



# Tracing knowledge evolution flows in scholarly restaurant research: a main path analysis

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## Abstract

Restaurant research has received significant attention globally. This article aims to examine the evolution and the knowledge structure of restaurant research over the past decades. We also investigate the restaurant research hotspots and knowledge diffusion paths based on 1489 articles extracted from the Web of Science database. Furthermore, we conduct a keyword co-occurrence network analysis and four different types of main path analyses to scrutinize the historical formation of the restaurant research. Results revealed that restaurant research mainly focused on five research themes: consumer behavior, consumer satisfaction, social media, green restaurants, and authenticity. While consumer behavior has been the mainstream topic, the focus of this line of research has recently shifted from traditional to luxury and ethnic restaurants. Furthermore, our analysis has detected several recent changes in response to the COVID-19 pandemic. By examining the knowledge structure of restaurant research, we reveal its knowledge diffusion paths and provide avenues for future research in this vast and interdisciplinary research field.

**Keywords** Restaurant research · Consumer behavior · Consumer satisfaction · Keyword co-occurrence · Main path analysis

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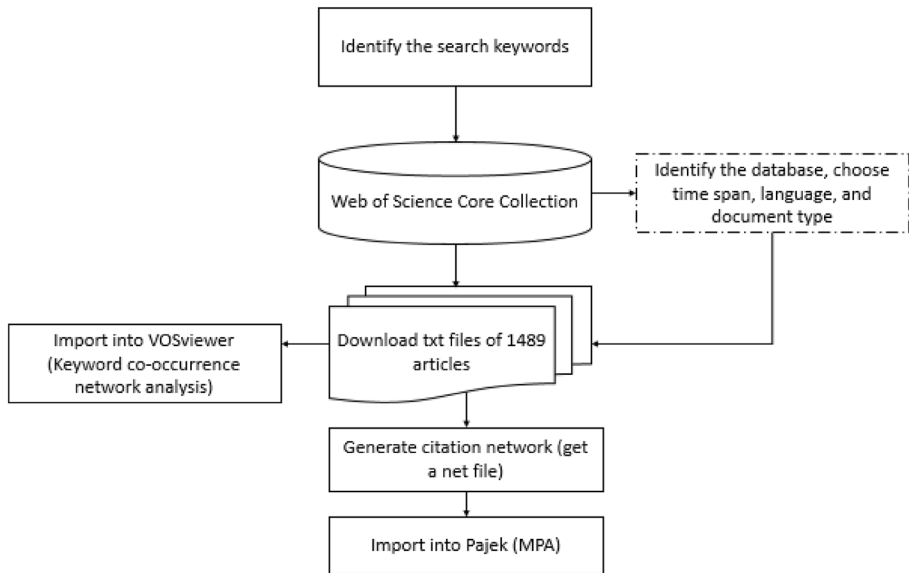
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## 1 Introduction

In recent decades, the restaurant industry has attracted significant attention from both scholars and practitioners (Chuah et al. 2021; Liu et al. 2020a, b; Rajput and Gahfoor 2020). According to DiPietro (2017), research on restaurants has increased considerably over the last three decades. To date, restaurant research represents one of the most important areas in the hospitality sector (Denizci Guillet and Mohammed 2015; Line and Runyan 2012). Indeed, as scholarly knowledge progresses in a scientific discipline, it becomes imperative for scholars to employ quantitative tools to review and uncover the knowledge domain's intellectual structure (Mostafa 2020; Rivera and Pizam 2015). Ferreira et al. (2014) argued that as research fields mature and become increasingly complex, scholars should periodically attempt to evaluate the knowledge generated and amassed to identify new contributions, uncover new patterns and research traditions, and grasp the subjects discussed, the theories and methodologies applied, and investigate the intellectual structure and the potential research directions in a field.

Thus, given the enormous interest in restaurant research, it is imperative to examine this knowledge domain in a systematic and comprehensive manner. Currently, some efforts have been undertaken to review prior restaurant-related scholarly research. For example, DiPietro (2017) conducted a review of the foodservice and restaurant literature published over the past decade in the leading hospitality and tourism outlets. Rodríguez-López et al. (2020) investigated the development of the restaurant research by employing bibliometric analysis. The authors identified the structure of relationships between previous and emerging themes, outlined research trends and offered a longitudinal perspective on the scholarly work published between 2000 and 2018. Although these reviews provide valuable information regarding scholarly restaurant research, no prior studies have so far applied the main path analysis (MPA) to examine the knowledge structure and the evolution flows of this domain. This is surprising given that this technique has been used in the literature to analyze knowledge domains in several research fields (Fu et al. 2019; Xiao et al. 2014; Xu et al. 2020). To bridge this lacuna, we apply the objective MPA technique to conduct a comprehensive analysis of the knowledge/intellectual structure of restaurant research.

Thus, this review aims to employ a keyword co-occurrence network analysis and MPA to explore the scholarly restaurant domain over the last decades. Using these quantitative approaches, not only the research hotspots can be discovered, but also the critical points shaping the historical formation of the restaurant domain. In addition, four distinct main paths are analyzed to lucidly explain the knowledge dissemination flows and structure of this domain. The use of quantitative methods reduces the analysis bias that might result from subjective reasoning. The combination of keyword co-occurrence clustering and MPA can deepen scholars' understanding of the complete history of restaurant research and help them understand the current state of this research domain and identify its future directions. By so doing, we believe that we make at least three contributions to the existing literature. First, by combining keyword co-occurrence clustering and MPA to examine the restaurant domain, we remedy a clear lacuna in previous research. Second, we provide a systematic analysis to investigate the knowledge transmission patterns from various angles, considering the local (forward and backward), global and key-route main paths, which helps reveal the "hidden structure" of the vast and multidisciplinary restaurant research. Third, by applying these fairly sophisticated quantitative methods, we vividly detect the evolutionary progress of the restaurant literature. More specifically, we aim to find answers to the following research questions (RQ):



**Fig. 1** Research procedure

**RQ 1.** What are the major topics/themes discussed in scholarly restaurant research?

**RQ 2.** What is the knowledge structure of restaurant research over the last decades?

**RQ 3.** What are the current trends/hotspots and the potential research directions in the field?

The structure of this paper is as follows. Section two deals with the data and methodology used to conduct the review. Section three presents the analysis of both the keyword co-occurrence network and the MPA approaches. Section four discusses the research findings, while Section five provides avenues for future research. Finally, Section six briefly concludes the research article.

## 2 Method

### 2.1 Data collection

Data quality constitutes a precondition to meaningful and interpretable results. In this respect, the Web of Science Core Collection (WoSCC) represents one of the most trustworthy and reliable sources covering several impactful journals (Rejeb et al. 2021b; Xiao et al. 2014). Moreover, WoSCC is commonly utilized by researchers as it enables them to conduct bibliometric analyses in different scientific fields (Mostafa 2020; Rodríguez-López et al. 2020). Thus, in the current study, the WoSCC is utilized as the main platform for data collection. Figure 1 presents the detailed research procedure of the study. Following Rodríguez-López et al. (2020), the search query applied in the present work is the following:  $TI=(restaurant^*)$  OR  $AK=(restaurant^*)$ , where TI and AK stand for the title field and author keywords field, respectively. The search in these fields is preferred in previous studies (Hernández et al. 2017; Sixto-Costoya et al. 2021; Villa et al. 2018) since it

helps to avoid non-pertinent entries and achieve greater accuracy in the results (Alnajem et al. 2021; Gao and Ruan 2018). The review is based on four sub-databases within the WoSCC, namely Science Citation Index Expanded (SCI-EXPANDED), Social Science Citation Index (SSCI), Art & Humanities Citation Index (A&HCI), and Emerging Sources Citation Index (ESCI). The time interval extends from 1970 to 2021, and the publications were collected on August 8, 2021. Only journal articles and reviews in English language were selected for the final analysis. Furthermore, the subject area was limited to Hospitality, Leisure, Sport, Tourism; Management; Business; and Operations Research Management Science, thus helping to mitigate discrepancy in research results, ensure a thorough exploration of the restaurant field, and enable better generalizability and systematization (Rejeb et al. 2022). For the sake of clarity and transparency, the search query used for the retrieval of publications is presented in "Appendix 1". After manually going through all the articles' metadata to exclude irrelevant (off-topic) publications, a total of 1489 documents were extracted and downloaded from the database.

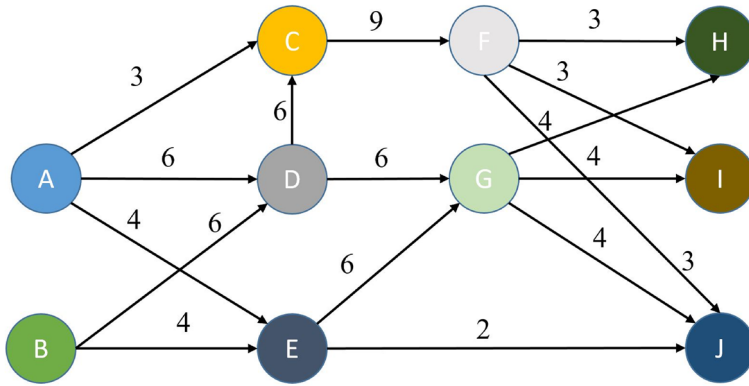
## 2.2 Keyword co-occurrence network

To obtain an in-depth understanding of restaurant research, we constructed a keyword co-occurrence network. Similar to a co-citation network, a keyword co-occurrence network shows the respective relationships between co-occurring author-supplied keywords (Abdollahi et al. 2021; Rejeb et al. 2021a, b; Yoon and Park 2020). Lee and Su (2010) noted that a keyword co-occurrence network analysis enables the researcher to identify research topics and capture the hotspots or research frontiers in a specific knowledge domain. Two keywords have a closer connection in the network if they appear in the same publications more frequently. By analyzing the keyword co-occurrence network, we aim to study the main content from the used keywords and portray the current structure of restaurant research. Owing to its high compatibility with the BibExcel tool, the software chosen for constructing this network is the VOSviewer. In this network, the radius of the node corresponds to the number of occurrences of each keyword, while the width of the links reflects the number of times each couple of keywords co-occur in publications. By clustering keywords, it is possible to determine the critical topics addressed in restaurant research.

## 2.3 MPA

Among various methods of citation-based analysis, we conducted cluster analysis and MPA. For the first, we adopted a keyword co-occurrence analysis. This bibliometric relational technique identifies the keywords used together more frequently in publications. These keywords are set as clusters, and a keyword co-occurrence network visualizes the association between them. The network could provide significant insights into different research foci and distribution of knowledge in a specified field (Börner et al. 2003; Rejeb et al. 2020).

MPA can complement cluster analysis by tracing a scientific domain's knowledge diffusion and research paths. With the application of MPA, we endeavor to efficiently handle a huge number of papers and unearth the interrelationships and knowledge diffusion trajectories in a scientific discipline. Furthermore, we applied MPA because of its capability to identify the mainstream literature and related themes, which entail potential directions for future research (Chuang et al. 2014). MPA also allows researchers to detect the structural backbone of the formation of restaurant research and to estimate the



**Fig. 2** A simple citation network with SPC values

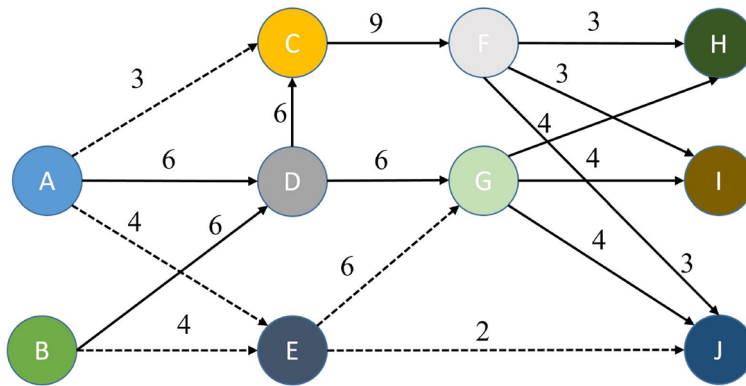
direct and indirect influences of a paper, thereby providing a more accurate estimation of the value of the paper. The detailed information gained from the multiple main paths helps us ascertain the most important themes in the restaurant literature that surface in different periods and how these themes evolved. The restaurant-related topics stem from objective citation relationships among publications, which can more precisely reflect the current state of the restaurant field and eliminate researchers' interpretations and judgments (Raghuram et al. 2010).

By conducting MPA and keyword co-occurrence network analysis, one could identify knowledge divergence, schools of thought, or paradigms and explore current and future trends in a research strand (Rejeb et al. 2022a; Tseng et al. 2021; Xu et al. 2020).

Initially introduced by Hummon and Dereian (1989), MPA represents a popular method being adopted by an increasing number of scholars to reveal the outstanding publications that have made major contributions to various domains (Liu et al. 2013). MPA-related studies could be divided into two main strands: the ones that developed the MPA and those that applied MPA in different contexts (Liu et al. 2019). For example, works applying MPA include reviews on corporate social responsibility (Lu and Liu 2014), strategic management (resource-based view) (Lu and Liu 2013), social commerce (Tang 2017), data quality (Xiao et al. 2014), the Internet of Things (IoT) (Fu et al. 2019), blockchain technology (Tseng et al. 2021; Yu and Pan 2021; Yu and Sheng 2021), supply chain bullwhip effect (Yu and Yan 2021) and sustainable technology innovation (Zhang et al. 2020).

To explain how MPA works, we presented a simple citation network (see Fig. 2). Consider two publications where one cites another. The publications are called nodes (e.g., A, B, and F), and a link is shaped from cited to citing node (e.g., A-C, A-D, and G-J). Nodes cited by others and do not cite other publications are called sources (e.g., A and B). Meanwhile, nodes not cited and only cite other documents are called sinks (e.g., H, I, and J).

Traversal weight is a key concept in MPA. It refers to different methods to assign different values to links. Among various methods such as search path link count (SPLC), search path node pair (SPNP), and node pair projection count (NPPC) (Hummon and Dereian 1989), we applied search path count (SPC) (Batagelj 2003). To determine the SPC value, one should count different paths that traversed the link, starting from a source till reaching a sink. For example, the SPC value of E-J is 2 because two paths are traversing through E-J, namely, A-E-J and B-E-J.



**Fig. 3** The forward local main path

The weighted network is extracted by calculating all the SPCs. The next step is to trace the main paths. In our study, we adopted local (forward and backward) main path analysis, global main path analysis, and key-route main path analysis to scrutinize the knowledge structure of restaurant research. These paths complement each other and could not be replaced (Yu and Sheng 2020). While the analysis of local main paths could determine the significant connections, the analysis of the global main path could reveal the path with the highest SPC. Contrary to these paths, the analysis of the key-route main path could extract knowledge divergence-convergence in a research field (Liu et al. 2013; Liu and Lu 2012).

To extract the forward local main path, we start with sources and compare their links. Then, the link(s) with the highest SPC are selected, and the nodes at the end of the selected link(s) are considered new starting points. We continue this process until reaching a sink. The resulted path is the forward local main path. In our example, it is presented by solid lines in Fig. 3.

While the forward local main path starts from sources and moves forward to sinks, the backward local main path moves backward from sinks to sources. The first depicts the publications with the most followers, where the latter portrays the ones that have taken the most ideas from previous papers (Liu and Lu 2012). Figure 4 illustrates the backward local main path for our example.

Neither forward nor backward local paths are necessarily the path with the highest SPC value. For this reason, the analysis of the global main path is used to extract the path. The paths with the highest SPC value (24) in our sample are drawn with solid lines in Fig. 5.

None of the above-mentioned paths necessarily extract all the links with the highest SPCs. Thus, the key-route main path analysis is used starting from the links with the highest SPCs. Then, the path is determined by moving forward till reaching a sink and moving backward till reaching a source (Liu and Lu 2012; Rejeb et al. 2022a, b, c). Figure 6 presents the key-route 2 main paths for our example. 2 refers to choosing 9 and 6 as the two highest SPCs. One could reveal more details by choosing more key-routes.

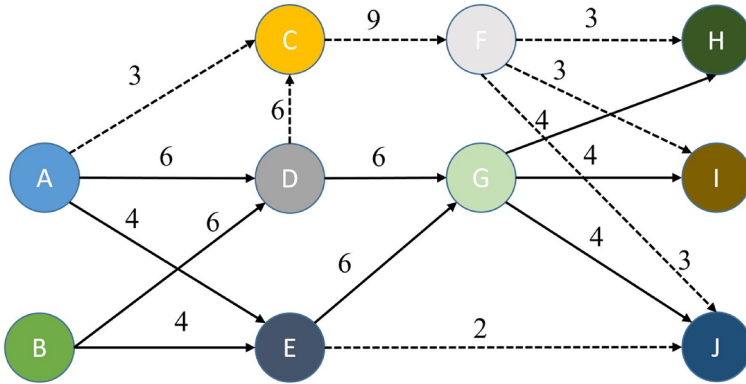


Fig. 4 The backward local main path

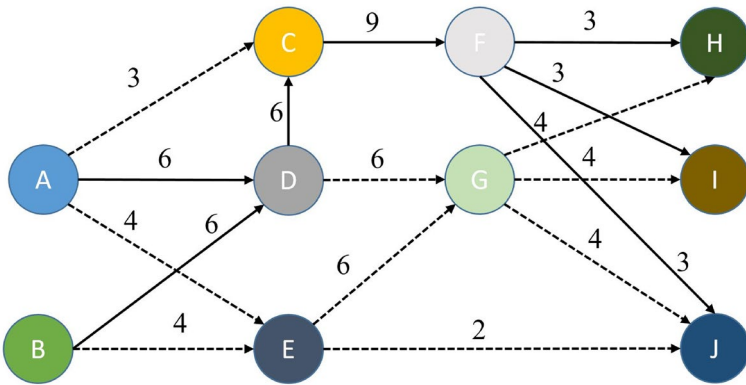


Fig. 5 The global main path

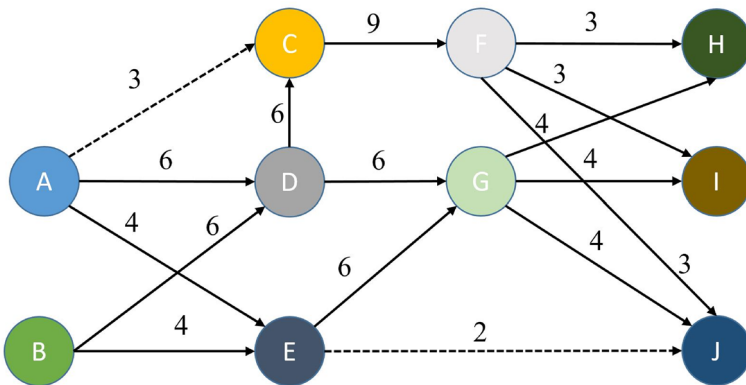


Fig. 6 The key-route 2 main path







**Table 1** Top 10 most frequent keywords in each cluster

Cluster 1	Cluster 2	Cluster 3
Restaurant	Customer satisfaction	Restaurant industry
Consumer behaviour	Service quality	CSR
Hospitality	Behavioral intention	Franchising
Foodservice	Satisfaction	Firm performance
Hotel	Emotion	Financial performance
Tipping	Loyalty	Restaurant type
Innovation	Perceived value	Internationalization
COVID-19	Trust	Job satisfaction
Tourism	Customer loyalty	Moderating effect
Revenue management	Full-service restaurant	Casual dining restaurant
Cluster 4	Cluster 5	Cluster 6
Restaurant management	Green restaurant	Authenticity
Online review	Attitude	Ethnic restaurant
Social media	Theory of planned behavior	Brand equity
eWoM	Restaurant menu	Brand loyalty
Dining experience	Menu labeling	Servicescape
Restaurant service	Green practices	Perceived quality
Service failure	Local food	Brand image
WoM	Gender	Brand trust
Service recovery	Menu design	Perceived authenticity
Restaurant experience	Food choice	Advertisement

behavior constitutes the result of multiple intrinsic and extrinsic factors, such as the motivations of various consumers, food attributes, and the environments where food choices are made (Camillo et al. 2010). In the current cluster, the relationship between consumer behavior and innovation and how they impact one another have attracted scholars' attention (Laužikas et al. 2015; Torabi Farsani et al. 2016). To offer a positive consumer experience, it is crucial to deploy information and communication technologies (ICT) applications and innovation in the foodservice sector. For example, in the study of Chuah et al. (2021), behavioral intentions are measured in terms of consumers' innovativeness and willingness to pay more for robotic restaurants. Furthermore, the recent COVID-19 pandemic has significantly influenced consumer behavior and highlighted the role of innovation in ensuring responsiveness and business survival (Hemmington and Neill 2021), enhancing order accuracy, optimizing productivity, and improving customer relationships and satisfaction (Gavilan et al. 2021; Hakim et al. 2021; Linh et al. 2021; Min et al. 2021; Vig and Agarwal 2021). Finally, some researchers in this cluster have investigated the tipping behavior of consumers (Beer and Greitemeyer 2019; Kowalczyk and Gębski 2021; Lynn 2021; Maynard and Mupandawana 2009; Seiter et al. 2011, 2016; Thrane and Haugom 2020).

The second cluster in green revolves around customer satisfaction. Several researchers have focused on customer satisfaction in the restaurant context (Agrawal and Mittal 2019; Dwaikat et al. 2019; Mannan et al. 2019; Rajput and Gahfoor 2020; Ryu et al. 2008; Xia and Ha 2021). They have also investigated the relationship between customer satisfaction and service quality, emotion, trust, and perceived value and demonstrated how customer

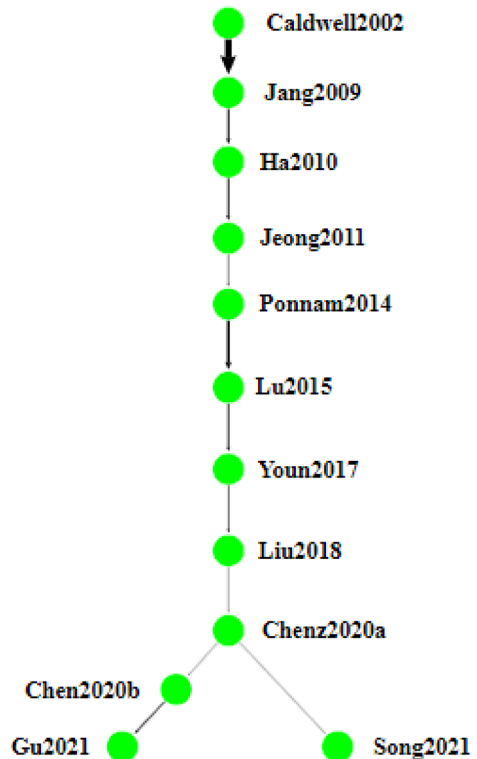
satisfaction could shape and impact behavioral intentions and customer loyalty in various types of restaurants, including full-service restaurants (Anggraeni et al. 2020; DiPietro and Levitt 2019; Mursid and Wu 2021; Tuncer et al. 2021).

The third cluster in blue emphasizes the importance of the corporate social responsibility (CSR) concept within the restaurant industry. As is the case with other industries, scholars in this field argue that it is not sufficient for restaurants to just maximize their financial performance. Instead, they should address social and environmental concerns as this would positively impact their reputation and enhance their financial performance (Theodoulidis et al. 2017; Yoon and Chung 2018). For example, CSR could positively influence job satisfaction, employee engagement, and, consequently, firm performance (Kim and Kim 2020). Furthermore, scholars have examined the moderating effects of CSR and its relationship with internationalization, franchising, as well as restaurant type and risk (Jung et al. 2018a, b; Bora and Lee 2020).

The fourth cluster in yellow is labeled as online reviews, indicating the critical role of social media in customers' communication and the effects of WoM and eWoM on restaurants' success or failure. Customers are increasingly sharing their views on restaurant services and experiences. In this cluster, researchers focused on how these shared views impact emotions and intentions (Huifeng and Ha 2021; Oliveira and Casais 2019; Popy and Bappy 2020). In addition, studies sought to answer how restaurants could better exploit positive and negative reviews to make effective recovery strategies after service failures, improve reputation, and enhance social capital and performance (Chang and Cheng 2021; Kim and Velthuis 2021; Micu et al. 2017).

The fifth cluster in purple focuses on green restaurants and sustainability. Green restaurants have become widely prevalent due to environmental concerns and consumers' needs for locally-grown and organic foods (Liu et al. 2020a, b). Unlike traditional restaurants, green restaurants commit efforts to reduce waste, increase water efficiency, and use sustainable furnishings and building materials (Ham and Lee 2011). In general, researchers explored the theme of green restaurants from various perspectives, including customer intentions, restaurant performance, and adoption drivers of green practices (Tehrani et al. 2020; Teng and Wu 2019; TM et al. 2021). Theory of planned behavior seems to be very popular in explaining consumers' attitudes, intentions and perceptions of the restaurant and the food choice differences between genders, ages, and regions (Jang et al. 2015; Kim et al. 2013; Moon 2021). Moreover, several studies have examined the impacts of green restaurant menus or organic menus on consumer intentions, highlighting menu labeling and design techniques (e.g., information about local foods) as a fundament to persuade consumers to buy green and sustainable foods (Cai et al. 2021; Cerdá Suárez et al. 2018; Shafieizadeh and Tao 2020; Shin et al. 2019).

Finally, the last cluster in aqua deals with consumer-brand relationships. The vital role of brands in the restaurant industry has been portrayed by several scholars (Hwang et al. 2011; Jin et al. 2012; Kwon et al. 2020; Lu et al. 2015; Wang and Mattila 2015). The high frequency of the keywords "Authenticity" and "Ethnic Restaurant" indicates the heightened importance of providing an authentic consumer experience and promoting ethnic cuisines. Overall, studies in this cluster have focused on antecedent factors (e.g., service-scape, perceived quality, brand and restaurant experience, and advertisement) that impact consumer behavior and enhance brand-related concepts such as brand trust, brand loyalty, brand equity, brand image, and (perceived) authenticity. While most studies belong to the marketing and sustainability strands, other fields like supply chain management, strategic management, and digital transformation can enrich restaurant research and contribute to this amazing knowledge domain.

**Fig. 8** Restaurant research forward local main path

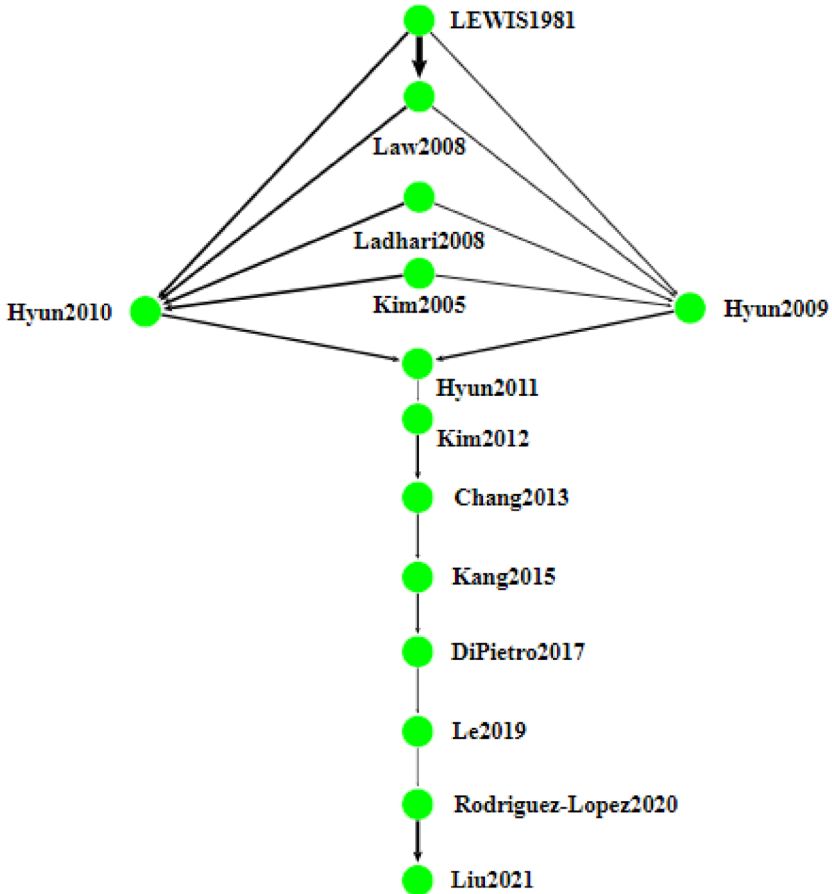
### 3.2 MPA results

We conducted local (forward and backward) main paths analysis, global main path analysis, and key-route main path analysis. These paths reveal the most important trajectories of restaurant research and complement each other. In the figures, each node represents a paper (i.e., unit of analysis) accompanied by the lead author's name and publication year. The directed links depict the knowledge flow, and their thickness reflects their importance or a higher search path count (SPC) value.

#### 3.2.1 Local main paths

Figures 8 and 9 present the local main paths, comprising 12 papers and 14 papers, respectively. Overall, the forward and backward local main paths do not share similar papers.

It is evident that Caldwell and Hibbert (2002) represents the first article on the forward local main path that marks the initial formation of restaurant research. In this study, the authors have examined different consumer behavior variables, including perceived and actual time spent in the restaurant, money, enjoyment of the experience, and future behavioral intentions. They further explored the impact of music tempo and preference on these variables. Strongly connected to the previous paper, Jang and Namkung (2009) have used the stimulus–organism–response framework to investigate the relationship between perceived quality (product, atmospherics, and service), emotions (positive and negative), and



**Fig. 9** Restaurant research backward local main path

behavioral intentions. Results revealed that restaurateurs should devote more attention to enhancing service quality and atmospherics to create positive emotions and deliver quality products to alleviate customers' negative emotions. Subsequently, Ha and Jang (2010) explored the impact of perceived service and food quality on customer satisfaction and loyalty and the moderating effect of the perception of atmospherics in Korean restaurants.

In an innovative research, Jeong and Jang (2011) scrutinized factors that cause customers to participate in positive eWOM. These factors include service and food quality, atmosphere, and price fairness. Ponnam and Balaji (2014) focused on casual dining restaurants and examined the relationship between visitation motives and restaurant attributes. At this point, authenticity or perceived authenticity has emerged in scholars' keywords. For example, Lu et al. (2015) examined the relationship between authenticity, brand equity, and brand choice intention. The authors found that consumers' authenticity perception constitutes a key determinant of brand equity, which considerably impacts consumers' choice of ethnic restaurants. Youn and Kim (2017) investigated the effects of ingredients, names, and stories about food origins on perceived authenticity and purchase intentions. In the context of independent, full-service mainstream ethnic restaurants, the connections

among perceived authenticity, perceived value, perceived quality, and behavioral intentions are examined by Liu et al. (2018). Results revealed that restaurant authenticity positively impacts perceived value and that respondents closely acquainted with Italian culture and food attribute more value to restaurant authenticity. Finally, Chen et al. (2020a) looked into the effects of perceived authenticity on perceived quality, perceived value, and behavioral intentions in a traditional branded restaurant.

Two paths have emerged at the extremity of the forward main path analysis. One path contains two papers revolving around nostalgia. For instance, Chen et al. (2020b) examined the role of nostalgia in affecting consumers' loyalty intentions at traditional Chinese restaurants and found that consumers with nostalgic feelings tend to perceive a higher value of their dining experience, which results in higher loyalty intentions. In a similar vein, Gu et al. (2021) examined the impact of nostalgia-evoking stimuli on customers' consequent assessment and post-purchase behavioral intention. The authors found that associations between nostalgia stimuli and epistemic, emotional, and nostalgia-seeking benefits were confirmed partially. The other path includes one paper. Building on signaling theory, Song and Kim (2021) explored the relationship between four aspects of time-honored restaurants, which are the restaurants that maintain good social recognition based on their establishment time. In addition, the relationship between brand heritage, brand evaluation, consumer experience, and behavioral outcomes are studied.

The above analysis uncovers several findings. First, consumer communication, WOM, and eWOM have a significant role in restaurant success in light of the emergence and enhancement of social media. Second, there is an emphasis on authenticity and its critical importance in brand attributes, consumer satisfaction, and purchasing intentions. Third, recent studies have focused on nostalgia as a psychological need that influences consumer behavior, revisit intention, and brand authenticity.

Unlike the previous path, the backward local main path moves backward and starts from sink nodes, which are not cited by other nodes but only cite other nodes in the citation network. By utilizing this variant, we can trace the roots of the latest publications. At the beginning of the backward local main path, three branch trajectories are revealed. In the first trajectory, earlier research on benefit segmentation in the restaurant industry was conducted by Lewis (1981). This research has identified five attributes determining consumer choice, including food quality, menu variety, price, atmosphere, and convenience. Next, Law et al. (2008) explored the perceived importance of attributes related to selecting Hong Kong's restaurants from the viewpoint of individual visit schemes and packaged travelers from Mainland China. In the second trajectory, Kim and Kim (2005) investigated the role of brand equity in luxury hotels and chain restaurants' performance, and later, Hyun (2009) developed and tested a customer equity model for chain restaurant brand formation.

The third trajectory starts with Ladhari et al. (2008), who explored customer satisfaction with services and its determinants and consequences. Finally, this path continues with Hyun (2010) and converges at Hyun et al. (2011). Focusing on the chain restaurant industry, Hyun (2010) identified food quality, service quality, price, location, and environmental factors impacting customer loyalty formation. Also, the author highlighted the role of these factors in increasing customer satisfaction. In another study, Hyun et al. (2011) examined the relationship between advertising, emotional responses induced by advertising, perceived value, and behavioral intentions.

The backward local main path continues with Kim et al. (2012) and Chang (2013), who studied the relationship between brand attitude, utilitarian value, hedonic value, well-being perception, and behavioral intentions for the first, and perceived value, customer satisfaction, and corporate reputation for the latter. Similar to some papers in the forward local

main path, the vital role of social media is stressed in the study of Kang et al. (2015). Their research focused on the relationship between members' participation, monetary sales promotion, and customer-brand relationships in online communications.

Following the seminal work of Kang et al. (2015), three reviews appeared: one critical review of restaurant and foodservice research (DiPietro 2017), a systematic review of authenticity in dining restaurants (Le et al. 2019), and a bibliometric analysis of restaurant research (Rodríguez-López et al. 2020). Finally, the last paper in the path has investigated the antecedents and drivers of quality performance based on dynamic capability theory (Liu et al. 2020a). The focus is also placed on micro, small, and medium hotels and restaurants, indicating the importance of small and medium enterprises in economic development.

Two new insights could be extracted based on the current analysis. The first is that some researchers in the restaurant industry, in parallel with other marketing scholars, felt the need to incorporate mathematical and financial concepts in marketing and brand management. Furthermore, structured reviews that systematize and summarize the restaurant literature have attracted scholars' attention.

### 3.2.2 Global main path

While the local main paths look for the largest local SPC, the global main path searches for the overall largest SPC. As depicted in Fig. 10, the global main path has four papers in common with the backward local main path and none in common with the forward local main path.

The dominant presence of marketing field research can be inferred from the analysis of the global main path. The papers in the path can be divided into three stages. In the primary stage (1981–2011), initial attempts were made to investigate the restaurant industry from the perspective of consumers' intention and restaurant selection. The endeavors in this stage continued via addressing the chain restaurant industry utilizing existing and new concepts such as relationship quality, loyalty, emotional responses, and perceived value. The focus of the next stage (2012–2019), which witnessed a plethora of publications, is luxury restaurants. New concepts like brand prestige, price premiums, and willingness to pay emerged. For instance, Hwang and Hyun (2012) underscored the important role of brand prestige in customer satisfaction and positive behavioral intentions in luxury restaurants. The authors explore the factors and consequences influencing brand prestige formation. Furthermore, the influence of environmental and non-environmental cues on emotional responses and consequently on behavioral intentions is studied by Hyun and Kang (2014). Subsequently, Yang and Mattila (2016) were among the first to bring the concept of perceived value in the luxury industry, specifically in hospitality and restaurant research. They also investigated its relationship with purchase intentions. Moving further in this direction, Chen and Peng (2018) analyze this relationship for traveling consumers incorporating the "food image" factor to previous models. In another paper, Kiatkawsin and Han (2019) explored the psychological constructs of willingness to pay in luxury restaurants. Materialism, bandwagon effects, snobbism, and hedonic and gastronomic knowledge were identified as the most critical drivers for paying price premiums.

In the last stage (2020–2021), the pandemic crisis, specifically COVID-19, and the need for innovative and socially responsible solutions were highlighted. Although the focus of the first papers is on the vital role of knowledge of luxury gastronomy in enhancing destination attractiveness Batat (2021a), a shift happens in the interest of researchers. As such, a

**Fig. 10** Restaurant research global main path



divergence happens at Batat (2021b), who investigated the response strategies of Michelin-starred chefs and the business transformation toward social bricolage entrepreneurial thinking during the COVID-19 pandemic. At the end of the global main path, authors aim to address COVID-19 challenges. For instance, Linh et al. (2021) examined the role of the pandemic in pushing customers toward online purchasing based on self-protective behavior theory. Finally, De Guzman et al. (2021) scrutinized the social responsibility-related initiatives undertaken by chefs during the pandemic.

In summary, at the start of the global main path, the link is much denser than the links at the middle and ending of the path, indicating that earlier research has received increased attention while recent research attracts a limited number of citations. Nevertheless, the appearance of those articles at the tail confirms the criticality of the successors in the global main path. The position of recent research has to be evaluated over time as more publications continue to appear.

### 3.2.3 Key-route main path

The key-route main path can reveal more details about the historical formation of scholarly restaurant research. To uncover additional insights, this study chooses the number of key-routes with a step size 5 and eventually selects 25. Meanwhile, the local method is used to



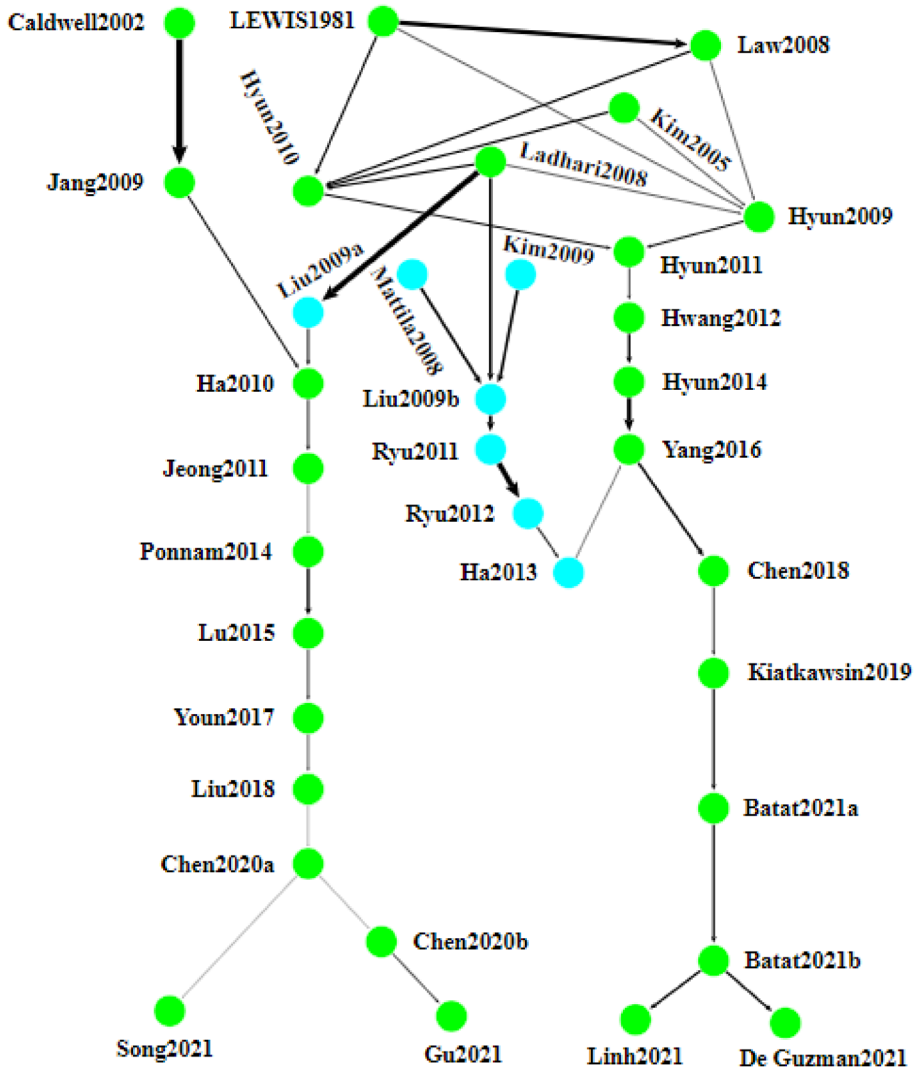


Fig. 11 Restaurant research key-route local main path

generate the path. The key-route main path is depicted in Fig. 11, which shows the knowledge structure of restaurant research. This path contains almost all the studies appearing on the local and global main paths, apart from seven new papers marked with aqua color. This section is devoted to the analysis of these papers.

In the first paper, Mattila and Ro (2008) examined customers' emotional responses after a service failure in a restaurant setting. According to the authors, customers with emotions of anger and disappointment are likely to make different dissatisfaction responses such as negative word-of-mouth, direct complaining, and switching. However, worried customers do not usually do the same. In general, customer satisfaction or dissatisfaction results from the interaction process between restaurant employees and customers. For example, the friendliness and attitude of employees may be closely related to customer satisfaction

with foodservice. Therefore, restaurant managers should understand customers' perception processes regarding emotion and cognition (Kim and Moon 2009). Inspecting the knowledge structure, Mattila and Ro (2008) and Kim and Moon (2009) merge in Liu and Jang (2009), who explored the relationships among dining atmospherics, emotional responses, perceived value, and behavioral intentions in the context of Chinese restaurants. It is argued that dining atmospherics influence customer positive emotions, negative emotions, and perceived value. Furthermore, Liu and Jang (2009) investigated customers' perceptions of Chinese restaurants in the United States using the Importance-Performance Analysis (IPA) approach. Findings revealed that environmental cleanliness and attentive service are two critical areas wherein Chinese managers can enhance their restaurants. The next two papers, Ryu and Han (2011) and Ryu et al. (2012), investigated the role of the physical environment in shaping customers' experience in restaurants. Finally, Ha and Jang (2013) identified consumer-dining values for each restaurant segment using a means-end approach and found that convenience, success, and economic values are largely associated with fast-food restaurants. In contrast, casual dining restaurants offer emotional and belonging values. Fine dining restaurants are also found to be strongly linked to emotion and quality life values.

## 4 Discussion

This study aims to analyze the critical topics in the restaurant domain using a keyword co-occurrence network and an MPA citation network of a total of 1489 articles in the restaurant literature. Drawing on the largest subnetwork, several paths are generated to reveal the knowledge flows of the restaurant field from various perspectives. The historical formation of this research field has been vividly illustrated based on the study of the forward and backward local main paths. Moreover, the global main path was applied to determine the most significant path, while the key-route main path was used to reveal the complex knowledge structure of restaurant research.

The analysis of the keyword co-occurrence network and the MPA leads to several findings, which can be presented along these lines:

1. The analysis of the keyword co-occurrence network shows that restaurant research has focused on multiple foci, including consumer behavior, consumer satisfaction, social media, green restaurants, and authenticity. Research about consumer behavior occupies a high percentage. As a dynamic interaction of cognition, emotion, and physical activities, consumer behavior attracted significant attention in the past years due to the competitive nature of the restaurant industry. Related keywords to consumer behavior include tipping, behavioral intention, satisfaction, emotion, perceived value, etc.
2. Given the importance of customer satisfaction in the restaurant industry, studies about the determinants of good consumer experience, customer loyalty, revisit intention, and positive word of mouth have captured scholars' interest. Recently, the restaurant industry has been hit severely by the COVID-19 pandemic. This was triggered mainly by public concern, lockdowns, and social distancing requirements. The pandemic has changed the way restaurants used to conduct their day-to-day operations and led to enormous declines in sales, layoffs, and disruptions.

3. The analysis of the four main paths confirms that consumer behavior has been the mainstream topic over the past decades. In the forward local main path, papers tend to focus on consumer behavior variables (e.g., purchase intention, consumer-brand relationship, attitudes, choice criteria). Research also concentrated on the impact of service quality, atmospherics, e-WOM, and authenticity. Papers at the end of the path researched the concept of nostalgia as an essential component in experiential consumer contexts. Unlike the forward local main path, the backward local main path reveals several papers examining the determinants of consumer choice, including food quality, menu variety, price, atmosphere, and convenience. Brand equity has also been a source of interest for scholars since it enables restaurant managers to improve customer satisfaction and retention. This study has several findings on the global main path. For instance, Lewis (1981) and Law et al. (2008), as the two articles on the beginning of the path, studied benefit segmentation and restaurant selection in the foodservice industry. Second, most of the articles on the path are devoted to examining relationship quality, loyalty, and emotional responses. In addition, researchers increasingly focused on luxury restaurants suggesting that this type of service provides customers with high-quality products that bring a high perception of the quality of life. In essence, the high quality of services and products in luxury restaurants offers consumers trust, which leads to savings in information costs. Furthermore, scholars have looked at the impact of the COVID-19 pandemic on the performance of restaurants. Understanding this topic will evoke managers' attention to implement innovative and socially responsible solutions to improve customer satisfaction and motivate future visitation. Finally, the new papers on the key-route main path predominately focus on customers' emotional responses to the physical environment and dining atmospherics.
4. The research focus has shifted from traditional restaurants to luxury restaurants as customers become demanding and expect superior and exceptional restaurant services. In this regard, restaurants are regarded as places where consumers enjoy high-quality food and services that lend an increased perception of prestige, comfort, and quality of life. Recently, COVID-19 has stressed the importance of hygiene and sanitation for customers searching for risk-free food consumption and restaurant experience.
5. Finally, the success of restaurants has been attributed to several factors. First, most studies have emphasized the role of consumer communication, WOM, and eWOM to shape consumer experiences and increase purchase intentions. Second, the mounting demand for authenticity has resulted in substantial research that has associated restaurant aspects with restaurant authenticity and further related authenticity perceptions to customer satisfaction and revisit intentions. Recent literature has also linked nostalgia to consumer behavior, return intentions, and brand authenticity. This line of research has shown that the attraction of restaurants stems mainly from their capability to evoke nostalgia or memories and use them to improve business revenues and profits.

## 5 Future research directions

Based on the previous discussions, this study suggests several future research directions.

1. There is a need to integrate several theories and grasp the decision-making process customers engage in when selecting restaurants that have experienced the effects of the COVID-19 pandemic. Therefore, the current predictors of customer behavior may not

- be comprehensive. Future studies may build on other theories and examine factors to explain customer behavior by including other constructs such as culture, target groups, and restaurant type.
2. Future research can focus on customers' attitudes, perceptions, and behavior toward CSR initiatives in restaurants. For example, whether perceived CSR increases behavioral intentions of eliminating food waste remains understudied. Additionally, customer response to food waste prevention in restaurants should be evaluated, particularly for customers with higher levels of socially responsible consumption.
  3. Online reviews represent vital decision support within consumers' purchase decision-making processes in the restaurant industry (Fernandes et al. 2021; Lee and Kim 2020; Mejia et al. 2019). For example, Dixit et al. (2019) noted that the relevance of online reviews in the restaurant industry is substantiated by the fact that more than 75% of readers of online reviews from a sample of 2000 adults in the US reported that reviews significantly influenced their purchase decisions. Zhang et al. (2010) also noted that the volume of online reviews was positively related to restaurants' online popularity. Accordingly, increased attention is required to study the determinants of the perceived usefulness of consumer-generated online reviews and their influence on consumer purchase and revisit decisions. Furthermore, a pending research question is how online reviews can reflect the current quality of restaurant products and services. Online reviews are expected to improve customer awareness of reviewed restaurants and decrease the perceived risk of information asymmetry. As a result, studies on the ways and techniques to ensure the credibility of online reviews are necessary to help restaurant managers understand their customers and enhance their performance.
  4. Even though green restaurants are increasing in number, research on such a type of restaurants largely remains scarce (Hwang and Lee 2019). Therefore, proposed potential avenues of future research include exploring how green restaurants can compete competitively with traditional restaurants while being affordable for the guests.
  5. Little research has been conducted to study the relationship between perceptions of restaurant authenticity and customer satisfaction. Consequently, the investigation of how perceptions of restaurant authenticity can impact customer satisfaction is encouraged as customers tend to attach importance to food-related features of restaurant authenticity (de Vries and Go 2017). Therefore, future studies should examine the impact of essential and peripheral features of authenticity on customer satisfaction and restaurant performance.
  6. Recently, the COVID-19 pandemic has remarkably affected the foodservice industry. The pandemic compels restaurant managers and operators to adopt practices that reduce frontline employees' concerns and fears during crises to allay their feelings of job insecurity and emotional exhaustion (Chen and Eyoum 2021). From the consumer perspective, the fear of infection has led to substitute restaurant experiences with at-home consumption (Kim et al. 2021). While such circumstances constitute an opportunity for restaurateurs to increase their delivery and pick-up services, there is also a potential to integrate new technologies like service robots to maintain their conventional ways of delivering restaurant services and replace frontline employees. Hence, future research should be devoted to clarifying the role of emerging technologies such as big data, blockchain, drones, and artificial intelligence in increasing restaurant resilience against disruptions and disastrous events. Of additional interest is assessing how to engage consumers in technology-driven restaurant services. Empirical studies are also imperative to better understand the factors that enable or hinder the adoption of new technologies during crises caused by pandemics.

## 6 Conclusions

The restaurant industry plays a critical role in the economy. Recently, restaurant research has gained significant interest from both researchers and practitioners. On the basis of 1489 articles extracted from the WoSCC, this study employs two quantitative approaches, namely a keyword co-occurrence network analysis and MPA to reveal the core topics and the influential publications that make impactful contributions to restaurant research and the knowledge transmission structure and patterns over the past five decades with the support of different main paths, including the local (forward and backward), global, and key-route main paths.

The clusters of the keyword co-occurrence network show that consumer behavior is the most critical theme in the restaurant literature. The local main path comprehensively portrays the restaurant domain's dynamic formation, indicating that the scholarly focus has been moved from traditional restaurants to luxury and ethnic restaurants over the study period. The analysis of the global main shows that the links from Lewis (1981) to Law et al. (2008) and Hyun and Kang (2014) to Yang and Mattila (2016) have the highest SCP values, which are the most critical links in the development of restaurant research. Moreover, the analysis of the key-route main path shows the knowledge transmission trajectories contributing to this domain more comprehensively.

To the best of authors' knowledge, no studies have combined keyword co-occurrence network and MPA to examine the knowledge dissemination trajectories of the whole restaurant field. The analysis of different main paths reveals a clear picture of the dynamic formation process from different perspectives, which provides profound insights for scholars to improve their comprehension of the initiation of restaurant research over the past decades. Unlike conventional review methods and bibliometric studies, this study provides novel ideas for analyzing the restaurant literature. On the one hand, MPA aids scholars in determining the most critical activities in developing the restaurant domain and unearthing its knowledge flows comprehensively and systematically. Furthermore, some future research directions are suggested to enrich existing restaurant research.

Despite its contributions, this study has some limitations. First, we relied only on one academic database to extract the articles. As a result, relevant publications not indexed in this database may be omitted from the analysis. Thus, the findings of the MPA may change as more articles are indexed in other databases. In this work, the keywords were searched in the title and keywords fields. Therefore, future studies may replicate the search query considering the abstract field to capture any potentially relevant but missing publications. Similarly, the results may not entirely uncover the formation of the whole restaurant domain. While the four main paths unearth the knowledge transmission trajectories from diverse perspectives, some relevant publications may not be discussed in this work. In other words, the MPA presents some limited research works, which cannot offer enough information on the full evolution process of the restaurant domain. Therefore, how to extract suitable data and apply a proper method to explain the comprehensive progress of this academic discipline can be considered in future works.

Second, this study does not consider the difference in terms of importance between the citing articles and the cited articles. Therefore, the importance of the articles included in the citation network should be considered in future studies. Finally, we limited articles to English and some specific subject areas, which implies that some important research papers in other languages and from different subject areas are not included

in this analysis. Future research may combine databases and articles published in different languages to test the robustness of our results.

## Appendix 1

Search query: TI=(restaurant\*) OR AK=(restaurant\*)) AND LANGUAGE: (English) AND DOCUMENT TYPES: (Article OR Review)

Refined by: WEB OF SCIENCE CATEGORIES: ( HOSPITALITY LEISURE SPORT TOURISM OR MANAGEMENT OR BUSINESS OR OPERATIONS RESEARCH MANAGEMENT SCIENCE )

Timespan: All years. Indexes: SCI-EXPANDED, SSCI, A&HCI, ESCI.

## Declarations

**Conflict of interest** The authors have no conflict of interest to declare. All co-authors have seen and agree with the contents of the manuscript and there is no financial interest to report. We certify that the submission is original work and is not under review at any other publication.

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