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Coronavirus impacts on post-pandemic travel behaviours

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Coronavirus impacts on post-pandemic planned travel behaviours

Manuscript type: Research Note

HIGHLIGHTS

- Provides a prompt understanding of a real time pandemic (coronavirus Covid-19)
- Analyses the intra-pandemic perception and post-pandemic planned behaviours
- Evaluates planned changes to travel behaviours
- Discusses intra-pandemic effects on perceptions towards tourist destinations

INTRODUCTION

Since its outbreak in Wuhan (China) in early January 2020, the COVID-19 strain of the novel coronavirus has spread rapidly across China and around the globe with a major resulting impact on travel and tourism. As a response to this outbreak, China was effectively the first country in the world to impose a mandatory nation-wide self-quarantine between 23rd January and 9th February 2020 (Bloomberg News, 2020).

This research note analyses the intra-pandemic (i.e. during the pandemic) perceptions as well as post-pandemic planned behaviours among Chinese residents within the context of the early stages of the COVID-19 pandemic. For this purpose, the Theory of Planned Behaviour (Ajzen, 1991) is adopted to explore planned changes to travel behaviours after the pandemic. The intra-pandemic perceptions towards tourism destinations are added to examine their association with post-pandemic planned travel behaviours, particularly with regards to Attitude and Post-pandemic Travel Intention. This research provides a novel contribution to existing knowledge by providing a prompt understanding of a *real-time* pandemic, particularly on the impacts of intra-pandemic perceptions on post-epidemic planned travel behaviours.

DATA AND METHODOLOGY

The measurement items for the three constructs including Subjective Norm, Attitude and Perceived Behavioural Control were adapted from tourism studies of the Theory of Planned Behaviour, such as Chen and Tung (2014) and Wang and Ritchie (2012). Intra-pandemic perceptions towards destinations were measured through the perception of the destination's Hospitality during the pandemic and the Impression of the destination based on cognitive knowledge of the pandemic at the destination.

Data for this study was collected using a self-administrated online questionnaire launched during the Chinese government's mandatory national 'self-quarantine' campaign. The survey was distributed using China's most popular social media platform – WeChat as well as a survey panel provided by Tencent Group. A non-probability snowball sampling technique was adopted. The survey was closed on 9th February 2020 – the last day of the mandatory national self-quarantine campaign. Given an initial data set of 980 responses, 11 were removed due to suspicious response patterns. The remaining data of 969 responses were kept for the analysis with an average survey completion time of 7 minutes.

The proposed model of post-pandemic planned behaviours was analysed using SmartPLS 3. Resulted from this analysis, given the differences found between crisis-resistant respondents and crisis-sensitive ones, a Chi-square Automatic Interaction Detection (CHAID) modelling technique, developed initially by Kass (1980), was then employed in order to gain further insights into the demographic profile of respondents planning to reduce the length of their next holiday.

RESULTS

The solution of the PLS-SEM algorithm indicated the validity and reliability of the outer model as well as inner model, with outer loadings of lower-order components, Cronbach's α, composite reliability (CR), average variance extracted (AVE) and the weights of lower-order constructs of intra-pandemic perceptions meeting their minimum standards (Table 1) (Hair *et al.*, 2017).

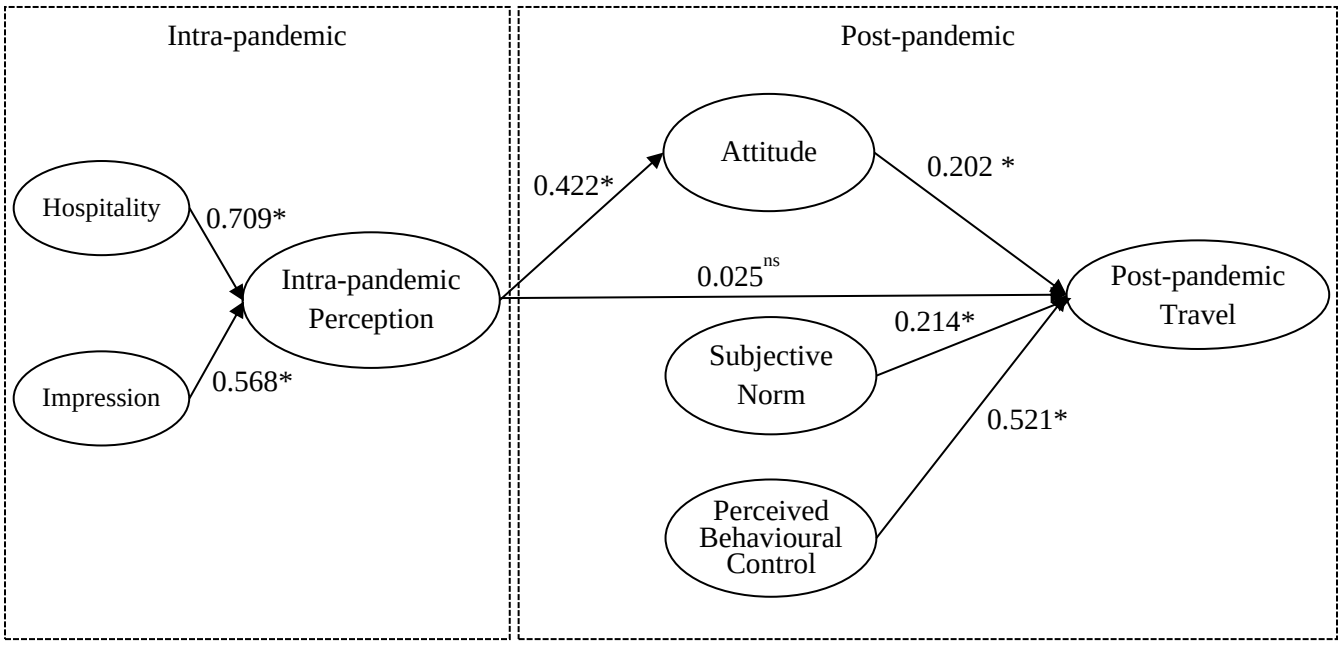
Table 1. Measurement model analysis.

Items translated into English from original in Chinese (Mandarin)	**Outer loading**	**t-statistics**	**Cronbach's α**	**CR**	**AVE**

Hospitality			0.848	0.929	0.868
During the travel ban, the city I intended on visiting remained welcoming to visitors from parts of the country hardest hit by the pandemic	0.932	140.350			
The city I intended on visiting showed a great deal of resilience in ensuring the health and safety of visitors	0.931	142.141			
Impression			0.847	0.929	0.868
My impression of the city will be affected by the number of coronavirus cases reported	0.932	144.176			
My impression of the city will be affected by its reported coronavirus recovery rate	0.931	136.225			
Attitude			0.887	0.947	0.899

Once this epidemic is over, I believe it is still a good idea to go on holiday to the city I intended on visiting	0.948	201.501			
Once this epidemic is over, I would be excited about going on holiday to the city I intended on visiting	0.948	188.573			
Subjective Norm			0.859	0.934	0.876
Once this epidemic is over, we intend on going on holiday to the destination we had chosen to visit originally	0.935	150.572			
Once this epidemic is over, my friends and colleagues intend on going on holiday to the destination they had chosen to visit originally	0.937	164.180			
Perceived Behavioural Control			0.796	0.907	0.830
Once this epidemic is over, I will remain financially able to go on	0.894	88.267			

holiday in the city I intended on visiting					
Once this epidemic is over, I will continue to have availability in my schedule to go on holiday in the city I intended on visiting originally	0.927	187.840			
Post-pandemic Travel Intention			**-**	**-**	**-**
After this epidemic, I will go on holiday to the city I intended on visiting originally	1.000	-			



*Notes: * p<0.001; ns p>0.05: non-significant*

Figure 1. The structure model of intra-pandemic perceptions and post-pandemic travel planned behaviours

Once the reliability and validity of the measurement model were confirmed, a path analysis among the five constructs was executed. No multicollinearity issues were detected as all the VIFs values were below 5 (Hair *et al.*, 2017). The results of the path analysis (Figure 1; Table 2) indicated a strong and significant relationship between Intra-pandemic Perception and Attitude. Intra-pandemic Perception also indirectly and significantly associated with Post-pandemic Travel Intention (β=0.085, p<0.01), fully mediated by Attitude. The coefficient of determination (R^2) was very high, at 0.719, demonstrating that 71.9% of the variability of Post-pandemic Travel Intention was explained by the model.

Table 2. Path analysis and effect size.

	Path coefficients	**T Statistics**	**f2**
Inter-pandemic Perception -> Attitude	0.422	13.830	0.224
Inter-pandemic Perception -> Post-pandemic Travel Intention	0.025	1.192	0.002
Attitude -> Post-pandemic Travel Intention	0.202	5.426	0.062
Perceived Behaviour Control -> Post-pandemic Travel Intention	0.521	15.134	0.487
Subjective Norm-> Post-pandemic Travel Intention	0.214	5.390	0.066
	R2	**Q^2**	
Attitude	0.186	0.156	
Post-pandemic Travel Intention	0.719	0.700	

To examine these associations among crisis-resistant tourists (Hajibaba *et al.*, 2015) and crisis-sensitive tourists, a multiple group analysis was carried out between respondents not expecting to

shorten their planned holiday (N=525) and another group of respondents expecting to shorten it (N=444). Moreover, the SEM analysis also found that Intra-pandemic Perception was significantly positively associated with Post-pandemic Travel Intention only for those who chose to shorten their holiday (β=0.111, p=0.003). Also for this group, Attitude had a slightly stronger relation with Post-pandemic Travel Intention than in the case of those who chose not to shorten their holiday. Yet, the difference was rather small (0.050) and not statistically significant.

Building on these findings, a CHAID modelling technique (see appendix for details) was employed to identify the demographic profiles of these two groups. The criterion variable used in the CHAID model was: "The duration of my next holiday will reduce" - a Boolean binary variable - given that a large proportion of respondents (45.9%) claimed that their next holiday would be shorter than planned as a result of the outbreak, with more than half of respondents (56.8%) planning on delaying their next holiday after the pandemic by 6 months or longer. The CHAID modelling carried out provided information about the relationship between the criterion variable and a range of demographic variables captured by this study, including age, gender, residential province, household size, caring for dependents, education level, household income, and expected outbreak duration. As part of this analysis, Pearson's Chi-Square analysis was used in the model due to the relatively large sample size. The significance level adopted for splitting nodes was set at 0.05, and cross-validation was applied through 10 sample-folds. The results obtained (Figure 2) show that educational attainment is the most important predictor (p = .000) as those with qualifications beyond a university degree were less likely to reduce the length of their next holiday. On the other hand, respondents with lower educational attainment (senior high school education or lower) and, crucially, those who lived with dependants (e.g. children or older parents/grandparents) were very likely to reduce the duration of their holiday (p = .033). Similarly, younger respondents (<29 years old) with a relatively low household income (30,000-80,000 RMB per annum) were more likely to reduce the duration of their holiday after the outbreak (p = .029).

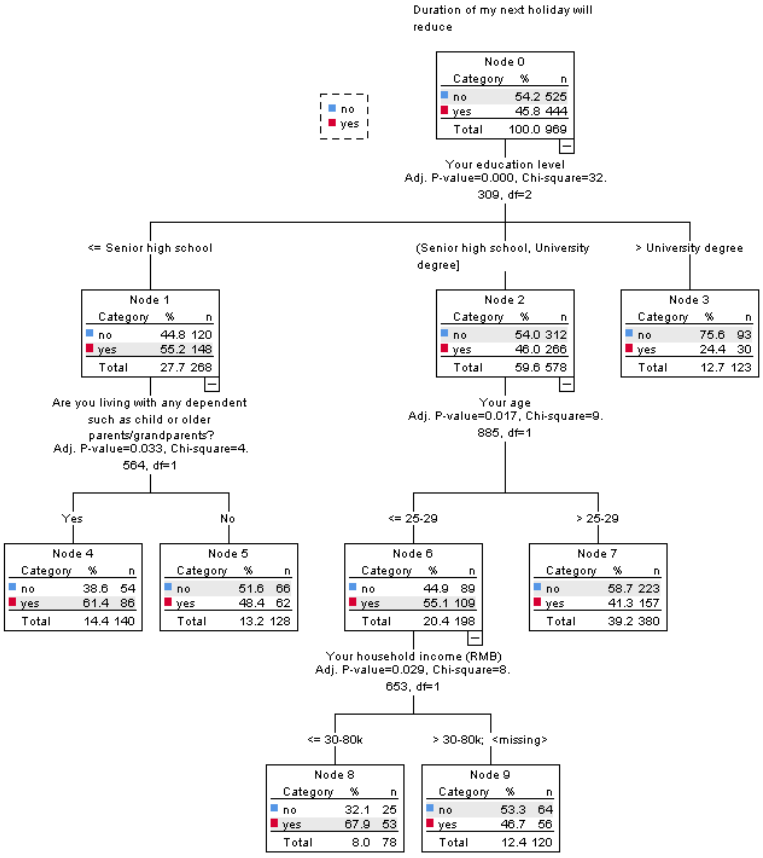


Figure 2. Results of CHAID model analysis of respondents' intended variation of holiday duration (n=969).

In addition to this, it was found that respondents intended on making considerable changes to their travel behaviour as a result of the COVID-19 outbreak. For instance, rail transport was the most popular mode of transport for domestic holidays before the outbreak (38.5%), but fewer respondents planned on taking this means of transport after the epidemic (25.4%). Similarly, the proportion of respondents willing to travel by coach dropped from 7.1% to 4.3%. It is notable that flight travel showed only a minor level of decline, possibly as a result of people's reliance on air travel in a country as large as China. Meanwhile, the most significant change was in car travel, from 25.4% prior to the epidemic to 41.2% post epidemic.

DISCUSSION AND CONCLUSIONS

The findings of this research note indicate significant changes in post-pandemic planned travel behaviours, rather than actual behaviours, which could not be evaluated due to the context and timing of this research. More specifically, a decline in intentions to use public transport as well as an increase in willingness to travel by private car could potentially result in additional pressures on existing road transport infrastructures, even though this remains to be confirmed by further research on actual behaviours. Similarly, further negative impacts on tourism may be expected with around half of the respondents intending on taking their next holiday six months or longer after the pandemic is brought under control, with generally shorter holidays planned. As a result, further research on the medium to long-term effects of this public health crisis on tourism demand is necessary alongside the likely longer-term implications for destination competitiveness (Perles-Ribe *et al.*, 2016).

Additionally, this study confirmed the Theory of Planned Behaviour model in the context of tourism amid a major crisis. It also found significant association between intra-pandemic perception and post-pandemic travel intention which is supported by earlier studies (e.g. Kim and Kwon, 2018) albeit seldom in the context of a major crisis. The differences found between respondent groups suggest the importance of intra-pandemic perception to post-pandemic travel intention among those who were more prone to shortening their post-pandemic holiday, and thus are identified as crisis-sensitive tourists. This is in stark contrast to crisis-resistant tourists, who were likely to be older, with a higher level of educational attainment, and less likely to be living with dependants. This is supported by earlier studies (e.g. Gokovali *et al.*, 2007), which found that people with a higher level of educational attainment tend to be less likely to reduce the length of their next holiday, even if it remains to be investigated whether the source of this apparent resilience may not be more closely linked instead to job security and/or levels expendable income. The results were somewhat different from Hajibaba *et al.* (2015)'s external crisis-resistant tourists who were found to be younger. This difference might be due to the specific nature of the crisis investigated. Regardless, tourism destinations would be advised to pay particular attention to crisis-sensitive tourists in their intra and post-pandemic communications in order to minimise the potential fallout. Furthermore, the role of the media and the quality and reliability of the information it disseminates were not investigated here, even if earlier studies have shown that perceptions of risk created may encompass other tourism destinations not directly affected by a major public health crisis event (Novelli *et al.*, 2018).

Although this research note serves its purpose in delivering early insights into an on-going global public health crisis, the research carried out remains limited in its breadth and scope. Further research into this public health crisis should be carried out with a larger and more diverse sample. This should include actual tourism behaviours and evolving destination image perceptions in key countries for the global tourism industry beyond China, in order to take into account factors such as country-related culture, demographics and other factors likely to affect tourists' planned behaviours and perceptions towards tourism destinations. Parallel to this, current knowledge related to the 'real-time' resilience and active response(s) of destinations and their image when facing a sustained crisis period remains a field of knowledge in need of further research, particularly as the nature (e.g. environmental, climate change, public health, economic,

social) of these crises continues to grow in complexity and interconnectivity. Similarly, the medium and long-term effects of this crisis on host-visitor relationships at regional, national and global levels remain a relatively untapped field of scholarly enquiry in tourism research.

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APPENDIX

RESEARCH METHODOLOGY

In addition to the initial structural equation modelling (SEM) analysis carried out in this study, a Chi-square Automatic Interaction Detection (CHAID) modelling technique, developed initially by Kass (1980), was crucial in identifying the demographic profiles of two groups – namely crisis-resistant tourists and crisis-sensitive ones.

CHAID has been used widely in direct marketing for consumer segmentation (Thomas and Housden, 2017) due to its ability to handle both nominal and interval variables simultaneously as predictors. In addition, the distribution or pattern of predictors is not assumed a priori. Tourists' demographic data include a wide diversity of measurement types including categorical, nominal, ordinal and interval-based variables. In this respect, Díaz-Pérez and Bethencourt-Cejas (2016) found that CHAID provides a precise and broad diversification of significant segments for tourists.

The overall profile of survey respondents is shown below (Table 3).

Table 3. Survey respondents' profile.

	Category	Frequency	%
Gender	Male	580	59.9
	Female	389	40.1
Household size	1	74	7.6
	2	165	17.0
	3	274	28.3
	4	217	22.4
	5	151	15.6
	6	53	5.5
	7 or more	35	3.6
Age	18 or under 18	21	2.2
	18-24	31	3.2
	25-29	267	27.6
	30-34	221	22.8
	35-39	191	19.7
	40-44	61	6.3
	45-49	51	5.3

	50-54	56	5.8
	55-59	39	4.0
	60-64	26	2.7
	65-69	5	0.5
Education	Junior high school and under	58	6.0
	Senior high school	210	21.7
	College	245	25.3
	University degree	333	34.4