

Sustainable Tourism in Antarctica: A Case Study of Tourism's Impact on the Ecosystem of Antarctica

Yueqi He

ID: 18035171

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Supervisor: Dr Claire Liu

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ABSTRACT

With the development of technology and infrastructure and increasing interest in the polar areas, Antarctic tourism has grown fast in recent years. Antarctica is inevitably facing more difficult and complicated challenges; therefore, some scholars and researchers have a pessimistic view on such rapid growth of tourism. The aim of this study is to explore the environmental impacts brought by Antarctic tourism and sustainable tourism in the Antarctic. Using secondary sources of information, this qualitative study collected data from the social media platforms of Zhihu and Mafengwo. The tourists' comments on Antarctic experiences were analysed using thematic analysis. The results showed the real situation of Antarctic tourism and the development of sustainable tourism in the Antarctic. Combining secondary information and the stories shared by the tourists online, the study contributes to knowledge and understandings of Antarctica tourism and the impacts of developing sustainable tourism in Antarctic.

Keywords: Antarctica, Antarctic tourism, environmental protection, impacts, Antarctic tourists, experiences, tourism development, sustainable tourism.

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ATTESTATION OF AUTHORSHIP

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed:

Name: Yueqi He

Date: 03/11/2020

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Chapter 1. Introduction

1.1 Background

Until the 18th century, Europeans had only basic navigation technology to explore the Antarctic area. From 1772 to 1775, Captain Cook led an expedition team to explore the Southern Hemisphere. On 17 January 1773, Captain Cook became the first person to cross the Antarctic circle, but failed to find the Antarctic land (Gurney, 1997). The first man who actually saw the Antarctic land was an Estonian, who saw it on 27 January 1820. From 1838 to 1839, an American, Charles Wilkes, conducted further explorations of Antarctica (Gurney, 1997), though this is not accepted by all historians (Bourke, 2004). The first person who arrived at the South Pole was the Norwegian, Roald Amundsen. Amundsen travelled by an expedition ship, the *Fram*, in June 1910, and reached Antarctica in January 1911. The expedition team members were equipped with skis and dogs for pulling sleds. They spent the winter in their base, and on 20 October 1911 Roald Amundsen and his four other team members, Olav Bjaaland, Helmer Hanssen, Sverre Hassel, and Oscar Wisting, set out for the South Pole. They finally reached the South Pole on 14 December 1911 (Gurney, 1997). Caroline Mikkelsen became the first woman who landed on Antarctica, in 1935. In 1944, due to military requirements, the British became the first people to establish a permanent base there (Bourke, 2004). The Australians established a scientific base in 1954, and other countries followed soon after. Now, many countries maintain bases in Antarctica. Until 1961, the Antarctic Treaty decreed that Antarctica was to be used only for scientific and peace-making purposes (Bourke, 2004).

1.2 The Antarctic Treaty, ATS, and IAATO

The Antarctic Treaty was drawn up in 1959 and came into force in 1961. It sought to conserve Antarctica and is regularly revised. In December 1959, 12 countries that were conducting scientific research in Antarctica, signed an international agreement known as the “Antarctic Treaty.” This came into force in June 1961 (Kruczek et al., 2018), and created an unprecedented global partnership which now includes more than 50 countries.

The Antarctic is the only uninhabited continent, and its political and legal status is defined by the Antarctic Treaty (Kruczek et al., 2018). The Antarctic Treaty Parties and the International Association of Antarctica Tour Operators (IAATO) come together once a year at the Antarctic Treaty Consultative Meeting (ATCM) to provide advice on tourism-related issues and solve the management problem of human activity in the Antarctic. In recent years, the ATCM provided many general suggestions for visiting the Antarctic areas, focussing on mitigating adverse impacts on the Antarctic environment, or on its aesthetic and scientific values (IAATO, 2020). In 2011, the Antarctic Treaty Parties implemented the Antarctic Treaty and its Environment Protocol into domestic laws. Domestic laws are needed to establish their own systems of rules for activities in Antarctica (IAATO, 2020). The Treaty states that, for the interests of humans, Antarctica can be used only for peaceful projects and purposes such as bona fide tourism and scientific research. The treaty was to remain in force for a period of 30 years initially. In 1991, the “Protocol on Environmental Protection to the Antarctic Treaty,” also known as the “Madrid Protocol,” added to the Antarctic Treaty and extended its validity period for another 50 years (Kruczek et al., 2018).

The Antarctic Treaty System (ATS) is a set of the complex system for the protection of Antarctica. The purpose of the ATS is to coordinate and mediate relationships among countries to protect Antarctica together. The ATS includes the Antarctic Treaty, recommendations adopted at the ATCM, the Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol), conventions for the Conservation of Antarctic Seals, and conventions for the Conservation of Antarctic Marine Living Resources (US Department of State). The Antarctic Treaty System encompasses 50 countries, and in over 50 years it has prevented attempts to seize parts of Antarctica as territorial claims. The ATS regulates a set of standards for all human activities in Antarctica (Secretariat of the Antarctic Treaty, 2017).

The International Association of Antarctica Tour Operators (IAATO) was founded in 1991. Its mission was to advocate and promote safe and environmentally responsible travel in the Antarctic. Therefore, coordination and mediation of tourism activity in

Antarctica is implemented by IAATO (Kruczek et al., 2018). To minimise the adverse impacts of tourism on the natural environment of Antarctica, IAATO manages and supervises tourists' activities, tourism projects, and safe distances to be maintained from wild animals. Effective visitor and environmental managements in Antarctica rely on continued endeavour and collaboration among the IAATO, other environmental organisations, and the Antarctic Treaty Parties. Members of IAATO work together to implement and develop operational procedures, guidelines, and membership requirements that fulfil their mission, while ensuring that visitors have a safe and enriching wilderness experience (Kruczek et al., 2018).

1.3 The Development of Tourism in Antarctica

Tourism in the Antarctic has a long history dating back to the end of the 19th century. According to IAATO, in early times, the aims of exploring Antarctica were to undertake scientific studies and geographical surveys, as well as hunt seals and whales. In 1882, tourists began to land on the sub-Antarctic islands, and by 1933, most sub-Antarctic islands had already been visited by tourists (Headland, 1994). When the Antarctic Treaty was signed in Washington in 1959, Antarctica became a place devoted to peace and science. In 1966, the explorer Eric Lindblad, led the first travellers' expedition to Antarctica on a cruise ship (IAATO, 2009).

With increasing interest in the Antarctic areas and the development of technology and infrastructure, Antarctic tourism has grown greatly over the past two decades. IAATO reported that 33,054 visitors landed on the Antarctic area in 2007 and 2008. This number more than doubled from 2002 and 2003 to 2007 and 2008 (IAATO, 2009). Furthermore, in 2007 and 2008, 13,015 visitors arrived but did not go ashore on the Antarctic land, but stayed on their ships. These ships carried more than 27,000 crew members in 2007 and 2008 (IAATO, 2009). Recent statistics show that the number of tourists going to the Antarctic has increased; 36,702 tourists travelled to Antarctica in 2015, and 51,707 in 2018 (IAATO, 2020). Statistics show that Australia, China, and the United States (US) are the main sources of Antarctic tourists, accounting for 11%, 16%, and 30%

respectively, in 2018. In comparison to a few years ago, the proportion of Chinese tourists travelling to Antarctica has increased rapidly. This frozen, beautiful, mysterious, and isolated land constantly attracts tourists from different countries and provides them with opportunities to view dramatic scenery, interact with the natural heritage, and understand the special wildlife in Antarctica (Powell et al., 2015).

In January 2020, the cruise ship *Coral Princess* sailed into the Antarctic waters at a price of under US\$ 4,000 per tourist. This price was significantly cheaper than most Antarctic expeditions, as normally the price of Antarctic exploration is more than three times this amount (McClanahan, 2020). This indicates that Antarctic exploration is now available to many people and becoming mainstream. Against this background, Antarctica is inevitably facing more complicated and tough challenges due to the growing popularity of Antarctic tourism. Concerns were raised by scholars and researchers concerned about such rapid growth of Antarctic tourism (McClanahan, 2020), as tourism had already brought negative impacts to this unique and fragile area. For example, there were carbon emissions with every arrival, oil spills and sewage pollution from a large number of cruise ships, and threats to wildlife. Antarctica's main attractions are unique wildlife and scenery, which are in demand by photographers. While the development of Antarctic tourism has created tourists' environmental protection awareness and provided the opportunity for some tourists to become the image ambassadors of the Antarctic, the damages to the ecological environment are still found to be negative (Lei et al., 2020).

According to the Antarctic and Southern Ocean Coalition (ASOC), many people worried that mass tourism had arrived in Antarctica, because mass commercial tourism requires a set of systematic checks, controls, and supervisions (Abdullah & Shah, 2018). Large numbers of people have already landed at crucial wildlife habitats and historic sites. Moreover, ASOC reported that some tourism operators frequently bring over 100 passengers, which is in contradiction to IAATO's protocols, which are not legally binding on tourism operators. There is a lack of external force in ensuring conformity to the protocols (Abdullah & Shah, 2018). ASOC claimed that the size of cruise ships needs to be considered, because larger ships bring more significant risks of marine pollution.

Although IAATO's self-regulatory guidelines is an "industry group that has resolved to set the highest possible tourism operating standards in its effort to protect Antarctica," they fail to bridge the gaps in the policy framework (Abdullah & Shah, 2018). Members who violate the treaty or regulations can have their membership status changed or be reprimanded, expelled, or put on probation, after the consideration of Membership and Executive Committees (Abdullah & Shah, 2018). However, membership of IAATO is not obligatory, which means operators can use common resources held by other members of IAATO without conforming to management and maintenance rules. Therefore, it is difficult to monitor tourists' activities (Abdullah & Shah, 2018).

1.4 The Significance of the Study

Antarctica is a popular international tourist destination. The purpose of this study is to analyse the Antarctic's tourism issues and sustainable tourism in the Antarctic. While Antarctica tourism is popular, little research has been conducted on the current situation of Antarctica tourism and the impacts on the sustainable development of the Antarctica destination. The findings of this secondary research provide insights from online participants who have visited Antarctica and shared their stories of what that happened in the Antarctic, which is helpful to learning the current situation of Antarctic tourism. This study can supplement work on the impacts of the development of Antarctic tourism, as well as provide new ideas about sustainable tourism in the Antarctic. With the development of science and technology, Antarctic tourism has become a prosperous venture. However, there are numerous environmental problems that need to be considered and resolved by humans, in addition to this aspect, the eco-environment of Antarctic is seem as one of the most important elements that influences global environment (Farreny et al., 2011). These reasons all lead to that the study focusing on sustainable tourism in Antarctica. The research questions of this study are: "what is the impact of the development of Antarctic tourism on Antarctica, what is the present situation of sustainable tourism in Antarctica, and what are the impacts of sustainable tourism on the development of Antarctic tourism? Secondary data for this qualitative study were collected from online postings on two social media platforms: Zhihu and Mafengwo.

These two applications are well-known sources of information and networks for Chinese tourists to use to share their travel experiences. The target samples were people who had been on an Antarctica tour and posted comments online that were relevant to the research questions. The data were analysed using thematic analysis.

1.5 Structure of the Dissertation

This dissertation is presented in six chapters. This chapter started with a background to the Antarctica and information about the Antarctic Treaty, ATS and IAATO, followed by the development of tourism in Antarctica as a destination. It then provided the research aim, research questions, and explained the significance of this study. The next chapter reviews literature relevant to the research topic. Chapter 3 describes the methodology and process of data analysis, and Chapter 4 presents the results. Chapter 5 discusses the findings in relation to the literature and previous studies, and the final chapter presents the conclusion and implications for future research on Antarctic tourism.

Chapter 2. Literature Review

2.1 Introduction

This literature review evaluates past research in order to explore new research topics. The main content of the literature review includes tourism in Antarctica; the Managerial System of Antarctic Tourism; stakeholders of Antarctic Tourism; and sustainable tourism in Antarctica, to help understand Antarctic tourism. The purpose of the literature review is to explore the development and impact of Antarctic tourism and identify the gap filled by the current research.

2.2 Tourism in Antarctica

Antarctic tourism refers to tourism companies, who are authorised by the Antarctic Treaty and are permitted to organise tourism activity in Antarctica (Rubin, 1996), and dates back to the 1960s. Since 1991, the International Association of Antarctica Tour Operators (IAATO) has been carefully monitoring, analysing, and reporting on Antarctic tourism. In 2018 and 2019, 56,168 people travelled to Antarctica by cruise ship, including 10,889 visitors who travelled by ship but did not set foot on the Antarctica continent (IAATO, 2020). Antarctica accepts relatively few visitors compared to other tourist destinations, but its unique characteristics need more rigorous regulations, monitoring, and safeguards (IAATO, 2020).

2.2.1 The Current Situation of Antarctic Tourism

Understanding the current situation of Antarctic tourism help this study to answer the research questions and identify the gap for the current research. Although Antarctic tourism is developing rapidly, Amelung and Lamers (2006) reported that the Antarctic Treaty System (ATS) has not yet built a comprehensive regulatory system on Antarctic tourism. The system of self-regulation supervised by IAATO is under enormous pressure with the development of Antarctic tourism. The current situation described by Amelung and Lamers (2006) helps researchers understand the impact of Antarctic tourism. They

applied the “integrated participatory scenario development” method as a tool to explore the project named “Adventure, tourism, and leisure in Antarctica: Towards integrated scenarios.” This methodology has been used in many scientific projects, and generally takes place in small groups or stimulates stakeholders and policymakers to participate actively to obtain unexpected ideas (Amelung & Lamers, 2006). Amelung and Lamers (2006) offered many new insights for Antarctic tourism development, to help stakeholders and policymakers prepare for a wide range of eventualities. These insights are also helpful to this study by providing ideas for solving the research problem.

Haase (2005) summarised some weaknesses of the current management system of Antarctic tourism. Through considering and discussing these weaknesses in management, researchers can remedy managerial limitations and mitigate the adverse impacts of Antarctic tourism. Haase (2005) questioned the effectiveness of the overall management system as well as presenting the actual and potential impacts of Antarctic tourism. He suggested that there needs a thorough investigation of tourism impacts as well as an appropriate monitoring system for tourism activities (Haase, 2005). Haase’s study indicated the importance of analysing the merits and weaknesses of the current Antarctic Treaty System regulation for tourism and industry self-regulation, and revealed the issues associated with tourism management in Antarctica.

2.2.2 Examples of Antarctic Tourism

The current situation of Antarctica tourism can be explained using the practical example of Barrientos Island, located in the Antarctic Peninsula. The reasons for its popularity are that Barrientos Island has rich biodiversity and many unique geological features (Cajiao et al., 2020). Cajiao et al. (2020) demonstrated that the development of tourism puts pressure on the environment at Barrientos Island as well affecting the eco-environment by disturbing wildlife. It was found that there are some non-native species of flora existing on this island and widely distributed on the island and in the nearby sea; the presence of these non-native species may affect the native species. Moreover, in the main locations of tourists, wildlife viewing may disturb wildlife even if tourists keep their distance

(Cajiao et al., 2020). Furthermore, Cajiao et al. (2020) found that tourism activities, to some extent, destroy the vegetation and soil on Barrientos island. They considered that understanding the relationship between the environment and tourism development will provide a deeper and more comprehensive insight into the need for Antarctic environmental protection and promote the implementation of adaptive frameworks for Antarctic environmental protection (Cajiao et al., 2020).

Campos et al. (2012) classified anthropogenic impacts on Antarctica into six parts: climate change; human activity in Antarctica; sealing, whaling and fisheries; tourism; invasive species; and offshore exploration, military and scientific activities. This early study has provided an example of studying Antarctic tourism. The South Shetland Islands are located in the Antarctic Peninsula region; King George Island is one of the South Shetland Islands as well as one of the most visited locations of the Antarctic (Campos et al., 2012). The South Shetland Islands have experienced the most rapid rates of climate change in the Antarctic region and have received the highest rates of human visitation over recent decades (Campos et al., 2012). King George Island has ten permanent research stations that are as a stepping stone for many scientists and tourists travelling to and from other parts of Antarctica (Campos et al., 2012). Although all expedition vessels visiting the Antarctic have to follow high environmental standards required by the IAATO, most vessels carry more than 400 passengers. and some may not follow the self-regulating guidelines (Campos et al., 2012). The frequency of visitation on King George Island affects the environment of this island, for example, illegal dumping of litter and sewage or fuel leaks would have severe effects on nearshore benthic communities, and noise from ships could interfere with the biologically important activities of whales, seals, and penguins (Campos et al., 2012).

2.2.3 The Antarctic Cruise Industry

Wright (2008) stated that cruising is a popular form of Antarctic tourism. This study examined how the growing Antarctic cruise industry affects the Antarctic environment and legislation. Wright (2008) illustrated the influence of climate change, the Antarctic

cruise industry, and sustainable tourism, and provided two cases of cruise ship pollution incidents in 2007. It was found that the Antarctic cruise industry put more pressure on the Antarctic environment, and in Antarctica, the three legal regimes (the Antarctic Treaty System, general international law, and the flag state law) have an important impact on the governance of cruise ships. However, Wright (2008) doubted whether these three legislations had the ability to implement enforceable regulations. International laws and regulations are too general to adequately respond to the specificities of the Antarctic environment. Therefore, Wright (2008) suggested the initiative of learning from the New Zealand Sustainable Tourism Charter Project and dispatching observers appointed by IAATO to sail with cruise ships, to make Antarctic tourism more sustainable.

Engelbertz et al. (2015) applied political discourse analysis as a tool for analysing cruise tourism in Antarctica. The discourse analysis used data from the ATS documents. Engelbertz et al. (2015) stated that human safety and environment protection on the Antarctic are the two main topics people cared about, and cruise tourism in Antarctica still lacks adequate regulations. Their study found that more volumes of maritime traffic and more people in Antarctica will bring higher risks of incidents and accidents as well as threats to human life and the Antarctic environment generally.

2.2.4 The Development of Antarctica Tourism

Understanding the development of Antarctic tourism could help researchers forecast Antarctic tourism trends and provide solutions to future uncertainties. Maher et al. (2011) discussed the many side-effects of Antarctic tourism's growth and explored the risk of a changing environment for Antarctic tourism. Their study used interviews to collect data and found the climate system of Antarctica was warming, but they did not consider this an issue for Antarctic tourism. Some of the interviewees did not know much about Antarctica. Moreover, in the absence of major incidents in the immediate future, Maher et al. (2011) forecast that Antarctic cruise tourism may increase.

In addition, according to IAATO statistics, Kruczek et al. (2018) also identified environmental problems, determined the volume of cruise traffic, and analysed the forms

and scale of tourism in Antarctica to determine the direction of tourism development. They also tried to verify the credibility of the Tourism Area Life Cycle (TALC) model and applied this model to analyse tourism in Antarctica. The key findings of their article were that tourism pollutes the natural environment such as with sewage and carbon dioxide (CO₂), and the TALC model showed that the volume of Antarctic tourism is constantly increasing. Therefore, they stated that appropriate control of tourism development and the implementation of the IAATO to restrict the number of tourists in Antarctica is needed to ensure the sustainable development of tourism (Kruczek et al., 2018).

2.2.5 The Types of Antarctica Tourism Activities

From 2003 to 2017, IAATO presented 14 different types of tourism activities on the Antarctic: ship cruises, remote underwater vehicles, science support, small boat cruising, small boat landing, extended walks, kayaking, scuba diving, skiing, snowboarding, anchoring, aircraft landing filming, and swimming (Cajiao et al., 2020). Among these 14 activities, landings through kayaking, small boat (Zodiacs), small boat rides, and extended walks were the most frequent activities at Antarctica, representing 97% of all tourism activities (Cajiao et al., 2020).

Another special Antarctic tourism activity is marine wildlife watching. Since December of each year, whale sightings on Antarctic sea routes have become an increasingly regular occurrence (Williams & Crosbie, 2007); fin whales are often sighted in the offshore areas of the Peninsula and South Georgia Island. In some of the most commonly visited destinations, repeated and frequent whale watching could cause potential disturbances to marine wildlife (Williams & Crosbie, 2007). To mitigate the impact of this Antarctic tourism activity, in 2001, IAATO developed the Marine Wildlife Watching Guidelines for Vessel and Small Boat Operations with periodic updates to ensure that tourists' interactions with marine wildlife do not cause harmful disturbances (Williams & Crosbie, 2007).

2.2.6 The CO₂ Emissions of Antarctic Tourism

The increase of tourism to the Antarctica does not only cause local problems, but also global environmental influences (Farreny et al., 2011). There is a lack of data on the environmental impacts of Antarctic tourism in carbon dioxide emissions. Farreny et al. (2011) used a methodology for quantifying CO₂ emissions, by passenger and by Antarctic cruise per day. They found that the average tourist trip to Antarctica resulted in 5.44 t of CO₂ emissions per passenger and approximately 70% of these CO₂ emissions were coming from cruise ships (Farreny et al., 2011). However, CO₂ emissions related to transporting ships, crew, food, and other goods for Antarctic tourism, were neglected by this study). They argued that putting CO₂ emissions into environmental impact assessments would be valuable and knowing the CO₂ emissions of Antarctic tourism would highlight the impacts of local transport and tourism on the global environment (Farreny et al., 2011).

2.3 The Managerial System of Antarctic Tourism

Because Antarctic tourism has peculiar characteristics, tourism activities on this continent need to be controlled and managed. People have been questioned whether or not the Antarctic environment can be adequately protected through these regulations, laws and various principles (Abdullah & Shah, 2018). Abdullah and Shah (2018) believed that Antarctic tourism regulation is still largely piecemeal, which prevents it from becoming sustainable. The following review of literature provides information about international laws, regulations, precautionary principles, and assessment indicators.

2.3.1 International Laws of Antarctic Tourism

Some literature has discussed the strengths and weaknesses of international laws as well as the importance of developing new laws governing Antarctic Tourism. Bastmeijer (2003) discussed whether the Protocol on Environmental Protection to the Antarctic Treaty and the domestic implementing legislation of the contracting parties offer normative criteria for monitoring and authorising tourist activities on Antarctica.

Bastmeijer (2003) also discussed Article 3 of the Protocol and found that the Protocol and domestic legislation did not offer clear and strong normative criteria for determining whether tourist activities can progress in Antarctica or not. The literature about international laws of Antarctic tourism discusses the deficiencies of international laws and helps researchers to understand the impact of Antarctic tourism and the current situation of Antarctic tourism.

2.3.2 International Regulations of Antarctic Tourism

Bastmeijer and Roura (2004) examined the international regulations of Antarctic tourism and discussed the main management issues. Their key finding was that more strategic policies and management systems should be cautiously considered to prevent irreversible damage in the future. They also provided some suggestions such as limiting tourism activities at particular sensitive regions and forbidding tourists in previously unvisited regions. Clearly, it is important to concentrate on tourist activities in well-managed and designated areas in the longer term (Bastmeijer & Roura, 2004).

Bastmeijer et al. (2008) explored the question of whether additional regulations needed to regulate or prohibit the future development of permanent land-based facilities such as hotels and visitor centres for tourists. They suggested four options for managing the development of permanent land-based facilities: no additional management measures; codification of the IAATO bylaws; full prohibition of new permanent facilities; and prohibition of new permanent facilities except in the direct surroundings of scientific research stations with the authorisation of one or more Consultative Parties (Bastmeijer et al., 2008). Bastmeijer and Lamers considered that a full prohibition of new permanent facilities could protect the environment and make Antarctic tourism sustainable by prohibiting permanent facilities for tourism and trying to keep Antarctic tourism ship-based; however, Harcha considered that a state authorisation system would be more suitable for Antarctica. This option means both governmental and privately operated facilities would be permitted only in the immediate surroundings of existing scientific research stations (Bastmeijer et al., 2008).

Molenaar's study (2005) considered that although the Antarctic Treaty System (ATS) is responsible for managing and governing Antarctica, it has been relatively passive and has various weaknesses. The study discussed further international regulations developed by the Antarctic Treaty Consultative Parties (ATCPs). Molenaar (2005) argued that regulation of Antarctic tourism should have two distinct levels: 1) managers should strive to achieve sustainable tourism by balancing economic interests and ecological protections for the present and future; and 2) managers need to ensure that activities are consistent with and contribute to the sustainable tourism of Antarctica. For example, at this level, people need to address the various risks (e.g. human safety, and threats to the Antarctic ecosystem) associated with Antarctic tourism.

2.3.3 The Precautionary Principles of Antarctica Tourism

Scott (2001, p.936) defined the *precautionary principle* as “[for] threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” The emphasis of the precautionary principle is to address an environmental threat before a disaster. Scott (2001) stated that the Antarctic Treaty System (ATS) demonstrated a significant difference between its responses to mining activities and those of tourism. The principles of mining are extremely strict, but the principles of tourism are relatively loose and have some drawbacks. In the ATS, tourism in Antarctica appears as a natural and inevitable development (Scott, 2001). Tourism is regarded as a legitimate and peaceful use of Antarctica. Undoubtedly, the ATS would face substantial difficulties if it began to manage Antarctic tourism in a way that conforms with the Protocol (Scott, 2001). Scott identified three particular issues: 1) defining tourism in a way that distinguishes it from other non-governmental activities and tourism activities in Antarctica; 2) unlike mining, tourism is already in progress, and tourism has commercial beneficiaries; and 3) most Antarctic visitors lack basic knowledge about Antarctica. These three facts may hinder the development of the Antarctic precautionary principle and need consideration and discussion by policy makers.

2.3.4 The Assessment Indicators (EIA, ATEF, ATECC)

International laws, regulations, and precautionary principles need various assessment indicators for evaluation, as noted in the literature. Kriwoken and Rootes (2000) evaluated the environmental impacts of Antarctic tourism by applying the environmental impact assessment (EIA) as a tool to assess and mitigate the impacts of Antarctic tourism. After preliminary assessment, initial environmental evaluation, and comprehensive environmental evaluation, Kriwoken and Rootes (2000) evaluated the EIA institutional arrangements of Antarctic tourism and provided suggestions for EIA principles in the future. Suggestions included learning from international best practices in EIA, determining the proper level of the EIA document, building a database of Antarctic EIAs, and promoting cooperation between Antarctic stakeholders (Kriwoken & Rootes, 2000).

Kariminia et al. (2012) discussed two assessment indicators: the Antarctic ecological footprint (ATEF) and the Antarctic tourism environmental carrying capacity (ATECC). They applied theoretical and conceptual approaches to investigate tourism impacts and proposed some interregional impacts of Antarctic tourism, providing direct and indirect strategies to mitigate the impact. While their study was limited in its scope, they offered an extensive context for Antarctic tourism attributes.

2.4. Stakeholders of Antarctic Tourism

Stakeholders of Antarctic tourism and tourists are the important objects of study, as their perspectives and behaviour show the real and practical state of Antarctica and Antarctic tourism.

2.4.1 The Perspectives of Stakeholders of Antarctic Tourism

In the context of sustainable development, Lamers and Amelung (2011) optimised the Antarctic tourism policy and discussed different stakeholder perspectives. Their qualitative data were obtained through semi-structured stakeholder interviews, and showed that most interviewees considered the environment closely related to their interests. Many interviewees expected stricter regulations than those that exist, because

of the inability of the Antarctic Treaty System (ATS) to enforce some policies. Perspectives on the difficulties of tourism and sustainable development in Antarctica are quite different. Lamers and Amelung (2011) provided some practical proposals to solve this problem, such as improving the monitoring and observation of tourists' behaviour.

Liggett et al. (2011) assessed the development of Antarctic tourism over the last five decades and evaluated Antarctic tourism's current status and potential development from the viewpoint of tourism stakeholders. The authors used semi-structured interviews and a Delphi study (designed to promote structured and anonymous group interaction, which allows researchers to strategically explore complex questions) as tools to collect data. They found that tourism operators expected more large vessels to move into the Antarctic ocean, but also worried about the risk of accidents and incidents. Their research participants demonstrated a desire to protect the Antarctic environment and had strong conservation ethics. For the potential development of Antarctic tourism, strategic, cooperative and creative regulatory methods are implemented by the Antarctic Treaty Consultative Parties (ATCPs) and IAATO, which can respond to new trends in Antarctic tourism.

2.4.2 Antarctic Tourists' Behaviour

Tisdell's study (2020) reported that most tourism activities concentrate on the Antarctic Peninsula. The research surveyed Antarctic tourists to determine their socio-economic profiles and attitudes towards environment protection and knowledge of Antarctica. Tisdell (2020) found in the absence of appropriate and mandatory management, tourism activities may put Antarctica in danger, but tourists also can, politically and socially, play a positive role in Antarctic nature conservation, as most wanted Antarctica to be maintained in its pristine state. For example, tourists are willing to help promote Antarctic environmental protection and some are willing to devote themselves to Antarctic conservation.

The South Shetland Islands and Penguin Island in the Antarctic Peninsula have the highest concentrations of tourism activities sites (Pfeiffer & Peter, 2004), so warrant investigation.

Pfeiffer and Peter (2004) collected data on birds on these two islands and tested their heart rates to determine the impacts of tourists' behaviour, and decrease the possibility of misbehaviour. Pfeiffer and Peter (2004) considered that tourists need to learn general knowledge about how to avoid harassing wildlife before landing at the Antarctic region.

An independent expedition is a non-governmental activity that seeks high-risk recreation it is expensive and risky but has some advantages (Murray & Jabour, 2004). An Antarctic Treaty Consultative Meeting (ATCM) considered that independent expeditions are high-risk adventure tourism activities, but have low environmental risks (Murray & Jabour, 2004). Murray and Jabour (2004) found that people concerned about the operators of independent expedition were unable to recover the high costs associated with rescue and repatriation operations (Murray & Jabour, 2004).

Hanifah et al. (2012) suggested some methods to help mitigate the negative impacts of tourists' misbehaviour, such as developing sustainable tourism, and building more natural reserves. They (2012) explained the concept of ecologically sustainable development (ESD), the concept of natural reserves devoted to peace and science (NRDPS), and the impacts of human activities in Antarctica. There are undeniable impacts of human activities in Antarctica, therefore, good practices based on ESD and NRDPS could enhance the protection and conservation efforts of Antarctica in the future.

2.5 Sustainable Tourism in Antarctica

The World Tourism Organization (1993) defined *sustainable tourism* as development that meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to the management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems. In the context of the Tourism and Sustainable Development Goals – Journey To 2030, contributing to sustainable economic growth, resource efficiency, environmental protection, and climate change, would promote the development of sustainable tourism (UNWTO, 2017). Moreover, UNWTO (2017) provided suggestions for sustainability: a)

a better understanding and monitoring of tourism's impact on the Sustainable Development Goals (SDGs); b) more meaningful integration of sustainable tourism in national planning processes; c) an upgrade of the current generation of coordination and partnership arrangements; and d) devising and adapting financing to the needs of the sector as a core implementer and accelerator of the SDGs (UNWTO, 2017, p.71). Understanding the UNWTO's SDGs would help researchers evaluate and analyse sustainable tourism in the Antarctica. Kruczek et al. (2018) observed that Antarctica is an important world testing area for sustainable tourism. However, there is no research to confirm that Antarctic tourism is really the best in the world, or how people ensure that human arrivals do not affect a destination's sustainability. These issues require consideration from researchers.

2.5.1 The Antarctic Treaty Consultative Parties (ATCPs) and IAATO

The main management groups of Antarctic tourism are the International Association of Antarctica Tour Operators (IAATO) and the Antarctic Treaty Consultative Parties (ATCPs). IAATO is a self-regulatory tourism industry body with the goal of advocating, promoting, and practising safe and environmentally responsible travel to the Antarctic. Over the last two decades, tourism issues have received increased attention from the ATCPs. The ATCPs are empowered through the Antarctic Treaty System (ATS) and are the main legal regime governing the Antarctic area. The ATCPs decide on Antarctic tourism regulation at large (Liggett et al., 2011).

2.5.2 Recommendations for Sustainable Tourism in Antarctica

Altvater et al. (2011) provided a set of recommendations for sustainable tourism in Antarctica to address the existing gaps in Antarctic tourism management. Recommendations included the development of a comprehensive tourism framework in the future; research and monitoring as the basis for reasonable decision-making; taking cumulative impacts into account and applying them in Environmental Impact Assessments; control of access to sites on Antarctica; control of the type of tourism activities; keeping tourism ship-based to decrease or prevent land-based facilities;

creating high average environmental standards; establishment of an observer system onboard tourists' routes; and providing education and training courses for tourists before their departure to Antarctica (Altvater et al., 2011).

2.5.3 New trends of Antarctica tourism and sustainable management strategies (the New Zealand and Australia research example)

Goff (2003) discussed New Zealand's attitudes and tourism managerial systems for Antarctica. In addition, the New Zealand Government proposed four suggestions to ensure tourists activities are conducted in a safe and eco-friendly manner: strengthening and increasing management methods; avoiding any further expansion of Antarctic tourism; prohibiting any expansion of permanent or semi-permanent land-based tourism construction in Antarctica; and keeping to the limits of government support and other non-governmental expeditions in the range of humanitarian assistance and basic hospitality (Goff, 2003). New Zealand's attitudes and tourism managerial system towards Antarctica provide other countries and the IAATO with a reference point and model for policymaking (Goff, 2003).

Barrington (2004) provided some sustainable management strategies for Antarctic tourism management. As one of the Antarctic Treaty System (ATS) partners, Australia has devoted itself to improving the management of Antarctic tourism. The ATS and its partners aim to ensure that Antarctic tourism is sustainable, balancing the relationship between economic interests and environmental protection (Barrington, 2004). Australia has provided proposals on how to manage potential impacts, that include: a) building a comprehensive database on Antarctic tourism; b) ensuring that tourism operators conduct their activities at a high standard; c) adopting quarantine practices; d) ensuring contingency plans; e) developing shipping guidelines; f) assessing the cumulative environmental impacts of tourism activities; and g) considering whether to limit the permanent infrastructure (Barrington, 2004). These suggestions have provided researchers with new insights into building sustainable tourism in Antarctica, made Antarctic tourism industry sustainable, and offered consumers in Antarctica a better

tourism experience. These suggestions aim to balance the relationship between the economic interests of tourism operators and the need to protect Antarctica's environment, and ensure that tourism does not disturb other uses of Antarctica, especially those of scientific research (Barrington, 2004).

2.6 Summary

The review of literature showed that the development of tourism in Antarctica is inevitable and fast, which incurs different impacts on Antarctica. It also revealed that there are many deficiencies in Antarctic tourism management, but that these deficiencies are not unsolvable. The literature provides useful information about the current situation for Antarctic tourism and the impacts of tourism, which were helpful for developing the research questions. However, information on the impact of sustainable tourism on Antarctic tourism is still inadequate, exposing the gap in the literature that this study aims to fill. It is important to identify the potential impacts of sustainable tourism development in Antarctica from the tourists' perspective. The next chapter discusses the methodology employed in this study, to fill this gap.

Chapter 3. Methodology

3.1 Introduction

This chapter explains the methodological approach that underpinned the research design and methods used for data collection and analysis. It starts with describing the research paradigm employed, then introduces the research questions and sampling strategy. It then explains the data collection process and the procedures of thematic analysis. Lastly, the strength and limitations of the study are reviewed.

3.2 Research Paradigm

This research uses secondary data with a qualitative method and interpretivist paradigm. Interpretivism allows researchers to construct reality socially, interpreting data from diverse sources and contexts to add new or overlooked meanings to existing understandings (Gray, 2013). The development of interpretivist philosophy is based on the critique of positivism in social sciences. Accordingly, this philosophy emphasizes qualitative analysis over quantitative analysis (Gray, 2013). According to interpretivist paradigm, it is important for the researcher as a social actor to appreciate differences between people. Moreover, interpretivist studies usually focus on meaning and may employ multiple methods in order to reflect different aspects of the issue (Gray, 2013).

3.3 Research Design

A *methodology* is a research strategy or system used to acquire knowledge, and lies behind the choice and use of particular methods (Crotty, 1998). As a system of methods for conducting research, the methodology must be in line with a specific ontological, epistemological, and paradigmatic base. The different ontological and epistemological positions of researchers often bring different research approaches (e.g. qualitative or quantitative approaches) (Grix, 2004). *Ontology* is the study of being and questions the nature of reality (Crotty, 1998). *Epistemology* is a way of understanding and explaining how we know what we know (Crotty, 1998).

This study is qualitative in nature. In opposition to quantitative research, qualitative research is a type of social science research that works with non-numerical data to understand concepts, opinions, or experiences. Qualitative research is built on a relativist ontology that believes “reality is a finite subjective experience, and nothing exists outside of human thoughts” (Denzin & Lincoln, 2005, p.1). It is also built on a subjectivist epistemology that believes “knowledge is always filtered through the lenses of language, gender, social class, race, and ethnicity” (Denzin & Lincoln, 2005, p.1). A constructivist epistemology believes that “reality is independent of human thought, but meaning or knowledge is always a human construction” (Crotty, 1998).

The research questions of this study are:

1. What is the impact of the development of Antarctic tourism on Antarctica?
2. What is the present situation of sustainable tourism in Antarctica?
3. What are the impacts of sustainable tourism on the development of Antarctic tourism?

Qualitative research can be applied to collect in-depth insights into a problem or generate new ideas for research and is commonly used in the humanities and social sciences (Denzin & Lincoln, 1994; Rosenblatt & Fischer, 1993). Moreover, qualitative research seeks to understand a research topic or problem from the perspective of the local population, which means it is especially effective in obtaining cultural information about the values, behaviours, and social contexts of particular populations, and therefore well suited to studying the understanding of tourists’ experiences in Antarctica.

3.4 Interpretive Description

There are many approaches to qualitative research, such as grounded theory, ethnography, phenomenology, interpretive description, narrative inquiry, and case studies. The methodology of this study is interpretive description, and was chosen as the most appropriate methodology, as the study aimed to describe and interpret the impact of Antarctic tourism. Thorne (2008) defined *interpretive description* as an approach to

generating knowledge that straddles the chasm between objective neutrality and abstract understanding, which is important for an applied discipline within the context of the special social mandates. Interpretive description draws lessons from various methodological principles developed for the theoretical purposes of social science traditions (Miles & Huberman, 1994). In terms of designs, samples, data collection, and analysis, interpretive description is strongly influenced by grounded theory, ethnography, phenomenology, and naturalistic inquiry (Berterö, 2015). Interpretive description is consistent with a constructivist and naturalistic orientation. A naturalistic orientation provides the philosophical basis for interpretive description. According to Lincoln and Guba (1985), the base principles are:

- There are multiple constructed realities that can be studied only holistically. Thus, reality is complex, contextual, constructed and ultimately subjective;
- The inquirer and the “object” of inquiry interact to influence one another; indeed, the knower and known are inseparable; and
- No a priori theory could possibly encompass the multiple realities likely to be encountered; rather, theory must emerge or be grounded in the phenomenon.

Given these principles, this study, through capturing the realities of the impacts of Antarctic tourism and exploring tourists’ experiences of Antarctic tourism, interprets the development patterns of Antarctic tourism and sustainable tourism in Antarctica.

3.5 Data Collection

Research methods are the specific techniques and procedures applied to collect and analyse data (Crotty, 1998). The purpose of this section is to describe the method of acquiring knowledge that helped answer the three research questions of this study. The most common data collection methods of qualitative research are observations, interviews, focus groups, surveys, and secondary research (Beerli-Palacio & Martín-Santana, 2019). The data collection methods of this study are secondary research and netnography.

Secondary research, in contrast to using primary sources, collect existing data in the form of texts, images, audio, or video recordings, using data collected by researchers who did not experience or participate in the actual data collection (Beerli-Palacio & Martín-Santana, 2019). There are various secondary sources, such as magazines, pictures, encyclopaedias, blogs, the Instagram platform, comments, and histories. Secondary research is applied in many fields, such as technology, medical libraries, information sciences, mathematics, humanities, history, law, family history, and autobiographies (Kragh, 2003). Hanafiah and Zulkifly (2019) applied a secondary data approach to examine the relationships between tourism destination competitiveness determinants and tourism performance. Yildiz and Mavi (2012) used secondary data to describe the status of sports tourism in Turkey. In secondary sources, the original data are selected and then generalised in a suitable form, so the researcher can analyse, interpret, or evaluate the data. Using secondary data for this study was more appropriate than using primary sources, because during the COVID-19 outbreak, having a direct connection with people or doing field research to collect primary information incurs a variety of risks.

Netnography is an online research method for conducting ethnographic research on the internet (Kozinets, 2017). It is a qualitative and interpretive research method that applies traditional ethnographic techniques to social media (Kozinets, 2017). Contemporary netnography is a set of research practices related to data collection, analysis, and research ethics. Most of the data are collected from a humanist participant-observational research stance (Kozinets, 2017). De Souza-Leão and Moura (2020) applied netnography to investigate consumers' cultural customs in online environments and determine how National Football League (NFL) viewers in Brazil expressed the experience of consuming via virtual interactions.

3.5.1 Sampling

This study applied a non-probability sampling method called “purposive sampling,” or “judgmental sampling,” in which the researcher only includes participants who meet certain criteria, and then checks whether or not they meet other criteria (Ames et al., 2019).

This study investigated the views of people who had been to Antarctica as tourists, and then checked to determine whether or not the information supported by them was helpful for answering the research questions of the study. The post time of the relevant answers on the Zhihu and Mafengwo apps (applications) was limited to between 2015 and 2020 (in early 2020, many regions and countries had not yet restricted travel as a response to the COVID-19 pandemic). It was preferred that posts included photographs of their travel, because selfies taken in Antarctica were considered evidence that they had in fact visited the Antarctic. The postings of the tourists in the two apps provided detailed descriptions of Antarctic tourism experiences. Post of only one or two sentences of description were not selected, and the posters' careers, hobbies, and experiences were considered to some extent. Most posters were engaged in tourism or specialised in Antarctic study, but some were science writers or tourism experts.

3.5.2 Data Collection Procedures

This study selected tourism experiences comments on Zhihu and Mafengwo. *Zhihu* is a Chinese application for experience and knowledge sharing as well as an online question and answer (Q&A) community (Qi et al., 2020). It is one of China's largest knowledge-sharing companies and provides a venue for sharing knowledge, experience, and skills for and between users; most of the knowledge is academic and worth referring to (Qi et al., 2020). Zhihu's users are from different industries and backgrounds, and share each other's knowledge, experience, and insights, continuously providing a variety of information via the app. Zhihu is a forum where users can discuss a topic of interest, and follow people who have the same interests. The integration of divergent thinking is a major feature of Zhihu, which encourages broadening the questions and open-ended answers in the Q&A process. Qi et al. (2020) applied Zhihu to analyse sponsorship networks and cross-domain knowledge exchange, and Deng et al. (2020) used Zhihu to analyse the theoretical contributions and practical implications of having four million users on Zhihu.

Mafengwo is a tourism forum established in 2006 in Beijing. It provides a platform for travel experience exchanges for people who love travel (Leung, 2020). Registered users share their travel stories and provide travel guides for various tourism sites, as well as information on hotels, air tickets, visas, etc. Mafengwo's users come from mainland China, Hong Kong, Taiwan, Malaysia, and elsewhere (Leung, 2020). He et al. (2020) used Mafengwo to collect tourists' perceptions of Thai travel and then study the factors influencing travel decision-making of Chengdu residents. Zhihu is similar to a Q&A platform which allows users to discuss various topics; however, Mafengwo focuses on the sharing of the tourism experiences. The two apps were used to complement each other in identifying user generated messages.

The data collection started with information searching, using keywords in the search box. Keywords searches were applied to collect relevant data from both applications. In consideration of the three research questions, the researcher used six keywords: "Antarctic tourism," "Antarctic tourism experience," "Antarctic tourists," "the development of Antarctic tourism," "Regulations and laws of Antarctic tourism," and "environmental impacts of Antarctic tourism." After these keyword searches, 20 postings on Zhihu and 20 on Mafengwo were collected. These postings were then checked to see whether or not they were relevant, reliable, and informative. Similarly, the posters' information was checked to ensure that the posters were in fact Antarctic tourists. Then the collected data were arranged in tables (see Appendices). Data were collected in Chinese then translated into English for analysis.

3.6 Data Analysis

This study used the thematic analysis method to analyse the information collected online. Thematic analysis is an interpretative approach for analysing qualitative data based on categorising data into particular themes. It aims at grasping the complexity of meanings of the phenomenon under study (Smith, 2015). For example, a psychologist could apply thematic analysis of travel blogs to explore how tourism shapes self-identity. Thematic analysis is used to analyse various types of qualitative data, such as data collected from

interviews, focus groups, surveys, observations, and secondary sources (Saldana, 2009). The data of the study were from secondary sources, so thematic analysis was considered an appropriate method. The flexibility of thematic analysis allows researchers from different methodological backgrounds to use this data analysis method. The method can summarise key features from a large body of data and highlight similarities and differences across the data (Braun & Clarke, 2006). Reliability of data is generally emphasised, but the researchers' subjective interpretations can bring bias or affect the analysis and findings (Braun & Clarke, 2006). However, subjectivity is viewed as an important resource rather than as a threat to reliability (Braun & Clarke, 2006).

The researcher started by becoming familiar with the data, re-reading the data collected. Whether the study aims for integrated or detailed analysis, or seeks latent or semantic themes, familiarising with all aspects of the data is inevitable (Braun & Clarke, 2006). The researcher checked the content of the online postings, the release dates, and information about the posters. Re-reading the data produced some new information and browsing through the data from Zhihu and Mafengwo provided a basis for the rest of the analysis (see Braun & Clarke, 2006). The researcher selected 40 relevant postings from Zhihu and Mafengwo: Poster 1 to poster 20 are from Zhihu, and poster 21 to poster 40 are from Mafengwo. The initial data, the post time and URL links are presented in Appendix 1.

Secondly, the researcher created an original list of ideas about what researchers need (see Braun & Clarke, 2006). After becoming familiar with the postings, the main content of data was identified as tourists' experiences in the Antarctic and their perspectives on Antarctica and Antarctic tourism. Next, the researcher identified specific segments of these data (see Thomas, 2006) and selected what was needed, discarding what was not relevant to the study. Specific segments of information were selected based on their relevance to the three research questions (i.e., what is the impact of development of Antarctic tourism on Antarctica, what is the present situation of sustainable tourism in Antarctica, and what are the impacts of sustainable tourism on the development of Antarctic tourism?).

Thirdly, from these specific segments, the researcher produced initial codes (or themes, or categories) (see Braun & Clarke, 2006). Codes identify features in the data that might be of interest. They are the most basic elements of the raw data that can be assessed in a meaningful way regarding the phenomenon under study (Boyatzis, 1998). In other words, coding is part of the analysis, in which the data are organised into meaningful groups (Braun & Clarke, 2006). The theme of coding can be data-driven or theory-driven. Data-driven codes are driven by the data, whereas theory-driven codes are more related to specific problems, so the researcher writes codes around specific problems (Braun & Clarke, 2006). The coding theme of this study was more theory-driven, because the researcher wanted to write codes around the three research questions. The coding was done manually and systematically across all the data, giving equal and sufficient attention to each data item. Then, the researcher identified needed aspects in the overall data items (see Braun & Clarke, 2006). Inductive coding was applied, which is a convenient and efficient way of analysing qualitative data. It also narrows varied and extensive raw data into a brief summary format (Thomas, 2006). Through manual inductive coding, the needed data were categorised into the different theme groups.

Based on the specific segments, the researcher identified and defined categories or themes (see Thomas, 2006). These specific segments were sorted into categories or themes, and then selected data labelled to create categories (see Thomas, 2006). These categories were extracted from the specific segments. The more summative, important, and general categories were extracted from the research aims and the lower level of categories (see Thomas, 2006). For example, there was abundant data describing the regulations of Antarctic tourism, so this information was categorised into a category named “strict regulations,” and finally put into a more summative category named “the environmental protection of Antarctic tourism.”

Fourthly, the researcher reduced the uncoded text and redundant and overlapping categories (see Thomas, 2006). Some segments of the text were removed if they were coded more than once and not relevant to the research questions. The final results were

used to illustrate the meanings in the data and to answer three research questions. Table 1 presents an example of the process of data analysis.

Table 1 *The Process of Data Analysis (Poster 4, 2018)*

Posters	Initial data	Identifying specific segments of information	Key categories (primary categories)	Important summative categories (major categories)
Poster 4 (Posted in 2018)	There are two opportunities to land on the Antarctic Peninsula every day, so in the morning, tourists will see expedition members driving Zodiacs between icebergs. South Georgia Island has relatively warm temperatures, fertile soil, and abundant food, so it has a huge variety of penguins and seals. The Antarctic Treaty regulated that viewing wild animals should not be at less than five metres, but once tourists land on South Georgia Island, they will find this is impossible because the land is full of animals. On South Georgia Island, elephant seal pups are abandoned by their mothers about 20 days after they are born, so baby elephant seals must learn to swim and forage in the sea on their own to avoid starvation. At this time, elephant seal pups had been hungry for more than ten days, and when they see humans, they view humans as their mother, so they will come to find milk.	Tourists will see expedition members driving Zodiacs between icebergs. The Antarctic Treaty regulated that viewing wild animals should not be at less than five metres. South Georgia Island has a huge variety of penguins and seals. But once tourists land on South Georgia Island, they will find this is impossible because the land is full of animals. Elephant seal pups had been hungry for more than ten days, and when they see humans, they view humans as their mother, so they will quickly come close to find milk. The Antarctic treaty regulated that only	7. The physical condition of viewing wild animals	1. Antarctic tourists' experience

Posters	Initial data	Identifying specific segments of information	Key categories (primary categories)	Important summative categories (major categories)
	The Antarctic treaty regulated that only ships with less than 500 people can land, and no more than 100 people every landing. Experts on cruise ships teach Antarctica knowledge every day. Luckily, sailors salvaged ice cubes to the bar, and I drank whisky with them.	ships with fewer than 500 people can land, and no more than 100 people per landing. Experts on cruise ships teach Antarctica knowledge every day. Sailors salvaged ice cubes to the bar, and I drank whisky with them.		

3.7 The Reliability and Validity of the Study

Reliability and *validity* refer to the quality of research. *Reliability* refers to how consistently a method measures something. If the same result can be consistently obtained by applying the same methods in the same situation, the measurement is considered reliable (Leung, 2015). Due to the wide availability of the Internet, the Internet information has become a mainstream data collection place (Chang, 2013). Despite the disadvantages of online postings, the merits often outweigh the drawbacks. The data of this study were collected from the online postings and it endeavoured to eliminate unwanted responses, maintain data consistency and retain valid data to enhance overall data reliability (Chang, 2013).

Validity refers to how accurately a method measures what it is intended to measure. If research has high validity, this means it produces results that correspond to real properties, characteristics, and variations in the physical or social world (Leung, 2015). The research method used in this study was considered suitable since the data collected from online sources generated similar results from the posters.

3.8 Limitations and Implications of the Methodology

Qualitative research pursues depth rather than breadth. Instead of extracting data from a large and representative sample of an entire population, qualitative research needs to obtain in-depth knowledge and information about a small and special group (Ambert et al., 1995). There are advantages of qualitative research. Qualitative research generally focuses on the scope of discovery rather than verification, which helps to acquire new information that may reflect new forms of social organisation or social structure, or new ways of thinking, or changes of socialisation (Ambert et al., 1995). It may help to complete redirection, or modification of, or additions to, old and existing ideas. This advantage of qualitative research conforms to the aim of this research of acquiring new knowledge and understandings by collecting and analysing secondary data (see Ambert et al., 1995). However, qualitative research is not without limitations. One of the limitations is that a qualitative researcher can over-identify with some participants. Over-identifying with participants means that a sympathetic researcher investigates a group of participants or prefers to ascribe a virtue or some other characteristic to participants, which can easily affect the outcome (Schonfeld & Mazzola, 2013). Therefore, qualitative research is not the best way to acquire cause-effect conclusions (Schonfeld & Mazzola, 2013).

Interpretive description is a relatively new methodology. It facilitates understandings of how and why. It is good for understanding social processes as well as illustrating complexity and contextual factors (Miles & Huberman, 1994). However, data collection based on interpretive description can be time consuming, and data analysis based on interpretive description can be complex. It can be regarded as less credible by non-researchers (Miles & Huberman, 1994). In secondary research, secondary data are often readily available, less expensive, and less time-consuming than that used in primary research; however, the credibility of secondary data must be evaluated, and not all secondary data resources offer up to date reports and statistics. These deficiencies may also affect the results of a study (Kragh, 2003). Finally, because thematic analysis does not require a lot of detailed theoretical or technological knowledge, it offers an easier

analysis method than some others (Braun & Clarke, 2006). Thematic analysis has few prescriptions and procedures; therefore, the researcher may find it relatively quick to learn (Braun & Clarke, 2006). Thematic analysis is suitable for finding similarities and differences, and this characteristic may help this study answer the research questions. Thematic analysis also helps to summarise key points of a large body of data and highlight similarities and differences in the data; however, if the researcher is not careful, thematic analysis may miss some details, and its flexibility may make it hard for new researchers to decide what aspects of the data to focus on. It can also have interpretive limitations if the analysis is not grounded in a theoretical framework (Braun & Clarke, 2006).

3.9 Summary

This chapter explained that this a secondary study using qualitative methods with an interpretivist paradigm and explained the research design and research questions. The study used secondary data and netnography; the sampling and data collection procedures were also explained. The four steps of thematic analysis were explained with examples. Finally, the chapter discussed the reliability and validity of the study, followed by its limitations and implications of the methodology. The following chapters present the results of this study.

Chapter 4. Results

4.1 Introduction

This chapter presents the main findings identified in this qualitative study. The results are presented according to the main themes generated from the thematic analysis described in Chapter 3. The four main themes are described and explained according to the data categories presented in Table 2.

Table 2 *Incorporating the Categories*

Key Categories (primary categories)	The most important and summative categories (major categories)
1. Tourists' perspectives on the Antarctic landscape 2. Seasick 3. Cold 7. The physical condition of viewing wild animals 8. The variety of Antarctic wild animals 9. Global warming 12. High price of Antarctic tourism 14. The popularity of Antarctica 13. The experience with the expedition team 19. The uniqueness of Antarctica	1. Antarctic tourists' experience
4. The capacity of the cruise ship 6. The regulations around viewing wild animals 10. Environmental education 16. Strict regulations 17. Antarctic tourists' environmental awareness	2. The environmental protection of Antarctic tourism
5. The polar plunge 11. Hospitality on board 15. The variety of tourists' products	3. The Antarctic tourism products
18. Negative comments by Antarctic tourists 20. Tourists' behaviour	4. The negative aspects of Antarctic tourism

4.2 Antarctic Tourists' Experience

This major category consists of ten primary categories: “tourists’ perspectives on the Antarctic landscape,” “seasick,” “cold,” “the physical condition of viewing wild animals,” “the variety of Antarctic wild animals,” “global warming,” “high price of Antarctic

tourism,” “the popularity of Antarctica,” “the experience with the expedition team,” and “the uniqueness of Antarctica.”

In terms of tourists’ perspectives on the Antarctic landscape, there were 14 segments focusing on “tourists’ perspectives on Antarctic landscape,” and the posters expressed their feelings using various words such as “shocking,” “majestic,” “pure,” and “incredible.” Most posters considered that the Antarctic landscape gave them a different and unique experience compared to that of other destinations. Posters described the Antarctic landscape with comments such as:

- *I consider that Antarctica is definitely a brand new and unique world;*
- *I think that maybe shocking, majestic, beautiful, unimaginable, incredible - these words barely describe Antarctica;*
- *Travelling in Antarctica impressed me the most. This is the most beautiful natural landscape I have ever seen in my life;*
- *Antarctica must be the most lonely and beautiful place on the earth;*
- *Antarctica may not be the most exciting or the most beautiful place, but it must be the most breath-taking; and*
- *No language can describe the emptiness and purity in front of me.*

The results showed the seasickness and cold that the tourists experienced in the Antarctic. Most of the posters considered these two experiences as challenges and part of the adventure. Some posters mentioned the Drake Passage in the Antarctic waters, the only route for cruise ships to the Antarctic land. They experienced a very uncomfortable period in this place. Posters described the seasickness.

- *When the cruise ship passed through the Drake Passage, our team members on the ship were all seasick;*
- *The Drake Passage is very windy, making it easy for people to get seasick;*
- *I have taken a lot of seasickness pills, but I still feel very uncomfortable;*
- *The wind and the waves were so big, everyone on the boat was seasick;*
- *I felt that my body was more comfortable only when I lay down, and I felt very sick whenever I stood up;*
- *The first hurdle is to cross the Drake Passage. As soon as I woke up in the morning, I started to vomit; and*
- *Sailing through the Drake Channel was a horrifying experience, and the shaking made most people want to vomit.*

Cold was also mentioned by two posters, who wrote that “I felt that the coldest day was camping in the polar regions,” and “there are often strong winds in Antarctica, and the strong wind takes away too much heat from our body”.

Data on the physical condition of viewing wild animals provides valuable information. Most posters found that the rule of keeping five metres away from Antarctic wildlife was difficult to achieve and may even be impossible. There were 24 segments mentioning the physical condition of viewing wild animals. This was also the topic that posters in this study wrote about the most. A few posters explained that because there are so many wild animals in the Antarctic, keeping a distance of more than five metres from them was impossible. Some animals even actively approach people. For example:

- *Elephant seal pups had been hungry for more than ten days, and when they see humans, they view humans as their mother, so come close to find milk;*
- *The density of penguins is so high, which means the principle of at least five metres away is completely impossible to achieve;*
- *The babies of elephant seals are so cute. They are not afraid of people at all and keep rubbing against me;*
- *A penguin was particularly interested in our landing gears. He circled around our clothes a few times; and*
- *When watching penguins, they will actively approach you or pass by very close to you.*

In terms of the variety of Antarctic wild animals, posters wrote these comments:

- *There are hundreds of thousands of penguins on this island, but the number has been declining in recent years;*
- *It was the first time that everyone on the board saw so many penguins, and I felt very shocked and surprised;*
- *South Georgia Island is warmer compared to other areas of Antarctica; therefore, there are many kinds of animals and plants. Here is also called Antarctic wildlife's paradise; and*
- *South Georgia Island has a huge variety of penguins and seals.*

Global warming affected some posters' impressions and feelings about the Antarctic. One claimed that he could clearly feel global warming in the Antarctic. Other posters also described global warming, providing evidence that global warming is actually happening in Antarctica.

- *The glacier has been receding;*
- *Global warming has led to the rapid melting of ice;*
- *The climate is warming;*
- *We could see the glacier collapse, but I did not want to see this scene. Global warming has caused the Antarctic ice melting;*
- *We may be used to hearing about the impact of climate warming on the planet in the news, but most people have never really experienced it; and*
- *With the impact of human activities and the increase in temperature brought by global warming, the natural environment and wild animals and plants here are facing severe tests.*

Many posters mentioned the price of an Antarctic trip, but only one stated that “travelling to the Antarctic was the highest price I have ever paid for a single destination.” However, the price of Antarctic tourism did not stop the popularity of Antarctica. As some posters mentioned, “while polar tourism is becoming increasingly popular, more and more people are beginning to realise the impact of this industry on the environment,” and “it can be said that Antarctic travel market is mature. More than 200 people travel to the South Pole every year.” One of the posters mentioned Heroína Island, an island in the Antarctic region that was the most visited island in this archipelago. However, even though it was the most visited island, its visit rate was only once per year. Posters considered that the Antarctic had become increasingly popular, although compared to other popular destinations, its popularity was still developing.

The experience with an expedition team was also mentioned by many posters. There were 13 segments related to this primary category. These posters considered that the staff and expedition team members in the Antarctic tour were very professional and knowledgeable. As one of the posters wrote, “the expedition team members from all over the world are equipped with stunts including ornithologists, oceanographers, geologists”. Other comments on this topic were:

- *The expedition members have rich knowledge and experience, and most of them are experts in their relevant fields;*
- *Such commercial expeditions in Antarctica are usually led by a very professional team;*
- *Under the leadership of a professional guide, I used a snowboard and dragged my sled to the South Pole; and*
- *The expedition members have various professional backgrounds.*

In addition to the unique landscape of the Antarctic, some posters made special mention of the uniqueness of Antarctica.

- *The Antarctic environment is special;*
- *Lack of microorganisms and lack of microbial activity make the rubbish difficult to degrade; and*
- *Due to the fragile ecology of Antarctica, all visitors to Antarctica must abide by Antarctic regulations.*

4.3 The Environmental Protection of Antarctic Tourism

This major category consisted of five primary categories: “the capacity of the cruise ship,” “the regulations around viewing wild animals,” “environmental education,” “strict regulations,” and “Antarctic tourists’ environmental awareness.”

Controlling the capacity of cruises to the Antarctic is a very important part of the environmental protection of Antarctic tourism by the IAATO. There were eight segments that mentioned the number of passengers on an Antarctic cruise.

- *Most cruise ships have more than 100 passengers, and these ships are already quite large;*
- *Our ship is basically the smallest, with more than 70 passengers, and more than 60 crew members and expedition members;*
- *The Antarctic treaty regulated that only ships with less than 500 people can land, and no more than 100 people every landing;*
- *132 people on the ship and 64 people completed the Polar Plunge;*
- *There are 190 passengers and 170 crew members;*
- *There were 170 people on the ship, 55 people participated in this swimming;*
- *There was a total of 175 passengers on the expedition ship; and*
- *The cruise ship carries approximately 110 passengers.*

The regulations of viewing wild animals were also mentioned by most of the posters. 19 segments are related to this topic. Most regulations are about how to view wild animals. For instance,

- *The regulations and staff required that the viewing distance of penguins should not be less than five metres;*
- *The rule for wild animals is not to come within five metres or stand on their usual routes;*
- *The Antarctic Treaty regulated that viewing wild animals should not be less*

than five metres;

- *The density of penguins is so high, which means the principle of at least five metres away is completely impossible to achieve; and*
- *You cannot come close to penguins within five metres, but if the penguin comes to you, you do not have to hide.*

Aside from the “five-metre principle,” one poster also mentioned that there was “no feeding, no rushing, no loud noise, no smoking here.”

The data included 17 posts about environmental education, various lectures about Antarctica, and viewing research stations, which are important platforms for environmental education. One of the posters considered that lectures about Antarctica and viewing research stations could promote more positive responses to climate change, attract more attention to environmental protection, and even further promote government policymaking. Other comments supported this:

- *Antarctica may be a good place for environmental education;*
- *The experts will use the spare time to arrange special lectures to explain Antarctic knowledge to tourists;*
- *Experts on cruise ships teach about Antarctica every day;*
- *The expedition team arranged various lectures; and*
- *They organised various lectures to explain all aspects of Antarctic knowledge to everyone.*

In terms of viewing research stations, posters wrote:

- *Great Wall Station has very strict requirements on the number of passengers and the landing time; and*
- *Allowed us to visit this scientific research station in the afternoon;*

Two posters wrote about tourists’ commitment to the lectures.

- *There were lectures every day. The attendance rate is almost 99%; and*
- *I had to go to a safety seminar in the morning and get landing boots. This meeting needs everyone to attend, tourists must sign the attendance table, otherwise, you cannot land.*

These comments showed that there were not only many activities around environmental education, but that these activities were are participated in by the tourists.

Strict regulations can help to achieve environmental protection against damage from Antarctic Tourism. There were 22 data segments describing the strict regulations at the Antarctic. Most posters considered that Antarctic tourism needed people to follow these regulations.

- *No feeding, no rushing, no loud noise, no smoking here;*
- *People need to comply with stricter requirements here than any other destination;*
- *Due to the fragile ecology of Antarctica, all visitors to Antarctica must abide by Antarctic regulations; and*
- *Great Wall Station has very strict requirements on the number of passengers and the landing time.*

According to the data, there were staff responsible for rubbish disposal and transporting the rubbish back to Chile for processing. Before tourists land on the Antarctic land, training is needed. As one poster wrote, “the highlight of the first day was training. A large group of people put on life jackets for training.” Signing various agreements is also needed, as posters explained: “the crew once again illustrated the restrictions in the Antarctic Treaty for tourists,” and “we signed an agreement about some of the Antarctic regulations before landing,” and so on. Various checks were needed. For example, the Antarctic Treaty does not allow anything to be discarded on the Antarctic continent, so even the shoes during landing, were uniformly distributed by each expedition ship; this was mainly because of concerns that foreign species on the tourists’ own shoes could destroy the unique ecology of Antarctica. The clothing of each person had the dust removed, in order to prevent damage to the ecological environment on the island, and tourists went through biological inspections and boot disinfection before landing on the island. The use of aircraft on the Antarctic continent was also prohibited, to prevent accidental aircraft crashes into the sea; lithium batteries would pollute the environment and aircraft would disturb the birds. Cruise ships, rules included “no personnel are allowed to take away anything that originally belonged to the Antarctic continent,” and “when returning to the boat from the island, the boots must also be disinfected.” One posters reported that Antarctic environmental sanitation was definitely the most stringent in the world.

Antarctic tourists' environmental awareness was crucial in evaluating the environmental protection of the Antarctic. According to the data collected, tourists on this trip followed the regulations and laws of Antarctica strictly, and most shared a high level of environmental awareness. Comments supporting this were:

- *The overall environmental protection awareness of tourists from Antarctica is much higher than tourists' awareness from other travel destinations;*
- *I do not know which other tourist destinations in the world have such strict regulations;*
- *The staff on the Antarctic cruise ship strictly supervise the landing; and*
- *As a tourist, I can only try my best not to destroy their ecological environment, and not disturb them.*

4.4 The Antarctic Tourism Products

This major category of data consisted of three primary categories: "the polar plunge," "hospitality on board," and "the variety of tourist products."

The polar plunge was one of the most popular tourism products in the Antarctic, and left most posters feeling impressed with such an unforgettable memory. Most mentioned they participated in the polar plunge.

- *I deliberately took the national flag to dive in Antarctic water;*
- *One of the must-experience events in Antarctica is the Polar Plunge;*
- *I jumped three times in the Antarctic waters;*
- *The tourists jumped into the Antarctic water;*
- *The most exciting activity is the polar swimming; and*
- *Antarctic diving is probably the craziest thing I have done in my life.*

The posters shared their experience of hospitality on board during their Antarctica trip including a barbecue on deck, a cocktail party on the ice, and whisky with ice from Antarctic water. Many posters stated that they drank whisky with a piece of the ice from the Antarctic water.

- *The crew helped me catch a piece of ice. I drank a cup of whisky with a small piece of the ice;*
- *We picked up a piece of ice. I took it to the bar and added whisky to drink it;*
- *Sailors salvaged ice cubes to the bar, and I drank whisky with them; and*
- *We removed external impurities on ice cubes that we picked up from*

Antarctic water, and then I made an iced whisky for myself in the bar.

Some posters mentioned barbecues.

- *We also had a barbecue at the southern-most barbecue stall here;*
- *The open-air barbecue on the cruise is a reserved item of most travel companies; and*
- *It will be deck barbecue and enjoy the Lima waterway.*

The variety of tourists' products in the Antarctic included driving Zodiacs (small boats), hiking, cocktail parties, viewing penguins and seals, skiing, whale watching, camping, taking propeller planes, playing with snowboards, soaking in hot springs, exploring ice lakes, snow biking, and driving snowmobiles. There were 17 segments describing the variety of tourists' products in the Antarctic.

- *Tourists will see expedition members driving Zodiacs between icebergs;*
- *Hiking is our expedition teams' main activity;*
- *Seeing glaciers by Zodiac, hiking, viewing penguins and seals, skiing, whale watching, and camping; and*
- *Under the leadership of a professional guide, I used a snowboard and dragged my sled to the South Pole.*

4.5 The Negative Aspects of Antarctic Tourism

The results also showed the negative aspects of Antarctica Tourism. This major category consisted of two primary categories: "negative comments by Antarctic tourists" and "tourists' behaviour."

- *Antarctic cruise tourism is destroying the local geographical environment;*
- *Some people travel long distances on cruise ships just to sip champagne while watching the glacier melt slowly;*
- *Except for penguins, seals, icebergs, the endless sea and silence, and expensive boat tickets, there is really nothing else; and*
- *Due to the large number of humans catching shrimps, a large number of penguins cannot find food. The climate is warming, and the habitat of penguins is getting reduced.*

The tourists' behaviour mentioned also revealed tourists' and leaders' misbehaviour:

- *Some expedition leaders like icebergs, some like animals, and some will boldly approach animals;*

- *Our expedition team also held a small cocktail party on the ice; and*
- *I saw that she was also holding a baby elephant seal in her arms.*

4.6 Summary

This chapter presented the main results generated from the data by thematic analysis. The key themes were identified as “Antarctic tourists” experience,” “the environmental protection of Antarctic tourism,” “the Antarctic tourism products,” and “the negative aspects of Antarctic tourism,” with supporting comments provided from the sub-categories of the postings. The following chapter discusses these findings in relation to the literature.

Chapter 5. Discussion

5.1 Introduction

This chapter presents the research findings and addresses the research questions (i.e. what is the impact of the development of Antarctic tourism on Antarctica, what is the present situation of sustainable tourism in Antarctica, and what are the impacts of sustainable tourism on the development of Antarctic tourism?). The chapter first discussed Antarctic tourists' experience, the environmental protection of Antarctic tourism, the Antarctic tourism products, and the negative aspects of Antarctic tourism based on the results of analysis. It then summarises the key findings in relation to existing literature and provides conclusions to the study.

5.2 Antarctic Tourists' Experience

The results showed the variety of tourist experiences in Antarctic tours, and most posters considered that the Antarctic landscape gave them a different and unique experience compared to that of other destinations. For example, one poster described the Antarctic landscape writing "travelling in Antarctica impressed me the most. This is the most beautiful natural landscape I have ever seen in my life." Other posters wrote "I considered that Antarctica is definitely a brand new and unique world," and "I think that maybe shocking, majestic, beautiful, unimaginable, incredible - these words barely describe Antarctica." The Antarctic landscape was also the reason tourists wanted to go there (Amelung & Lamers, 2006). Moreover, the distinctiveness of the Antarctica experience confirmed that the Antarctic environment is indeed unique. Cajiao et al. (2020) mentioned that the Antarctic has rich biodiversity and many unique geological features, and McClanahan (2020) commented that the Antarctic is a unique and fragile area. Some scholars and researchers were pessimistic about such rapid growth in Antarctic tourism, concerned about the negative impacts on this unique and fragile area. Therefore, the uniqueness of Antarctica means humans need to provide special and rigorous methods to keep it unique. The development of Antarctic tourism may be a threat to this unique and

fragile area. In common with the Antarctic landscape, the uniqueness of the Antarctic may also be why tourists want to travel to the Antarctic (Amelung & Lamers, 2006). Seasickness and the cold of the Antarctic trip were experienced by most of the tourists. Most of the posters considered these two experiences as challenging and part of the adventure. However, the previous literature does not mention the seasickness and cold of an Antarctic trip. Due to the challenging of seasickness and cold, these two experiences may become an obstacle to people who want to travel to the Antarctic. Tourists' various experiences can help others understand and study their behaviour and generate solutions to problems in the development of Antarctic tourism, such as vomitus disposal (Wright, 2008).

The physical condition of wild animals viewing observed by the posters showed that the Antarctic Treaty regulated that viewing wild animals should not be at less than five metres, and tourists should not stand on their usual routes, approach them actively, or touch them, unless wild animals approached the tourists. However, the actual situation of viewing wild animals was that keeping the "five-metre principle" was impossible due to the high density of penguins. This result is an important contribution to the literature. Williams and Crosbie (2007) stated that in some of most commonly visited destinations, repeated and frequent whale watching would cause potential disturbances to marine wildlife. Cajiao et al. (2020) found that the development of tourism puts pressure on the environment of Barrientos Island as well affecting the eco-environment by disturbing wildlife. Even if every tourist followed the "five-metre principle" strictly, tourists' landing and inadvertent contacting wild animals could disturb wildlife or ultimately destroy their habitats. Cajiao et al. (2020) also found that some non-native species of flora are already widely distributed on this island as well as in the nearby sea. The presence of these non-native species may affect native species, so these non-native species brought by humans may be a threat to Antarctic wild animals. The results of this study are therefore consistent with those of Cajiao et al. (2020). In the main locations of tourists concentrations, wildlife viewing has the potential to disturb wildlife, even if tourists keep their distance (Cajiao et al., 2020). With the development of Antarctic tourism, this

physical situation of viewing wild animals would bring various inevitable impacts which would become an obstacle to the implementation of sustainable tourism in the Antarctic.

The variety of Antarctic wild animals observed by the posters showed that the density of penguins was high. One of the posters mentioned that the South Georgia Island was than other areas of Antarctica, so there were many kinds of animals and plants; this island is also called "Antarctic wildlife paradise." The previous literature noted that Barrientos Island is located in the Antarctic Peninsula and is popular due to its rich biodiversity and many unique geological features (Cajiao et al., 2020). Some posters noticed that "now the number of penguins is declining." This finding indicates a particular threat to Antarctic animals. Only some researchers briefly mentioned that Antarctic tourism brings the Antarctic eco-environment under more pressure (e.g. Cajiao et al., 2020; Campos et al., 2012). The development of Antarctic tourism may lead to a decrease in the number of Antarctic wild animals, due to disturbances by humans, and the threat of non-native species (Cajiao et al., 2020).

Global warming was identified by a large number of tourists in the Antarctic. One of the posters wrote that "global warming has caused the Antarctic ice melting. We may be used to hearing about the impact of climate warming on the planet in the news, but most people have never really experienced it." Wright (2008) examined the way the growing Antarctic cruise industry affects the Antarctic environment and legislation and illustrated the influence of climate change. Noakes (2011) discussed many side-effects of Antarctic tourism's growth and explored the risk of a changing environment for Antarctic tourism. Global warming is caused by excessive CO₂ emissions. Farreny et al. (2011) stated that increased tourism to the Antarctic may not only bring local, but also global environmental influences. Farreny et al. (2011) found that the average tourist trip to Antarctica results in 5.44t of CO₂ emissions per passenger and approximately 70% of these CO₂ emissions are from cruising. Global warming affects the Antarctic environment. Antarctic tourism also produces CO₂ emissions, aggravating global warming. Farreny et al. (2011) stated that putting CO₂ emissions into environmental impact assessments would be valuable, and CO₂ emissions of Antarctic tourism highlight the impacts of local transport and tourism

on the global environment. The CO₂ emissions of Antarctic tourism is an impact brought about by the development of Antarctic tourism. Whether or not the CO₂ emissions are a management loophole for sustainable tourism has become a serious issue.

In comparison to previous research on Antarctica tourism, the results of this study have revealed the issue of the expensive cost of travelling to Antarctica. The high price may hold back the pace of development of Antarctic tourism and become an obstacle to tourists who want to travel to the Antarctic but cannot afford it. According to Tisdell (2020), due to the high price of Antarctic tourism, only people with a good income and social status, or those who engage in scientific work, could afford to go. These tourists can, politically and socially, play a positive role in Antarctic nature conservation, as most wanted Antarctica to be maintained in its pristine state. For example, tourists were willing to help promote Antarctic environmental protection and some were willing to devote themselves to Antarctic conservation (Tisdell, 2020). Clearly, the high cost of Antarctic tourism stops many tourists and controls arrivals to the Antarctic to some extent.

The popularity of Antarctica as a destination was identified by the posters. This result is consistent with the statistics of IAATO (2020) and IAATO (2009). IAATO stated that there were 33,054 visitors landing on the Antarctic area in 2007 and 2008. There was an increase of more than double, from 2002 and 2003 to 2007 and 2008 (IAATO, 2009). There were 36,702 tourists travelling to the Antarctica in 2015 and 51,707 in 2018 (IAATO, 2020). In 2018 and 2019, 56,168 people travelled to Antarctica by cruise ship, including 10,889 visitors who travelled on cruise ships only, but did not set foot on the Antarctica continent (IAATO, 2020). McClanahan (2020) suggested that due to the popularity of Antarctic tourism, some scholars and researchers were pessimistic about such rapid growth, which would have negative impacts on this unique and fragile area. However, it is also the popularity of Antarctic tourism that makes humans pay attention to environmental problems.

This study also revealed the roles of the expedition teams. The tourists found the expedition members had rich knowledge and experience, and most were experts in their

relevant fields, such as being ornithologists, oceanographers, or geologists. The professional staff and expedition team members on board the cruise ships educated the tourists in Antarctica, supervising and managing their behaviour with their professional knowledge and expertise. This however, was not mentioned in previous literature. On the contrary, Scott (2001) stated that the principles of mining were extremely strict; however, the principles of tourism are relatively loose and have some limitations. Molenaar (2005) considered that the Antarctic Treaty System (ATS) had responsibility for managing and governing Antarctica, but ATS has been relatively passive, and has weaknesses. Bastmeijer and Roura (2004) examined the international regulations of Antarctic tourism and discussed the main management issues of Antarctic tourism. Therefore, the results of this study may contribute to the literature on Antarctic tourism. The professionalism of the Antarctic expedition team may promote the development of sustainable tourism in the Antarctic.

5.3 The Environmental Protection of Antarctic Tourism

Controlling the capacity of a cruise ship is an important part of the environmental protection of Antarctic tourism. According to the data, most cruise ships had more than 100 passengers. The Antarctic Treaty regulated that only ships with less than 500 people could land, with no more than 100 people in each landing. In comparison with the previous literature, these data provide new information. Controlling the capacity of cruises to the Antarctic is a very important part of sustainable tourism in the Antarctic as well as being an important part of the environmental protection of Antarctic tourism by the IAATO. Controlling the arrival numbers of Antarctic tourists could directly decrease pressure on the eco-environment of Antarctica.

The regulations around viewing wild animals showed that the Antarctic Treaty stated that viewing wild animals should not be at less than five metres. This information did not directly appear in the previous literature, but it is important, because almost every tourist in the study mentioned this regulation. Aside from the “five-metre principle,” one poster also mentioned that there was “no feeding, no rushing, no loud noise, no smoking here.”

These messages can provide good publicity to promote Antarctic environmental protection and help promote the development of sustainable tourism in the Antarctic.

This study further found that receiving environmental education was an important part of Antarctica tourists' activities. The experts and expedition teams on cruise ships organised various lectures to explain all aspects of Antarctic history. The expedition teams also arranged visits to the research stations on the Antarctic, evidenced by a poster who discussed the experience of viewing Great Wall Station. Tisdell (2020) found in the absence of appropriate and mandatory management, tourism activities may put Antarctica in danger, but tourists also can, politically and socially, play a positive role in Antarctic nature conservation as most wanted Antarctica to be maintained in its pristine state. For example, posters found that tourists in Antarctica were willing to help promote Antarctic environmental protection and some were willing to devote themselves to Antarctic conservation. Antarctica may be a good place for environmental education. This is a positive impact on the development of Antarctic tourism.

Many posters mentioned that on their Antarctic trip there were strict regulations. The data about the strict regulations provided many detailed and practical regulations, which also did not appear in the academic literature. These regulations can be found in the Protocol on Environmental Protection to the Antarctic Treaty (1991). Strict regulations can help to achieve environmental protection against Antarctic Tourism. The 22 data segments describing the strict regulations in the Antarctic show detailed guidelines for tourists and tour operators in Antarctica. However, in comparison to information in other literature, whether or not the strict regulations mentioned by posters are effective was not identified. This issue was also raised by other researchers who identified the deficiencies of the regulations. For example, Amelung and Lamers (2006) stated that the Antarctic Treaty System (ATS) has not yet built a comprehensive regulatory system on Antarctic tourism. The system of self-regulation supervised by IAATO is under enormous pressure with the development of Antarctic tourism. Bastmeijer (2003) discussed Article 3 of the Protocol and found that the Protocol and domestic legislation do not offer clear and strong normative criteria for determine whether tourist activities should proceed in Antarctica or

not. Molenaar (2005) considered that the Antarctic Treaty System (ATS) has responsibility for managing and governing Antarctica, however, ATS has its weaknesses.

Antarctic tourists' environmental awareness is a crucial element for evaluating the environmental protection of the Antarctic. According to the data collected in this study, tourists followed the regulations and laws of Antarctica strictly, and most of them shared a high level of environmental awareness, which means the environment of the Antarctic may be protected to some degree. However, this study also found that some tourists are not aware of the importance of environmental protection and regulations. This resonated with discussions about tourists' misbehaviour mentioned in other research in terms of the negative aspects of Antarctic tourism. Studies by Pfeiffer and Peter (2004) and Williams and Crosbie (2007) discussed the potential disturbances brought by tourists' misbehaviour as a result of poor environmental awareness.

5.4 Antarctic Tourism Products

Data about the polar plunge provided information about diving in the Antarctic waters. Some of the posters considered that as one of the "must-experience" events in Antarctica. Cajiao et al. (2020) stated that in the period of 2003 to 2017, IAATO presented 14 different types of tourism activities on the Antarctic. The polar plunge is one of the most attractive experiences. Although this activity is permitted by IAATO, the polar plunge may bring some negative impacts.

The results also showed that most tourists enjoyed the hospitality on board the cruise ships. This has implications for the cruise ship operators in terms of the variety of facilities and services that can be provided before negative impacts appear. Hospitality on cruise ships included holding an open-air barbecue on the deck, holding small cocktail parties on the ice, and salvaging ice cubes and putting them in whisky. This finding provided detailed information from the tourists that has not appeared in previous studies. However, there are questions around whether holding open-air barbecues on the deck brings excessive CO₂ emissions and air pollution, or if holding a small cocktail party on

the ice brings in non-native species accidentally, or whether salvaging ice cubes impacts the environment and aggravates global warmings.

There were 13 tourist products in the Antarctic: driving Zodiacs, hiking, cocktail parties, viewing penguins and seals, skiing, whale watching, camping, taking propeller planes, playing with snowboards, soaking in hot springs, exploring ice lakes, snow biking, and driving snowmobiles. Cajiao et al. (2020) stated that IAATO presented 14 different types of tourism activities on the Antarctic: ship cruises, remote underwater vehicles, science support, small boat cruising, small boat landing, extended walks, kayaking, scuba diving, skiing, snowboarding, anchoring, aircraft landing filming, and swimming. Among these 14 types of activities, kayaking, Zodiacs, Zodiac rides and extended walks were the most frequent activities in Antarctica, representing 97% of all tourism activities (Cajiao et al., 2020). The findings from the posters added more tourist products known about in Antarctica tourism. IAATO mentioned 14 activities, but the data in this study revealed the new activities of cocktail parties, camping, taking propeller planes, soaking in hot springs, exploring ice lakes, snow biking, and driving snowmobiles; these did not exist in the 14 activities mentioned by IAATO.

5.5 The Negative Aspects of Antarctic Tourism

The negative comments by Antarctic tourists showed that Antarctic cruise tourism is destroying the local environment. Many researchers have negative comments about Antarctic tourism. For example, Amelung and Lamers (2006) stated that the Antarctic Treaty System (ATS) has not yet built a comprehensive regulatory system for Antarctic tourism. The system of self-regulation supervised by IAATO is under enormous pressure with the development of Antarctic tourism. Haase (2005) summarised some weaknesses of the current management system of Antarctic tourism, and Cajiao et al. (2020) found that tourism activities can destroy the vegetation and soil on Barrientos Island. Engelbertz et al. (2015) found that more volumes of maritime traffic and people in Antarctica bring higher risks of incidents and accidents as well as threats to human life and the Antarctic environment. One poster in this study considered that except for penguins, seals, icebergs,

the endless sea and silence, and expensive boat tickets, there is really nothing else at Antarctica. This negative comment on the Antarctic landscape is different from those praising the scenery written by most researchers.

Data on tourists' behaviour mainly focused on misbehaviour, such as some people boldly approaching animals, and one of the expedition team members holding a baby elephant seal in her arms. These actions are inappropriate according to the Protocol on Environmental Protection to the Antarctic Treaty (1991). Due to tourists' misbehaviour, Pfeiffer and Peter (2004) collect data on birds, and by testing the heart rates of the birds to evaluate the impacts of tourists' behaviour, hoped to have information to help reduce misbehaviour. Pfeiffer and Peter (2004) considered that tourists need general knowledge about how to avoid harassing wildlife before landing in the Antarctic region. Williams and Crosbie (2007) stated that in some of the most commonly visited destinations, repeated and frequent whale watching could cause disturbance to marine wildlife.

5.6 Summary

This study has identified some answers to the research questions. First of all, the impacts of the development of Antarctic tourism in Antarctica include: disturbing wildlife; aggravating global warming; adding to pressure caused by the popularity of Antarctic tourism; threatening the unique environment; offering environmental education; excessive CO₂ emissions; air pollution; and bringing non-native species in accidentally. In addition, viewing wild animals, the increasing numbers of Antarctic tourists, various tourists' products, the weaknesses of the current management system, and tourists' misbehaviour may be obstacles to sustainable tourism in Antarctica. However, the professionalism of the expedition teams, strict regulations and environmental education, and the high price of Antarctic tourism may benefit the promotion and development of sustainable tourism in Antarctica. Finally, in terms of the third research question, the data collected in this study may not provide an adequate answer. Kruczek et al. (2018) stated that Antarctica is an important world testing area for sustainable tourism. Sustainable tourism meets the needs of present tourists and host regions while protecting and

enhancing opportunities for the future. This finding provides challenges for tour operators engaged in the development of sustainable tourism in Antarctica. The next chapter presents the conclusions of the study and provides recommendations for future research.

Chapter 6. Conclusion

6.1 Introduction

This chapter summarises the overall study. Firstly, it revisits the research questions. Then, the research limitations and implications are discussed, followed by recommendations for future research.

6.2 Research Questions

As mentioned before, with increasing interest in the Antarctic areas and the development of technology and infrastructure, Antarctic tourism has grown greatly over the past two decades. According to the Antarctic and Southern Ocean Coalition (ASOC), large numbers of people land at crucial wildlife habitats and historic sites, so mass commercial tourism in the Antarctic requires a set of systematic checks, controls, and supervision, which will bring pressure to the environment of the Antarctic and expose defects in the IAATO's regulations (Abdullah & Shah, 2018). Against this background, there are many studies devoted to exploring this topic. The purpose of this study was to analyse Antarctic tourism issues and sustainable tourism in the Antarctic. The research questions of this study were: "what is the impact of the development of Antarctic tourism on Antarctica, what is the present situation of sustainable tourism in Antarctica, and what are the impacts of sustainable tourism on the development of Antarctic tourism?" The impacts of the development of Antarctic tourism on Antarctica include those of disturbing wildlife; aggravating global warming; adding to pressure caused by the popularity of Antarctic tourism; threatening the unique environment; offering environmental education; excessive CO₂ emissions; air pollution; and bringing non-native species in accidentally. In addition, viewing wild animals, increasing numbers of Antarctic tourists, various tourists' products, the weaknesses of the current management system, and tourists' misbehaviour may be obstacles to sustainable tourism in Antarctica. However, the professionalism of the expedition team, strict regulations and environmental education and the high price of Antarctic tourism may benefit the promotion and development of

sustainable tourism in Antarctica. Finally, to answer the question about the impacts of sustainable tourism on the development of Antarctic tourism, it is recognised that the data collected now may not provide an adequate answer.

6.3 Research Limitations

There are several limitations to this study. Firstly, the data collected were secondary and limited to the Chinese tourists who shared their experiences on two social media websites. Secondly, the sample size was small. The data analysis was based on 40 postings, which is not sufficient to generate representative findings on those who have visited the Antarctica. Thirdly, the research question of “what are the impacts of sustainable tourism on the development of Antarctic tourism?” could not be answered due to the limited postings analysed. Lastly, the secondary data obtained from the Zhihu and Mafengwo apps are relevant to Chinese users, but the experiences of tourists from other countries and areas were missing. Finally, as there was a large amount of data to collect and analyse, the chosen method of manual coding may have produced some errors.

6.4 Research Implications

First of all, according to the statistics of IAATO, Antarctic tourism has grown significantly over the past two decades (IAATO, 2020), along with various and intractable environmental issues. Therefore, to study the relationship between the impact of Antarctic tourism and the Antarctic environment, a perspective of sustainable tourism may be helpful for addressing the various environmental issues. The development of Antarctic tourism needs more advanced methods. Secondly, Kruczek et al. (2018) stated that Antarctica is an important world testing area for sustainable tourism. In terms of sustainability, it is not yet known whether Antarctic tourism is really the best in the world and how people ensure that human arrivals do not affect a destination’s sustainability (Kruczek et al., 2018). In the context of the Tourism and Sustainable Development Goals – Journey To 2030, contributing to sustainable economic growth, resource efficiency, environmental protection, and climate change, would promote the development of sustainable tourism (UNWTO, 2017). It is therefore important to study the present

situation of sustainable tourism in Antarctica and the impact of sustainable tourism on the development of Antarctic tourism. Thirdly, the number of studies on sustainable tourism in the Antarctic are still limited; therefore, the results and discussion of this study could be supplementing this field. This study has also contributed to research methods by using social media platforms to explore tourists' experiences in Antarctica. Finally, the findings of this study have practical implications for tour operators in promoting and organising Antarctica tours and how international laws and regulations might be implemented to ensure the sustainable development of tourism in Antarctica.

6.5 Recommendations for Future Research

Due to the limitations of this study, the findings are not generalisable to all tourists to Antarctica. Future research needs to collect data from tourists from other countries to explore their experiences of Antarctica tourism. Moreover, research also can be conducted by interviewing tour operators such as cruise ship managers and staff, to identify their understandings of the impacts of sustainable tourism in Antarctica. Furthermore, field research on the Antarctic will need to be conducted in the future, as a real tourist to this polar area can provide more useful information about sustainable tourism and tourism impacts on the Antarctic.

6.6 Summary

The first chapter of the study introduced the background of Antarctica and information on the Antarctic Treaty, ATS and IAATO. This was followed by a discussion of the development of tourism in Antarctica as a destination. This chapter also explained the research aim, research questions, the significance of the study, and the structure of this dissertation. The second chapter reviewed literature relevant to the research topic to study and evaluate past research findings with a view to exploring new research topics. The third chapter was the methodology. This explained qualitative research and the methodology of this study, interpretive description. The data collection used secondary data and netnography, and the data analysis method of thematic analysis was overviewed. The fourth chapter presented the results from the data analysis, sorted into different

themes using thematic analysis. The fifth chapter discussed and interpreted the main results of the study, and the final sixth chapter is the conclusion, with implications, limitations and recommendations.

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Appendix 1: Identifying specific segments of information from initial data

Posters	Initial Data	Identifying Specific Segments of Information
Poster 1 (Posted in 2017)	<p>When the cruise ship passed through the Drake Passage, our team members on the ship were all seasick. I was so excited when I first saw the iceberg. Although the Antarctic is very cold, I swam in the Antarctic sea. The crew helped me catch a piece of ice that maybe tens of thousands of years old, and I brought it back and drank a cup of whisky with a small piece of the ice. This piece of ice is very hard and difficult to melt. We came to Port Lockroy, where there is a British scientific research station (64°49' S, 63°30'W). There is also known as the southernmost post office in the world and the southernmost souvenir shop. We also ate barbecue at the southernmost barbecue stall here. There was no limit on barbecue and drinks. We learned that the staff at the scientific research station cannot usually take a bath, because the freshwater supply at the scientific research station is mainly provided by Antarctic cruise ships, they can only take a bath when the cruise ship is docked.</p> <p>The tourists on this trip followed the regulations and laws of Antarctica very much. The regulations and staff required that the viewing distance of penguins should not be less than five metres and required that when landing, tourists must take the path that the staff has stepped on to avoid entering the ice crack by mistake. All tourists strictly followed the rules. The staff on board are all experts who study the Antarctic, for example, the old man sailing is a professor at the University of Tasmania in Australia who has studied Antarctica for 43 years.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>When the cruise ship passed through the Drake Passage, our team members on the ship were all seasick.</p> <p>I was so excited when I first saw the iceberg.</p> <p>The crew helped me catch a piece of ice. I drank a cup of whisky with a small piece of the ice.</p> <p>We also ate barbecue at the southernmost barbecue stall here.</p> <p>The tourists on this trip followed the regulations and laws of Antarctica very much. The regulations and staff required that the viewing distance of penguins should not be less than five metres.</p> <p>when landing, tourists must take the path that the staff has stepped on to avoid entering the ice crack by mistake. All tourists strictly followed the rules.</p> <p>The staff on board are all experts who study the Antarctic</p>
Poster 2 (Posted in 2017)	<p>I think going to Antarctica is not the biggest challenge. It can even be said that as long as you have normal physical function and intelligence, there is basically no challenge. Of course, Antarctica is cold in winter, but Antarctica in summer is not cold</p>	<p>Most cruise ships have more than 100 passengers, and these ships are already quite large.</p>

Posters	Initial Data	Identifying Segments of Information
	<p>at all (for places that can be reached by ordinary cruise ships) and it is usually summer when travelling. Most cruise ships have more than 100 passengers, and these ships are already quite large. The advancement of technology makes it no longer a problem to pass through the Drake Passage. The facilities and services on board can basically satisfy everyone. In recent years, Antarctic tourism has continued to develop, and cruise fares have become more and more expensive. Frankly speaking, this is the highest price I have ever paid for a single destination, and I think this price is still relatively expensive.</p> <p>I considered that Antarctica is definitely a brand new and unique world, regardless of topography, meteorology, hydrology, or ecological environment. When you walk alone, looking at the endless snowy field, you will feel awe; when you are camping in the wild, wake up in the middle of the night and find that sky is full of stars, you will want to cry; when you pass by whales and penguins again and again, as if you can touch them with your hand, you will pray that this land will be always holy.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>This is the highest price I have ever paid for a single destination.</p> <p>I considered that Antarctica is definitely a brand new and unique world.</p> <p>When you walk alone,, you will pray that this land will be always holy.</p>
Poster 3 (Posted in 2018)	<p>Our ship took two days from South America to Antarctica through the Drake Channel. The Drake Passage is very windy, making people easy to get seasick. Our ship is basically the smallest, with more than 70 passengers, and more than 60 crew members and expedition members. Most landing points in Antarctica have restrictions on the number of people. Our ships can land all tourists at once, while large ships can only land in batches.</p> <p>The 4-day itinerary has theoretically 8 landing opportunities: landing every half day, 2-3 hours each time. Sometimes, tourists would return early or cancel due to the weather. We picked up a piece of ice that was at least two thousand years old. I took it to the bar and added whisky to drink it. On the fourth day, we landed at Whaler's bay and we were swimming here.</p> <p>There are really many penguins. In Antarctica, the rule for wild animals is not to close to within five metres or stand on their usual routes, but there will always be penguins walking by your side. The expedition members have rich knowledge and experience, and most of them are experts in related fields, such as polar geography, history, and biology. The experts will use the spare time to arrange special lectures to explain Antarctic</p>	<p>The Drake Passage is very windy, making people easy to get seasick.</p> <p>Our ship is basically the smallest, with more than 70 passengers, and more than 60 crew members and expedition members.</p> <p>Most landing points in Antarctica have restrictions on the number of people.</p> <p>Landing every half day, 2-3 hours each time.</p> <p>We picked up a piece of ice. I took it to the bar and added whisky to drink it.</p> <p>We landed at Whaler's bay and we were swimming here.</p>

Posters	Initial Data	Identifying Segments of Specific Information
	<p>knowledge for tourists. After the trip, visitors will have a deep understanding of Antarctic knowledge.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>The rule for wild animals is not to close to within five metres or stand on their usual routes, but there will always be penguins walking by your side.</p> <p>The expedition members have rich knowledge and experience, and most of them are experts in related fields</p> <p>The experts will use the spare time to arrange special lectures to explain Antarctic knowledge for tourists.</p>
Poster 4 (Posted in 2018)	<p>There are two opportunities to land on the Antarctic Peninsula every day, so in the morning, tourists will see expedition members driving Zodiac between icebergs. South Georgia Island has relatively warm temperatures, fertile soil, and abundant food, so it has a huge variety of penguins and seals. The Antarctic Treaty regulated that viewing wild animals should not be less than five metres, but once tourists land on South Georgia Island, they will find it is impossible because the land is full of animals. On South Georgia Island, elephant seal pups are abandoned by their mothers about 20 days after they are born, so baby elephant seals must learn to swim and forage in the sea on their own to avoid starvation. At this time, elephant seal pups were hungry for more than ten days, and when they see humans, they view humans as their mother, so they will quickly close to humans and find milk.</p> <p>The Antarctic treaty regulated that only ships with less than 500 people can land, and no more than 100 people every landing. Experts on cruise ships teach Antarctica knowledge every day. Luckily, sailors salvaged ice cubes to the bar, and I drank whisky with them.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>Tourists will see expedition members driving Zodiac between icebergs.</p> <p>The Antarctic Treaty regulated that viewing wild animals should not be less than five metres.</p> <p>South Georgia Island has a huge variety of penguins and seals.</p> <p>Bt once tourists land on South Georgia Island, they will find it is impossible because the land is full of animals.</p> <p>Elephant seal pups were hungry for more than ten days, and when they see humans, they view humans as their mother, so they will quickly close to humans and find milk.</p> <p>The Antarctic treaty regulated that only ships</p>

Posters	Initial Data	Identifying Specific Segments of Information
		<p>with less than 500 people can land, and no more than 100 people every landing.</p> <p>Experts on cruise ships teach Antarctica knowledge every day.</p> <p>Sailors salvaged ice cubes to the bar, and I drank whisky with them.</p>
Poster 5 (Posted in 2018)	<p>I think that maybe shocking, majestic, beautiful, unimaginable, incredible, these words barely describe Antarctica. In Antarctica, seeing a wild animal is very easy. I have taken a lot of seasickness pills, but I still feel very uncomfortable. I deliberately took the national flag to dive in Antarctic water, I think it makes a lot of sense. The open-air barbecue on the cruise is a reserved item of most travel companies. Hiking is our expedition teams' main activity. We also landed at Fort Point that has fewer tourists than other hot sites.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>I think that maybe shocking, majestic, beautiful, unimaginable, incredible, these words barely describe Antarctica.</p> <p>Seeing a wild animal is very easy.</p> <p>I have taken a lot of seasickness pills, but I still feel very uncomfortable.</p> <p>I deliberately took the national flag to dive in Antarctic water.</p> <p>The open-air barbecue on the cruise is a reserved item of most travel companies.</p> <p>Hiking is our expedition teams' main activity.</p>
Poster 6 (Posted in 2019)	<p>Travelling in Antarctica impressed me the most. Due to weather permitting, we drove into the Lemaire Channel, one of the most beautiful sites in Antarctica. This is the most beautiful natural landscape I have ever seen in my life. I considered that one of the must-experienced events in Antarctica is the Polar Plunge, and finally, 132 people on the ship and 64 people completed the Polar Plunge. When watching penguins, they will actively approach you or pass by very close to you.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>Traveling in Antarctica impressed me the most. This is the most beautiful natural landscape I have ever seen in my life.</p> <p>One of the must-experienced events in Antarctica is the Polar Plunge</p>

Posters	Initial Data	Identifying Specific Segments of Information
		<p>132 people on the ship and 64 people completed the Polar Plunge.</p> <p>When watching penguins, they will actively approach you or pass by very close to you.</p>
Poster 7 (Posted in 2017)	<p>According to the tour guide, this is one of the best cruise ships in Antarctic waters. The entire ship has 7 floors, this time there are 190 passengers and 170 crew members. The density of penguins is so high, which means the principle of at least five metres away is completely impossible to achieve. Therefore, it is the first time that I have zero-distance contact with penguins. I think that if penguins live on other continents, they cannot be regarded as protected animals at all, because there are too many penguins. Our expedition team also held a small cocktail party on the ice. Our ship encountered several kinds of whales on the way, and the scene of the whales spraying water was very shocking.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>There are 190 passengers and 170 crew members.</p> <p>The density of penguins is so high, which leads to that the principle of at least five metres away is completely impossible to achieve.</p> <p>I have zero-distance contact with penguins. there are too many penguins.</p> <p>Our expedition team also held a small cocktail party on the ice.</p> <p>Our ship encountered several kinds of whales on the way.</p>
Poster 8 (Posted in 2018)	<p>At the end of December 2018, I and other researchers boarded a scientific research ship to Antarctica from Chile. In my spare time, I would hike around as a tourist. I jumped three times in the Antarctic waters. Frankly speaking, I can clearly feel global warming. In 1968, a scientific research station was built beside the glacier in order to obtain fresh water, but now the location of the scientific research station has not changed, but the glacier has receded far away. The glacier has been receding. In the scientific research station, there is staff who are responsible for rubbish disposal. They pack up the rubbish that is generated from the Antarctic experiment and life, and transport all the rubbish back to Chile for processing. All things accidentally thrown outside must also be registered strictly. For example, someone dropped a spoon into the water while eating at the dock and it must be registered.</p>	<p>In my spare time, I would hike around as a tourist. I jumped three times in the Antarctic waters.</p> <p>I can clearly feel global warming.</p> <p>The glacier has been receding.</p> <p>There is staff who are responsible for rubbish disposal.</p> <p>Transport all the rubbish back to Chile for processing.</p>

Posters	Initial Data	Identifying Specific Segments of Information
	https://www.zhihu.com/question/20710997?sort=created	All things accidentally thrown outside must also be registered strictly.
Poster 9 (Posted in 2019)	<p>As an expedition member, I led a ship of Chinese friends to Antarctica. We are fortunate enough to land at the Great Wall Station, China's scientific research station in Antarctica. On the ship, the expedition team arranged various lectures, and everyone can choose to participate according to their own interests. The topics are usually Antarctic geology, biology, and exploration history. During once landing, a curious elephant seal occupied our landing supplies, when we needed to leave. Finally, our expedition leader had to carefully use a snow pole to drag other supplies back from the seal. The number of penguins in South Georgia is as many as a million, which may induce tryphobia. As long as you sit there for a while, curious baby penguins will come and approach you. According to the regulations, you cannot close to penguins within five metres, but if the penguin comes to you, you do not have to hide. If the penguin slaps you, you cannot fight back.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>The expedition team arranged various lectures.</p> <p>A curious elephant seal occupied our landing supplies, when we needed to leave. Finally, our expedition leader had to carefully use a snow pole to drag other supplies back from the seal.</p> <p>As long as you sit there for a while, curious baby penguins will come and approach you.</p> <p>You cannot close to penguins within five metres, but if the penguin comes to you, you do not have to hide.</p>
Poster 10 (Posted in 2018)	<p>My most unforgettable experience during my travels in Antarctica was the close encountering with whales. In order to have closer contact with Antarctica, we participated in the Zodiac project. Since Antarctic glaciers are in danger of breaking at any time, and most of them are hidden underwater, a certain safe distance must be maintained when driving Zodiac. Suddenly, the expedition leader yelled "Attention! Whales!", and then we saw a whale leaping from the water. These whales are very smart and never accidentally bumps into a Zodiac.</p> <p>We went to the small island named Baily Head, and the entire shore was densely packed with penguins. I thought there were at most one million penguins in Antarctica, but the answer was 14 million. Removing external impurities of ice cubes that picked up from Antarctic water, and then I made an iced whisky for myself in the bar. Many lectures (Antarctic history, glaciers, birds, photography, etc.) are organised on board. There are also</p>	<p>My most unforgettable experience during my travels in Antarctica was the close encountering with whales.</p> <p>We participated in the Zodiac project.</p> <p>The entire shore was densely packed with penguins.</p> <p>Removing external impurities of ice cubes that picked up from Antarctic water, and then I made an iced whisky for myself in the bar.</p>

Posters	Initial Data	Identifying Segments of Specific Information
	<p>areas dedicated to reading and coffee on board. There will also be a knowledge contest and auction on the last day.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	Many lectures are organised on board.
Poster 11 (Posted in 2015)	<p>What do tourists do when they go to Antarctica? Seeing glaciers by Zodiac, hiking, viewing penguin and seals, skiing, whale watching, and camping. I think these activities will not have much impact on the Antarctic environment. I do not deny that some tourists' environmental awareness is not good enough, but overall, most tourists' environmental awareness is still very good. IAATO has strict requirements for all Antarctic tourism companies. It can even say that Antarctic travel is the place with the highest environmental protection requirements in the world. Thanks to the effective work of IAATO, I think that the overall environmental protection awareness of tourists from Antarctica is much higher than tourists' awareness from other travel destinations. There are dog sleds in the Arctic, but the Antarctic do not permit to bring any animals or plants. I do not know which other tourist destination in the world has such strict regulations! Also, tourists cannot even take a stone away. The staff on the Antarctic cruise ship will really strictly supervise the landing. I have a good example of Antarctic tourists. When an Antarctic tourist was sitting on the ground to rest, a penguin came over and fell asleep on her laps. Tourists cannot close to animals within five metres. Therefore, this tourist just sat for more than 20 minutes. After the penguin waked up and left, the tourist got up and left.</p> <p>https://www.zhihu.com/question/22655751/answer/29463044</p>	<p>Seeing glaciers by Zodiac, hiking, viewing penguin and seals, skiing, whale watching, and camping.</p> <p>Most tourists' environmental awareness is still very good.</p> <p>IAATO has strict requirements for all Antarctic tourism companies.</p> <p>It can even say that Antarctic travel is the place with the highest environmental protection requirements in the world.</p> <p>The overall environmental protection awareness of tourists from Antarctica is much higher than tourists' awareness from other travel destinations.</p> <p>I do not know which other tourist destination in the world has such strict regulations!</p> <p>Tourists cannot even take a stone away.</p> <p>The staff on the Antarctic cruise ship will really strictly supervise the landing.</p> <p>Tourists cannot close to animals within five metres. Therefore, this tourist just</p>

Posters	Initial Data	Identifying Specific Segments of Information
		<p>sat for more than 20 minutes.</p> <p>After the penguin waked up and left, the tourist got up and left.</p>
<p>Poster 12</p> <p>(Posted in 2017)</p>	<p>To reach Antarctica from Ushuaia, we need to cross the Drake Passage known as the "Devil Westerly Belt". Unluckily, the wind and the waves were so big, everyone on the boat was seasick. Such commercial expeditions in Antarctica are usually led by a very professional team. I chose the Quark expedition team from the United States. They only focus on travelling to the North and South Pole. The expedition members have various professional backgrounds such as Antarctic biology, ocean and geography. Usually, they organise various lectures to explain all aspects of Antarctic knowledge to everyone. When I landed on Orne Harbour the next day, I proposed to my girlfriend. Back on the boat, the tourists jumped into the Antarctic water with all kinds of weird movements, and then they climbed into the boat and took the vodka handed over. After the polar plunge is the deck barbecue. On the fourth day, when I actually saw the penguins, I found that they were really smelly. Then, when we were in the Zodiac, I felt that the Zodiac shook, and two whales swam past us. It is amazing!</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>The wind and the waves were so big, everyone on the boat was seasick.</p> <p>Such commercial expeditions in Antarctica are usually led by a very professional team.</p> <p>The expedition members have various professional backgrounds</p> <p>They organise various lectures to explain all aspects of Antarctic knowledge to everyone.</p> <p>The tourists jumped into the Antarctic water</p> <p>After the polar plunge is the deck barbecue.</p> <p>When we were in the Zodiac, I felt that the Zodiac shook, and two whales swam past us.</p>
<p>Poster 13</p> <p>(Posted in 2017)</p>	<p>In my opinion, responsible Antarctic travel should be supported. Because it is extremely difficult to travel by own in Antarctica now. An Antarctic trip is organised by an authorised travel agency and it is a responsible tourism. In my opinion, abiding by IAATO and AECO's visitor regulations and protecting the local ecology; encouraging and supporting tourists to take more active actions to deal with climate change after the journey are responsible Antarctic tourism.</p> <p>Responsible Antarctic travel should be supported, because:</p> <p>1. Non-exploitation activities</p>	<p>An Antarctic trip is organised by an authorised travel agency and it is a responsible tourism.</p> <p>Antarctica is also a very good place for environmental education.</p> <p>It is possible to promote more active responses to climate change and even</p>

Posters	Initial Data	Identifying Segments of Information	Specific of
	<p>Antarctic travel is a non-exploratory activity and will not take away any biological or non-biological substances (except small microorganisms) from the local area. Compared with mining and fishing activities, it has less impact on the environment and ecology of the polar region. It will not bring greater risks to the local environment.</p> <p>2. Environmental Education</p> <p>Antarctica is also a very good place for environmental education. There can be close contact with a large number of wild animals. Such experiences are easier to help people establish an emotional connection with nature. Also, the relevant training and education on Polar Cruises are very scientific.</p> <p>3. Social impact</p> <p>Because travel to Antarctica is expensive, most of the people, who are able to participate, are successful people with influence. If the beauty of Antarctica can be used as a fulcrum and the influence of tourists can be used as a lever, it is possible to promote more active responses to climate change and even further promote government policymaking.</p> <p>https://www.zhihu.com/question/22655751</p>	<p>further promote government policymaking.</p>	
<p>Poster 14</p> <p>(Posted in 2019)</p>	<p>More and more wealthy tourists around the world travel to Antarctica by cruise ships. According to reports, in 2017, there were 45,000 tourists and 34 cruise ships to the Antarctic region. The luxurious polar experience has become more abundant: The Scenic Eclipse cruise ship is equipped with an indoor swimming pool, a meditation room, two helicopters, a six-seater submarine, and 110 bottles of whisky. The Crystal Endeavor cruise ship is not only equipped with helicopters and submarines, but also provides casino entertainment. The Seabourn Venture cruise ship provides mountain biking, kayaking and other activities, equipped with two six-seater submarines, as well as high-quality champagne and caviar.</p> <p>While polar tourism is becoming increasingly popular, more and more people are beginning to realise the impact of this industry on the environment. Antarctic cruise tourism is destroying the local geographical environment. German newspapers once satirised cruise tourists, "Some people travel long distances on cruise ships just to sip champagne while watching the glacier melt slowly."</p>	<p>While polar tourism is becoming increasingly popular, more and more people are beginning to realise the impact of this industry on the environment.</p> <p>Antarctic cruise tourism is destroying the local geographical environment.</p> <p>Some people travel long distances on cruise ships just to sip champagne while watching the glacier melt slowly.</p>	

Posters	Initial Data	Identifying Segments of Specific Information
	https://zhuanlan.zhihu.com/p/92899727	
Poster 15 (Posted in 2017)	<p>At 4 pm on November 22, we hurried to the pier and saw the Fram cruise ship waiting for us on the shore. The ship is like a small United Nations. People who have different skins stand excitedly on the deck, speaking their own languages, although no one can understand what everyone is sighing about. However, the excitement did not last long, and the ship quietly sailed into the famous "westerly zone" of the Drake Passage. I felt that my body may be more comfortable only when I lie down, and I felt very sick whenever I stand up. After two days of sailing, we finally arrived in the Antarctic Peninsula area. The scenery in front of me is gradually enriched, and you can see penguins playing on the ice. The sky became lively, sea swallow followed the cruise ship. There are only three main colours of blue, white and lake blue, which are extremely pure. When I left Paradise Bay, I filled a few pieces of ice with a thermos and took it back to the ship.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>I felt that my body may be more comfortable only when I lie down, and I felt very sick whenever I stand up.</p> <p>There are only three main colours of blue, white and lake blue, which are extremely pure.</p> <p>When I left Paradise Bay, I filled a few pieces of ice with a thermos and took it back to the ship.</p>
Poster 16 (Posted in 2019)	<p>To go to Antarctica, the first hurdle is to cross the Drake Passage, which is known as the "Devil Strait" and the "Corridor of Death". Going to Antarctica is one of my dreams, but the road to the dream has always been bumpy. This time I was greeted by seasickness. Our ship shook extremely badly, and constantly heard the sound of various objects shaking, and we could only walk slowly by supporting the wall. The broadcast on the ship also reminded us that we should not put valuables such as cameras and computers on the table, because these things will fall to the ground. As soon as I woke up in the morning, I started to vomit. This feeling of dizziness and vomiting accompanied me for two days, and I could barely eat for these two days. After more than 70 hours of shaking, the first sight of the Antarctic continent was an unbreathable scenery. If the earth is a lonely and beautiful planet, then Antarctica should be the most lonely and beautiful place on the earth. In Antarctica, you must follow the "five-metre principle", that is, you must be at least five metres away from any animal, unless they walk toward you, but the penguins in Antarctica are not afraid of humans at all, and will slowly close to you. Antarctic diving is probably the craziest thing I have done in my life. Travel to Antarctica is mainly from November to March, which is the warm season in Antarctica every year. In November, the ice broke and penguins courted.</p>	<p>The first hurdle is to cross the Drake Passage. As soon as I woke up in the morning, I started to vomit.</p> <p>Antarctica should be the most lonely and beautiful place on the earth.</p> <p>You must follow the "five-metre principle"</p> <p>You must be at least five metres away from any animal, unless they walk toward you</p> <p>Antarctic diving is probably the craziest thing I have done in my life.</p>

Posters	Initial Data	Identifying Segments of Information	Specific of
	<p>December to January is the warmest time on the Antarctic continent. February to March is the best time to watch whales.</p> <p>https://zhuanlan.zhihu.com/p/67247406?from_voters_page=true</p>		
<p>Poster 17</p> <p>(Posted in 2018)</p>	<p>Traveling to the Antarctic, the first feeling of many people must be very cold. Of course, Antarctica is very cold in winter, but it is usually summer when travelling. Usually, the temperature of Antarctica's summer is around 0 degrees Celsius, I believe there will be lower temperatures in winter in many areas of China. But there are often strong winds in Antarctica, and the strong wind takes away too much heat from our body. Nevertheless, as long as you take measures to prevent wind, there will be no problems. I felt that the coldest day was camping in the polar regions, and without a tent, we slept for one night under the combination of a waterproof bag, a sleeping bag and a heat insulation pad. I felt quite warm at first, and I was awaked in the middle of the night due to the cold. Antarctica may not be the most exciting or the most beautiful place, but it must be the most shocking. I think this shock comes more from the "new". Antarctica is definitely a brand-new world for us. Someone once said that when you reach Antarctica, you will feel like you are on another planet. A trip to the Antarctic allows you to experience such a pure place on the earth, to realise that the world is much larger than we imagined, and to feel that life can be more exciting and meaningful.</p> <p>https://zhuanlan.zhihu.com/p/46906304</p>	<p>There are often strong winds in Antarctica, and the strong wind takes away too much heat from our body.</p> <p>I felt that the coldest day was camping in the polar regions</p> <p>Antarctica may not be the most exciting or the most beautiful place, but it must be the most shocking.</p>	
<p>Poster 18</p> <p>(Posted in 2015)</p>	<p>I took a propeller plane and landed at 89 degrees south latitude, which is 110 kilometres from the south pole. Under the leadership of a professional guide, I wear a snowboard and drags my sled to the South Pole. I also climbed the peak of Vinson, the highest peak in Antarctica, at an altitude of 4,830 metres. I believe that the Antarctic environment is special. Lack of microorganisms and lack of microbial activity make the rubbish difficult to degrade; therefore, human activities may cause irreversible damage to the Antarctic environment. In order to protect this continent, people need to comply with stricter requirements than any destination. For example, all urine must be brought back to the base camp and transported back to South America by plane.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>I took a propeller plane and landed at 89 degrees south latitude.</p> <p>Under the leadership of a professional guide, I wear a snowboard and drags my sled to the South Pole.</p> <p>I also climbed the peak of Vinson.</p> <p>The Antarctic environment is special.</p> <p>Lack of microorganisms and lack of microbial activity</p>	

Posters	Initial Data	Identifying Segments of Specific Information
		<p>make the rubbish difficult to degrade.</p> <p>People need to comply with stricter requirements than any destination.</p> <p>All urine must be brought back to the base camp and transported back to South America by plane.</p>
Poster 19 (Posted in 2016)	<p>The expedition team members from all over the world are equipped with stunts including ornithologists, oceanographers, geologists and so on. They will give tourists lectures every day. Due to the fragile ecology of Antarctica, all visitors to Antarctica must abide by Antarctic regulations. Sometimes, tourists can see the curved snow road that is the ‘Penguin Highway’, and tourists need to make way for the penguins. I considered the most exciting activity is the polar swimming. There were 170 people on the ship, 55 people participated in this swimming. In addition, a piece of ice water prepared by the ship was sold at a high price of US\$500.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>The expedition team members from all over the world are equipped with stunts including ornithologists, oceanographers, geologists and so on.</p> <p>They will give tourists lectures every day.</p> <p>Due to the fragile ecology of Antarctica, all visitors to Antarctica must abide by Antarctic regulations.</p> <p>Tourists need to make way for the penguins.</p> <p>The most exciting activity is the polar swimming.</p> <p>There were 170 people on the ship, 55 people participated in this swimming.</p>
Poster 20 (Posted in 2017)	<p>At the end of 2017, my husband and I went to Antarctica. Because we were engaged in polar travel planning, we chose a scientific research ship with a small passenger capacity, which can be good for every landing. It was summer in the southern hemisphere. From seeing the first piece of ice floating on the sea, we began to be in a state of extreme excitement. Antarctica is really a beautiful and pure place. Humans have to marvel at the magic of nature. The scientific research ship sailing through the</p>	<p>Antarctica is really a beautiful and pure place.</p> <p>Sailing through the Drake Channel was a horrifying experience, and the shaking made most people want to vomit.</p>

Posters	Initial Data	Identifying Segments of Specific Information
	<p>Drake Channel was a horrifying experience, and the shaking made most people want to vomit. Fortunately, I participated in the polar diving. The moment I entered the sea, I felt my body tingled to suffocation, and it was even more uncomfortable after landing. The entire Antarctic trip gave me a perfect experience, from lectures by scientific researchers, various interest groups, ice-breaking cruises on Zodiacs to several landings, which I have never experienced. The trip to the South Pole and the polar plunge are experiences that people must participate in their lifetime. I will definitely go again if I have a chance in the future.</p> <p>https://www.zhihu.com/question/20710997?sort=created</p>	<p>I participated in the polar diving.</p> <p>The entire Antarctic trip gave me a perfect experience, from lectures by scientific researchers, various interest groups, ice-breaking cruises on Zodiacs to several landings</p>
<p>Poster 21</p> <p>(Posted in 2019)</p>	<p>Crossing the Drake Passage, I probably vomited more than seven times in my memory. Only lying down and sleeping on the bed can make me comfortable a little. Except for necessary lectures on the ship, most of the time we rested on the boat. When I saw Antarctica, I did not know what adjectives should be used to describe that landscape. That landscape really shocked me. On the fourth day of the voyage, we finally landed on Port Lockroy. This is a small place. A black and red house stands on the hillside. It was originally a scientific research base of the United Kingdom. Now it has become a small Antarctic museum and sells souvenirs. Because the museum is very small, it can only accommodate about 25 people at a time, and it needs to be entered in batches. Landing on the Antarctic continent has a rule that the safe distance from any animal must be greater than five metres, but penguins can approach us. Port Lockroy is too small, but penguins are everywhere. I was lucky enough to come to the Great Wall Station of China. Not all Antarctic cruise ships have the opportunity to come to the Great Wall Station. Great Wall Station has very strict requirements on the number of passengers and the landing time. The landing time cannot exceed 45 minutes.</p> <p>http://www.mafengwo.cn/i/12422902.html</p>	<p>Crossing the Drake Passage, I probably vomited more than seven times in my memory.</p> <p>That landscape really shocked me.</p> <p>Safe distance from any animal must be greater than five metres, but penguins can approach us.</p> <p>Great Wall Station has very strict requirements on the number of passengers and the landing time.</p>
<p>Poster 22</p> <p>(Posted in 2018)</p>	<p>Many years ago, when I saw the Antarctic tourism advertisement in the newspaper, my first reaction was: Can Antarctica travel? That is the only piece of pure land in the world. It is the seventh continent on earth that does not belong to any country. In summer, the waters of the Antarctic may be frozen. These ice floes stab an ordinary cruise ship like a sharp knife. Therefore, all cruise ships that can drive into the Antarctic waters must have</p>	<p>There was a total of 175 passengers on the expedition ship.</p> <p>The highlight of the first day was training. A large group of people putted on life jackets for training.</p>

Posters	Initial Data	Identifying Segments of Specific Information
	<p>special ice strength. There was a total of 175 passengers on the expedition ship. The highlight of the first day was training. A large group of people putted on life jackets for training. There were lectures every day. Everyone will listen to these lectures. The attendance rate is almost 99%.</p> <p>The first time we landed, we were greeted by a few lovely sea bugs, and along the beach, we could see the former whaling boats and oil mills. It is said that more than 40,000 whales were killed in this place. Later whaling was banned. This very historic bay has also been fully preserved. Over the past 58 years, Gullydviken's whaling station has slaughtered 54,000 whales and produced 455,000 tons of whale oil and 192,000 tons of whale meat. The number is shocking. You can imagine how bloody it was back then.</p> <p>Although the Antarctic Treaty regulates that tourists and animals must keep a distance of five metres, I found that as long as you squat down, they will naturally walk to you. The dreamiest landing point in South Georgia is Gold Bay! It is a small beach but densely covered with wild animals. You may be only half a metre away from the walrus. The walrus mother returned to the sea to catch fish after the feeding period, leaving hungry walrus babies on the beach. They will always pounce on you. Unfortunately, due to some reasons, our expedition team failed to soak in the hot springs on Deception Island.</p> <p>http://www.mafengwo.cn/i/11328606.html</p>	<p>There were lectures every day. The attendance rate is almost 99%.</p> <p>Although the Antarctic Treaty regulates that tourists and animals must keep a distance of five metres, I found that as long as you squat down, they will naturally walk to you.</p> <p>Gold Bay! It is a small beach but densely covered with wild animals.</p> <p>You may be only half a metre away from the walrus.</p> <p>Walrus babies,, will always pounce on you.</p> <p>Our expedition team failed to soak in the hot springs on Deception Island.</p>
Poster 23 (Posted in 2019)	<p>There are many animals in South Georgia. Some of them are all brought in by humans, including cows, sheep, deer, cats, dogs, rats, and even monkeys and foxes. Due to the remediation in recent years, we did not see any non-native animal here. Humans used to breed reindeer here, causing damage to the vegetation, so reindeer breeding was strictly limited to a certain area. In 2013, people believed that reindeer should not be here, so a large number of reindeer were killed or moved to Falkland. Rats arrived by boat unintentionally. As the glacier retreats, the range of activities of the rats is expanding. The rats are extremely fertile, and people have to pay a higher price to start extermination. 9 million euros were put in and hundreds of millions of baits were put in three stages. Finally, in 2018, the rat was exterminated here. In Grytvikan, the huge body of the whale was cut into small pieces, then extracted the whale oil, and finally</p>	<p>Heroina Island is already the most visited island in this archipelago. Even if it is already the most visited island, its visit rate is only once a year.</p>

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	<p>transported to the manufacturer to repackage it. Landing on Heroína Island has become the worthiest thing of our trip, because Heroína Island is already the most visited island in this archipelago. Even if it is already the most visited island, its visit rate is only once a year. In 2019, this honour belongs to us.</p> <p>http://www.mafengwo.cn/i/20321158.html</p>		
<p>Poster 24</p> <p>(Posted in 2018)</p>	<p>Antarctica, for many people, is a place that is difficult to reach in their lifetime, and many travellers regard it as an ultimate destination. When you see the first iceberg, it means that the test of the devil's westerly zone is coming to an end, and the Antarctic continent is getting closer. Fortunately, the first thing greeting us is whales. The Antarctic Treaty stipulates that humans cannot take the initiative to touch penguins and must maintain a distance of at least five metres from them, but penguins can take the initiative to approach humans. There is no permanent human settlement in Antarctica, only a few places have scientific research stations for scientists. The Great Wall Station is one of the places most Chinese want to visit during the Antarctic trip.</p> <p>http://www.mafengwo.cn/i/10656842.html</p>	<p>The Antarctic Treaty stipulates that humans cannot take the initiative to touch penguins and must maintain a distance of at least five metres from them, but penguins can take the initiative to approach humans.</p>	
<p>Poster 25</p> <p>(Posted in 2019)</p>	<p>It must be said about the Antarctic landing: the expedition leader will take us on the Zodiac. But most of the landings have to drip through the sea to reach the shore. The expedition team will set up walking routes on the island in advance. Antarctica also has very good protection for wild animals. The expedition team will require people to keep a distance of more than five metres from animals. No feeding, no rushing, no loud noise, no smoking here. Global warming has led to the rapid melting of ice. Today's seals can only choose slightly larger ice floes as their habitat. Also, if a lot of penguins are coming towards you, you must step back because you may be standing on the penguin highway. At the last stop in Antarctica, we finally came to the most famous islands in Antarctica — South Shetland Islands. On the beach, giant seals are in groups and lying lazily on the beach. That's so cute.</p> <p>http://www.mafengwo.cn/i/18774814.html</p>	<p>The expedition leader will take us on the Zodiac.</p> <p>The expedition team will set up walking routes on the island in advance.</p> <p>Antarctica also has very good protection for wild animals.</p> <p>The expedition team will require people to keep a distance of more than five metres from animals.</p> <p>No feeding, no rushing, no loud noise, no smoking here. Global warming has led to the rapid melting of ice.</p> <p>If a lot of penguins are coming towards you, you must step back because you</p>	

Posters	Initial Data	Identifying Specific Segments of Information
		may be standing on the penguin highway.
Poster 26 (Posted in 2017)	<p>You can see that I am so close to the cute penguins in the photo, but please do not try to touch them. The Antarctic Treaty stipulates that you cannot approach these small animals actively. You must keep a distance of five metres. If you do not move, the little penguins may come to you. You do not need to avoid them. Obviously, penguins like me better.</p> <p>The Drake Strait is located between the Antarctic continent and the South American continent, where the Pacific and the Atlantic meet. Due to its special geographical location, the wind here is above level 8 almost every day. Because I was timid, I did not participate in Polar Plunge, but I have no regrets at all. Each Zodiac will have an expedition leader, some expedition leaders like icebergs, some like animals, and some will boldly approach animals.</p> <p>http://www.mafengwo.cn/i/7408712.html</p>	<p>You can see that I am so close to the cute penguins in the photo, but please do not try to touch them.</p> <p>The Antarctic Treaty stipulates that you cannot approach these small animals actively.</p> <p>You must keep a distance of five metres. If you do not move, the little penguins may come to you.</p> <p>Because I was timid, I did not participate in Polar Plunge</p> <p>Some expedition leaders like icebergs, some like animals, and some will boldly approach animals.</p>
Poster 27 (Posted in 2017)	<p>Shock, great, pure, and beautiful are not enough to describe Antarctica. If you want to ask me what is so fun about Antarctica? Sorry, I really cannot answer this question. Except for penguins, seals, icebergs, the endless sea and silence, and expensive boat tickets, there is really nothing else. I landed on an island on the last day. I can't remember the name of this island. I heard from the crew that the island's weather conditions are usually very bad. Even the crew who have been to Antarctica several times landed here for the first time. There are hundreds of thousands of penguins on this island, but the number has been declining in recent years.</p> <p>http://www.mafengwo.cn/i/10354542.html</p>	<p>Except for penguins, seals, icebergs, the endless sea and silence, and expensive boat tickets, there is really nothing else.</p> <p>There are hundreds of thousands of penguins on this island, but the number has been declining in recent years.</p>
Poster 28 (Posted in 2017)	<p>The current technology has made great progress compared with a hundred years ago. It is no longer technically difficult to reach the South Pole, and it is safe enough. It can be said that Antarctic travel is very mature. More than 200 people travel to the South Pole every year. Even so, the South Pole is still one of the most inaccessible travel destinations on earth. Early this morning, we</p>	<p>It can be said that Antarctic travel is very mature. More than 200 people travel to the South Pole every year.</p>

Posters	Initial Data	Identifying Segments of Information
	<p>drove to the mountain near the camp to explore the mysterious blue ice lake at the foot of the mountain. There, it was the first time that I really set foot on the inland of Antarctica. In addition to outdoor adventures, there are also many polar projects that can be experienced in our camp. Snow biking is one of them. There is a total of 10 bicycles in the camp. You can experience snow biking anytime you want. Driving snowmobiles can experience the speed and passion in this land. There is no red light, no speed limit.</p> <p>http://www.mafengwo.cn/i/6870050.html</p>	<p>We drove to the mountain near the camp to explore the mysterious blue ice lake at the foot of the mountain.</p> <p>There are also many polar projects that can be experienced in our camp. Snow biking is one of them.</p> <p>Driving snowmobiles can experience the speed and passion in this land.</p>
<p>Poster 29</p> <p>(Posted in 2016)</p>	<p>Antarctica is the last continent on the earth where no one has settled. This mysterious place, which has an average altitude of 2350 metres, is covered with snow and ice all year, is difficult to approach easily even today. Except for distance, there is the Drake Passage between the Antarctic and the nearest South American continent. Before landing, we still have many things to emphasise. The crew once again illustrated the restrictions in the Antarctic Treaty for tourists.</p> <p>First of all, environmental sanitation is definitely the most stringent in the world. The Antarctic Treaty is not allowing anything to be discarded on the Antarctic continent, even the shoes during landing are uniformly distributed by each expedition ship (mainly afraid that foreign species on the tourists' own shoes destroy the unique ecology of Antarctica). And before landing, the clothing of each person was dust-removed. Then, tourists must maintain a five-metre distance from wild animals. Of course, it doesn't matter if the animals approach you. Again, no personnel are allowed to take away anything that originally belonged to the Antarctic continent. Finally, it was announced that the use of aircraft on the Antarctic continent was prohibited, so as to prevent accidental aircraft crashes into the sea. Lithium batteries would pollute the environment and aircraft would disturb birds.</p> <p>http://www.mafengwo.cn/i/5443578.html</p>	<p>The crew once again illustrated the restrictions in the Antarctic Treaty for tourists.</p> <p>Environmental sanitation is definitely the most stringent in the world. The Antarctic Treaty is not allowing anything to be discarded on the Antarctic continent, even the shoes during landing are uniformly distributed by each expedition ship (mainly afraid that foreign species on the tourists' own shoes destroy the unique ecology of Antarctica).</p> <p>And before landing, the clothing of each person was dust-removed.</p> <p>Tourists must maintain a five-metre distance from wild animals.</p> <p>No personnel are allowed to take away anything that originally belonged to the Antarctic continent.</p>

Posters	Initial Data	Identifying Specific Segments of Information
		<p>the use of aircraft on the Antarctic continent was prohibited, so as to prevent accidental aircraft crashes into the sea.</p> <p>Lithium batteries would pollute the environment and aircraft would disturb birds.</p>
Poster 30 (Posted in 2018)	<p>The travel agency chartered the entire ship, with many Chinese tourists on this cruise ship. Antarctica has only more than 20 sunny days throughout the year. But luckily, we saw its sunny day when we had just arrived. Under the sunlight, the small red houses on the shore are very bright. That is the Great Wall Station of China. The Great Wall Station of China is located on King George Island in the South Shetland Islands. The Lemaire Channel is a long and narrow sea area between the Antarctic Peninsula and an ice-covered island, with magnificent scenery on both sides.</p> <p>http://www.mafengwo.cn/i/8649846.html</p>	<p>The Lemaire Channel is a long and narrow sea area between the Antarctic Peninsula and an ice-covered island, with magnificent scenery on both sides.</p>
Poster 31 (Posted in 2017)	<p>Many people say that setting foot on Antarctica is the ultimate dream of their life. With the wind on the sea, we arrived at Sanders Island under the protection of the expedition team. Before Zodiac docked, we had already seen groups of penguins on the distant mountains. It was the first time that everyone on the board saw so many penguins, and I felt very shocked and surprised. Then our ship sailed to South Georgia. After two days of the sea voyage, the cruise ship came to South Georgia on the seventh day. In order to prevent damage to the ecological environment on the island, tourists go through biological inspection and boot disinfection before landing on the island. When returning to the boat from the island, the boots must also be disinfected. The last activity in Antarctica: Polar Plunge. People put on swimsuits, fastened seat belts and jumped into the cold ocean.</p> <p>http://www.mafengwo.cn/i/11979254.html</p>	<p>It was the first time that everyone on the board saw so many penguins, and I felt very shocked and surprised.</p> <p>In order to prevent damage to the ecological environment on the island, tourists go through biological inspection and boot disinfection before landing on the island. When returning to the boat from the island, the boots must also be disinfected.</p> <p>The last activity in Antarctica: Polar Plunge.</p>

Posters	Initial Data	Identifying Segments of Specific Information
Poster 32 (Posted in 2016)	<p>I crossed the Drake Passage on the first two days, I felt seasick, but I had to go to a safety seminar in the morning and get landing boots. Because this meeting needs everyone to attend, tourists must sign the attendance table, otherwise, you cannot land. Almirante Brown was a workstation in Argentina. Until 1984, the doctor who had been worked here burned this workstation, because he could not continue to tolerate the winter. No one was injured in the fire, but the site has since been abandoned. What's more interesting is skiing that anyone can do here. Climb up the only hillside, and then just sit down and slide down the hill (but we did not try, the expedition leaders appeared to be very cautious when landing on this island, and repeatedly reminded us not to cross the warning line because the cliff is dangerous).</p> <p>http://www.mafengwo.cn/i/5386269.html</p>	<p>I crossed the Drake Passage on the first two days, I felt seasick,</p> <p>But I had to go to a safety seminar in the morning and get landing boots. this meeting needs everyone to attend, tourists must sign the attendance table, otherwise, you cannot land.</p> <p>What's more interesting is skiing that anyone can do here.</p>
Poster 33 (Posted in 2018)	<p>Penguins will always be the best spokesperson for Antarctica. In this season when the ice and snow begin to melt, I have seen the magic of nature. No language can describe the emptiness and purity in front of me. The old sailor on our Zodiac is a person with rich experience in Antarctic sea navigation. While sailing, he carefully searched the sea surface. As long as there is a suitable ice cube, he will catch it for everyone to take pictures and taste. What is taste? I can tell you; it is salty. And our expedition leader Karin would stand on a high place, look down at the surrounding situation, and all landing locations and route arrangements are determined by her.</p> <p>http://www.mafengwo.cn/i/8663570.html</p>	<p>No language can describe the emptiness and purity in front of me.</p> <p>The old sailor on our Zodiac is a person with rich experience in Antarctic sea navigation.</p> <p>As long as there is a suitable ice cube, he will catch it for everyone to take pictures and taste.</p> <p>And our expedition leader Karin, and all landing locations and route arrangements are determined by her.</p>
Poster 34 (Posted in 2017)	<p>We signed the Treaty about some Antarctic regulation before landing. We must keep a distance of five metres from the penguins, unless the penguins walk to you. Even a rock we cannot take away. Now the number of penguins is declining. Due to the large number of humans catching shrimps, a large number of penguins cannot find food. The climate is warming, and the habitat of penguins is getting reduced. They should not be disturbed too much. As a tourist, I can only try my best not to destroy their ecological environment, not to disturb them. We continued to sail to Paradise Bay, where we could see the glacier</p>	<p>We signed the Treaty about some Antarctic regulation before landing.</p> <p>We must keep a distance of five metres from the penguins, unless the penguins walk to you.</p>

Posters	Initial Data	Identifying Specific Segments of Information
	<p>collapse, but I do not want to see this scene. Global warming has caused the Antarctic ice melting. You can hear a roar here from time to time. It is the sound of a glacier collapsing into the sea. If you don't come here to witness what happened, you don't know that our planet is so vulnerable. We may be used to hearing about the impact of climate warming on the planet in the news, but most people have never really experienced it.</p> <p>http://www.mafengwo.cn/i/8091781.html</p>	<p>Even a rock we cannot take away.</p> <p>Now the number of penguins is declining. Due to the large number of humans catching shrimps, a large number of penguins cannot find food. The climate is warming, and the habitat of penguins is getting reduced.</p> <p>As a tourist, I can only try my best not to destroy their ecological environment, not to disturb them.</p> <p>We could see the glacier collapse, but I do not want to see this scene. Global warming has caused the Antarctic ice melting.</p> <p>We may be used to hearing about the impact of climate warming on the planet in the news, but most people have never really experienced it.</p>
Poster 35 (Posted in 2019)	<p>There are many lectures on the boat, including mandatory (such as landing instructions, Zodiac instructions) and voluntary. The content of the lectures is also very rich, including penguins, seabirds, posters, whales, photography, glaciers, various small history, and scientific research etc. Originally, we planned to go to the Great Wall Station, but due to the epidemic, the Great Wall Station was closed, and other scientific research stations also rejected us, which is a pity.</p> <p>http://www.mafengwo.cn/i/18766534.html</p>	<p>There are many lectures on the boat, including mandatory (such as landing instructions, Zodiac instructions) and voluntary.</p> <p>The content of the lectures is also very rich</p>
Poster 36 (Posted in 2019)	<p>After one day and two nights sailing, finally, we came to the Antarctic Peninsula. There are more ice-free areas in the Antarctic Peninsula than any other area in the Antarctic continent, and a large number of Antarctic wildlife live here. With the impact of human activities and the increase in</p>	<p>Antarctic Peninsula, a large number of Antarctic wildlife live here.</p> <p>With the impact of human activities and the increase in</p>

Posters	Initial Data	Identifying Specific Segments of Information
	<p>temperature brought by global warming, the natural environment and wild animals and plants here are facing severe tests. During the trip, the expedition team leader will lead you to find various marine animals and approach them quietly so that you can take photos or videos.</p> <p>http://www.mafengwo.cn/i/18738574.html</p>	<p>temperature brought by global warming, the natural environment and wild animals and plants here are facing severe tests.</p> <p>The expedition team leader will lead you to find various marine animals and approach them quietly</p>
<p>Poster 37</p> <p>(Posted in 2018)</p>	<p>I had a wedding in Antarctica. The first place we landed is South Georgia. It takes more than one kilometre to walk from the place where we got off the Zodiac to the penguin gathering location. The expedition team has planted a red flag on the ground in advance. We need to move along the established route. The babies of elephant seals are so cute. They are not afraid of people at all and keep rubbing against me. At first, I was a little worried about safety issues, but the expedition team leader said it was okay. I saw that she was also holding a baby elephant seal in her arms. The expedition leader Ali specially selected Neko Harbour, the most beautiful landing point in this trip. The Antarctic wedding trip, in addition to the stunning natural scenery and wild animals, the most moving and unforgettable thing is the great support of the tourists and expedition team to our wedding.</p> <p>http://www.mafengwo.cn/i/18660184.html</p>	<p>The expedition team has planted a red flag on the ground in advance. We need to move along the established route.</p> <p>The babies of elephant seals are so cute. They are not afraid of people at all and keep rubbing against me.</p> <p>I saw that she was also holding a baby elephant seal in her arms.</p> <p>The stunning natural scenery</p>
<p>Poster 38</p> <p>(Posted in 2020)</p>	<p>In the afternoon, our ship cruised around the Great Wall Station. This was also our first close encounter with the Great Wall Station. We originally thought that we could land on the scientific research station, but later due to some reasons, we were not allowed. There are many activities on the 6th day. In the morning, it is planned to land Petermann Island. This is our first landing. Everyone is very excited. In the afternoon, we planned to cruise in Pléneau Bay. In the evening, it will be deck BBQ and enjoy the Lima waterway. Our great captain and explorers communicated with the Ukrainian scientific research station and allowed us to visit this scientific research station in the afternoon.</p> <p>http://www.mafengwo.cn/i/18143212.html</p>	<p>Everyone is very excited.</p> <p>It will be deck barbecue and enjoy the Lima waterway.</p> <p>Allowed us to visit this scientific research station in the afternoon.</p>
<p>Poster 39</p>	<p>After nearly two days of wandering, we finally reached land. This is Laurie Island, the second largest of the South Orkney Island group. A gigantic glacier covered the entire view, with barely a piece of land left visible. This is the location of our</p>	<p>16 lonely male researchers were so eager that they sent radio 2 days before our</p>

Posters	Initial Data	Identifying Segments of Information	Specific of
(Posted in 2016)	<p>landing site today: Orcadas research station. As we approached, the entire crew came to welcome us. This is one of the research stations rarely visited by ships, and Ushuaia was the first ship to have visited in 6 months. 16 lonely male researchers were so eager that they sent radio 2 days before our arrival, asking: “Does anyone have cigarettes?”. A penguin was particularly interested in our landing gears. He circled around our clothes a few times. Antarctica is the last piece of virgin land on Earth, and is the place to demonstrate the frailty of humanity.</p> <p>http://www.mafengwo.cn/i/20584645.html</p>	<p>arrival, asking: “Does anyone have cigarettes?”.</p> <p>A penguin was particularly interested in our landing gears. He circled around our clothes a few times.</p>	
Poster 40 (Posted in 2019)	<p>The cruise ship carries approximately 110 passengers, including 40 Chinese tourists and 60 tourists from several European countries. Antarctica is a paradise for whales. In the days of Antarctica, we landed on several islands and learned that around the nineteenth century, the British killed whales to refine whale oil, which brought destruction to the survival of whales. This fishing activity did not end until the 1950s — the drafting and signing of the Antarctic Treaty. South Georgia Island is an active volcanic island. The island is desolate and mountainous. Most of it is covered by ice and snow, but South Georgia Island is warmer compared to other areas of Antarctica; therefore, there are many kinds of animals and plants. Here is also called "Antarctic wildlife's paradise".</p> <p>http://www.mafengwo.cn/i/12055222.html</p>	<p>The cruise ship carries approximately 110 passengers</p> <p>South Georgia Island is warmer compared to other areas of Antarctica; therefore, there are many kinds of animals and plants.</p> <p>Here is also called "Antarctic wildlife's paradise".</p>	

Appendix 2: Creating key categories

The Segments of Information	Key Categories
<p>I was so excited when I first saw the iceberg.</p> <p>I considered that Antarctica is definitely a brand new and unique world.</p> <p>I think that maybe shocking, majestic, beautiful, unimaginable, incredible, these words barely describe Antarctica.</p> <p>Traveling in Antarctica impressed me the most. This is the most beautiful natural landscape I have ever seen in my life.</p> <p>Antarctica should be the most lonely and beautiful place on the earth.</p> <p>Antarctica may not be the most exciting or the most beautiful place, but it must be the most shocking.</p> <p>Antarctica is really a beautiful and pure place.</p> <p>That landscape really shocked me.</p> <p>No language can describe the emptiness and purity in front of me.</p> <p>The stunning natural scenery</p> <p>Everyone is very excited.</p> <p>There are only three main colours of blue, white and lake blue, which are extremely pure.</p> <p>The Lemaire Channel is a long and narrow sea area between the Antarctic Peninsula and an ice-covered island, with magnificent scenery on both sides.</p> <p>When you walk alone,, you will pray that this land will be always holy.</p>	<p>1.Tourists' perspectives on the Antarctic landscape</p>
<p>When the cruise ship passed through the Drake Passage, our team members on the ship were all seasick.</p> <p>The Drake Passage is very windy, making people easy to get seasick.</p> <p>I have taken a lot of seasickness pills, but I still feel very uncomfortable.</p> <p>The wind and the waves were so big, everyone on the boat was seasick.</p> <p>I felt that my body may be more comfortable only when I lie down, and I felt very sick whenever I stand up.</p> <p>The first hurdle is to cross the Drake Passage. As soon as I woke up in the morning, I started to vomit.</p> <p>Sailing through the Drake Channel was a horrifying experience, and the shaking made most people want to vomit.</p> <p>Crossing the Drake Passage, I probably vomited more than seven times in my memory.</p>	<p>2.Seasick</p>

The Segments of Information	Key Categories
I crossed the Drake Passage on the first two days, I felt seasick.	
<p>I felt that the coldest day was camping in the polar regions.</p> <p>There are often strong winds in Antarctica, and the strong wind takes away too much heat from our body.</p>	3.Cold
<p>Most cruise ships have more than 100 passengers, and these ships are already quite large.</p> <p>Our ship is basically the smallest, with more than 70 passengers, and more than 60 crew members and expedition members.</p> <p>The Antarctic treaty regulated that only ships with less than 500 people can land, and no more than 100 people every landing.</p> <p>132 people on the ship and 64 people completed the Polar Plunge.</p> <p>There are 190 passengers and 170 crew members.</p> <p>There were 170 people on the ship, 55 people participated in this swimming.</p> <p>There was a total of 175 passengers on the expedition ship.</p> <p>The cruise ship carries approximately 110 passengers.</p>	4.The capacity of the cruise ship
<p>I deliberately took the national flag to dive in Antarctic water.</p> <p>One of the must-experienced events in Antarctica is the Polar Plunge.</p> <p>I jumped three times in the Antarctic waters.</p> <p>The tourists jumped into the Antarctic water.</p> <p>The most exciting activity is the polar swimming.</p> <p>I participated in the polar diving.</p> <p>The last activity in Antarctica: Polar Plunge.</p> <p>We landed at Whaler's bay and we were swimming here</p> <p>After the polar plunge is the deck barbecue.</p> <p>Antarctic diving is probably the craziest thing I have done in my life.</p> <p>Because I was timid, I did not participate in Polar Plunge</p>	5.The polar plunge
<p>The regulations and staff required that the viewing distance of penguins should not be less than five metres.</p> <p>The rule for wild animals is not to close to within five metres or stand on their usual routes.</p> <p>The Antarctic Treaty regulated that viewing wild animals should not be less than five metres.</p>	6. The regulations of viewing wild animals

The Segments of Information	Key Categories
<p>The density of penguins is so high, which means the principle of at least five metres away is completely impossible to achieve.</p> <p>You cannot close to penguins within five metres, but if the penguin comes to you, you do not have to hide.</p> <p>Tourists cannot close to animals within five metres.</p> <p>You must follow the "five-metre principle"</p> <p>You must be at least five metres away from any animal, unless they walk toward you</p> <p>Tourists need to make way for the penguins.</p> <p>Safe distance from any animal must be greater than five metres, but penguins can approach us.</p> <p>Although the Antarctic Treaty regulates that tourists and animals must keep a distance of five metres</p> <p>The Antarctic Treaty stipulates that humans cannot take the initiative to touch penguins and must maintain a distance of at least five metres from them, but penguins can take the initiative to approach humans.</p> <p>The expedition team will require people to keep a distance of more than five metres from animals.</p> <p>No feeding, no rushing, no loud noise, no smoking here.</p> <p>If a lot of penguins are coming towards you, you must step back because you may be standing on the penguin highway.</p> <p>The Antarctic Treaty stipulates that you cannot approach these small animals actively.</p> <p>You must keep a distance of five metres.</p> <p>Tourists must maintain a five-metre distance from wild animals.</p> <p>We must keep a distance of five metres from the penguins, unless the penguins walk to you.</p>	
<p>But there will always be penguins walking by your side.</p> <p>When watching penguins, they will actively approach you or pass by very close to you.</p> <p>Seeing a wild animal is very easy.</p> <p>The density of penguins is so high, which means the principle of at least five metres away is completely impossible to achieve.</p> <p>I have zero-distance contact with penguins.</p>	<p>7. The physical condition of viewing wild animals</p>

The Segments of Information	Key Categories
<p>A curious elephant seal occupied our landing supplies, when we needed to leave. Finally, our expedition leader had to carefully use a snow pole to drag other supplies back from the seal.</p> <p>As long as you sit there for a while, curious baby penguins will come and approach you.</p> <p>My most unforgettable experience during my travels in Antarctica was the close encountering with whales.</p> <p>Therefore, this tourist just sat for more than 20 minutes. After the penguin waked up and left, the tourist got up and left.</p> <p>When we were in the Zodiac, I felt that the Zodiac shook, and two whales swam past us.</p> <p>I found that as long as you squat down, they will naturally walk to you.</p> <p>You may be only half a metre away from the walrus.</p> <p>Antarctica also has very good protection for wild animals.</p> <p>You can see that I am so close to the cute penguins in the photo, but please do not try to touch them.</p> <p>If you do not move, the little penguins may come to you.</p> <p>Some expedition leaders like icebergs, some like animals, and some will boldly approach animals.</p> <p>The expedition team leader will lead you to find various marine animals and approach them quietly</p> <p>The babies of elephant seals are so cute. They are not afraid of people at all and keep rubbing against me.</p> <p>I saw that she was also holding a baby elephant seal in her arms.</p> <p>A penguin was particularly interested in our landing gears. He circled around our clothes a few times.</p> <p>But once tourists land on South Georgia Island, they will find it is impossible because the land is full of animals.</p> <p>Elephant seal pups were hungry for more than ten days, and when they see humans, they view humans as their mother, so they will quickly close to humans and find milk.</p> <p>Our ship encountered several kinds of whales on the way.</p> <p>Walrus babies,, will always pounce on you.</p>	
<p>The density of penguins is so high</p> <p>The entire shore was densely packed with penguins.</p>	<p>8. The variety of Antarctic wild animals</p>

The Segments of Information	Key Categories
<p>Gold Bay! It is a small beach but densely covered with wild animals.</p> <p>There are hundreds of thousands of penguins on this island, but the number has been declining in recent years.</p> <p>It was the first time that everyone on the board saw so many penguins, and I felt very shocked and surprised.</p> <p>Now the number of penguins is declining.</p> <p>Antarctic Peninsula, a large number of Antarctic wildlife live here.</p> <p>South Georgia Island is warmer compared to other areas of Antarctica; therefore, there are many kinds of animals and plants.</p> <p>Here is also called "Antarctic wildlife's paradise".</p> <p>South Georgia Island has a huge variety of penguins and seals.</p> <p>There are too many penguins.</p>	
<p>I can clearly feel global warming.</p> <p>The glacier has been receding.</p> <p>Global warming has led to the rapid melting of ice.</p> <p>The climate is warming,</p> <p>We could see the glacier collapse, but I do not want to see this scene. Global warming has caused the Antarctic ice melting.</p> <p>We may be used to hearing about the impact of climate warming on the planet in the news, but most people have never really experienced it.</p> <p>With the impact of human activities and the increase in temperature brought by global warming, the natural environment and wild animals and plants here are facing severe tests.</p>	9. Global warming
<p>The experts will use the spare time to arrange special lectures to explain Antarctic knowledge for tourists.</p> <p>Experts on cruise ships teach Antarctica knowledge every day.</p> <p>The expedition team arranged various lectures.</p> <p>Many lectures are organised on board.</p> <p>They organise various lectures to explain all aspects of Antarctic knowledge to everyone.</p> <p>They will give tourists lectures every day.</p> <p>The entire Antarctic trip gave me a perfect experience, from lectures by scientific researchers,</p> <p>There were lectures every day. The attendance rate is almost 99%.</p>	10.Environmental education

The Segments of Information	Key Categories
<p>But I had to go to a safety seminar in the morning and get landing boots. this meeting needs everyone to attend, tourists must sign the attendance table, otherwise, you cannot land.</p> <p>There are many lectures on the boat, including mandatory (such as landing instructions, Zodiac instructions) and voluntary.</p> <p>The content of the lectures is also very rich</p> <p>Antarctica is also a very good place for environmental education.</p> <p>Great Wall Station has very strict requirements on the number of passengers and the landing time.</p> <p>Allowed us to visit this scientific research station in the afternoon.</p> <p>It is possible to promote more active responses to climate change and even further promote government policymaking.</p>	
<p>The crew helped me catch a piece of ice. I drank a cup of whisky with a small piece of the ice.</p> <p>We picked up a piece of ice. I took it to the bar and added whisky to drink it.</p> <p>Sailors salvaged ice cubes to the bar, and I drank whisky with them.</p> <p>Removing external impurities of ice cubes that picked up from Antarctic water, and then I made an iced whisky for myself in the bar.</p> <p>When I left Paradise Bay, I filled a few pieces of ice with a thermos and took it back to the ship.</p> <p>As long as there is a suitable ice cube, he will catch it for everyone to take pictures and taste.</p> <p>We also ate barbecue at the southernmost barbecue stall here.</p> <p>The open-air barbecue on the cruise is a reserved item of most travel companies.</p> <p>It will be deck barbecue and enjoy the Lima waterway.</p> <p>Our expedition team also held a small cocktail party on the ice</p>	11. Hospitality on board
<p>This is the highest price I have ever paid for a single destination.</p>	12. The high price of Antarctic tourism
<p>The staff on board are all experts who study the Antarctic</p> <p>The expedition members have rich knowledge and experience, and most of them are experts in related fields</p> <p>There is staff who are responsible for rubbish disposal.</p> <p>The staff on the Antarctic cruise ship will really strictly supervise the landing.</p> <p>Such commercial expeditions in Antarctica are usually led by a very professional team.</p>	13. The experience with the expedition team

The Segments of Information	Key Categories
<p>The expedition members have various professional backgrounds.</p> <p>An Antarctic trip is organised by an authorised travel agency and it is a responsible tourism.</p> <p>Under the leadership of a professional guide, I wear a snowboard and drags my sled to the South Pole.</p> <p>The expedition team will set up walking routes on the island in advance.</p> <p>The old sailor on our Zodiac is a person with rich experience in Antarctic sea navigation.</p> <p>And our expedition leader Karin, and all landing locations and route arrangements are determined by her.</p> <p>The expedition team has planted a red flag on the ground in advance. We need to move along the established route.</p> <p>The expedition team members from all over the world are equipped with stunts including ornithologists, oceanographers, geologists and so on.</p>	
<p>While polar tourism is becoming increasingly popular, more and more people are beginning to realise the impact of this industry on the environment.</p> <p>It can be said that Antarctic travel is very mature. More than 200 people travel to the South Pole every year.</p> <p>Heroína Island is already the most visited island in this archipelago. Even if it is already the most visited island, its visit rate is only once a year.</p>	14.The popularity of Antarctica
<p>Tourists will see expedition members driving Zodiac between icebergs.</p> <p>Hiking is our expedition teams' main activity.</p> <p>Our expedition team also held a small cocktail party on the ice.</p> <p>In my spare time, I would hike around as a tourist.</p> <p>We participated in the Zodiac project.</p> <p>Seeing glaciers by Zodiac, hiking, viewing penguin and seals, skiing, whale watching, and camping.</p> <p>I took a propeller plane and landed at 89 degrees south latitude.</p> <p>Under the leadership of a professional guide, I wear a snowboard and drags my sled to the South Pole.</p> <p>I also climbed the peak of Vinson.</p> <p>The entire Antarctic trip gave me a perfect experience, from lectures by scientific researchers, various interest groups, ice-breaking cruises on Zodiacs to several landings.</p> <p>Our expedition team failed to soak in the hot springs on Deception Island.</p>	15.The variety of tourists' products

The Segments of Information	Key Categories
<p>The expedition leader will take us on the Zodiac.</p> <p>we drove to the mountain near the camp to explore the mysterious blue ice lake at the foot of the mountain.</p> <p>there are also many polar projects that can be experienced in our camp. Snow biking is one of them.</p> <p>Driving snowmobiles can experience the speed and passion in this land.</p> <p>What's more interesting is skiing that anyone can do here.</p>	
<p>Most landing points in Antarctica have restrictions on the number of people.</p> <p>Landing every half day, 2-3 hours each time.</p> <p>There is staff who are responsible for rubbish disposal.</p> <p>Transport all the rubbish back to Chile for processing.</p> <p>All things accidentally thrown outside must also be registered strictly.</p> <p>People need to comply with stricter requirements than any destination.</p> <p>All urine must be brought back to the base camp and transported back to South America by plane.</p> <p>Due to the fragile ecology of Antarctica, all visitors to Antarctica must abide by Antarctic regulations.</p> <p>Great Wall Station has very strict requirements on the number of passengers and the landing time.</p> <p>The highlight of the first day was training. A large group of people putted on life jackets for training.</p> <p>No feeding, no rushing, no loud noise, no smoking here.</p> <p>The crew once again illustrated the restrictions in the Antarctic Treaty for tourists.</p> <p>Environmental sanitation is definitely the most stringent in the world. The Antarctic Treaty is not allowing anything to be discarded on the Antarctic continent, even the shoes during landing are uniformly distributed by each expedition ship (mainly afraid that foreign species on the tourists' own shoes destroy the unique ecology of Antarctica).</p> <p>And before landing, the clothing of each person was dust-removed.</p> <p>No personnel are allowed to take away anything that originally belonged to the Antarctic continent.</p> <p>The use of aircraft on the Antarctic continent was prohibited, so as to prevent accidental aircraft crashes into the sea.</p> <p>Lithium batteries would pollute the environment and aircraft would disturb birds.</p>	16.Strict regulations

The Segments of Information	Key Categories
<p>In order to prevent damage to the ecological environment on the island, tourists go through biological inspection and boot disinfection before landing on the island. When returning to the boat from the island, the boots must also be disinfected.</p> <p>But I had to go to a safety seminar in the morning and get landing boots. this meeting needs everyone to attend, tourists must sign the attendance table, otherwise, you cannot land.</p> <p>We signed the Treaty about some Antarctic regulation before landing.</p> <p>Even a rock we cannot take away.</p>	
<p>The tourists on this trip followed the regulations and laws of Antarctica very much.</p> <p>Most tourists' environmental awareness is still very good.</p> <p>IAATO has strict requirements for all Antarctic tourism companies.</p> <p>It can even say that Antarctic travel is the place with the highest environmental protection requirements in the world.</p> <p>The overall environmental protection awareness of tourists from Antarctica is much higher than tourists' awareness from other travel destinations.</p> <p>I do not know which other tourist destination in the world has such strict regulations!</p> <p>Tourists cannot even take a stone away.</p> <p>The staff on the Antarctic cruise ship will really strictly supervise the landing.</p> <p>As a tourist, I can only try my best not to destroy their ecological environment, not to disturb them.</p>	17.Antarctic tourists' environmental awareness
<p>Antarctic cruise tourism is destroying the local geographical environment.</p> <p>Some people travel long distances on cruise ships just to sip champagne while watching the glacier melt slowly.</p> <p>Except for penguins, seals, icebergs, the endless sea and silence, and expensive boat tickets, there is really nothing else.</p> <p>Due to the large number of humans catching shrimps, a large number of penguins cannot find food. The climate is warming, and the habitat of penguins is getting reduced.</p>	18. The negative comments by Antarctic tourists
<p>the Antarctic environment is special.</p> <p>Lack of microorganisms and lack of microbial activity make the rubbish difficult to degrade.</p> <p>Due to the fragile ecology of Antarctica, all visitors to Antarctica must abide by Antarctic regulations.</p>	19. The uniqueness of Antarctica
<p>Some expedition leaders like icebergs, some like animals, and some will boldly approach animals.</p>	20.Tourists' behaviour

The Segments of Information	Key Categories
Our expedition team also held a small cocktail party on the ice. I saw that she was also holding a baby elephant seal in her arms.	

Incorporating the Categories

Key Categories (primary categories)	The Most Important and Summative Categories (major categories)
1. Tourists' perspectives on the Antarctic landscape 2. Seasick 3. Cold 7. The physical condition of viewing wild animals 8. The variety of Antarctic wild animals 9. Global warming 12. High price of Antarctic tourism 14. The popularity of Antarctica 13. The experience with the expedition team 19. The uniqueness of Antarctica	5. Antarctic tourists' experience
4. The capacity of the cruise ship 6. The regulations of viewing wild animals 10. Environmental education 16. Strict regulations 17. Antarctic tourists' environmental awareness	6. The environmental protection of Antarctic tourism
5. The polar plunge 11. Hospitality on board 15. The variety of tourists' products	7. The Antarctic tourism products
18. The negative comments by Antarctic tourists; 20. Tourists' behaviour.	8. The negative aspects of Antarctic tourism

Appendix 3: Posters' images

Figure 1: *Poster 1 Image of Dining on Cruise Ship*



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Figure 2: *Poster 1 Image of Polar Plunge*



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Figure 3: *Profile of Poster 1*

孙斌 登山向导, 攀登教练, The North Face、Black Diamond、

居住地 现居海淀区

所在行业 体育健身

教育经历  北京大学·化学系

个人简介 登山向导, 攀登教练, The North Face、Black Diamond、Julbo赞助登山运动员, 国家级登山运动健将, 巅峰户外运动学校校长, 巅峰探游负责人, 藏户外协会常务理事, 北京师范大学珠海分校运动休闲学院客座教授, 慕尼黑ISPO评委。登顶过七大洲最高峰, 并徒步抵达南北极点。毕业于北京大学, 曾是北大山鹰社骨干, 攀岩队长; 2000年, 因对攀登的激情和热爱而加入国家登山队, 拥有丰富的攀登和登山活动组织经验, 国内系列攀岩、攀冰、高山向导课程的设计者和教练; 2006-2008年服务于北京奥组委, 负责火炬接力珠峰传递项目; 2008年, 创立北京巅峰探游体育文化有限公司, 致力于提供全球范围内的探险旅行服务; 2012年, 创立公益机构巅峰户外运动学校, 为国内的原住民向导、俱乐部领队、大学社团提供攀登相关培训课程。

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Figure 4: Poster 37 image



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Figure 5: Profile of Poster 37



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