Understanding Residents' Intention to Adapt to Climate Change in Urban Destinations—A Case Study of Chang-Zhu-Tan Urban Agglomeration

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Abstract: While urban destinations have been affected by climate change, they are also at the vanguard of climate change adaptation. However, there is limited evidence from the urban destination point of view showing how they perceive or adapt to climate change influences. Therefore, this study bridges the gap by adopting the protection motivation theory to investigate residents’ perceptions of climate change risks and their adaptation intentions. Web-based questionnaires were developed and distributed to respondents, specifically residents in the CZT (Chang-Zhu-Tan) urban agglomeration. Structural equation modeling (SEM) was employed to explore the underlying mechanisms. The findings show that the residents were already aware of the impact of global climate change and were well informed with regard to the relevant information. The key factors driving the residents’ intention to adapt to the changing climate were identified, and include information, risk perception, perceived adaptive capacity, and adaptive incentives. Importantly, receiving the relevant information can greatly enhance an individual’s risk awareness and adaptation appraisal ability. When people perceive greater climatic hazards and adaptive ability, they are more inclined to undertake climate interventions. Additionally, adaptive incentives have a considerable influence on adaptation appraisal, and greater incentives will mobilize residents to better adapt to climate change. The results provide useful suggestions, such as enhancing climate risk awareness and building adaptive capacity for urban destinations to generate better policies and strategies in climate adaptation and destination management.

Keywords: climate change; risk perception; adaptation intention; urban destination; protection motivation theory

1. Introduction

Climate change has become a major issue threatening the sustainable development of human society. The latest report of the IPCC (Intergovernmental Panel on Climate Change) warns of the possibility of irreversible climate change [1]. To cope with the increasing climate risk, the United Nations (UN) has called us to “Take urgent action to combat climate change and its impacts” to achieve sustainable development [2]. Adaptation is considered the major strategy for humans, especially noting that mitigation cannot work in the short term to combat climate change. Therefore, climate change adaptation has quickly emerged as a research agenda, and is now regarded as an important element of the international climatic policy.

Cities have become more vulnerable than ever. The climate risk faced by cities is more urgent due to highly concentrated economic production and infrastructure [3]. According to The World Bank, the rate of urban population was 56.156% in 2018, and will reach 68%
in 2050 [4]. With the population–economy agglomeration, urbanization is considered to advance tourism development. Meanwhile, it also threatens to complicate and amplify urban diseases further, especially in the context of climate change. Arguably, the exposure of residents becomes greater with the increasing population in cities. Therefore, addressing climate change has been recognized as a critical issue to help urban planners and decision-makers manage climate risk and improve urban actions such as climate adaptation [5].

Cities have played an important role in improving tourism. They work as important tourist origins, distribution centers, and destinations. As stated by the World Tourism Cities Federation, tourist sites conduct approximately 80% of global tourist activities. It is of note that many cities place great value on the tourism industry to boost socio-economic development across Europe and North America. In other cities in developing countries, urban tourism has been recognized as a driving force for achieving socio-economic improvement. For instance, the four cities with the most visitor arrivals are all in Asia [6]. Undoubtedly, urban tourism feels the most severe effects of climate change, and relies greatly on city systems such as lifeline facilities, ecological environments, and tourism attractions. However, it is of note that, until recently, the climate change–urban tourism relationship has rarely been discussed. Scholars have identified this knowledge gap and called for more attention to be given [7].

The aim of this study was to examine the link between climate change and urban destinations. China is a reasonable context for such a research topic. First, China is a sensitive and significant area in terms of global climate change. From 1901 to 2022, the annual average temperature in China increased by 0.16 °C every 10 years, and the heating rate was significantly higher than the global average level during the same period. Climatic extreme events have shown an increasing trend in China [8]. Second, the Chinese government attaches great importance to addressing climate change. The National Development and Reform Commission and the Ministry of Housing and Urban-Rural Development highlight the participation of multiple actors, such as enterprises, communities, and residents, in the climate adaptation management system, and place greater emphasis on climate risk communication. For the tourism sector, the China National Tourism Administration (now the Ministry of Culture and Tourism) has called for a fuller understanding of the current situation and the characteristics of climate change at the local level, with its severe impacts on the tourism industry. Moreover, tourism is considered an important way to realize urban revitalization in the post-COVID-19 era. The China State Council thus highlights the importance of enhancing the urban tourist experience and advancing the construction of featured urban destinations in the 14th China tourism development plan.

Urban tourism is an emerging but under-explored topic in China. A range of studies have investigated subjects such as tourism planning, image, competitiveness, markets, and attractions. It is worth noting that scholars have recently become aware of environmental issues (such as air quality and carrying capacity) in urban destinations. In terms of climate change and urban tourism, Ge et al. [9] examined the impact of climate change on botanic attractions. Hu et al. [10] investigated the climate risk perception of the tourism sector and its adaptation intention. Yu et al. [11] proposed the holiday climate index:urban and found the severe effect of the future redistribution of tourism climate resources on several major urban destinations. A study by Cheng et al. [12] observed that extreme climate events such as haze-fog weather have significant negative impacts on urban tourism destination choice tendency. The experience of coping with a health crisis (i.e., the COVID-19 pandemic) was discussed with regard to future climate adaptation and mitigation in metropolitan destinations [13]. However, our understanding of the effect of climate change on urban tourism remains limited. As Pandy and Rogerson [13] suggested, there is a “major disconnect” between municipal authorities’ recognition of climate threats and the perceived risk by business tourism stakeholders. In a review of the research into tourism and climate change by Scott and Gössling [14], two types of destinations (urban and island tourism) were identified as a gap that needs be addressed in future research. It is widely acknowledged that the occurrence of, and response to, climate change and related disasters is not only
a natural process, but also closely related to social culture, human behavior, knowledge, and experience [15]. Addressing environmental challenges requires human behavioral change, while human cognition (e.g., risk perception and adaptation appraisal) serves as the fundamental basis for behavioral change. In other words, people are likely to display pro-environment behavior and other protective actions when they are aware of climatic risk and feel capable of dealing with the relevant impacts of climate change. The available studies on resident responses to climate change in urban destinations, particularly in China, are still insufficient.

This study attempted to explore the risk perception and adaptation appraisal of residents and the mechanism of these two constructs in driving people’s adaptation intention in an urban destination setting. Three research objectives were proposed: (1) to understand residents’ perceptions of climate change in urban destinations; (2) to investigate the underlying cognitive mechanics of individuals’ adaptation intentions; (3) to draw lessons from the results to enhance the community resilience and improve the climate governance of urban destinations.

2. Theoretical Background

2.1. Adaptation, Adaptive Capacity, and Perceived Adaptive Capacity

Adaptation has its origins in biology and ecology science. Darwin [16] believed that adaptation is the adjustment of organisms to their environment in order to improve their chances of survival in that environment. This pivotal concept then provided the theoretical foundation for anthropologists to investigate the “human–environment” relationship. Steward [17] used the concept of “cultural adaptation” to describe how a “cultural core” (i.e., regional society) adjusts itself to respond to a changing natural environment. Arguably, adaptive response is an inherent feature of humans [18]. In the climate change context, human systems are expected to respond to climatic stimuli by adjusting functions and behaviors. As one of the two main coping strategies adopted by humans, adaptation is defined by the IPCC [19] as follows: “In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities” (p. 118). Smit [20] proposed a conceptual framework to better understand “what adaptation means” by inquiring “who or what adapts, adaptation to what, how does adaptation occur”, also arguing that adaptation appraisal is needed to answer the question, “how good is the adaptation?”. Building adaptive capacity is of great value to system adaptation. According to Smit and Wandel [21], adaptations are manifestations of adaptive capacity. Among the plethora of scholarly contributions, the terminology from the Millennium Ecosystem Assessment that has been adopted by the IPCC [19] has great implications for knowledge evolution in adaptation, defining adaptive capacity as “the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences” (p. 118). However, “the ability to adjust” has been interpreted from many angles. Some scholars investigated the objective factors (e.g., economy, infrastructure, and technology) influencing adaptive capacity, while other studies highlighted the importance of human cognition from a psychological perspective. Furthermore, in recent years, calls have been made to pay increased attention to individual adaptation, which provides the foundation for actual adaptive behaviors. Perceived adaptive capacity (PAC), or adaptation appraisal, describes how an organism evaluates its capacity to cope with a particular risk. It is imperative to note that “the objective ability or capacity of a human actor only partly determines whether that actor will take an adaptive response” (p. 5) [22]. This has been identified as a research priority by the IPCC and other researchers. In other words, people tend to cope and adapt to changes or impacts when they feel prepared and confident [23,24]. Obtaining more insights into this psychological driver is crucial for building the adaptive capacity of systems to address climate change.
2.2. Tourism and Climate Change Adaptation

The existing literature has investigated the nexus of tourism and climate change adaptation. In terms of “who or what adapts”; business, tourist, and destinations have been examined. For instance, Hu et al. [10] investigated the tourism industry’s perceptions of climate risks and adaptation intentions in China. A study by Wilkins et al. [25] showed the heterogeneity of tourists’ perceptions of the changing climate and weather patterns. The phenomena to which adaptations are made (adaptation to what) have also been examined. A longitudinal approach was adopted to examine how the projected changes to climate would have impacted the 19 previous OWG (Olympic Winter Games) hosts based on two key climate indicators [26]. Tourism communities in YuanYang County in China have a deep understanding of the effects of climatic hazards (drought, flash floods, and landslide disasters) [27]. A study using actual behavioral tracking-based information was conducted to investigate the potential impact of climate change (specifically, summer weather) on tourists’ time–space activities [28]. In regard to “how does adaptation occur?”, Becken and Loehr [29] identified that complementary governance arrangements are a crucial factor for enhancing tourism’s overall ability to address climate change. A variety of approaches have also been proposed to advance the evaluations of adaptations (how good is the adaptation?). Becken et al. [30] developed a framework for assessing tourism–climate change policy integration, which comprised coverage, climate change scope, materiality, and alignment. A study by Scott et al. [31] developed an index system (the Climate Change Vulnerability Index for Tourism), then eight indicators were provided to assess adaptive capacity in terms of the tourism sector and host country. Wu et al. [32] employed Participatory Rural Appraisal (PPA) to analyze the adaptive types and levels of farmers in rural destination. Phenophase–climate change indicators (i.e., variations in the activity timing and habitat pattern of birds) were proposed by Liu et al. [33] to assess the impact of climate change on bird-watching tourism.

In recent years, the lack of community-based adaption in tourism has been noted, and then recognized as an emerging research need. Local communities need to engage in climate change adaptation as they are the most important stakeholder in the sustainable development of tourism. The community-based approach could provide an opportunity for a better understanding of local knowledge, capabilities, priorities, and climatic impacts at the local scale [34]. Furthermore, the challenges (e.g., lack of knowledge and resources) they are facing cannot be ignored [35]. It is worth mentioning that the urgency with regard to conducting more studies in developing countries has been confirmed [36].

2.3. PMT in Tourism

Understanding how and why people react to climate change is perhaps the key to overcoming adaptation barriers, which has been identified as an urgent environmental problem in tourism. Numerous theories and models have been proposed and employed to examine pro-environmental behavior. A recent meta-study documented several theories employed in the existing literature, such as the Theory of Planned Behavior, the Theory of Reasoned Action, the Value-Belief Norm, and the Norm Activation Model, while at the same time, calling for the exploration of other theories and models [37]. Protection motivation theory (PMT), deriving from health science, offers insights into why and how behavior changes when people perceive risk. It attempts to delineate the underlying mechanism of behavioral change: after undertaking the two mediating processes (i.e., risk appraisal and coping appraisal), people then shape their intentions, which normally leads to varying coping behaviors. In this study, risk appraisal is an individual’s assessment of potential climate hazards. It consists of two variables: perceived severity and perceived probability. Adaptation appraisal describes an individual’s judgement of one’s capacity to tackle climate change. According to a review by Floyd et al. [38], “increases in threat severity, threat vulnerability, response efficacy, and self-efficacy facilitate adaptive intentions or behaviors”. Therefore, this study assumes that residents in urban destinations feel inclined to take climate adaptation actions when they perceive a high climate risk and adaptive capacity.
PMT has been applied in health science and has been widely adopted by other disciplines to study protective behaviors such as AIDS prevention [39] and food waste reduction [40]. It also serves as a viable and feasible theoretical tool to explain adaptive behavior [36]. PMT has been recently employed in the tourism context. Most tourism studies have focused on tourists’ risk perception, including norovirus risk, overcrowding risk, environmental risk, and health risk [41–43]. However, it is only recently that PMT has been employed and tested in tourism adaptation [44]. In addition, major constructs, including perceived severity, perceived efficacy, behavioral intentions and their relationship, have been identified and examined. However, a partial list of the components of protection motivation theory have been tested in the existing tourism literature [43]. A number of constructs, such as information and adaptive incentives, still require more examination to expand the current body of literature and knowledge. According to Dietz et al. [45], more information could result in an increasing awareness of the impacts of climate change (i.e., risk perception). Moser and Ekstrom [46] also argued that communication and information are perpetually needed aspects of the adaptation process. For instance, a weather–proximity–cognition framework was developed to provide pivotal information in regard to climatic changes for enhancing business decision-making [47]. In summary, how people obtain and comprehend information on climate risk will influence their risk perception and their evaluation of their coping ability with regard to climate risks. Furthermore, the role of incentives cannot be ignored in climate adaptation. As Becken and Loehr [29] argued, an enabling environment is required to intensify climate adaptation action. Singh [48] pointed eliminating information and communication asymmetry should be a top priority for policy intervention. The provision of an enabling environment increases the effectiveness of climate adaptation by supporting policy, information technology, finance, etc. In addition, the influence of social norms on climate-related behaviors has also been documented in the existing research. People tend to perform or avoid a behavior when they perceive social pressure from other important people (e.g., relatives and friends) [49]. It is of note that social norms played a mediating role between flood insurance decisions and risk perception in climate adaptation [50]. Neef et al. [51] found that communities’ adaptation strategies were embedded in a complex set of social norms and cultural values. The important role of celebrities in shaping moral and social norms was also identified by Gössling [52]. However, few studies have included the two constructs, despite their importance. Therefore, this study attempts to make a contribution to a more comprehensive framework by absorbing the two factors.

Hypotheses

Based on above literature review, seven hypotheses are proposed (Figure 1):
Information has a positive and significant impact on residents' climate risk appraisal.

Information has a positive and significant impact on residents' climate adaptation appraisal.

Risk appraisal has a positive and significant impact on residents' adaptive intention.

Adaptation appraisal has a positive and significant impact on residents' adaptive intention.

Adaptive incentive has a positive and significant impact on residents' risk appraisal.

Adaptive incentive has a positive and significant impact on residents' adaptation appraisal.

Adaptive incentive has a positive and significant impact on residents' adaptive intention.

3. Methods

3.1. Case Area

The urban destination of Chang-Zhu-Tan (i.e., Changsha, Zhuzhou, and Xiangtan, three cities in middle China) has been chosen for two reasons. First, the tourism industry has played a critical role in the socio-economic development of CZT. In 2018, CZT welcomed a total of 273.8 million tourists. Tourism revenue reached CNY 301.682 billion (approximately USD 42 billion), accounting for 36.1% of the tourism revenue for Hunan and 19.1% of the GNP of CZT. Second, global warming has become increasingly urgent and pressing in recent years. The current facts regarding climate change in the Chang-Zhu-Tan (CZT) urban agglomeration include the fact that the temperature has increased significantly in winter and spring. Specifically, the number of days with low temperatures has declined, but there have been interdecadal fluctuations in the number of days with high temperatures. Similar trends have also been shown in the amount of precipitation and the number of precipitation days. Moreover, the wind speed has decreased dramatically, while the annual number of haze days has increased greatly [53]. Climate change has had both “fast and slow” impacts on the CZT urban destination. The “fast” impact refers to climatic shocks such as extreme events. For instance, with the heavy rains experienced in Hunan Province, the hydrometric station by the Xiangjiang River in Changsha witnessed a record of 39.49 m in July 2017, which was the highest level recorded in history. The flood even submerged the most famous scenic spot in Changsha, Orange Island. More than 200 tourism attractions in Hunan Province were temporarily closed, of which about 23 scenic spots in the CZT area were suspended. The “slow” impact represents residual climatic change including inter-annual variability, which has also been noted. This may lead to the diminution of the tourism product and environmental services in urban destinations. For example, the wetland landscape in this region is rapidly decreasing and becoming fragmented. In summary, to address climate change, the importance of community and individual engagement in climate governance has been highlighted. Therefore, a close inquiry into the climate risk perceptions of residents and their intention to take adaptive actions is of great value in urban destinations.

3.2. Data Collection

This study employed a self-administered questionnaire to collect research data. To respond to the requirements of social distancing during the COVID-19 pandemic, web-based questionnaires were produced then distributed to respondents (i.e., residents in CZT) using sampling commercial services from June to July 2021. A cross-sectional survey was conducted online with Wenjuanxing, using the convenience random sampling method. Wenjuanxing, similar to Qualtrics, SurveyMonkey, or CloudResearch, is the largest online survey company in China. The Wenjuanxing sample database covers over 6.2 million high-quality respondents. Members of the platform are from all regions of China and engage in a variety of occupations, allowing for an authentic, diverse, and representative sample. More than 172 million questionnaires have been issued from Wenjuanxing in China in their research. The target population in the present study was Chinese adults living in
the Chang-Zhu-Tan urban destination. A total of 479 questionnaires were confirmed as valid after careful screening.

3.3. Measurement

The questionnaire comprised several parts. First, based on previous studies [54,55], the construct of information was measured by five items: In terms of information, I already have a general understanding of the threats posed by climate change/learned to prepare for climate risks/information about climatic dangers from a variety of sources/actively seek out relative information/seen others mobilize themselves to respond to climatic events (1 = strongly disagree, 5 = strongly agree). The remaining constructs were measured utilizing previous literature from the PMT [56,57]. Specifically, the likelihood of perceived climate change included the following five items: What is the possibility that climate change will get worse? To what extent will climate change impact urban residents’ health? To what extent will climate change impact urban residents’ productive and living activities? To what extent will climate change impact the urban ecological environment? To what extent will climate change impact urban attractions and facilities? (1 = impossible, 5 = certain). The perceived severity of climate change included the following five items: Overall, the impact of climate change will be... and I feel the effects of the changing climate on health and living activities/production activities/ecological environment/attractions and facilities will be... (1 = not negative at all, 5 = very negative/dangerous). Adaptation intention is measured by asking respondents three questions [58]: The government should implement technical safeguards/institutional measures/infrastructure investments to adapt to a changing climate (1 = strongly disagree, 5 = strongly agree). Drawing from existing studies [56,59], five items were used to measure adaptive incentives: To combat climate change, our city has a well-defined road-map/supported tourism industry with valuable advice/offered tourism industry financial support; concern about climate threats has been sparked by my corporation’s advocacy of climate-friendly growth; and my concern about climate threats is a result of other people’s preference for more environmentally friendly and climate-resistant goods (1 = strongly disagree, 5 = strongly agree). The background section collected demographic details including age, education, length of residence, and work organization.

3.4. Data Analysis

SPSS 26.0 was applied to conduct descriptive statistics and EFA (Exploratory Factor Analysis). AMOS 26.0 was employed to perform CFA (Confirmatory Factor Analysis) and SEM in this study.

3.5. Descriptive Statistics

As shown in Table 1, the majority of the 479 respondents were women (62%). More than half of the respondents had lived in CZT for more than ten years (approximately 55%). In terms of age, the 25–35 age group was the most represented (41%). The education level was mainly college/university, accounting for more than 70%. Nearly 22% of the respondents worked in party and government organizations, followed by commerce and service industry and technicians. The sample was fairly representative overall.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
<th>Demographic Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>Length of residence</td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>182</td>
<td>38</td>
<td>&lt;5</td>
<td>110</td>
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<tr>
<td>Female</td>
<td>297</td>
<td>62</td>
<td>6–10</td>
<td>104</td>
<td>21.71</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>11–19</td>
<td>101</td>
<td>21.09</td>
</tr>
<tr>
<td>18–24</td>
<td>171</td>
<td>35.7</td>
<td>&gt;20</td>
<td>164</td>
<td>34.24</td>
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<tr>
<td>25–35</td>
<td>197</td>
<td>41.13</td>
<td>Organization</td>
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Table 1. Summary of respondents’ demographic characteristics (N = 479).
### Table 1. Cont.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
<th>Demographic Characteristics</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>36–44</td>
<td>76</td>
<td>15.87</td>
<td>Party, government and public institutions</td>
<td>106</td>
<td>22.13</td>
</tr>
<tr>
<td>45–54</td>
<td>24</td>
<td>5.01</td>
<td>Business and service</td>
<td>86</td>
<td>15.87</td>
</tr>
<tr>
<td>&gt;55</td>
<td>11</td>
<td>2.3</td>
<td>Technician</td>
<td>86</td>
<td>15.87</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>Farmland, forestry, livestock and fishing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>9</td>
<td>1.88</td>
<td>Retiree</td>
<td>32</td>
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<tr>
<td>High school</td>
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<td>Student</td>
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<td>University</td>
<td>336</td>
<td>70.15</td>
<td>Other</td>
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<tr>
<td>Post graduate</td>
<td>100</td>
<td>20.88</td>
<td></td>
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</tbody>
</table>

### 4. Results

#### 4.1. Perception of Climate Impacts and Adaptation

In terms of climate hazards and impacts, the survey showed that approximately 92.07% of respondents shared an experience of rainstorms (Figure 2), followed by frost (49.9%), snowstorms (39.04%), heat waves (47.81%), flood (51.98%), drought (35.07%), typhoon events (21.92%), and bush fires (6.68%). Few respondents (1.25%) had experienced beach erosion or sea level rises. As shown in Figure 3, the majority of respondents believed that most climate-related disasters would have a serious impact on their cities/regions except beach erosion, mountain fires, and sea-level rises. Most respondents affirmed the catastrophic effect of climate change and believed that the climate change impact on urban destinations would worsen (Figure 3). Figure 4 depicts respondents’ perception of climate preparedness and adaptations. More than half (55.53%) reported that they had good engagement with climate change information. In regard to adaptation appraisal, about 70% of the survey participants felt capable of addressing climate change. Moreover, adaptive incentives had been observed by about two-thirds (64.93%) of the participants. As depicted in Figure 5, the analysis revealed no significant differences in the residents’ responses when stratified by age or gender groups. Notably, the age group labeled as “55 or above” exhibited the highest mean score of 6.18, while the “18–24” age group displayed relatively lower scores, with a mean of 5.4. The adaptation intention scores of both genders exhibited a high degree of similarity, suggesting that both groups display comparable levels of intention to adapt.

![Figure 2](image_url) Residents’ report on their climate change experiences.
4.2. Measurement Model

EFA was performed first to investigate the internal structure of the constructs using SPSS 26.0 software. The Kaiser–Mayer–Olkin (KMO) test yielded a promising result of 0.897, higher than the threshold value of 0.7 [60]. The Bartlett test’s p value was less than 0.000, suggesting that the data could be used for factor analysis. Five common factors were extracted with eigenvalues greater than 1: 9.031, 4.383, 1.754, 1.738, and 1.219, respectively.
The variances were 32.255%, 15.653%, 6.264%, 6.207, and 4.611%, respectively. The five factors totally interpreted 64.989% of the variance. Each item had a factor loading above 0.500, thus there was no need to remove any items.

The fitting degree of the CFA model was not ideal initially ($\chi^2/df = 3.889$, GFI = 0.834, RMSEA = 0.089, NFI = 0.841, IFI = 0.8777, TLI = 0.862, CFI = 0.876). The researchers therefore used the modification index (MI) provided by Amos 26.0 to adjust and improve the theoretical model. Some items (i.e., RA3, RA5, ADS5, AD5) were deleted during model revision based on Hair’s suggestion. The model then yielded a reasonably good model (Table 2). The model’s fitting indices, as reported in Table 2, indicate a strong level of fit. The $\chi^2/df$ ratio was calculated to be 2.504, which is below the recommended threshold of 3, suggesting a favorable fit. Similarly, the RMSEA value of 0.053 fell below the threshold of 0.080. Furthermore, the fit indices GFI, NFI, IFI, TLI, and CFI all exceeded 0.900, indicating a high level of congruence between the model and the observed data. Additionally, RFI reached values of 0.893, which approached the desired threshold of 0.900. Therefore, an effective and simplified measurement model was determined.

Table 2. Summary of EFA and CFA.

<table>
<thead>
<tr>
<th>Item</th>
<th>EFA</th>
<th>CFA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Information</td>
<td>Risk Appraisal</td>
</tr>
<tr>
<td>IF1</td>
<td>0.765</td>
<td>0.743</td>
</tr>
<tr>
<td>IF2</td>
<td>0.740</td>
<td>0.762</td>
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<tr>
<td>IF3</td>
<td>0.841</td>
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<td>IF4</td>
<td>0.842</td>
<td>0.686</td>
</tr>
<tr>
<td>IF5</td>
<td>0.716</td>
<td>0.679</td>
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<tr>
<td>RK1</td>
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<td>RK2</td>
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<td>0.727</td>
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<td>RK3</td>
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<td>0.722</td>
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<td>RK5</td>
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<td>RK6</td>
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<td>RK8</td>
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<tr>
<td>AA 2</td>
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<td>0.814</td>
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<tr>
<td>AA 3</td>
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</tr>
<tr>
<td>AA 4</td>
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<td>ADS2</td>
<td>0.826</td>
<td>0.876</td>
</tr>
<tr>
<td>ADS3</td>
<td>0.800</td>
<td>0.794</td>
</tr>
<tr>
<td>ADS4</td>
<td>0.670</td>
<td>15.095</td>
</tr>
</tbody>
</table>

Note: $\chi^2/df = 2.504$, GFI = 0.904, RMSEA = 0.053, NFI = 0.906, RFI = 0.893, IFI = 0.941, TLI = 0.933, CFI = 0.941.

Cronbach’s alpha (CA) and composite reliability (CR) were employed to evaluate the validity of the latent variables in the model. The CA values of each construct were all above 0.8, which fit the criteria (i.e., >0.7), ranging from 0.807 to 0.912. The CR values of every construct were all higher than 0.6 (Table 2). The discriminant validity was confirmed because the square roots of the average variance extracted (AVE) values were higher than the correlations between the corresponding variable and any other variables (Table 3). All factor loading of items and most AVE values were above 0.5, except the dimension of adaption appraisal, which was slightly below 0.5, supporting the convergent validity.
Table 3. Discriminant validity of constructs.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information</td>
<td>0.735</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Risk appraisal</td>
<td>0.310</td>
<td>0.772</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Adaptation appraisal</td>
<td>0.516</td>
<td>0.298</td>
<td>0.697</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Adaptive incentives</td>
<td>0.550</td>
<td>0.524</td>
<td>0.513</td>
<td>0.788</td>
<td></td>
</tr>
<tr>
<td>5. Adaptation intention</td>
<td>0.508</td>
<td>0.381</td>
<td>0.588</td>
<td>0.503</td>
<td>0.797</td>
</tr>
</tbody>
</table>

Note: The matrix’s lower triangle displays inter-factor correlations. The square root of the average variance extracted (AVE) values for the relevant construct is shown by the bold diagonal elements.

4.3. Hypothesis Testing

The results of the structural model analysis indicate that the model fits well with the data ($\chi^2$/df = 2.543, GFI = 0.902, RMSEA = 0.056, TLI = 0.931, CFI = 0.939). Figure 6 depicts the findings of the structural model, delineating the relationship between the latent variables in our extended theoretical framework based on the PMT model. All hypotheses were supported and are summarized in Table 4.

Figure 6. The empirical results of the theoretical model. Note: *** indicates the path is significant at 0.001 level.

Table 4. Overview of hypothesis testing.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Relationship</th>
<th>Path Coefficient</th>
<th>t-Value</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Information → residents’ risk appraisal.</td>
<td>0.327</td>
<td>6.100</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>Information → residents’ adaptation appraisal.</td>
<td>0.354</td>
<td>5.388</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>Risk appraisal → residents’ adaptation intention.</td>
<td>0.218</td>
<td>4.840</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>Adaptation appraisal → residents’ adaptation intention.</td>
<td>0.413</td>
<td>6.512</td>
<td>Supported</td>
</tr>
<tr>
<td>H5</td>
<td>Adaptive incentives → the levels of information.</td>
<td>0.558</td>
<td>9.759</td>
<td>Supported</td>
</tr>
<tr>
<td>H6</td>
<td>Adaptive incentives → residents’ adaptation appraisal.</td>
<td>0.327</td>
<td>5.185</td>
<td>Supported</td>
</tr>
<tr>
<td>H7</td>
<td>Adaptive incentives → residents’ adaptation intention.</td>
<td>0.247</td>
<td>4.427</td>
<td>Supported</td>
</tr>
</tbody>
</table>
5. Conclusions and Discussion

Climate change communication and community-based adaptation have been recognized as urgent issues and an imperative research priority in recent years. Exploring residents’ climate risk perception and adaptation intention provides an opportunity for a better understanding of the local knowledge, individual experiences, and capacities in urban communities. This research suggests a bottom-up theoretical model based on the PMT model to investigate the underlying process of climate adaptation. The finding contributes to the existing literature by investigating individuals’ understanding of climate risk in China. Moreover, some important constructs have been introduced into this study to extend the PMT. Our findings reveal that most respondents are concerned about climate change, and report the localized climate impacts on urban destinations, such as heavy rain and heat waves, consistent with the results of the existing studies [10,61]. The results from this study support seven research hypotheses. Information has been observed as an influencing factor in increasing risk appraisal and adaptation appraisal. Similar to previous studies [62,63], it was found that climate change information accessibility could raise public awareness and individuals’ self-efficacy. People are expected to take adaptive measures, either when they feel more threatened from climate risk or when they have a higher perceived adaptive capacity. This finding supports prior studies [64,65]. The findings lead to the conclusion that both risk perception and self-efficacy are important motivating factors in enhancing the adaptation intention of residents in urban destinations, which also confirms the usability of PMT in cases of climate risk. The role of adaptive incentives in raising public risk perception, improving the public’s perceived adaptive capacity and increasing their intention to address climate change was identified in this study. This is in line with the findings revealed by Luo et al. [56] and Mbow et al. [66].

5.1. Theoretical Contribution

This study contributes to the existing body of knowledge in three ways. First, the urban community has been rarely discussed in the existing literature, despite their pivotal role in destination climate adaptation. Community-based adaptation is fundamentally a positive response of communities to natural disasters and environmental change. This response depends on the actors’ perception of the environment and the disasters. Therefore, a close investigation into urban communities’ perceptions of climatic impacts and adaptation could improve our understanding of the underlying mechanism of adaptation behavior. Second, PMT was employed and tested in the context of tourism adaptation. Most studies have used theories such as TPB (Theory of Planned Behavior), VBN (Value-Belief-Norm), and NAM (Norm Activation Model) to investigate environmentally relevant behaviors. However, Loureiro et al. [37] called for more theories and models to enhance our understanding of pro-environment behavior. In a meta-analysis by Van Valkengoed and Steg [36], PMT was recommended as a reasonable theory to explain adaptive behavior. This study therefore attempts to employ constructs from PMT (e.g., risk perception and perceived self-capacity) to analyze the adaptation mechanism of urban residents. In other words, it contributes to theory testing [67]. Third, PMT has been extended by including the under-studied motivational factors, such as information and adaptive incentives. It is noted that what and how climatic information is received play a critical role in explaining adaptive actions, but are relatively under-explored. As Clayton [68] argued, placing information as a high priority could be helpful in overcoming cognitive limitations. Adaptive incentives have also been proved to have an influence on people’s adaptation intention with regard to climate change. Specifically, this construct’s measurement has been improved and supplemented from social norms. Integrating information and adaptive incentive into PMT could improve the accuracy with which this theory predicts adaptive behavior.

5.2. Management Implication

Communication about climate change has been proven to be of great value in this study. Our findings could boost climate education for urban communities, encouraging
them to take adaptation actions in the future. First, municipal policymakers should ensure that the programs aimed at increasing residents’ climate risk perception are in line with the latest scientific progress. Moreover, informing people about the protective and adaptive behaviors they could undertake could be more effective than apprising them of the catastrophic climate impacts. Second, policymakers should utilize multiple channels to disseminate complex information to strengthen the effectiveness of climate communication. Third, policymakers should promote the integration of government climate service platforms, community sensor facilities, and home terminals. This integration will enable the development of people-centered services within communities, such as intelligent warnings, emergency rescue measures, and post-disaster psychological recovery initiatives.

Social norms were introduced and tested as a powerful predictor of adaptation intention in this study. Policymakers can play a crucial role in establishing a “climate community” that attracts greater attention from urban communities towards positive descriptive social norms. This influence has the potential to inspire and impact other residents and communities. For instance, good climate adaptation practices adopted by urban communities should be advertised by local authorities through slogans, broadcasts, mobile messages, etc., to enhance the residents’ perception of descriptive social norms corresponding to climate-proof behaviors. The government could formulate the implementation of reasonable climate adaptation standards, and take appropriate measures to distribute these standards, fostering residents’ injunctive social norms for climate adaptation. For instance, in China’s National Climate Change Adaptation Strategy 2035, good examples of climate adaptation practice are encouraged to be exchanged and promoted.

An enabling environment demonstrates the value of improving climate awareness and action. Decision-makers can effectively leverage policy tools from three specific aspects: command-and-control regulation, incentives policies, and voluntary participation [69]. Command-and-control regulation has the characteristics of strong binding and a rapid effect. It includes a series of strategic plans, laws, and technical standards. The strategic plan is mainly used to clarify the future development direction of the socio-ecological system, and has been identified as powerful regulations. For instance, to build a climate-resilient society, it is pivotal to develop strategies by integrating a destination’s climate adaptation and tourism’s sustainable development. Incentive tools such as the eco-compensation mechanism could boost stakeholders’ involvement by coordinating their interests and then promoting the destination’s adaptation to climate change. Environmental protection NGOs (Non-Governmental Organizations) also can be developed to promote a destination’s adaptive governance system by providing climate propaganda and education to residents.

Generally, integrated solutions are more effective for enabling urban destinations to cope with climate change. Enhancing climate risk awareness and building the adaptive capacity of residents have proved to be crucial ingredients in adaptation actions. It is imperative and reasonable to develop a multi-level adaptive governance network comprising government, the tourism industry, and the urban community. Although climate change is a worldwide issue, actions and solutions are to be found at all scales [70]. As Reischl et al. [71] argued, the most effective way to enhance climate change adaptation is through strong networks. These networks could coordinate the different roles of stakeholders, and manage climate risks by identifying their functions and capabilities. The responsibility of these networks is to promote climate actions at multiple levels [72]. Specifically, local governments need to provide an enabling environment by advancing policy tools and public services [73]. Climate communication (i.e., climatic information, adaptation technology, and financial loans) could be facilitated by the interaction of network actors through workshopping ideas and practices.

5.3. Limitation and Future Research

This study investigated the cognitive processes driving residents’ intention to make climate adaptations in urban destinations based on the protection motivation theory. However, several limitations remain, despite the empirical contributions of this paper. First, this
study focuses on the adaptation intention of urban residents instead of their real adaptive behaviors. Second, future research may benefit from a longitudinal approach. Third, protection motivation theory could be improved by combining relative theories and including more critical constructs in future studies. For instance, absorbing the affect and emotion with regard to climate change, which have been found to be powerful drivers of climate change perception and action, could promote further climate interventions [74].

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data is unavailable due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

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