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Perspectives on Michelin Green Star Restaurants: Inspector and Customer Review Analysis

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Abstract

Rapid technological advancements have transformed people's lifestyles and eating habits. While technological innovations have brought convenience, they have also contributed to the growing challenges of global warming and environmental pollution. This study aims to explore the perspectives of customers and Michelin inspectors on the service quality and sustainability practices of Michelin Green Star restaurants. Data were collected from the global Michelin Guide website and TripAdvisor, and text mining techniques were applied to analyze online reviews from both inspectors and customers. Using the BERTopic model, the study identified seven key aspects of restaurant service quality considered in Michelin restaurant evaluations, nine aspects specific to Green Star restaurant assessments, and eight aspects highlighted in customer reviews. These findings reveal the similarities and differences in the evaluation criteria used by inspectors and customers, providing valuable insights for restaurant operators.
Keywords: Michelin Green Star Restaurant, Online Reviews, Text mining, BERTopic.

1 Introduction

The term "green restaurant" was first introduced by Lorenzini [2] to describe environmentally friendly establishments that implement resource-efficient measures such as water conservation and waste reduction. As green restaurants, these establishments are expected to actively participate in and communicate the outcomes of their sustainable practices [3]. Typically, green restaurants adhere to specific guidelines to ensure compliance with sustainability and environmental standards while also conveying their core values to customers. Internationally, the Green Restaurant Association (GRA) in the United States established a certification system as early as 1990, setting sustainability standards for restaurants. The certification evaluates restaurants across seven key categories: energy, water, waste, disposables, chemicals and pollution reduction, sustainable food, and sustainable furnishings and building materials. Meeting these certification standards enhances a restaurant's green brand image. Similarly, the Sustainable Restaurant Association (SRA) in the United Kingdom launched the "Food Made Good" sustainability rating system in 2010, which assesses restaurants based on three dimensions and ten key indicators. This framework provides a structured evaluation, helping restaurants improve their sustainability practices and achieve long-term environmental goals. These certification systems establish clear objectives and concrete benchmarks, setting an evolving industry standard that encourages more restaurants to engage in sustainable practices [4]. The Michelin Green Star, introduced in the 2020 edition of the Michelin Guide France, is a prestigious sustainability award granted to restaurants that demonstrate outstanding

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commitments to ethical and environmental practices. Michelin's expert inspectors rigorously evaluate these restaurants based on factors such as food sourcing, environmental responsibility, and service quality, ensuring a high level of credibility and professionalism [5]. Green Star restaurants distinguish themselves through their dedication to sustainability, particularly in minimizing waste and promoting responsible dining practices. In the restaurant industry, Michelin Green Star restaurants hold a recognized status, as they are evaluated not only for their ingredient quality and service excellence but also for their achievements in sustainability.

Recent studies have highlighted the significant positive impact of restaurant sustainability practices on consumer values and behaviors [7]. However, restaurant operators face a critical challenge: how to identify which sustainability initiatives effectively enhance customer satisfaction and loyalty. This challenge is not only driven by consumers' increasing awareness of environmental and sustainability issues but also reflected in their growing support for green restaurants.

Given the leadership of Michelin Green Star restaurants in sustainable dining—such as using ethically sourced ingredients, collaborating with green suppliers and producers, and reducing plastic usage—this study analyzed their customer reviews from TripAdvisor alongside professional evaluations from the Michelin Guide to understand and compare the evaluation focuses of customers and Michelin's professional inspectors.

2 Related Studies

2.1 Green Restaurants

Customer satisfaction is a crucial indicator of a restaurant's operational performance, as it reflects the overall quality of the dining experience. Various factors contribute to restaurant customer satisfaction, including food quality, pricing, service attitude, and dining environment. Previous research has highlighted a strong correlation between sustainability practices and customer satisfaction in the restaurant industry [11]. Given that customer satisfaction is a key driver of success, sustainability initiatives have been identified as an effective strategy for enhancing satisfaction levels.

Studies have categorized the factors influencing consumer dining experiences and restaurant choices into eight major dimensions, including ambiance, food quality, service, pricing, and behavioral intentions, demonstrating that customers evaluate restaurants based on multiple aspects [12]. Additionally, research suggests that the restaurant's atmosphere can evoke both positive and negative emotions, which in turn affect customers' intention to revisit [13]. Liu et al. further emphasized that the relationship between food quality and customer satisfaction is nonlinear, with pricing playing a moderating role. Their findings indicate that a low-quality dining experience has a greater negative impact on customer satisfaction than a high-quality experience has on improving it [14].

In recent years, green consumerism has become more widespread, and shifts in dietary habits have fueled the emergence of the green food movement, reinforcing the increasing focus on environmental sustainability [8]. The term "green" represents eco-friendliness, sustainability, and environmental consciousness. A green restaurant is broadly defined as any restaurant that actively engages in green practices [9]. While Lorenzini [2] first introduced the concept of green restaurants in 1994, its definition may vary depending on research objectives and academic perspectives. Additionally, multiple factors influence consumer behavior in green restaurants, including the restaurant's environmental image, perceived benefits, and reduced guilt associated

with dining choices [10]. Previous studies indicated that consumers' attitudes toward restaurant sustainability practices primarily depend on their perception of food quality and overall restaurant management [8]. This suggests that when choosing a green restaurant, consumers consider not only environmental factors but also various other aspects, which collectively shape their dining frequency and preferences.

Although extensive literature has examined green restaurants, research specifically on Michelin Green Star Restaurants remains limited. This gap may exist because researchers have traditionally focused on mass-market dining establishments or restaurants with significant social influence, often overlooking high-end dining venues. Additionally, as the Michelin Green Star is a relatively new distinction, it has yet to receive sufficient academic attention. This study aimed to bridge this gap by exploring the unique characteristics and evaluation criteria of Michelin Green Star Restaurants.

2.2 Review Analysis

In today's era of rapid digital technological development and widespread use of social media, consumers are increasingly relying on User-Generated Content (UGC) to make purchasing decisions. UGC refers to content such as data, text, images, and videos created, shared, and uploaded by general internet users on social media platforms, also known as electronic word of mouth (eWOM) or online reviews. In the current internet age, most consumers explore a vast amount of online reviews to identify or evaluate products, seeking a more comprehensive assessment of the items they consider [6]. At the same time, businesses can leverage online reviews to establish a positive brand image on social platforms, deepen emotional connections with consumers, and enhance brand loyalty. Among the numerous customer review platforms, TripAdvisor, as a well-known international travel website, provides extensive customer reviews and feedback. These user-shared reviews serve as valuable references for other travelers, reducing the gap between actual experiences and expectations.

Text mining is a branch of data mining aiming at the automated content analysis of large volumes of textual data, extracting valuable information such as sentiments, topics, and opinions. Text mining is widely applied across various domains, including customer service, product development, and financial research. In the service industry, hotel operators utilized the emotional needs expressed in customer reviews to identify innovative opportunities and develop strategies [16]. In the tourism sector, text mining was employed to extract the quantity of positive and negative words from reviews, identifying key factors that influence consumer happiness [17]. In the financial domain, information was extracted from large amounts of financial text data to detect potential trends or warning signals, which aids decision-making and risk management [18]. In the construction field, natural language processing technologies were used to analyze construction-related textual data, extracting insights to improve construction management practices and promoting the automation and intelligence of the construction industry [19]. The broad application of text mining in these studies highlights its value across different sectors. It is important to note that online reviews often lack a fixed format and may contain diverse types of information, which is why some studies have focused on multi-attribute evaluation [15] to gain a more comprehensive understanding and analysis of the diversity in textual data.

Topic modeling is a statistical model used to identify latent topics within text data. It automatically analyzes each document and counts the frequency of words, then extracts the relevant topics based on this statistical information. Topic modeling utilizes unsupervised

learning, eliminating the need for pre-labeled or annotated data, and directly trains from the text itself. Common models, such as Latent Dirichlet Allocation (LDA) and Latent Semantic Analysis (LSA), transform text into feature vectors, further analyzing the significance of factors to uncover valuable insights [20]. With the continuous development of natural language processing techniques, deep learning-based topic modeling methods such as BERTopic have emerged in recent years.

BERTopic is a method that combines the pre-trained BERT (Bidirectional Encoder Representations from Transformers) model with topic modeling. It extracts document embeddings using the pre-trained BERT language model and reduces the embedding dimensions using Uniform Manifold Approximation and Projection (UMAP). It then applies the Hierarchical Density-Based Spatial Clustering of Applications with Noise (HDBSCAN) clustering technique to group semantically similar documents. Finally, using class-based TF-IDF (c-TF-IDF), it extracts key terms and features from the document clusters, aiding the understanding of the topics within those clusters. Many studies have widely applied BERTopic for topic extraction. For instance, Ng et al. analyzed social media posts to explore public sentiment during the outbreak of the infectious disease Monkeypox, highlighting an important social issue [22]. Jeon et al. combined BERTopic with a deep natural language processing-based hybrid model, PatentSBERTa, to analyze patents from the U.S. Patent and Trademark Office, extracting topic features and identifying potential technologies related to digital healthcare, offering valuable insights for researchers in the field of digital healthcare [23]. Niroomand et al. utilized the BERTopic model to explore the application trends and potential research topics of artificial intelligence in 21st-century renewable energy systems. Their research identified seven main topics and analyzed the evolution of these topics over time, comprehensively identifying technologies at the intersection of artificial intelligence and renewable energy systems, enhancing scientific work in pattern detection and demonstrating the importance of emerging deep learning algorithms in addressing uncertainties and dynamic conditions in renewable energy systems [24].

This study utilized BERTopic to identify the key topics that are concerned in customer reviews and inspector comments of Michelin Green Star restaurants.

3 Methodology

This study collected review data from the global Michelin Guide website and the TripAdvisor travel review platform. Using text mining techniques, it explored the key aspects emphasized by Michelin inspectors in selecting “Michelin Restaurants” and “Green Star Restaurants” while also identifying the focal points of customer attention from TripAdvisor reviews. To achieve this, the collected textual review data underwent preprocessing, followed by topic modeling using BERTopic to analyze the perspectives of both restaurant inspectors and customers. Finally, the identified topics were interpreted, and concrete managerial implications were derived.

3.1 Data Collection and Preprocessing

The 480 Michelin Green Star restaurants listed on the Michelin Guide website as of November 2023 were studied. Their data was collected from the Michelin Guide website and TripAdvisor using the Python programming language and Chrome browser extensions. The Selenium package in Python was utilized to develop a script that automates Chrome browser operations, simulating browsing behavior and directing it to the target websites for data scraping.

The collected data of Michelin Green Star restaurants from the Michelin Guide website include restaurant names, locations, stars, and the evaluation perspectives for their selection as a Michelin-listed restaurant (MICHELIN Guide's Point of View) and as a Green Star restaurant (Gastronomy & Sustainability). Figure 3.1 provides an example of a restaurant, illustrating how its information is presented on the Michelin Guide website.

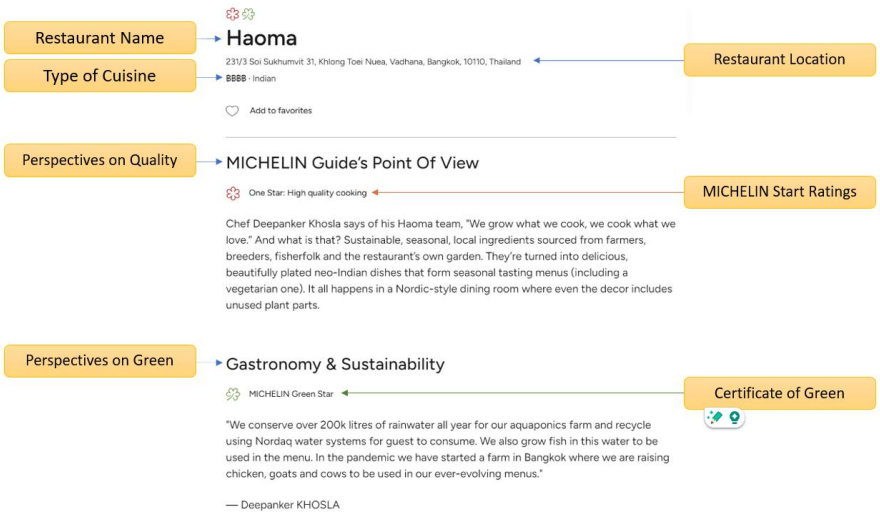


Figure 3.1 A Green Start restaurant presented on the Michelin Guide website

Customer review data for these 480 Michelin Green Star restaurants was sourced from TripAdvisor, including review titles and content, review timestamps, and ratings. Totally, 57,80 reviews were collected. Figure 3.2 shows a customer review on the TripAdvisor website.

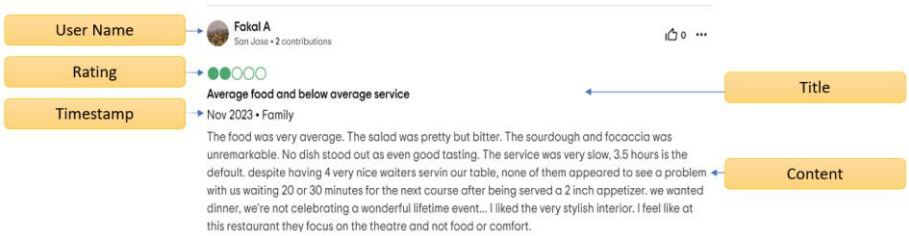


Figure 3.2 A restaurant review on TripAdvisor

This study analyzed three types of textual data: "MICHELIN Guide's Point of View" and "Gastronomy & Sustainability" from the Michelin Guide website, as well as customer reviews from TripAdvisor. The analysis aimed to explore the similarities and differences among Michelin inspectors' focus on restaurant quality (presented in MICHELIN Guide's Point of View), their emphasis on sustainability practices (presented in Gastronomy & Sustainability), and general consumer concerns (presented in customer reviews). To achieve this, text preprocessing was conducted after data collection, including the removal of non-English reviews, sentence segmentation, and lowercase conversion. As a result, the three datasets yielded 2,068, 1,224, and 43,434 cleaned sentences, respectively, for subsequent topic modeling analysis.

3.2 Topic Modeling

The BERTopic technique was employed to extract topics from the three distinct datasets, aiming to understand their respective focal points. The first step involved converting the preprocessed sentences from the previous step into embedding vectors using BERT. Specifically, this study utilized the pre-trained all-MiniLM-L6-v2 model from SentenceTransformers, a Transformer-based semantic model capable of effectively capturing textual semantics.

In the second step, UMAP was applied to reduce the dimensionality of the high-dimensional embeddings while preserving their intrinsic structure, facilitating subsequent clustering. During this process, parameters such as n_neighbors, n_components, and min_dist must be fine-tuned. Given the differences in size and data distribution of the three datasets, this study iteratively adjusted the parameters to achieve an optimal configuration, preventing issues of excessive crowding or sparsity in the embedding space.

The third step involved clustering the dimensionally reduced sentence embeddings using the HDBSCAN algorithm, ensuring that semantically similar sentences were grouped together. In this step, different parameters, min_cluster_size, and min_samples, were tested to achieve optimal clustering, filtering out the noise to obtain more distinct and meaningful topics.

The fourth step utilized CountVectorizer to extract vocabulary and construct a bag-of-words model for each cluster. In the fifth step, c-TF-IDF was applied to weigh the vocabulary features, identifying the key terms that define each cluster. Finally, the clusters were formulated into distinct topics, with the key terms serving as interpretative elements to elucidate the thematic content of each topic.

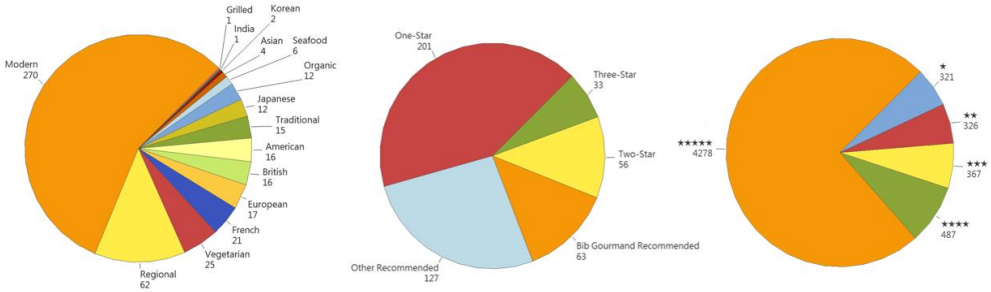
The parameters used in this analysis are presented in Table 3.1.

Table 3.1 Setting of parameters in BERTopic

	UMAP			HDBSCAN	
Parameter	n_neighbors	n_components	min_dist	min_cluster_size	min_samples
MICHELIN Guide's Point of View	25	10	1	6	0
Gastronomy & Sustainability	15	10	0.0	35	5
Customer Reviews	15	5	0.5	58	2

4 Results

As of November 2023, the Michelin Guide website has listed a total of 480 Green Star restaurants. These restaurants offer a diverse range of cuisines, categorized into 15 different types, with the majority of restaurants classified under modern cuisine, as shown in Figure 4.1 (a). These restaurants are rated as Michelin one-star, Michelin two-star, and Michelin three-star, as well as Bib Gourmand and other recommended restaurants that do not hold a Michelin star but are featured in the guide. The distribution of these restaurants is illustrated in Figure 4.1 (b). Among the 5,780 customer reviews collected for the 480 Michelin Green Star restaurants, published between January 1, 2022, and January 1, 2024, the majority of reviews were accompanied by a 5-star rating. This indicates a high level of customer satisfaction with these restaurants, as illustrated in Figure 4.1(c).



(a) Cuisine Type (b) Michelin Certificate (c) Customer Review

Figure 4.1 Green Star Restaurants

Table 4.1 presents the seven topics identified through BERTopic analysis of MICHELIN Guide's Point of View, along with the key terms that constitute each topic, level of concern, and the final topic names derived from key terms. These topics reflect the key aspects and criteria considered by Michelin inspectors when evaluating restaurant quality, encompassing factors of ingredient and taste, dining environment, wine and beverage, professional and passionate service, sustainability principles, dish pairing, and reservation systems. For Topic 1, Ingredient and Taste, Inspectors emphasize the intrinsic characteristics of food and dishes, highlighting their strong focus on ingredient sourcing, quality, cooking techniques, and overall flavor. Topic 2, Dining Environment, includes key terms such as terrace, guestrooms, stay, and view. This reflects that Inspectors evaluate the comfort, visual experience, and overall ambiance of the dining space. Factors such as modernity, scenic views, and the overall atmosphere play a crucial role in their assessments. Topic 3, Wine and Beverage, involves terms like wine, drinks, and non-alcoholic beverages. Inspectors may consider the variety of wine and beverage options and how well they pair with the dishes when evaluating a restaurant. Topic 4, Professional and Passionate Service, focuses on aspects related to service quality, including professionalism, teamwork, and friendliness. Inspectors likely assess a restaurant based on its service standards, staff coordination, and attitude toward guests. Topic 5, Sustainability Practices, includes keywords related to sustainability, ecoresponsibility, and waste management. Inspectors may evaluate whether a restaurant has a clear commitment to sustainable practices and whether it implements corresponding actions, indicating the growing importance of sustainability in their considerations. Topic 6, Dish Pairing, covers menu design, lunch combinations, and daily specials. Inspectors may assess the diversity of dish pairings and the uniqueness of daily specialties when rating a restaurant. Topic 7, Reservation System, pertains to reservation-related aspects such as booking processes and system convenience. Reviewers may evaluate whether the restaurant's reservation system is user-friendly and efficient in preventing booking errors. The factors, ingredient and taste, dining environment, and wine and beverage are concerned more significantly than others from the perspectives of inspectors when evaluating the quality of the restaurants.

Table 4.1 Topics extracted from MICHELIN Guide's Point of View

Topic	Key Terms	Concern Level	Name
1	dish, menu, flavour, fish, vegetarian, chef, ingredient, cuisine, vegetable, sourced	41%	Ingredient and Taste
2	terrace, guestroom, room, dining, hotel, stay, view, overnight, modern, large	22%	Dining Environment
3	wine, pairing, selection, label, cellar, nonalcoholic, interesting,	20%	Wine and Beverage

	natural, choice, drink		
4	service, professional, team, friendly, atmosphere, charming, attentive, relaxed, informal, enthusiastic	7%	Professional and Passionate Service
5	sustainability, philosophy, sustainable, green, ecoresponsibility, underpins, approach, nature, waste, establishment	4%	Sustainability Practices
6	menu, lunchtime, set, lunch, carte, course, available, dinner, daily, special	4%	Dish Pairing
7	booking, online, system, advance, missed, general, compulsory, wait, reservation, door	2%	Reservation System

Table 4.2 presents the topic extraction results from the Gastronomy & Sustainability section, showcasing the perspectives provided by inspectors in evaluating restaurants for Green Star certification. It includes nine major topics: cooking methods, environmental protection and waste reduction, environmental sustainability, ingredient types and sources, local/seasonal ingredients, farm cultivation, sustainable practices and commitments, energy sources and utilization, and animal welfare. Topic 1, Cooking Methods, encompasses cooking styles, ingredient usage, and the selection of local ingredients. It indicates that inspectors may evaluate whether a restaurant's cooking techniques, ingredient choices, and sustainability philosophy are aligned. Topic 2. Recycle and Waste Reduction, focuses on a restaurant's efforts in waste minimization and environment conservation, including food waste management and resource recycling, reflecting the restaurant's contribution to environmental protection. Topic 3, Environmental Sustainability, highlights the importance that restaurants place on environmental protection and the sustainable use of natural resources in both their operational philosophy and actions, demonstrating their commitment to ecological conservation. Topic 4, Ingredient and Sources, discusses the ingredients used by restaurants, such as fish, meat, and vegetables, indicating an emphasis on ingredient freshness and traceability. Topic 5: Local and Seasonal Ingredients, reflects inspectors' assessment of whether restaurants prioritize local ingredients to reduce the carbon footprint of dishes while also favoring organic produce. Topic 6, Permaculture, involves restaurants' sustainable agricultural activities inspired by natural ecosystems, such as growing their own vegetables and fruits, suggesting that some establishments engage in self-sufficient farming to shorten the supply chain and reduce resource consumption. Topic 7, Sustainable Practices and Commitments, encompasses restaurants' business philosophies, material usage, and waste management, emphasizing their commitment to sustainability. Topic 8, Energy Sources and Utilization, concerns a restaurant's energy consumption, including the use of solar, hydro, and electric power. It indicates a focus on energy conservation, carbon footprint reduction, and the consistent application of sustainable energy solutions. Topic 9, Animal Welfare, examines restaurants' adherence to animal-friendly practices and organic agriculture, highlighting the importance of considering the well-being of animals and nature alongside human welfare.

Table 4.2 Topics extracted from Gastronomy & Sustainability

Topic	Key Terms	Concern Level	Name
1	cuisine, ingredient, food, local, cooking, produce, organic, producer, dish, cook	17%	Cooking Methods
2	waste, compost, plastic, food, reduce, zero, use, recycle, recycling, garden	17%	Recycle and Waste Reduction
3	sustainability, nature, sustainable, approach, environment, also, make, always, people, future	16%	Environmental Sustainability
4	fish, meat, use, vegetable, produce, seafood, fisherman, fishing, farm, animal	14%	Ingredient and Sources
5	local, produce, ingredient, organic farm use, producer, seasonal, come, sourced	11%	Local/Seasonal Ingredients

6	vegetable, garden, herb, fruit, kitchen, permaculture, plate, plant, come, grow	10%	Permaculture
7	dining, material, sustainable, sustainability, commitment, food, new, furniture, waste, many	5%	Sustainable Practices and Commitments
8	solar, energy, water, system, power, electricity, electric, rainwater, photovoltaic	5%	Energy Sources and Utilization
9	animal, organic, farming, welfare, sustainable, nature, people, farm, produce, work	5%	Animal Welfare

Table 4.3 presents the topics reflected in customer reviews, covering aspects such as food quality and service experience, expectation fulfillment, reservations and waiting, pricing and value, willingness to revisit, restaurant reputation and reviews, reception and attitude, and travel arrangements. These explain the issues that customers are concerned with in their reviews. Topic 1 highlights that food quality and service experience are key factors directly influencing customer satisfaction. Customers dining at Michelin Green Star restaurants may expect to enjoy high-quality ingredients, innovative dishes, and good dining experiences. This topic has received major attention from customers. Topic 2 is about customers' expression of feelings regarding whether their expectations are met. When their actual experience does not meet expectations, it may lead to negative reviews. Therefore, restaurants must maintain high standards to align with customer expectations. Topic 3 explores whether the reservation process is smooth and whether customers experience long wait times before being seated, both of which affect their overall satisfaction. Topic 4, pricing and value, reveals customers' concerns about cost-effectiveness, expecting excellent value for money and reasonable pricing. In addition to food quality, customers also consider price when reviewing their dining experience. Topic 5 reflects that customers evaluate a restaurant based on their willingness to revisit. A memorable and positive dining experience increases customer retention and loyalty. Topic 6 focuses on restaurant reputation and public perception. While Michelin Green Star recognition is an important reference, general public reviews also significantly influence customer decisions. Thus, restaurants should actively maintain a good reputation and positive reviews. Topic 7 highlights staff reception and attitude. Exceptional service leaves a lasting impression on customers, enhancing their overall satisfaction. This also underscores the importance of employee training in improving customer experience. Topic 8 relates to factors considered by travelers when selecting restaurants. Tourists often view dining as an integral part of their travel experience, taking into account restaurant reputation, dining quality, and overall experience. This topic explores how travelers prioritize restaurant choices and evaluate their dining experiences.

Topic	Key Terms	Concern Level	Name
1	food, michelin, service, experience, staff, wine, menu, great, star, amazing	83%	Food Quality and Service Experience
2	expectations, disappointed, disappointing, disappointment, high, shame, expected, sure, exceeded, enough	6%	Expectation Fulfillment
3	reservation, table, booking, advance, tables, booked, reservations, wait, make, email	4%	Reservations and Waiting
4	worth, expensive, price, bill, prices, charge, value, money, cheap, quality	3%	Pricing and Value
5	back, return, wait, soon, returning, going, coming, sure, next, forward	1.7%	Willingness to Revisit
6	stars, review, reviews, star, write, read, negative, place, three, reputation	1.2%	Restaurant Reputation and Reviews
7	cheers, job, girl, hugs, finnish, congrats, guys, accommodating, faultless, great, done	0.7%	Reception and Attitude
8	visit, steak, experience, better, weeks, famed, choice, trip, tourist, going	0.4%	Travel Arrangement

5 Discussion

This study aimed to analyze and explore the inspectors' and customers' perspectives of Michelin Green Star restaurants using the BERTopic modeling. It seeked to understand the key focus areas of inspectors regarding Michelin and Green Star certifications, as well as the service attributes that customers care about.

The results revealed that food quality and dining experience are the primary concerns of Michelin inspectors. Factors such as ingredient freshness, culinary techniques, and food-beverage pairing are all crucial evaluation criteria for Michelin recognition. Additionally, Michelin restaurants emphasize the professionalism and attitude of service staff, as high-quality service enhances the overall dining experience and directly influences customer perception. Furthermore, sustainability is an essential aspect of evaluation, reflecting the inspectors' recognition of the restaurant industry's environmental responsibilities. With the growing awareness of environmental protection, Michelin expects restaurants to not only provide high-quality dining experiences but also minimize their environmental impact, thereby strengthening their brand image.

Regarding the evaluation criteria for Green Star certification, this study found that inspectors adhere to the core principles of sustainable development, which include traceability of ingredient sources, energy conservation and carbon reduction in restaurant operations, food waste management, resource recycling and reuse, and ecological conservation. The inspectors place significant emphasis on the transparency of the food supply chain, encouraging restaurants to prioritize local organic produce or traditional ingredients to reduce their carbon footprint.

From customer reviews, several key findings can be summarized. First, this study identified the main factors influencing customer satisfaction, including ingredient quality, service experience, value for money, and restaurant reputation. However, in general, the most frequently mentioned topics in customer reviews revolve around "Food Quality and Service Experience," while other factors such as value for money, reservation convenience, and staff attitude are also important. Notably, despite dining at Green Star-certified restaurants, customers primarily focus on the restaurant's service and food quality rather than its sustainability performance.

Overall, these three perspectives highlight the critical importance of food-related aspects, including ingredient quality, food diversity, and cooking methods. From the inspectors' viewpoint, ingredient traceability and culinary standards are essential, underscoring the high expectations for food quality in Michelin restaurants. On the other hand, customer reviews emphasize food quality and variety, indicating that ingredients are a key factor affecting customer satisfaction at Michelin Green Star restaurants. This also reflects the core values and competitive advantages of these restaurants. However, some differences exist—inspectors place greater emphasis on sustainability criteria, whereas customers are more concerned with food quality, service experience, and value for money. These insights provide valuable references for restaurants to enhance their service quality and overall performance.

6 Conclusions

Culinary quality is the core competitive advantage of a restaurant. Continuously focusing on ingredient quality, cooking techniques, and menu design to provide customers with a top-tier dining experience is crucial. This study found from customer reviews that food quality remains the primary concern for diners. However, with the rise of environmental awareness and

sustainable development concepts, sustainability has become an important issue that restaurants can no longer ignore. Finding a balance between meeting customer expectations and incorporating environmental considerations into operations is a critical challenge that the restaurant industry must address.

This study found that Michelin Green Star restaurants have indeed made efforts toward environmental sustainability; however, this is not the primary concern for customers, making it difficult to translate these efforts into perceived customer value. It is recommended that restaurants take additional measures to make their sustainability initiatives more tangible to customers. For instance, clearly displaying the origin and cultivation methods of ingredients can enhance transparency, allowing customers to better understand the food sources and build trust in the restaurant. Additionally, restaurants can integrate sustainability into their brand identity by emphasizing their commitment to sustainable development and environmental protection. This can be conveyed through their website, advertising, and interior design, helping to establish an environmentally responsible brand image. Restaurants can also enhance customer awareness of environmental issues by organizing eco-themed events, encouraging diners to learn about and participate in sustainability practices. Furthermore, restaurants should continue to stay informed on environmental topics, regularly refine their sustainability strategies, and adapt to evolving best practices to strengthen customer trust and satisfaction.

Finally, several directions for future research can be considered. First, expanding the sample scope by incorporating multiple data sources, such as Google Reviews and Yelp, can contribute to obtaining more comprehensive analytical results. Second, other topic modeling techniques may be applied for comparative analysis to further validate the accuracy of the findings. Lastly, conducting in-depth comparisons of different types or regions of restaurants could provide insights into their strengths in terms of food quality and sustainability strategies. Further exploration of the competitive landscape in the restaurant industry would contribute to a more comprehensive understanding of its current state and emerging trends.

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