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Changes in travel behaviors and intentions during the COVID-19 pandemic and recovery period: A case study of China

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ABSTRACT

The COVID-19 pandemic severely hit the tourism industry in China and worldwide. Chinese government adopted extensive nonpharmaceutical interventions (NPIs) to control it. COVID-19 has been well under control since April 2020 and China entered into a unique recovering period. The aim of this study is to examine how the COVID-19 pandemic changed residents’ travel behaviors and intentions and investigate the theoretical factors associated with these changes during the pandemic and the recovery period. This study used a mixed-methods approach by combining quantitative surveys (N = 1,423) and qualitative interviews (N = 34). We extended the theory of planned behavior (TPB) to include other emerging factors in the context of the COVID-19 pandemic, such as risk perception, tourist trust, and charitable attitude. Our findings show that COVID-19 changed residents’ travel preferences in different ways, for example, tend to choose natural/outdoor/uncrowded attractions over cultural/indoor/crowded attractions. Second, respondents’ domestic travel behaviors and intentions were positively associated with constructs in TPB, charitable attitude to contribute to the recovery of the tourism industry, tourists’ trust in domestic COVID-19 control, and awareness of destinations’ promotion strategies, while domestic travel intentions were negatively associated with risk perception. Third, concerns about the international COVID-19 control and travel restrictions were the two major factors affecting residents’ intentions to travel abroad. Finally, we highlighted the management implications including implementing strict preventive measures while improving the effectiveness, increasing tourists’ trust, and adopting diverse marketing and promotion strategies.

Management implications

This study can provide management strategies for China and other countries to encourage the recovery of the tourism industry from COVID-19. Tourism destinations should adopt various promotion strategies (e.g., ticket discount or free admission, shopping festivals, tax-free shopping, coupons offered by the government, etc.), while implement strict preventive measures on COVID-19 in the tourism destinations (e.g., restriction on the flow of tourists, mask-wearing policy, social distancing). Moreover, the respondents tended to choose natural/outdoor/uncrowded attractions over cultural/indoor/crowded attractions because of good air circulation and low risk perceptions about COVID-19. Promoting natural and outdoor attractions can be the first step to aid in the recovery of the whole tourism industry. The natural and outdoor attractions are more likely to be located in rural areas with relatively low density and underdeveloped economy, and such change in preference could potentially help narrow the economic gap between cities and villages, and alleviate issues (e.g., crowding, traffic congestion) brought by over-tourism in big cities in China.

1. Introduction

COVID-19 posed a severe impact on the world economy (Imai et al., 2020; WHO, 2020a). In the latest forecast of the International Monetary Fund, the global economy shrank by 3.5% in 2020 (IMF, 2021). The tourism industry was the sector that was impacted the most by COVID-19 (UNWTO, 2020). UNWTO statistics showed 100–120 million direct tourism jobs were at risk in 2020 and the number of international tourists fell by 74%, which resulted in a loss of US$1.3 trillion in export revenue (UNWTO, 2021a, p. 2020). GDP from Travel and Tourism in 2020 dropped by 23% compared to 2019 and the international traffic dropped by 67%, resulting in a loss of 264 million USD, and the domestic

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traffic dropped by 40%, resulting in a loss of 124 million USD (ICAO, 2020; WTTC, 2021). Many experts and institutions predicted that international tourism will not return to pre-COVID-19 levels by 2023 (ITA, 2020; UNWTO, 2021b; Walton, 2020).

As the first country to discover coronavirus, from January 19, 2020, China initiated a first-level emergency response to this major public health emergency and strictly implemented nonpharmaceutical interventions (NPIs) to contain COVID-19, including staying-at-home order, wearing masks, Wuhan lock-down on January 23, 2020, restricting population movement and gatherings, strict contact tracing, setting up designated hospitals for COVID-19, publicizing COVID-19 prevention knowledge, dividing risk levels by counties and implementing differing prevention and control measures, implementing unified national case reporting system, etc. (China’s Health Commission, 2020; The State Council, 2020a, 2020b, 2020c; Wuhan Municipal Government, 2020; Xi, 2020; Z. Zhou, 2020). The outbreak of the COVID-19 has halted China’s tourism industry. During the Spring Festival (Feb. 24, 2020–Mar. 2, 2020), revenue from scenic spots dropped by more than 90% (He & Peng, 2020), losses in the accommodation industry exceeded 67 billion yuan (Liu, 2020), and 88% of catering companies’ turnover decreased by 80% when compared with 2019 (Zhong & Su, 2020).

Due to strict NPIs, the COVID-19 has been well under control, and on Mar. 18th, for the first time there were no new reported domestic cases in China (WHO, 2020b), and on April 8th, Wuhan was unlocked (Xinhuanet, 2020). Since April, Chinese residents resumed travel, and the tourism industry was gradually recovering (Ma, 2020). China has entered into a special and unique period from May 2020 to November 2020, when people resumed travel and the tourism industry was gradually recovering, which is distinct from the other countries that were still undergoing serious impact from COVID-19. To help the tourism industry’s recovery under the prequisite for containing the coronavirus, the Chinese government implemented a variety of NPI measures. The Ministry of Culture and Tourism in China issued a guideline to reopen tourism attractions while preventing the spread of the coronavirus on Feb. 25, 2020, and revised the guideline continuously to improve relevant measures, such as wearing masks, measuring temperature before entering, controlling the flow of visitors, reducing gathering, etc. (Ministry of Culture and Tourism, 2020a; 2020b; 2020c; 2020d, 2020e). Also, many tourism attractions introduced reservation systems to control the flow of visitors (Zeng, 2020).

The national and local departments also introduced strategies to promote tourism attractions and encourage Chinese residents to travel, including discounts in ticket prices, government coupons, shopping festivals, intensive marketing, etc. For example, all A-level scenic spots in Hubei province were open to the public for free from August 7th (Beijing Youth Daily, 2020); the government in Shandong provided coupons of 138 million yuan to stimulate consumption in the cultural and tourism industries (China Daily, 2020); the Ministry of Commerce launched activities such as shopping festival to attract visitors (Hua & Pei, 2020); duty-free shops in Hainan province adopted extensive online marketing and advertisement and launched a series of promotion activities for duty-free shopping (X. Zhou, 2020).

Although the COVID-19 in China was well-controlled and the tourism industry was gradually recovering, there were still risks associated with travel due to sporadic cases and imported cases from foreign countries (Health Commission of Hebei Province, 2021). As COVID-19 continued to spread in other countries and more people return to China, the number of imported cases continued to increase. Besides, imported cold-chain food was also creating potential risks, although there was no direct evidence to prove the transmission of coronavirus from cold-chain food to human beings (Xinhuanet, 2021; Zhang, 2020). Residents still perceived imported food as a potential risk because many places had positive detections of coronavirus nucleic acid on the imported products or packaging (Shukun, 2020).

The COVID-19 had a tremendous and unprecedented impact on the tourism industry. Several scholars analyzed the impact of the COVID-19 pandemic on the tourism industry from the perspective of economic losses and provided suggestions for the recovery of the tourism industry from a macro perspective (Ahmad et al., 2020; Gaffney & Eeckels, 2020; Grech et al., 2020; Kitamura et al., 2020; Zhang et al., 2021). However, yet to our knowledge, there were few studies to investigate how COVID-19 changes people’s travel behaviors, especially during the unique recovery period of the tourism industry in China. In this study, we hypothesized that COVID-19 significantly changes people’s travel behaviors and willingness to travel due to high perceived risks, although COVID-19 has been well under control in China. We targeted the special and unique period from May 2020 to November 2020, when people resumed travel and the tourism industry was gradually recovering, which is distinct from the other countries that were still undergoing serious impact from COVID-19.

The focus of this study is to examine the theoretical factors that might influence residents’ travel behaviors and willingness to travel during the pandemic and the recovery period. We built this study upon the theory of planned behavior (TPB) and extended the TPB model to include risk perception, tourist trust, and charitable attitude under the context of the COVID-19 pandemic. The factors examined in this study are based on previous literature and existing theories. The research questions of this study include 1) how does the COVID-19 pandemic change Chinese residents’ travel behaviors and willingness to travel domestically and internationally? 2) What factors lead to such changes? We used a mixed-methods approach including both quantitative survey and qualitative interviews. The outcome of this study can provide a better understanding of changes in Chinese residents’ travel behaviors and intentions during the pandemic and could be beneficial for guiding management policies and strategies for China and other countries to encourage the recovery of the tourism industry from the pandemic.

2. Theoretical framework

To better understand what factors influence people’s travel intentions and behaviors during the pandemic and the recovery period, we adopted the theory of planned behavior (TPB) framework that has been widely used in various behavior research (Ajzen, 2012). In the context of the pandemic, there are many emerging factors that are hypothesized to influence people’s travel behaviors, such as fear of infection, trust in governments’ control of the pandemic, destination management, vaccines, etc. Thus, we extended TPB to incorporate additional variables. The following subsections elaborate five related theories or variables: TPB, charitable attitude, risk perception, tourists’ trust, and social-demographic factors.

2.1. Theory of planned behavior (TPB)

TPB can help us predict individual behaviors (Ajzen, 1991). As indicated by TPB, intention, and behaviors are influenced by three factors: attitude towards the behavior, subjective norm, and perceived behavior control (Ajzen, 1985). Among them, attitude towards the behavior refers to a positive or negative evaluation of a particular behavior (Ajzen, 2020). Individuals’ behavior is also influenced by social pressure from their social group, including family members, friends, and other people they value, which is measured by subjective norm (Ajzen, 1991; La Barbera & Ajzen, 2020). Perceived behavior control refers to the ability people perform a specific behavior, which could be time, money, skills, opportunities, resources, etc. (Ajzen, 2020). Behavioral intention refers to the strong will to perform a specific behavior and it is influenced by the three factors aforementioned and has an influence on individuals’ behaviors (Ajzen, 2012). While most empirical research considers attitude towards the behavior, subjective norm, and perceived behavior control are equally important, some studies have demonstrated some interaction between them (Castanier et al., 2013; Earle et al., 2020; Hagger et al., 2022). TPB has been applied in many research fields, such as psychology, sociology, medicine,
environment, agriculture, public management, etc. (Deng et al., 2016; Idris et al., 2016; Lu, Singh, et al., 2021; Perez et al., 2014; Yu et al., 2018). With respect to tourism research, TPB has been used to investigate people’s intention to travel to Cuba (Jordan et al., 2018), people’s willingness to buy tourism products online (Amaro & Duarte, 2016), people’s willingness to travel by air (Morton et al., 2018), people’s use of virtual tourism (Lu, Xiao, et al., 2021), etc. Particularly, many scholars used TPB to study people’s behaviors and behavioral intentions in the face of natural disasters and crises, for example, preparation intention for natural disasters such as earthquakes (Ong et al., 2021), help-seeking intention after a natural disaster (Shi & Hall, 2021), veterans’ leisure behaviors (Taff et al., 2016), pro-environmental behaviors after disasters (Zhang et al., 2014), and the impact of climate change on pro-environmental behaviors (Elías et al., 2019). After the outbreak of COVID-19, TPB has also been applied to study residents’ behaviors regarding food and beverage purchases (Li et al., 2020), the impact of public opinion on acceptance in social distancing (Qazi et al., 2020), the impact of COVID-19 on overseas tourists’ behaviors (Huan et al., 2020), people’s willingness to visit national parks (Seong & Hong, 2021), and the impact of social media reports of COVID-19 on people’s willingness to travel (Adiyoso & Wilopo, 2021).

However, Armitage and Conner (2001) suggested that TPB only accounted for 27% and 39% of the variance in behaviors and intention, and Sutton (1994) and Bagooz and Natarajan (2000) showed that past behavior customs, motivation, goals, and anticipated emotions had an impact on people’s actual behavior. Ajzen (1991) stated that motivational factors can also affect intention, and Ajzen and Kruglanski (2019) proposed the theory of reasoned goal pursuit (TRGP) to include motivational factors based on TPB. TRGP argued that motivation is a direct prerequisite for intention; attitudes and subjective norms together determine motivation; and perceived behavioral control moderates the effect of motivation on intention (Ajzen & Kruglanski, 2019). Many scholars showed that attitude and motivation are correlated, for example, Myung and Yang (2016) found that there is a significant correlation between leisure motivation and attitude, and Ragheb and Tate (1993) and Stanton-Rich (1995) proved that coginitional and affective attitude have a direct causal influence on people’s leisure motivation. Moreover, Wong (2013) and Huang and Hsu (2009) stated that motivation has a direct impact on the attitude of tourist destinations, and Chon (1989) and Gnoth (1997) pointed out that motivation is one of the important prerequisites for attitude formation. Thus, we consider that attitude and motivation are inseparable, and we integrate them in the extended TPB model.

Additionally, an extended TPB model including other variables was developed to improve the capability of the TPB to predict intention and behaviors, including perceived risks (Hsieh et al., 2016; Quintal et al., 2010), trust (Giampietri et al., 2018; Lobb et al., 2007), different in behaviors, including perceived risks (Hsieh et al., 2016; Quintal et al., 2014), and the impact of climate change on pro-environmental behaviors (Elías et al., 2019). After the outbreak of COVID-19, TPB has also been applied to study residents’ behaviors regarding food and beverage purchases (Li et al., 2020), the impact of public opinion on acceptance in social distancing (Qazi et al., 2020), the impact of COVID-19 on overseas tourists’ behaviors (Huan et al., 2020), people’s willingness to visit national parks (Seong & Hong, 2021), and the impact of social media reports of COVID-19 on people’s willingness to travel (Adiyoso & Wilopo, 2021).

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2.2. Charitable attitude

In addition to the general attitude, particularly in the context of natural disasters, previous research suggested that charitable attitudes could influence people’s willingness to travel, for example, Wu (2013) found that people would willing to travel to those places severely affected by the Wenchuan earthquake (magnitude of 8.5) for contributing to the rehabilitation of local economy and Biran et al. (2014) also regarded “helping local people to recover from the disaster” as a factor to influence travel intention. A charitable attitude can be regarded as a kind of baseline altruism, and people with this attitude would do things that are beneficial to random strangers (Leider et al., 2009). We can find similar attitudes in tourists giving money at churches (Gutic & Caie, 2016), runners running charity marathons (Nettleton & Hardey, 2006), volunteer field rescuers (Urely et al., 2002), hotel consumers who choose green hotels to stay (Wang, Wong, & Narayanan Alagas, 2020). Teng et al. (2013) proposed an amended model based on TPB through research on tourists visiting green hotels and found that altruism affects people’s willingness to visit green hotels by influencing tourists’ attitudes and perceived behavior control. Therefore, based on previous research, we also explored whether the charitable attitude influences people’s travel behaviors in the context of the COVID-19 pandemic. Right after the outbreak of coronavirus, many travelers perceived a sense of guilt while traveling, which is because people perceived that traveling as an immoral or even criminal behavior that would spread coronavirus (Wang, Xue, et al., 2020). However, after the coronavirus was well under control in China, people’s travel might be regarded as a charitable action to support the recovery of the tourism industry. The outbreak of COVID-19 resulted in great economic losses in China and worldwide, and we hypothesized that people might perceive travel after the pandemic as a charitable way to contribute to the recovery of the national economy, which would have a positive impact on their willingness to travel.

2.3. Risk perception associated with travel

Risk is defined as the possibility of involving exposure to danger (Reisinger & Mavondo, 2005). However, compared with the risk itself, the risk that people perceived is the factor that affects people’s decision-making (Bauer, 1967; Brewer et al., 2007). Behavioral sociologists believe that what affects people’s behavior changes is risk perception, which is an individual’s subjective judgment on the likelihood (i.e., the possibility of a person being injured by a dangerous event), susceptibility (i.e. individuals’ resistance or vulnerability to disaster), and severity of risks (i.e., the degree of damage that a hazard can cause) (Bourque et al., 2012; Slovic, 1987). Many scholars have conducted research on risk perception from different perspectives, and they combined risk perception with the Theory of Planned Behavior (Ajzen, 1991; Forward, 2009; Lobb et al., 2007), Health Belief Model (Bosch et al., 2010; Brewer et al., 2007; Tenkorang, 2013), Protective Action Decision Model (Duan et al., 2020; Lindell & Perry, 2012; Terpstra & Lindell, 2012), and Social-cognitive Model (Bandura, 1986; Lee & Lemyre, 2009; Nurius, 2000) to construct the extended models. Risk perception of natural disasters such as hurricanes (Matyas et al., 2011), global warming (Probst-Haider et al., 2016), earthquakes (Paul & Bhuiyan, 2010; Wu & Walters, 2016), and infectious diseases (Cahyanto et al., 2016; Liu-Lastres et al., 2018) have been proved to have a negative impact on people’s willingness to travel. Nowadays, COVID-19 is the biggest societal risk that has formed tremendous threats to the world (World Economic Forum, 2021), and changes brought by it have in turn affected people’s mental health and social stability. Also, coronavirus is easy to survive and spread at low temperatures and so there are potential risks for winter outbreaks (Mallapaty, 2020). Therefore, we hypothesized individuals’ travel behaviors might be affected by perceived risks associated with the COVID-19, including sporadic and imported cases, and the possibility of winter outbreak.

2.4. Tourists’ trust

Trust is a complex concept, which is considered to be related to
beliefs, commitment, and moral responsibility (Hosmer, 1995; Sztopka, 1999). Tourism researchers stated that tourists’ trust is a perception and has an important impact on satisfaction, loyalty, and willingness to revisit, which makes tourists’ trust one of the important prerequisites for their travel (Chang, 2014; Loureiro & Gonzalez, 2008; Poon & Koay, 2021). Previous research suggested that there are three types of trust of tourists: trust toward the government (Nunkoo & Gursoy, 2017; Yang, Huang, et al., 2021), trust toward tourism organizations and enterprises (Anaya-Sánchez et al., 2019; Liang et al., 2014), and trust toward people encountered during the journey (Chang, 2014; Artigas et al., 2017). In addition, some studies found that tourists’ self-confidence can enable people to avoid adverse events during travel (Valencia & Crouch, 2008). Consumer’s trust has also been used to predict people’s consuming intentions (Carfora et al., 2019; Cheung & To, 2017; Ibrahim et al., 2020). Previous studies have demonstrated that trust has a significant positive impact on a tourist’s willingness to travel to a destination after a disaster (Aliperti & Cruz, 2020; Estevao & Costa, 2020; Hajibaba et al., 2016). Thus, in the context of COVID-19, we hypothesized that trust toward the government’s control of the COVID-19 pandemic would have a positive effect on tourists’ willingness to travel. In addition, many scenic spots in China have implemented online reservation systems to make people’s traveling more convenient and imposed restrictions to control the flow of tourists, which could also have an impact on travel behaviors and intentions. Further, with effective vaccines being developed and being distributed among the general public, we also hypothesized that vaccines and vaccination would have a positive impact on people’s travel intentions.

2.5. Social-demographic factors

Besides the above factors, we also included other social-demographic factors. As indicated by previous research (Luan et al., 2019; Papagiannakis et al., 2018; Zegras & Srinivasan, 2007), income is a determinant to influence people’s travel behaviors. Only when people’s basic needs are met, people would pursue a higher level of happiness, for example, happiness obtained from travel (Maslow, 1981; Zhan, 2017). COVID-19 is the biggest societal risk, and the shutdown of many service and manufacturing sectors in early 2020 in China significantly decreased people’s income, which we hypothesized will directly influence people’s travel behaviors and willingness to travel. In addition to income, there have been researches indicating that habit persistence also has a long-term impact on people’s travel consumption (Kwack, 1972; Lyssiotou, 2000). Moreover, female was found to be more likely to perceive risk during travel, and middle-aged people travel more often compared to other age groups (Liu, 1988; Staats et al., 2006). Thus, because of the fear of infection, females might travel less frequently and last shorter than males. Moreover, the fact that the elderly especially those with chronic conditions infected with COVID-19 have a higher mortality rate (Uhler & Shivashankar, 2020) was likely to cause the elderly afraid of traveling.

Based on previous literature, we build a conceptual model (Fig. 1) and hypothesized that travel behaviors and intentions during the pandemic are affected by four dimensions, including three constructs in TPB, special attitude (e.g., charitable attitude, attitude towards cumbersome health checks and measures, attitude towards promotion strategy), risk perception (e.g., sporadic cases, imported cases, and winter outbreaks), tourists’ trust (e.g., the sense of trust towards governments’ control of COVID-19, vaccines, and the effectiveness of visitor management in scenic area). This framework is the basis for the design of our questionnaire and interview guide, as well as the basis for our data analysis.

3. Method

3.1. Data collection

Here, we used a mixed-methods approach integrating the use of qualitative and quantitative research methods to collect, integrate, and analyze data (Creswell et al., 2004). The mixed-methods approach integrates the advantages of both methods, which makes it inclusive and diverse, and provides an expandable and creative form of research when exploring the impact of COVID-19 on people’s travel behaviors (Tian, 2006). This study used a concurrent design strategy, where quantitative and qualitative research are conducted at the same time (Jick, 1979), and there is no logical order between them given the urgent need to understand the impact of COVID-19 on people’s travel behaviors. Through quantitative research, we can discover the trends and the extent to which different factors affect dependent variables in an objective way. Qualitative research provides an understanding of the development process of events, including why they happened and how they happened (Cornelissen, 2017). Quantitative research and qualitative research study the same event from different perspectives and use different methods. Therefore, these multiple verifications can provide us with more explanations and improve the robustness of the research results (Alavi et al., 2018; Greene et al., 1989; Molina-Azorín & Font, 2016). The analyses of the two types of data in our research are carried out in parallel, and in the interpretation stage, we integrate and compare the results of qualitative and quantitative results to achieve the purpose of triangulation.

3.1.1. Quantitative survey

The questionnaire was designed based on previous literature (Ajzen,
1991; Biran et al., 2014; Cahyanto et al., 2016; Chebli, 2020; Chien et al., 2012; Liu et al., 2019; Liu-Lastres et al., 2018; Nunkoo & Gursoy, 2017; Nyaupane & Andereck, 2007) and the theoretical framework of this study (Fig. 1). All four team members in this research project with expertise in travel behaviors and tourism management participated in the research design process and collectively designed the questionnaire. Any discrepancy among team members was discussed and resolved. In addition, we asked two experts in the field of tourism management to check our questionnaire and provide feedback to resolve confusing and leading questions. Before distributing the online survey, we conducted a pilot test with three participants to solicit feedback and further check the questions. The questionnaire was written in Chinese because the research subjects are Chinese residents. The translated questionnaire is available in Appendix A. The questionnaire includes questions about travel experience in the past two years, the impact of the COVID-19 pandemic on the travel plan, traveling experience in the recovery period (since May 2020), future travel intentions both domestically and internationally, travel mode preference (Chebli, 2020), theory of planned behavior (Ajzen, 1991; Chien et al., 2012; Nyaupane & Andereck, 2007), special attitude (e.g., charitable attitude (Biran et al., 2014)), risk perception (e.g., sporadic cases, imported cases, and winter outbreaks (Cahyanto et al., 2016; Liu-Lastres et al., 2018; Soviec, 1987)), tourists’ trust related to COVID-19 control both domestically and internationally, trust towards the effectiveness of visitor management in the tourism destination (Liu et al., 2019; Nunkoo & Gursoy, 2017), and social-demographic factors (e.g., gender, age, educational background, residency, income, and the extent to which COVID-19 affects their household income).

We distributed the anonymous survey via an online survey platform, Questionnaire Star (https://www.wjx.cn/), which has been widely used by many universities and research institutes in China. The survey was distributed and administrated from November 12th to December 20th, 2020. All respondents filled out the survey voluntarily and anonymously. We used sampling methods of convenience sampling and snowball sampling to collect our data (Heckathorn & Cameron, 2017). A total of 1,464 responses were collected, and after excluding invalid samples with a very short time span in answering (less than 2 min), we received a total of 1,423 samples.

3.2. Data analysis

3.2.1. Statistical analysis

Here, we were not only interested to explore respondents’ actual travel behaviors but also respondents’ willingness to travel in the future. We performed a Poisson regression to examine what factors influence respondents’ actual travel during the recovery period of the COVID-19 pandemic since May. Poisson regression is used because the dependent variable is the travel counts, i.e., how many times the respondents have traveled since May 2020 (Agresti, 2019). The independent variables include attitudes and motivation towards travel (relaxation functionality and social functionality), social norm, perceived behavior control, charitable attitude, attitude towards COVID-19 measures, attitude towards promotion strategies in the tourism destination, perceived risk on sporadic cases and imported cases, attitude towards restriction on tourists’ flow and attractions’ reservation system, and trust towards COVID-19 control in China. We have also included social-demographic variables as covariates: gender, education, age, and household income. We also hypothesized that the COVID-19 might severely affect household income, hence influencing travel behaviors. So, we included a change in income due to COVID-19 as an independent variable.

Further, we performed ordinal logistic regression models to examine what factors influence respondents’ willingness to travel domestically within the province of residence and outside the province of residence in the upcoming half-year, and willingness to travel internationally in the upcoming year after the travel restriction is lifted. The dependent variable is a five-point Likert variable (ordinal variable) – the willingness to travel (i.e., 1: very unwilling, 2: unwilling, 3: neutral, 4: willing, and 5: very willing). For the willingness to travel domestically, we added more variables: perceived risks in winter outbreaks, trust towards vaccine development and vaccination in China, and trust towards the effectiveness of the vaccines to control the COVID-19 in China. For the willingness to travel internationally, we excluded variables that are only applicable domestically and additionally included trust towards international COVID-19 control, trust towards international vaccine development and vaccination, and trust towards the effectiveness of the vaccine to control the international COVID-19 as the independent variables. An iteratively reweighted least squares (IWLS) method was used to fit the Poisson regression model and ordinal logistic regression model.

3.2.2. Qualitative data analysis

Recorded interviews with prior consents from the interviewees were transcribed in Chinese by native Chinese speakers and imported into Nvivo 12. We developed a codebook using an iterative coding process and inductive reasoning with three coders to ensure the reliability and validity of coding. After the development of the codebook, two coders coded and analyzed all interview manuscripts together to ensure transparency, and any discrepancies that occurred between the two coders were discussed and resolved. Then, we performed a second coding process to avoid the omission of code based on the current structure. Finally, we reviewed the transcripts again to make sure that theoretical saturation had been achieved by this open coding process. Through open coding, the content of the interview data was fractured and conceptualized. And we integrated them to form a new theory (Strauss & Corbin, 1998). Based on integration and construction of new categories, we verify and supplement the original hypothesis model (Gerson, 1991).

4. Result

4.1. The impact of COVID-19 on travel from Jan. To Apr. 2020

The demographic profile of the respondents is shown in Table 1. More than half of the respondents (55.5%) stated that the COVID-19 pandemic has extremely or greatly influenced their travel plan, 16.5% responded moderate influence, and 15.0% responded slight influence,
while only 12.9% responded no influence. The result of qualitative analysis reveals similar patterns as the survey. Most of the interviewees stated that their travel plans during the pandemic were disrupted, within which 95.5% of them stated that they did not continue their original travel plans after the travel restriction was lifted, mainly because of the fear of infection (47.0%), lockdown of the destination (23.5%), seasonality of tourism products (17.7%), and the emergence of new travel plan (14.6%).

About 60% of the respondents stated that the pandemic significantly reduced or reduced their household income and only 35.4% agreed or strongly agreed that because of the suspension of work during the pandemic, they did not have time to travel after the COVID-19 was under control. Although self-employed or freelancers were significantly affected by COVID-19, a self-employed interviewee stated that after the COVID-19 was under control, to make more money, she had to continue working instead of traveling:

“In the past, we usually started to work after the January 18th in the lunar calendar. However, this year, we delayed the starting of work for more than a month. During this period of time, not only did I have no income, but the price of commodities rose a lot and I also had to buy COVID-19 preventive supplies such as masks and ethanol for disinfection. I have been working since I started working and I reduced my recreation time and canceled my vacations.” (P6)

When the respondents’ travel plan was interrupted during the pandemic, visiting friends and relatives (VFR) was the least favorite alternative recreation activity (14.6%) that the respondents chose (Fig. 2). This aligns with the fact that Chinese residents were required to follow the stay-at-home order, reduce gathering, and reduce unnecessary trips to go outside during the pandemic, and most Chinese residents did so. The majority of the respondents (61.6%) chose to watch movies/TV products or other online entertainment. Sports and fitness (49.7%), recreation around place of residence (40.7%), and recreation in local parks (37.2%) follow. Interestingly, 28.3% of the respondents chose to watch live streaming to experience the tourism destinations. Travel-related live streaming, an intuitive way of travel promotion, has been loved by a large number of people during the pandemic (CGTN, 2020).

### 4.2. The impact of COVID-19 on travel preference during the recovery period

During the Labor Day holiday in China (five days from May 1st to May 5th), 31.1% of the respondents traveled, and among those who traveled, 73.5% traveled within the province of residence and 26.5% outside the province of residence. During the National Day holiday in China (eight days from Oct. 1st to Oct. 8th), 46.0% of the respondents traveled, and among those who traveled, 61.5% traveled within the province of residence and 38.5% traveled outside the province of residence. More respondents traveled and more respondents traveled outside the province during the National Day holiday (October) when compared with the Labor Day holiday (May). Further, since May, about 76% of the respondents traveled at least once (i.e., traveled once: 40.6%; traveled twice: 21.9%; traveled 3 times: 8.6%; traveled 4 times: 2.0%; traveled five times and more: 3.2%).

From the interview, within half a year since May, most respondents (n = 28, 82.4%) have traveled, of which 32.1% respondents traveled for one time (n = 9), 35.7% for twice (n = 10), 14.3% for three times (n = 4), 10.7% for four times (n = 3), and 7.1% for five times (n = 2). Of the

![Fig. 2. Alternative activities for leisure and recreation when travel plan was disrupted during the pandemic from Jan. 2020 to Apr. 2020 (n = 1423; note: a respondent can choose multiple alternative activities and so the sum of percentage is greater than 100%).](image-url)

### Table 1

| Socio-demographic Variable | Response category | Percentage | Sample Size |
|----------------------------|-------------------|------------|-------------|
| Gender                     | Male              | 39.7%      | 1423        |
|                            | Female            | 60.3%      |             |
| Age                        | Under 19          | 3.7%       | 1423        |
|                            | 19-30             | 63.5%      |             |
|                            | 31-40             | 19.6%      |             |
|                            | 41-50             | 9.6%       |             |
|                            | 51-60             | 2.8%       |             |
|                            | Above 60          | 0.4%       |             |
| Education                  | Middle school and under | 1.9% | 1423 |
|                            | High school and equivalent | 7.6% | |
|                            | Vocational degree | 17.3%      |             |
|                            | Bachelor’s degree and equivalent | 65.1% | |
|                            | Master’s degree   | 6.7%       |             |
|                            | Doctoral degree   | 1.1%       |             |
| Household Annual Income (in Chinese Yuan) | Under 30000 | 8.5% | 1423 |
|                            | 30000-50000       | 11.8%      |             |
|                            | 50000-100000      | 19.8%      |             |
|                            | 100001-200000     | 30.5%      |             |
|                            | 200001-300000     | 16.1%      |             |
|                            | 300001-400000     | 5.1%       |             |
|                            | 400001-500000     | 2.9%       |             |
|                            | Above 500000      | 4.9%       |             |

### Notes

- A respondent can choose multiple alternative activities and so the sum of percentage is greater than 100%.
interviewees who have traveled, more than half of them (n = 16, 57.1%) traveled during the summer break, 46.4% (n = 13) traveled during holidays or festivals (e.g., Labor Day, Dragon Boat Festival, National holiday, and Mid-autumn festival), and 39.3% (n = 11) traveled during ordinary working days and weekends. Of those who traveled, the majority of the interviewees (n = 20, 71.4%) have reduced the length of time for each trip to varying degrees (n = 20).

In terms of preference for travel modes in the upcoming half-year, only 12.3% of the respondents chose to travel with a travel group, while 41.0% chose to travel independently using the transportation that they chose and 46.7% chose self-driving tour.

Qualitative analysis suggested that the COVID-19 had more or less influenced people’s preference in travel modes. Twenty-one interviewees (61.8%) said that their travel modes would not change, while others (38.2%) were more inclined to change from traveling in groups to traveling independently and planning their own travel routes. One interviewee stated that if he has to travel with a group, he would choose a group with a smaller size. Also, the COVID-19 has affected their choice on transportation (n = 16, 47.1%), of which 8 interviewees stated that they would use public transportation less, 5 interviewees chose to drive private cars more, and 6 interviewees would like to rent cars, take taxis, or use shared bicycles more. Two interviewees expressed that they are more inclined to choose airplanes for long-distance travel.

“I think traveling by plane is not as crowded as other transportation modes and the travel time is shorter, so the risk of infection is lower.” (P5)

With respect to the impact of the COVID-19 on people’s choice of accommodation, fifteen interviewees (44.1%) stated that their choices in accommodation did not change too much. Fifteen interviewees (44.1%) expressed that preventive measures and sanitary conditions became their first consideration in choosing accommodation. About 41.2% of the interviewees (n = 14) tend to choose hotels rather than home-stays because hotels have better preventive measures, while only one interviewee said that he tends to stay at home-stays due to low customer flows and not being crowded.

“I might prefer homestays rather than hotels. The homestay is relatively independent and not so crowded. There was a lot of news that a certain hotel has an infected person, so the entire hotel was quarantined. I will try to avoid this situation.” (P31)

Regarding preferences on types of tourism destinations in the upcoming half-year, the respondents tend to choose an outdoor destination over an indoor destination, choose a natural landscape over a cultural landscape, and choose an uncrowded destination over a crowded destination (Fig. 3). This aligns with the fact that the risk of contracting the coronavirus in a closed environment is 18.7 times greater than in an open-air environment (Nishiura et al., 2020), and the risk of spreading the coronavirus in a crowded destination is obviously higher than in an uncrowded destination because the social distancing is difficult to maintain in crowded destinations. However, the respondents did not show a strong preference for rural to urban and familiar to unfamiliar destinations (Fig. 3).

What we found in the interview was that good air circulation was the main reason why people were more inclined to choose natural and outdoor landscapes (n = 9). The interview also revealed people’s strong tendency towards uncrowded destinations.

“I will choose more outdoor attractions because the air circulation there is better. I used to go to some indoor entertainment venues, such as amusement arcades, internet cafes, and other indoor places, however, I haven’t gone to these places since January 2020.” (P10)

“I would be more inclined to go to less crowded attractions. Crowded means gathering, and I will be worried about being infected.” (P7)

Past travel preferences greatly affected people’s travel preferences. The qualitative data revealed that people who did not like traveling in the past still chose not to travel, while others who liked traveling were still more inclined to travel after the pandemic was controlled. The interview also revealed that tourists’ personality still influenced their travel patterns (Plog, 2001) that allocentric tourists tend to choose unfamiliar or new attractions and psychometric tourists tend to choose familiar attractions. The interview did not show that COVID-19 changed people’s preference for familiar attractions over unfamiliar attractions. The Internet allows tourists to obtain sufficient information about scenic spots before they go, which alleviated their anxiety due to the unfamiliarity with the destinations.

“I will definitely choose the ones I haven’t visited before because I prefer to explore the unknown. I will do a detailed plan rather than just go there straightly without knowing any information. After the pandemic, I will pay more attention to the information related to COVID-19 such as local measures and control to COVID-19, the new way to buy tickets, reservation system, and so on.” (P11)

When asked what factors should be considered when choosing a tourist destination, interviewees mentioned the number of local cases (n
= 12; 35.3%), and the local policies related to COVID-19 prevention and control (n = 8; 23.5%), and the degree of crowding (n = 4; 11.8%).

In the upcoming half-year, 66.9% of the respondents were very willing or willing to travel within the province of residence and 56.5% outside the province of residence, while only 32.0% were very willing or willing to travel internationally. During the interview, when asked whether they would like to travel abroad in the next year, concerns about the international pandemic control were the main reason for unwillingness to travel abroad (n = 20).

4.3. Theory and factors associated with travel behaviors and willingness to travel

Building upon TPB, the majority of respondents had a positive attitude and motivation towards travel after the pandemic was under control, among which 66.2% of the respondents strongly agreed or agreed that they want to strengthen their relationship with family and friends through travel and 63.9% agreed or strongly agreed that they want to relax themselves through travel (Table 2). The majority of the respondents (52.4%) strongly agreed or agreed that many people around them traveled after the pandemic was under control and 43.2% strongly agreed or agreed that they had extra time and energy to travel (Table 2).

About 50.4% of the respondents showed a charitable attitude towards travel that they want to contribute to the recovery of the national economy and tourism industry through travel. Troublesome health checks and measures did not receive high agreement as the other three factors, while 61.8% strongly agreed or agreed that the promotion strategies attracted them to travel (Table 3).

In addition to TPB, we also gauged people’s risk perception towards COVID-19. We found that imported cases (mean = 4.09; 78.5% strongly agree or agree) and the winter break (mean = 4.01; 78.6% strongly agree or agree) were the most worrying factors when people consider traveling (Table 4). Besides, 67.2% of respondents also showed concerns about the emergence of sporadic cases in some areas (Table 4).

Interviewees also expressed varying degrees of uncomfortableness, fear, and anxiety while traveling. Some interviewees felt uneasy when going out (n = 3), some were afraid of coronavirus nucleic acid testing (n = 3), some were uncomfortable with the overabundant preventive measures and mandatory requirement for wearing masks during their travels (n = 3), and one feared being quarantined if surrounding cases were detected (n = 1). Interviewees also felt anxiety and pressure, for instance, when they found that the attractions were crowded (n = 3), touching communal facilities (n = 1), or watching news related to the pandemic (n = 1). Thus, they were more inclined to travel to areas with fewer people (n = 2) and strengthen personal protection against COVID-19 (e.g., reducing the frequency of removing masks and carrying alcohol-based sanitizer) (n = 2).

After the COVID-19 was under control in China, many scenic spots reopened. About 82.2% of the respondents strongly agreed or agreed that restricting the flow of visitors can help reduce the risk of COVID-19 infection while traveling. 79.8% strongly agreed or agreed that the reservation system made their travel more convenient and comfortable (Table 5).

The qualitative data analysis complemented the survey results and reveals that most interviewees (n = 27; 79.4%) expressed that they felt sureness when traveling, among which 12 interviewees said that there were fewer tourists in the scenic spots, 8 interviewees mentioned that the health checks related to COVID-19 during their travels made them feel protected, and 5 interviewees (14.7%) stated that most strangers that they met during their travels did personal protection (i.e., wearing masks) which made them feel safe.

Our survey was designed and distributed before the vaccine was launched and Chinese residents only had a preliminary understanding of the vaccine. We designed questions to gauge respondents’ perceptions of COVID-19 control and the effectiveness of vaccines to control COVID-19 in China and worldwide. Most respondents (80.2% strongly agreed or agreed) were confident about China’s COVID-19 control and the rapid recovery of the tourism industry, 80.8% strongly agreed or agreed that China’s COVID-19 vaccine will be available soon and most people will be vaccinated, and 80.3% strongly agreed or agreed that popularization

| Table 2 |
| --- |
| **Factors** | **Statement** | **Strongly disagree (1)** | **Disagree (2)** | **Neutral (3)** | **Agree (4)** | **Strongly agree (5)** | **N** | **M** |
| **Attitude and motivation towards travel (relaxation functionality)** | Because you cannot go outside during the pandemic, after the pandemic was under control you really want to relax via travel. | 2.5% | 5.3% | 28.3% | 44.9% | 19.0% | 1423 | 4 |
| **Attitude and motivation towards travel (social functionality)** | Because you cannot go outside during the pandemic, after the pandemic was under control you really want to travel with your family and friends to enhance relationships. | 2.0% | 5.7% | 25.7% | 43.2% | 23.0% | 1423 | 4 |
| **Social norm towards travel** | Since May 2020, there have been many friends, relatives, and colleagues around you going to travel. | 3.1% | 10.7% | 33.5% | 38.5% | 13.9% | 1423 | 4 |
| **Perceived behavior control towards travel** | Since May 2020, you have had extra time, energy, and money to travel. | 6.7% | 15.6% | 34.3% | 31.9% | 11.3% | 1423 | 4 |

| Table 3 |
| --- |
| **Factors** | **Statement** | **Strongly disagree (1)** | **Disagree (2)** | **Neutral (3)** | **Agree (4)** | **Strongly agree (5)** | **N** | **M** |
| **Charitable attitude toward travel** | Since May 2020, you want to contribute to the recovery of the national economy and tourism industry through travel. | 3.5% | 8.4% | 37.3% | 35.6% | 14.8% | 1423 | 4 |
| **Attitude towards COVID-19 measures** | When taking a train or an airplane to travel, you feel that the health check and measures for the COVID-19 are very cumbersome. | 4.7% | 14.4% | 33.3% | 34.0% | 13.4% | 1423 | 3 |
| **Attitude towards the promotion strategies** | The promotion strategies provided by the tourism destinations (such as ticket discounts, shopping festivals, etc.) attract you to travel and shop. | 1.6% | 7.0% | 29.3% | 42.9% | 19.3% | 1423 | 4 |
46.9% of the respondents strongly agreed or agreed that the global pandemic has been and will be under control and the tourism industry will return to normal in the near future (Table 7). While 62.8% believed that the popularization of vaccination will help the tourism industry to develop effective vaccines and vaccines will be popularized. This showed that most of the respondents did not have enough trust towards COVID-19 control in other countries.

Through interviews, we found that the increase in people’s actual travel and willingness to travel domestically was related to people’s trust in the Chinese domestic control of COVID-19. All interviewees expressed strong trust in China’s control over COVID-19. When talking about the imported cases, sporadic cases, and winter outbreaks, most interviewees warned about the winter outbreak, and so you feel that there is still a high risk associated with traveling.

Due to the characteristic that the coronavirus is more stable at low temperatures and is easy to spread in the winter, experts and scientists warn about the winter outbreak, and so you feel that there is still a high risk associated with traveling.

Table 4
Risk perception COVID-19 associated with traveling.

| Factors                                      | Statements                                                                 | Strongly disagree (1) | Disagree (2) | Neutral (3) | Agree (4) | Strongly agree (5) | N   | M       |
|----------------------------------------------|-----------------------------------------------------------------------------|-----------------------|--------------|-------------|------------|-------------------|-----|---------|
| Perceived risk on sporadic cases             | Since May 2020, there have been sporadic cases in some areas, and so you feel that there is still a high risk associated with traveling. | 1.4%                  | 6.6%         | 24.5%       | 47.7%      | 19.5%             | 1423| 3.77    |
| Perceived risk on imported cases             | Foreign imported cases continue to appear, and so you feel that there is still a high risk associated with traveling. | 0.9%                  | 3.0%         | 17.2%       | 43.0%      | 35.5%             | 1423| 4.09    |
| Perceived risk on winter outbreak           | Due to the characteristic that the coronavirus is more stable at low temperatures and is easy to spread in the winter, experts and scientists warn about the winter outbreak, and so you feel that there is still a high risk associated with traveling. | 1.3%                  | 2.9%         | 17.0%       | 50.8%      | 27.8%             | 1423| 4.01    |

Table 5
Trust towards the effectiveness of visitor management in the scenic area.

| Factors                                      | Statements                                                                 | Strongly disagree (1) | Disagree (2) | Neutral (3) | Agree (4) | Strongly agree (5) | N   | M       |
|----------------------------------------------|-----------------------------------------------------------------------------|-----------------------|--------------|-------------|------------|-------------------|-----|---------|
| Trust towards visitor management via flow restriction | Most scenic spots impose restrictions on the flow of visitors, and you feel that this helps protect the safety of tourists from the COVID-19 to a certain extent. | 1.2%                  | 2.3%         | 14.1%       | 53.2%      | 29.0%             | 1423| 4.06    |
| Trust towards visitor management via the reservation system | Most scenic spots implemented the reservation system, and you feel that it is very convenient, which makes your travel more comfortable. | 0.7%                  | 2.4%         | 17.0%       | 53.1%      | 26.7%             | 1423| 4.03    |

Table 6
Tourists’ trust towards domestic COVID-19 control by the government and vaccines in China.

| Factors                                      | Statements                                                                 | Strongly disagree (1) | Disagree (2) | Neutral (3) | Agree (4) | Strongly agree (5) | N   | M       |
|----------------------------------------------|-----------------------------------------------------------------------------|-----------------------|--------------|-------------|------------|-------------------|-----|---------|
| Trust towards government COVID-19 control and tourism in China | You believe that China has controlled and will control the COVID-19 well, and the tourism industry will return to normal in the near future. | 1.0%                  | 3.3%         | 15.3%       | 51.4%      | 28.8%             | 1423| 4.04    |
| Trust towards vaccine development and vaccination in China | You believe that China will develop an effective vaccine against COVID-19 soon, and most people will be vaccinated after the vaccine is launched in the market. | 0.9%                  | 2.8%         | 15.4%       | 47%        | 33.8%             | 1423| 4.10    |
| Trust towards the effectiveness of the vaccine to control the COVID-19 in China | You believe that most people vaccinated will greatly help control domestic COVID-19 and make domestic travel safer. | 0.9%                  | 2.7%         | 15.8%       | 45.3%      | 35%               | 1423| 4.11    |

of vaccination can make domestic travel safer (Table 6). In contrast, only 46.9% of the respondents strongly agreed or agreed that the global pandemic has been and will be under control and the tourism industry will return to normal in the near future (Table 7). While 62.8% believed that the popularization of vaccination will help the tourism industry to recover, only 58.5% strongly agreed or agreed that many countries will develop effective vaccines and vaccines will be popularized. This showed that most of the respondents did not have enough trust towards COVID-19 control in other countries.

Through interviews, we found that the increase in people’s actual travel and willingness to travel domestically was related to people’s trust in the Chinese domestic control of COVID-19. All interviewees expressed strong trust in China’s control over COVID-19. When talking about the imported cases, sporadic cases, and winter outbreaks, most interviewees stated that these events are reasonable (n = 17; 50.0%) and believed that the same large-scale outbreak like in Wuhan will not
happen again due to governments' efforts (n = 22; 64.7%). However, the majority of the respondents (n = 20; 58.8%) expressed their concerns about international COVID-19 control.

4.4. Factors influencing actual travel during the recovery period of pandemic

A Poisson regression model was performed to explore what factors influenced respondents’ actual travel (travel counts since May, 2020). This model suggested that respondents’ actual travel behaviors can be partly explained by TPB. There was a significant positive association between social norms and travel counts (p-value = 0.001; Table 8), which indicates that the reference group that people care about (e.g., friends, relatives, and colleagues) played an important role in influencing people’s travel behaviors. Also, respondents who stated that they have extra time, energy, and money to travel (perceived behavior control) were more likely to travel (p-value<0.001; Table 8).

The charitable attitude was significantly positively associated with the number of travels (p-value = 0.044; Table 8), which indicated that people who want to contribute to the recovery of China’s economy and tourism industry through their own travel were more likely to travel. Our model also indicated that there was a significant negative association between attitudes towards restriction on the flow of visitors and the number of travels (p-value = 0.019; Table 8). This might be because people who agreed most scenic spots imposing restrictions on the flow of visitors were less motivated to travel or unable to visit due to restrictions on flow. Attitude towards the promotion strategies was significantly positively associated with the number of travels (p-value = 0.011; Table 8), which means that tourists who know that many scenic spots have ticket discounts, discounts on products, or shopping festivals were more likely to travel more frequently. This can be confirmed via interview that four interviewees said that they would be more willing to go to scenic spots with discounted tickets.

“I live in Hubei. After the pandemic, all attractions in Hubei Province are free to the public. Some people say that traveling is still dangerous now, but I do not worry about it at all. Due to the free entry policy, I went to most of the attractions in Hubei Province. And all of these attractions are located in the mountains and I feel quite safe.” (P5)

In addition, males were more likely to travel than females (p-value = 0.003; Table 8) because females were more likely to perceive fear (Liu, 1988; Staats et al., 2006). As expected, the household income was a significant predictor (p-value<0.001; Table 8) for travel. The interview revealed that especially for interviewees with lower income, the decline in income during lockdown push them to work harder in the recovery period of the pandemic and they became more cautious about traveling because they were afraid that they cannot earn their lives due to infection with COVID-19.

“I haven’t been out this year. Although COVID-19 is almost under control in China, I still feel that I would better not go out. I don’t want to make trouble or get into any trouble.” (P18)

4.5. Factors influencing willingness to travel in the future

An ordinal logistic regression was applied to examine what factors would affect people’s willingness to travel domestically in the next six months and internationally in the upcoming year. TPB can also partially predict respondents’ willingness to travel within the province or outside provinces in the next six months. Attitude and motivation towards travel (relaxation functionality) and social norms were positively associated with willingness to travel within and outside the province of residence (Table 9).

Attitude towards COVID-19 measures was negatively associated with respondents’ willingness to travel within the province of residence (p-value = 0.002; Table 9), which was because people who perceive health checks and measures as cumbersome were less likely to travel. Similar to actual travel, attitude towards the promotion strategies were positively associated with respondents’ willingness to travel both within and outside the province in the next six months (p-value = 0.001; Table 7).

There was a negative association between willingness to travel outside the province of residence and perceived risk in sporadic cases (p-value<0.001; Table 9). This was because sporadic cases, especially the emergence of asymptomatic infections, were uncontrollable, which would make tourists more cautious and less likely to travel a long distance outside the province. The quantitative data did not reveal a significant association between willingness to travel and perceived risks in upcoming winter outbreaks. However, through the interviews, 28 interviewees (82.4%) stated that their travel plans in the next six months were affected by the upcoming winter risks. Among them, 14 interviewees stated that they would not travel this winter, 9 interviewees said that they would avoid going to high-risk areas, and 4 interviewees stated that more detailed planning would be carried out before traveling and strict protective measures would be taken. The difference between quantitative and qualitative results might be because most of the interviews were conducted later than the survey, which was close to the winter season when there were a few winter outbreaks in Shenyang and Dalian.

Trust towards COVID-19 control and tourism recovery in China had a significant positive effect on respondents’ willingness to travel within (p-value = 0.018; Table 8) and outside the province (p-value = 0.002; Table 9), which showed that people who have more trust towards domestic COVID-19 control were more likely to travel in both short- and long-distance in the next half year. Unsurprisingly, education and household income were significant predictors for willingness to travel (Table 9). Younger respondents were more willing to travel outside the province (p-value<0.001; Table 9).

Table 8

| Factors | \( \hat{\beta} \) | Odds Ratio | p-value |
|---------|----------------|------------|---------|
| Attitude and motivation towards travel (relaxation functionality) | 0.006 | 1.006 | 0.889 |
| Attitude and motivation towards travel (social functionality) | 0.005 | 1.005 | 0.892 |
| Social norm towards travel | 0.104 | 1.109 | 0.001** |
| Perceived behavior control towards travel | 0.113 | 1.119 | 0.001*** |
| Charitable attitude towards travel | 0.065 | 1.067 | 0.044* |
| Attitude towards COVID-19 measures | 0.005 | 1.005 | 0.843 |
| Attitude towards the promotion strategies | 0.083 | 1.086 | 0.011* |
| Perceived risk on sporadic cases | -0.030 | 0.971 | 0.367 |
| Perceived risk on imported cases | -0.020 | 0.980 | 0.565 |
| Trust towards tourism management via flow restriction | -0.095 | 0.909 | 0.019* |
| Trust towards tourism management via the reservation system | 0.024 | 1.025 | 0.570 |
| Trust towards COVID-19 control and tourism in China | -0.012 | 0.988 | 0.730 |
| Gender | 0.138 | 1.148 | 0.003** |
| Education | 0.008 | 1.008 | 0.789 |
| Age | 0.011 | 1.011 | 0.690 |
| Household income | 0.096 | 1.100 | 0.001*** |
| Change in income due to COVID-19 | 0.000 | 1.000 | 0.993 |

Note: \( \hat{\beta} \) is the estimated coefficient; significance level: * denotes significance at 0.05 level, ** denotes significance at 0.01, and *** denotes significance at 0.001; Gender: female is coded as 0, male is coded as 1, and female is used as the baseline; Education, age, and household income are ordered following Table 1; Statement for change in income due to COVID-19: “How much influence does the COVID-19 have on your household income?” (response: significantly increased (1), increased (2), unchanged (3), decreased (4), and significantly decreased (5)); the notes in this table are also applicable to Table 9 and Table 10.
Still, TPB can partially explain people’s willingness to travel abroad next year that attitude and motivation towards travel for relaxation functionality (p-value < 0.001; Table 10) and social norm towards travel (p-value = 0.021; Table 10) were positively associated with the willingness to travel abroad.

As expected, trust towards international COVID-19 control (p-value < 0.001; Table 10) and trust towards the effectiveness of the vaccine to control the international COVID-19 (p-value = 0.013; Table 10) had positive significant effects on the willingness to travel abroad which means that those respondents who believed that COVID-19 was well controlled globally and who were confident in the popularization of vaccination and effectiveness of vaccines to control COVID-19 were more likely to travel abroad.

Eight interviewees stated that they would like to travel abroad next year, and the main reasons were studying abroad, business trips, and visiting friends/relatives, however, they still had high concerns about international travel, for example, a large number of local infections in other countries (n = 4), the international traveling policies (n = 4), and flight issues (e.g., limited flight, high price, and potential in-flight cancellation) (n = 4). When asked whether they would be willing to travel abroad after being vaccinated next year, 67.7% of the interviewees (n = 23) expressed a negative attitude. International COVID-19 control (n = 8), the international traveling policies and restrictions (n = 5), flight-related issues (e.g., limited flight, high price, and potential in-flight cancellation) (n = 4), and income (n = 3) were still the main barriers that made them hesitate to travel even being vaccinated. Even interviewees who wish to travel abroad after being vaccinated also expressed concerns about the pandemic control at the destination country (n = 5), air ticket prices and the number of flights (n = 4), and the pandemic prevention policies in China and the destination country (n = 4).

Similar to the factors that affect the willingness to travel domestically, age was negatively associated with outbound travel intentions (p-value < 0.001; Table 10), and household income was positively associated with outbound travel intentions (p-value < 0.001; Table 10).

5. Discussions and conclusion

In this study, we explored how COVID-19 changed Chinese residents’ travel behaviors and factors that influenced Chinese residents’ actual travel and willingness to travel using a mixed-methods approach by combining qualitative method and quantitative method. This study has both practical and theoretical implications. On the one hand, this study has theoretical significance and extends the TPB model to include other emerging factors in the context of the COVID-19 pandemic including charitable attitudes, risk perception, and tourists’ trust to explain residents’ travel behaviors. On the other hand, the outcome of this study can provide a better understanding of Chinese residents’ travel behaviors and intentions during the pandemic and could be beneficial for guiding policies for the recovery of the tourism industry in China as well as other countries.

5.1. Theoretical implications

Our study found that people’s travel behaviors and intentions can be partially explained by the theory of planned behavior. Positive attitude and motivation, subjective social norms, and perceived behavior control towards travel were positively associated with people’s travel behaviors in the special recovery period of COVID-19 or travel intentions in the future in China. The future travel intention is positively associated with attitudes and motivations for relaxation, rather than the one for strengthening social relations. It is worth noting that both travel behaviors and intentions have different degrees of association with social norms. Also, although perceived behavior control has no significant

Table 9
Ordinal logistic regression on factors influencing respondents’ willingness to travel domestically in the upcoming half-year.

| Factors                                      | Travel within the province of residence | Travel outside the province of residence |
|----------------------------------------------|----------------------------------------|----------------------------------------|
|                                              | Odds Ratio p-value                      | Odds Ratio p-value                      |
| Attitude and motivation towards travel       | 0.545 1.725 -0.001***                  | 0.413 1.511 -0.001***                  |
| (relaxation functionality)                   |                                        |                                        |
| Attitude and motivation towards travel       | -0.009 0.991 0.908                   | 0.118 1.125 0.143                     |
| (social functionality)                       |                                        |                                        |
| Social norm towards travel                   | 0.161 1.175 0.018*                    | 0.225 1.253 -0.001***                 |
| Perceived behavior control towards travel    | 0.104 1.110 0.096                     | 0.113 1.120 0.061                     |
| Charitable attitude toward travel            | 0.083 1.087 0.242                     | 0.001 1.001 0.989                     |
| Attitude towards COVID-19 measures           | -0.168 0.845 0.002**                  | -0.017 0.983 0.750                    |
| Attitude towards the promotion strategies    | 0.138 1.148 0.049**                    | 0.212 1.236 0.001***                  |
| Perceived risk on sporadic cases             | -0.013 0.987 0.869                    | -0.220 0.803 0.005**                  |
| Perceived risk on imported cases             | 0.073 1.075 0.419                     | 0.000 1.000 0.996                     |
| Perceived risk on winter outbreak            | 0.036 1.037 0.694                     | -0.087 0.917 0.344                    |
| Trust towards visitor management via flow restriction | 0.028 1.028 0.765                 | 0.044 1.045 0.635                     |
| Trust towards visitor management via the reservation system | 0.158 1.172 0.096                 | 0.001 1.001 0.993                     |
| Trust towards COVID-19 control and tourism in China | 0.199 1.220 0.018*                | 0.263 1.300 0.002**                   |
| Trust towards vaccine development and vaccination in China | 0.154 1.166 0.107                | -0.143 0.867 0.128                    |
| Trust towards the effectiveness of the vaccine to control the COVID-19 in China | -0.059 0.943 0.523                  | 0.029 1.029 0.752                     |
| Gender                                       | 0.072 1.074 0.494                     | -0.250 0.779 0.015*                   |
| Education                                    | 0.189 1.208 0.004**                   | 0.159 1.172 0.012*                    |
| Age                                          | -0.025 0.975 0.674                    | -0.277 0.758 -0.001***                |
| Household income                             | 0.071 1.073 0.027*                    | 0.144 1.155 -0.001***                 |
| Change in income due to COVID-19             | -0.107 0.898 0.114                    | -0.069 0.934 0.296                    |

Table 10
Ordinal logistic regression on factors influencing respondents’ willingness to travel internationally in the upcoming year.

| Factors                                      | Odds Ratio p-value |
|----------------------------------------------|-------------------|
| Attitude and motivation towards travel       | 0.362 1.437 -0.001*** |
| (relaxation functionality)                   |                   |
| Attitude and motivation towards travel       | -0.049 0.953 0.522 |
| (social functionality)                       |                   |
| Social norm towards travel                   | 0.146 1.157 0.021* |
| Perceived behavior control towards travel    | 0.071 1.074 0.225  |
| Attitude towards COVID-19 measures           | -0.022 0.978 0.659 |
| Trust towards international COVID-19 control | 0.331 1.392 -0.001*** |
| and tourism                                  |                   |
| Trust towards international vaccine          | -0.080 0.923 0.300 |
| development and vaccination                 |                   |
| Trust towards the effectiveness of the vaccine to control the international COVID-19 | 0.178 1.195 0.013* |
| Gender                                       | 0.084 1.087 0.403  |
| Education                                    | -0.038 0.963 0.539 |
| Age                                          | -0.264 0.768 -0.001*** |
| Household income                             | 0.116 1.123 -0.001*** |
| Change in income due to COVID-19             | -0.089 0.915 0.165 |
association with travel intentions, it has been shown to have a significant and positive effect on actual travel. Our finding is consistent with Ajzen (1991) and Schiffer and Ajzen (1985)’s research results. Especially, respondents who want to contribute to the recovery of China’s economy and tourism industry through their own travel (i.e., charitable attitude) were more likely to travel during the recovery period.

Our findings highlighted that the respondents and interviewees who perceived risk related to COVID-19 were less likely to travel or would reduce the length of their travel and shorten the travel distance, which is similar to Brug et al. (2004) and Neuburger and Egger (2021)’s findings. Among them, the risks that people perceive about sporadic cases have the most significant negative impact on the willingness to travel outside government in controlling COVID-19 led to an increase in the willing Chinese government to reduce the length of their travel and shorten the travel distance, which is perceived risk related to COVID-19 were less likely to travel or would prefer to plan their travel routes instead of traveling within travel during the recovery period. Trust towards the effectiveness of the Chinese government’s control over the spread of the virus implemented by scenic spots were more likely to travel during the recovery period. Trust towards the effectiveness of the Chinese government’s control over COVID-19 led to an increase in the willingness of Korean residents to travel domestically. In addition, trust towards the effectiveness of vaccines was found to have a significantly positive impact on willingness to travel abroad. Lastly, income, education, age, and gender were more or less associated with actual travel behaviors or travel intentions.

5.2. Managerial implications

Our study revealed that the mobility of Chinese residents was largely restricted from January to April in 2020 because of the COVID-19 outbreak and due to strict NPI measures, the tourism industry was recovering since April. We found that COVID-19 disrupted most of the respondents’ and interviewees’ travel plans from January to April. Visiting friends and relatives (VFR) was the least favorite alternative recreation activity that the respondents chose when their travel plans were disrupted, which is in line with the fact that NPI measures (e.g., staying at home and social distancing) had been implemented and supported by Chinese residents. Due to the government’s efforts and strict NPI measures, COVID-19 has been well under control since April 2020. Notably, most of the respondents and all interviewees expressed trust towards China’s control on COVID-19. The tourism industry is recovering, and people showed a growing interest in traveling, with more respondents traveling and a higher percentage of respondents traveling across the province during the National Day holiday (October) in 2020 when compared with the Labor Day holiday (May). This confirms that well controlling the COVID-19 is a prerequisite for the recovery of the tourism industry.

Chinese residents’ travel preferences and behaviors were shifted by the COVID-19 pandemic, including shorter length of travel, more independent travel, higher level of dependence on private transportation mode, and preference towards natural/outdoor/uncrowded attractions. Due to high perceived risks, the survey respondents and interviewees would prefer to plan their travel routes instead of traveling within travel groups. Similarly, public transportation modes (e.g., bus, train) were less preferable compared to private transportation modes (e.g., private cars, renting cars, taxis), which might become a barrier for the low-income groups to travel during the COVID-19 pandemic. The concerns for COVID-related risks also change Chinese residents’ preferences for lodging and accommodation that nearly half of the interviewees would take preventive measures and sanitary conditions as the primary consideration. The numbers of local cases, the local policies related to COVID-19 prevention, and the degree of crowding were the three major factors that interviewees took into consideration when choosing a destination. Regarding destination choices, the respondents tended to choose natural/outdoor/uncrowded attractions over cultural/indoor/crowded attractions because of good air circulation and risk perceptions about COVID-19. These findings are aligned with findings in other COVID-19 related studies that the nature-based outdoor recreation areas seem to be demanding destinations to mitigate the stresses and challenges of stay-at-home order during the COVID-19 pandemic (Xiao et al., 2021; Hamidi & Zandiatashbar, 2021). The natural/-outdoor/uncrowded attractions are more likely to be located in rural areas with relatively low density and underdeveloped economy, and such change in preference could potentially help narrow the economic gap between cities and villages, and alleviate problems and issues (e.g., crowding, traffic congestion) brought by over-tourism in big cities.

This study has implications for policymakers in China as well as other countries and can provide management strategies for other countries to encourage the recovery of the tourism industry from COVID-19. Tourism destinations should adopt various promotion strategies (e.g., ticket discount or free admission, shopping festivals, tax-free shopping, coupons offered by the government, etc.), while implementing strict preventive measures on COVID-19 in the tourism destinations (e.g., restriction on the flow of visitors, mask-wearing policy, social distancing). Our quantitative results showed that the tourists who were aware of the information about promotion strategies and activities in tourism destinations are more likely to travel. The result is in line with the findings from Blake and Sinclair (2003) that sector-specific targeted subsidies were found to be the most efficient means to recover an unexpected and sudden downturn in tourism demand. Tourism destinations should adopt diverse marketing and promotion strategies, especially before summer breaks and holidays to respond to the increasing travel demands. Besides, with the charitable attitude in functioning, attractions and local government could adopt more advertising and marketing to guide and attract visitors to recover the destinations’ economy. Additionally, social media, video-sharing social networking platforms, and official websites can be effective ways to enhance tourists’ awareness about promotion strategies as well as travel and safety information (e.g., ticket purchase means, special health check and measures, opening hours, the average number of tourists per day, etc.), which can help tourists plan their travel routes and increase their sense of security. These strategies can potentially reduce the perceived risks and level of stress associated with COVID-19 for a portion of the general public.

Interestingly, our results indicate a management dilemma regarding travel-related COVID-19 preventive measures in the recovery period of the pandemic. On the one hand, the COVID-19 preventive measures, for example, mask-wearing policy, restriction on tourist flow, health check, and social distancing, etc. could make travelers feel protected. When planning a trip, interviewees hope to get more information about the destination and COVID-19 prevention policies and strategies. On the other hand, some interviewees expressed feelings that they did not like wearing masks for a long time when traveling and some felt stressed when they experienced excessive and repetitive health checks and measures in the transit region and the tourism destination. It is challenging for the government and scenic spots to balance health safety and the burden of health checks. On the premise of ensuring health safety, the transit and destination region could consider reducing the repetitive and ineffective health check (e.g., undergoing multiple health checks in the same destination), while increasing the effectiveness (e.g., more training to the health check staff and increase the reliability and accuracy of infrared thermometer to measure temperatures).

The respondents and interviewees were confident about the domestic COVID-19 control by the government and the rapid recovery of the tourism industry, while in contrast lack of trust towards international COVID-19 control and international travel restrictions led to the rapid decline in the number of outbound travels, which were not yet recovered.
as the domestic travels by the end of 2020. The regression model indicated that the respondents who expressed trust towards the effectiveness of the vaccine were more willing to travel abroad, which showed that it is necessary to propagateize the effectiveness of the vaccine and implement widespread vaccination. However, interviewees still showed a negative attitude towards international travel even if being vaccinated and the reasons mainly include international COVID-19 control, the international traveling policies, and restrictions, and flight-related issues (e.g., limited flight, high price, and potential in-flight cancellation).

The COVID-19 pandemic could have a negative impact on the diversity, equality, inclusion, and environmental sustainability of tourism. First, our findings suggested that the elderly and low-income respondents showed lower willingness to travel due to fear of infection and reduced income, respectively, which proved that COVID-19 has violated their travel rights (Streimikiene et al., 2021). In addition, for hygienic reasons and health, interviewees showed resistance to public/shared goods, such as contacting public facilities and not being willing to take public transportation (e.g., buses and trains), and they preferred to choose using personal goods and drive private cars. Such formation and continuation of habits might lead to more waste of resources and more greenhouse gas emissions even if after the pandemic is over. Moreover, a massive increase in the usage of masks while traveling and even littering masks in tourism destinations can have a severe physical impact on the tourism destinations. Thus, the destinations should adopt strategies to collect the used masks and dispose of them properly.

6. Limitations

Although this study provides many timely insights, like other empirical studies this study also has limitations, which provide opportunities for future research. First, since this research is conducted only with Chinese residents, future scholars could conduct more research to additionally investigate the differences in culture, politics, policies, and medical level among different countries change residents’ travel behaviors and intentions. Future research can also measure people’s travel behaviors and intention to visit different tourism destinations, such as areas with a large number of COVID-19 cases or cruise ships where the risk of infection is relatively high. Second, in the theoretical framework of this research, we measured attitudes in TPB from the perspective of motivation. Future research could measure the influence of attitude on people’s travel intention in the context of pandemic from multiple perspectives, such as affective, cognitive, and behavioral (Harrison, 1976). Third, due to the COVID-19 pandemic and social distancing, we did not conduct on-site survey but conducted online surveys using convenience sampling and snowball sampling, which resulted in our sample being skewed towards highly educated, female, and 18–40 years old. Although the age, gender, and education level of our sample are similar to the demographic characteristics of the domestic and outbound tourists (China Tourism Academy, 2020; WTTCF, 2018), people over 40 years old, especially over 60 years old, and lower education should be further studied to ensure the diversity and inclusiveness of the sample. We recommend subdividing social-demographic group and travel patterns, and performing separate analyses on different social groups, such as elderly, people who like to travel alone or in a group, residents of areas with a large number of cases, etc. Finally, this study was conducted in a fixed period of time. However, residents’ travel behaviors and intentions might be drastically affected by special circumstances, such as virus mutations, changes in travel and immigration policies, vaccine development, and treatment improvement. Thus, we recommend that this type of research can be conducted regularly (e.g., half a year) and longitudinal data can be collected to consider the change of the influencing factors.

CRediT authorship contribution statement

Xuecong Fan: Conceptualization, Data curation, Investigation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. Junyu Lu: Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing, Supervision, Project administration, Funding acquisition. Miaoxi Qiu: Conceptualization, Formal analysis, Data curation, Investigation, Writing – original draft. Xiao Xiao: Conceptualization, Investigation, Methodology, Writing – review & editing.

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Supplementary data: Appendix A and Appendix B

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