.58)	*(0.40)*	*(0.73)*	*(0.39)*	*(0.22)*	*(0.36)*
Control variables						
Number of reviews	0.36*	0.01	0.30	0.26	0.36	0.37*
	(0.17)	*(0.08)*	*(0.21)*	*(0.15)*	*(0.21)*	*(0.16)*
Chain	0.51	0.34	0.39	0.37	0.40	0.37
	(0.37)	*(0.38)*	*(0.38)*	*(0.40)*	*(0.44)*	*(0.27)*
Distance to city center	-0.12	-0.05	-0.12	-0.13	-0.14	-0.15
	(0.11)	*(0.11)*	*(0.12)*	*(0.11)*	*(0.12)*	*(0.11)*
Percentage of high incomes	0.04	0.03	0.03	0.03	0.04	0.04
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*
Leftist voting intensity	0.07	0.07	0.07	0.06	0.07	0.06
	(0.09)	*(0.08)*	*(0.09)*	*(0.09)*	*(0.10)*	*(0.08)*
Percentage of inhabitants with a Dutch background	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.02)*	*(0.01)*
Ln(theta)	0.10	-0.54*	-0.17	-0.28	-0.10	-0.10
	(0.38)	*(0.21)*	*(0.39)*	*(0.37)*	*(0.36)*	*(0.30)*
LogLik	-612.3	-614.6	-616	-613.9	-615.7	-611.6
AIC	1258.65	1263.28	1266.02	1261.74	1265.34	1257.21
BIC	1330.7	1335.33	1338.07	1333.79	1337.39	1329.27
Obs	512	512	512	512	512	512

Table 11B

Zero-inflation model coefficients concerning the specification of Model 1B

	Italian cuisine	**French cuisine**	**Indian cuisine**	**Pub**	**Coffee**	**Lunch**
Intercept	-4.14	-6.25	-5.03	-5.06	-3.68	-2.74
	(7.13)	*(12.17)*	*(10.37)*	*(13.20)*	*(10.44)*	*(7.14)*
Independent variable						
Cuisine type	-1.19	-8.08***	0.15	1.12	-1.29	-9.73
	(3.11)	*(2.37)*	*(1.79)*	*(1.06)*	*(2.22)*	*(15.99)*
Control variables						
Number of reviews	0.31	-1.32	0.26	0.17	0.23	0.23
	(0.25)	*(2.23)*	*(0.25)*	*(0.22)*	*(0.25)*	*(0.17)*
Chain	-1.26	-13.34***	-1.67	-1.59	-1.27	-1.33*
	(0.65)	*(1.18)*	*(1.09)*	*(1.09)*	*(0.68)*	*(0.58)*
Distance to city center	-0.13	-0.21	-0.18	-0.21	-0.21	-0.25
	(0.19)	*(0.28)*	*(0.20)*	*(0.41)*	*(0.29)*	*(0.16)*
Percentage of high incomes	-0.03	-0.13	-0.06	-0.08	-0.05	-0.05
	(0.04)	*(0.08)*	*(0.08)*	*(0.13)*	*(0.05)*	*(0.04)*
Leftist voting intensity	0.05	0.09	0.07	0.07	0.05	0.03
	(0.10)	*(0.16)*	*(0.13)*	*(0.17)*	*(0.14)*	*(0.09)*
Percentage of inhabitants with a Dutch background	0.02	0.05	0.03	0.03	0.02	0.03
	(0.03)	*(0.06)*	*(0.04)*	*(0.06)*	*(0.04)*	*(0.03)*

Regression results concerning Hypothesis 1B

The regression results concerning H1B can be seen in Table 12 and were based on the Ordinal Logistic Regression model. None of the independent variables show a significant result, indicating that H1B is rejected. Interestingly, the number of reviews does show a significant result at a .001 level. The coefficients range from 0.83 to 0.86. This indicates that for every 1000 unit increase in the number of reviews, the odds of acting at least a little bit on sustainability (i.e., having a sustainability score of either 1, 2, 3, or 4 versus having one of 0 increases between 129% and 136%.

Moreover, an OLR model assumes that there are certain cutpoints that indicate where the latent variable is divided into to create the groups in the data. In Table 12, these variables are presented by the rows underneath *Intercepts*. These variables represent a threshold in the logistic distribution but do not hold any further importance to interpreting the analysis. As seen in Table D3, the full model shows the same results as Table 12, indicating that none of the independent variables are significant predictors and that the number of reviews is a positive significant predictor, with a coefficient of 0.86. This validates the results depicted in Table 12.

Table 12
Regression results concerning H1B

	CV	Model 2	Model 3	Model 5
		Price level	Sustainability congruent name	New building
Independent variables				
		-0.16	0.75	-0.14
		(0.21)	*(0.52)*	*(0.46)*
Control variables				
Number of reviews	1.18***	1.17***	0.85***	0.86***
	(0.34)	*(0.33)*	*(0.24)*	*(0.25)*
Chain	0.42	0.40	0.54	0.50
	(0.47)	*(0.48)*	*(0.48)*	*(0.53)*
Capital city	0.13	0.31	0.19	0.11
	(0.39)	*(0.45)*	*(0.39)*	*(0.39)*
Intercepts				
0/1	-0.86	-0.28	0.37	0.20
	(0.31)	*(0.73)*	*(33)*	*(0.32)*
1/2	1.31***	0.80	1.48***	1.27***
	(0.33)	*(0.73)*	*(0.35)*	*(0.35)*
2/3	1.84***	1.34	2.03***	1.81***
	(0.35)	*(0.74)*	*(0.38)*	*(0.37)*
3/4	2.18***	1.67*	2.37***	2.15***
	(0.37)	*(0.75)*	*(0.40)*	*(0.39)*
LogLik	-141.35	-141.05	-140.34	-141.30
AIC	296.69	298.41	296.67	298.60
BIC	315.40	319.48	318.06	319.98
Obs	107	107	107	107

4.3 Regression results concerning Hypothesis 2

Regression results concerning Hypothesis 2A

The regression results testing H2A are shown in Table 13. As explained in Chapter 3.1, the regressions run to test H2A were based on the ordinary least squares distribution with clustered standard errors taken into account. The residual standard errors of the regressions range from 0.31 to 0.36. The R-squared values range from 0.06 to 0.10, meaning the models explain about 6-10% of the variability observed in the dependent variable. Interestingly, Model 2B has a lower R-squared value compared to the model that only incorporated the control variables. Lastly, the F-statistic values range from 2.57 to 5.36. They are all significant at a .001 level, indicating that for all models, at least one independent or control variable is significantly related to the dependent variable.

As explained in Chapter 3.3, the product variable in Table 13 refers to the product of the sustainable innovations variable multiplied by the independent variable of interest of the specific model.

Table 13

Regression results concerning H2A

	CV	**Model 1A** Vegetarian cuisines	**Model 1B** Share of vegetarian dishes	**Model 2A** Average price level	**Model 2B** GM price category	**Model 3** Sustainability congruent name	**Model 4** Sustainability incongruent name	**Model 5** Michelin star	**Model 6** New building
Intercept	1.75**	1.79**	1.82**	1.93*	2.05**	1.69**	1.69**	1.62*	1.64*
	(0.65)	*(0.65)*	*(0.68)*	*(0.78)*	*(0.68)*	*(0.65)*	*0.64)*	*(0.63)*	*(0.71)*
Independent variables									
Product variable		-0.03	-0.04**	-0.00	-0.01	-0.03**	-0.21	-0.21	-0.01
		(0.02)	*(0.01)*	*(0.00)*	*(0.02)*	*(0.01)*	*(0.15)*	*(0.15)*	*(0.01)*
Sustainable innovations	0.02*	0.03***	0.03*	0.03**	0.02	0.02***	0.02*	0.02*	0.03**
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.02)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Independent variable		0.03	0.28***	0.03**	0.03	0.17**	-0.05	0.30***	-0.09
		(0.16)	*(0.08)*	*(0.01)*	*(0.06)*	*(0.05)*	*(0.15)*	*(0.06)*	*(0.09)*
Control variables									
Number of reviews	-0.04	-0.04	-0.05	-0.07	-0.02	-0.04	-0.04	-0.04	-0.04
	(0.03)	*(0.03)*	*(0.04)*	*(0.04)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.16)*	*(0.03)*
Chain	-0.06*	-0.07*	-0.07**	-0.05	-0.04	-0.07*	-0.06*	-0.04	-0.05*
	(0.03)	*(0.03)*	*(0.02)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.02)*
Distance to city center	0.05	0.05	0.04	0.05	0.06	0.05	-0.06	-0.05	0.06
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*
Percentage of high incomes	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Leftist voting intensity	0.03***	0.03**	0.03**	0.03*	0.02*	0.03***	0.03***	0.03***	0.03**
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Percentage Dutch background	0.01***	0.01***	0.01***	0.01***	0.01**	0.01***	0.01***	0.01***	0.01***
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Residual SE	0.36	0.36	0.34	0.33	0.31	0.36	0.36	0.36	0.36
R2	0.07	0.07	0.10	0.09	0.06	0.07	0.08	0.09	0.08
F	5.25***	4.27***	5.36***	4.40***	2.57***	4.34***	4.59***	4.76***	4.83***
Obs	512	512	419	411	356	512	512	512	512

For Model 1A, this means that the product variable refers to the product of the sum of sustainable innovations multiplied by the dummy variable, vegetarian cuisines, and so forth. As can be seen, two product variables show a significant effect. However, the coefficient in these regressions is a negative one, whereas the expected relationship was a positive one. Therefore, the results in Table 13 reject H2A.

Although H2A is rejected, the regression analyses do provide interesting information concerning the effect of the number of total sustainable innovations on the dependent score. This relationship is a significant positive one for seven out of eight models at levels ranging from .001 to .05 level. This indicates that the more sustainable innovations a restaurant displays, the higher its mean review score will be. Moreover, it is also interesting to note that the share of vegetarian dishes, average price level, sustainability congruent name, and Michelin star have positive significant results on their own at either a .01 or .001 level, indicating that those variables are also significant positive predictors of the mean review score. This means that the higher these variables are, the higher the mean review score of a restaurant is. The absolute effect of the independent variables is higher for every model except for Model 2A.

Additionally, it is interesting to note that several control variables also show a significant effect on the mean review score. Namely, whether restaurants are part of a chain, the leftist voting intensity in a neighborhood, and the percentage of people with a Dutch background in a neighborhood are all significant predictors for the mean review score. Being part of a chain is a negative significant predictor, meaning that restaurants that are part of a chain tend to have a lower mean review score. Leftist voting intensity and the percentage of people with a Dutch background are both positive indicators of the mean review score at a .001 level.

Regression results concerning Hypothesis 2B

The regression results concerning H2B can be seen in Table 14 and were based on the OLS regression model. The multiple R-squared values range from 0.25 to 0.34, indicating that the models explain between 25% and 34% of the variation of the dependent variable, which is explained by the variance of the independent and control variables of the specific models. Additionally, all F-values are significant at a .001 level and range from 3.74 to 5.86. None of the product variables show a significant effect on the mean review score. Because of this, Hypothesis 2B is rejected. Still, the average price level does show a small significant effect on the mean review score at a .01 level. This indicates that for every 1-euro increase in the price level, the mean review score increases by 0.01.

Moreover, several control variables do show significant results as well. Whether a hotel is part of a chain shows a significant result at a .05 level, ranging from -0.37 to -0.42. This indicates that being part of a chain significantly negatively affects a hotel's mean review score, bringing down the mean review score anywhere between 0.37 and 0.42. Additionally, the variable star rating is significant, mainly at a .001 level and once at a .05 level. The coefficients range from 0.24 to 0.43, indicating that for every additional star a hotel is awarded, the mean review score is between 0.24 and 0.43 points higher. The full model, as shown in Table D4, shows the same variables to be significant predictors, as depicted in Table 14, thereby validating the results.

Table 14
Regression results concerning H2B

	CV	**Model 2**	**Model 3**	**Model 5**
		Price level	Sustainability congruent name	New building
Intercept	6.80***	6.34***	6.71***	6.75***
	(0.32)	*(0.34)*	*(0.33)*	*(0.35)*
Independent variables				
Product variable		-0.00	-0.09	0.01
		(0.00)	*(0.12)*	*(0.08)*
Independent variable		0.01**	0.31	0.08
		(0.00)	*(0.34)*	*(0.22)*
Sustainable innovations	0.00	0.23	0.01	-0.01
	(0.04)	*(0.14)*	*(0.05)*	*(0.06)*
Control variables				
Number of reviews	0.01	0.02	0.01	0.00
	(0.05)	*(0.05)*	*(0.05)*	*(0.05)*
Chain	-0.38*	-0.39*	-0.37*	-0.42*
	(0.15)	*(0.15)*	*(0.1)*	*(0.1, 9)*
Star rating	0.41***	0.24*	0.43***	0.42***
	(0.09)	*(0.10)*	*(0.09)*	*(0.09)*
Capital city	-0.01	-0.22	0.01	0.00
	(0.14)	*(0.16)*	*(0.14)*	*(0.15)*
Multiple R2	0.25	0.34	0.26	0.25
F	5.34***	5.86***	3.88***	3.74***
Obs	87	87	87	87

4.4 Regression results concerning Hypothesis 3

Regression results concerning Hypothesis 3A

The regression results for H3A can be seen in Table 15. The models were run based on the OLS distribution and taking clustered standard variables into account based on restaurants' postcodes. The models have R-squared values ranging from 0.123 to 0.129 and F-values ranging from 8.74 to 9.17, all of which are significant. This indicates that all models have at least one statistically significant variable. The only significant predictor of a restaurant's mean price concerning the product variables is found in Model 1B. The combination of having a higher share of vegetarian dishes and engaging in sustainable innovations has a positive effect on the mean price level of a main dish. Interestingly, the share of vegetarian dishes on its own is a significant negative predictor of a restaurant's mean price level with a much larger magnitude in the coefficient.

Table 15

Regression results concerning H3A

	CV	**Model 1A**	**Model 1B**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		Vegetarian cuisine	Share of vegetarian dishes	Sustainability congruent name	Sustainability incongruent name	Michelin star	New building
Intercept	4.20***	4.11***	3.50***	4.20***	4.17***	4.01***	4.20***
	(0.85)	*(0.87)*	*(0.71)*	*(0.84)*	*(0.85)*	*(0.87)*	*(0.85)*
Independent variables							
Product variable		0.01	0.06**	0.01	0.03	-0.01	-0.01
		(0.03)	*(0.02)*	*(0.02)*	*(0.14)*	*(0.02)*	*(0.02)*
Independent variable		0.07	-0.58***	0.08	0.05	0.58***	0.04
		(0.10)	*(0.13)*	*(0.10)*	*(0.07)*	*(0.09)*	*(0.03)*
Sustainable innovations		-0.01	-0.02	-0.02	-0.01	-0.01*	-0.01
		(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Control variables							
Number of reviews	0.14***	0.14***	0.12**	0.14***	0.14***	0.14**	0.14**
	(0.04)	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*
Chain	-0.20***	-0.20***	-0.14***	-0.19***	-0.20***	-0.17***	-0.20***
	(0.04)	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*
Distance to city center	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.02
	(0.02)	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*
Percentage of high incomes	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Leftist voting intensity	-0.02*	-0.02	-0.01	-0.02*	-0.02	-0.02	-0.02*
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Percentage Dutch background	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*	*(0.00)*
Multiple R2	0.11	0.11	0.16	0.11	0.11	0.15	0.11
F	5.51***	6.31***	34.26***	9.06***	3.75***	66.27***	6.28***
Obs	411	411	411	411	411	411	411

Additionally, it is interesting to note that having a Michelin star is a significant positive predictor as well, indicating that restaurants with a Michelin star usually have a higher mean average price level. Moreover, both the number of reviews and being in a chain are also significant predictors. The first is a positive significant predictor, meaning that the higher the number of reviews, the higher the mean review score of a restaurant. The latter is a negative significant predictor, meaning that when a restaurant is part of a chain, its mean price level is lower compared to its independent competitors.

Regression results concerning Hypothesis 3B

The regression results concerning H3B can be seen in Table 16. The multiple R-squared ranges from 0.50 to 0.51, and the F values range from 11.18 to 16.04. All F values are significant at a .001 level. Similar to the regression results concerning H3A, none of the product variables show a significant result, thereby rejecting H3B. Additionally, none of the independent variables show a significant result either.

Table 16

Regression results concerning H3B

	CV	**Model 3**	**Model 5**
		Sustainability congruent name	New building
Intercept	3.28***	3.27***	3.28***
	(0.28)	*(0.28)*	*(0.28)*
Independent variables			
Product variable		-0.02	-0.00
		(0.04)	*(0.03)*
Independent variable		0.14	0.00
		(0.11)	*(0.02)*
Sustainable innovations	-0.02	-0.02	-0.02
	(0.02)	*(0.02)*	*(0.02)*
Control variables			
Mean review score	0.13**	0.12**	0.13**
	(0.04)	*(0.04)*	*(0.04)*
Chain	-0.01	-0.00	-0.01
	(0.05)	*(0.05)*	*(0.06)*
Star rating	0.15***	0.16***	0.15***
	(0.03)	*(0.04)*	*(0.04)*
Capital city	0.30***	0.31***	0.30***
	(0.05)	*(0.05)*	*(0.05)*
Multiple R2	0.56	0.57	0.56
F	20.57***	15.09***	14.33***
Obs	87	87	87

However, it is interesting to note that two control variables do show significant results at a .001 level, and one control variable shows a significant result at a .01 level. Star rating has a positive significant result ranging from 0.20 to 0.21, indicating that with every increase in awarded stars, a hotel's price level goes up by between 22% and 23%. The significant coefficients related to a hotel's location being within the capital city range from 0.30 to 0.31, indicating that the expected geometric mean for the group of hotels being in the capital city is roughly between 35% and 36% higher. Lastly, the mean review score is also a significant positive predictor of a hotel's price level. The hotel's price level increases by 12-13% for every one-unit increase in the mean review score. The full model, shown in Table D5, shows results similar to those in Table 16, thereby supporting the findings.

Chapter 5 Discussion

5.1 Discussion concerning Hypothesis 1

Discussion concerning Hypothesis 1A

The most important results concerning H1A include the fact that the variables of having a vegetarian cuisine, the share of vegetarian dishes, having a sustainability congruent name, and being in a new building all significantly positively affect the sum of sustainable innovations found on a restaurant's website, whereas having a sustainability incongruent name significantly negatively affects this sum. Based on these results, H1A is supported by four out of six models. The results support the theory that congruency, in general, influences restaurants' decision to adopt or not adopt specific innovations based on whether these innovations are in line with their already existing characteristics. These results also confirm the idea that sustainable restaurants can be viewed as a separate category, with the core characteristics involving having a higher share of vegetarian dishes, having a sustainability congruent name, and being in newer buildings. Next to that, it also implies that the categorization theory, in general, is helpful in determining why certain restaurants adopt sustainable innovations and some do not.

Additionally, the share of vegetarian dishes and having a sustainability congruent name both negatively affect the excess zeroes present in the data; therefore, these variables increase the likelihood of being a non-zero observation. In other words, it means that the more vegetarian dishes are on a menu, the more likely it is that a restaurant does not have zero sustainable innovations, so therefore, it must have adopted at least one sustainable innovation. A similar reasoning follows the significant result of having a sustainability congruent name. Therefore, these results also suggest that restaurants that have characteristics congruent to sustainability are more likely to adopt sustainable innovations, which is in line with H1A.

Contrary to the hypothesized relationship, neither the average price level nor the Google Maps price indicator category were significant predictors of the sum of sustainable innovations. This might be because of the relatively high number of missing values, respectively 101 and 156, compared to the full sample. Of the subsample of restaurants that have missing values for the average price level, 23 out of 101 implemented sustainable innovations. The maximum of implemented sustainable innovations in this group was 5, and the mean was 0.59 (SD = 1.37). This indicates that the group of restaurants with missing values for their average price level may have a big influence on the overall correlations. This is similar to the subsample of restaurants with missing values for their Google Maps price indicator: 41 out of 156 restaurants in this subsample implemented sustainable innovations. The maximum number of sustainable innovations implemented was 8 in this group, with a mean of 0.66.

Still, the results in Tables E1, E2, E3 & E4 do suggest that a restaurant's mean price level and Google Maps price indicator have a significant effect. Tables E1 & E2 indicated that the variable Google Maps price category did show a significant positive effect on the dependent variable, in contrast to the variable of mean price level having a significant negative effect on the dependent variable in Tables E3 & E4. The latter could be because the regression models shown in Tables E3 & E4 examined the effect on Category 3 sustainable innovations. This category includes social sustainability. Therefore, it makes sense for the restaurants that show more sustainable innovations within Category 3 also to have a lower mean price level because that means that those restaurants are more accessible to customers with a lower income level.

The first finding can be explained by the fact that the sustainable innovations included in Category 1 & 2 do not specifically focus on social sustainability. Therefore, the restaurants that adopt these types of innovations probably do not care to focus on enabling people from a lower-income group also to visit those restaurants. However, the types of innovations included in Category 1 & 2 are more costly than those included in Category 3. Therefore, it makes sense for restaurants that adopt more Category 1 & 2 sustainable innovations to put relatively higher prices on their services because sustainable innovations also often require more money. The Google Maps price category is usually an indication of how expensive a restaurant is compared to similar restaurants in the same segment.

The dummy variable Michelin star also did not have a significant result, contrary to what was expected in H1A. A possible explanation is that only nine restaurants from the sample have a Michelin star or Bib Gourmand recognition. This means that not much information was available concerning sustainable innovations for these restaurants, especially considering five restaurants from this group had implemented sustainable innovations. When only 9 out of the 512 restaurants are in the treatment group, it is difficult to attach statistical significance to the outcome.

Moreover, having an Italian, French, or Indian cuisine also significantly affects the extent to which sustainable innovations are adopted. Restaurants that have an Italian cuisine are likely to implement less sustainable innovations. This is in line with the expectation that restaurants focusing on cuisines related to meat will show less sustainable innovations. However, contrary to the hypothesized relationship, having an Indian cuisine is negatively related to the sum of implemented sustainable innovations. This is interesting because the variable of vegetarian cuisines has a significant positive effect. This can be explained by the fact that the impact of having a cuisine classified as 'vegetarian' has a relatively large magnitude. Restaurants with a menu related to the French cuisine show fewer excess zeroes in the dependent variable, therefore showing more non-zero observations. This is not in line with the expectation that the French cuisine, because it focuses mainly on meat products, will show less sustainable innovations. This might be because, in total, 29 restaurants showcase the French cuisine. Of these, 11 restaurants offer at least one sustainable innovation, and of these, 7 restaurants show at least two innovations. Proportionally, this is a big portion of the total share of French cuisine restaurants. An explanation for this high presence of innovative activity could be that the French cuisine is also related to the nouvelle cuisine, known for its culinary innovation use (Myhrvold, 2021). Therefore, it would make sense if French restaurants in Utrecht were also more open to using innovative approaches, including sustainable innovations.

Discussion concerning Hypothesis 1B

The main results related to the hotel sector concern the fact that congruency between hotels' characteristics and sustainability does not significantly affect their sustainability score. Therefore, the results do not support the theory that having sustainability-congruent characteristics positively impacts the implementation of sustainable innovations within the hotel sector. The results did point out that the number of reviews positively affects a hotel's sustainability score. Moreover, as explained in Chapter 3.1, hotels often had a sustainability score of either 0 or 4. The group of hotels with a sustainability score of 0 included those that did not provide any information.

It makes sense that when a hotel does provide information concerning its sustainability operations, it would want to provide as much information as possible, thereby creating a score of 4. As a result, not many hotels get awarded a score of 2 or 3.

Furthermore, it was found that only one hotel within the sample had an in-house restaurant with a vegetarian cuisine. This could be because the guests visiting in-house restaurants might not care much about sustainability or the congruency between a hotel's characteristics and sustainability levels. As a result, hotels might not feel the need to match the cuisines of their in-house restaurants with their sustainability levels. Additionally, it was also found that only three hotels had a sustainability-incongruent name. This could be because of the same reasons. Another explanation could be that many of the sustainability-incongruent names found within the restaurant data sample, which can be seen in Appendix C, are related to unsustainable food categories. It makes sense that restaurant names might be related to (unsustainable) food categories. In contrast, hotels do not choose names related to food categories at all, thereby having fewer sustainability-incongruent names overall.

The finding that number of reviews is a significant positive predictor of a hotel's sustainability score indicates that the higher the number of reviews, the higher a hotel's sustainability score. However, the relationship between these two variables is not theoretically grounded. A possible explanation for this apparent relationship could be that an endogeneity issue is present, meaning that the dependent variable could influence the independent variable. This would imply that the higher the sustainability score of a hotel, the more reviews it would attract, based on the fact that environmental awareness increases a hotel's overall performance (Duric & Topler, 2021). This would make sense because the additional sustainability measures could convince guests to write a review. In Chapter 5.4, this potential endogeneity issue is discussed more thoroughly, and recommendations for future research are given.

5.2 Discussion concerning Hypothesis 2

Discussion concerning Hypothesis 2A

The main findings related to H2A are that only two product variables had a significant result, implying they were significant negative predictors. These two product variables were the share of vegetarian dishes and having a sustainability congruent name. This finding does not align with the hypothesized relationship between 'super congruency' and the mean review score. Therefore, little support was found for the theory that congruence in one's firm characteristics and concurrently acting sustainably is positive for one's company valuation. A possible explanation for this concerns potential guests not seeing the congruence between the extent to which sustainable innovations are adopted and the other independent variables, i.e., having a vegetarian cuisine, lower price level, having a Michelin star, or being in a new building. If people cannot see the congruency themselves, they also cannot increase or decrease their valuation based on it.

Another explanation could be that potential guests do not view sustainable restaurants as a separate category compared to conventional restaurants. If this is the case, the sustainability congruent characteristics also do not influence a guest's company valuation because both categories appear the same to them in terms of characteristics and congruency.

Lastly, a possible explanation could be that the chosen characteristics, i.e., the independent variables, are not the proper core characteristics for the category of sustainable restaurants. However, this is not likely because most of the independent variables show significant effects for H1A. If they would not be considered core characteristics of the category of sustainable restaurants by guests, then these hypotheses should also have been rejected.

The following variables were positive significant predictors of the mean review score: the share of vegetarian dishes, the average price level, having a sustainability congruent name, having a Michelin star, and the number of sustainable innovations. This means that when these variables are present, the mean review score of a restaurant increases. This could have managerial implications because restaurants could choose to focus on these variables, thereby increasing their mean review score on Google Maps, which in turn could positively impact their revenues (Luca, 2016). See Chapter 6.2 for further policy and managerial implications. An increased mean review score could incentivize consumers to choose a specific restaurant because consumers are likelier to choose a restaurant with a high online review rating (Ali et al., 2021).

Additionally, the finding that the share of vegetarian dishes leads to a higher mean review score is in line with the research by Mathayomchan and Taecharungroj (2020), who argue that, among other factors, offering a variety of dietary options positively affects customer experience in the restaurant sector. In their research, dietary requirements were related to including vegetarian, vegan, and gluten-free options on the menu. This could also have managerial implications.

Lastly, the variable sustainable innovations was also found to be a significant positive predictor of a restaurant's mean review score, indicating that guests appreciate it when restaurants engage in sustainable innovative activities. It is interesting to note that the magnitude of the significant coefficients of share of vegetarian dishes, average price level, sustainability-congruent name, and having a Michelin star, are all greater than that of the sustainable innovations variable. This indicates that the characteristics of a restaurant, and therefore also the image they are portraying, have a bigger influence on the appreciation of guests, compared to whether restaurants actually engage in sustainable behavior.

Discussion concerning Hypothesis 2B

The regression results shown in Chapter 4.6 indicate that the 'super congruency' effect, which was partly present for restaurants, was not present for hotels. This could be explained by the same reasoning as argued above: hotel guests might not care much about the congruency between a hotel's activities and its characteristics. Another explanation could be that hotel guests view congruency differently than restaurant guests. As stated before, hotel guests are often not from the area in which the hotel is situated. This could lead to them missing the social cues as to why a company would be in a specific category because they have a different mental framework.

Consequently, hotel guests might not place sustainable hotels in the category of sustainable hotels because they might misinterpret the characteristics. Additionally, word-of-mouth advertising plays a more minor role because guests are often not from the area where a hotel is situated. The main advertising is probably done online, through people leaving reviews. This could be less focused on sustainability.

Also, the tourism sector in the Netherlands is not focused on nature or culture but mainly on providing guests with a place to sleep. In some countries, the tourism sector does focus more on nature or culture, which is why in those countries, congruency could play a more prominent role than it does in Utrecht because congruency is very much dependent on cultural aspects as well (Cudennec & Durand, 2022).

It is interesting to note that chain is a significant negative predictor of a hotel's mean review score, whereas a hotel's star rating and price level are significant positive predictors. The first indicates that people value hotels that are part of a chain less than those that are not. A possible explanation could be that hotels that are part of a chain have fewer differentiating characteristics, which might negatively affect guests' appreciation of the hotel. The finding that a higher star rating leads to a higher mean review score could be explained by the fact that generally speaking, hotels with higher star ratings are more luxurious and have better facilities. Therefore, it makes sense that the mean review score would be higher. Moreover, the fact that the mean price level is a significant positive predictor for a hotel's mean review score is in line with the theory by Xie et al. (2014), who argue that those variables are connected.

5.3 Discussion concerning Hypothesis 3

Discussion concerning Hypothesis 3A

In Table 15, only one product variable has a significant result: the product variable related to the share of vegetarian dishes. This means that restaurants engaging in sustainable, innovative behavior and continuously having a higher share in vegetarian dishes have a higher mean price level. Overall, it is an interesting result because the share of vegetarian dishes itself is a significant negative predictor of the mean price level. This partly supports the theory concerning 'super congruency' and its effect on a restaurant's mean price level, yet the analyses only support one out of six models.

Moreover, the number of reviews is a significant positive predictor, whereas being part of a chain is a significant negative predictor. Both were also significant predictors in the research by Yim et al. (2014), who researched a hedonic pricing model for the restaurant sector in Seoul. However, in their research, both variables were negative predictors. This difference could be due to social and environmental differences between Seoul and Utrecht. The study by Yim et al. explains that people who leave restaurant reviews prefer visiting relatively cheap and popular restaurants with good overall quality. Based on this, they conclude that therefore it makes sense that the number of blogger reviews is a significant negative predictor because restaurant bloggers visit cheaper restaurants more often, therefore also writing reviews about those restaurants more often. The type of person who writes blog reviews in the Netherlands is probably a different type of person than the person who writes blog reviews in South Korea. Based on this, the previous argument from Yim et al. does not hold anymore. One situation that could explain the positive coefficient of the number of reviews variable is the fact that an increase in the number of reviews could increase the demand for the restaurant as well because more people might be willing to go, based on the fact that a larger amount of people already went before them. An increase in demand would also increase the price of a good or service when keeping the supply of the good or service the same, i.e., when the restaurant does not expand.

As mentioned, when a restaurant is part of a chain, its average price level tends to be lower. This is also in line with the research by Yim et al., who argue that this is due to the inherent goal of franchising, which is to share marketing costs and use the brand reputation (Connell, 1997). As a result, a restaurant which is part of a chain can attract more customers and is, therefore, in a position to require lower prices.

Discussion concerning Hypothesis 3B

It was found that the expected 'super congruency' between the hotel's sustainability-congruent characteristics and its sustainability rating did not affect their mean price level. Additionally, none of the independent variables were significant predictors. However, both a hotel's star rating and location did positively affect hotels' mean price levels. This is in line with the research by Duric and Topler (2021), who examined the hedonic pricing models for hotels. The findings emphasize that 'super congruency' is present in the restaurant sector but not in the hotel sector. The arguments explaining this difference, as explained in Chapter 5.2, hold true for the missing effect of 'super congruency' on hotels' mean price levels as well.

5.4 Limitations and Recommendations

As briefly touched upon, the main limitation of the research is that endogeneity might be present in both the part of the research focusing on restaurants and the part concerning hotels. This means that the dependent variable affects the independent variables by choosing their characteristics based on their sustainable innovation activities. The research attempted to decrease the bias related to this by using the initial list of restaurants provided by OpenStreetMap. Because many of the entry dates on the list were from 2017/2018, it can be concluded that those restaurants were founded in those years or before. During this time, sustainability was less a topic of interest. Therefore, it is more likely that the restaurants in this list adopted sustainability activities because they were congruent with their already-existing characteristics rather than choosing their characteristics because of their sustainability levels. For future research, it is recommended to redo the regression analyses with restaurants and hotels founded before 2015 as a robustness check to decrease the endogeneity bias even more. This was not possible for the current dataset because the founding date could not be found for many hotels and restaurants.

Another source of endogeneity could be that the dependent variable might have influenced the independent variables directly through the simultaneity bias. This is because, as can be seen in Table 1A and Table 2, both the dependent and independent variables for H1A concerning restaurants involve vegetarianism. In order to decrease this simultaneity bias, a robustness check was performed, which ran the regression analysis concerning H1A involving the same operationalization of sustainable innovation, yet without attributing a score to sustainable innovations 2.4., offering more than 75% vegetarian food (Table F1 & F2). It was found that the same dependent variables are significant predictors of adopted sustainable innovations. However, all variables, except for having a sustainability incongruent name, did show a lower coefficient, meaning that the magnitude of the effect of the independent variables on the dependent variable is smaller.

Moreover, another robustness check was performed concerning performing R1 for restaurants without outliers, excluding the two restaurants that showed 17 and 11 sustainable innovations (Table F3 and F4). This analysis also showed similar variables to be significant predictors as the significant independent variables in Table 10A & 8B, thereby strengthening those findings.

For future research, one could consider applying Instrumental Variable (IV) techniques, such as the Two Stage Least Squares (TSLS), which is known to be a good way to deal with endogeneity. However, choosing the appropriate instrumental variable is difficult, as is combining TSLS with the zero-inflated negative binomial model. This is why it makes more sense to use Structural Equation Modeling (SEM) to determine the correct relationships. SEM decreases the endogeneity bias by modeling endogenous covariances directly (Grace, 2021). SEM allows for a linear model framework to be examined while including latent and observed variables (Kline, 2016). It can include simple regression, multiple regression, multivariate regression, and other types of regression that were not relevant to the current study.

SEM is also a good way to deal with the limitation that congruency is a latent variable. The congruency between restaurant characteristics and the category of sustainable restaurants cannot be measured, nor can the congruency between the category of sustainable restaurants and the adoption of sustainable innovations. As mentioned, this could also be why only two out of eight product variables in Table 7 show a significant effect on the total number of sustainable innovations. It is difficult to determine whether this is due to a missing congruency between the restaurant's characteristics or between the category of sustainable restaurants and the adoption of sustainable innovations. Running a similar regression, as stated in Chapter 3.1, is recommended for future research, yet explicitly including congruency as a latent variable using SEM.

For future research, it is also recommended to investigate the effect of having congruency between restaurant characteristics and sustainability and restaurants' average revenues, taking the latter as the dependent variable. This would contribute to the current research in the sense that the performed study examined the effect on the mean review score, even though it does not provide information concerning the direct positive or negative financial effects a restaurant faces when they span categories. It would be interesting to see if the expected negative effect is present in restaurants' revenues, thereby testing the category spanning theory from another perspective.

Another limitation of the research is that the independent variables are based on logical reasoning as to why specific characteristics are congruent with the category of sustainable restaurants. These characteristics were consequentially taken as the independent variables. This introduces subjectivity in the setup of the research design and, therefore, creates a threat to the construct validity. For future research, it would be recommended to perform qualitative research concerning which restaurant characteristics are viewed as being congruent with the category of sustainable restaurants and whether people view sustainable restaurants as a separate category from conventional restaurants. This would increase the validity of subsequent research concerning congruency and restaurants. It is advised to interview both consumers and restaurateurs to gain a complete understanding of how both relevant groups view the congruency and characterization aspects of sustainable restaurants.

Moreover, the present research focused only on publicly available data. The reasoning behind this is that congruency and potential category spanning can only occur when characteristics are visible to the consumer as well. Still, it would be interesting to conduct a research diving deeper into sustainable innovations that restaurants have not posted on their websites but are implementing. Restaurants could still be advertising themselves through these innovations through activations within their actual restaurants or through word-of-mouth marketing. These types of sustainable innovations would still affect someone's perception of congruence and possible category spanning but are not taken into account in the current study. Additionally, because companies should try to avoid greenwashing (L. Zhang et al., 2018), not all sustainable actions from a restaurant are probably shown on their websites.

As mentioned in Chapter 5.3, the absence of the 'super congruency' effect for the hotel sector can be explained by the fact that the tourism sector in the Netherlands is not focused on nature or culture. It is very well possible that in areas that do have this focus, the 'super congruency' effect is present. The present research only focused on Utrecht because of time constraints. For future research, it is recommended to redo the analyses concerning the 'super congruency' based on the hotel sector in a country where the tourism sector focuses more on nature and culture, such as Indonesia.

Furthermore, as discussed before, some results concerning the hedonic price model for the restaurant sector differ from the results by Yim et al. (2014), partly because the location of the study was different. This could indicate that the results concerning the other hypotheses are also biased by the location of the study. As a result, it is recommended that the studies be redone in different locations with different environmental and social aspects. In this way, the reliability of the results can be improved, and the effect of location on the results can be determined as well. Specifically, it would increase our understanding of congruency to reconduct the studies in locations where sustainability might be understood differently, such as a metropolitan city in India or a technology-focused city in the United States of America.

Chapter 6 Conclusion

The present research provides insight into factors affecting the extent to which sustainable innovations are implemented by restaurants and hotels, as well as factors affecting the valuation of restaurants and hotels as observed by review scores and price levels. The main research question that was answered is the following:

"How does congruency affect the extent to which sustainable innovations are implemented by the hospitality industry, and what are the effects of acting in a congruent way on the company valuation?"

This question was answered through different regression analyses based on a combination of already existing and newly created datasets. Additionally, some results were checked on a qualitative basis by either looking at current trends in the hospitality industry based on industry papers or by conducting an exploratory interview with the owner sustainable restaurant.

The key concept in the main research question is congruency. This approach was chosen because the hospitality industry has a central place in society and is therefore influenced by many cultural and social aspects as well. Therefore, it makes sense to use a theory grounded with a focus on social aspects as well. In the context of the present research, congruency refers to a company having characteristics that are congruent with the organizational category it is classified as. The underlying theory which was applied is the theory of categorization, which states that companies can be identified as certain categories based on their organizational attributes and characteristics (Cudennec & Durand, 2022). It was expected that restaurants and hotels with sustainability-congruent characteristics were more congruent with the category of sustainable restaurants and hotels and would, therefore, implement more sustainable innovations and receive a higher valuation. It should be noted that the perception of congruency depends on many things, such as how a person processes informational cues and bigger aspects, such as cultural and societal norms and standards.

6.1 Conclusion

The regression analyses showed that several characteristics are positively related to the extent to which sustainable innovations are implemented by restaurants: having a cuisine related to vegetarianism, having a higher share of vegetarian dishes, having a sustainability-congruent name, and being situated in a newer building. Additionally, having a sustainability-incongruent name was related to having less sustainable innovations. Moreover, little evidence was found that having these sustainability-congruent characteristics combined with also implementing sustainable innovations affects the company valuation. Most of the product variables testing this relationship did not have a significant effect on the mean review score of a restaurant. A similar nonsignificant result was found for the effect of this 'super congruency' on the mean review score of restaurants by concurrently having sustainability congruent characteristics and implementing sustainable innovations. Overall, it can be concluded that having sustainability-congruent characteristics does positively affect the extent to which sustainable innovations are adopted within the restaurant sector.

However, acting in a congruent way by both implementing sustainable innovations and having sustainability-congruent characteristics does not affect company valuation for restaurants.

Moreover, the regression analyses showed little evidence that having sustainability-congruent characteristics has an influence on the extent to which sustainable innovations are adopted within the hotel sector. Additionally, 'super congruency' was also not found to be present for the hotel sector because when hotels had sustainability congruent characteristics and at least a score of one for their sustainability rating, their mean price level nor their mean review score was positively affected by this. Based on these findings, it can be concluded that congruency does not affect the extent to which sustainable innovations are adopted within the hotel sector and that acting in a congruent way does not affect the company valuation within this sector.

The differing results obtained for the restaurant and the hotel sector can be explained by the fact that congruency is highly affected by how guests and customers process informational cues and bigger cultural and societal differences. The hotel sector and the restaurant sector attract different kinds of guests. Specifically, restaurants usually host local guests as well as guests from outside the city, while hotels mainly host guests from outside the area they are situated in. Such guests might be less sensitive to congruency than local guests because they cannot relate informational, social, and cultural cues to the local context. Moreover, restaurants may have more ways to distinguish themselves with sustainable innovations as food plays such a central role in restaurants and much less so in hotels. Innovations related to food are inherent to many industries, so the possibilities for implementing innovations related to food are bigger.

Overall, innovation is an essential generator of growth for the entire hospitality industry (Lee et al., 2019; Ozturkoglu et al., 2021). Specifically within the hospitality sector, innovation differs because of the intangibility of services, the fact that services are both produced and consumed at the same time, the variety of services that exists, and the high involvement of human resources in producing services (Fitzsimmons & Fitzsimmons, 1999).

In conclusion, congruency affects the extent to which sustainable innovations are implemented within the restaurant sector but does not affect the extent to which sustainable innovations are implemented within the hotel sector. This difference is probably because categorization and congruency are heavily affected by cultural and social aspects. Thus, the categorization approach is less applicable for service industries that are less connected to the social and cultural context of the location in which they are operating. It can also be concluded that congruency is likely to not affect the company valuation, both within the hotel and restaurant sector.

For future research, the categorization approach could also be applied to restaurants in other places in order to examine whether the conceptual frameworks hold true and whether different social and cultural contexts affect the found relationships and perhaps also find evidence for the effect of congruency on company valuation. Additionally, it would be interesting to conduct a research examining the hotel industry in a location that is more connected to its local social and cultural context, such as a tourist destination with a unique natural and cultural environment. This should be done in order to determine whether the hypothesized relationships hold there.

Lastly, more advanced statistical methods, such as Structural Equation Modelling or Instrumental Variable techniques, are recommended to diminish the endogeneity bias and deal with the fact that congruency is included in the regression equations as a latent variable.

6.2 Implications

Because restaurants can play an active role in promoting sustainability due to their central role in society (Higgins-Desbiolles & Wijesinghe, 2019), the findings concerning sustainable innovation implementation have important policy and sectoral implications. The second and third parts concerning the factors affecting a hotel or restaurant's mean review score and mean price level have managerial implications for company owners that want to increase their mean review score or keep their prices on a competitive level.

Policy implications

If policymakers want to increase the level of sustainability in their areas, it is recommended to encourage sustainability within the hospitality industry because of the dominant presence it occupies in the cultural environment. Based on the conducted research, it can be concluded that restaurants with a vegetarian cuisine or a higher share of vegetarian dishes, with a sustainability congruent name, and situated in a newer building have a higher sum of sustainable innovations adopted. A possible way of influencing the hospitality industry's sustainability level is to encourage these characteristics within the local communities.

Policies could, for example, focus on permits for restaurants with a vegetarian cuisine. This way, the municipality can (indirectly) encourage restaurants to adopt sustainable innovations. Based on the research, the sustainable innovations that were adopted most often by the restaurant sector are related to the use of renewable energy, getting products from local suppliers, and aiming for waste reduction. Policymakers could encourage these sustainable innovations by creating subsidies for restaurants that implement these types of sustainable innovations. Additionally, they could, together with sector-wide organizations, encourage more local partnerships by setting up platforms or discussion evenings where local companies can find each other and increase their local networks. Even though the congruency effect was not present in the hotel industry, policymakers could still try to influence the sustainability level by encouraging sustainability through subsidies and encouraging more local partnerships.

Sectoral implications

The present research also holds implications for both the restaurant industry and the hotel industry. The branch organizations specifically are in a position in which they could encourage sustainable innovation as well because they can act as a mediator between different companies (such as Koninklijke Horeca Nederland). It is recommended that they highlight the positive effects of adopting sustainable innovations and support local partnerships. They are also in a position where they could spread information about which sustainable innovations are possible to lower the bar of actually implementing these innovations. It is advised for the restaurant branch organization to target restaurants with sustainability-congruent characteristics because they are more likely to adopt sustainable innovation measures.

Managerial implications

Based on the reviewed literature and the performed research, it is recommended that restaurant managers focus on the congruency between their restaurant's characteristics and the category in which their restaurant is present. This is because doing this increases company valuation in general (Cudennec & Durand, 2022), and it decreases the risk of category spanning, which decreases the risk of lower consumer appreciation (Kovács & Johnson, 2014).

Moreover, it is recommended that restaurant managers focus on characteristics that increase their mean review score itself because it is shown that an increase in Yelp review rating increases a restaurant's revenue (Luca, 2016). Therefore, as it is shown that sustainable innovation is a positive predictor of the mean review score, it is recommended that restaurateurs focus on this. Additionally, an increase in the share of vegetarian dishes is found to have a positive effect on the mean review score. Therefore, this is also a strategy a restaurateur could focus on.

The literature shows that sustainable innovations within the restaurant industry are usually neither patented nor costly to implement (Maynard et al., 2020). The innovations that were implemented most often, such as the use of renewable energy, getting products from local suppliers, and aiming for waste reduction, are innovations about which a lot of knowledge is already available. Thus, one could think about implementing these innovations because they are already commonly adopted.

It has also been shown that sustainable innovation is becoming more and more important for hotels, and it is therefore recommended for hotel owners to focus on this (Asadi et al., 2020). The analyses performed in the present research did not find evidence for congruency between hotels' sustainable innovation activities and their characteristics to affect their mean review score or mean price level. However, this does not mean that this is always the case for hotel sectors in other countries or regions as well, particularly in areas with unique natural or cultural heritage, which is why further research is needed to confirm whether the categorization approach can be applied to those sectors. All in all, even though the level of sustainability did not show to have a significant effect on the mean review score nor the mean price level, it is still recommended for hotels to focus on sustainability overall because it does provide added benefits in terms of cost-savings and word-of-mouth marketing (Wang et al., 2018).

6.3 For the future

The restaurant and hotel industries have the potential to make significant steps toward sustainability, which is a promising starting point for ensuring that our planet can continue to provide for us. Sustainable innovations could play a big part in the shift towards sustainability. This research has shown that much is already known about sustainable innovation within the hospitality industry. One difficulty is that sustainability goals can clash with the core characteristics of restaurants and hotels. The present research has shown that congruency between sustainability congruent characteristics and adopting sustainable innovations does not necessarily impact a company's valuation. Therefore, it is possible for restaurants and hotels to adopt sustainable innovations without facing the negative consequences related to category spanning. This is, in a way, a hopeful finding. More research should be done concerning how to combine the economic goals, social standards, and environmental goals, specifically within the hospitality industry, but the present research has shown that lot is still possible.

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Appendix A Cuisines and their relationship with vegetarianism

This section attempts to distinguish which cuisines are cognitively related to vegetarianism by looking into dictionary definitions of different cuisines. Firstly, popular American cuisine is characterized by packaged and commercial goods and is associated with creating fast-food restaurants (Tilove, 2011). In contrast, Asian cuisine is characterized by complex cooking and incorporating meat as an essential food source (Goldstein, 2002). The French cuisine includes several dishes such as pot-au-feu (boiled beef), gigot d'agneau (lamb), or pate (Hyman & Hyman, 2003). Greek cuisine traditionally focused on vegetarian meals but transformed into a more meat-focused cuisine once the wealth of Greece increased (Kremezi, 2003). In Mexico, people tend to eat dishes made of meats, native chilies, or beans (Pilcher, 2003). Middle Eastern cuisine focuses on using lamb, minced meat, vegetables, and several spices (Roden, 2018). Surinam's national dish is chicken and rice (Hoefte, 2001). Lastly, restaurants that serve mainly fish or steak are, in essence, not cognitively correlated to the idea of vegetarianism.

In Italy, the focus is on pasta and antipasto, consisting of meats and cheeses (Katona-Apte, 2003). Interestingly, the different regions in Italy have different culinary traditions, such as serving pizza in Naples and risotto in Milan. If a restaurant serves dishes from too many different regions, an Italian guest would be displeased about this, highlighting the concept of incongruence and its negative effect on a guest's appreciation for a restaurant.

The Indonesian cuisine is characterized by rice, vegetable dishes, fish, and sometimes beef or pork (Williams, 2002). The main components of Japanese cuisine include rice, soup, and pickles (Holland, 2003). Traditionally, Japan used to have a cultural taboo on eating meat, but after the country has become westernized, eating meat has become more popular. Additionally, seafood is also largely consumed in Japan. The Mediterranean cuisine involves many national cuisines, but the overarching similarities include a high consumption of fruits, vegetables, grains, legumes, nuts, and fish and a low consumption of dairy products, eggs, and meat (Lerner, 2011). In Spain, it is customary to eat bread, legumes, rice, garden vegetables, pork products, lamb and veal, and fish (Freeman, 2001). Thai food is centered around rice and seafood (McIntosh, 2002). Lastly, the Vietnamese cuisine uses fish, vegetables, fruit, and white rice (Parvanta, 2003).

In India, vegetarianism is generally practiced, focusing on using chickpeas and lentils when cooking (Regenstein, 2011). As a result, the only cuisine that is generally connected to vegetarianism is the Indian cuisine. However, multiple cuisines are related to pescetarianism, excluding meat but including fish in its customs (McNamee, 2022). These cuisines include the Japanese cuisine, the Mediterranean cuisine, the Thai cuisine, and the Vietnamese cuisine.

Appendix B Restaurant names congruent with sustainability

To distinguish sustainability-congruent names, an attempt was made to classify restaurant's names based on whether they involved a nature-related theme or a sustainability-related theme. The following names were included in the list of sustainability-congruent names:

- A Beautiful Mess
- Averechts
- Zuiver
- Hemel en aarde
- Parkcafé buiten
- Le Jardin
- Blauw
- Broodnodig
- Sunshine
- Broei
- Vintage
- Boslust
- Vegitalian
- VanPlanten
- De Nijverheid
- Resto VanHarte
- Karma Kebab
- The Green House
- De Kwekerij

Appendix C Restaurant names incongruent with sustainability

To distinguish sustainability-incongruent names, an attempt was made to classify restaurant's names based on whether they involved a meat-based theme or a generally unsustainability-related theme. The following names were included in the list of sustainability-congruent names:

- De drie dorstige herten
- RUIG
- Stael
- Balkan grill boro
- Bar beton rijnsweer
- Meat & more
- Bar beton
- De beren
- Champions sports & grill
- De zware jongens

Appendix D Full models

Full models concerning Hypothesis 1A

Table D1

Full model concerning H1A, showing the count regression results

	Full model – Vegetarian cuisine x average price	Full model – Vegetarian dishes x average price	Full model – Vegetarian cuisine x GM price category	Full model – Vegetarian dishes x GM price category
Intercept	-6.51 *(4.61)*	-4.99 *(3.88)*	-9.05 *(5.10)*	-2.27 *(4.26)*
Independent variables				
Vegetarian cuisine	1.09*** *(0.20)*		1.09** *(0.38)*	
Share of vegetarian dishes		2.00*** *(0.27)*		1.93*** *(0.33)*
Average price level	-0.03* *(0.01)*	-0.01 *(0.01)*		
GM price category			0.62 *(0.50)*	1.16*** *(0.35)*
Sustainability congruent name	0.74** *(0.26)*	0.22 *(0.15)*	0.68* *(0.31)*	0.15 *(0.21)*
Sustainability incongruent name	-0.99** *(0.37)*	-0.60 *(0.37)*	-1.28*** *(0.38)*	-0.68 *(0.37)*
Michelin star	0.80 *(0.44)*	0.91** *(0.28)*	1.15* *(0.50)*	1.00*** *(0.25)*
New building	0.32 *(0.25)*	0.24 *(0.21)*	0.26 *(0.19)*	0.07 *(0.22)*
Control variables				
Number of reviews	0.42* *(0.17)*	0.53*** *(0.12)*	0.54*** *(0.16)*	0.59*** *(0.10)*
Chain	0.37 *(0.27)*	0.29 *(0.26)*	0.78* *(0.34)*	0.50* *(0.21)*
Distance to city center	-0.08 *(0.10)*	-0.11 *(0.08)*	-0.09 *(0.11)*	-0.19 *(0.11)*
Percentage of high incomes	0.04 *(0.03)*	0.06** *(0.02)*	0.06* *(0.02)*	0.06** *(0.02)*
Leftist voting intensity	0.10 *(0.07)*	0.07 *(0.05)*	0.11 *(0.07)*	-0.03 *(0.06)*
Percentage of inhabitants with a Dutch background	-0.00 *(0.01)*	-0.01 *(0.01)*	0.00 *(0.01)*	0.01 *(0.01)*
Ln(theta)	0.39 *(0.36)*	1.13** *(0.40)*	0.57 *(0.41)*	1.12** *(0.41)*

LogLik	-501.73	-452.47	-438.79	-358.28
AIC	1057.47	958.94	931.59	770.56
BIC	1165.97	1066.98	1036.21	870.02
Obs	411	404	356	294

Table D2

Zero-inflation model coefficients concerning the full model of H1A

	Full model - Cuisine x average price	Full model – Vegetarian dishes x average price	Full model - Cuisine x GM price category	Full model – Vegetarian dishes x GM price category
Intercept	-14.10 *(7.76)*	-14.01 *(10.22)*	-10.7 *(8.44)*	-0.08 *(17.17)*
Independent variables				
Vegetarian cuisine	-0.07 *(0.61)*		0.27 *(0.94)*	
Share of vegetarian dishes		-5.68** *(1.94)*		-5.05*** *(1.35)*
Average price level	0.01 *(0.03)*	-0.05 *(0.04)*		
GM price category			-0.45 *(0.85)*	12.85*** *(1.94)*
Sustainability congruent name	-12.15*** *(0.85)*	-0.24 *(1.13)*	-2.33 *(1.53)*	0.52 *(0.59)*
Sustainability incongruent name	-9.27** *(3.14)*	-11.62*** *(1.59)*	-13.35*** *(3.04)*	-13.06*** *(1.29)*
Michelin star	-2.09 *(2.54)*	-0.28 *(1.07)*	0.63 *(1.58)*	0.09 *(1.15)*
New building	0.63 *(0.39)*	0.62 *(0.33)*	0.04 *(0.26)*	0.09 *(1.15)*
Control variables				
Number of reviews	0.38 *(0.23)*	0.39 *(0.25)*	0.82** *(0.27)*	0.88* *(0.40)*
Chain	-1.06* *(0.43)*	-0.81* *(0.40)*	-0.87 *(4.43)*	-0.13 *(0.48)*
Distance to city center	-0.18 *(0.23)*	-0.22 *(0.21)*	-0.08 *(0.24)*	-1.36** *(0.42)*
Percentage of high incomes	-0.02 *(0.03)*	0.01 *(0.04)*	0.00 *(0.00)*	0.02 *(0.03)*
Leftist voting intensity	0.18 *(0.10)*	0.20 *(0.14)*	0.16 *(0.12)*	-0.43 *(0.28)*
Percentage of inhabitants with a Dutch background	0.05 *(0.03)*	0.06 *(0.03)*	0.01 *(0.03)*	0.18** *(0.07)*

Full model concerning Hypothesis 1B

Table D3

Full model concerning H1B

	Full model
Independent variables	
Price level	-0.20
	(0.21)
Sustainability congruent name	0.81
	(0.53)
New building	-0.21
	(0.46)
Control variables	
Number of reviews	0.86***
	(0.25)
Chain	0.63
	(0.54)
Capital city	0.37
	(0.46)
Intercepts	
0/1	0.39
	(0.35)
1/2	1.50***
	(0.37)
2/3	2.05***
	(0.40)
3/4	2.39***
	(0.42)
LogLik	-141.30
AIC	-139.83
BIC	326.38
Obs	107

Full models concerning Hypothesis 2B

Table D4

Full model concerning H2B

	Full model – Price level	Full model – Sustainability congruent name	Full model – New building
Intercept	6.29***	6.48***	6.52***
	(0.37)	*(0.34)*	*(0.35)*
Independent variables			
Product variable	-0.00	-0.08	-0.01
	(0.00)	*(0.12)*	*(0.08)*
Sustainability score	0.23	0.03	0.03
	(0.14)	*(0.05)*	*(0.06)*
Price level	0.01**	0.01**	0.01**
	(0.00)	*(0.00)*	*(0.00)*
Sustainability congruent name	-0.02	0.17	-0.01
	(0.19)	*(0.33)*	*(0.19)*
New building	0.08	0.07	0.08
	(0.16)	*(0.17)*	*(0.22)*
Control variables			
Number of reviews	0.00	0.00	0.00
	(0.00)	*(0.00)*	*(0.00)*
Chain	-0.44*	-0.37*	-0.37*
	(0.18)	*(0.18)*	*(0.18)*
Star rating	0.24*	0.28*	0.27*
	(0.11)	*(0.11)*	*(0.11)*
Capital city	-0.21	-0.25	-0.24
	(0.16)	*(0.17)*	*(0.17)*
Multiple R2	0.34	0.33	0.32
F	4.50***	4.19***	4.12***
Obs	87	87	87

Note. The Product variable is calculated based on the independent variable stated in the first row.

Full models concerning Hypothesis 3B

Table D5

Full model concerning H3B

	Full model – Sustainability congruent name	Full model – New building
Intercept	3.27***	3.27***
	(0.28)	*(0.28)*
Independent variables		
Product variable	*-0.02*	-0.00
	(0.04)	*(0.02)*
Sustainability score	-0.02	-0.02
	(0.02)	*(0.02)*
Sustainability congruent name	0.14	
	(0.12)	
New building		0.00
		(0.08)
Control variables		
Mean review score	0.12**	0.12**
	(0.04)	*(0.04)*
Chain	0.00	0.00
	(0.06)	*(0.06)*
Star rating	0.16***	0.16***
	(0.04)	*(0.04)*
Capital city	0.31***	0.31***
	(0.05)	*(0.05)*
Residual SE	0.20	0.21
Multiple R2	0.57	0.57
F	13.04***	13***
Obs	87	87

Note. The Product variable is calculated based on the independent variable stated in the first row.

Appendix E Specification of R1 concerning the restaurant sector

Regression results concerning H1A taking the sum of Category 1 & 2 sustainable innovations as the dependent variable

Table E1

Count regression results concerning H1A, taking Category 1 & 2 as the dependent variable

	CV	**Model 1A** Vegetarian cuisine	**Model 1B** Share of vegetarian dishes	**Model 2A** Average price level	**Model 2B** GM price category	**Model 3** Sustainability congruent name	**Model 4** Sustainability incongruent name	**Model 5** Michelin star	**Model 6** New building
Intercept	-1.49	-2.94	-3.81	-0.95	-3.14	-2.11	-3.36	-2.23	-1.23
	(9.42)	*(7.02)*	*(4.43)*	*(8.48)*	*(7.73)*	*(7.57)*	*(7.95)*	*(11.04)*	*(4.78)*
Independent variables									
		0.97***	1.86***	-0.02	1.30*	0.82**	-0.84*	0.70*	0.63**
		(0.27)	*(0.38)*	*(0.12)*	*(0.63)*	*(0.28)*	*(0.43)*	*(0.34)*	*(0.23)*
Control variables									
Number of reviews	0.28	0.28	0.43**	0.27	0.42*	0.32*	0.27	0.29	0.33*
	(0.19)	*(0.16)*	*(0.13)*	*(0.20)*	*(0.21)*	*(0.13)*	*(0.18)*	*(0.19)*	*(0.16)*
Chain	0.09	0.09	0.43	0.20	0.58	0.22	0.17	0.15	0.04
	(0.40)	*(0.32)*	*(0.13)*	*(0.59)*	*(0.42)*	*(0.39)*	*(0.40)*	*(0.50)*	*(0.26)*
Distance to city center	-0.09	-0.06	-0.12	-0.11	-0.17	-0.07	-0.04	-0.08	-0.14
	(0.14)	*(0.13)*	*(0.23)*	*(0.13)*	*(0.17)*	*(0.13)*	*(0.14)*	*(0.15)*	*(0.11)*
Percentage of high incomes	0.01	0.01	0.04	0.02	0.04	0.01	0.02	0.01	-0.01
	(0.04)	*(0.03)*	*(0.02)*	*(0.04)*	*(0.04)*	*(0.05)*	*(0.05)*	*(0.05)*	*(0.02)*
Leftist voting intensity	0.02	0.04	0.04	0.01	-0.02	0.02	0.05	0.03	0.01
	(0.12)	*(0.09)*	*(0.06)*	*(0.11)*	*(0.11)*	*(0.10)*	*(0.11)*	*(0.14)*	*(0.06)*
Percentage of inhabitants with a Dutch background	-0.00	0.00	-0.00	-0.00	0.02	0.01	0.00	-0.00	0.01
	(0.03)	*(0.02)*	*(0.01)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.02)*	*(0.03)*	*(0.02)*
Ln(theta)	-0.45	1.30	11.24	0.77	0.62	0.93	0.85	0.59	0.82
	(0.77)	*(0.89)*	*(175.24)*	*(0.77)*	*(0.66)*	*(1.04)*	*(0.75)*	*(0.84)*	*(0.75)*

LogLik	-505.60	-498.17	-393.39	-434.85	-373.02	-494.98	-505.10	-502.91	-501.91
AIC	1041.19	1030.34	820.78	903.69	780.04	1023.96	1044.19	1039.81	1037.82
BIC	1104.77	1102.39	889.43	972.01	845.91	1096.01	1116.24	1111.86	1109.87
Obs	512	512	419	411	356	512	512	512	512

Table E2

Zero-inflation model coefficients concerning H1A, taking Category 1 & 2 as the dependent variable

	CV	**Model 1A**	**Model 1B**	**Model 2A**	**Model 2B**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		Vegetarian cuisine	Share of vegetarian dishes	Average price level	GM price category	Sustainability congruent name	Sustainability incongruent name	Michelin star	New building
Intercept	-3.06	-2.94	-11.29	-3.75	-1.81	-6.77	-4.86	-3.22	-1.13
	(16.74)	*(9.41)*	*(11.04)*	*(15.55)*	*(15.97)*	*(15.74)*	*(8.68)*	*(15.94)*	*(12.08)*
Independent variables									
		-0.96	-4.45***	0.13	8.86***	-2.12	-9.41	-1.22	0.57
		(0.74)	*(0.75)*	*(0.29)*	*(2.14)*	*(3.07)*	*(14.12)*	*(1.11)*	*(0.57)*
Control variables									
Number of reviews	0.14	0.09	0.09	0.20	0.67	0.15	0.11	0.16	0.20
	(0.29)	*(0.22)*	*(0.23)*	*(0.37)*	*(0.42)*	*(0.23)*	*(0.23)*	*(0.28)*	*(0.27)*
Chain	-1.21	-0.85	0.10	-0.36	-0.35	-0.90	-0.86	-1.11	-1.14
	(1.83)	*(0.19)*	*(0.59)*	*(1.09)*	*(0.99)*	*(1.26)*	*(0.96)*	*(2.02)*	*(0.83)*
Distance to city center	-0.16	-0.09	-0.07	-0.14	-0.64	-0.14	-0.03	-0.15	-0.18
	(0.27)	*(0.16)*	*(0.17)*	*(0.31)*	*(0.64)*	*(0.37)*	*(0.17)*	*(0.35)*	*(0.26)*
Percentage of high incomes	-0.06	-0.04	0.01	-0.03	-0.01	-0.04	-0.03	-0.06	-0.07
	(0.14)	*(0.06)*	*(0.05)*	*(0.06)*	*(0.06)*	*(0.13)*	*(0.08)*	(0.16)	*(0.08)*
Leftist voting intensity	0.03	0.04	0.15	0.03	0.21	0.08	0.06	0.03	0.03
	(0.21)	*(0.12)*	*(0.14)*	*(0.17)*	*(0.25)*	*(0.19)*	*(0.11)*	*(0.20)*	*(0.17)*
Percentage of inhabitants with a Dutch background	0.03	0.03	0.04	0.03	-0.07	0.04	0.02	0.03	0.03
	(0.05)	*(0.03)*	*(0.04)*	*(0.07)*	*(0.06)*	*(0.08)*	*(0.03)*	*(0.05)*	*(0.03)*

Regression results concerning H1A taking the sum of Category 3 sustainable innovations as the dependent variable

Table E3

Count regression concerning H1A, taking Category 3 as the dependent variable

	CV	**Model 1A** Vegetarian cuisine	**Model 1B** Share of vegetarian dishes	**Model 2A** Average price level	**Model 2B** GM price category	**Model 3** Sustainability congruent name	**Model 4** Sustainability incongruent name	**Model 5** Michelin star	**Model 6** New building
Intercept	-10.66	-11.30*	-9.73	-10.18	-11.65	-11.40	-13.38*	-10.11	-11.03
	(6.26)	*(5.07)*	*(5.62)*	*(5.71)*	*(10.47)*	*(6.15)*	*(6.55)*	*(6.33)*	*(5.83)*
Independent variables									
		1.05*	1.59**	-0.05**	0.03	0.76*	-2.09*	0.56	0.25
		(0.53)	*(0.52)*	*(0.02)*	*(1.29)*	*(0.36)*	*(1.00)*	*(0.85)*	*(0.39)*
Control variables									
Number of reviews	0.10	-0.10	0.38**	0.35	0.39	0.07	-0.15	0.14	-0.11
	(0.09)	*(0.11)*	*(0.20)*	*(0.18)*	*(0.20)*	*(0.09)*	*(0.12)*	*(0.11)*	*(0.10)*
Chain	0.19	0.24	0.27	0.11	0.44	0.37	0.18	0.15	0.18
	(0.37)	*(0.35)*	*(0.37)*	*(0.42)*	*(0.46)*	*(0.31)*	*(0.37)*	*(0.37)*	*(0.37)*
Distance to city center	-0.33**	-0.31*	-0.34**	-0.38***	-0.38*	-0.30*	-0.23	-0.33**	-0.31*
	(0.12)	*(0.12)*	*(0.10)*	*(0.11)*	*(0.19)*	*(0.13)*	*(0.13)*	*(0.12)*	*(0.13)*
Percentage of high incomes	0.02	0.06*	0.07*	0.05	0.05	0.05	0.06	0.06	0.05
	(0.03)	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.04)*
Leftist voting intensity	0.19*	0.19**	0.15	0.17*	0.19	0.19	0.22*	0.18	0.18*
	(0.09)	*(0.07)*	*(0.08)*	*(0.08)*	*(0.18)*	*(0.09)*	*(0.09)*	*(0.09)*	*(0.09)*
Percentage of inhabitants with a Dutch background	-0.03*	-0.03**	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03**	-0.02
	(0.01)	*(0.01)*	*(0.01)*	*(0.01)*	*(0.03)*	*(0.01)*	*(0.03)*	*(0.01)*	*(0.03)*
Ln(theta)	-0.48	-0.48	1.25	0.17	1.19	-0.30	-0.35	-0.49	-0.39
	(0.30)	*(0.31)*	*(0.88)*	*(0.55)*	*(0.11)*	*(0.34)*	*(0.49)*	*(0.30)*	*(0.51)*

LogLik	-324.04	-321.97	-248.03	-267.87	-240.49	-308.96	-322.91	-322.44	-323.60
AIC	678.08	677.93	530.06	569.73	514.99	651.92	679.81	678.88	681.19
BIC	741.66	749.98	598.71	638.05	580.86	723.97	751.86	750.93	753.25
Obs	512	512	419	411	356	512	512	512	512

Table E4

Zero-inflation model coefficients concerning H1A, taking Category 3 as the dependent variable

	CV	**Model 1A**	**Model 1B**	**Model 2A**	**Model 2B**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		Vegetarian cuisine	Share of vegetarian dishes	Average price level	GM price category	Sustainability congruent name	Sustainability incongruent name	Michelin star	New building
Intercept	-14.40	-14.60	-23.17	-23.74*	-9.83	-53.05	-15.29	-11.02	-16.47
	(11.19)	*(13.44)*	*(14.74)*	*(12.00)*	*(12.49)*	*(27.10)*	*(12.66)*	*(9.76)*	*(13.66)*
Independent variables									
		-0.27	-4.31***	-0.05	-1.25	-13.30***	-7.09	-11.12***	-0.19
		(0.97)	*(0.91)*	*(0.03)*	*(1.49)*	*(0.99)*	*(11.81)*	*(0.74)*	*(0.69)*
Control variables									
Number of reviews	-0.84*	-0.87*	0.03	0.33	0.89*	-0.85*	-0.85	-1.07*	-0.76
	(0.42)	*(0.43)*	*(0.15)*	*(0.17)*	*(0.45)*	*(0.22)*	*(0.60)*	*(0.43)*	*(0.62)*
Chain	-9.15	-12.49	-1.41**	-2.20***	-1.70***	-4.35*	-4.34	-13.02**	-3.92
	(10.36)	*(12.43)*	*(0.43)*	*(0.43)*	*(0.45)*	*(0.43)*	*(8.69)*	*(4.87)*	*(5.76)*
Distance to city center	-0.71*	-0.69	-0.65	-0.96*	-0.25	-1.11*	-0.33	-0.70*	-0.61
	(0.36)	*(0.48)*	*(0.52)*	*(0.37)*	*(0.43)*	*(0.47)*	*(0.65)*	*(0.33)*	*(0.47)*
Percentage of high incomes	-0.14***	-0.14***	-0.06*	-0.14**	-0.06	-0.15	-0.13***	-0.15***	-0.14***
	(0.03)	*(0.04)*	*(0.03)*	*(0.05)*	*(0.03)*	*(0.09)*	*(0.03)*	*(0.03)*	*(0.04)*
Leftist voting intensity	0.22	0.22	0.35	0.33*	0.19	0.75*	0.23	0.17	0.24
	(0.15)	*(0.18)*	*(0.21)*	*(0.16)*	*(0.19)*	*(0.37)*	*(0.15)*	*(0.13)*	*(0.17)*
Percentage of inhabitants with a Dutch background	0.07	0.07	0.08***	0.12**	0.02	0.16	0.08	0.07	0.08
	(0.04)	*(0.04)*	*(0.02)*	*(0.04)*	*(0.04)*	*(0.09)*	*(0.07)*	*(0.04)*	*(0.05)*

Appendix F Robustness checks concerning the restaurant analyses

Restaurant regression results concerning H1A without the vegan variable

Table F1

Count regression results concerning H1A, without the vegan variable

	CV	**Model 1A** Vegetarian cuisine	**Model 1B** Share of vegetarian dishes	**Model 2A** Average price level	**Model 2B** GM price category	**Model 3** Sustainability congruent name	**Model 4** Sustainability incongruent name	**Model 5** Michelin star	**Model 6** New building
Intercept	-3.10	-4.97	-5.22	-0.77	5.39	-3.37	-4.37	-3.54	-3.38
	(6.90)	*(5.82)*	*(5.50)*	*(7.97)*	*(8.28)*	*(6.93)*	*(6.95)*	*(7.32)*	*(3.84)*
Independent variables									
		1.05**	1.82***	-0.02	0.70	0.90**	-1.22***	0.63	0.68**
		(0.34)	*(0.30)*	*(0.02)*	*(0.70)*	*(0.30)*	*(0.33)*	*(0.41)*	*(0.22)*
Control variables									
Number of reviews	0.32	0.32	0.48**	0.30*	0.41*	0.38*	0.33	0.33	0.38
	(0.17)	*(0.19)*	*(0.18)*	*(0.14)*	*(0.18)*	*(0.18)*	*(0.18)*	*(0.18)*	*(0.20)*
Chain	0.36	0.37	0.28	0.22	0.63	0.53	0.37	0.40	0.33
	(0.39)	*(0.35)*	*(0.30)*	*(0.40)*	*(0.52)*	*(0.35)*	*(0.36)*	*(0.42)*	*(0.73)*
Distance to city center	-0.18	-0.16	-0.12	-0.19	-0.16	-0.15	-0.15	-0.17	-0.20
	(0.12)	*(0.10)*	*(0.10)*	*(0.14)*	*(0.15)*	*(0.11)*	*(0.12)*	*(0.12)*	*(0.11)*
Percentage of high incomes	0.04	0.04	0.06*	0.03	0.05	0.03	0.05	0.04	0.02
	(0.03)	*(0.03)*	*(0.02)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.04)*	*(0.02)*
Leftist voting intensity	0.06	0.09	0.08	0.03	0.07	0.06	0.08	0.07	0.05
	(0.10)	*(0.08)*	*(0.07)*	*(0.11)*	*(0.12)*	*(0.10)*	*(0.10)*	*(0.10)*	*(0.05)*
Percentage of inhabitants with a Dutch background	-0.02	-0.02	-0.02	-0.02	-0.01	-0.01	-0.02	-0.02	-0.00
	(0.01)	*(0.01)*	*(0.01)*	*(0.02)*	*(0.02)*	*(0.01)*	*(0.01)*	*(0.01)*	*(0.01)*
Ln(theta)	-0.06	0.14	0.99*	-0.19	-0.16	0.21	-0.14	-0.01	0.09
	(0.43)	*(0.43)*	*(0.40)*	*(0.45)*	*(0.40)*	*(0.38)*	*(0.41)*	*(0.43)*	*(0.41)*

LogLik	-594.96	-590.62	-477.29	-508.82	-441.14	-580.93	-593.57	-592.63	-590.17
AIC	1219.92	1215.24	988.58	1051.64	916.29	1195.86	1221.14	1219.26	1214.34
BIC	1283.50	1287.29	1057.22	1119.96	982.16	1267.91	1293.19	1291.31	1286.39
Obs	512	512	419	411	356	512	512	512	512

Table F2

Zero-inflation model coefficients concerning H1A, without the vegan variable

	CV	**Model 1A**	**Model 1B**	**Model 2A**	**Model 2B**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		Vegetarian cuisine	Share of vegetarian dishes	Average price level	GM price category	Sustainability congruent name	Sustainability incongruent name	Michelin star	New building
Intercept	-4.15 (*11.17*)	-5.56 *(9.20)*	-13.06 *(11.89)*	-6.76 *(31.13)*	-1.08 *(13.33)*	-10.36 *(10.44)*	-5.39 *(7.18)*	-3.71 *(10.53)*	-3.35 *(9.43)*
Independent variables									
		-0.27 *(0.70)*	-3.97** *(1.34)*	-0.01 *(0.06)*	-0.18 *(1.27)*	-9.78* *(4.92)*	-8.90* *(3.61)*	-1.46 *(0.83)*	0.70 *(0.75)*
Control variables									
Number of reviews	0.24 *(0.22)*	0.23 *(0.23)*	0.20 *(0.24)*	0.37 *(0.20)*	0.70** *(0.24)*	0.24 *(0.22)*	0.25 *(0.22)*	0.26 *(0.24)*	0.33 *(0.29)*
Chain	-1.64 *(1.08)*	-1.43* *(0.71)*	-0.58 *(0.42)*	-1.56 *(1.47)*	-1.24 *(0.65)*	-1.27 *(0.63)*	-1.46 *(0.77)*	-1.62 *(1.02)*	-1.64* *(0.74)*
Distance to city center	-0.30 *(0.26)*	-0.27 *(0.23)*	-0.26 *(0.42)*	-0.49 *(0.85)*	-0.27 *(0.38)*	-0.27 *(0.26)*	-0.20 *(0.17)*	-0.30 *(0.24)*	-0.32 *(0.31)*
Percentage of high incomes	-0.06 *(0.08)*	-0.05 *(0.05)*	0.01 *(0.04)*	0.09 *(0.26)*	-0.04 *(0.04)*	-0.03 *(0.06)*	-0.03 *(0.05)*	-0.06 (0.07)	-0.07 *(0.06)*
Leftist voting intensity	0.07 *(0.15)*	0.09 *(0.12)*	0.21 *(0.16)*	0.10 *(0.40)*	0.05 *(0.18)*	0.16 *(0.14)*	0.09 *(0.10)*	0.06 *(0.14)*	0.05 *(0.13)*
Percentage of inhabitants with a Dutch background	0.01 *(0.04)*	0.01 *(0.03)*	0.01 *(0.03)*	0.03 *(0.13)*	-0.02 *(0.05)*	0.02 *(0.04)*	0.01 *(0.03)*	0.01 *(0.04)*	0.02 *(0.03)*

Restaurant regression results concerning H1A without outliers

Table F3

Count regression results concerning H1A, without the outliers

	CV	**Model 1A** Vegetarian cuisine	**Model 1B** Share of vegetarian dishes	**Model 2A** Average price level	**Model 2B** GM price category	**Model 3** Sustainability congruent name	**Model 4** Sustainability incongruent name	**Model 5** Michelin star	**Model 6** New building
Intercept	-3.78 *(6.25)*	-5.23 *(5.61)*	-5.59 *(4.70)*	-2.91 *(6.12)*	-4.51 *(7.07)*	-3.91 *(6.33)*	-4.87 *(6.50)*	-4.34 *(6.72)*	-4.14 *(3.47)*
Independent variables									
		0.83* *(0.40)*	1.85*** *(0.32)*	-0.02 *(0.02)*	0.54 *(0.63)*	0.81** *(0.27)*	-1.01* *(0.44)*	0.68 *(0.39)*	0.65** *(0.22)*
Control variables									
Number of reviews	0.24 *(0.22)*	0.28 *(0.20)*	0.46** *(0.17)*	0.25 *(0.15)*	0.35* *(0.16)*	0.32 *(0.18)*	0.24 *(0.23)*	0.26 *(0.21)*	0.33 *(0.19)*
Chain	0.34 *(0.33)*	0.32 *(0.29)*	0.27 *(0.23)*	0.20 *(0.34)*	0.62 *(0.36)*	0.48 *(0.29)*	0.35 *(0.32)*	0.39 *(0.36)*	0.29 *(0.26)*
Distance to city center	-0.07 *(0.10)*	-0.09 *(0.10)*	-0.06 *(0.09)*	-0.06 *(0.09)*	-0.09 *(0.15)*	-0.06 *(0.10)*	-0.03 *(0.10)*	-0.07 *(0.10)*	-0.11 *(0.08)*
Percentage of high incomes	0.02 *(0.03)*	0.03 *(0.03)*	0.05* *(0.02)*	0.02 *(0.03)*	0.03 *(0.03)*	0.03 *(0.03)*	0.03 *(0.04)*	0.03 *(0.04)*	0.01 *(0.02)*
Leftist voting intensity	0.07 *(0.08)*	0.09 *(0.08)*	0.08 *(0.06)*	0.06 *(0.09)*	0.04 *(0.11)*	0.06 *(0.09)*	0.08 *(0.09)*	0.08 *(0.09)*	0.06 *(0.05)*
Percentage of inhabitants with a Dutch background	-0.01 *(0.01)*	-0.01 *(0.01)*	-0.01 *(0.01)*	-0.01 *(0.01)*	0.01 *(0.02)*	-0.01 *(0.01)*	-0.01 *(0.01)*	-0.01 *(0.01)*	-0.00 *(0.01)*
Ln(theta)	-0.01 *(0.44)*	0.12 *(0.42)*	1.07** *(0.38)*	-0.06 *(0.47)*	2.90 *(0.44)*	0.21 *(0.37)*	0.09 *(0.45)*	0.05 *(0.43)*	0.19 *(0.39)*

LogLik	-603.48	-600.28	-476.36	-511.46	-476.36	-591.46	-602.50	-601.10	-598.92
AIC	1236.96	1234.56	986.72	1056.91	986.72	1216.93	1239	1236.19	1231.85
BIC	1300.48	1306.55	1055.28	1125.14	1055.28	1288.91	1310.98	1308.18	1303.83
Obs	512	512	419	411	356	512	512	512	512

Table F4

Zero-inflation model coefficients concerning H1A, without the outliers

	CV	**Model 1A**	**Model 1B**	**Model 2A**	**Model 2B**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
		Vegetarian cuisine	Share of vegetarian dishes	Average price level	GM price category	Sustainability congruent name	Sustainability incongruent name	Michelin star	New building
Intercept	-4.43	-4.96	-14.11	-8.85	-1.95	9.81	-5.83	-4.33	-3.76
	(9.00)	*(7.87)*	*(10.23)*	*(17.65)*	*(11.56)*	*(7.85)*	*(7.19)*	*(8.50)*	*(7.89)*
Independent variables									
		-0.76	-4.79**	-0.01	-0.46	-10.05***	-8.98	-1.30	0.69
		(1.06)	*(1.03)*	*(0.05)*	*(0.76)*	*(2.87)*	*(6.11)*	*(0.85)*	*(0.58)*
Control variables									
Number of reviews	0.21	0.22	0.20	0.33	0.64**	0.24	0.21	0.24	0.30
	(0.28)	*(0.24)*	*(0.23)*	*(0.20)*	*(0.20)*	*(0.22)*	*(0.29)*	*(0.26)*	*(0.25)*
Chain	-1.59	-1.42*	-0.51	-1.44	-1.09	-1.24	-1.50	-1.53	-1.57**
	(1.05)	*(0.72)*	*(0.38)*	*(1.11)*	*(0.56)*	*(0.60)*	*(1.03)*	*(0.90)*	*(0.56)*
Distance to city center	-0.14	-0.14	-0.15	-0.23	-0.20	-0.12	-0.07	-0.14	-0.20
	(0.18)	*(0.19)*	*(0.17)*	*(0.36)*	*(0.53)*	*(0.19)*	*(0.17)*	*(0.18)*	*(0.22)*
Percentage of high incomes	-0.06	-0.05	0.01	0.06	-0.03	-0.04	-0.04	-0.05	-0.07
	(0.07)	*(0.05)*	*(0.04)*	*(0.11)*	*(0.03)*	*(0.06)*	*(0.07)*	*(0.06)*	*(0.04)*
Leftist voting intensity	0.06	0.07	0.22	0.12	0.03	0.14	0.09	0.06	0.04
	(0.12)	*(0.11)*	*(0.14)*	*(0.23)*	*(0.19)*	*(0.10)*	*(0.09)*	*(0.11)*	*(0.11)*
Percentage of inhabitants with a Dutch background	0.02	0.02	0.03	0.04	0.01	0.03	0.02	0.02	0.03
	(0.03)	*(0.03)*	*(0.03)*	*(0.08)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.03)*	*(0.02)*

Appendix G Exterior pictures of The Green House and KEEK

Figure G1

Exterior look of The Green House

Figure G1

Exterior look of KEEK