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Abstract

Public transport is used extensively in urban destinations, even though tourists are often unfamiliar with the variety of local means of transport. This study focuses on the role of intermodal transport on tourist visitation to peripheral attractions that are not directly connected to the metro system. A discrete choice experiment conducted in Hong Kong allowed the analysis of tourist preferences toward transport services, perceived level of ease for intermodal transport, and the influence of direct transport access on switching behaviour. The estimates of a latent class choice model revealed two segments of tourists with different preferences toward intermodal transport usage, price sensitivity and information provision. From a management perspective, the investigation provides valuable information for attractions, destination marketing organizations, and transport companies. In this regard, a what-if analysis is conducted to estimate the impact in the probability of attraction visitation associated with different policies. Furthermore, the analysis of the potential demand related to direct transport access indicated a significant increase in the intention to visit secondary tourist attractions. The results allowed to derive implications that help to decongest tourism flows, thereby eventually leading to a more competitive, sustainable and inclusive transportation network systems for tourists and residents alike.

Keywords: intermodal public transport, intra-destination tourist mobility, urban tourism, discrete choice experiment, tourist attractions.

Introduction

Tourists inevitably rely on transportation facilities and networks to travel between an origin and a destination, and within the destination itself. The dynamic underlying tourist movement patterns and visitation behaviour at the destination are more complex and less planned in advance, than the transport arrangements between the origin and the destination. This situation is particularly relevant to urban destinations where individual tourists use public transport extensively to visit tourist attractions, although they are typically unfamiliar with many of the local means of public transport. In general, cities around the world are characterized by networks of tourist-friendly metro lines that extend across urban areas and represent the most common mode of transport used by tourists (Le-Klähn & Hall, 2015) connecting popular attractions and main hotel locations. However, tourist attractions are also located in peripheral areas, and their accessibility relies to a greater extent on the available transport options. To this end, Authors (2022) modelled tourist accessibility to peripheral attractions by incorporating different accessibility dimensions, such as land-use, transport, temporal, and individual. By further elaborating the transport dimension, this study concentrates on the role of intermodal transport on tourist visitation to peripheral attractions with the intention to outline implications for local transport providers, tourist attractions and destination management organizations. In particular, the aim of this study is to aid policy implications that help increasing the visits of peripheral attractions with intermodal public transport. Besides the selection of intermodal transport, tourist can take advantage of taxis that provide direct access to attractions at a higher cost. However, from the environmental perspective, it is desired that tourists use more collective transport for visitation. In this regard, this study conducts a what-if analysis to assess the changes in the probability to visit peripheral attraction in reaction to possible interventions in the characteristics of attractions and transport services. These interventions can have a direct impact on the visitation of peripheral attractions and thereby an indirect impact on the tourist experience and destination satisfaction. Ultimately, policies aimed at increasing tourist confidence with intermodal public transport at the destination can eventually help to decongest tourist flows from city centre attractions to peripheral attractions.

Based on a discrete choice experiment conducted among tourists in Hong Kong, this research examines tourist preferences for intermodal public transport, the perceived level of ease, and the impact of direct access on switching behaviour. Like any urban destination, peripheral tourist attractions in Hong Kong receive a consistently lower flow of tourists than attractions located in the main urban area (Hong Kong Tourism Board, 2020) and their accessibility often requires tourists to engage in intermodal transport. A latent class choice (LCC) model is developed to reveal the underlying variations in tourists' preferences. Two crucial aspects are examined apart from travel cost and travel time attributes: (1) information provided during the transport journey, and (2) characteristics of the tourist attractions.

From a theoretical perspective, this study contributes to the current literature on tourist use of transport services at the destination by assessing tourist preferences in relation to intermodal transport selection and visitation of peripheral tourist attractions. The role of transport services in the decision of attraction visitation modelled through a discrete choice experiment represents a novel approach proposed by this study. In this regard, tourist preferences are specifically analysed by considering the characteristics of the attractions and attributes of transport services. The present study further elaborates the perceived level of ease and quantifies the importance of direct access to certain attractions to encourage the use public transport services and increase visitation.

Literature review

Intra-destination tourist mobility

Destinations are made-up of various resources including cultural activities, public services and tourism services. Given that tourists move through space, understanding tourist movements allows portraying mobility patterns, and provide an intuitive characterization of tourist behaviour (McKercher, Wong, & Lau, 2006). The literature adopts the term inter-destination tourist mobility to describe tourist movements between destinations, while intra-destination tourist mobility refers to spatial movements of tourists within the destination (Masiero & Zoltan, 2013; Xia et al., 2010).

Although the adoption of cutting-edge technologies in tracking tourist movements (e.g., GPS, GIS, big data) allows an understanding how tourists spend their time at the destination (Park et al., 2020; Zheng, Huang, & Li, 2017), decisions resulting in movement patterns require further investigation (McKercher, Filep, & Moyle, 2021). Intra-destination tourist mobility has been increasingly analysed in recent tourism literature (Park et al., 2020; Zoltan & McKercher, 2015). In analysing tourists visiting Hong Kong, McKercher and Lau (2008) classified 78 discrete movement patterns into 11 mobility styles, and concluded that the movement patterns are highly dependent on tourists' willingness to travel distance, referred as territoriality. In fact, Park et al. (2020) analysed the visitation patterns of three South-Korean cities and found only 8-30% of the destination areas were visited.

Tourist attractions

In the context of intra-destination tourist mobility, the role of tourist attractions is of high importance (McKercher et al., 2006), where the attraction visitation depends on tourists' evaluation of the attraction's ability to provide the desired experience. In stimulating visits, characteristics of attractions play an important role by exercising a pulling power (Richards, 2002). Leiper (1990) considers attractions as a system involving the interaction of the tourist, nucleus and marker. The terms nucleus is used to describe the inherent attribute of the attraction (e.g., cultural element, sight) generating a visit. An attraction is included in the itinerary, if tourists believe their needs are satisfied. Further, marker carries pieces of information about the attraction collected before the trip or en-route. Secondary attractions do not pull tourist to visit a destination, they usually rely on special markers at destination to create visitation. Due to the prevalence of Information Communication Technologies, tourists typically gather destination-related information from the internet using platforms such as Online Travel Agents, website of destination marketing organizations (DMO) and social media sites (Sun et al., 2020). Ratings of attractions on travel related social network cites, such as TripAdvisor, have also significant effect on visitation patterns (Van der Zee & Bertocchi, 2018).

Accordingly, a cost and benefit assessment of attraction visitation portrays intra-destination tourist mobility. In that regard, movement patterns are significantly impacted by the hotel location of tourists (Shoval, McKercher, Ng, & Birenboim, 2011). While iconic attractions generate tourist visits irrespective of the hotel location, visitation to second-tier attractions (i.e., peripheral attractions) is heavily dependent on the hotel location, thereby highlighting the role of ease of access and distance. Hence, the effect of distance decay is also present in local level; the further an attraction is from a tourist' base, the less likely it gets visited (Zoltan & McKercher, 2015). Tourists motivated by cultural novelty seeking are more likely to visit widely through a destination, while those who wish to experience nature or to be physically active show more confined, yet more intense movement patterns (Masiero & Zoltan, 2013). To this end, the attractiveness and potential demand of tourist attractions as a function of attraction characteristics and availability of reliable intermodal transport systems may be key in improving tourism at the destination.

The role of public transport

Tourists rely strongly on transportation options to travel from an origin to a destination (global level) and to travel between attractions at the destination (local level) (Duval, 2007). The criteria in selecting a mode of transport can vary considerably between the global and local levels. Studies on transportation from an origin to a destination are numerous, especially on air travel (Page & Connell, 2014; Song, Hess, & Dekker, 2018). Meanwhile, an increasing body of research focuses on the transportation options at destinations (Le-Klähn & Hall, 2015), predominantly on analysing modal switch behaviour, movement patterns, and integrated travel products. Knowing the places visited by tourists within a specific destination enhances the planning process for transport infrastructures to gradually boost destination development (Prideaux, 2000).

Given the lack of familiarity of tourists with the destination, related research investigated factors motivating tourists to use public transport for visiting attraction. Romão and Bi (2021) found that users of collective transport mode are more satisfied with the destination. Le-Klähn, Gerike and Hall (2014a) found that reasons for tourists to use public transport at the destination include for instance unavailability of a car, access to a well-developed local public transport system, and lack of confidence in driving a car at unfamiliar city. In that regard, Le-Klähn and Hall (2015) suggest that transport supply and user behaviour vary significantly across urban and rural contexts. While rural areas are mainly served by bus services alone, urban areas encompass several modes of transport. Among these modes of transport, tourists generally use the metro the most. Thompson and Schofield (2007) found that tourists have lower expectations with bus travel than with metro. Moreover, research on tourism and public transport has focused on promoting the modal shift in transport to reduce the negative externalities associated with traffic congestion and with environmental issues (Lumsdon, Downward & Rhoden, 2006). Therefore, the promotion of using public transport at destination can both affect the movement patterns and consumption of tourists at destinations considerably.

Studies have rarely examined tourist behaviour toward public transport in travel situations that involve intermodal connections - the use of at least two different vehicle and the exchange between them- to reach attractions, specifically those located in peripheral areas. The importance of transport interchanges in travel behaviour is recognized in the literature on public transport (Hine & Scott, 2000; Noland & Polak, 2002; Wardman, 2004; Hutchinson, 2009), although the majority of the research focuses on the rail market (Wardman & Hine, 2000). Therefore, research emphasizes the interchanges within modes, as opposed to those between modes. Some of these studies discriminate to generate useful insights on the recreational and leisure segment of travel. For instance, Wardman (2001) determined that commuters value interchanges less in terms of money than leisure travellers do. This result may be attributed to the fact that tourists are less familiar with the transport network, as argued by the author. Although few studies acknowledge the burden caused by public transport interchanges on tourist experience (Owen, 1991) and modal shifts (Lumsdon et al., 2006), the behavioural response of tourists has not yet been assessed. Indeed, Le-Klähn and Hall (2015) calls for further research in visitors willingness to switch mode.

Time and cost

Tourist preferences associated with the selection of transport mode facilitating intra-destination mobility are highly heterogenous. Consistent with the literature on commuters' transport mode choice preferences, travel time, travel cost and the number of transfers are important factors for tourists when selecting a transport mode to reach points of interest at the destination (Ho & Mulley, 2013; Jiang, Du, & Sun, 2011). Time as a temporal resource is seen as one of the most influential factor characterizing tourist behaviour because it constrains what activities tourists can experience (McKercher et al., 2021). Given tourists' available time budget is typically determined prior the trip (i.e., length of stay), decisions on allocating time may be considered under the opportunity/cost framework (Lew & McKercher, 2006). For instance, to maximize time spent at experiencing the desired activities or attractions, tourists may attempt to minimize time spent on transit time. Oostendorp and Gebhardt (2018) found the importance of time efficiency crucial in the evaluation of intermodal changes in the context of the Berlin city.

In line with Thompson and Schofield (2007), transport attributes can be divided to soft and hard categories. While hard attributes are more quantifiable, such as travel time and cost, soft attributes are related to information provided, level of comfort and staff attitude. Hard attributes matter more for local commuters, yet soft attributes are more important for tourists' overall satisfaction (Thompson & Schofield, 2007).

Information provision and ease of travel

With regards to the service aspect of public transport, tourists place high importance on punctuality, connectivity, service frequency and accessibility of stops (Le-Klähn, Hall, Gerike, 2014b). Above all, provision to information about the transport system and how to access points of interest within the destination are crucial for generating visits to attractions (Kinsella & Caulfield, 2011; Le-Klähn & Hall, 2015; Malhado & Rothfuss, 2013). Moreover, user-friendly public transport is regarded as another necessary determinant associated with a greater use (Le-Klähn et al., 2014a; Thompson & Schofield, 2007).

In this regard, a crucial aspect is how tourist perceive the level of ease using public transport. Le-Klähn, et al. (2015) found that visitors' perception on the ease of travel significantly influenced the area they visited. Thompson and Schofield (2007) found that destination satisfaction is more affected by public transport's ease of use than its efficiency and safety. Le-Klähn and Hall (2015) suggest that the provision of real-time available information with tourist guides can stimulate the use of public transit. They further encourage the diffusion of on-board information, such as network maps, signalling the next stop, expected trip duration and user-friendly approach on ground (e.g., easy ticketing and multiple languages) that can help the switch to public transport use. Increasing amount of research publications are analysing preferences for Mobility-as-a-Service applications (Kim et al., 2021; Matyas & Kamargianni, 2021). By using intelligent transportation systems and receiving travel information real-time, tourists perceive the journey time and waiting shorter than otherwise (Liu, Shi, & Jian, 2017).

Visitor and trip characteristic variables

Demographic variables can affect movement patterns and transport mode choice at the destination. The factors of preventing tourists to take advantage of the local public transport system relate to personal preferences toward transport modes, such as travel party (e.g., traveling with children/group), dependence on public transport schedules and inconvenience. Adult groups, such as friends or couples are more likely to consume spatially the destination, then families with children (Zoltan & McKercher, 2015). Le-Klähn et al. (2015) found that solo travellers are less likely to use public transport than those having a travel companion.

Cultural background not only affects the attractions that are visited and tourists' dispersal throughout the destination, but also the transport mode selected for visitation (Le-Klähn, et al., 2015). Yet, little is known about the existence of behavioural differences among cultural groups related to transport mode decision (Le-Klähn and Hall, 2015) and their preferences in order to increase their use of public transport. Cultural proximity and language similarity of tourist with the destination could affect the decision.

Destination familiarity plays an important role in attraction visitation and accordingly in the area visited. While first timers are more likely to visit iconic attractions, repeaters usually develop a more specialized itinerary in their additional visits (McKercher, et.al, 2012). Lastly, regarding tools that facilitate tourists visits, Zoltan and McKercher (2015) analysed tourist consumption in a canton of Switzerland through destination card usage. While the purchase of the card enabled tourists to travel for free by public transport within the canton, the results showed that the majority of card users had confined movements and visited only the attractions located in the subregion of their accommodation. Consequently, the implementation of destination cards and discounted travel costs may not be sufficient enough in decongesting tourist flows to attractions that are perceived far and complicated to reach.

Study methodology

Survey instrument

The empirical analysis is conducted on survey data aimed at understanding the preferences of tourists in Hong Kong toward the use of public transport to access peripheral tourist attractions. The core part of the survey consisted of a discrete choice experiment assessing tourist preferences for specific hypothetical scenarios. Table 1 reports the attributes and attribute levels considered for the four alternatives included in the discrete choice experiment.

Table 1. Attributes and attribute levels

	Attribute levels	Notation
Scenario attributes		
Tourist attraction	Nature	$Att.Type_0$
	Culture	$Att.Type_1$
Rating tourist attraction	Top 10 attraction on TripAdvisor	$Att.Rating_0$
	Top 10 attraction on Visit Hong Kong	$Att.Rating_1$
	Trendy attraction on Visit Hong Kong	$Att.Rating_2$
	Off-beaten attraction on unconventional sources	$Att.Rating_3$
Intermodal transport attributes		
First leg travel time	10 min; 20 min; 30 min; 40 min	TT_1
Connecting transport	No information	$Cont_0$
	Generic map	$Cont_1$
	Detailed map	$Cont_2$
	Markings on pavement	$Cont_3$
Second leg travel time	10 min; 20 min; 30 min; 40 min	TT_2
Alighting	No information	$Alig_0$
	Next stops on screen	$Alig_1$
	Announcement for the attraction	$Alig_2$
Total cost	10 HK$; 25 HK$; 40 HK$	TC
Taxi attributes		
Taxi travel time	15 min; 30 min; 45 min	TTT
Taxi travel cost	100 HK$; 200 HK$; 300 HK$	TTC

Tourists choose whether to visit a peripheral attraction based on the characteristics of the attraction (scenario attributes) and the available transport mode (alternative attributes). Accessibility to peripheral attractions through public transport is assumed to require the use of two means of transport. The first leg of the travel is typically made on the metro as most hotels are located in proximity of the metro line, whereas the remaining part of the travel takes place in a public local bus (Metro + Bus alternative) or a similar transport mode, such as a 16-seater minibus (Metro + Minibus alternative). The two intermodal transport alternatives are described by the typical attributes of travel time and travel cost as well as attributes related to the information available to tourists at the interchange (connecting transport) and at the end of the transport journey (alighting). As an alternative to public transport, tourists visiting urban destinations can rely on taxi services. Therefore, the choice experiment includes a third alternative (taxi alternative) described by travel time and travel cost. A no-visit option was further included in the choice experiment allowing respondents to state their intention not to visit the attraction. The characteristics of the attraction are introduced through two scenario attributes describing the type and rating of the attraction and were kept invariant across the four alternatives. Attribute levels were selected to reflect the current journey characteristics at the destination with the exception of alighting information for minibus which is currently not available. To facilitate the comprehension of the attribute related to the information at interchange, an illustrative example was provided to the respondents.

A pilot survey was performed on a sample of 50 tourists to validate the questionnaire and acquire preliminary information on the preference data. The main survey was based on a Defficient experimental design generated for the estimates retrieved from the pilot survey. In particular, the experimental design comprised twelve choice tasks randomly divided into two blocks, so that each respondent faced six choice tasks. To fully comprehend the preferences of tourists deciding not to visit the attraction, a follow-up question is integrated into the choice experiment asking whether tourists would be willing to visit the attraction if a direct public transport connection was available. The response to this question reveals whether non-visitation is due to unfavourable transport options or to the attraction itself. Furthermore, the selection of the intermodal transport alternatives may be triggered by the lack of substantially convenient alternatives leading to a differentiated level of confidence toward such alternatives. Therefore, the level of ease of using public intermodal transport was explicitly asked to tourists who selected either of the two intermodal transport options using a 5-point ordinal indicator (i.e., from very difficult to very easy). An example of choice card is provided in Figure 1.

Scenario				
Type of attraction: Cultural attraction (e.g., historical site, architecture, museum)				
Rating of attraction: Top 10 attraction on TripAdvisor				
	Metro + Minibus	**Metro + Bus**	**Taxi**	**No visit**
	First transport			
Travel time	40 minutes	30 minutes		
Connecting transport information	Detailed map	No information		
	Second transport			
Travel time	30 minutes	10 minutes		
Alighting information	Announcement for the attraction	Announcement for the attraction		
Taxi travel time			30 minutes	
Total travel cost	HK$ 25 (US$ 3.2)	HK$ 40 (US$ 5.1)	HK$ 100 (US$ 12.8)	
Which option you prefer?	◯	◯	◯	◯
Follow-up questions:				
How easy would it be for you to use the selected option?	Very difficult O O O O O Very easy			
Would you visit the attraction if it was directly accessible by metro?				Yes O No O

Figure 1. Example of a choice card

Apart from the discrete choice experiment and related follow-up questions, other information was collected in the main survey, such as tourist profile, travel characteristics, familiarity with the destination, travel motivation, and information source at the destination. The data collection was performed in the summer 2019 by a trained research assistant who randomly intercepted independent tourists in main tourist areas of the destination. Tourists with no previous experience of the local metro were excluded from the target sample population. This guaranteed a certain level of familiarity with the local transport system. The final sample comprises responses from 516 tourists.

Sample description

Table 2 illustrates the sample characteristics. In line with the official statistics for overnight visitors in 2019 (HKTB, 2020), the sample is characterized by gender balance and a predominant share (73.2%) of tourists below 45 years of age.

Table 2. Descriptive statistics of the sample

	Frequency	Mean	Std. dev.
Gender (Female)	53.1%		
Age			
16–25	14.5%		
26–35	43.0%		
36–45	30.2%		
46–55	9.9%		
55 or above	2.3%		
Household income			
Below $3000	28.9%		
$3000–$4000	25.2%		
$4000–$5000	25.0%		
Greater than $5000	20.9%		
Destination familiarity			
Repeat visit	19.6%		
Long-stay (> 3 nights)	21.3%		
Traveling party			
Alone / Partner / Spouse	36.9%		
Family with kids	26.4%		
Relatives / Friends	36.8%		
Motivation for this trip [(a)]			
Experience different cultures		3.8	0.5
Visit cultural and historical attractions		3.7	0.6
Visit most popular attractions (sightseeing)		3.7	0.6
Visit entertainment parks		3.1	0.9
Visit natural attractions		3.0	0.9
Go shopping		2.8	0.9
Information source			
Smartphone (google maps, travel apps)	87.0%		
Guidebook	6.6%		
Paper map	5.2%		
Asking locals	1.2%		

[a] Four-point scale (1 = Not at all important; 4 = Very important).

In terms of travel party, a similar share is observed for tourists traveling alone or with partner (36.9%) or with friends or relatives (36.8%). About 20% of the respondents had already visited the destination, whereas 21% stayed in Hong Kong for more than three nights. On average, travellers expressed high interest in experiencing cultural diversity and visiting cultural and sightseeing attractions. To explore the destination, tourists mainly rely on smartphones (87.0%), whereas a low percentage (1.2%) seek the assistance of locals.

Given that each respondent faced six choice tasks, the sample comprises 3096 choice observations. The descriptive statistics are summarized in Table 3. The two intermodal transport options were chosen in most of the choice tasks (70.6%). When chosen, the intermodal transport was perceived as difficult or very difficult in 13.7% of the cases, whereas a higher percentage was associated with the respondents perceiving such options as easy (46.4%) or very easy (22.5%) to use. The taxi alternative was selected in 15.2% of the cases, whereas respondents preferred not to visit the proposed tourist attraction in in 14.3% of the cases. Interestingly, the majority (61.8%) of the “no visit” choices would be converted to visitation intentions if a direct public transport option was available.

Table 3. Descriptive statistics of the choice observations

	Count	Frequency
Alternatives		
Metro + Minibus	798	25.8%
Metro + bus	1386	44.8%
Taxi	470	15.2%
No visit	442	14.3%
Intermodal options: Level of ease		
Missing	*5*	*0.2%*
Very difficult	26	1.2%
Difficult	273	12.5%
Neither	375	17.2%
Easy	1014	46.4%
Very easy	491	22.5%
No-visit: Visit only if direct		
No	168	37.8%
Yes	274	61.8%

Data modelling method

To analyse the data collected with the discrete choice experiment, this research adopted discrete choice modelling. Based on the random utility framework (RUM), discrete choice models postulate that a choice from finite and discrete alternatives follows the maximization of utility associated with the selected alternative (McFadden, 1986). In general, utility for individual n selecting alternative i is obtained as follows:

$$U_{in} = V_{in} + \varepsilon_{in} = ASC_i + \sum_k \beta_k X_{ik} + \varepsilon_{in} , \qquad (1)$$

where V_{in} refers to the observed component of utility, involving an alternative specific constant (ASC_i) and a linear in specification of estimated parameters (β_k) attached to attribute X_k. Given that an alternative of the choice set J must be normalized to zero, $J-1$ alternative specific constants are estimated. Meanwhile, ε_{in} refers to the unobserved component of utility, assumed to be independent and identically distributed, following the Gumbel distribution. Given that only a part of the utility is observed, choices can be predicted up to a probability. The probability for individual n selecting alternative i is obtained by utilizing the multinomial logit model, expressed as follows:

$$P_{in} = \frac{\exp{(V_{in})}}{\sum_{J=1}^{J_i} \exp{(V_{jn})}}. \qquad (2)$$

The systematic part of utility associated with the four alternatives considered in the discrete choice experiment are expressed as follows:

$$V_{MMB} = ASC_{MMB} + \beta_{TT_1} TT_1 + \beta_{TT_2} TT_2 + \beta_{TC} TC + \sum_{k=1,2,3} \beta_{Cont_k} Cont_k + \sum_{k=1,2} \beta_{Alig_k} Alig_k,$$

$$V_{MB} = ASC_{MB} + \beta_{TT_1} TT_1 + \beta_{TT_2} TT_2 + \beta_{TC} TC + \sum_{k=1,2,3} \beta_{Cont_k} Cont_k + \sum_{k=1,2} \beta_{Alig_k} Alig_k,$$

$$V_{Taxi} = ASC_{Taxi} + \beta_{TTT} TTT + \beta_{TTC} TTC, \qquad (3)$$

$$V_{No-visit} = \beta_{Att.Type_1} Att.Type_1 + \sum_{k=1,2,3} \beta_{Att.Rating_k} Att.Rating_k$$

where alternatives “metro + minibus” and “metro + bus” are referred as MMB and MB respectively. Alternative specific travel time is considered for the first (TT_1) and the second (TT_2) legs of the intermodal transport as well as the taxi alternative (*TTT*). Cost of both taxi and intermodal transport alternatives are specified as total fare. Attributes associated with the information on alighting ($Alig_k$) and connecting transport ($Cont_k$) were dummy coded with the base level being “No information”. The scenario attributes related to type ($Att.Type_1$) and rating ($Att.Rating_k$) of the attractions were dummy coded and entered only in the no-visit option.

The taste variation captured in discrete choice models can be attributed to observed or unobserved factors. Observed source of heterogeneity relates to individual characteristics (e.g., age, gender, income), and it is typically modelled through interaction terms. Meanwhile, unobserved heterogeneity is captured in a parametric or non-parametric way. For instance, the mixed multinomial logit model is a parametric approach to capturing unobserved heterogeneity by incorporating random parameters in the model estimation with the assumption that preference heterogeneity follows a parametric distribution (McFadden & Train, 2000). On the other hand, the latent-class choice (LCC) model allows the isolation of unobserved sources of heterogeneity through allocating the sample into latent segments with homogeneous preferences. In particular, the LCC model measures heterogeneity through discrete parameter variation, thereby providing a non-parametric approach to capturing heterogeneity in individual tastes (Greene & Hensher, 2003). While the LCC model allows allocating the sample population into q classes, the class allocation of individuals remains unknown to the analyst. The probability of individual n selecting alternative i in choice situation t conditional on class q is derived as follows:

$$P_{int|q} = \frac{\exp(\mathrm{x}'_{int}\beta_q)}{\sum_{j=1}^{J_i}\exp\left(\mathrm{x}'_{int}\beta_q\right)}\,, \tag{4}$$

where β refers to the class-specific parameters associated with attribute X. The number of classes specified in the model is determined by the analyst based on information criteria such as Bayesian information criterion (Hensher, Rose, & Greene, 2005).

Although the class assignment of individuals is unknown, the class membership model inside the LCC model links class allocation to observable individual characteristics, thereby providing an increased explanatory power to the interpretation of model estimates. The class membership model utilizes the logit structure, expressed as follows:

$$H_{nq} = \frac{\exp(\mathbf{z}'_n\theta_q)}{\sum_q \exp\left(\mathbf{z}'_n\theta_q\right)}\,, \tag{5}$$

where the estimated coefficient θ is associated with individual characteristic z. Parameters in the class membership model for one of the latent classes are normalized to zero, therefore the estimation is performed for Q-1 classes. The class membership model of this research was estimated as a function of tourist characteristics such as age, country of origin, travel party, length of stay and destination familiarity, where each of these characteristics are specified as dummy-coded variables.

Given that respondents completed a sequence of choices in the experiment, our model specification uses the pseudo-panel structure of the data allowing for correlation among the choice observations recorded for each scenario (t). Parameters of the LCC model including the class membership model (θ) and the class-specific choice model (β_q) are retrieved using the maximum likelihood estimator as follows:

$$\ln L = \sum_{n=1}^{N} \ln \left[\sum_{q=1}^{Q} H_{nq}\left(\prod_{t=1}^{T_i} P_{int|q}\right)\right] . \quad (6)$$

The LCC model parameters were successively used to predict the choices of each subject in the sample. In particular, the probability of individual n selecting alternative i from the choice set $C_n$was computed for each choice task. In the presence of a full-set of alternative specific constants, market shares may be recovered at the sample level by averaging the probabilities for each alternative (Train, 2009). Therefore, market shares were predicted after systematically increasing/decreasing specified attribute levels, and the new market shares were compared against the base prediction (i.e., market shares based on the choice model).

The dichotomous data obtained from the follow-up question on the no-visit option is modelled through a binary logistic regression. The dependent variable is a binary indicator with a value of 1 if the respondent is willing to visit the attraction only if a direct public transport link is available, and 0 otherwise. The explanatory variables include the type and rating of the attraction and traveller motivation. Furthermore, an ordered logistic regression is used to model the ordinal categorical data expressing the level of ease perceived by the respondents for the selected intermodal transport option. Intermodal transport attributes and type of information used by the respondents to move within the destination are considered as explanatory variables.

Model results

This section starts with the presentation of the discrete choice model results and what-if analysis to investigate the change in the choice probabilities under specific scenarios. The remaining part of the section reports the results for the two follow-up questions related to the level of ease in using the intermodal public transport and the impact of direct public transport in choices associated with the no-visit intention.

Latent class choice model estimates

A two-class model specification provided the best solution in terms of model estimates and was selected as final model. Table 4 presents the estimation of the full set of parameters for both latent class one (representing 62.3% of respondents) and latent class two (representing 37.7% of respondents). The alternative specific constants are normalized with respect to the no-visit option and their positive and significant estimates reveal the general tendency to engage in the available transport modes to reach the attraction. The comparison between the two classes indicates that tourists in class two have a strong underlying preference for the taxi alternative. Following the model specification in Equation (3), the probability to select the no-visit option is affected by the scenario attributes “tourist attraction” and “rating attraction”. In this context, the results indicate that the probability to select the no-visit option decreases in both classes if the choice involves a cultural attraction rather than a natural attraction. Regarding the rating of the attraction, while respondents in both classes are substantially indifferent between attractions listed in the DMO or TripAdvisor top ten, the increase in the probability to select the no-visit option associated with either trendy of off-beaten attractions is considerably higher in class two than class one.

The estimates related to the attributes of the intermodal transport alternatives indicate, as expected, a negative and significant sensitivity to travel time in the first (metro) and second (bus or minibus) segments of the transport journey. However, the two classes register a specular pattern: respondents in class two are more sensitive to bus/minibus travel time (-0.076) than metro travel time (-0.040) whereas respondents in class one weigh more metro travel time (-0.068) than bus/minibus travel time (-0.046). Another differentiation between the two latent classes regards the sensitivity toward the information provided by the local transport operators. In particular, while respondents in both classes significantly prefer any type of information to no information, alighting information and, to a smaller extent interchange information, are considerably more important for tourists in class two than those in class one. Regarding the travel cost of the intermodal transport, class one registers a relatively higher sensitivity than class two.

Regarding the taxi alternative, although both latent classes indicate a similar sensitivity to travel cost, respondents in class two show a marginal (-0.008) and statistically insignificant sensitivity to travel time. Instead, the coefficient associated to taxi travel time (-0.103) is significant in class one. To profile the respondents in the two latent classes, demographic and travel-related variables were used in the model to explain the class allocation. With respect to class two, respondents in class one are more likely to be young tourists (age between 16 and 35 years old) and from outside China. Compared to class one, respondents in class two are more likely to travel with kids or with friends and relatives rather than alone or with partner. They are also more likely to be in the destination for the first time and to engage in short visits.

Table 4. Latent class choice model results

	Class 1		**Class 2**	
	Estimate	p-value	Estimate	p-value
$ASC_{Metro + Bus}$	6.082	0.000	2.512	0.078
$ASC_{Metro + Minibus}$	5.713	0.000	2.310	0.091
ASC_{Taxi}	7.170	0.000	9.804	0.000
$Att.Type_1$	-1.086	0.000	-1.338	0.000
$Att.Rating_1$	-0.157	0.385	-1.628	0.249
$Att.Rating_2$	3.444	0.000	5.134	0.000
$Att.Rating_3$	2.587	0.000	4.191	0.000
TT_1 (metro)	-0.068	0.000	-0.040	0.042
TT_2 (bus/minibus)	-0.046	0.000	-0.076	0.000
TC	-0.067	0.000	-0.056	0.000
TTT	-0.103	0.000	-0.008	0.281
TTC	-0.033	0.001	-0.034	0.000
$Alig_1$	1.340	0.000	5.211	0.000
$Alig_2$	0.730	0.000	4.259	0.000
$Cont_1$	1.167	0.000	1.592	0.000
$Cont_2$	0.579	0.013	1.119	0.004
$Cont_3$	0.830	0.000	1.428	0.000
Class allocation (Ref: Class 2)				

Constant	2.929	0.000
Travel Company: Family with kids	-2.756	0.000
Travel Company: Friend / relatives	-1.706	0.000
Age:16-35	0.970	0.000
Chinese tourists	-0.777	0.012
LOS: Short stay	-0.906	0.002
First visit	-0.761	0.008
Average probability		
Class 1	0.623	
Class 2	0.377	
Model fits		
Log-likelihood (constant)	-4291.97	
Log-likelihood (model)	-2794.93	
BIC	5919.41	

Choice probabilities and what-if analysis

The model estimates were used to assess the change in the choice probabilities associated with the two latent classes (C1 and C2) under specific scenarios. For the core transport attributes, the scenarios assume changes of 20% and 40% decrease in travel time, and 20% increase/decrease in travel cost. Given that the attributes related to the attractions (i.e., type and ranking of the attraction) and transport information (i.e., interchange and alighting information) are qualitative in nature, the scenarios are identified by constraining the attribute to a specific level. Each scenario considers changes to only one attribute level at a time.

Table 5. Choice probabilities resulting from changes in the attraction attributes

	Alternatives							
	Metro + MB		**Metro + B**		**Taxi**		**No visit**	
	Share (%)		Share (%)		Share (%)		Share (%)	
	C1	C2	C1	C2	C1	C2	C1	C2
Baseline	31.9	15.5	49.6	37	4.7	32.3	13.8	15.1
Scenarios								
A1. Type: Nature	30.3	15.3	45.7	33.5	4.6	31.3	19.4	20.0
A2. Type: Culture	34.2	17.4	51.9	39.2	4.9	33.9	8.9	9.5
B1. Rating: TripAdv Top10	36.7	18.6	56.1	45.4	5.0	35.2	2.2	0.8
B2. Rating: DMO Top10	36.9	18.7	56.2	45.9	5.1	35.3	1.9	0.2
B3. Rating: DMO Trendy	22.4	10.6	38.7	23.0	3.1	27.9	35.9	38.5
B4. Rating: Off-beaten	28.6	13.6	46.5	30.0	4.0	31.5	20.9	24.9

Table 5 shows the choice probabilities associated with specific types and ratings of the attraction. The baseline indicates the average shares registered for each alternative in the choice experiment for the two latent classes. It is possible to note the remarkable difference between the two classes across the transport alternatives: the intermodal transport options receive a high share among respondents in class (81.6% in total), whereas respondents in class two have a high preference for taxi which receive a share of 32.3%. The general preference for cultural attractions is reflected in the lower share of no visitation associated with cultural attractions (8.9% and 9.5% for class one and class two, respectively) compared with natural attractions (19.4% and 20.0%). The redistribution of the market shares primarily involves the intermodal transport options. By contrast, the taxi option registers only a relatively low increase in shares from natural to cultural attractions.

The rating of the attraction is a crucial element of information for tourists. With everything else being constant, nearly every tourist in both classes would visit an attraction listed in the top 10 ranking, as indicated by the substantial decline of the no visitation share for the top 10 list of TripAdvisor (2.2% for class one and 0.8% for class two) and local DMO (1.9% and 0.2%), respectively. Conversely, the no visitation share for trendy and off-beaten would increase in both classes to above 35% and 20%. Similar to the redistribution of shares observed for the type of the attraction, the market share of taxi appears relatively rigid.

Table 6. Choice probabilities resulting from changes in the core transport attributes

	Alternatives							
	Metro + MB		**Metro + B**		**Taxi**		**No visit**	
	Share (%)		Share (%)		Share (%)		Share (%)	
	C1	C2	C1	C2	C1	C2	C1	C2
Baseline	31.9	15.5	49.6	37	4.7	32.3	13.8	15.1
Scenarios								
A1. Metro + MB: TT2 - 20%	36.3	18.9	46.6	35.2	4.4	31.5	12.8	14.4
A2. Metro + MB: TT2 - 40%	40.9	22.8	43.4	33.2	4.0	30.5	11.7	13.5
B1. Metro + B: TT2 - 20%	29.1	14.0	54.2	42.2	4.3	30.8	12.4	13.0
B2. Metro + B: TT2 - 40%	26.3	12.5	58.8	47.7	3.9	29.1	11.0	10.8
C1. Taxi: TC + 20%	32.7	17.1	50.7	40.6	2.7	25.5	13.9	16.8
C2. Taxi: TC - 20%	30.6	12.5	47.8	30.5	8.1	44.3	13.5	12.7

Table 6 shows the results of the what-if analysis related to changes in travel time and travel cost attributes. A 20% decrease in minibus travel time for the intermodal transport options leads to an increase of 4.3% for class one and 3.4% for class two in the respective transport mode share. However, the gain in market share is generally distracted from the other intermodal transport mode (−3.0% in class one and -1.8% in class two) and, to a less extent, from the taxi and no visit options. A decrease in the travel time of the bus ride makes the metro+bus intermodal transport alternative particularly appealing and would reduce the no visitation by 1.4% and 2.8% in class one and by 2.1% and 4.3% in class two for, respectively, a 20% and 40% decrease in travel time.

For changes in taxi travel cost, a 20% decrease in the fare benefits taxi (market shares increase of 12% in class two and 3.4% in class one) more than what a 20% fare increase penalizes it (−6.8% in class two and -2% in class one). However, a decrease in taxi fare would mainly lower the shares of the intermodal transport options.

Table 7 shows the choice probabilities related to changes in transport information attributes. If no in-vehicle information is provided, then the analysis predicts a drop in the shares for "metro + bus" intermodal option (−11.9% in class one and -34.8% in class two), and an increase in no-visitation (+9.6% in class one and +18.9% in class two); the taxi shares for class two would also raise to 58.9%. Alternatively, providing information to tourists through in-vehicle screens or announcements would benefit the "metro + minibus" intermodal link (up to +7.7% in class one and +16.9% in class two). This result is particularly interesting because these types of information are currently unavailable on minibuses. Attribute levels that are relevant to generate demand for attraction visitation (i.e., decrease predicted shares in no-visitation) include in-vehicle information on screen (−3.8% in class one and -4.0% in class two) and the use of general maps at the transport interchange (−4.4%in class one and -3.9% in class two).

Table 7. Choice probabilities resulting from changes in the transport information attributes

	Alternatives							
	Metro + MB		**Metro + B**		**Taxi**		**No visit**	
	Share (%)		Share (%)		Share (%)		Share (%)	
	C1	C2	C1	C2	C1	C2	C1	C2
Baseline	31.9	15.5	49.6	37	4.7	32.3	13.8	15.1
Scenarios								
A1. Con.Tr. info: No info	27.4	10.4	45.0	27.4	6.4	40.4	21.2	21.9
A2. Con.Tr. info: Generic map	33.6	17.2	54.4	42.4	2.7	29.2	9.4	11.2
A3. Con.Tr. info: Detailed map	30.9	15.3	50.3	38.0	4.3	32.5	14.6	14.1
A4. Con.Tr. info: Markings	32.2	16.6	52.2	40.9	3.5	30.4	12.2	12.1
B1. Alig. info: No info	30.9	5.0	37.7	2.2	7.9	58.9	23.4	34.0
B2. Alig. info: Stop on screen	39.6	32.4	47.4	31.7	3.0	24.9	10.0	11.1
B3. Alig. Info: Announcements	36.1	25.4	43.6	24.1	4.9	32.7	15.4	17.7

Level of ease with the use of intermodal public transport

For every choice scenario (2184 in total, see Table 3) that resulted in a respondent selecting the intermodal public transport, the respondent was asked to state the level of ease with the selected alternative. The exclusion of five missing values (see Table 3) led to 2179 valid observations for further analysis. In particular, the 5-point level of ease indicator (i.e., from very difficult to very easy) was modelled through an ordered logistic regression as a function of intermodal transport attributes and type of information used by the respondents to move within the destination. Table 8 reports the mean values of the variables used in the analysis and the model results.

The comfort level with the intermodal transport service decreases as travel time, for either the first leg (metro) or second leg (minibus or bus), increases, although a stronger relationship is registered for the latter. In particular, an increase of 10 minutes in the minibus or bus travel time is associated with a decrease of 5% in the probability to rate the intermodal transport option as very easy. The provision of information between the first and second modes of transport does not appear to contribute to the level of ease associated with intermodal transport.

Respondents may even perceive an increased level of difficulty if they are confronted with a detailed map. A positive relationship is observed between alighting information and level of ease. In particular, the announcement of the tourist attraction on the minibus and bus speaker is associated with a 9.1% increase in the probability to rate the intermodal transport as very easy. As registered for travel time, travel cost is also associated with a decrease in the respondents' confidence in intermodal transport. An increase of 10 HK$ in travel fare would decrease the probability to rate the intermodal transport as very easy by 5%. The source of personal information that the respondents use to assist their movement within the destination affects their confidence with intermodal transport. Compared with paper-based sources (i.e., paper map and guidebook), the use of smartphones and direct interaction with locals increase the probability to rate the intermodal transport as very easy by 8.1% and 12.8%, respectively.

Table 8. Ordered logit model results – Level of ease

	Mean	Coeff.	SE	Sig.	ME(y=5)
Constant		6.141	0.326	0.000	
Travel time					
First leg (metro)	26.43	−0.023	0.005	0.000	−0.004
Second leg (minibus or bus)	23.56	−0.028	0.004	0.000	−0.005
Connecting transport (Ref: No info)					
Generic map	0.29	0.097	0.129	0.452	0.016
Detailed map	0.21	−0.512	0.152	0.001	−0.077
Marking on pavement	0.32	−0.185	0.123	0.132	−0.030
Alighting (Ref: No info)					
Next stop on screen	0.50	−0.104	0.147	0.477	−0.017
Speaker announcement	0.40	0.535	0.150	0.000	0.091
Total cost	24.53	−0.031	0.004	0.000	−0.005
Information source (Ref: paper)					
Smartphone	0.87	0.558	0.127	0.000	0.081
Local people	0.01	0.657	0.381	0.084	0.128
Threshold 1		2.642	0.062	0.000	
Threshold 2		3.757	0.050	0.000	
Threshold 3		5.980	0.062	0.000	
Model fit					
Log-likelihood (constant)	−2849.439				
Log-likelihood (model)	−2724.056				
Chi-squared test	250.766		0.000		

Potential benefits of direct public transport accessibility

For every choice scenario that resulted in the respondents selecting the no-visitation option (442 in total, see Table 3), a follow-up question was prompted to assess the role of the proposed transport services on their choice. This follow-up question enabled the respondents to either confirm or revise their choice if a direct public transport to the tourist attraction was available. The dichotomous information (i.e., 0 if no-visit choice is confirmed, 1 if the choice is revised into a visit intention) collected from the follow-up question was modelled through a binary logistic regression as a function of attraction characteristics and traveller motivation. The mean values of the variables used in the analysis and the model results are presented in Table 9.

The mean values reveal a relatively small size of the potential demand associated with the top 10 attractions listed on TripAdvisor and DMO website, represented in, respectively, 3.6% and 1.6% of the no-visit choices. Instead, a consistent share of no-visit choices are associated with trendy (27.4%) and off-beaten (67.4%) attractions. Compared with an off-beaten attraction, the availability of a direct public transport accessibility would increase the probability of revising the choice from no visitation to visitation of the attraction by 29.2% (or by 9.8%) for a Trip Advisor top 10 attraction (or a trendy attraction promoted on the DMO website). Given the size of the potential demand (i.e., mean values), this finding becomes particularly relevant for trendy attractions. High interest in cultural or natural attractions lead to a similar (i.e., 9.0% and 8.9%, respectively) increase in the probability of attraction visitation via direct transport link. Instead, a lower probability is registered for travellers interested in shopping activities at the destination.

Table 9. Binary logit model results – Direct public transport

	Mean	Coeff.	SE	Sig.	ME(y=1)
Constant		−0.857	0.920	0.352	
Tourist attraction (Ref: Nature)					
Culture	0.403	0.250	0.215	0.245	0.054
Rating attraction (Ref: Off-beaten)					
Top 10 on TripAdv	0.036	1.886	0.786	0.017	0.292
Top 10 on DMO	0.016	−1.625	1.109	0.143	−0.356
Trendy on DMO	0.274	0.465	0.241	0.053	0.098
Importance of engaging in/visiting					
Cultural and historical attractions	3.688	0.416	0.188	0.027	0.090
Most popular attractions	3.686	−0.269	0.193	0.162	−0.058
Entertainment parks	3.197	0.031	0.136	0.822	0.007
Natural attractions	2.966	0.412	0.129	0.001	0.089
Shopping	2.955	−0.253	0.137	0.065	−0.055
Model fit					
Log-likelihood (constant)	−293.536				
Log-likelihood (model)	−274.446				
Chi-squared test	38.180		0.000		

Discussion and conclusions

This study contributes to the under-researched area of tourists' use of intermodal transport to visit peripheral attractions. In particular, tourists' preferences are investigated with the aim of aiding policy implications that increase visits in peripheral urban areas by using public transport. In order to reach this aim, the role of intermodal public transport on intra-destination tourist mobility was analysed through a discrete choice experiment conducted among tourists in Hong Kong. First, a latent class choice model was estimated to reveal segments of tourists with different preferences. Second, a what-if analysis was developed on the estimates of the latent class choice model to investigate changes in choice probabilities and facilitate managerial suggestions. Third, the perceived level of ease in using the selected intermodal transport option was investigated to further derive implications. Fourth, switching behaviour was studied through the analysis of the availability of hypothetical direct access to peripheral attractions. The findings can be beneficial for destination management organizations, transport providers, itinerary planners and attractions.

Two latent classes emerged from the data, explaining the choices with different individual characteristics. An important distinction is observed between the two groups mainly derived by the sensitivity toward information access. Tourists belonging to the second class, are more likely to visit the destination for the first time and staying for a short duration. Therefore, they are also more likely to visit an attraction when it is top rated on TripAdvisor or by the DMO. Chinese tourists are more likely to belong to class two, and in fact, there is literature regarding people of Chinese ethnicity relying more on online evaluations and ratings (Chong, et al., 2018). While cultural proximity was expected to aid the sensitivity towards information provided, the results are different in this sample. An explanation could be the existence of conflict between Chinese tourists and Hong Kong residents (Wassler, et al., 2018), hence asking local people for guidance during alighting and switching transport means could be perceived an uncomfortable situation for them. Indeed, the taxi option is more preferred to be selected by this group. Members of class one are in general more sensitive to public transport travel cost. They are younger tourists, and less likely to be from mainland China. Furthermore, they stay longer on their repeated visit at the destination, and are consequently more likely to visit peripheral attractions with intermodal transport (only 13.8% of cases selected no visit, and less than 5% selected the taxi option). Therefore, members of class one need less incentives to engage in peripheral visits, but they definitely appreciate shorter overall travel time, supplementing information, especially with generic maps, cultural attractions and direct access to the attraction.

The results of the what-if analysis allow the identification of measures that could change the visitation behaviour. One of the most important reasons for not visiting a peripheral attraction relates to its own ranking. If it is ranked by the DMO or TripAdvisor in the top 10, it generates visitation anyway, especially by tourists belonging to class two. Instead, the probability to visit off-beaten and trendy attractions are significantly lower regardless the complexity of reaching them. Hence, marketing efforts can overcome the disadvantage of complex and distant access of attractions. Instead to increase the share of selecting public transport, the installation of onboard screen with alighting information would make the biggest impact to members of class two, according to the results. This service is currently not offered on minibuses in Hong Kong, moreover minibuses only stop on demand.

The result regarding the high importance of information provided for tourists is in line with previous research. Tourist value soft attributes of transport services more important than hard, quantifiable attributes, such as travel time and travel costs. Results of this research confirm suggestions by Le-Klähn and Hall (2015) that different types of on-board information can aid tourists during their travel experience. New technologies, such as routing apps can help tourist to plan their way to an attraction using combined modes of transport. However, as the results show, elder tourists or tourists travelling with children rely more on additional information on-board and on platforms especially visiting the area for the first time and might be not aware of local language. They might be less used to technologies or have more difficulties to use them while traveling. In fact, the modelling of the level of ease showed that smart phone users for navigation perceive less difficult the intermodal journeys versus tourists relying on paper maps and guidebooks. Interestingly, tourists perceive complications when are confronted with detailed maps and instead, they prefer generic maps to aid interchanges. Travel time instead has negative effect on the comfort perceived by the tourists. In line with the results of the what-if analysis, the reduction of travel time on intermodal transports would decrease no-visitation or taxi selection. This may be particularly relevant for tourists belonging to class one that are in general more sensitive to changes in both public transport and taxi travel time, and additionally they are more sensitive to metro than bus or minibus travel time changes. In fact, while traveling on metro, tourists cannot enjoy the view of the destination. Extended travel time in taxi instead means higher travel costs.

The analysis of the potential demand related to direct transport access to tourist attractions showed significant increase in visitation of trendy attractions, especially among tourists with interest in “cultural and historical” and “natural” attractions. This result strengthens the role of public transport in tourist experience. Especially in peak season, specific transport to less visited, trendy attractions could be organized in order to release the amount of people at main attractions. Analog to the function of transport links at global level, where transport can drive demand by opening direct flight connections to secondary destinations, also at local level, direct transport links can raise demand to secondary attractions. At last, the optimization of transport services is key in large cities, not only for local citizens, but also for tourists. In facilitating these efforts, urban cities could (1) increase environmental sustainability by encouraging tourists’ use of collective transport modes, (2) enrich the tourist experience by incentivising visitation of attractions in peripheral areas, and consequently (3) decongest tourist flows in central areas. Therefore, to decongest tourists flows from central areas, tourists need to be directed to peripheral attractions by first easing their journey to the peripheries. Tourists want to arrive faster, with clear information provision at alighting and at interchanges, or even better with direct links from their hotel location. Second, the awareness and rating of the attraction has a high importance. If peripheral attractions are extensively promoted and rated on DMO and TripAdvisor platforms, they are more likely to get visited. Third, as cultural attractions are more likely to be visited by tourists, peripheral attractions should be promoted by emphasizing their cultural elements. For example, if an area is famous for its landscape, it could be jointly advertised with a characteristic temple, or a traditional fishing village nearby. The supplementary cultural aspect could extend the value of the peripheral visit.

The relevance of the study in the shadow of Covid-19

The survey data for this study was collected just before the outbreak of Covid-19 pandemic, therefore, it does not consider its effect on travel behaviour. While the frequency of trips diminished in general or even stopped in some countries temporarily, some reflections could be derived in relations to the results of this study. Indeed, the decongestion of tourism flows from main attractions to peripheral attractions gain even more importance during the pandemic. In line with Zhang et al. (2021), the preference for selecting public transport is reduced due to the fear of virus contamination. Beck et al. (2021) found that concerns about hygiene and crowds are the main factors of not using public transport during pandemic. These fears are likely to persist also after the pandemic, and destinations will experience the longtail psychological effect after reopening. This can become an opportunity for peripheral attractions, as they can benefit from their less crowded and mainly outdoor locations. Moreover, Hong Kong minibuses are restricted to transport seated passengers only, therefore they are not exposed to crowding. Hence, visiting peripheral attractions by public minibus can be perceived as a safer alternative to the more crowded buses or metro.

As a result of the Covid-19 pandemic, the travel behaviour of Hong Kong's residents associated with the use of transport services changed dramatically. Zhang et al. (2021) compared subway data before and during the pandemic in Hong Kong. The city has 11 subway lines with 95 stations, and on a normal (pre-pandemic) day 5 million passengers frequented the service daily. According to the study, the most infected areas – infection clusters – were located around subway stations, in central urban areas. The decrease of subway usage was measured around 35% compared to weekdays and 60% to Sundays, which indicates that people perceived a high risk of moving around the city on a non-working day. However, the decrease in subway usage observed in Hong Kong is still lower than in some other big metropolitan cities (Zhang et al., 2021). In another study based in Hong Kong, Lee and Leung (2022) reported anomalies of different transport modes compared to pre-Covid times, and found that the decrease in the use of ferries to outlying islands and minibuses was considerably lower than the reduction of passengers experienced by subway, urban ferries, buses, and taxis. Indeed, locations catering for outdoor leisure activities became more popular during the pandemic; hiking trails, country parks and outlying islands in Hong Kong experienced more local tourists than before the appearance of the virus. These places are not accessible by metro, and passengers must utilize buses, minibuses, ferries or individual transport modes to reach them. Based on the above arguments, it is reasonable to assume that peripheral attractions would gain popularity also among tourists, after Hong Kong borders reopen.

Limitations and further research

This research provided new insights into tourist transport mode preferences for visiting peripheral attractions in a single-trip situation. Hence, looking at the trip sequence, only the decision for the departure leg is considered, and transport selection to an additional attraction or to return to the hotel are omitted. Indeed, Kim et al. (2021) found that tourists are more likely opting for a bus for the departure leg and choose a taxi instead when they return from a tiring day of visiting attractions. Therefore, further research could analyse the choice in a trip sequence and confront the research results.

The study also investigated the level of ease associated with the selected intermodal transport option. This variable could be further investigated in relation to the overall tourist experience at the destination in future studies. In fact, the role of public transport in destination attractiveness, satisfaction, and intention to revisit has been measured in varying level of details. In the case of Greater Manchester, Thompson and Schofield (2007) found that the effect of perceived performance of public transport on overall destination satisfaction was less significant. This finding could be investigated and compared in different contexts and locations. As this current study shows, different transport characteristics can affect tourists' choice in visiting or not a peripheral area and attraction, therefore, these characteristics can have a significant and indirect effect on overall destination satisfaction.

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