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Residents' willingness to pay for mitigation measures: The case of tourism impacts in Tel Aviv's neighborhoods

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ABSTRACT

Destinations wishing to develop new sustainable tourism strategies have to adopt proactive measures in order to address potential adverse impacts of tourism. Using a discrete choice approach, we investigated residents' preferences and willingness to pay for municipal programs that mitigate such future tourism-related concerns in Tel Aviv. Results indicate that residents who live nearby the tourist center commonly perceive tourism impacts as more severe, but do not necessarily favor interventions that mitigate these impacts. Furthermore, both perception of impacts and preferences for mitigation measures were found to be heterogeneous and associated with socio-economic characteristics and geographical proximity to the tourist center. Therefore, the study informs researchers and policymakers to consider generating neighborhood-specific intervention strategies when considering future sustainable tourism development.

1. Introduction

The rapid increase in international tourism after the Second World War has primarily been perceived as driving economic growth, and a source for foreign currency (Alexander, 1953; Pizam, 1978). Tourism has also been associated with additional non-economic positive externalities such as an increase in public space usage, and support of cultural practices that positively affect residents' values and identity perceptions (García-Hernández, de la Calle-Vaquero, & Yubero, 2017; Nunkoo & Ramkissoon, 2010). However, with the continued increase in tourists' flow through the 1960s and more prominently during the 1970s, negative impacts of unconstrained tourism flows began to be acknowledged (Cohen, 1978; Gilbert & Clark, 1997; Pizam, 1978). Early discussions about negative impacts focused primarily on natural environments and resorts (Haralambopoulos & Pizam, 1996; Pigram, 1980; Wall, 2020), as these were the two prominent types of tourist destinations at the time. The increase in urban tourism since the 1990s (Ashworth & Page, 2011; Wall, 2020) has led to a growing interest in tourism impacts within urban environments (Gilbert & Clark, 1997).

In recent years, the term *overtourism* has been introduced in popular media and has been rapidly adopted within the academic domain as well (Goodwin, 2017; Koens, Postma, & Papp, 2018; Milano, Novelli, &

Cheer, 2019). Overtourism describes the large flows of tourists into (urban) destinations and the perceived impact of these flows on local residents' quality of life, on one hand, and on the tourist experience, on the other (Goodwin, 2017). The concept of overtourism has been developed through observations of several exemplar cities—mainly from the developed world—such as Amsterdam, Venice, Barcelona, Dubrovnik, as well as other non-urban destinations such as Iceland and Boracay. Nevertheless, the importance of studying overtourism seems to go beyond the identification and theorization of the phenomenon in a few leading tourist destinations. Following the popularization of the term (some scholars feel that the term overtourism has been overused; Koens et al., 2018; Milano et al., 2019), overtourism has become a driver of new tourism-related policies.

More and more destinations started to acknowledge that the expected increase in tourism flow in a “business-as-usual scenario” may lead to undesired conflicts between tourists' demands and locals' needs at some point (Capocchi, Vallone, Amaduzzi, & Pierotti, 2019; Kušcer & Mihalič, 2019). So, while most destinations do not experience de facto overtourism, the exemplar destinations that are commonly discussed within popular and academic literature lead many policy makers to devise and adopt more sustainable and limited tourism development strategies in order to avoid attaining the dubious title of overtoured

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destination in the future. This includes the adoption of mitigation strategies such as regulation of short-term rentals, emission measurement and control, and introduction of entrance fees and taxation that aim to reduce the volume of tourists in overcrowded areas (Christine, 2019; Nepal & Nepal, 2019; Pham, Meng, & Becken, 2022).

Since overtourism emphasizes the adverse impact of the tourist load on the daily routine and quality of life of local residents in a destination, researchers proposed adopting tools and indicators that measure residents' attitudes towards tourists in order to assess overtourism levels (Namberger, Jackisch, Schmude, & Karl, 2019). However, so far, studies did not investigate residents' opinions and preferences for actual interventions that could mitigate future tourism's adverse impacts. The current study takes a resident-centered approach to investigate potential tourism impacts and preferred mitigation measures. This is done while controlling for the type of the impact and the mitigation programs and the personal characteristics of residents, including their place of residency.

The objectives of the study are threefold. First, to review and identify the most prominent adverse tourism impacts. Second, based on the impacts identified in Objective 1, to develop a method to assess tourists' attitudes towards municipal intervention to mitigate negative tourism impacts. The study proposes to employ a discrete choice method (Train, 2009) to elicit residents' willingness to pay for mitigation measures that will reduce tourism's future impacts (see methodological section). The advantage of the approach is that it facilitates the assessment of potential perceived impacts and corresponding interventions rather than just residents' current attitudes. Hence, the approach may help in assessing bottom-up concerns about future manifestations of overtourism. Third, we test the proposed method on a case study in Tel Aviv, Israel. Tel Aviv has faced a rapid increase in the number of tourists in recent years (in pre-Covid-19). It is a good example for a city that is yet to experience a complete overtourism situation, but in which overtourism potential affect future tourism development plans. Study results can be used to develop and prioritize overtourism mitigation programs in the post-COVID-19 era. Mainly for cities rethinking their strategies for the management of tourism flows, aspiring to more sustainable strategies that emphasize residents' quality of life.

2. Literature review

2.1. Residents' perception of tourism impacts

Systematic investigation and theorization of potential and actual negative consequences of tourist activity began during the 1970s (Ap, 1990; Mathieson & Wall, 1982; McCool & Lime, 2001; Pigram, 1980; Sharpley, 2014). The conceptualizations that emerged in this period, such as tourism carrying capacity, extended the discussion about tourism's impacts beyond the unidimensional economic perspective to also include references to the physical-environmental and socio-cultural dimensions (Frauman & Banks, 2011; Mathieson & Wall, 1982; Pizam, 1978; Tokarchuk, Gabriele, & Maurer, 2021).

The more recent concept of overtourism continues the discussion on adverse tourism impacts. Namberger et al. (2019), for example, associate overtourism with a "limits-to-growth" approach. They assert that an overtoured destination is one that exceeds the limits of its tourism carrying capacity. In particular, overtourism is thought to have a negative impact on, among other things, increased congestion (Pinke-Sziva, Smith, Olt, & Berezvai, 2019), litter, and noise in the streets and in public spaces around the main attractions (Pinke-Sziva et al., 2019; Smith, Sziva, & Olt, 2019); reduced access to basic services due to the replacement of basic daily amenities with businesses that cater to tourist demands (Dodds & Butler, 2019); and an increase in rental prices due to the transformation of apartments into short-term rentals such as Airbnb (García-López, Jofre-Monseny, Martínez-Mazza, & Segú, 2020; Guizi, Breda, & Z. B. and R., 2020; Martín, Martínez, & Fernández, 2018). Digital platforms such as Airbnb had reduced barriers to entry for

potential providers in the accommodation market and encouraged landlords to switch from a supply of long-term rentals to short-term rentals (Barron, Kung, & Proserpio, 2020; Benítez-Auriales & Tussya-diah, 2021; García-López et al., 2020). Airbnb activity and especially the professionalization of Airbnb (Dogru, Mody, Suess, Line, & Bonn, 2020; Giannoni, Brunstein, Guéniot, & Jouve, 2021) has also negatively affected the traditional hospitality sectors in terms of performance (Zervas, Proserpio, & Byers, 2017). In contrast, more positive impacts on employment in the hospitality and tourism sectors were also reported (Dogru, Mody, Suess, McGinley, & Line, 2020).

With the development of a more sophisticated framework for analyzing the impacts of tourism since the 1970s', researchers have started to pay more attention to the interactions between tourists and local host communities. Much of the theorization and many of the empirical studies about social and cultural impacts of tourists has shifted since the early years of the discipline; what was first conceptualized as a one-directional phenomenon in which the host community passively absorbed the outcome of tourists' activity became a more realistic understanding of a process in which residents react, their perceptions and attitudes towards tourism shifting with time and contextual and personal factors (Ap, 1992; Doxey, 1975; Getz, 1994; Pigram, 1980).

Over the years, scholars have presented several different motivations and arguments to support their investigations of host communities' opinions. First, from the perspective of the local community, understanding how residents perceive changes in their quality of life due to tourism activity may help policy makers and planners minimize negative social impacts. (Frauman & Banks, 2011; Harrill, 2004; Vargas-Sánchez, Porras-Bueno, & de los Plaza-Mejía, 2011; Williams & Lawson, 2001). Second, from the demand, or tourist, perspective, it is important to maintain the local community's positive attitude towards tourists; it is argued that the success and sustainability of a destination is highly dependent on the local community's goodwill regarding hosting tourists. (Jurowski & Gursoy, 2004; Sharpley, 2014). Third, the analysis of residents' opinions has been suggested as a useful tool for assessing tourism's impact, or, more precisely, the social carrying capacity of destinations (Mansfeld, 1992; Muler Gonzalez, Coromina, & Galf, 2018). Several methods that assess the attitudes of the host community have been implemented. These methods will be discussed in the following section.

2.2. Measuring and analyzing residents' attitudes towards tourism

By far the most common data-collection tool used in studies in the field are attitude questionnaires. In these questionnaires, residents are explicitly asked about their attitudes, opinions, and/or perceptions about tourists and specific outcomes related to tourism activity. The questionnaires employ a set of statements which the respondent rates using some sort of numerical or ordinal rating scale (see for example, Davis, Allen, & Cosenza, 1988; Martín et al., 2018). According to Harrill (2004), researchers commonly utilize this type of data for two main purposes: (1) classification of residents' attitudes and perceptions, or, as Harrill refers to it, "resident and community typologies"; (2) identifying the factors that affect residents' perceptions. Importantly, the two approaches are complementary rather than competing and are occasionally implemented simultaneously.

2.2.1. Classification of residents' attitudes towards tourism

Classification or segmentation studies, as they are often called, attempt to recognize distinct groups that share common characteristics. The approach, which often relies on cluster analysis techniques, assumes that groups are not homogenous; hence, a general group average misrepresents the variation within the group (Williams & Lawson, 2001).

The work of Davis et al. (1988) is a prominent example of a study that utilized a clustering technique for the purpose of differentiating between groups of residents. The study enacted a clustering procedure on its 31-item questionnaire and identified five groups of residents

distinguished by their attitude towards tourists. The *Haters, Lovers, Cautious Romantics, In-Betweeners*, and *Love 'Em for a Reason*. Subsequent studies identified similar clusters of residents based on their attitudes (see, for example, Williams & Lawson, 2001).

Classification techniques were also used to identify typical responses of residents rather than just their attitude towards tourists. For example, based on personal interviews and written comments, Ap and Crompton (1993) differentiated four types of residents' responses strategies to tourism. These include *Embracement, Tolerance, Adjustment*, and *Withdrawal*. Using a factor analysis procedure, Namberger et al. (2019) found two types of predispositions towards tourists. They named the residents who had a tendency to avoid tourism *mass tourism avoiders* and the second group of residents *tourism sympathizers*.

2.2.2. Identifying the factors that affect residents' perceptions

Much of the research in the field is concerned with identifying and validating key factors that affect residents' perceptions of tourism. For instance, the hypothesis suggested by the Irridex model, that residents' attitudes are dependent on the development stage of tourism in the destination and hence vary temporally, has been empirically supported (Getz, 1994; Martín et al., 2018). Based on the social exchange theory, Ap (1992) argues that an intrapersonal variation in attitude towards tourism is expected. Residents who benefit from tourism (e.g., earn their income from the tourism industry; Getz, 1994; Pizam, 1978; Vargas-Sánchez et al., 2011) are more likely to develop positive opinion about tourists. In contrast, residents who are primarily exposed to tourism's adverse outcomes (e.g., increase in rental prices; Martín et al., 2018) will tend to develop more negative attitudes. Following the same logic, social exchange theory may also explain spatial or intraurban variation in residents' perceptions of tourism. Residents who live in proximity to central tourist districts, experience high concentration of tourists on a daily basis, and are therefore more exposed to tourism's adverse outcomes will be more likely to develop a negative attitude to tourism. In contrast, those who are more distant will be more likely to possess a positive perception of tourism (Jurowski & Gursoy, 2004; Martín et al., 2018; Sheldon & Var, 1984). While this spatial effect is usually consistent, some exceptions have been recorded in the literature (Belisle & Hoy, 1980).

Other prominent factors that were found to affect residents' opinions of tourism include length of residency in and attachment to the neighborhood (Jurowski, Uysal, & Williams, 1997; McCool & Martin, 1994; Sheldon & Var, 1984), personal values and predispositions (Namberger et al., 2019; Williams & Lawson, 2001), familiarity with the tourism sector and its beneficial and adverse impacts (Gursoy, Jurowski, & Uysal, 2002; Perdue, Long, & Allen, 1990), gender, education level, and other socio-demographics characteristics (Mansfeld, 1992; Muler Gonzalez et al., 2018). However, the impact of socio-demographics is often not consistent and is commonly found to be less significant than other factors (Belisle & Hoy, 1980; Harrill, 2004; Perdue et al., 1990).

The review above suggests that while residents' perceptions of tourism have been a fruitful topic of investigation, yielding numerous studies, little is known about the attitudes of residents towards potential future overtourism impacts. This is especially important in cases in which the city authority wishes to develop a proactive strategy in order to avoid negative effects as tourism increases. Furthermore, there is not much data available about which mitigation strategy is perceived to be more viable and useful from the point of view of the local heterogenous host community. Questions about sustainable tourism development seem to receive greater priority in light of the growing awareness and interest of policy makers and the general public about overtourism and the negative impacts of tourism, which are expected to grow.

In the absence of actual data on best strategies for each destination, we propose implementing a discrete choice experiment that assesses residents' willingness to pay for mitigation measurements that will reduce the chances of their city and neighborhood becoming overtoured. This approach allows to distinguish between the different adverse

impacts and the heterogeneity of the local population in their perception of these impacts. To the best of our knowledge, only a few studies in the past used a "willingness to pay approach" in the context of adverse tourism impacts, most of which from the perspective of the tourists (Casey, Brown, & Schuhmann, 2010; Concu & Atzeni, 2012; Wang, Wang, & Yu, 2017). This is the first attempt to implement such an approach in order to formulate an heterogenous proactive strategy regarding the residents' quality of life.

3. Methodology

3.1. The model

Our proposed method, illustrated with our case study city, Tel Aviv, employs a framework of consumers' discrete choice behavior, specifically the random parameter logit (mixed logit) model (Train, 2009) with 40 random draws. The model we estimate allows for preferences heterogeneity of the different effect of an intervention. For example, residents who are Airbnb property owners are less likely to support interventions that regulate the short-term rental market. This will reflect in a negative coefficient. The parameters for describing the effects are assumed to be normally distributed. Price is fixed so that the willingness to pay will be normally distributed also. The likelihood function formulation presented in Eq. (1) is adopted from Fleischer and Sternberg (2006):

The utility that Tel Aviv resident i receives from j is:

$$U_{ij} = X_{ij}\beta_i + \varepsilon_{ij} = X_{ij}\bar{\beta} + X_{ij}\tilde{\beta}_i + \varepsilon_{ij} \quad (1)$$

X_{ij} - vector of attributes Tel Aviv resident i obtain from attribute j .

β_i - vector of random preferences of Tel Aviv resident i (density function $f(\beta)$).

ε_{ij} - random error specific to i and j , assuming the distribution i.i.d. is not dependent on β_i and X_{ij} .

$\tilde{\beta}_i$ - deviation of i preferences from the average $\bar{\beta}$ of Tel Aviv resident i .

In order to maximize utility, Tel Aviv resident i chooses what he or she conceives to be the most beneficial alternative j . There is a part in the utility function that is unknown to the researcher: $X_{ij}\tilde{\beta}_i + \varepsilon_{ij}$. This part represents the specific preferences of resident i . Thus, it is correlated over the different alternatives. We can assume that the difference in $\tilde{\beta}_i$ is responsible for this specific correlation and then the likelihood of resident i to choose j from all the alternatives is as represented in Eq. (2):

$$P_{ij} = \text{prob}(X_{ij}\beta_i + \varepsilon_{ij} - X_{ik}\beta_i < \varepsilon_{ik}, \forall k \neq j) \quad (2)$$

If the error ε_{ij} distributes "extreme value," then the probability seen above equals to Eq. (3):

$$P_{ij} = \int_{-\infty}^{\infty} \left[\frac{e^{X_{ij}\beta_{ij}}}{\sum_{k=1}^{k=m} e^{X_{ij}\beta_{ij}}} \right] f(\beta) d\beta \quad (3)$$

in which m is defined as an alternative number in the set of choices.

According to Train (2009), it is possible to attain an evaluation of the above probability as indicated in Eq. (4):

$$\hat{P}_{ij} = \frac{1}{R} \sum_{r=1}^{r=R} \frac{e^{X_{ij}\beta_{ij}}}{\sum_{k=1}^{k=m} e^{X_{ij}\beta_{ij}}} \quad (4)$$

We allow for heterogenous preferences, except that of the cost, for the type of mitigation method used depending on the attributes of the residents (e.g., location of residence, seniority in the city). Based on this assumption, all the coefficients, have an independent normal distribution. According to economic theory the higher the price of an alternative the lower is the probability it will be chosen. Thus, the parameter of cost

does not have heterogenous preferences and it is expected to receive a negative value for all Tel Aviv residents. This assumption guarantees that willingness to pay for all other attributes will have a normal independent distribution.

3.2. The discrete choice experiment and questionnaire

Data collection was conducted through a stated preference discrete choice questionnaire that included four sections. In the first section participants received a short description of the problems that overtourism causes in different parts of the world and were asked if they were aware of these problems. In the second part of the questionnaire, participants were asked to rate their level of agreement regarding 17 statements about tourists in Tel Aviv. Most of the items were extracted from existing questionnaires (Andereck, Valentine, Knopf, & Vogt, 2005; Chen, 2001). A 4-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree) was used for all 17 items. A “no opinion” option (marked as 5) was adopted following pilot interviews that were conducted, in which residents stated that some of the items are not relevant for them.

The third section included the discrete choice experiment. In this section participants were requested to choose their preferred overtourism mitigation program out of a set of three different optional programs that were presented to them. Each participant was asked to complete five different menus (i.e., perform five choices). The fourth and final part included a set of socioeconomic and demographic characteristic questions, including neighborhood of residence, which is associated with the daily level of exposure to tourists.

3.2.1. Construction of the discrete choice questionnaire

Potential overtourism-induced problems that were embedded in the experiment were extracted from relevant literature and media about overtourism and adjusted to the local context. In our case study city, Tel Aviv, we identified three such frequently mentioned problems. These were: littering, tourist overcrowding, and increase in housing rental prices due to pressure from tourist short-term rentals through platforms such as Airbnb. Accordingly, the mitigation programs presented in the experiment dealt with these three problems (see attributes that were used and their levels in Table 1 and an example for a menu that was presented to participants in Table 2). Each program was assigned a monthly city tax that residents would be required to pay if the program was enacted. It is very likely that adjustments will be required for other cities and contexts.

For the sake of determining a reasonable tax level we conducted interviews with a convenience sample of 15 Tel Aviv residents of different ages and income levels. They were first given a short description of the problems that different cities in the world struggle with due to overtourism and then asked to determine a reasonable monthly tax they would pay to the city in order to construct a mitigation and regulation program to help avoid the disutility caused by overtourism. The tax level ranged between 10 NIS (~\$2.87 U.S.) and 40 NIS (~\$11.46 U.S.) per month, with 20 NIS (~\$5.73 U.S.) and 25 NIS (~\$7.16 U.S.) the most

Table 1
Discrete choice experiments attributes and their levels.

Type	Attribute	Levels
Mitigation measures effectiveness	1. Rental availability	3 levels: significantly reduced, slightly reduced, similar to current situation
	2. Litter level	3 levels: highly littered, intermediate littering level, clean
	3. Street crowdedness level	3 levels: highly crowded, intermediate crowdedness level, not crowded
Tax	4. Monthly city tax (NIS)	5 levels: 0, 10, 20, 25, 40

Table 2

An example of one menu with three preset plans that was given to participants.

	Plan 1	Plan 2	Plan 3
Rental availability	Reduced significantly	Not affected	Reduced significantly
Street litter	Intermediate littering level	Clean	Reduced significantly littered streets
Street overcrowding	Intermediate crowdedness level	Not crowded	Very crowded
Monthly tax	10 NIS	40 NIS	0 NIS
Choose your preferred plan	○	○	○

prevalent sums.

The choice menus used in the experiment were designed based on Fleischer, Shafir, and Mandelik (2013). Rather than including all possible alternative programs, we reduced optional programs to a total of 36 alternative programs using orthogonal design (Hensher, Rose, & Greene, 2005). As presented in Table 1, each mitigation program was characterized by the expected effectiveness of the program in mitigating each of the three aforementioned overtourism problems. The 36 alternatives were grouped into menus of three alternatives each (see example in Table 2). Grouping was conducted manually to ensure that no one alternative was superior to the others (i.e., demonstrated better mitigation effectiveness in all three dimensions and had a lower tax assigned to it). An opt-out alternatives were added to some menus, based on the orthogonal design and the manually grouping (in this alternative, residents do not pay any tax and consequently no mitigation efforts are taken, leading to increased littering, overcrowding, and rental pricing). We obtained 15 different preset menus. Alternatives in each menu were displayed in a random order.

3.3. Study area: Tel Aviv

Tel Aviv (officially Tel Aviv-Yafo) is the second largest city in Israel, with ~460,000 residents, and is the central economic hub of the country. Up until the COVID-19 outbreak, the city experienced a substantial increase in tourists. Between 2015 and 2017 the number of hotel nights has increased by 7.7% annually, and in 2018 the city hosted 2.2 million tourists, of which 1.5 million were international tourists and 700,000 domestics (Tel Aviv Global, 2019). The old city of Jaffa, the 14-km-long shoreline, and the vibrant urban atmosphere which includes a trendy culinary and nightlife scene are considered to be the city’s three central attractions. Since no mitigation programs have been applied in Tel Aviv thus far, we could not use market data. Hence, we implemented the stated preference approach and elicited preferences for preventing overtourism-induced impacts.

The rapid growth in incoming tourists is beginning to manifest in notable adverse outcomes, some of which have been reported in the popular media. Most apparent is the impact of the high rate of short-term rentals (compared to traditional lodging options), mainly Airbnb, which is among the highest in the world (for example, in 2018, 17,000 rentals were offered in Airbnb website, Tel Aviv Global, 2019) and which puts pressure on the rental housing market, which already suffers from a severe shortage of supply (Eshel & Hananel, 2019). Tel Aviv makes an interesting case; the municipality, which has an official strategy of positioning the city as one of the world’s leading urban destinations, has acknowledged the risks of overtourism in some of its neighborhoods. Consequently, it has emphasized the need for sustainable development that involves residents in future tourism planning and prioritizes residents’ quality of life (Tel Aviv Global, 2019). However, the city has yet to determined official steps that will support such sustainable development.

3.4. The sample and sampling procedure

A sample of 400 participants received an online questionnaire through iPanel, an Israeli survey panel company during November 2019. Sample size was calculated using Johnson & Orme (2010) formula. In order to evaluate the influence of proximity to tourists' concentration on willingness to pay to mitigation programs, we distinguished between neighborhoods that are located in the central tourism district and neighborhoods that are located outside the tourist district in which residents had potentially fewer daily interactions with tourists. The first group included 210 residents of districts 3 and 5, which are close to the beach (see Fig. 1). This area sees a lot of tourist activity and has an extremely high concentration of short-term rentals and hotels that cater to international travelers. The second group included 190 residents, of which 95 residents of districts 4, and 6, which are located in close proximity to the tourist center and 95 residents of districts 1 (only sub-district 13 was sampled), and 9, located in the city's north and east respectively, far from tourist points of interest and accommodations.

Our preliminary analysis revealed that residents' attitudes towards tourists in neighborhoods that are located outside the tourist center but in close proximity to it (i.e., districts 4, and 6) are very similar to the attitudes of residents living in the tourist center itself (i.e., districts 3 and 5). Therefore, we relate to all of these districts (3, 5, 4 and 6) as *central neighborhoods*. In contrast, neighborhoods in district 1, and 9 that are more remote from the center are referred to as *peripheral neighborhoods*.

Participants from other districts were excluded from the study based on a screening question that appeared at the beginning of the questionnaire. Due to the strict city district exclusion criteria, the sample was biased in few dimensions. Most notably, the sample included a larger share of females (76% females, see Table 3), and was slightly more educated than the general population in Tel Aviv. Our final sample included 2000 choice observations (400 participants * 5 menus that each participant completed).

4. Results

4.1. Residents' perceptions and attitudes towards tourists

We used an exploratory factor analysis for the 17 resident statements on their perceptions and attitudes towards tourists in order to attain a more parsimonious description of the attitudes. The "no opinion" option was used by 154 residents for at least one of the statements. Thus, we analyzed only the 246 participants who rated all 17 statements. We found no sample bias when comparing characteristics of participants who were omitted with those who were included in the analysis. Our analysis revealed three factors that account for 58.5% of the information in the statements. Factor 1 had a rather high eigen value of 7.09 while Factor 3 demonstrated low eigen value of 1.07 indicating that it explains little variance. Factor loadings appear in Table 4. Factors 2 and 3 include only two items each; however, given the exploratory nature of the analysis and the theoretical relations between items comprising each of these factors, they were included in the list of factors (Raubenheimer, 2004).

We named Factor 1 "general adverse impacts". It includes 12 statements with very good internal consistency (Cronbach alpha = 0.919) about various negative impacts that are associated with tourist activity in a destination and may affect Tel Aviv's residents' quality of life. Factor 2 includes two statements with good internal consistency (Cronbach alpha = 0.808) that relate to tourism's impact on the real-estate market due to home-sharing platforms such as Airbnb. It is therefore named "short-term rentals impacts." The differentiation of the two real-estate statements from the general list of impacts in Factor 1 highlights the prominence of Airbnb's impact in Tel Aviv. Factor 3 relates to residents' opinions about the increase in tourist arrivals and the role of the municipality in mitigating this increase. This factor seems to

reflect residents' level of involvement with tourism. We named this factor "involvement with tourist flow." However, Factor 3 suffered from very low internal consistency (Cronbach alpha = 0.084).

Table 5 presents *t*-tests of the three factors over the two types of neighborhoods. As indicated by Factor 1, residents in the central neighborhoods were more aware of the general adverse impacts caused by tourists compared to residents in peripheral neighborhoods. However, the difference was not statistically significant (1.84 vs. 1.72 respectively, *p*-value = 0.145). When examining the per-statement scores between the two areas, we see that residents in central neighborhoods perceive tourist impacts on street litter, overcrowding and local culture and lifestyle to be more severe compared to residents in peripheral neighborhoods. However, except for overcrowding, these impacts are still conceived to be rather minor in absolute numbers. Given the relatively low scores of Factor 1 in both areas, it seems that, overall, residents in Tel Aviv do not find tourist impacts to be a major concern regardless of their home neighborhood location.

Significant disparity in attitude was found in Factor 2 (3.21 in central neighborhoods vs. 2.33 in peripheral neighborhoods, *p*-value < 0.001), which reflects the greater impact of short-term rentals in central neighborhoods. The high score of Factor 2 in the center implies that Airbnb is conceived as a real threat to urban living in central neighborhoods. Differences in Factor 3 indicate that residents in central neighborhoods are also significantly more involved with tourism. For the central area's residents, the sense that tourists are important to Tel Aviv and that the city should tend to adverse tourist effects is greater than it is for residents of peripheral neighborhoods. Importantly, other socio-demographic variables did not yield significant differences in residents' perception of tourism.

4.2. Residents' perception of overtourism

Table 6 presents the results of three models of the mixed logit estimations. In Model 1, we employed the three treatments and the monthly tax only. In Model 2, interactions of the three treatments with the dummy peripheral neighborhoods were added. In Model 3, we added interactions with residents' characteristics, including age, education (years of formal education), and number of years living in Tel Aviv.

As expected, the coefficient of "monthly tax" is negative and significant in all three models, meaning that residents would prefer an option with a lower tax when everything else is constant. The mean value of the coefficients of the three interventions are all positive and significant in all the models. An inspection of the parameters of the standard deviation of the random parameters—in the second column of each model—indicates that for all three city treatments of overtourism there is a significant heterogeneity across residents. The significant level of the standard deviation indicates that people have heterogeneous preferences to the different treatments, i.e., some residents prefer the treatment and some do not. Thus, although the mean is positive and significant, still not all respondents place a positive value on this attribute. The estimated means and standard deviations of these coefficients provide information on the share of the population that places a positive value on the site attribute and the share that places a negative value. For example, in Model 3 the distribution of the coefficient of the indicator for a short-term rental regulation treatment obtains an estimated mean of 0.52 and estimated standard deviation of 0.99. The deviation of the mean by the standard deviation (in order to transform the distribution to standard normal) enables us to see that 70% of respondents placed a positive value on this treatment, while 30% place a negative value. The same calculation was similarly conducted on the two other coefficients. Street litter reduction has the highest coefficient and is considered a favorable action by 85% of the residents; overcrowding mitigation is looked upon positively by 74%.

The coefficients of the interaction variables in Models 2 and 3 depict additional heterogeneity based on location and other attributes of the residents. The significant negative coefficient of the interaction variable

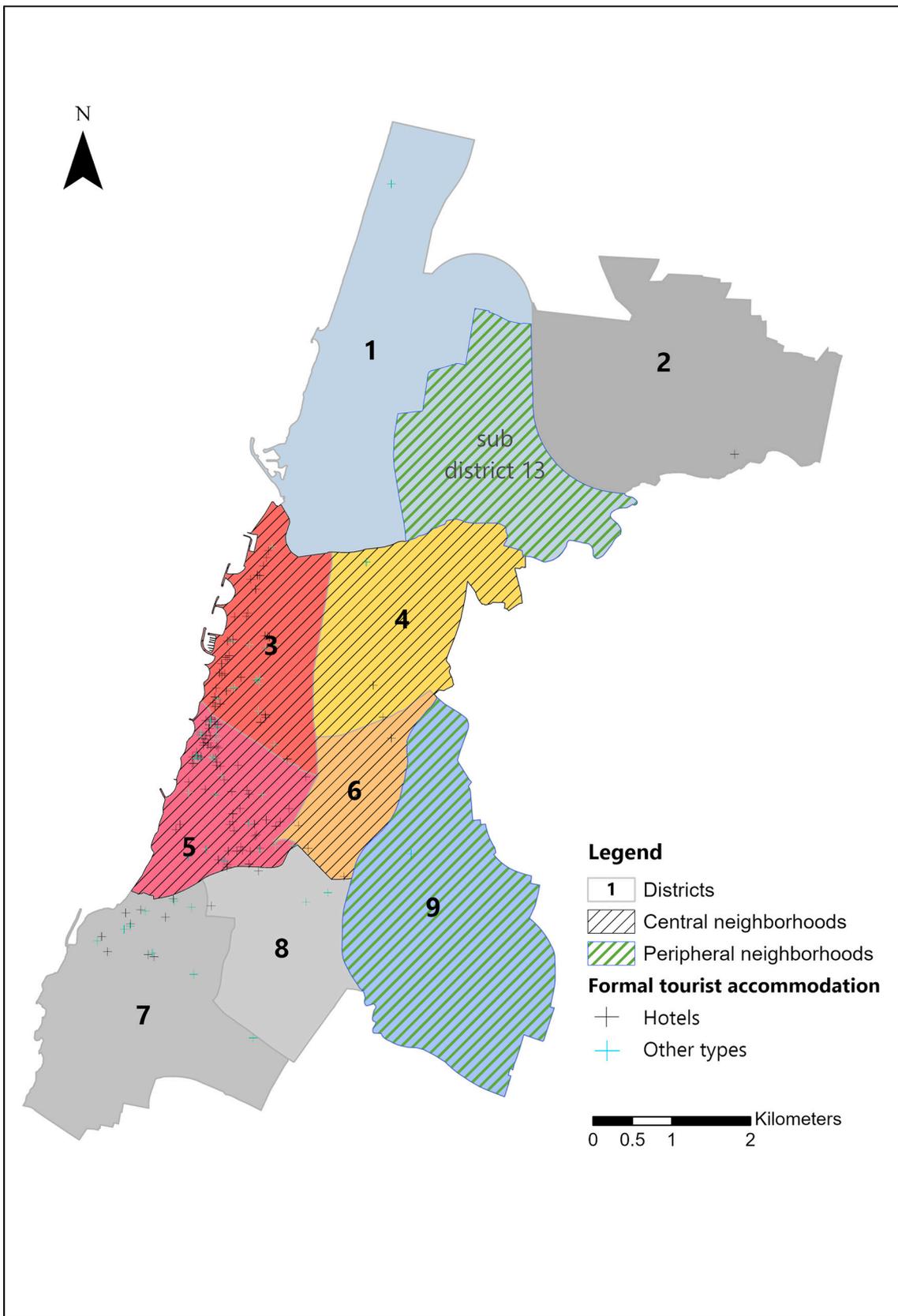


Fig. 1. Map of Tel Aviv's districts. The central and peripheral areas that are marked on the map are the ones that were used in the data analysis of the current study.

Table 3
Socio-demographic characteristics of the sample.

Variable	
Sample size (n)	
<i>Central neighborhoods</i>	
District 3	142
District 4	77
District 5	68
District 6	18
<i>Peripheral neighborhoods</i>	
District 1 (sub district 13)	15
District 9	80
Total sample	400
Gender (% male)	24%
Education in years (average/stdv)	15.13 / 2.531
Age (average/stdv)	35.99 / 10.26
Awareness of negative impacts of overtourism ^a	81%

^a Percent of respondents who answered YES when asked: “Are you aware of the negative impacts of over-tourism that some cities in the world experience?”

of short-term rentals’ regulation with the peripheral neighborhoods shows that residents of these neighborhoods are much less in favor of the city intervening in the real-estate market. This is probably due to the smaller impact of Airbnb apartments on the real-estate market in the peripheral areas. In this sense, the direct engagement of residents with adverse tourism impacts affect their choice of program. The opposite is true for overcrowding mitigation. One explanation could be that residents in peripheral neighborhoods are crowd-averse more than are residents in the central areas. Some residents in the more affluent neighborhoods on the city’s periphery likely chose to move to this area due to its less crowded, more tranquil atmosphere in the first place. Residents in peripheral neighborhoods are also more favorable of interventions that aim to reduce litter as indicated by the positive and significant coefficient in Model 2.

Similar results, although somewhat less significant for rentals’ regulation, were obtained in Model 3. The rest of the interaction variable coefficients indicate that the preference for treatment of street litter increases with level of education and decreases with age, whereas residents who live longer in the city are less sensitive to overcrowding. A likelihood-ratio test that was conducted indicated that Model 3 performs significantly better than Models 1 and 2 (Pvalue<0.001), while Models 1 and 2 demonstrated similar performance.

The average willingness to pay per a unit of an attribute is calculated by a ratio of two coefficients. The coefficient of each one of the treatments by the coefficient of monthly tax (for more details about this ratio and the rationale behind it see: [Bateman et al., 2002](#), p. 283; [Train, 2009](#)). Based on Model’s 3 coefficients, residents’ average willingness to pay for the city to regulate short-term rentals is estimated to be 10.4 NIS (~\$2.98 U.S.) monthly. However, there is very wide variation in residents’ willingness to pay for this intervention (stdv = 20.46) that changes with residents’ attributes, i.e., residents from central neighborhoods, younger, more educated, and living less years in Tel Aviv are willing to pay more for short-term rental regulation. Similarly, 21.9 NIS (~\$6.26 U.S.) is the estimated average willingness to pay for the city dealing with street litter, with similar effects of residents’ attributes on willingness to pay. The estimated willingness to pay for dealing with overcrowding is 8.4 NIS (~\$2.40 U.S.) with smaller variation compared to rentals regulation (stdv = 15.55). Based on the average monthly city tax in Tel Aviv (752 NIS / ~\$215.5 U.S.) as a benchmark ([Frankel, 2019](#)), residents’ willingness to pay can be translated to between 1.1% of the city tax for overcrowding regulation to 2.9% of the total monthly city tax for clean streets.

We further used the coefficient of the interaction variables to calculate the willingness to pay of residents in peripheral neighborhoods vs. central neighborhoods (see [Table 7](#)). There is no significant difference in the case of regulation of short terms rentals, however, for the other two attributes we see a significant difference. Residents in

Table 4
Factor loadings.

Item#	Statement	Factor	Factor	Factor	Factor
		1	2	3	4 ^a
	<i>Eigenvalues</i>	7.09	1.78	1.07	(1.03)
17	The presence of tourists negatively affects my sense of belonging to my residence area	0.80			
16	Tourists negatively affect my sense of personal security in my residence area	0.78			
2	The tourists in Tel Aviv disturb me	0.78			
5	Tourists negatively affect my enjoyment of leisure activities	0.77			
14	Tourists have a negative impact on the access to essential services in my residence area (post office, grocery, etc.)	0.74			
12	Tourism has a negative impact on the local culture and lifestyle in my residence area	0.74			
15	The presence of tourists in my leisure places in my residence area disturbs me	0.72			
8	Tourists increase the litter and rubbish in my residence area	0.72			
13	Infrastructure (water, electricity, sanitation) in my residence area is deteriorating as a result of the number of tourists	0.70			
6	Tourists damage the beach and sea environment	0.68			
7	Tourists cause heavy traffic on roads	0.57			
9	Tourists lead to overcrowding in my residence area	0.48			
10	Housing prices in my residence area are higher because of short-term rental of apartments (such as Airbnb)		0.88		
11	Short-term rental of apartments (such as Airbnb) decreases the supply of apartments for long-term rent to residents in my residence area		0.85		
4	It is the municipality’s responsibility to take care of the problems that may arise with the increase in tourism			0.75	
3	It is important that more tourists come to Tel Aviv			0.52	
1	I feel that there are many tourists in Tel Aviv				0.91

^a Factor 4 was omitted since it includes only one item.

peripheral neighborhoods are willing to pay more for clean and less crowded streets. This makes sense since these residents chose to begin with to leave far away from the busy center of the city and more in a suburban style neighborhoods.

5. Discussion and conclusions

The current study makes several theoretical, methodological and practical contributions. Theoretically, it reevaluates factors that are known to affect residents’ perception of tourism’s impact. Similar to past studies socio-demographic background ([Harrill, 2004](#); [Perdue et al.,](#)

Table 5
T-test of factor means by districts.

		Mean	Stdv	t-statistic	p-value
Factor 1—General adverse impacts	Central neighborhoods	1.84	0.55	1.463	0.145
	Peripheral neighborhoods	1.72	0.54		
Factor 2—Short-term rentals' impacts	Central neighborhoods	3.21	0.77	6.566	0.0000
	Peripheral neighborhoods	2.33	0.93		
Factor 3—Involvement with tourist flow	Central neighborhoods	3.28	0.57	2.542	0.012
	Peripheral neighborhoods	3.06	0.53		

1990) did not seem to affect residents' perceptions of impact severity. In addition, we found inverse relations between distance of residence from tourist centers and the perception of the severity of tourist impacts, which is in line with most past studies (Jurovski & Gursoy, 2004; Martín et al., 2018). Importantly, the influence of proximity to the tourist center does not seem to be "linear." We found that residents in the center and those living in close proximity, in the "first ring neighborhoods," had very similar, almost identical, perceptions and attitudes towards tourists (which led us to treat the two groups as homogenous in our analysis).

Table 6
Mixed logit estimates.

Attribute	Model 1			Model 2			Model 3		
	Mean of Coefficient (Std. error)	Stdv of coefficient (Std. error)	% with positive value of the attribute	Mean of Coefficient (Std. error)	Stdv of coefficient (Std. error)	% with positive value of the attribute	Mean of Coefficient (Std. error)	Stdv of coefficient (Std. error)	% with positive value of the attribute
Monthly Tax	-0.05*** (0.006)			-0.05*** (0.006)			-0.05*** (0.006)		
Interventions									
Short-term rentals' regulation	0.27*** (0.06)	0.98*** (0.09)	61	0.32*** (0.06)	0.98*** (0.09)	63	0.52*** (0.11)	0.99*** (0.09)	70
Street litter reduction	1.14*** (0.08)	1.08*** (0.09)	85	1.11*** (0.08)	1.08*** (0.09)	85	1.09*** (0.12)	1.07*** (0.09)	85
Overcrowding mitigation	0.22*** (0.07)	0.67*** (0.09)	63	0.16** (0.08)	0.67*** (0.09)	60	0.42*** (0.13)	0.65*** (0.09)	74
Interactions									
Rentals regulation*Peripheral neighborhood				-0.23** (0.10)			-0.15 (0.11)		
Street litter*Peripheral neighborhood				0.18* (0.11)			0.35*** (0.12)		
Street overcrowding*Peripheral neighborhood				0.27** (0.12)			0.31** (0.13)		
Rentals regulation*Education							-0.02 (0.06)		
Street litter*Education							0.18*** (0.06)		
Overcrowding*Education							-0.1 (0.07)		
Rentals regulation*Age							-0.1 (0.06)		
Street litter*Age							-0.15*** (0.05)		
Overcrowding*Age							0.02 (0.06)		
Rentals regulation*Years in Tel Aviv							-0.007 (0.004)		
Street litter*Years in Tel Aviv							-0.005 (0.004)		
Overcrowding*Years in Tel Aviv							-0.01** (0.005)		
Log-likelihood	-1860.1			-1856.4			-1842.2		

*** p-value <0.01, ** p-value <0.05, * p value<0.1.

This might be explained by the fact that residents who live near the center conceive the central neighborhoods as part of their immediate choice and activity space and are also highly affected by the increase in the rent in the center of Tel Aviv due to Airbnb activity.

Though not originally the main aim of the research, a second theoretical contribution of the study is made through the differentiation between residents' perception of adverse impacts and preferences for mitigation measures. The study found that residents in central neighborhoods in Tel Aviv, who perceive short-term rentals as a greater threat than do residents in peripheral neighborhoods, were willing to pay higher city taxes to mitigate a future decrease in housing availability. However, this effect was not statistically significant in our third and

Table 7
Comparison between willingness to pay of residents in central and peripheral neighborhoods based on Model 3 coefficients.

Attribute	Mean willingness to pay NIS (stdv)	
	willingness to pay for residents in central neighborhoods	willingness to pay for residents in peripheral neighborhoods
Short-term rentals	10.4 (20.46)	No significant change
Litter	21.9 (21.67)	28.8 (27.5)
Overcrowding	8.4 (15.55)	14.6 (17.7)

more complete model. In fact, in contrast to our original assumption, the perception of impacts as more severe, did not usually translate into favoring programs that tackle these impacts. For example, residents in peripheral areas favored future interventions that mitigate litter and overcrowding even though they perceived these threats as more minor compared with central neighborhood residents. It seems that residents fear that the core characteristics of the neighborhood that led them to choose living in their neighborhood at the first place will be negatively transformed. Hence, they will be willing to pay more to maintain these fundamental characteristics.

Third and related to the previous point, our findings further imply that residents' preferences for mitigation measures are heterogeneous and are dependent on residents' characteristics. In Tel Aviv, socio-demographics were associated with residents' preferences for interventions and willingness to pay. For example, older residents were less likely favor an intervention that treats street littering. Similarly, the longer people were living in Tel Aviv, the less favorable they were of paying for any kind of intervention, and especially for treatment of overcrowding. It might be that along the years residents in Tel Aviv are becoming less crowd-averse and maybe even choose to stay because they enjoy the "hustle and bustle" of the city. Our results also support the existence of spatial heterogeneity for mitigation measures preferences. Residents of peripheral neighborhoods were less in favor of the city intervening in the real-estate market (though this finding was significant in all models) and more supportive of programs that mitigate overcrowding and litter compared to residents from central neighborhoods.

Methodologically, the study implements discrete choice modeling in a novel context that allows researchers to assign monetary values to potential intervention programs based on residents' willingness to pay and hence creates a useful tool for prioritizing intervention strategies. Consequently, the approach could be valuable for municipalities that wish to employ (socially) sustainable tourism development programs. This includes municipalities that reconsider their tourism strategies in the context of post COVID-19 recovery strategies. Furthermore, measurements of residents' attitudes and their willingness to pay for interventions can also be used to dynamically assess the impact of changes in tourism demand. For example, during the peak of COVID-19, when international tourism has practically stopped, residents' attitudes towards tourism has most likely changed and so does their willingness to pay for intervention.

The current study also has several practical and managerial implications. At the local level, the grouping of most adverse impacts under one factor indicates that Tel Aviv residents have yet to develop a complex understanding that differentiates between various problems caused by overtourism and their potential costs. It is very likely that with the expected increase in tourism and the consequent development of specific negative dimensions, residents will become more sensitive to specific adverse outcomes. Urban destinations with similar volume of tourists are likely to demonstrate similar patterns.

The current study calls for a more proactive approach to deal with the overtourism phenomenon. We argue that overtourism is more prevalent as a concept that guides policy than an actual phenomenon. Periodical evaluations of residents' perceptions towards tourism may be useful in identifying and mitigating future overtourism symptoms. Furthermore, we emphasize that policy makers should avoid implementing homogenous mitigation strategies throughout the city due to intra-urban variation in (perceived) impacts. However, there is still a question of who should be responsible to initiate and implement these evaluation and mitigation strategies. The answer to this question is largely dependent on local factors such as the municipality's tangible and intangible resources, the relations between local and central government, and the structure of the local tourism sector. Moreover, different aspects of overtourism may require the intervention of different actors at different scales. In Israel, for example, housing prices have been a major socioeconomic concern, affecting the national political agenda (Eshel & Hananel, 2019). Therefore, mitigation strategies

that deal with housing prices in Tel Aviv will most likely need to involve national-level ministries. Other destinations may require different type of interventions.

The importance of residents' perceptions has been increasingly emphasized in recent years as an essential part of the development of sustainable tourism strategies (Sharpley, 2014). Consequently, it was suggested that tourism planning and management should aim to be more responsive to residents' needs (Vargas-Sánchez, de los Plaza-Mejía, & Porras-Bueno, 2009). Our study suggests that in order to do so, tourism planners and destination management organizations should be sensitive to the variation between residents in different neighborhoods and areas in the city. They should generate area-specific strategies that take into account the different needs and threats caused by the increased flow of tourism in each of the city's neighborhoods. Employing a willingness to pay approach helps evaluate how acute the foreseen problem is and how residents perceive the role of the municipality in mitigating this issue. While the current study proposes several general guidelines, we recommend that local stakeholders map the unique threats of overtourism and their spatial distribution in their local destinations when developing strategies.

The study has several limitations. First, it should be borne in mind that residents' attitudes are context-dependent. It is likely that other destinations will vary in residents' perceptions. Therefore, it is advised to adjust the research design and questions based on the local context of the destination under investigation. Second, the sample that was used in Tel Aviv is not representative; we preferred to have respondents from very specific neighborhoods, which in turn limited the number of available respondents and their socio-demographic characteristics. In order to assess the robustness of the models that were employed, we ran the models several times with a more representative male-female ratio using subsamples of the female respondents. In these models, residents' preferences for mitigations (Model 1), were reproduced and so did the preference of residents in the periphery to treat overcrowding and to pay less for interventions that deal with short-term rental (Model 2) though the latter was found marginally significant or insignificant in some cases. Similarly, most interactions in Model 3 repeated themselves. An exception was the negative preferences of residents who live more years in the center towards overcrowding intervention that was not found to be robust. Future studies should consider sampling more residents and use more representative samples where this is possible. Third, the discrete choice framework that is proposed here has potential flaws. For example, a different framing of the discrete choice experiment (i.e., not framing it as an increase in city tax), such as a contribution to a third-sector organization, might have corresponded better with the perceptions of residents about tourism's impacts. Future studies should test the sensitivity of respondents to questionnaire wording. Lastly, our approach focuses on residents' perception, which may give a limited picture of the destination. An investigation that takes into account all relevant actors, including tourists, local stakeholders, and residents should be considered in future studies in order to provide a more comprehensive and holistic understanding of desired interventions.

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.

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