Exploring the impact of dark kitchens on community quality-of-life: The role of local biopolitics, disposition, integrity, and lobbying

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ABSTRACT

This study examines residents' perceived impact of dark kitchens on community Quality-of-Life. A Community Engagement Theory-based research model is developed, including Gentrification, Local Biopolitics, Disposition and Integrity as antecedents, while perceived Lobbying for/against dark kitchens is used as a moderator. A survey is administered to 1827 US adults via Amazon Mechanical Turk. After controlling for Lobbying, the results indicate that Local Biopolitics, Disposition and Integrity positively related to better perceptions of Quality-of-Life, thus pointing that in large urban areas, dark kitchens may become an important player in meal provision. Furthermore, the findings reveal how trust in dark kitchens and positive Disposition towards them can significantly enhance residents' perceived community impact, specifically when high levels of Lobbying are perceived too. These findings also suggest that while dark kitchens can enhance community well-being through responsible practices and positive public engagement, the role of Lobbying introduces complexity, potentially undermining trust in these businesses. The study underscores the need for balanced regulation and community involvement to maximize the benefits of dark kitchens in urban settings.

1. Introduction

The culinary commercial landscape has recently undergone a remarkable transformation, driven largely by technological advances and shifting consumer preferences. A noteworthy development is the proliferation of dark kitchens - also known as ghost kitchens, virtual kitchens, or cloud kitchens – which are establishments that focus exclusively on food delivery (Libereat, 2022). As they operate without customer-facing dining areas, dark kitchens are optimized for the preparation of food for online delivery platforms (Hakim et al., 2022; Ashton et al., 2022). Despite being a secondary effect of the rise of online food delivery marketplace, dark kitchens' increasing prevalence underscores their unique role in the future of food service trends (Shapiro, 2023; Talamini et al., 2022).

Normally located in more obscure urban and peri-urban areas like industrial estates or shipping containers, they provide owners with financial benefits of lower operational investment in physical premises, given the less expensive spaces where they tend to operate, and of the possibility to rent excess kitchen space that may remain unused (Reuschke and Mason, 2022; Wilkinson and Hui, 2022). Their role in providing convenient, quick, and affordable meals reflects the broader dynamics of online food delivery's expansion. Through the Servuction model, Ashton et al. (2022) develop a typology and research agenda for on-demand restaurant food delivery, including dark kitchens. While operational efficiencies are usually praised, other studies also reveal challenges to the dark kitchen model, such as worker exploitation (Giousmpasoglou et al., 2023) and community displacement (Shapiro, 2023). Moreover, despite their potential to meet consumer demands for convenience and efficiency, dark kitchens raise concerns about reducing community interaction and increasing isolation, thus undermining local Quality-of-Life (QoL) (Pookulangara et al., 2023). Therefore, more research is needed to guide their evolution in ways that align with and enhance QoL in urban communities.

Through the Community Engagement Theory, we examine sociopolitical and individual-level antecedents like Gentrification, Local Biopolitics, Disposition, and Integrity, and their influence on the local community's perceptions of dark kitchens' impact on QoL. These antecedents were selected for their previously posited relevance to urban transformation and community engagement. Specifically, Gentrification was chosen due to the socio-economic shifts in urban areas it captures

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(Lees and Ley, 2008; Shapiro, 2023), while Local Biopolitics for the way it reflects governance structures that impact well-being (Esposito, 2013; Lynch, 2017). Disposition was selected for its reflection of individual attitudes and trust in dark kitchens of the local community (Bowden-Everson et al., 2013; Dandis et al., 2023) and Integrity due to how it reflects ethical and operational standards that foster trust and loyalty (Amatulli et al., 2021; Hou et al., 2023).

This study also investigates perceived Lobbying in the local community as a moderator, reflecting the socio-political efforts that influence public opinion and policymaking (Binderkrantz and Pedersen, 2019; Shapiro, 2023). As a moderator, Lobbying is expected to either amplify or mitigate the perceived impact of our antecedents on the community's QoL, thus revealing the dynamic interplay between community trust, political engagement and regulatory practice. This study adopts Community Engagement Theory to explore the extent to which dark kitchens affect QoL, emphasising collaborative approaches to ensure positive contributions to communities.

2. Literature review

2.1. The impact of meal services and restaurants in local communities

Meal services and restaurants are often central to community development in urban areas, and their importance for economic, cultural, and social development is being recognized (Hakim et al., 2022). Studies show that restaurants are meaningful amenities to many individuals and groups, even though many residents cannot afford to use them regularly (e.g., Kim and Jang, 2019). Restaurants are generally perceived as a valued urban experience and accessing them can improve the QoL of residents of all types. Empirical studies suggest multiple benefits of restaurants to community-level QoL, including the local economy, taxation, job growth, and increased access to leisure and community experiences, leading to better well-being.

For example, Jung and Yoon (2010) highlight the remarkable connection between restaurants and life satisfaction within local communities. This is bidirectional: Kim and Jang (2019) studied the psychological factors leading to 'sharing' restaurant experiences on social media, finding that higher life satisfaction promotes this behavior. Sharing restaurant experiences online is motivated by getting positive reactions, widening social interactions, and seeking higher status within society. In this context, individuals' satisfaction aroused from restaurant experiences is deemed a crucial variable underlying perceived QoL.

Traditional establishments, such as UK pubs, further exemplify the central role of meal facilities in fostering social ties and developing community identity. Pubs are usually considered an integral part to UK local life, serving as spaces where locals gather for social bonding, thus impacting their wellbeing (Jones et al., 2018). Same as fish and chips shops, colloquially referred to as 'the local chippy', which are staple places to many UK communities, creating a sense of belonging with their local presence and regular interactions with residents (British Council, 2021).

Also, found that social capital and community identity, driven by interactions in local leisure facilities and well-maintained public spaces, enhance life satisfaction. As such, it can be argued that restaurants focused on facilitating social interactions through both physical and social experiences may contribute to enhanced QoL within local communities. However, there is a scarcity of research that empirically evaluates these potential effects in the case of dark kitchens (Gonzalez-Aleu et al., 2022).

2.2. Community engagement theory and residents' perceptions

At this juncture, it is worth considering relevant theories and models for elucidating how residents perceive the effects of meal providers on community QoL. Among these is the Community Engagement Theory, which posits that active participation, collaboration, and mutual understanding between local communities and external entities can enhance community well-being, decision-making, and sustainable development by incorporating the perspectives and needs of community members (Dianita, 2021). Community engagement, therefore, focuses on motivating individuals and groups to actively shape policies, plans, and activities that directly impact their lives and environment, ultimately fostering a sense of ownership and addressing their needs and preferences. By doing this, community engagement aims to drive enhanced overall well-being, social cohesion, and long-term sustainability of communities (Baba et al., 2021). When applied to restaurants and hospitality, Community Engagement Theory argues that involving residents in restaurant planning, development, and operation can lead to more positive outcomes (Mihalic and Kuščer, 2022). Additionally, understanding the dynamics of power and influence within community engagement processes and investigating the role of diverse stakeholders, including marginalized groups, can provide a more holistic view of how restaurants impact community well-being. All of this is specifically needed concerning dark kitchens: prior research focused on community engagement and traditional meal providers but has not yet adequately scrutinized newer forms of food provision.

2.3. Dark kitchens and community engagement

In the face of rapid technological advancements and changing consumer expectations, industries such as hospitality and food service must undergo significant digital transformation to remain competitive. Similar to the hotel industry's move to enhance digital capabilities and customer-centric strategies, for instance, through the use of AI chatbots for personalized booking experiences or mobile apps for seamless check-ins and tailored services, the rise of dark kitchens represents a parallel shift in the food service sector, where leveraging technology is essential for meeting evolving customer demands (Lam and Law, 2018). Dark kitchens emerged as a service where food delivery assisted by digital platforms and limited staff and infrastructure can satisfy a wide range of consumer needs in large urban areas (Ashton et al., 2022). Dark kitchens primarily involve quick delivery of cheaper meals based on a highly cost-effective business model (Hakim et al., 2022). However, unlike traditional fast-food outlets, which also offer quick-service menus, but with standardized items, dark kitchens can provide diverse cuisines and customizable meal options, catering to a broad spectrum of consumer preferences (Giousmpasoglou et al., 2023). Thus, the growth of dark kitchens makes them a major contributor to meal delivery services in large cities worldwide (Shapiro, 2023) and, while quick food-delivery services specifically are becoming increasingly associated with dark kitchens, they remain separate from fast-food chains and traditional takeaway restaurants. A blurred distinction between these different types of meal delivery models is common (Giousmpasoglou et al., 2023).

The success of dark kitchens is closely dependent on the growth of online food delivery services which make possible their existence and expansion. The role of local word of mouth promotion and improved availability of digital technology in urban communities (social media) is also not insignificant, particularly for dark kitchens whose main value proposition is their ability to support the growing demand for food delivery services. Opposed to traditional restaurants, dark kitchens operate anonymously, with limited direct engagement with the locals. Nevertheless, the quick delivery and convenience they offer may still enhance residents' QoL. Therefore, the Community Engagement Theory could be used as a framework for examining how residents evaluate the overall impact of dark kitchens on the community's QoL.

2.4. Local communities' beliefs

As Giousmpasoglou et al. (2023) point out, a limitation in the existing research regarding residents' perception of dark kitchens is the failure to encompass their dispositions towards them. Understanding how residents' perceptions of dark kitchens influence their positive or

negative opinions of their relationship with community QoL is crucial. Studying how these perceptions link to actual behaviors exhibited by residents is also important.

Perceived impact on QoL is a precursor to residents' intentions to support dark kitchens. Conversely, if residents believe that dark kitchens might diminish their community's QoL, their use and support of dark kitchens is likely to be low (Shapiro, 2023). Hence, this study focuses on examining the connection between Disposition towards dark kitchens and community QoL, alongside perceptions of Integrity, Gentrification and Local Biopolitics, as well as the effect of perceived Lobbying for/-against dark kitchens (the effort of individuals or organizations, mostly commonly industry representatives, to sway government officials to endorse specific policies or regulations; De Figueiredo and Richter, 2014). The intention is to provide insight into how these factors influence residents' beliefs about dark kitchens' impact on QoL.

To further investigate how dark kitchens affect community QoL, we propose four antecedents for examination: Gentrification, Local Biopolitics, Disposition and Integrity - along with the moderating role of perceived Lobbying. These factors were selected according to their applicability to the socio-political, economic and individual facets of community engagement, as well as their theoretical and practical importance in the case of dark kitchens. All the constructs are presented in detail in the following sections, in relation to our study's framework and objectives.

2.5. Gentrification and dark kitchens

Gentrification is broadly understood as the process by which locals might be subject to sharp increases in the cost of living due to inflow by a higher-income demographic, often forcing the existing community to leave. In this context, the relationship between dark kitchens and gentrification is complex. At first, dark kitchens profit from cheaper real estate in urban areas, but when they are integrated into commercial spaces it marks a change in the use of urban space that may affect property dynamics locally (Savills, 2023; Reforma, 2022). While the direct impact on rising property values and gentrification remains underexplored, their growing presence in urban commercial real estate highlights their potential in shaping the overall urban development landscape. Gentrification and how urban spaces transform are important components in understanding how a localized meal business can change community QoL (Latham, 2003). As gentrification changes the demographic profile of the local clientele, dark kitchens also have to diversify the cuisines and provide more premium products to fit changing consumer needs. However, there is a dearth of literature explicitly investigating the perceived association between Gentrification and dark kitchens (Hakim et al., 2022).

While objective and empirical data on the topic is lacking, theorists have commented that 'going dark'—replacing consumer-facing shop fronts with logistical spaces for online order fulfillment—will likely have widespread and unknown consequences for urban geographies (Shapiro, 2023). Previous work shows that dark kitchens are most common in urban areas with the highest population density (Shapiro, 2023), while simultaneously, these areas are most likely to undergo Gentrification (Lees and Ley, 2008). Using the Community Engagement Theory, we will explore how the displacement of longstanding residents and institutions, coupled with the inward migration of new residents and development of commercial enterprises, affects community perceptions of the impact of dark kitchens, leading to the following hypothesis:

H1. Perceived community Gentrification positively affects the perception of dark kitchens' impacts on community-level Quality-of-Life.

2.6. Satisfaction with local biopolitics

The concept of biopolitics – i.e., how the local power shapes and

regulates well-being, health, and longevity resources within society (Esposito, 2013) – can be drawn upon to explore the impact of the various facets of dark kitchens on local communities (Lynch, 2017). An example of the application of biopolitical theory to the hospitality sector is Roelofsen and Minca (2018), who focus on the Airbnb homestays and experiences platform. However, there is scarce academic work exploring the link between the structures of everyday biopolitics and the consequences of dark kitchen proliferation in an area. Building on research that demonstrates that negative perceptions of local health and well-being relate to a more critical view of tourism and tourism-related activities within a neighborhood (Suess et al., 2018), we argue that locals' view of dark kitchens is likely to be molded positively or negatively depending on whether they are seen to complement or work against the core facets of Local Biopolitics: community health and well-being infrastructures. This is an unexplored area of research that we aim to address. Thus, we hypothesize that:

H2. Perceptions of biopolitical leadership by local authorities positively affect perceptions of dark kitchens' impacts on community-level Quality-of-Life.

2.7. Dark kitchen disposition

In addition to Gentrification and Local Biopolitics, residents' Dispositions towards dark kitchens represent a crucial factor in their perceived impact on QoL. Research on consumer trust indicates that psychological states underlying confidence in hospitality services determine long-term relationships with providers and purchase decisions (Dandis et al., 2023). Shafieizadeh and Tao (2020) report that differences in trust significantly affect restaurant selection, which suggests that attitudes toward dark kitchens may influence how individuals understand their effect on communities. Dark kitchen attitudes are defined here as locals' beliefs about the potential of such services to achieve the community's long-term political and social goals. In examining the essential role of trust in the adoption and success of dark kitchens, Jiang et al. (2024) highlight the importance of food safety, economic value, personalization, food authenticity and multisensory experiences, such as presentation, aroma, and packaging, in cultivating initial trust among customers. This trust is essential for fostering customer loyalty and encouraging repeat business. Evaluation of this construct focuses on residents' opinions around acceptability, trust, and value based on personal experiences and expectations (Bowden-Everson et al., 2013). Therefore, the following hypothesis is formulated:

H3. Favorable Disposition toward dark kitchens positively affects perceptions of dark kitchens' impacts on community-level Quality-of-Life.

2.8. The integrity of dark kitchens

A further component is the notion of Integrity. In the dining context, Integrity is defined as the adherence to high ethical standards and operational transparency which drive consumer trust and loyalty (Amatulli et al., 2021). Across the hospitality sector, perceived Integrity has been examined within the hotel (Amatulli et al., 2021) and tourism industries (Hou et al., 2023). However, the concept of Integrity is yet to be explored in dark kitchens.

Although dark kitchens are out of customers' sight, they can prove their Integrity by adhering to strict food safety standards, being transparent about food sourcing, and running a sustainable business. Reputation building measures that include the use of digital communication tools (real time updates and tracking), food authenticity guaranteed by quality and presentation and reliable branding can be used to mitigate the risks of their covert activities and gain the trust of customers (Jiang et al., 2024). Thus, we address this gap through the following hypothesis:

H4. Perceived Integrity in dark kitchens provision positively affects perceptions of dark kitchens' impact on community-level Quality-of-Life.

2.9. Lobbying for/against dark kitchen development

A moderator in this analysis, Lobbying, refers to individuals or organizations' perceived level of effort to sway government officials to endorse specific policies or regulations (De Figueiredo and Richter, 2014). Various stakeholders can lobby the food industry, including community groups, charities, and not-for-profits (Koens and Wood, 2017). Conversely, community Lobbying would promote controls and limitations on the proliferation of dark kitchens, primarily concerned with preserving and enhancing neighborhood well-being, liveability, and 'feel' (Chamlee-Wright and Storr, 2011). Therefore, the level of perceived Lobbying is an important factor when examining local community perceptions of dark kitchens and support for their further development. Previous studies suggest that Lobbying is a key moderator to the success of interest groups, whether public or economic (e.g., Binderkrantz and Pedersen, 2019). A high level of perceived Lobbying may denote either the belief that dark kitchens are trying to influence regulations in their favor or that residents are trying to protect their neighborhood. The respective moderation hypotheses are proposed as follows:

Lobbying moderates the relationship between Gentrification **(H1a),** Local Biopolitics **(H2a),** Disposition **(H3a),** and Integrity **(H4a),** and perceptions of dark kitchens' benefits on Community-level QoL.

The model to be validated (Fig. 1) describes the constructs thought to influence residents' perceptions of how dark kitchens impact community QoL, including perceptions of Gentrification, Local Biopolitics, dark kitchen Disposition, dark kitchen Integrity, and the effect of perceived Lobbying.

3. Methods

3.1. Research design

The focus of the study is to determine the factors that influence the perceived impact of dark kitchens on QoL within local communities, as well as the potentially moderating influence of Lobbying on this perceived impact. A questionnaire was developed to achieve this, incorporating items from prior literature. A cross-sectional survey design was employed.
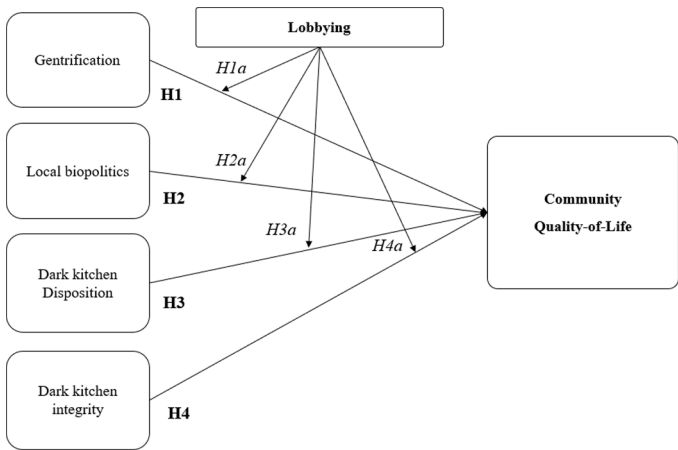
3.2. Sample and data collection

The survey was administered in June 2023 to adults across the U.S. using the online platform Amazon Mturk (Chan and Wan, 2023). Those aware of dark kitchens operating within their local areas were eligible to participate ($n = 1922$). Out of these 1922 respondents, 1827 respondents were selected as the final sample after eliminating all those responses who did not want to answer any questions or did not disclose their demographic information. The substantial sample size adheres to the principles of the Law of Large Numbers, ensuring that the sample means more accurately represent the population mean, thus enhancing the statistical robustness of the research (Idele, 1979). This approach is particularly pertinent given the multifaceted nature of our study's six constructs, where diverse and comprehensive data are vital for robust analysis. The choice of MTurk as a data collection platform aligns with its proven effectiveness in accessing a diverse participant pool, ensuring a broad and representative sample essential for the comprehensive analysis of our study's constructs (Litvin and Guttentag, 2023). Demographic information collected included gender, age, household size, length of residence, employment status, and ethnic background. Frequencies and corresponding percentages on each demographic variable are reported in Table 1.

The sample comprised nearly equal numbers of male (50.7 %) and female (49.3 %) respondents. Most respondents were between 24 and 39 years old (24–30 years, 33.0 %, and 31–39 years, 35.0 %), whereas 29.6 % were older than 40; only 2.5 % of the sample were young adults aged between 18 and 23 years. More than three-quarters of respondents currently lived with two other people in the same household (14.4 % lived with 2; 30.8 % lived with 3; 40.4 % lived with 4; and 9.0 % lived with more than 4); only 5.4 % of households reported single adults living alone. The largest proportion of the length of residence reported was more than 10 years (44.1 %), followed by a length between 3 and 5 years (21.7 %), and between 5 and 10 years (18.4 %). Regarding respondents' employment status, the vast majority were either employed (84.6 %) or self-employed (13.5 %). Finally, nearly three-quarters of the sample reported a White/Caucasian ethnic background (73.6 %), with Native American/Hawaiian natives representing 11.2 % of respondents.

Fig. 1. Conceptual model of the perceived impact of dark kitchen on community QoL.

Table 1
Demographic profile of respondents.

Characteristics	Categories	Frequency	Percentage
Gender	Female	901	49.3 %
	Male	926	50.7 %
Age (years)	18–23	46	2.5 %
	24–30	602	33.0 %
	31–39	640	35.0 %
	40–59	465	25.5 %
	60-above	74	4.1 %
Household size	1	98	5.4 %
	2	264	14.4 %
	3	562	30.8 %
	4	738	40.4 %
	More than 4	165	9.0 %
Length of residence	Less than one year	71	3.9 %
	Between 1 and 3 years	216	11.8 %
	Between 3 and 5 years	397	21.7 %
	Between 5 and 10 years	337	18.4 %
	More than 10 years	806	44.1 %
Employment status	Employed	1546	84.6 %
	Self-employed	247	13.5 %
	Unemployed	34	1.9 %
Ethnicity	White/Caucasian	1345	73.6 %
	Black/African American	79	4.3 %
	Asian	118	6.5 %
	Native American/Hawaiian	205	11.2 %
	Latino/Hispanic	80	4.4 %

3.3. Measures

The questionnaire was designed to collect perceptions on several constructs relevant to the rise of dark kitchens and local community QoL, drawing on validated scales from previous literature focusing on community members as the unit of analysis. Survey items were adapted and developed from existing scales to evaluate perceptions of the key factors set out in our model: Gentrification (Hirsch et al., 2021), Local Biopolitics (Hadzibajramovic et al., 2015), Integrity of dark kitchens (Jung et al., 2010), Disposition towards dark kitchens (Woosnam, 2012), Community-Level QoL (Naidoo and Sharpley, 2016), and the effect of perceived Lobbying as a moderator (Dela Santa, 2013). Appendix 1 in the Supplementary Material includes a complete description of the constructs' development. The survey instrument grouped items into these respective constructs, ensuring each one was thoroughly measured. Participants responded on a 7-point Likert type scale: 'Strongly disagree' (1); 'Disagree' (2); 'Slightly disagree' (3); 'Neutral' (4); 'Slightly agree' (5); 'Agree' (6), and 'Strongly agree' (7). A pilot study of 70 respondents was conducted in May 2023, using a sample of adults who knew what dark kitchens were, recruited via Amazon MTurk, to verify the appropriateness, accuracy and completeness of the measures employed. The sample size of 70 was chosen for the pilot study as it is generally considered sufficient to identify potential issues with the survey instrument, such as unclear questions, response patterns, and the overall reliability of the scales (Teare et al., 2014). To assess reliability, the Cronbach's alpha was calculated. The Cronbach's alpha values were 0.917, 0.891, 0.892, 0.784, 0.790, and 0.925 for Gentrification, Local Biopolitics, dark kitchen Disposition, dark kitchen Integrity, community-level QoL, and Lobbying respectively. These reliability coefficient values were above the accepted threshold values of $\geq$ .8 (Taber, 2018), suggesting that the constructs were sufficiently reliable for research purposes. On the basis of the pilot study, minor modifications were made in the wording of certain items to reduce ambiguity and misinterpretation, while making the constructs easier to comprehend for the participants to ensure a good response rate in the survey.

3.4. Data analysis tools

The data analysis was conducted in two distinct stages. Initially, the study rigorously evaluated the measurement model through factor analysis. The Exploratory Factor Analysis (EFA) was employed to uncover the underlying dimensions and the pattern matrix of the collected data. On the other hand, Confirmatory Factor Analysis (CFA) assessed the reliability and validity (including both convergent and discriminant validity) of the constructs under study. Following this, the second stage involved using Structural Equation Modeling (SEM) approach using maximum likelihood estimation to test the proposed hypotheses through path analysis. Additionally, multi-group SEM, measurement invariance assessments, and chi-square difference tests were conducted to examine the moderation effect of perceived Lobbying on the proposed hypotheses.

4. Results

First, EFA was carried out to reduce the items into summary variables and identify any structural patterns in the data (De Vaus, 2002). Maximum likelihood method as the extraction method and Varimax as the rotation method were used for EFA analysis. Six constructs were extracted based on the Eigenvalues higher than 1. At the same time, the rotated matrix (rotated factor loadings < 0.5) confirmed that items that were supposed to measure a certain construct were loaded onto each single respective construct. Kaiser-Meyer-Oklin's measure of sampling adequacy of 0.955 was higher than 0.70, suggesting an adequate sample size for data analysis. At the same time, Bartlett's test of sphericity was significant at a 1 % level (χ^2 (595) = 39,197.702, $p < 0.001$), suggesting having excellent factor loadings.

Confirmatory factor analysis (CFA) was subsequently performed to evaluate the unidimensionality of the constructs and the validity of the measurement scales (Hair et al., 2017). To determine the internal consistency of the constructs, reliability was assessed using both Cronbach's alpha and composite reliability methods. The findings indicated that all constructs exhibited Cronbach's alpha and composite reliability values above the 0.7 threshold (Hair et al., 2017), indicating that the reliability criteria were met (see Table 2). Furthermore, convergent and discriminant validity were assessed. To assess convergent validity, average variances extracted (AVE) were used and found to be higher than the suggested threshold level of 0.5 (Hair et al., 2017), indicating to have achieved convergent validity (Table 2). To assess discriminant validity (Table 3), the Fornell-Lacker criterion was used, and found that the AVE score of each construct was lower than the square of correlations with other constructs, suggesting having achieved discriminant validity (Fornell and Larcker, 1981).

The mean and standard deviation of each construct and correlation between study variables are presented in Table 4. Subsequently, the goodness-of-fit indices were computed for the measurement model to assess nomological validity, determining how well the specified model fits the observed or sample data. The assessment of nomological validity on the measurement model revealed CFI (0.916), NFI (0.903), IFI (0.916), TLI (0.908), GFI (0.872), AGFI (0.852), SRMR (0.057), and RMSEA (0.057), which lied within the suggested threshold level. Other

Table 2
Confirmatory factor analysis – reliability & convergent validity.

	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Gentrification		0.892	0.893	0.544
GENT1	0.785			
GENT2	0.704			
GENT3	0.768			
GENT4	0.706			
GENT5	0.710			
GENT6	0.776			
GENT7	0.709			
Local Biopolitics		0.879	0.880	0.550
BIOP1	0.733			
BIOP2	0.747			
BIOP3	0.728			
BIOP4	0.706			
BIOP5	0.760			
BIOP6	0.775			
Dark Kitchen Disposition		0.884	0.886	0.565
DISP1	0.776			
DISP2	0.808			
DISP3	0.755			
DISP4	0.723			
DISP5	0.726			
DISP6	0.718			
Dark Kitchen Integrity		0.920	0.920	0.656
INT1	0.828			
INT2	0.812			
INT3	0.796			
INT4	0.798			
INT5	0.784			
INT6	0.842			
Lobbying		0.852	0.853	0.592
LOB1	0.726			
LOB2	0.775			
LOB3	0.766			
LOB4	0.808			
Quality-of-life		0.892	0.894	0.586
QoL1	0.738			
QoL2	0.712			
QoL3	0.804			
QoL4	0.815			
QoL5	0.704			
QoL6	0.812			

Table 3
Discriminant validity.

	AVE	BIOP	GENT	DISP	INT	QoL	LOBB
BIOP	0.550						
GENT	0.544	0.143					
DISP	0.565	0.193	0.304				
INT	0.656	0.128	0.143	0.514			
QoL	0.586	0.315	0.315	0.247	0.213		
LOBB	0.592	0.162	0.306	0.477	0.296	0.315	

values for χ^2 were 3422.906, df = 848. In general, the model fit was considered good, despite the GFI value being slightly under the conventional 0.90 cutoff point, since fitness of such a complex model should be assessed holistically using multiple indices, instead of relying on a single threshold index (Hair et al., 2017; Hu and Bentler, 1999). As stated by literature, GFI is sensitive to model complexity and sample size, hence slight deviations could still represent an acceptable fit when other indices (e.g., CFI, NFI, IFI) exceed 0.90, as seen in this study (Cho et al., 2020).

Harman's one-factor test (1967) was employed to evaluate the potential for common method bias. To conduct this assessment, all items were subjected to principal component analysis using varimax rotation. Results indicated that no single factor emerged with more than 50 % variances, suggesting no issue of common method bias. The maximum variance explained by a single factor was 36 %, which was lower than the threshold level of 50 % under Harman's one-factor test (Kock, 2020). Additionally, a common latent factor (CLF) test was performed by comparing the χ^2 values between the constrained and unconstrained models (Hultman et al., 2009). The χ^2 difference test indicated that the two models were significantly different at 5 % level (See Table 5), suggesting common method bias. Hence, the CLF was considered in the structural equation model for hypothesis testing. The CMB model suggested a good model fit, as the values of GFI (0.880) and AGFI (0.861) were higher than 0.85, the values of CFI (0.919), NFI (0.907), IFI (0.919), and TLI (0.912) were higher than 0.9, and the values of SRMR (0.058) and RMSEA (0.056) were lower than 0.08. Given that multiple indices exceed the 0.90 threshold, the model fit remains robust despite a slightly lower GFI, in line with previous recommendations (Hair et al., 2017; Cho et al., 2020).

A Mann-Whitney U test was used to compare early and late respondents to address potential non-response bias, a common problem in survey-based research. This test helps to determine when there are systematic differences between groups of respondents depending on their timing of participation, thus ensuring the generalizability and reliability of the data (Malhotra, 2010). Such an analysis determines whether respondents who responded earlier in the data collection differed in any apparent systematic way from those who responded at the later data collection stage. Results, as shown in Table 6, indicated no significant differences in any of the study variables ($p > 0.05$), indicating that there were no significant differences in respondents' replies of these two groups (Malhotra, 2010). Hence, there was no issue of non-response bias in the study.

Structural equation modeling using maximum likelihood (ML) was conducted to analyze the relationship between the latent variables. The SEM model showed a good model fit, as the values of CFI (0.922), NFI

(0.911), IFI (0.922), and TLI (0.914) were higher than 0.9, and the values of SRMR (0.058) and RMSEA (0.059) were lower than 0.08, despite the slightly lower GFI (0.880) and AGFI (0.860) (Hair et al., 2017; Cho et al., 2020). Next, direct hypotheses were examined, and the results of the structural path coefficient, standard errors, and p-value were presented in Table 7. Following established SEM reporting conventions (Hair et al., 2017), we report statistical significance at multiple levels, using p < 0.001 for the highest level of significance, while also acknowledging p < 0.01 and p < 0.05. This approach ensures rigor and reduces the likelihood of Type I errors. Any result significant at p < 0.001 naturally meets the lower thresholds as well. Results indicated that perceived community Gentrification did not significantly affect the perception of dark kitchens' impacts on community-level QoL ($\gamma = 0.035$, $t = 1.303$, $p = 0.193$). However, perceptions of Local Biopolitics, favorable Disposition towards dark kitchens, and perceived Integrity in dark kitchens provision had a significant positive effect on community-level QoL (BIOP: $\gamma = 0.146$, $t = 5.080$, $p < 0.001$; DISP: $\gamma = 0.280$, $t = 15.068$, $p < 0.001$; INT: $\gamma = 0.195$, $t = 4.680$, $p < 0.001$). Hence, hypotheses H2, H3, and H4 were accepted, while hypothesis H1 was rejected. Fig. 2 shows the SEM model along with standardized coefficient values.

Next, a multi-group analysis was conducted to assess the moderating role of perceived Lobbying for/against dark kitchens in the relationship of perceived community Gentrification, perceptions of Local Biopolitics, favorable Disposition towards dark kitchens, and perceived Integrity in dark kitchens with community-level QoL. To gauge perceived Lobbying, the sample was split into low and high groups using a median split, a common technique in social sciences for comparing multiple groups. This ensures an even distribution of subjects that allows for meaningful statistical analysis (Fitzsimons, 2008; Iacobucci et al., 2015). The median value was 5.50 points. The group with scores below the median consisted of 1169 respondents, while the group with scores above the median consisted of 658 respondents. These groups were labeled as low-perceived Lobbying and high-perceived Lobbying, respectively.

After splitting the data into two groups, the metric invariance test for perceived Lobbying was conducted by comparing the unconstrained model and the constrained model. The χ^2 difference test between the two models was significant ($\Delta\chi^2 = 31.183$, $p < 0.001$), suggesting that perceived Lobbying can be potentially a significant moderator in the relationship between any independent variables and community-level QoL. Table 8 also reflected an adequate configural invariance, with most model fit indices meeting generally accepted cutoffs (CFI = 0.912, NFI = 0.887, IFI = 0.912, TLI = 0.904, GFI = 0.877, AGFI = 0.856, SRMR = 0.061, RMSEA = 0.041), meaning that there were significant differences between the constrained and unconstrained model, and that the model maintains overall robustness despite the marginal GFI deviation (Hair et al., 2017; Cho et al., 2020).

Table 5
Common method bias.

	χ^2	DF	p-value
Unconstrained	3823.944	545	
Constrained	3686.120	544	
Differences	137.824	1	0.000

Table 4
Mean, standard deviation, & correlations between study variables.

	Mean	SD	BIOP	GENT	DISP	INT	QoL	LOBB
BIOP	4.54	1.312	1.000					
GENT	5.22	0.957	0.378 * **	1.000				
DISP	5.14	1.018	0.439 * **	0.551 * **	1.000			
INT	5.17	1.125	0.358 * **	0.499 * **	0.717 * **	1.000		
QoL	5.11	1.150	0.561 * **	0.372 * **	0.497 * **	0.461 * **	1.000	
LOBB	5.16	1.119	0.402 * **	0.553 * **	0.691 * **	0.544 * **	0.377 * **	1.000

Table 6
Mann-Whitney U test.

	BIOP	GENT	DISP	INT	QoL	LOBB
Mann-Whitney U	376774	418011	408532.5	414493.5	412585	407223
Wilcoxon W	629890	671127	661648.5	667609.5	665701	660339
Z	−1.818	1.938	1.075	1.618	1.443	0.958
Asymp. Sig. (2-tailed)	0.069	0.053	0.282	0.106	0.149	0.338

Table 7
Structural equation modelling.

Hypothesis		Estimate	S.E.	C.R.	P	Results
H1	GENT → QoL	0.035	0.027	1.303	0.193	Not Supported
H2	BIOP → QoL	0.146	0.029	5.080	* **	Supported
H3	DISP → QoL	0.280	0.019	15.068	* **	Supported
H4	INT → QoL	0.195	0.042	4.680	* **	Supported

* ** $p < 0.001$, * * $p < 0.01$, * $p < 0.05$

Fig. 2. SEM analysis.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 8
Model fit for moderator.

Goodness-of-fit	Perceived Lobbying
χ^2	3422.906
Df	848
RMSEA	0.041
GFI	0.877
NFI	0.887
CFI	0.912
AGFI	0.856
IFI	0.912
TLI	0.904
SRMR	0.0614

A series of χ^2 difference tests were conducted for each independent variable by constraining one path at a time in the constrained model. Results, as shown in Table 9, indicated that perceived Lobbying did not

significantly moderate the relationship between perceived community Gentrification and community-level QoL ($\Delta\chi^2 = 0.078$, $p = 0.780$). Hence, hypothesis H1a was rejected. Moreover, perceived Lobbying significantly moderated the relationship between perceptions of bio-political leadership by local authorities and community-level QoL ($\Delta\chi^2 = 21.063$, $p < 0.001$). Furthermore, perceived Lobbying significantly moderated the relationship between a favorable Disposition towards dark kitchens and community-level QoL ($\Delta\chi^2 = 4.010$, $p < 0.05$). Here, the corresponding path coefficients indicated that a favorable Disposition towards dark kitchens on community-level QoL was only significant for respondents with high perceived Lobbying ($\gamma = 0.176$, $p < 0.001$). Lastly, perceived Lobbying significantly moderated the relationship between perceived Integrity in dark kitchens and community-level QoL ($\Delta\chi^2 = 11.193$, $p < 0.001$). Again, the corresponding path coefficients indicated that the effect of perceived Integrity in dark kitchens on community-level QoL was stronger for respondents having low perceived Lobbying ($\gamma = 0.227$, $p < 0.001$). Hence, hypotheses H2a, H3a, and H4a were accepted. In short, perceived Lobbying significantly moderated the relationship between perceptions of biopolitical leadership by local authorities, favorable Disposition towards dark kitchens, and perceived Integrity in dark kitchens with community-level QoL.

In summary, the measures used for each variable under study were found to be reliable and valid. The study found the presence of common method bias, which was considered in SEM analysis. Hypothesis testing indicated that only perceptions of Local Biopolitics, Disposition towards dark kitchens, and Integrity of dark kitchens significantly positively affected community-level QoL. Also, the perceived Lobbying
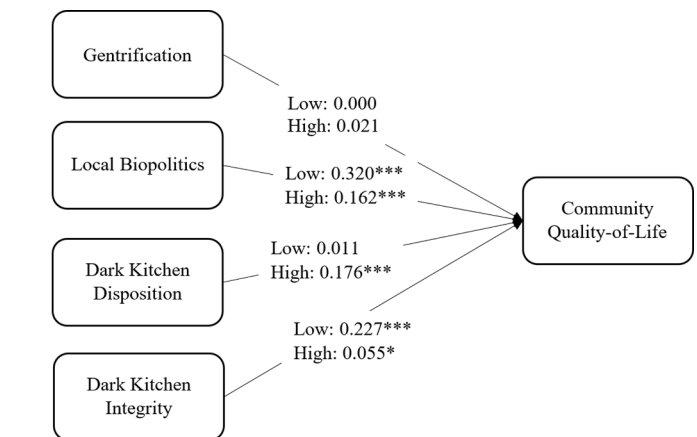
*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Fig. 3. Multi-group SEM analysis.

Table 9
Multi-group analysis.

Hypothesis		Low Perceived Lobbying	High Perceived Lobbying	$\Delta\chi^2$	ΔDF	P	Result
H1a	GENT → QoL	0.000 (0.824)	0.021 (0.433)	0.078	1	0.780	Not Supported
H2a	BIOP → QoL	0.320 (0.000)* **	0.162 (0.000)* **	21.063	1	0.000 * **	Supported
H3a	DISP → QoL	0.011 (0.888)	0.176 (0.000)* **	4.010	1	0.045 *	Supported
H4a	INT → QoL	0.227 (0.000)* **	0.055 (0.017)*	11.193	1	0.001 * **	Supported

* ** $p < 0.001$, * * $p < 0.01$, * $p < 0.05$

significantly moderated the relationship of Local Biopolitics, Disposition towards dark kitchens, and Integrity of dark kitchens with community-level QoL. However, perceived community Gentrification did not significantly affect community-level QoL, and perceived Lobbying did not significantly moderate the relationship between perceived community Gentrification and community-level QoL. Both measurement and structural models had good model fit, suggesting a good reliability of the results.

5. Discussion and conclusions

5.1. Key Findings

In this study, we proposed a conceptual model to analyze residents' perceptions of Gentrification, Local Biopolitics, Integrity and Dispositions towards dark kitchens, their influence on QoL in local communities, and how Lobbying perceptions moderate such associations. Key insights about the variables' direct and moderated influences and interactions provide a comprehensive view of how societal and personal factors contribute to the perceived influence of dark kitchens on community QoL.

The analysis revealed that only three (Local Biopolitics, Disposition, and Integrity) of the four hypothesized factors were directly associated with positive perceptions of the impact on local QoL, highlighting the importance of both public and dark kitchen engagement and collaboration in enhancing community life quality, as outlined by the Community Engagement Theory. Moreover, Lobbying did not significantly moderate the relationship between community Gentrification and QoL ($\Delta\chi^2 = 0.078$, $p = 0.780$), hypotheses H1 and H1a being thus rejected. This seems to indicate that in this case, the effect of Gentrification on QoL is either non-existent or is overwhelmed by other factors like Local Biopolitics and Integrity. The non-significant effect of Gentrification on QoL (H1) indicates that residents may not consider dark kitchens as important factors contributing to urban displacement or community disruption. This could be because of their operational nature that does not involve direct contact with customers and does not change the physical appearance of the neighbourhood. This difference from past work which has focused on the direct role of Gentrification in urban development (e.g., Mialon et al., 2016) suggests that this relationship is more complex than previously understood in localized settings.

Conversely, Lobbying significantly influenced the effects of Local Biopolitics, Disposition towards dark kitchens, and perceived Integrity, on QoL. Specifically, Local Biopolitics had a stronger positive impact on QoL in areas with low perceived Lobbying ($\Delta\chi^2 = 21.063$, $p < 0.001$). While our findings show the role of Local Biopolitics in enhancing QoL, our data did not directly measure its effect specifically on dimensions such as health and well-being services. However, based on prior literature (e.g., Roelofsen and Minca, 2018) it can be assumed that Local Biopolitics can shape these services, given that governance structures influence access to public resources, including healthcare and community well-being initiatives. Future studies should investigate these connections using datasets that differentiate urban areas by access to such services.

Furthermore, the positive effect of Disposition was significant only in areas with high perceived Lobbying ($\Delta\chi^2 = 4.010$, $p < 0.05$), and the Integrity of dark kitchens had a stronger impact in low Lobbying contexts ($\Delta\chi^2 = 11.193$, $p < 0.001$). These findings highlight how Lobbying can either enhance or diminish the perceived benefits of dark kitchens on community well-being. The corresponding path coefficients indicated that the effect of perceived Integrity in dark kitchens on community-level QoL was stronger for respondents indicating low levels of perceived Lobbying. Moreover, the findings are in line with previous research on trust dynamics (e.g., Jiang et al., 2024) and posit that the impact of Lobbying is context dependent. In particular, while our dataset does not differentiate between community sizes, prior literature suggests that smaller communities, where social ties are tighter and

business practices are more visible, may be more sensitive to Lobbying and ethical standards (e.g. Damianakis and Woodford, 2012). This implies that Lobbying's moderating role could vary across urban and rural settings, making it a key area for future research.

Considering the study findings, we conclude that while the factors of Local Biopolitics and Disposition positively affect the perceived impact on QoL, the influence of some elements of social dynamics, such as Integrity, are more complex and context dependent. This complexity comes from the variations in transparency, public trust and socio-economic conditions that impact perceptions of Integrity in dark kitchen operations. Our discussion shows how these factors influence whether Integrity reinforces or weakens trust in dark kitchens, depending on the regulatory and cultural context. By shifting the focus from organizational Integrity, as explored in prior studies (e.g., Praningrum et al., 2022), to its impact in urban governance and consumer trust, this study provides a new perspective. Future research could further explore how Integrity interacts with political advocacy in different cultural or regulatory environments.

Lobbying emerges as a powerful moderating force that can either amplify or diminish the effects of these variables. It should also be noted that Lobbying at the community level is vastly different from organizational Lobbying. Organizational Lobbying is concerned with internal decision making (e.g., Praningrum et al., 2022), while community-level Lobbying can include public interest advocacy, grassroots activism or regulatory influence. Understanding these distinctions helps to enrich the knowledge about how the political engagement affects community level QoL.

Lobbying's role across the models suggests that political engagement and advocacy are critical in shaping the effects of environmental and social policies on community well-being. The moderation effect observed with Integrity indicates that while Lobbying can reduce the strength of the positive relationship between Integrity and QoL, it does not undermine the perceived benefits entirely. Instead, it highlights the delicate balance required in managing political influences to maintain trust and ethical practices within the community (Veksler, 2015). This is consistent with findings by Praningrum et al. (2022), who demonstrated that leader integrity mitigates the effects of organizational politics on employee behavior, suggesting that integrity at different levels - whether organizational or community - plays a crucial role in moderating influences. Factors like commercial Integrity are particularly vulnerable to rapid market changes, making them susceptible to Lobbying efforts, which can distort perceptions of trust and ethical practices (Chamlee-Wright and Storr, 2011). Additionally, building and keeping trust in dark kitchens is challenging, as customers' views are shaped by things like food safety, value for money, and personalized service, which can be easily affected by strong Lobbying efforts (Jiang et al., 2024).

The perceptions of Local Biopolitics relating to positive evaluations of impact on local QoL showed that the more residents report health, social, and well-being services as accessible facilities within their neighborhoods, the greater their agreement with the idea that dark kitchens improved living conditions in their local areas. Correspondingly, the subjective effect of enhanced Local Biopolitics may provide a framework of "community" protection where dark kitchens become a factor unable to damage consumers (Roelofsen and Minca, 2018). The significant moderating effect of Lobbying on the relationship between Local Biopolitics and community-level QoL suggests that political involvement and regulation in the context of dark kitchens can indeed enhance the impact of local biopolitics on QoL. This finding indicates that Lobbying efforts can either amplify or direct the influence of local authorities' biopolitical decisions, potentially leading to more effective or visible outcomes in terms of community well-being. As highlighted by Mialon et al. (2016), lobbying by industry actors can significantly shape public health policies, which in turn affects community outcomes. The significant effect observed in this study may be since in communities where political engagement is strong, lobbying can help align

biopolitical actions with the specific needs and priorities of the community, thereby enhancing their overall impact. This highlights the importance of a collaborative approach where lobbying efforts work in tandem with local authorities to ensure that regulations and policies are effectively addressing the concerns and welfare of the community, particularly in sectors like dark kitchens, which directly impact public health and QoL (Dahan et al., 2010).

Perceptions directly related to dark kitchens, such as locals' Disposition towards dark kitchens and beliefs in their Integrity, also yielded significant links to QoL. According to Bowden-Everson et al. (2013), the fact that more favorable Dispositions towards dark kitchens led to better opinions on their benefits to community-level QoL can be explained by relational determinants. Specifically, it follows that beyond satisfying the necessity for food provision, dark kitchens may have cultivated enhanced levels of trust and community involvement in their regular interactions with residents. Therefore, residents with higher positive attitudes toward dark kitchens loyally supported their role within urban communities because they also noted the positive impact on their living standards. Moreover, Lobbying amplified the impact of dark kitchen Disposition on QoL, meaning that the more dark kitchens focus on food safety and health regulations, the more positively they are perceived by the community, leading to improved QoL.

The direct link between dark kitchen Integrity and community QoL highlights the importance of compliance with operational and ethical standards. This result is consistent with the effect of multiple trustworthiness attributes that dark kitchens may have advertised to their consumers (Ma et al., 2017). Trustworthiness attributes like food safety, quality ingredients, and responsiveness to feedback foster positive perceptions of dark kitchens. However, excessive lobbying may undermine these benefits by creating perceptions of manipulation, reducing public trust. Qualities associated with food safety and hygiene, quality ingredients, and responsiveness to residents' feedback may promote sustainability-focused communication with local communities (Amatulli et al., 2021). As a result, beliefs in the Integrity of dark kitchens become closely associated with their perceived impact on the QoL of local communities. This aligns with the theory that excessive lobbying can lead to perceptions of manipulation or unfair advantage, thus reducing public trust (Hirsch et al., 2023).

5.2. Theoretical contributions

This study offers significant theoretical contributions by expanding our understanding of the impact of dark kitchens on QoL using the Community Engagement Theory in a new context. Our findings underline that the perceived impact of local QoL is significantly correlated with perceptions of Local Biopolitics, dark kitchen Disposition, and Integrity, all different aspects of the community's engagement with dark kitchens. Moreover, furthering prior research, this study also shows the nuanced role of Lobbying as a moderator of perceptions of Local Biopolitics, Disposition and Integrity on QoL, which had not been previously explored in detail. The study proposed and evaluated a conceptual model that explores residents' experiences with dark kitchens and their link to QoL, thus providing a framework for evaluating their role within urban ecosystems.

The research also addressed the scarcity of studies on personal experiences with dark kitchens which, despite lacking traditional direct interaction with customers, still indirectly engage through digital interactions, food presentation, aroma, packaging and customer service, hence analyzing how these services enhance QoL through insights from a large sample local community members familiar with dark kitchens. In fact, this study challenges the assumption that the lack of a traditional customer-facing interface undermines meaningful community engagement. Thus, it demonstrates that perceptions of transparency, food safety and ethical practices, facilitated through policy compliance and communication strategies, are essential to influencing QoL perceptions. Our findings underscore dark kitchens's role beyond simple operational

entities; demonstrating their integration in complex social and political networks that impact community trust and wellbeing.

Finally, by applying the Community Engagement Theory to dark kitchens, this study offers a foundation for future research on their long-term socio-economic and regulatory implications. The unearthed community engagement effects establish that dark kitchens, with their prominent impact on multiple community-level QoL aspects, could present themselves as key players in the long-term development of urban dining landscapes, an impact worth studying through future research.

5.3. Practical implications

Our study demonstrates how dark kitchens' success is intertwined with community engagement, perceptions of transparency and lobbying practices that lead to favorable views. For policymakers, this presents the need for more targeted regulations that ensure dark kitchens' cost-efficiency does not compromise on customers' health and safety or workers' fair employment conditions and labor protection. Thus, transparency in regulating wages, job security and working conditions may prevent worker exploitation, which is an operational risk of dark kitchens' low overhead costs (Giousmpasoglou, Marinakou, and Ladkin, 2024). Moreover, government-led initiatives that encourage healthy food options could counter concerns over the nutritional value of online delivery meals, making dark kitchens more closely aligned to broader public health goals (Boelsen-Robinson et al., 2020; Delaney et al., 2021).

From an environmental perspective, dark kitchens adopting sustainable practices such as container reuse programs trialed in the UK, green packaging materials and energy-efficient systems, can raise their profile with sustainable-conscious customers (Elsaed et al., 2022). To tackle the absence of physical atmosphere, dark kitchens can enhance the consumption experience in a cost-neutral way through courteous and professional delivery interactions, or visually appealing and higher-quality packaging and branding (Giousmpasoglou, Marinakou, and Ladkin, 2024; Moreau, 2020). Through these tweaks, operators could replicate in part the emotional and sensory experience of dining out, thus enhancing customer engagement and loyalty.

For local communities, structured engagement mechanisms, such as community advisory boards and feedback forums, which have been successfully used by public authorities to engage residents in community matters, could empower residents to influence how dark kitchens operate in their neighborhoods (Institute for Public Health Innovation, 2020). This could shape initiatives like sustainability commitments, local food ecosystem support, and economic contributions, thus ensuring that dark kitchens align with community values and expectations for their long-term acceptance and integration into urban environments.

5.4. Limitations and future research

There are certain limitations in the present study. Firstly, it does not encompass the experiences and perceptions of residents unaware of dark kitchens operating in their local areas. Compared to regular consumers and residents with some knowledge about dark kitchens, the opinions of residents with little engagement may differ significantly regarding their perceived association with local QoL. This is an unexplored area for further studies. In addition, this study does not account for delivery drivers' (riders) role in how dark kitchens are perceived by local communities, although they are a visible and integral part of the ghost kitchen ecosystem, potentially being a key element to service enhancement. Prior studies describe the dark kitchen-related issues that riders contribute to in local communities, such as traffic congestion, noise and environmental pollution, or parking challenges, thus future studies could examine how all these concerns may influence local perceptions of dark kitchens, particularly relating to urban QoL (Ashton et al., 2022; Tuomi et al., 2023).

Generalizing findings from this study to the entire population of large urban areas should also be approached cautiously, especially given the novelty of dark kitchens. Demographic variables in this study were used to characterize the sample, but we did not use them to explore how the relationship between dark kitchens and community QoL might vary according to particular demographic characteristics, Thus, further research is needed to establish the perceived benefits of dark kitchens for specific urban populations. Finally, this study relied on self-report measures; while we used valid measures of perceptions and experiences, it does not confirm alignment with actual indicators of Gentrification and Local Biopolitics, for example. Relying solely on self-reported surveys may limit accuracy in some of these domains, so follow-up work utilizing objective measures of operational scope and community conditions would be advised.

Not considering the impact of the COVID-19 pandemic on dark kitchens, and how local communities' perceptions may vary between pre- and post-pandemic contexts, is another limitation of our study. Therefore, future research could also focus on analyzing these temporal dynamics for a more comprehensive understanding of how residents' attitudes may have changed over time. Lastly, our findings reflect the perceptions of a large sample of residents at a specific time point, this limits causal interpretations but did provide important novel insights into the relationships and constructs concerning dark kitchens' impact on QoL. Future research should employ more sophisticated designs, including quasi-experimental pre-and post-testing, to examine the causal and temporal characteristics of the relationships identified here in more detail. The theoretical framework and empirical approach adopted in this study, alongside the results, should help guide and inspire future research in this important area.

CRediT authorship contribution statement

Aguiar Castillo Carmen Lidia: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing. **Sevilla-Sevilla Claudia:** Formal analysis, Validation, Visualization, Writing – review & editing. **Jerez Jerez Maria Jesus:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author used ChatGPT and Microsoft Copilot to more efficiently organise and format references, check specific words/sentences translation and ensure the paper does not have any grammatical or spelling errors, as the author is not a native English speaker. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ijhm.2025.104231.

References

Amatulli, C., De Angelis, M., Stoppani, A., 2021. The appeal of sustainability in luxury hospitality: An investigation on the role of perceived integrity. Tour. Manag. 83, 104228. https://doi.org/10.1016/j.tourman.2020.104228.

Ashton, M., Tuomi, A., Backman, P., 2022. Ghost production: Applying the servuction model to establish a typology and propose a research agenda for on-demand restaurant food delivery'. Journal of Hospitality and Tourism Insights. Advance online publication.

Baba, S., Mohammad, S., Young, C., 2021. Managing project sustainability in the extractive industries: towards a reciprocity framework for community engagement'. Int. J. Proj. Manag. 39 (8), 887–901.

Binderkrantz, A.S., Pedersen, H.H., 2019. The lobbying success of citizen and economic groups in Denmark and the UK. Acta Polit. 54, 75–103. https://doi.org/10.1057/s41269-017-0076-7.

Boelsen-Robinson, T., Peeters, A., Thow, A.M., Hawkes, C., 2020. Barriers and facilitators to implementing a healthier food outlet initiative: perspectives from local governments. Public Health Nutr. 24, 2758–2770. https://doi.org/10.1017/S1368980020002323.

Bowden-Everson, J.L.H., Dagger, T.S., Elliott, G., 2013. Engaging customers for loyalty in the restaurant industry: The role of satisfaction, trust, and delight. J. Foodserv. Bus. Res. 16 (1), 52–75. https://doi.org/10.1080/15378020.2013.761025.

British Council (2021) Fish and Chips: A National Dish. Available at: ⟨https://www.britishcouncil.org/fish-and-chips-national-dish⟩ [Accessed 11 January 2025].

Chamlee-Wright, E., Storr, V.H., 2011. Social capital, lobbying and community-based interest groups. Public Choice 149, 167–185.

Chan, E.K., Wan, L.C., 2023. How eco-certificate/effort influences hotel preference. Ann. Tour. Res. 101, 103616.

Cho, G., Hwang, H., Sarstedt, M., Ringle, C.M., 2020. Cutoff criteria for overall model fit indexes in generalized structured component analysis. J. Mark. Anal. 8, 189–202. https://doi.org/10.1057/s41270-020-00089-1.

Dahan, N., Doh, J., Oetzel, J., Yaziji, M., 2010. Corporate-NGO collaboration: co-creating new business models for developing markets. Long. Range Plan. 43, 326–342. https://doi.org/10.1016/j.lrp.2009.11.003.

Damianakis, T., Woodford, M.R., 2012. Qualitative research with small connected communities. Qual. Health Res. 22, 708–718. https://doi.org/10.1177/1049732311431444.

Dandis, A.O., Al Haj Eid, M., Griffin, D., Robin, R., Ni, A.K., 2023. Customer lifetime value: The effect of relational benefits, brand experiences, quality, satisfaction, trust and commitment in the fast-food restaurants'. The TQM Journal. Advance online publication.

De Figueiredo, J.M., Richter, B.K., 2014. Advancing the empirical research on lobbying. Annu. Rev. Political Sci. 17, 163–185. https://doi.org/10.1146/annurev-polisci-100711-135308.

De Vaus, D., 2002. Surveys in Social Research, fifth ed. Routledge, London.

Dela Santa, E., 2013. The politics of implementing Philippine tourism policy: a policy network and advocacy coalition framework approach. Asia Pac. J. Tour. Res. 18 (8), 913–933.

Delaney, T., Wyse, R.J., Wolfenden, L., 2021. Online food delivery systems and their potential to improve public health nutrition: A response to "A narrative review of online food delivery in Australia". Public Health Nutr. 26, 273–274. https://doi.org/10.1017/S1368980021000926.

Dianita, R., 2021. Urban community engagement to reduce and prevent food waste at household level. Urban Community Engagem. Reduce Prev. Food Waste Househ. Lev. 1 (3), 261–271.

Elsaed, A.A., Zaki, M.K.E., Emam, A.M., 2022. The role of green packaging in increasing customers' trust: Applied to cloud kitchens in Egypt. J. Fac. Tour. Hotels Univ. Sadat City 6 (2/1), 111–120. ⟨https://mfth.journals.ekb.eg/article_275618_240395d657186276b5700899e412504f.pdf⟩.

Esposito, R., 2013. Terms of the Political: Community, Immunity, Biopolitics. New York. Fordham University Press.

Fitzsimons, G.J., 2008. Death to dichotomizing. J. Consum. Res. 35 (1), 5–8. https://doi.org/10.1086/589565.

Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Mark. Res. 18 (1), 39–50. https://doi.org/10.2307/3151312.

Giousmpasoglou, C., Ladkin, A., Marinakou, E., 2023. Worker exploitation in the gig economy: the case of dark kitchens. Journal of Hospitality and Tourism Insights. Advance online publication.

Giousmpasoglou, C., Marinakou, E. & Ladkin, A. (2024) The rise and fall of dark kitchens in the gig economy, Bournemouth University Business School. Hospitality & Catering News. Available at: ⟨https://www.hospitalityandcateringnews.com/2024/11/the-rise-and-fall-of-dark-kitchens-in-the-gig-economy/⟩ [Accessed 19 January 2025].

Gonzalez-Aleu, F., Hernandez, J.V., Ramirez, R., Linares, C.M., Peinado, J.A., Daniel, J., 2022. Strategic planning for repurposing kitchen equipment production operations during COVID-19 pandemic. Oper. Manag. Res. 15, 1241–1256.

Hadzibajramovic, E., Ahlborg Jr, G., Grimby-Ekman, A., Lundgren-Nilsson, Å., 2015. Internal construct validity of the stress-energy questionnaire in a working population, a cohort study. BMC Public Health 15 (1), 1–9.

Hair, J.F., Hult, G.T., Ringle, C.M., Sarstedt, M., 2017. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), second ed. Sage Publishers, Thousand Oaks, CA.

Hakim, M.P., Libera, V.M.D., Zanetta, L.D.A., Nascimento, L.G.P., da Cunha, D.T., 2022. What is a dark kitchen? A study of consumer's perceptions of deliver-only restaurants using food delivery apps in Brazil. Food Res. Int. 161, 111891.

Hirsch, A.V., Kang, K., Montagnes, B.P., You, H.Y., 2023. Lobbyists as gatekeepers: theory and evidence. J. Polit. 85 (2), 731–748. https://doi.org/10.1086/722171.

Hirsch, C.R., Krahé, C., Whyte, J., Krzyzanowski, H., Meeten, F., Norton, S., Mathews, A., 2021. Internet-delivered interpretation training reduces worry and anxiety in individuals with generalized anxiety disorder: a randomized controlled experiment. J. Consult. Clin. Psychol. 89 (7), 575–589. https://doi.org/10.1037/ccp0000660.

Hou, P., Yao, Y., Lin, P.M.C., Ren, L., 2023. Employees' perception of tourism enterprise integrity: Dimensions and scale development. Int. J. Hosp. Manag. 111, 103495. https://doi.org/10.1016/j.ijhm.2023.103495.

Hu, L.T., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives'. Struct. Equ. Model. A Multidiscip. J. 6 (1), 1–55.

Hultman, M., Robson, M.J., Katsikeas, C.S., 2009. Export product strategy fit and performance: an empirical investigation (Available at:). J. Int. Mark. 17 (4), 1–24. https://doi.org/10.1509/jimk.17.4.1.

Iacobucci, D., Posavac, S.S., Kardes, F.R., Schneider, M.J., Popovich, D.L., 2015. The median split: robust, refined, and revived (Available at:). J. Consum. Psychol. 25 (4), 690–704. https://doi.org/10.1016/j.jcps.2015.06.014.

Idele, S.I., 1979. The law of large numbers: Some issues of interpretation and application for beginners'. J. R. Stat. Soc. Ser. D. 28 (3), 209–217.

Institute for Public Health Innovation (2020) Community Advisory Board engages county residents to address food security needs in Montgomery County, Institute for Public Health Innovation, 31 August. Available at: https://www.institutephi.org/2020/08/31/community-advisory-board-engages-county-residents-to-address-food-security-needs-in-montgomery-county/ [Accessed 1 February 2025].

Jiang, Y., Balaji, M.S., Lyu, C., 2024. Cultivating initial trust in ghost kitchens: a mixed-methods investigation of antecedents and consequences. Int. J. Hosp. Manag. 119 (January), 103727. https://doi.org/10.1016/j.ijhm.2024.103727.

Jones, P., Hillier, D., Comfort, D., 2018. The role of pubs in local communities. Int. J. Contemp. Hosp. Manag. 30 (2), 117–126. https://doi.org/10.1108/IJCHM-09-2016-0503.

Jung, H.S., Yoon, H.H., 2010. Study on the effects of service encounter elements in a family restaurant based on customers' emotional response and satisfaction. J. Korean Soc. Food Cult. 25 (4), 456–465.

Jung, H.S., Namkung, Y., Yoon, H.H., 2010. The effects of employees' business ethical value on person–organization fit and turnover intent in the foodservice industry'. Int. J. Hosp. Manag. 29 (3), 538–546.

Kim, D., Jang, S.S., 2019. The psychological and motivational aspects of restaurant experience sharing behaviour on social networking sites'. Serv. Bus. 13, 25–49.

Kock, N., 2020. Harman's single factor test in PLS-SEM: checking for common method bias'. Data Anal. Perspect. J. 2 (2), 1–6.

Koens, A., Wood, R.C., 2017. An analysis of international employment levels in hospitality occupations using secondary statistics. Int. J. Tour. Res. 19 (5), 496–504.

Latham, A., 2003. Urbanity, lifestyle and making sense of the new urban cultural economy: notes from Auckland, New Zealand. Urban Stud. 40 (9), 1699–1724.

Lees, L., Ley, D., 2008. Introduction to special issue on gentrification and public policy. Urban Stud. 45 (12), 2379–2384. https://doi.org/10.1177/0042098008097098.

Libereat (2022) The Rise of Dark Kitchens. Available at: ⟨https://libereat.com/2022/03/the-rise-of-dark-kitchens/⟩ [Accessed 23 April 2023].

Litvin, S.W., Guttentag, D., 2023. There is no place like home for the holidays: who travels in the midst of a deadly pandemic?'. J. Travel Res. 62 (5), 1077–1089.

Lynch, P., 2017. Mundane welcome: Hospitality as life politics. Ann. Tour. Res. 64, 174–184.

Ma, X., Neeraj, T., Naaman, M., 2017. A computational approach to perceived trustworthiness of Airbnb host profiles. Proc. Int. AAAI Conf. Web Soc. Media 11 (1), 604–607.

Malhotra, N., 2010. Marketing Research: An Applied Orientation, sixth ed. Prentice Hall, Upper Saddle River, NJ.

Mialon, M., Swinburn, B., Wate, J., Tukana, I., Sacks, G., 2016. Analysis of the corporate political activity of major food industry actors in Fiji. Glob. Health 12 (1), 18. https://doi.org/10.1186/s12992-016-0158-8.

Mihalic, T., Kuščer, K., 2022. Can overtourism be managed? Destination management factors affecting residents' irritation and quality-of-life. Tour. Rev. 77 (1), 16–34.

Moreau, C., 2020. Brand building on the doorstep: the importance of the first (Physical) impression. J. Retail. 96, 155–167. https://doi.org/10.1016/j.jretai.2019.12.003.

Naidoo, P., Sharpley, R., 2016. Local perceptions of the relative contributions of enclave tourism and agritourism to community well-being: the case of Mauritius. J. Destin. Mark. Manag. 5 (1), 16–25. https://doi.org/10.1016/j.jdmm.2015.11.002.

Pookulangara, S., Wen, H., Bharath, J., 2023. Consumer attitudes toward ordering from cloud kitchens: a gender and marital status perspective. Int. J. Contemp. Hosp. Manag. 35 (5), 1859–1879.

Praningrum, M., Suryosukmono, G., Atmaja, F., 2022. The role of leader integrity moderation in explaining the relationship of organizational political perception, employee work stress, employee innovative behavior, and public organization performance. J. Manag. Public Adm. 22 (3), 45–65.

Reforma (2022) Dark kitchens: the new player in commercial real estate, Reforma. Available at: ⟨https://comercial.reforma.com/libre/comercial/campanas/industria_parks_oct22/4.darkkitchens_new_player_commercial.html⟩ [Accessed 11 January 2025].

Reuschke, D., Mason, C., 2022. The engagement of home-based businesses in the digital economy. Futures 135, 102542. https://doi.org/10.1016/J.FUTURES.2020.102542.

Roelofsen, M., Minca, C., 2018. The Superhost. Biopolitics, home and community in the Airbnb dream-world of global hospitality'. Geoforum 91, 170–181.

Savills (2023) 'Dark kitchens in Europe: The top takeaways', *Savills*. Available at: ⟨https://www.savills.com/blog/article/336625/commercial-property/dark-kitchens-in-europe–the-top-takeaways.aspx⟩ [Accessed 11 January 2025].

Shafieizadeh, K., Tao, C.W.W., 2020. How does a menu's information about local food affect restaurant selection? The roles of corporate social responsibility, transparency, and trust. J. Hosp. Tour. Manag. 43, 232–240.

Shapiro, A., 2023. Platform urbanism in a pandemic: dark stores, ghost kitchens, and the logistical-urban frontier. J. Consum. Cult. 23 (1), 168–187. https://doi.org/10.1177/14695405211069983.

Suess, C., Baloglu, S., Busser, J.A., 2018. Perceived impacts of medical tourism development on community well-being. Tour. Manag. 69, 232–245.

Taber, K.S., 2018. The use of Cronbach's alpha when developing and reporting research instruments in science education. Res. Sci. Educ. 48 (6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2.

Talamini, G., Li, W., Li, X., 2022. From brick-and-mortar to location-less restaurant: the spatial fixing of on-demand food delivery platformization. Cities 128, 103820. https://doi.org/10.1016/j.cities.2022.103820.

Teare, M.D., Dimairo, M., Shephard, N., Hayman, A., Whitehead, A., Walters, S.J., 2014. Sample size requirements to estimate key design parameters from external pilot randomised controlled trials: a simulation study. Trials 15 (1), 264. https://doi.org/10.1186/1745-6215-15-264.

Tuomi, A., Jianu, B., Roelofsen, M., Ascenção, M.P., 2023. Riding against the algorithm: algorithmic management in on-demand food delivery. In: Ferrer-Rosell, B., Massimo, D., Berezina, K. (Eds.), Information and Communication Technologies in Tourism 2023. ENTER 2023. Springer Proceedings in Business and Economics. Springer, Cham, pp. 28–39. https://doi.org/10.1007/978-3-031-25752-0_3.

Veksler, A., 2015. Diluted regulations: a need to review the theoretical classification of the different lobbying regulatory environments. J. Public Aff. 15 (1), 56–64. https://doi.org/10.1002/pa.1495.

Wilkinson, C. & Hui, A. (2022) 'The mystery of London's dark kitchens', Time Out London. Available at: ⟨https://www.timeout.com/london/news/the-mystery-of-londons-dark-kitchens-041322⟩ [Accessed 11 January 2025].

Woosnam, K.M., 2012. Using emotional solidarity to explain residents' attitudes about tourism and tourism development. J. Travel Res. 51 (3), 315–327. https://doi.org/10.1177/0047287511410351.

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