An Exploration in Arctic Cruise Tourism Supply Chain Management: Does People's Sensitivity to Last Chance Tourism Messages Matter?

by

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A Thesis submitted to the Faculty of Graduate Studies of
The University of Manitoba
in partial fulfillment of the requirements of the degree of

MASTER OF SCIENCE

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Abstract

Accelerating rates of climate change in the Arctic have led to increased interest in Arctic cruise tourism which emphasizes a "last chance" to see polar bears and the Arctic ice landscape. Dramatic climate change in the Arctic region and the increased accessibility of cruise navigation have created an competitive tourism supply chain (TSC) for Arctic cruise tourism. While Arctic cruise activities have a high potential for exploitability, there is a lack of understanding of what drives people's travel intentions to take Arctic cruises. Increased understanding is critical for efficient and sustainable management of the Arctic cruise tourism supply chain. Relatively little research has addressed the influence of consumer environmental awareness on travel behavior, especially with regard to so-called Last Chance Tourism (LCT). We therefore propose a theoretical framework that includes people's awareness of climate change, their intentions to do Arctic cruise activities, and the impact of sensitivity to LCT messages. A pilot study is conducted to generate questionnaire items. Exploratory factor analysis and scale dimensionality determination are based on a sample size of 558 participants from a North American panel. The results from hierarchical regression analysis show that sensitivity to LCT messages is not a moderator between awareness of climate change and intentions to do Arctic cruise activities. Rather, two independent variables—awareness of climate change and sensitivity to LCT messages—are statistically significantly and separatel related to intentions to do Arctic cruise activities. Our findings shed light on a new psychological aspect of people's intentions to do Arctic cruise activities in an LCT context, and provide practical insights for Arctic cruise operators on issues such as demand management, two-party relationships, and product development.

Keywords: Sensitivity to LCT messages; Intentions to Arctic cruise activities; Awareness of climate change; Arctic tourism sustainable development; Last Chance Tourism; Arctic cruise supply chain; Arctic cruise supply chain management

Acknowledgements

I would like to express my deepest appreciation to my supervisor (Professor Bruno Silvestre) and my co-supervisor (Professor Changmin Jiang) for their extraordinary support. Without their guidance and persistent help, the completion of my thesis would not have been possible.

I would also like to extend my sincere thanks to my thesis committee members, Professor Jijun Gao, and Professor Kelsey Taylor, for their helpful comments and support for my thesis.

I must also thank Sandy Pera, and Nicholas Borodenko and his team, for their valuable comments and advice on some of the chapters.

Finally, I am extremely grateful to my family, my friends, and all the people who have supported me along the way. Thank you all for your company, guidance, and support. All the best wishes to you.

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Chapter 1 Introduction

According to the Arctic Monitoring & Assessment Programme Report 2021 (AMAP 2021), climate change is a here-and-now problem in the Arctic because of global warming. The temperature in the Arctic is rising faster than the global average, which has led to changes in sea and land ice, snow cover, and precipitation. The Global Climate Model Projects model (CIMP6) predicts that the first instance of a largely sea-ice-free Arctic in September would occur before 2050; by then, an ice-free Arctic summer would be more than 10 times greater under the 1.5 ºC global warming scenario (AMAP 2021). Due to the rapid increase in Arctic surface temperatures, Arctic rivers are freezing up later in the autumn and their ice is breaking up earlier in springtime (AMAP 2021).

With the constantly increasing temperatures in the Arctic, and technology developments for ice-breaker ships, Arctic cruise routes have now become more accessible and feasible (Têtu et al., 2020). The combination of Arctic climate change and the accessibility of cruise navigation has created an exclusive and competitive tourism supply chain (TSC) for Arctic tourism. Zhang et al (2009) have defined the TSC as "a network of tourism organizations engaged in different activities ranging from the supply of different components of tourism products/services such as flights and accommodations to the distribution and marketing of the final tourism product at a specific tourism destination, and involves a wide range of participants in both the private and public sectors." The tourism products are of great importance in describing a TSC (Zhang et al., 2009). In this context, the Arctic cruise activities are viewed as tourism products, which form service networks as value-added chains of various service components (Zhang et al., 2009).

A large number of investors are aware of the exploitability of the exclusive Arctic TSC, especially the tourism products (i.e., Arctic cruise activities). It is estimated that investment in the circumpolar Arctic over the next decade due to the better sea-ice condition for cruise navigation will be C$100 billion to C$301.65 billion (Lloyds, 2012; Dawson et al., 2017). Between 2019 and 2020, the cruise passenger volume from North America increased by about 20% (CLIA 2020), and it is estimated that the growth of global Arctic cruise passengers will double between 2018 (242,154) and 2027 (412,153). On the supply side, the number of berths on ships in the Arctic is planned to increase to 14,415 by 2027 (compared to 9,367 in 2018); this will support port infrastructures (CLIA 2018; Lau et al., 2022). Arctic cruise activities have grown due to fresh and innovative cruise tourism products: exotic experiences, the disappearing Arctic ice landscape,

unique Arctic culture, Arctic wildlife and fauna, and attractive cruising destinations (Lau et al., 2022).

The threat to species, ecosystems, landscapes, and cultural features caused by climate change has activated a new form of tourism called "last chance tourism" (LCT) (Lemieux et al., 2018). LCT is defined as "tourists explicitly seeking vanishing landscapes, and/or disappearing natural and/or social heritage" (Lemelin et al., 2010). The LCT phenomenon was originally identified in studies of Arctic regions (Lemelin et al., 2010). The concept of LCT first emerged in the popular press to describe a dramatic tourist flow shifting to cold regions (Dawson et al., 2010). For example, seeing polar bears has been recognized as the main reason to visit national parks in the Canadian Arctic (Maher and Meade, 2008). "Last Chance" is one of the most important motivators for tourists to pursue Antarctic cruise activities (Maher et al., 2011), and a growing number of travellers have spent their vacations in the Arctic because they believe the ice landscapes or Arctic creatures will vanish in the near future (Eijgelaar et al., 2010).

LCT vacations are the result of climate change's impact on the tourism industry (Dawson et al., 2011; Lemieux et al., 2018). Climate change, the destination issue, and environmental sustainability problem issue have been highlighted in the TSC investigated by Szpilko (2017) in the database *Web of Science*. People's perceptions of climate change impacts can influence their travel intentions (Dawson et al., 2011; Lemieux et al., 2018). From a psychological perspective, awareness of an environmental problem is the very first stage when people plan vacation destinations or any travel intentions (Engel et al., 1986; Howard and Sheth, 1969; Swarbrooke and Horner, 2007). The awareness of environmental problems has been used in a wide range of influential human behavior frameworks based on the research of Kollmuss and Agyeman (2002). In the aviation context, for example, people's awareness of climate change has been used to investigate air travel intentions, which has been labelled the "Flyers' dilemma" (Becken, 2007; Árnadóttir et al., 2021).

However, until recently, there has been very little research undertaken to investigate whether people's environmental awareness influences their travel behavioral intentions (Hares et al., 2010), especially in the LCT context. There is only one research setting climate change concern in the theoretical model to investigate its impact on last chance experiences (Groulx et al., 2016). Even in cruise tourism research, most studies focus on how different types of motivation impact people's travel intentions (Hung and Petric, 2011; Jung and Han's 2016; Han

and Hyun, 2018). These include “escape and relaxation” motivation (Hung and Petric, 2011), “learning/discovery” motivation (Hung and Petric, 2011), “self-esteem” motivation (Han and Hyun, 2018), and “bonding” motivation (Jung and Han’s 2016).

Still, little empirical work has examined LCT motivations and related behavioral intentions (Groulx et al., 2016). Moreover, the exploration of LCT motivations is often measured as a simple sentence, such as “to see the reef before it’s gone” (Piggott and McNamara, 2017). It is hard for people to understand the immensely complex and intangible environmental problems caused by climate change in a short time without any other explanations, such as language and pictures (Kollmuss and Agyeman, 2002). Interestingly, research suggests that the LCT motivation shaped by media has indirectly affected people’s perception of climate change and then influenced their travel intentions (Lemelin et al., 2010). Few studies have explicitly identified whether the LCT motivation has the potential power to influence people’s intentions toward vacation destinations because critical information about the LCT phenomenon is omitted (Eagle et al., 2018; Lemieux et al., 2018).

In spite of its importance, this study aims to explore the potential LCT motivation power by creating a newness variable that is sensitive to LCT messages. The creation of the newness variable is based on Cheng and Wu’s (2015) sustainable island tourism development model, which uses the notion if environmental sensitivity to identify people’s pro-environmental behavioral intentions, and to generate a definition of environmental sensitivity from an individual’s psychological perspective (Peterson, 1982). The role of environmental sensitivity in cruise tourism or LCT has rarely been explored. Furthermore, an integrative approach—which includes awareness of climate change, and the moderating role of sensitivity to LCT messages—has not been evident in trying to explain intentions to do Arctic cruise activities or other LCT activities.

In order to fill this gap in the cruise tourism literature, and to provide further information for the debate about the last chance phenomenon of “loving a destination to death” (Dawson et al., 2010), this study aims to develop a robust theoretical framework of people’s awareness of climate change and their intentions to do Arctic cruise activities by considering the moderating impact of sensitivity to LCT messages.

To bridge this research gap, the present study utilizes a questionnaire-based survey as the quantitative methodology approach because tourists are obviously one of the key components in

tourism supply chains (Soratana, 2021). Based on the CLIA Global Market Report in 2020, North American cruise passengers have accounted for the largest passenger volume among global cruise passengers. As a result, the North American panel is selected as the target dataset in this questionnaire. A pilot study within the Manitoba panel was tested to develop item generation. After that, a total of 558 valid questionnaires were collected from the North American panel of people who said they were interested in Arctic cruise activities when asked the following filter question: "How interested would you be in learning about Arctic cruise tourism?" The purpose of the quantitative questionnaire is to investigate the research question of whether the sensitivity to LCT messages impacts the relationship between awareness of climate change and consumer intentions participate in Arctic cruise activities.

The data collection process was completed by Prairie Research Associates (PRA). There are 40 questions, which are mainly divided into four parts: (1) demographics questions, (2) questions used to measure awareness of climate change, (3) questions used to measure sensitivity to LCT messages after reading LCT cards designed by PRA, (4) questions used to measure intentions to do Arctic cruise activities. To determine the dataset scale validity and reliability, an exploratory factor analysis (EFA) was performed to examine the dimensionality of scales related to three major variables: awareness of climate change, sensitivity to LCT messages, and intentions about Arctic cruise activities. Hierarchical regression analysis was applied to examine the research question and hypotheses. The three-variable model is tested in IBM SPSS version 26 for calculating descriptive statistics, regression, and moderation analysis.

Further data analysis is based on three research objectives in this study (1) to identify whether people's awareness of climate change will influence their intentions to participate in Arctic cruise activities, (2) to explore the new variable of sensitivity to LCT messages through an environmental sensitivity measurement scale and designed LCT cards in the Arctic cruise tourism context, and (3) to test the moderating role of sensitivity to LCT messages in the relationship between people's awareness of climate change and their intentions to pursue Arctic cruise activities. Based on the literature, it is expected that there is a close relationship between people's awareness of climate change and their intentions about Arctic cruise activities (Hines et al., 1986; Kollmuss and Agyeman, 2002; Hares et al., 2010). In particular, when people have a higher sensitivity to LCT messages, it will strengthen the relationship between awareness of climate change and intentions to do Arctic cruise activities, which leads to higher intentions to do Arctic

cruise activities. As a result, the research question in this study is that does the sensitivity to LCT messages would affect the relationship between awareness of climate change and intentions to do Arctic cruise activities.

Interestingly, compared to the expected results, awareness of climate change and sensitivity to LCT messages do not impact the intentions to do Arctic cruise activities simultaneously, though they are statistically significantly related to intentions to do Arctic cruise activities separately. This surprising finding builds a solid foundation for research on the cruise tourism literature and on LCT market research. It provides both theoretical and managerial contributions. First, the significant relationship between the awareness of climate change and intentions to do Arctic cruise activities supports the idea that people's environmental awareness about climate change plays a vital role in their vacation decisions (Scott et al., 2010; Gössling et al., 2015; Reis and Higham, 2017). Moreover, this result indicates that the awareness-behavior gap occurs in the LCT travel for Arctic cruise tourism as well as in the aviation travel context (Hares et al., 2013). Second, although sensitivity to LCT messages does not moderate the relationship between awareness of climate change and intentions to do Arctic cruise activities, neither a relationship between sensitivity to LCT messages or environmental sensitivity and intentions to do Arctic cruise activities in the LCT context nor the potential role of sensitivity to LCT messages as a moderator in this relationship, has been identified in the cruise tourism literature. The study finds that people's sensitivity to LCT messages directly and positively influences their intentions to do Arctic cruise activities. It provides a new psychological aspect to investigate people's intentions to do Arctic cruise activities in an LCT context. Third, the new psychological construct of sensitivity to LCT messages explores a strong potential factor which will influence people's travel intentions in the LCT context

This research has also identifies implications for demand management, two-party relationships, and product development (Zhang et al., 2009) for Tourism Supply Chain Management (TSCM) with respect to the Arctic. TSCM has been defined as "a set of approaches utilized to efficiently manage the operations of the TSC within a specific tourism destination to meet the needs of tourists from the targeted source markets, and accomplish the business objectives of different enterprises within the TSC" (Zhang et al., 2009). In the study presented here, Arctic cruise activities are tourism products throughout the Arctic TSC. First, the emergence of LCT in Arctic cruise activities through the strong relationship between sensitivity to LCT

messages and intentions to do Arctic cruise activities indicates a large potential *demand* for Arctic cruise activities based on an empirical survey on a North American panel and statistics analysis from survey data. From a strategic point of view, the results will help policymakers and practitioners to make tourism investment decisions with respect to destination infrastructure and long-term financial investment. From an operational point of view, the potential increased demand for Arctic cruise activities in the LCT context directly influences the activities of supply chain members, such as Arctic cruise lines, recreation facility providers, and tour operators.

Second, the statistically significant impact of awareness of climate change and sensitivities to LCT messages on intentions to do Arctic cruise activities, respectively, show that there is a complex and paradoxical *two-party relationship* between tourists and the Arctic environment. The occurrence of an awareness-behaviour gap in LCT travel for Arctic cruise activities should get the attention of Arctic cruise tourism operators and practitioners. Arctic cruise operators are vital components in the tourism value chain (Soratana, 2021), and are significant value sources within TSC to achieve a sustainable and competitive advantage in the tourism industry (Szpilko, 2017). Arctic tourism organizations need to consider not only the impact of the market structure on economic profits, but also that of others which might be harmful to the Arctic sustainable environment development in the long term. The results provide a further understanding of the relationship between tourists and the Arctic environment. It is critical to achieve efficient and sustainable Arctic TSCM in the long run. The results also indicate a risk alert for sustainable environmental development in the long run if Arctic cruise tourism is still driven by emphasizing aspects such as the vanishing Arctic ice landscape and polar bears. The challenge for Arctic tourism policymakers and Arctic cruise operators is to maximize positive economic sustainable development while minimizing the negative environmental impact on the Arctic environment under conditions of increasing demand for LCT Arctic cruise tourism.

Third, the results also provide insights on *product development* for Arctic Cruise TSCM. People's awareness of climate change and a higher sensitivity to LCT messages will involve a deeper understanding of customer needs and the root causes of potential motivations to engage in Arctic cruise activities. Satisfying customer needs at the right time with the right products is the ultimate goal for Arctic TSCM.

The remainder of the paper is organized as follows. In Chapter 2, the relevant literature is reviewed. In Chapter 3, we describe the data and methodology we used, and in Chapter 4 we

present the empirical results. In Chapter 5, we discuss our results, and in Chapter 6 we present our overall conclusions, point out the theoretical and practical implications of our study, and discuss some limitations of our study. This study contributes a clearer understanding of the potential drivers of the Arctic cruise tourism market and provides a foundation for discussing the effective sustainable management of this LCT-concept travel phenomenon.

Chapter 2 Literature Review

2.1 Awareness of Climate Change

The relationship between climate change and the tourism industry has been debated by both tourism operators and policy makers (Ma and Kirilenko, 2020; UNWTO 2020). The World Tourism Organization (UNWTO) Report in 2020 pointed out that the tourism industry should reduce their total emissions by 2030 in order to balance the relationship between tourism demand and expected transport-related CO2 emissions under its own "high-ambition scenario" where tourism would move toward low-emission and high-efficiency operations (UNWTO 2020). It is estimated that transport-related CO2 emission will increase 25% by 2030 (from 1,597 in 2016 to 1,988 Mt of CO2 in 2030). Transport-related CO2 emissions in the tourism sector account for 22% of worldwide emissions from transportation (UNWTO 2020). As a result, the tourism industry is recognized as a driver of climate change (Demiroglu et al., 2018). Meanwhile, the tourism industry is highly sensitive to the impact of climate change (Schwirplies and Zegler, 2016) because many nature-based tourism destinations are vulnerable to climate change factors (Hall et al., 2014).

When it comes to investigating people's behavioral changes that are related to travel decisions, Kollmuss and Agyeman (2002) remind us that the relationship is a complicated one that cannot be explained by a single framework or diagram. Based on research from social psychology and environmental psychology in consumer decision-making processes (Cheng and Wu, 2013), most studies distinguish three dimensions: demographic factors, external factors, and internal factors (Kollmuss and Agyeman, 2002; Walls et al., 2013; Árnadóttir et al., 2021).

Demographic factors like gender and education level impact environmental attitudes and tourism-related behavior (Kollmuss and Agyeman, 2002). For example, females are more likely to be concerned about environmental damage than males, but females may have a smaller knowledge base regarding the environment (Kollmuss and Agyeman, 2002). In much quantitative and qualitative consumer tourism-related research, educational level is frequently used as key demographic variables or control variable to investigate tourists' behavior change (Kriwoken and Rootes, 2000; Maher et al., 2016; Groulx et al., 2016; Stewart et al., 2016; Schwirplies and Ziegler, 2017; Piggott and McNamara, 2017; Wu et al., 2020).

External factors include institutional factors, economic factors, and social and cultural factors (Kollmuss and Agyeman, 2002; Walls et al., 2011; Árnadóttir et al., 2021). Economic

factors have a strong impact on people's tourism-related behaviors (Kollmuss and Agyeman, 2002; Walls et al., 2011).

Internal factors have been widely studied in tourism-related behavior from the "attitudinal" factors (Hares et al., 2013). The internal factors consist of motivation, norms, awareness, values, priorities, and locus of control (Kollmuss and Agyeman, 2002; Árnadóttir et al., 2021). Motivations have been identified as a critical factor and have influenced people's travel intention through various motivation theories or concepts (Hung and Petric, 2011). Table 1 shows 9 different motivation categories, which can be reduced to 3 main tourism types: (1) Sun and sand destinations (Prebensen et al., 2010); (2) Cruise tourism (Hung and Petrick, 2011; Jung and Han's, 2016; Han and Hyun, 2018); and (3) Last Chance tourism (Stewart et al., 2016; Groulx et al., 2016; Piggott and Mcnamara, 2017; Lemieux et al., 2018; Wu et al., 2020). In cruise tourism, Hung and Petrick (2011) find that escape/relaxation was the strongest motivation after interviewing cruise passengers who were embarked and debarked at Port Everglades in Fort Lauderdale, Florida. The escape/relaxation motivation is referred to as changing tourists' routine life by participating in travel, and relieving tourists' psychological/emotional stress (Han and Hyun, 2018). Although Jung and Han (2016) and Han and Hyun (2018) apply the same motivation category to investigate tourists' intention to cruise tourism, the results are different. Learning/discovery and thrill is considered as the most important motivation for luxury cruise tourists (Han and Hyun, 2018), whereas self-esteem and social recognition are identified as the most influential motivation for Hong Kong cruise tourists (Jung and Han's, 2016). Learning/ discovery and thrill represents tourists' willingness to seek novel experiences and new knowledge by travelling (Lee et al., 2017).

Table 1 Motivation Category in Different Tourism Type

Author	Tourism type	Motivation Category
Prebensen et al.(2010)	Sun and sand destinations	Body-related: Sun and warmth-related motivations and fitness and health motivations; Mind-related: Escapism

		motivations; Culture and nature motivations
Hung and Petrick (2011)	Cruise tourism	Self-esteem and social recognition; Escape and relaxation; Learning/discovery and novelty/thrill
Groulx et al. (2016)	Last Chance Tourism	Nature relatedness; Place identity
	Churchill	Natural reflection; Last chance experience; Joining the story
Jung and Han's (2016)	Cruise tourism (Hong Kong tourists)	Escape/relaxation; Self-esteem and social recognition; Learning/discovery and thrill; Bonding
Stewart et al. (2016)	Glacier Tourism	Discovery and getting close to nature; Last chance to experience
Piggott and Mcnamara (2017)	Great Barrier Reef Tourism	Escape/relaxation; Last chance to experience; Nature/climate; Active/Adventure
Han and Hyun (2018)	Cruise tourism (Luxury cruise tourism)	Escape/relaxation; Self-esteem and social recognition; Learning/discovery and thrill; Bonding
Lemieux et al. (2018)	Glacier tourism	Last Chance Tourism; Escape and reflection; Story telling
Wu et al. (2020)	Fast-disappearing tourism	Fast-disappearing Experiential authenticity; Last-chance destinations (Maldives) dependence; Last-chance

	identity; Last-chance affect; Last-chance social bonding; Experiential satisfaction; Experiential trust; Experiential loyalty

There are very few studies that investigate whether tourist awareness of climate change will impact their holidays and travel behaviors (Hares et al., 2010). But there are a few studies that point out that public awareness and concerns about climate change should not be underestimated as one of the important potential changes in tourism flows (Scott et al., 2010; Gössling et al., 2015; Reis and Higham, 2017).

The important impact of environmental awareness on consumer sustainable environmental behavior developed in the U.S. in the 1960s (Kollmuss and Agyeman, 2002; Arlt et al., 2013). This oldest and simplest model (Early U.S. Linear Models) focused on the environmental psychology connections between environmental knowledge, environmental attitudes/awareness, and pro-environmental behaviors (Kollmuss and Agyeman, 2002; Arlt et al., 2013). The model assumed that the more knowledge people have, the more they will practice pro-environmental behaviors (Kollmuss and Agyeman, 2002). In social psychology research on tourism, environmental awareness is also viewed as an important variable that affects tourist behavior intention. This is evident in the models of predictors of environmental behavior (Hines et al., 1996) and models of ecological behavior (Fietkau and Kessel, 1981). From the perspective of cognitive psychology, Cheng and Wu (2013) construct a causal relationship model of "*environmental knowledge – environmental sensitivity – place attachment – environmental responsible behavior*" to learn the four constructs in a sustainable tourism behavior model. The model tries to determine whether tourists having a high environmental concern will behave in an environmentally-friendly way when they visit various places. This is based on the "cognition–affection–attitude–behavior" model defined by Fishbein and Manfredo (1992). Those influential theoretical models have been widely used in environmentally sustainable vacation choices, and emphasize the important role of environmental awareness in a climate change context (Becken, 2004; Bergin-Seers and Mair, 2009; Juvan and Dolnicar, 2014).

Environmental awareness is narrowly defined as "whether someone is aware of the endangered environment;" this is a purely cognitive construct in a psychological perspective (Matthies and Schahn, 2004). Following Matthies and Schahn (2004), in this thesis we define the awareness of climate change as whether someone is aware of the *endangered* environment in a climate change context. Based on the behavioral intention model from the cognition perspective (Fishbein and Manfredo, 1992), and on consumer behavior in the vacation decision-making process from the psychological perspective (Walls et al., 2011), we assume that people's awareness of climate change consists of two parts: cognition (knowledge) and affection (emotional involvement) (Kollmuss and Agyeman, 2002; Walls et al., 2011). Cognition is defined as "a neural-mental activity more aligned with information processing and utilitarian thought processing" (Peterson et al., 1986). In other words, cognition is described as a type of direct experience or knowledge from different information channels, such as online media, TV news, magazines, and academic journals (Cheng and Wu, 2013). After evaluating the information, the knowledge has become to people's beliefs or values as specific environmental knowledge (Amyx et al., 1994). Amyx et al (1994) describe natural environments as environmental concern. Fryxell and Lo (2003) define a type of common knowledge as environmental knowledge, which consists of environmental protection, environmental ecosystems, etc. Haron et al (2005) classify the level of understanding of environmental knowledge by different abilities. However, the environmental knowledge of climate change is viewed as an abstraction from individuals' real experiences (Barr et al., 2010; Reis and Higham, 2017). Lazarus (2009) makes two points: First, it is very hard for a normal person to understand a complicated and interconnected climate system, especially the long-term environmental problems caused by climate change (Arlt et al., 2011). Second, the lack of information sources and professional background knowledge is another barrier for tourists to understand climate change and the actual influence of climate change (Arlt et al., 2011).

Recent empirical studies have measured the awareness of climate change in common environmental knowledge based on the definition of Fryxell and Lo (2003). For example, Tiller and Schott (2012) first asked participants to consider the statement "*Tourism within New Zealand does not contribute to global climate change*" and then tried to determine whether they observed any change around their home environment, including weather/temperature change, flora/fauna change, snow/glacier cover, air quality, and erosion. Maher et al (2011) ask participants to consider the following statement about the effect of human behavior on climate change: "*Human are*

contributing to changes in the global climate." Arlt et al (2013) provide a statement that says "climate change and how to reduce harmful gas emissions is a popular topic of discussion at the moment…" and then ask participants to answer some climate problem awareness questions. Dickson et al (2013) explore awareness of climate change under the understanding of climate change (*i.e., The contribution of driving a car/using aerosol cans/heating homes/packaging on products to climate change*) and tourism-specific understanding of climate change (*i.e., car driving to the destination/air travel to the destinationto the destination*). Higham et al (2014) use comparative analysis of perceptions of global climate change and human contributions to climate change among Norwegian, British, and German participants.

One of the components of awareness of climate change is cognition (environmental knowledge), and another is affection (emotional involvement) (Kollmuss and Agyeman, 2002; Walls et al., 2011). Affection is "*a synonym for feelings or emotions and has a psychological component*" (Walls et al., 2011). It has complex components, such as feelings and emotions (Peterson et al., 1986). Cohen (2005) points out that tourists' emotions are one of the key influences on consumer behavioral intentions. Holbrook (1986) recognizes emotional involvement as a pervasive factor in consumer behavior. Tourism researchers find that it leads to irrational choices when tourists are faced with decisions about vacation choice (Holbrook, 1986; Decrop and Snelders, 2005; Walls et al., 2011). For example, messages carried by the media influence tourists' attention on tourism. Some headlines, related to climate change, such as "too hot" for the Mediterranean in summer tourism, and "collapse" for Rocky Mountains in skiing tourism, are used by media to shift the tourist flow to other places (Gössling et al., 2012).

Using the LexisNexis Academic database, Ma and Kitilenko (2020) analyze English newspaper publications worldwide on topics framed with climate change and tourism over the past 30 years. There identified 15 topics listed as the "hot topics" in their selected media (see Table 2). Most newspapers focus on extreme weather such as changes in seasonality, sea level rise, coral reef bleaching, and coastal erosion. These selective topics will affect the public's specific travelling choices and the tourism market in general (Ma and Kitilenko, 2020).

Table 2 15 Hot Topics related to Climate Change and Tourism

Topic 1	Coral reef bleaching
Topic 2	Ski and winter tourism
Topic 3	Glaciers melting
Topic 4	Ecosystem and biodiversity
Topic 5	Coastal erosion
Topic 6	Coral reef-driven tourism
Topic 7	Summer heatwaves
Topic 8	Seasonal weather pattern changes
Topic 9	Clean energy
Topic 10	Greenhouse gas
Topic 11	Polar cruises
Topic 12	Air travel
Topic 13	Islands disappearing
Topic 14	Trekking tours
Topic 15	Scientific research

Source: Ma and Kitilenko (2020)

Awareness of an environmental problem is the first stage when tourists start to plan vacation destinations in various decision-making models from psychological perspective (Engel et al., 1986; Howard and Sheth, 1969; Swarbrooke and Horner, 2007). A number of theories have designed to investigate people's pro-environmental behavior (Jackson, 2005). Some of the most influential frameworks use awareness of an environmental problem as the key variable to evaluate people's behavioral intentions and behavioral change (Kollmuss and Agyeman, 2002). These include the Early U.S. Liner Models, Theory of Reasoned Action (Fishbein and Ajzen, 1975), the Theory of Planned Behavior (Ajzen and Fishbein, 1980), Models of Predictors of Environmental Behavior (Hines et al., 1986), and the Model of

Ecological Behavior (Fietkau and Kessel, 1981). As a result, awareness of an environmental problem is a prerequisite variable for people's behavioral intentions in vacation decisions.

2.2 Intentions to do Arctic Cruise Activities

When it comes to understanding behavioral change, a wide range of conceptual theories have been developed that use various social, psychological, subjective, and objective variables in order to model consumer behavior (Jackson, 2005; Hares et al., 2010). Although hundreds of studies try to explain the relationship between environmental awareness and pro-environmental behavior, no unified answers or definitions have been developed (Kollmuss and Agyeman, 2002). Some of the most influential analytical theoretical frameworks are shown in Table 3. A linear progression model of "environmental knowledge-->environmental attitude-->environmental attitude-->pro-environmental behavior" has been suggested, but this model has been rejected by critics on the basis that the assumptions are too simplistic, and increasing environmental knowledge does not increase pro-environmental behaviors (Kollmuss and Agyeman, 2002). Rajecki (1982) identifies three root causes of the environmental attitude-behavior gap. The first cause is *direct versus indirect experience*. Simply put, indirect experiences with environmental problems has a weaker effect on the relationship between attitude and behavior than direct experiences. The second cause is *temporal discrepancy*, which means that people's attitudes toward environmental problems may change over time. The third cause is *normative influences*, i.e., different living environments, cultural backgrounds, and social regulations widen the gap between attitudes and behavior.

The theories of Reasoned Action and Planned Behavior address these discrepancies (Ajzen and Fishbein, 1975; Ajzen and Fishbein, 1980), and are regarded as the most influential attitude-behavioral models in social psychology (Kollmuss and Agyeman, 2002; Juvan and Dolnicar, 2014). They postulate that attitudes and social norms may directly affect behavioral intentions and lead to actual behavior (Ajzen and Fishbein, 1980). In particular, Planned Behavior is widely used in investigating environmentally sustainable behavior (Cheng and Tung, 2010; Fielding et al., 2008; Shaw et al., 2000), especially environmentally sustainable tourism behavior (Han et al., 2010; Ham and Kim, 2010; Ong and Musa, 2011). The model has provided a promising explanation of the relationship between environmental awareness and related behavioural intentions (Han et al., 2010; Ham and Kim, 2010; Ong and Musa, 2011).

Some empirical studies have argued that the relationship between behavioral intention and actual behavioral change is weak (McDonald et al., 2012; McKercher and Tse, 2012). Based on the Ajzen and Fishbein's models, Hines et al (1986) developed the Responsible Environmental Behavior model. However, a meta-analysis of 128 pro-environmental research studies (Hines et al., 1986) revealed that knowledge of environmental problem and attitudes towards the environment directly influence people's behavioral intentions (Hines et al., 1986; Kollmuss and Agyeman, 2002). Fietkau and Kessel (1981) view environmental knowledge as a modifier of environmental attitudes, which then impacts pro-environmental behavior. The value-belief-norm theory postulates that people's beliefs/awareness about the environment and their responsibilities or norms cause pro-environmental behaviors (Stern, 2000).

Table 3 Literature Review for the Research on Tourism-Related Consumer Behavior

Theory Framework	Author	Key variables	Limitations	Research Field
Early US Linear Models		Environmental Knowledge; Environmental Attitude; Pro-environmental Behavior	The assumptions are too simplistic	Environmental Psychology
Theory of Reasoned Action	Ajzen and Fishbein (1975)	Normative Beliefs; Motivation; Attitudes; Subjective Norms; Behavior Intention; Behavior	Underlying assumption that people act rationally	Social Psychology
Theory of Planned Behavior	Ajzen and Fishbein (1980)	Attitudes; Scoial Norms; Perceived Behavioral Control; Behavioral Intentions; Behavior	Great promise in explaining behavioral intentions, but weak relationship between the behavior intentions and behavior change	Social Psychology
Models of Responsible Environmental Behavior	Hines et al (1986)	Knowledge of issues; Knowledge of Action Strategies; Action Skills; Personal Factors; Intention to Act; Pro-environmental Behavior	The relationships between the variables are weak and they are dependent on different situations	Social Psychology

Model of Ecological Behavior	Fietaku and Kessel (1981)	Environmental Knowledge; Environmental Attitudes and Values; Pro-environmental Behavior	The assumptions that human is rational	Social Psychology
Theory of Intent-oriented Environmental Action Value-Belief-Norm (VBN)	Stern's (2000)	Attitudes; Beliefs; Values; Awareness; Contextual Forces (social, institutional, and political factors); Personal Capabilities (e.g., knowledge and skills); Habits	People have little responsibility to themselves on their contribution to climate change due to tourism activity	Social Psychology

Blake (1999) notes that most of pro-environmental behavior models have a common deficiency: "They assumes humans are rational and make systematic use of the information available to them, and they fail to take into account individual, social, and institutional constraints." Blake (1999) identifies three barriers in the relationship between environmental awareness and pro-environmental behavior. The first barrier is individuality: the relationship between environmental awareness and pro-environmental behavior will be uncertain if individuals do not have sufficient environmental knowledge (the individual's strong desires and needs will overcome environmental awareness). The second barrier is responsibility: people do not want to feel duty-bound to take responsibility for environmental protection. The third barrier is practicality: information asymmetry, time interval, and financial problems will prevent people from exhibiting pro-environmental behaviors. Although Blake (1999) considered three barriers and tried to compensate for the research flaws in previous theoretical models, he ignored social factors and cultural background for the deep psychological factors. Kollmuss and Agyeman (2002) concluded that it is difficult to define the relationship between environmental awareness and pro-environmental behavior in a "*grand unified theory*" because it is such a complex issue.

Instead of discussing people's environmental behavior as a general concept and in relation to people's behavioral response to climate change, it may be more useful to divide behavioral response into two types: impact-oriented and intent-oriented behavior (Stern, 2000). It is critical to understand both types of behaviors and how they are different (Whitmarsh, 2009). Impact-oriented behavior is defined as "the actual impact of behavior on environmental issues" (Whitmarsh, 2009), and it is used to identity the behaviors which strongly change the environment

(Stern, 2000). By contrast, intent-oriented behavior research is concerned with "the motivation of the actor in respect of the environmental issue" (Whitmarsh, 2009). This definition is used to help us understand specific behavioral change when concentrating on people's beliefs (Stern, 2000). Previous research has investigated people's behavioral change from the perspective of impact-oriented behavior rather than intent-oriented behavior (Poortinga et al., 2004). Those behavioral changes have been explained from the experts' perspective (Poortinga et al., 2004). Whitmarsh (2009) points out that the behavior change from non-expert members may influence climate change mitigation by intent-oriented behavior, but few researchers have investigated intent-oriented behavior in the climate context (Whitmarsh, 2009). There is more research that focuses on pro-environmental intentions in general (Gaterleben and Vlek, 2002).

In order to assess what determines people's intent-oriented behavior, Whitmarsh (2009) has conducted exploratory research that is based on Stern's (2000) theoretical framework and the Value-Belief-Norm (VBN) theory. VBN theory assumes that social-psychological factors (e.g., the ecological worldview, the perceived ability to reduce threats, and personal responsibilities) lead to adopting corrective behavioral intentions when the individual believes that human-environment relations are threatened (Stern, 2000). This study has utilized in-depth interviews and survey (qualitative and quantitative) targeting U.K. participants. It found that people's environmental awareness is positively related to intent-oriented behaviors, and that knowledge about climate change has played an important role in those intentions. The findings are aligned with previous research showing that intent-oriented behavior is attitudinally-determined, whereas impact-oriented behavior is determined by people's motivations, contextual factors (e.g., social, economic, and institutional factors) and demographic factors (e.g., gender, educational level). This exploratory research on the public's behavioral intentions and their response to climate change has also shown that public awareness of climate change influences people's behavioral intentions.

Results from studies attempting to explore the relationship between awareness of climate change and intentions to travel vary (Arora et al., 2021). According to Wurzinger and Johansson (2006), tourists with richer knowledge of the environment will be more concerned about the environmental issue of visiting certain locations. Tourists will then show sustainable behavioral intentions and try to exercise minimal influence on natural-based travel destinations. This is consistent with Fishbein and Manfredo's "cognition-affection-attitude-behavior" conceptual framework (Kollmuss and Agyeman, 2002; Cheng and Wu, 2013). Whitmarsh (2009) points out

that tourist awareness of climate change will increase their willingness to mitigate travel to specific destinations. In the category of air travel, one study found that people tend to shorten flights when they are highly concern about the climate change issues (Bruderer Enzler, 2017).

However, having a higher awareness of climate change does not emerge as a positive predictor of having environmentally sustainable vacation intentions (Juvan and Dolnicar, 2014). Studies show that travel has a special symbolic meaning of freedom, which means that tourists feel that they have the right to make their own travel decisions (Becken, 2007). Tourism creates social, mental, and economic benefits that individuals do not want to forgo (Dickson et al., 2013). Indeed, growing awareness of climate change may actually increase tourists' travel frequencies (Tiller and Schott, 2012; Reis and Higham, 2017; Schwirplies and Ziegler, 2017). One exploratory qualitative study interviewed 20 Australian travellers to determine whether widespread concerns about climate change would influence their intentions to travel to New Zealand. Most interviewees were unwilling to mitigate their travel plans, but they were conflicted with respect to "ethical" and "sustainable" travel intentions (Reis and Higham, 2017). Whitmarsh (2009) found that most British people chose to recycle household waste and save home energy consumption rather than reduce their travel habits or budgets.

Becken (2007) suggests that tourists prefer to behave more responsibly in daily life rather than reducing tourism travel. Tourists rarely translated their climate change concerns into environmentally-friendly travel intentions, such as reducing travel plans (Scott et al., 2007; Tiller and Schott, 2012). For example, skiing tourism is threatened by climate change due to rising surface temperatures, which affects glacier surfaces (Intergovernmental Panel on Climate Change IPCC, 2013). Summer skiers in Norway—who can directly witness the climate change impact on the summer skiing tourism—were selected as respondents in a study that investigated the relationship between their awareness of climate change and their travel intentions to skiing tour destinations. Although most of the respondents were aware of climate change problems, this awareness did not influence their travel decisions to skiing tourism locations (Demiroglu et al., 2018). Individuals are more likely to adjust their travel destinations or types of holidays because they are quite flexible (Scott et al., 2007). Based on a survey of 947 winter sports tourists and 5,362 other tourists, Schwirpiles and Ziegler (2017) found that tourists are much more flexible about travel intentions if they have a higher awareness of climate change effects. Due to extreme hot weathers caused by climate change, Mediterranean regions may no longer be seen as attractive

to Germans as they previously were. Rather, they plan to shift future travel to other destinations or increase travel frequencies to other places in order to avoid extreme weather (Schwirpiles and Ziegler, 2017). As reported by the Cruise Line International Association 2020, the Mediterranean was among the Top 3 destinations by average passenger volume from 2018 to 2020, but the rate of passenger increase (16%) from North America was lower than that of Alaska (20%).

Tourists are more willing to travel to the polar regions because summer temperatures are relatively comfortable there (Ma and Kirilenko, 2020). Numerous studies focus on the Arctic as a cruise destination (Lemelin et al., 2010; Dawson et al., 2010; Maher et al., 2010; Piggott and McNamara, 2016; Stewart et al., 2016; Lemieux et al., 2018; Palma et al., 2019). Arctic cruise tourism has captured tourists who are interested in being not the "first one," but the "last one" to observe polar bears, Arctic wildlife, and ice landscapes because of the accelerating loss of Arctic sea ice that is caused by climate change (Dawson et al., 2011). Although the Arctic cruise industry was forced to stop tourism services during 2020 because of the COVID-19 pandemic, demand has already recovered in 2022. The Arctic cruise lines are open to the public to reserve the trips in 2022 and 2023 (see Table 4). Arctic cruise tourism is popular among tourists, politicians, tourism operators, and researchers in tourism and the socio-psychological field (Lau et al., 2022).

Table 4 Arctic Cruise Trips Reservation Schedule

Arctic Cruise Line	Reservation Year	Trip Duration (Days)	Travel Agency
Svalbard Polar Bear Safari	May 2022	11	SWOOP Arctic
Chukotka and Wrangel Island Explorer	July 2022 / Aug 2022	16	SWOOP Arctic
Svalbard, Greenland & Iceland Polar Quest	Aug 2022 / Aug 2023	15-18	SWOOP Arctic
Spitsbergen Explorer: Wildlife Capital of the Arctic	May 2022 / June 2022	12	Quark Expeditions
Jewels of the Russian Arctic: Franz Josef Land and Novaya Zemlya	2022 / 2023	16	Quark Expeditions

Under the Northern Lights: Exploring Iceland & East Greenland	Sep 2022	14	Quark Expeditions

Sources: https://www.quarkexpeditions.com/arctic;
https://www.swoop-arctic.com/cruises/svalbard/quest-iceland-greenland

The human population of Arctic cruise tourism destinations and the sustainability development of the destinations has been viewed as problematic for decades (Lemelin et al., 2010; Dawson et al., 2010; Maher et al., 2010; Palma et al., 2019; Wu et al., 2020). On the one hand, more tourists has a positive effect on improving economic development in the Arctic region (Dawson et al., 2010; Lemelin et al., 2010; Wu et al., 2020). On the other hand, tourism increases carbon emissions through both long-distance travel transportation, especially for those destinations in remote areas, and through local tourist and accommodations activities (Dawson et al., 2010).

Many studies have examined the socio-psychological predictors of environmentally sustainable travel choices at the individual level (Juvan and Dolnicar, 2014), but most focus on the types of motivation that influence tourists' travel intentions (Hung and Petrick, 2011; Stewart et al., 2016; Jung and Han, 2016; Stewart et al., 2016; Lee et al., 2017; Piggott and Mcnamara 2017; Han and Hyun, 2018; Lemieux et al., 2018; Wu et al., 2020). These studies typically ignore the impact of tourists' environmental awareness on their intentions regarding travel destinations (Hares et al., 2010). Only one empirical study has examined the relationship between people's climate change concerns and their intentions to experience a vulnerable and disappearing landscape in Churchill, Manitoba (Groulx et al., 2016).

Based on previous psychological theoretical models (refer back to Table 3), environmental awareness has been identified as a key variable that influences people's travel behavior. Stern (2000) categorizes people's behavior into two different types—impact-oriented behavior and intent-oriented behavior. Intent-oriented behavior is attitude-determined, and concentrates on people's attitudes or awareness. Combined with the Planned Behavior theory (Ajzen and Fishbein, 1980), it has shown great promise in explaining the relationship between environmental awareness and behavioral intentions in sustainable tourism behavior (Cheng and Tung, 2010; Fielding et al., 2008; Shaw et al., 2000; Han et al., 2010; Ham and Kim, 2010; Ong and Musa, 2011; Juvan and Dolnicar, 2014).

Because there is no unified theory defining the relationship between people's environmental awareness and their behavioral intentions (Hares et al., 2013), in this paper we do not try to apply any particular theory; rather, we investigate the gap between environmental awareness and behavioral intentions in a particular context: the relationship between environmental awareness in a climate change context and behavioral intentions to do Arctic cruise activities. Based on the preceding discussion, we propose following hypothesis:

Hypothesis 1: People's awareness of climate change has a positive effect on their intentions to do Arctic cruise activities.

2.3 Sensitivity to Last Chance Tourism Messages

With the development of Arctic cruise tourism, the phenomenon of tourists visiting the Arctic to see polar bears, rare fauna, and the melting Arctic ice-landscape is identified as Last Chance Tourism (LCT) (Lemelin et al., 2010; Dawson et al., 2011; Groulx et al., 2016). LCT is regarded as a fresh term which only appeared in recent years (Dawson et al., 2010). There are many other descriptive phrases that are similar to the LCT, such as "disappearing tourism," "doom tourism." "climate tourism," (Lemelin et al., 2010), "catastrophe tourism," and "extinct tourism" (Stewart et al., 2016). Table 5 shows the different definitions of LCT. All these definitions ascribe the popularity of last chance tourism to people's curiosity. The "last chance" to experience fast-disappearing destinations includes peoples' desire to explore and to photograph those destinations that have endangered and rare fauna (Ballantyne et al., 2009). The highly-improved transportation systems and advanced global communication technology indirectly supports the accessibility of LCT (Lemieux et al., 2018).

Table 5 Definitions of Last Chance Tourism

Authors	Last Chance Tourism Definition
Lemelin et al. (2010)	LCT is a niche tourism market where tourists explicitly seek vanishing landscapes or seascapes, and/or disappearing natural and/or social heritage.

Bhattarai (2015)	Last-chance Tourism refers to a form of tourism which is understood as travel to destinations impacted by climate change.
Piggott and McNamara (2017)	LCT is a niche tourism market focused on witnessing and experiencing a place before it disappears.
Palma et al.(2019)	LCT is the concept by which tourists seek out regions and ecosystems under rapid change, such as Marginal Ice Zone (MIZ), in order to experience them in their classical setting before they are potentially, irrevocably changed.

The tourism industry has developed LCT marketing as "place branding campaigns" to capture tourists' interests by place vulnerability and rarity (Eijgelaar et al., 2010; Lemieux et al., 2018). A common characteristic of LCT places is that they are located in the world's protected areas (Stewart et al., 2016). The LCT destinations include the Maldives Islands (where the landscape is threatened by the rising of sea levels), Churchill, Canada (where the polar bears are endangered by climate change due to the lack of food access and accommodations), Mount Kilimanjaro (where the acceleration of ice level threats the land scale (Lemieux et al., 2018), and the Great Barrier Reef (GBR), where coastal development and climate change threaten aquatic species (Piggott and Mcnamara, 2017). Scholars theorize that the LCT place branding builds an emotional relationship between tourists and LCT destinations (Lemelin et al., 2010; McGaurr et al., 2015; Groulx et al., 2016). This emotional relationship is driven by media construction (Eijgelaar et al., 2010; Dawson et al., 2011; Piggott and McNamara, 2016; Ma and Kirilenko, 2020). For example, Yahoo Adventure released a list of "9 things you must see before they disappear forever" by using an LCT brand marketing strategy to attract tourists' attention, and promoting LCT to a potentially broad array of tourists (Lemiexu et al., 2018).

Table 6 A Selection of Media Headlines Related to LCT

Headline	Author / Media source
Tourists Try to See Great Barrier Reef Before it's Gone	Howard (2016). *National Geographic.*
Arctic Tourism: "See It Before It's Gone"	Marc Montgomery (2016). *RADIO CANADA INTERNATIONAL (RCI).*
Endangered destinations to visit before they're gone	Schmalbruch (2017). *Business Insider.*
Top 10 Disappearing Travel Destinations To Visit Before They're Gone	Polly Rider (2017). *Culture Trip.*
30 Places to Visit Before They're Gone Forever	Hannah Huber (2018). *AD.*
11 Places to Visit Before It's Too Late	Lindsey Olander (2020). *JETSETTER.*

In combination with risk perception research, some studies show that media headlines have encouraged tourist interest in visiting LCT destinations (Lemelin et al., 2010). Eagle et al. (2018) collected 28 kinds of online news media headlines that were directly related to the Great Barrier Reef (GBR) and climate change. GBR tourism is a typical example of LCT market branding (Piggott and Mcnamara, 2016). The GBR is not only listed in the World Heritage List by the United Nations Educational, Scientific, and Cultural Organization (UNESCO), but also ranks high in numerous travel magazines and websites or natural magazines of places that are regarded as last chance places to visit within one's lifetime (Table 6) (Piggott and Mcnamara, 2016). The theme of "Coral bleaching" and "Reef is dying/dead" rank number 2 and number 3, respectively on the list of the most frequent titles in the media (Eagle et al., 2018). Eagle et al. (2018) find that the media use predominately sensationalized and negative reports to potentially shape tourists' perceptions on the declining health of the GBR caused by climate change; these reports reinforce tourists' intentions to visit "to see the reef before its gone" (Piggott and Mcnamara, 2016).

Another example is Churchill, Canada with polar bear viewing (Dawson et al., 2010). Tourist awareness of the climate change impact on the polar from the media activates their willingness to view polar bears before they are extinct. For example, one tourist responded during

an interview by saying that "I was here seven years ago but I wanted to come up again to show my wife the polar bears before they are all gone," and "I thought I better come see the bears because the next time I am in this country they will be all gone" (Dawson et al., 2010). The media advertising on Arctic sea-ice melting conditions due to climate change and its impact on polar bears has successfully driven tourists' intentions to visit Churchill due to "the last time to see" (Palma et al., 2019). In the case of the Arctic cruise tourism, the polar bear is a major icon for LCT (Dawson et al., 2011).

Interestingly, research suggests that the motivation for LCT that is shaped by media coverage indirectly impacts on people's awareness of climate change and their intentions to LCT destinations (Lemelin et al., 2010; Groulx et al., 2016; Lemieux et al., 2018). LCT is examined as a unique form of tourism in protected areas (Dawson et al., 2010; Lemelin et al., 2010; Eijgelaar et al., 2010; Lemieux and Eagle, 2012; Groulx et al., 2016; Stewart et al., 2016). From an LCT perspective, media reports affect people's environmental awareness about travel destination vulnerability and try to create an urgency for people to visit a site sooner rather than later (Hmielowski et al., 2013; Lemieux et al., 2018). From a psychological perspective, the language and images about the danger of climate change is a signal from the media increases people's sensitivity of climate change problems and their cognitive understanding of severe environmental degradation in LCT destinations (Kollmuss and Agyeman, 2002; Wall et al., 2011; Tiller and Schott, 2012; Hall et al., 2014). This triggers emotional actions by acting non-pro-environmental behavior on vacation decision making intentions (Kollmuss and Agyeman, 2002; Wall et al., 2011). As a result, this study assumes that people's sensitivity to LCT messages will influence their awareness of climate change problems and then will affect their intentions to do Arctic cruise tourism.

Table 7 LCT Motivations Research

Author	LCT motivation
Groulx et al., (2016)	To feel connected to an environment that may not exist in the future To view an iconic feature that may disappear from the park in the future
Stewart et al., (2016)	To see a natural feature that may disappear in the future

Piggott and McNamara (2017)	To see the reef before it's gone
	The beauty and health of the reef is declining
Lemieux et al., (2018)	To feel connected to an environment that may not exist in the future
	To view an iconic feature that may disappear from the park in the future

However, no model of this sensitivity to LCT messages currently exists, and the definition of sensitivity to LCT messages is based on a general definition of environmental sensitivity from an individuals' psychological perspective (Peterson, 1982). Very little research involving environmental sensitivity can be found in the tourism literature, with the exception of Cheng and Wu (2015), who examined the mediating role of environmental sensitivity in the relationship between environmental knowledge and environmentally responsible behavior of tourists who visited the Penghu Islands. Environmental sensitivity refers to an individual's concern and attitude towards the environment (Peterson, 1982) or "an empathetic perspective towards the environment," which would influence individuals' behavior in the future (Hungerford and Volk, 1990; Cheng and Wu, 2015). Keeping in mind the definition of environmental sensitivity, we define the sensitivity to LCT messages as an individual's concern about LCT information in the Arctic. Instead of using a one-sentence to describe the LCT messages that have been studied in previous LCT research (see Table 7), we describe the sensitivity to LCT messages as a combination of a brief introduction about the current situation in the Arctic landscape and Arctic polar bears and two images of them. We do this because it is difficult for people to understand most environmental degradation (Kollmuss and Agyeman, 2002). It is therefore important to present information using both language and pictures to help people understand the immensely complicated issue of environmental issues (Kollmuss and Agyeman, 2002). The introduction sources are from both academic research and official media and the LCT messages about the Arctic landscape and Arctic polar bear include the key words in the definition of Last Chance Tourism, such as "disappearing," "vanishing," and "last chance to see." Integrating the above research studies in psychology and in the tourism field suggests the following hypothesis:

Hypothesis 2: Sensitivity to LCT messages has a moderating effect on the relationship between awareness of climate change and intentions to do Arctic cruise activities. A higher sensitivity to LCT messages will strengthen the relationship between people's awareness of climate change and their intentions to do Arctic cruise activities.

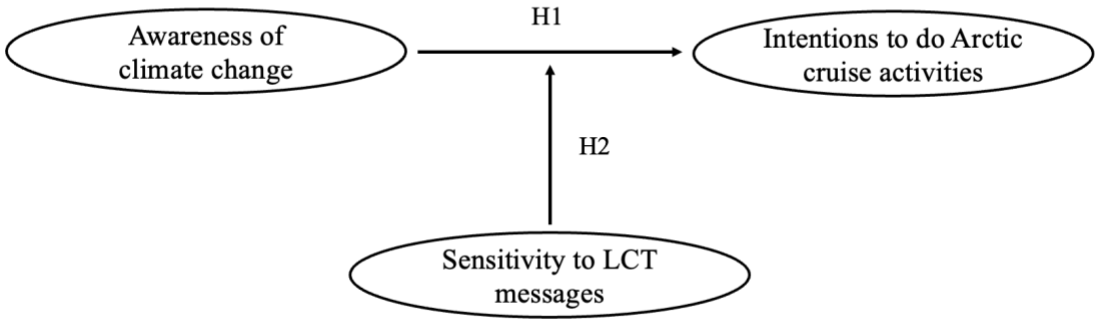


Figure 1 Theoretical Model

Chapter 3 Research Methods

A questionnaire-based survey is utilized as the quantitative approach in this study. All the research methods follow Churchill's (1979) key steps for the scale development process in the tourism literature (Wen et al., 2018; Chen et al., 2020; Huang et al., 2021; Huang and Wen, 2021). A pilot study is conducted to develop item generation (Churchill, 1979; Huang et al., 2021). Factor exploration and scale dimensionality determination are based on a sample size of 558 participants for exploratory factor analysis (EFA; n = 558). The research methods provided representative, reliable, and applicable results (Pan et al., 2021). This study has been approved by the research ethics committee of the authors' institution in advance (Miyakawa and Oguchy, 2022). The purpose of the quantitative survey is to investigate how the sensitivity to LCT messages impacts the relationship between awareness of climate change and intentions to do Arctic cruise activities.

3.1 Sample and data collection procedures

This study employs a survey method to collect data. The 2020 CLIA Global Market Report shows that North America ranks first in passenger volume for cruises (see Figure 2). Thus, North America has a large potential for cruise industry development. We therefore chose the North American panel as the source of survey participants.

Passenger Volume (K) by Source Passenger Regions

	2018	2019	2020
North America	14,240	15,408 (8.2%▲)	3,008 (-80.5%▼)
Western Europe	6,731	7,226 (7.4%▲)	1,223 (-83.1%▼)
Asia	4,240	3,738 (-11.8%▼)	497 (-86.7%▼)
South America	883	935 (5.9%▲)	458 (-51.0%▼)
Australia/NZ/Pacific	1,460	1,351 (-7.5%▼)	340 (-74.8%▼)
Eastern Europe	213	263 (23.3%▲)	72 (-72.6%▼)
Africa	154	169 (9.8%▲)	68 (-59.6%▼)
Scandinavia/Iceland	225	218 (-3.0%▼)	52 (-76.2%▼)
Central America	47	49 (5.7%▲)	14 (-71.3%▼)
Middle East/Arabia	111	108 (-2.2%▼)	8 (-92.3%▼)
Caribbean	56	57 (1.0%▲)	7 (-87.7%▼)

Figure 2 2020 Global Cruise Passenger Statistics

Source: CLIA Global Market Report 2020

The sample is comprised of that portion of the North America panel who are interested in Arctic cruise activities. To achieve this sub-sample, we asked the following straightforward filter question: "How interested would you be in learning about Arctic cruise tourism?" before starting the survey. There were three choices ("very interested," "interested," and "not at all interested." Only the respondents who chose "very interested" or "interested" were eligible to complete the questionnaire; respondents who chose "not at all interested" were excluded. The data collection process was completed in association with Prairie Research Associates (PRA).

There were a total of 40 items of information in this 5-minute survey. PRA programmed the approved questions into online survey software and conducted the pretest. The pretest involved 17 participants in the Manitoba panel who completed it to ensure that manipulations were working, and to provide feedback on potential change. Once the pretest was complete, PRA launched the survey using a North American panel, which included 558 participants.

In order to produce reliable and valid survey data, the eligible participants were asked to review the informed consent form after finishing the filter question. The consent form clearly showed what the purpose of this study was, how the principal investigator selected the participants, how many participants would be asked to participate, what the study procedures were and what benefits the participants would get from doing the survey. A consent form was administered that contained the risks, discomforts, benefits, and costs, the honorarium for participation was also clearly mentioned in the consent form. Only participants who signed the consent form were allowed to complete the survey. Signatures were valid only when participants gave their initials or full names; other formats of signatures were invalid, for example, someone writes their name as "Study" or "Ouse." Each participant received points that they could use toward prizes, and points varied based on the time participants spent on survey questions. The points given were similar to other point-style programs (e.g., Air Miles, Aeroplan). Participants can accumulate points and then use them to get gift cards, items, etc.

3.2 Measurement

3.2.1 Awareness of climate change

Based on the definition of awareness of climate change in the literature, the questions for awareness of climate change were designed to measure participants' general awareness and understanding of climate change. Four items (see Table 8) were used to assess awareness of climate

change; a 5-point Likert agreement scale was used (where 1 = strongly disagree, and 5 = strongly agree). These items are adapted from previous studies that tested tourists' climate change problem awareness, acceptance, and impacts (Arlt et al., 2011; Tiller and Schott, 2012; Macher et al., 2011).

Table 8 Awareness of Climate Change Measurement

Measurement Questions
Climate change could be listed as one of the greatest threats to humanity
Climate change brings many weather-related challenges (e.g., heavy rain, limited snowfall, etc.)
Humans are contributing to changes in the global climate
Climate change is not as dangerous as we are told

3.2.2 Sensitivity to LCT messages

Before completing questions about sensitivity to LCT messages, participants were asked to read a Last Chance Tourism (LCT) message card about the Arctic landscape and polar bears (see Figure 3); that message was designed by PRA. The card conveys LCT information by using some keywords from the definition of Last Chance Tourism (Lemelin et al., 2010). This measurement has been widely used in studies published in marketing research journals (Xu and Wyer Jr, 2010; Park and John, 2011; Konrod and Danziger, 2013; Aydinoglu and Cian, 2014; Moore and Knorath, 2015; Choi et al., 2019).

Table 9 Previous Studies in Marketing Journals

Author	Variables	Procedure	Pretest
Park and John (2011)	IV: signalling appeal; self-improvement appeal DV: ads appeal effectiveness	1. Self-theory and attitude measure 2. Reading two ads for a new Victoria's Secret eye shadow by authors 3. Evaluate the product	Yes

Aydinoglu and Cian (2014)	IV: picture type (person or product) DV: consumer attitudes towards ads	1. Appearance self-esteem measure as pretest 2. Randomly assigned six printed ads 3. Measure their attitudes toward the ads	Yes
Moore and Konrath (2014)	IV: affect intensity DV: consumption related outcomes Mo: vividness of ads (study 3)	1. Scenario: "You and a friend are shopping at the mall" 2. Show product type with vivid, pleasure-focused version or pallid, information-focused version 3. Answer DV questions	Yes
Ngoc To and Patrick (2020)	IV: a model gaze direction DV: ads attitude Mo: narrative transportation	1. Told a scenario 2. Randomly to each of three gaze condition (compared images) 3. Control gender 4. Rate attitudes	Yes
Xu and Wyer Jr (2010)	IV: puffery DV: product evaluation	1. Told a scenario 2. Read the cover story and ads 3. Answer product evaluation	Yes
Konrod and Danziger (2013)	IV: effect of figurative language DV: consumer attitudes toward consumption (hedonic/utilitarian)	1. Scenario: Imagine sending a hotel trip 2. Reading ads (figurative vs. literal) 3. DV evaluation	Yes

Source: All the papers were from *Journal of Consumer Psychology* or *Journal of Consumer Research*

Park and John developed two advertisements for a new Victoria's Secret eye shadow to evaluate the ads appeal effectiveness. Moore and Konrath (2015) showed images in different

colour versions to investigate how the narrative transportation would impact the relationship between gaze direction and ads attitude. Xu and Wyer Jr (2010) asked participants to read the cover story and ads to answer the product evaluation measurement. Konrod and Danziger (2013) used two contrast ads in a figurative and a literal format to determine how the effect of figurative language influenced consumers' attitudes toward consumption.

Figure 3 Last Chance Tourism Messages Card

Measurement of "sensitivity to LCT messages" is based on the scale of Daniel (2002), who developed the measure of environmental sensitivity, and Cheng and Wu (2013) who tested tourists' environmental sensitivity to Penghu. Eight items are tested using a 5-point Likert agreement scale (where 1 = strongly disagree, 5 = strongly agree).

Table 10 Sensitivity to LCT Messages Measurement Questions

I am concerned about the ecological preservation of the Arctic
I am concerned about the preservation of polar bears in the Arctic
I care about the impact of my living habits on the natural environments of the Arctic region
I care about the impact of my living habits on the survival of polar bears in the Arctic
I appreciate the natural environment in the Arctic
I appreciate the polar bears in the Arctic
I think the biggest negative impact of climate problems in the Arctic is the risk to the ice landscape
I think the biggest negative impact of climate change in the Arctic is the risk to polar bears

3.2.3 Intentions to do Arctic cruise activities

Based on the previous definition of intentions to do Arctic cruise activities, four items are tested using a 5-point Likert agreement scale (where 1 = strongly disagree, 5 = strongly agree). The scale is derived from the concept of individuals' intentions scale of Fishbein and Ajzen (1975).

Table 11 Intentions to Do Arctic Cruise Activities Measurement Questions

I am interested in taking an Arctic cruise in the next five years (assuming I will have the financial means to do so)
I want to take a cruise to the Arctic sometime in the future to see polar bears and Arctic landscapes (assuming I will have the financial means to do so)
I would encourage friends and relatives to go on an Arctic cruise in the future
I would recommend an Arctic cruise to others

3.3 Data Analysis

Given previous theoretical approaches and empirical studies in tourism research from a consumer-oriented perspective (Lee et al., 2017; Wu et al., 2020; Wen et al., 2020; Huang et al., 2021; Huang and Wen, 2021; Wang et al., 2021), our data analysis followed a rigorous procedure

using SPSS v26.0. An exploratory factor analysis (EFA) was conducted in SPSS v26 by using principal component extraction to determine the maximum common dimensions on corresponding multi-item variables (Huang et al., 2021; Pan et al., 2021; Wang et al., 2021). The Kaiser-MeyerOlkin (KMO) test is used to test adequate sample size for the 16 items which measure the independent variable (Awareness of climate change); dependent variable (Intentions to do Arctic cruise activities); and moderator (Sensitivity to LCT messages) (Huang et al., 2021). Finally, hierarchical regression analysis was applied to examine the hypotheses in the theoretical model based on 558 valid survey responses (Wen et al., 2020).

Chapter 4 Results

4.1 Demographic profiles of samples

The data were analyzed using SPSS version 26 to calculate descriptive statistics. To ensure the validity of the questionnaire, all the selected participants were asked to complete the filter question "How interested would you be in learning about Arctic cruise tourism?" As shown in Table 12, there were 558 valid questionnaires from the North American Panel after data screening ensured that only participants who selected "interested" (n = 224) or "very interested" (n = 334) filled out the questionnaire.

Table 12 Filter Question

	Frequency	Percent	Valid Percent	Cumulative Percent
Interested	224	40.1	40.1	40.1
Very interested	334	59.9	59.9	59.9
Total	558	100.0	100.0	100.0

The demographic profile information collection followed previous tourism research methods (Yu and Ko, 2012; Jaapar et al., 2017; Lee et al., 2017; Wen et al., 2020; Huang and Wen, 2021; Wang et al., 2021; Miyakawa and Oguchi, 2022). As shown in Table 12, males accounted for 57.5% of respondents, with females and non-binary making up 42.3% and 0.2%, respectively). Over 60% of participants were between 25 and 44 years old, and one-third of participants were older than 55. Most of the respondents (92.3%) are from the U.S., and others (7.3%) are from Canada. In terms of education, holders of university degrees at or above the bachelor's level are the most numerous (47.7%), followed by holders of high school certificates (29.8%), and holders of diplomas or other non-university certificates (19.5%). A small minority of (3%) had no certificate, diploma, or degree.

Table 13 Sociodemographic Profiles (N = 558)

Characteristics		Frequency	Percentage (%)
Gender	Male	321	57.5
	Female	236	42.3
	Non-binary	1	0.2
Age	18-24	69	12.4
	25-34	138	24.7
	35-44	117	21.0
	45-54	82	14.7
	55+	152	27.2
Country	Canada	43	7.7
	United States of America	515	92.3
Education	No certificate, diploma, or degree	17	3.0
	High school certificate or equivalent	165	29.6
	Apprenticeship or trades certificate or diploma	38	6.8
	College, CEGEP, or other non-university certificate or diploma	71	12.7
	University certificate or diploma below the bachelor level	52	9.3
	University certificate, diploma, or degree at the bachelor's level	100	17.9
	University certificate, diploma, or degree above the bachelor's level	115	20.6
Cruise experience	None	222	39.8
	One	127	22.8
	Two	91	16.3
	Three	47	8.4
	Four	30	5.4

Five or more	41	7.3

Regarding prior cruise experiences, the survey revealed that more than half of the participants had at least a one cruise experience, and 40% of participants had no cruise experience. One- or two-time cruise experiences are the most common (39.1%), followed by three-time cruise experiences (8.4%), more than five times (7.3%), and four times (5.4%). Of those who had cruise experiences before (n = 336), 34% of participants had an Arctic cruise experience (see Figure 4).

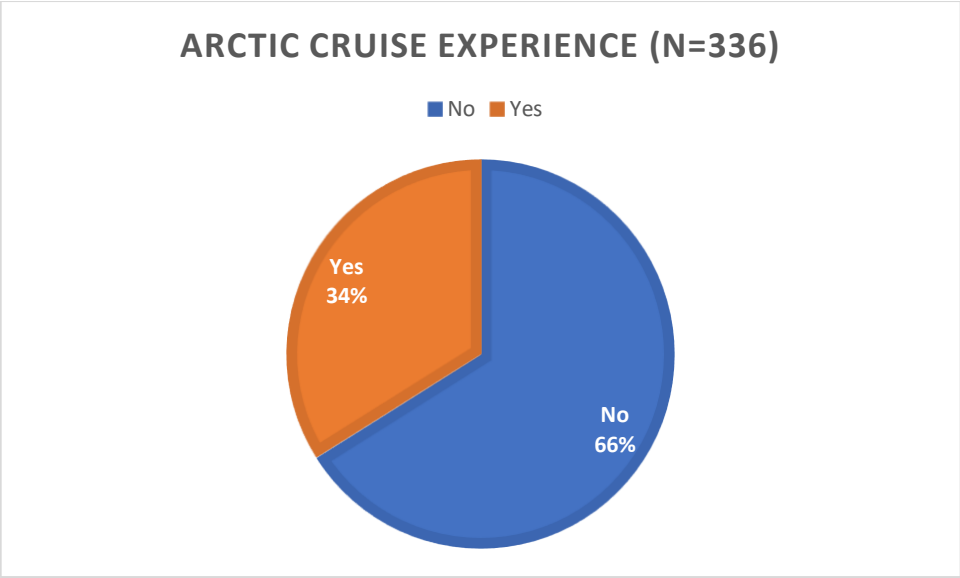


Figure 4 Participants Who Had an Arctic Cruise Experience (N = 336)

Before planning travel destinations, most participants (65%) said they spent at least 5 hours on travel research, 18.6% of participants were willing to spend an average of 20 hours, and 6.5% of participants would spend more than 40 hours to do thorough preparation for vacation plans (see Figure 5).

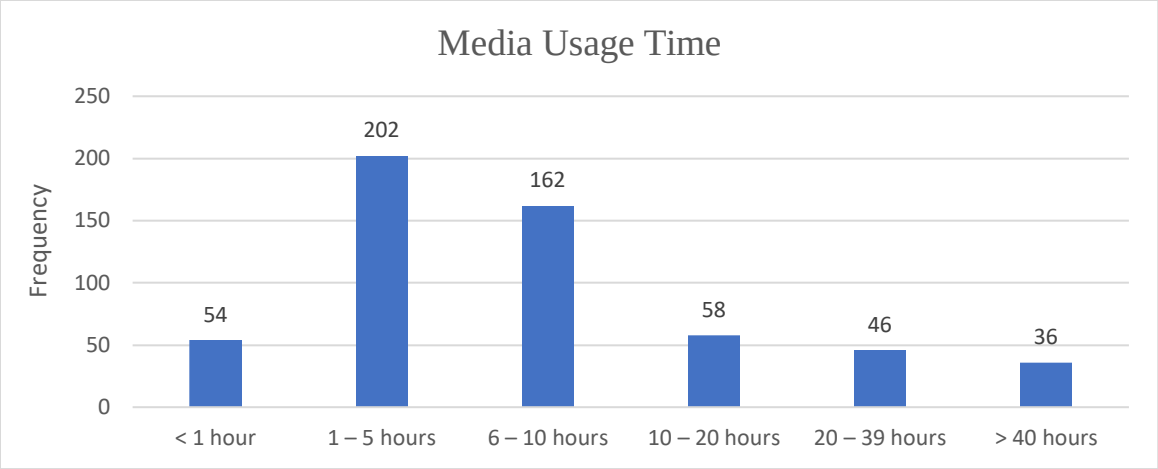


Figure 5 Media Usage Time on Travel Research (N=558)

The most popular information source participants used to do travel research was websites /online searches (Mean = 4.31), followed by travel books/brochures/agencies (Mean = 3.59), and social media (e.g. Facebook, Twitter, Instagram, blogs)(Mean = 3.52). (Are the numbers in the preceding sentence based on a 5-point scale? If so, you need to say that here and in Figure 6. Traditional media sources, such as TV or radio (Mean = 3.15) and newspapers/magazines (Mean = 3.1) are not as important as the internet. Media sources have a strong influence on participants' travel decision-making and personal perceptions of travel destinations (Arlt et al., 2011; Ma and Kirilenko, 2020). The academic literature finds that media usage time influence people's intentions and behavioral change (Arlt et al., 2011), and the mass media has determined the important issues perceived by the public, then changing their travel decisions (Ma and Kirilenko, 2020). A typical example is the Great Barrier Reef (GBR) travel in Australia. A total of 242 articles from news media, blogs, and the online press have mentioned the themes of "global warming" and "the reef is dying," and this has stimulated GBR trips in recent years (Eagle et al., 2018).

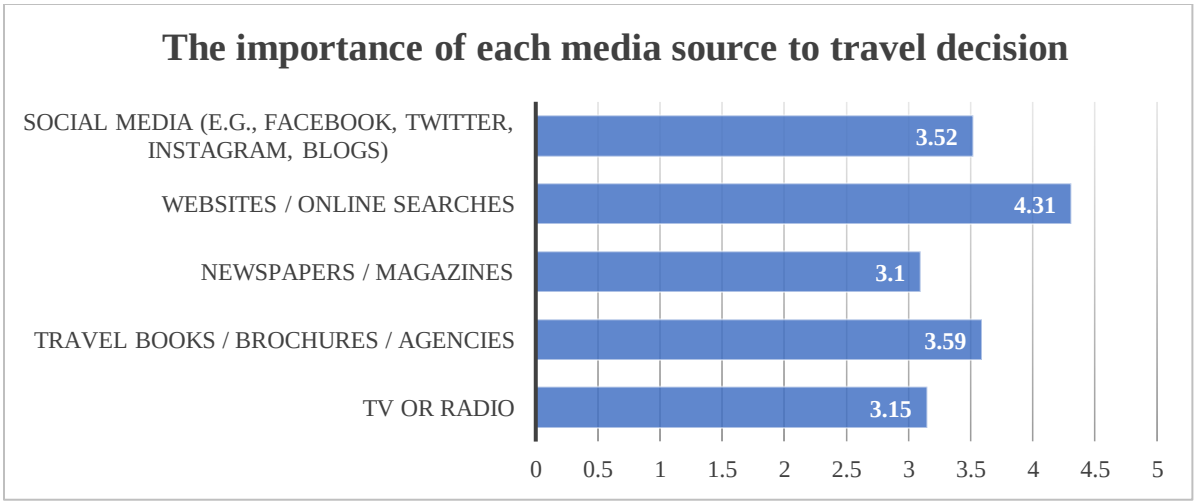


Figure 6 The Importance of Each Media Source to Travel Decision

4.2 Scale dimensionality determination

To determine if the dataset is subject to the common method variance and potential dimensions, an exploratory factor analysis (EFA) was conducted using principal components analysis with oblique rotation (Jaapar et al., 2017; Wang et al., 2021). The reliability tests are used to test the consistency of the variables (Yu and Ko, 2012).

As shown in Table 14, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy test is 0.907 which exceeds the recommended value of 0.60 (Wen et al., 2020). Bartlett's Test of Sphericity is statistically significant ($p = 0.000$), which verifies that the dataset is adequate for factor analysis and the notion of factorability of the correlation matrix (Hair et al., 2010; Jaapar et al., 2012; Wu et. Al., 2020; Wang et al., 2021). The results indicate that factor analysis should generate distinct and reliable factors, and suggest dimensionality in the scale items (Wen et al., 2018; Wu et al., 2020).

Table 14 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.907
Bartlett's Test of Sphericity	Approx. Chi-Square	5201.183
	df	120
	Sig.	0.000

The results of the EFA (see Table 15 below) showed that three components were extracted with eigenvalues exceeding 1.0 among all the 16 multi-item variables. Only an Eigenvalue of at least one is a significant element or component (Yu and Ko, 2012). But all factor loadings ranged from 0.548 to 0.879, and they are above the acceptable threshold of 0.5 (Yu and Ko, 2012; Jaapar et al., 2017). Therefore, none of the items were removed. The three components explained 43.227%, 14.648% and 7.839% of total variance, respectively.

The three dimensions are labelled as follows: Factor 1, Sensitivity to LCT messages; Factor 2, Intentions to do Arctic cruise activities; Factor 3, Awareness of climate change. The three factors have eight, four, and four items, respectively. The first factor is Sensitivity to LCT messages (SLCTM1 – SLCTM8); it refers to an individual's concerns and attitudes toward natural-based tourism destinations messages (Peterson, 1982; Cheng and Wu, 2013), and it is conveyed by social media and academic reports. The destination is targeted as the Arctic region which has vanishing ice landscapes and endangered rare animals like polar bears (Lemelin et al., 2010). The second factor is Intentions to do Arctic cruise activities; it reflects participants' willingness to go on Arctic cruise activities (Fan et al., 2015). The third factor is Awareness of climate change; it represents participants' general understanding of the impact of climate change on the earth (Matthies and Schahn, 2004). The EFA results satisfied the requirement of a reliable coefficient of measurement scales and revealed high internal consistency (Hair et al., 2010).

Table 15 Exploratory Factor Analysis of Multi-item Variables

Exploratory factor analysis of multi-item variables			
	Component		
	1	2	3
Factor 1: Sensitivity to LCT messages			
SLCTM1	0.580		
SLCTM2	0.627		
SLCTM3	0.561		
SLCTM4	0.651		
SLCTM5	0.873		
SLCTM6	0.879		
SLCTM7	0.548		
SLCTM8	0.583		
Factor 2: Intentions to do Arctic cruise activities			
IACA1		0.824	
IACA2		0.765	
IACA3		0.882	
IACA4		0.855	
Factor 3: Awareness of climate change			
ACC1			0.849
ACC2			0.817
ACC3			0.844
ACC4			0.583
Eigenvalue	*6.916*	*2.344*	*1.254*
Percentage of variance explained	*43.227*	*14.648*	*7.839*

Note. ACC = awareness of climate change, SLCTM = sensitivity to LCT messages, and IACA = intentions to do Arctic cruise activities

4.3 Hypotheses testing

Hierarchical multiple regression has been widely used to test moderation effects (Cohen et al., 2014; Yang and Lau, 2019; Ruiz-Ortega et al., 2021). Although there are some potential issues such as multicollinearity and inflated standard errors (Lance, 1998), hierarchical multiple regression is popular in empirical research which examines moderating effects (Yang and Lau, 2019).

Hierarchical regression is adopted to test the two hypotheses with a dataset of 558 cases. The interaction effect of the moderator applied in this study is followed by Wen et al. (2020), who proposed interaction variables to differentiate the main effects from the interaction effects. Based on the verification of EFA, there are three dimensions (components) based on a total of 16 items. The three dimensions represent the study variables: IV: Awareness of climate change (Factor 3); DV: Intentions to do Arctic cruise activities (Factor 2); and Moderator: Sensitivity to LCT messages (Factor 1). The three-variable model is tested in IBM SPSS version 26 for regression and moderation analysis. The potential multicollinearity problem is reduced by centred predictors (Yang and Lau, 2019).

Hierarchical regression analysis is completed by a three-step process (Wen et al., 2020; Miyakwa and Oguchi, 2022): 1) enter the independent variable Awareness of climate change (ACC) into the regression; 2) add the moderator variable Sensitivity to LCT messages into the regression; 3) assess the interactive effect of combining independent and moderating variables into the regression.

First, the ANOVA results reveal statistical significance in all three models shown in Table 16 ($p = 0.000$). Second, the results exclude the autocorrelation and multicollinearity problem with intentions to do Arctic cruise activities as the dependent variable because the Durbin-Watson value is 2.128 and the VIF value is lower than 0.10. Third, the R-square and Adjusted R-square results in the three models are acceptable based on previous studies in the tourism management area (Wan et al., 2014; Leonidas et al., 2016; M.jj et al., 2016; Dai et al., 2019; Lu et al., 2019; Wen et al., 2020; Li et al., 2021; Ruzi-Ortega et al., 2021; Luu et al., 2022; Su et al., 2022).

Table 16 Hierarchical Regression of Intentions to do Arctic Cruise Activities on Awareness of Climate Change and Sensitivity to LCT Messages (N = 558)

	DV: Intentions to do Arctic Cruise Activities		
	Model 1	**Model 2**	**Model 3**
Step 1: Independent variable			
Awareness of climate change (ACC)	0.244***		
Step2: Moderator			
Awareness of climate change (ACC)		-0.470	
Sensitivity to LCT Messages （SLCTM）		0.469***	
Step3: Interactive effect			
Awareness of climate change (ACC)			-0.275
Sensitivity to LCT Messages （SLCTM）			0.338**
Interaction ACC * SLCTM			0.045
Adjust R^2	0.058	0.192	0.193
R^2	0.600	0.195	0.197
$\triangle R^2$		0.136	0.002

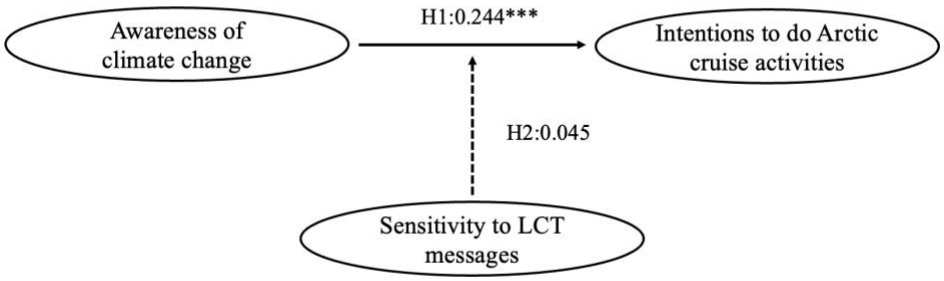
Note: *p = 0.1; **p = 0.05; ***p = 0.001;

All VIF (variance inflation factors) estimates < 5; Durbin-Watson value = 2.128

Model 1 is used to test the main effects, i.e., the relationship between awareness of climate change (ACC) and intentions to do Arctic cruise activities (IACA). The results indicate that people's awareness of climate change exerts a significantly positive impact on intentions to do Arctic cruise activities (ß = 0.244, p = 0.000); this supports H1. However, when the moderator of sensitivity to LCT messages (SLCTM) is included in Step 2, the independent variable of awareness of climate change (ACC) does *not* have a statistically significant (ß = -0.470) impact on the dependent variable of (IACA). By contrast, Model 2 reveals that sensitivity to LCT messages (SLCTM) has a positive and significant effect on intentions to do Arctic cruise activities (IACA) (ß = 0.469, p = 0.000) and produces a 13.5% increase in R^2. (4)

To test Hypothesis 2, the interactive term between awareness of climate change (ACC) and sensitivity to LCT messages (SLCTM) is added in Step 3. Based on the sign and significance of ß

coefficients and minor R^2 change in Model 3, the findings show that the moderating influence of sensitivity to LCT messages upon the relationship between awareness of climate change and intentions to do Arctic cruise activities is not significant (ß = 0.045; $\triangle R^2$=0.002); thus Hypothesis 2 is not supported (see Figure 7).



Note: Significant ——→

Non-significant --------→

Standardized path coefficient

Figure 7 A Path Model of Hierarchical Regression Model

In conclusion, the results of the hierarchical regression indicate that the independent variable of awareness of climate change and the moderator (sensitivity to LCT messages) positively and significantly impacts the dependent variable (intentions to do Arctic cruise activities) separately (see Figure 8). However, they do not simultaneously affect people's intentions to do Arctic cruise activities in the moderator effect model.

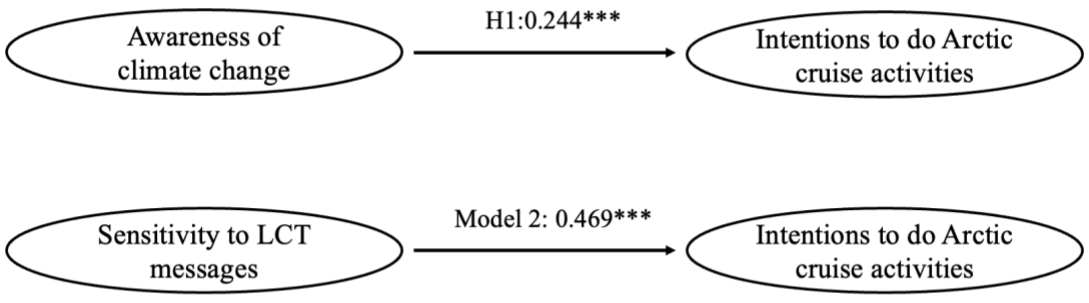


Figure 8 Interpreted Results from Hierarchical Regression

Chapter 5 Discussion

This study develops and validates measurement scales of people's awareness of climate change and intentions to do Arctic cruise activities from and individual perspective followed by Churchill (1979). We also examined the relationship between awareness of climate change and intentions to do Arctic cruise activities, with sensitivity to LCT messages postulated as a moderator. We integrated the proposed theoretical relationships by using a sample of 558 respondents from North America who were interested in learning about Arctic cruise tourism. Our findings provide both theoretical and practical insights.

Demographic characteristics within the LCT market are also conducive to a heightened concern (Groulx et al., 2016). Similar to previous polar tourism research, most of the participants (refer back to Table 13) are well-educated (Macher et al., 2011; Groulx et al., 2016). Árnadóttir and Heinonen (2021) point out that women are more likely to be emotionally engaged and to show more concerned than men about the environment. In order to avoid this data bias, the proportion of participants' gender is relatively equal (Table 13). This study controls the economic factor in this Arctic cruise tourism context because it views as a strong influencer on people's vacation decisions (Árnadóttir and Heinonen, 2021). Participants were asked to complete their intentions to take a cruise to the Arctic without considering their financial budget. The North America panel participants aim to prevent big cultural differences in the Arctic cruise context (Árnadóttir and Heinonen, 2021).

We found that there is no moderating effect of people's sensitivity to LCT messages on the association between awareness of climate change and intentions to do Arctic cruise activities (ß = 0.045; $\triangle R^2 = 0.002$; $p > 0.1$). Although one study (Cheng and Wu, 2015) suggested that environmental sensitivity moderates the connection between environmental awareness and environmentally responsible behavior, no studies have tested the effect of the sensitivity to LCT messages as a moderator of the relationship between awareness of climate change and intentions to do Arctic cruise activities. We also found that awareness of climate change and sensitivity to LCT messages do not simultaneously impact the intention to do Arctic cruise activities, but they are statistically significant when the awareness of climate change and intentions to do Arctic cruise activities are considered separately (see Figure 8).

We found that people's awareness of climate change is positively and significantly related to intentions to do Arctic cruise activities. It supports the literature stating that environmental

awareness about climate change plays an important role in people's behavioural intentions (Scott et al., 2010; Gössling et al., 2015; Reis and Higham, 2017), which are based on the socio-psychological models (Ajzen and Fishbein, 1975; Ajzen and Fishbein, 1980; Fietaku and Kessel, 1981). This finding is also consistent with Juvan and Dolnicar (2014) who find that people with a high level of climate change awareness do not react environmentally concerning the sustainability of their vacation intentions. The results of our study provide new outcomes by combining and extending some influential theoretical frameworks between environmental awareness and behavioral intentions from both the environmental and social psychology perspectives (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980; Fietkau and Kessel, 1981; Kollmuss and Agyeman, 2002), and internal factors frameworks in cruise tourism research (Hung and Petric, 2011; Jung and Han's, 2016; Han and Hyun, 2018). Previous studies have underestimated the important influence of people's awareness of climate change on their travel intentions (Scott et al., 2010; Gössling et al., 2015; Reis and Higham, 2017) and few studies have provided fine-grained analyses of Arctic cruise tourism and the LCT trend (Maher et al., 2011; Palma et al., 2019).

The inconsistency between people's awareness and behavior has been investigated by many studies (Barr, 2004; Blake, 1999; Kollmuss and Agyeman, 2002). It is commonly referred to as the awareness/attitude-behavior gap (Hares et al., 2013; Juvan and Dolnicar, 2014; Reis and Higham, 2017). The awareness/attitude-behavior gap is seen as one of the great challenges when people are faced with the climate change agenda (Antimova et al., 2012; Hares et al., 2013; Dickson et al., 2013; Reis and Higham, 2017). The gap shows that people's concerns towards climate change do not reliably translate into pro-environmental behaviors and personal engagement at the individual level (Antimova et al., 2012). Although none of current studies have investigated whether the awareness–behavior gap exists in the Arctic tourism context, studies in the air travel context show that this tension exists (Young et al., 2014; Higham et al., 2014; McDonald et al., 2015).

The positive relationship between people's awareness of climate change and intentions to do Arctic cruise activities is like the phenomenon of "flyers' dilemma" (Hares et al., 2013; Dickson et al., 2013; Young et al., 2014; Higham et al., 2014; McDonald et al., 2015). The "flyers dilemma" idea is that the increasing awareness of climate change problems may cause people visit closer destinations or even increase travel intentions and frequencies (Cohen and Higham, 2011; Higham and Cohen, 2011; Davsion et al., 2014; Árnadóttir et al., 2019). Árnadóttir et al (2021) tested

whether green identity residents of the Reykjavik Capital Region will meet the "flyers' dilemma." Surprisingly, the green identity participants who were highly aware of climate change problems (they had a score of 14 or 15 out of 15 are *more* unlikely to reduce the travel frequencies. This finding is consistent with hypothesis 1 in this study, namely that people who are more aware of climate change have a higher intentions to do Arctic cruise activities.

In the context of air travel, some studies have used cognitive dissonance theory to explain the gap between people's awareness and their behaviors (Becken, 2007; Randles and Mander, 2009; Reis and Higham, 2017; Árnadóttir et al., 2021). McDonald et al. (2015) observes that cognitive dissonance theory is viewed as a black box with respect to using the awareness-behavior gap to explain consumers' inconsistent behavior about tourism. Cognitive dissonance theory (Festinger, 1957: 9) indicates that "people experience psychological discomfort when there is an inconsistency between "cognitions (attitudes, beliefs, values, opinions, knowledge) about themselves, about their behavior and about their surroundings." It means that the more people are aware of climate change problems, the more dissonance they will have when they state inconsistent intentions or planned behaviors (Hare et al., 2010). There are two ways to adjust cognitive dissonance: change beliefs or behaviors (McDonald et al., 2015).

However, no study has investigated the awareness-behavior gap using cognitive dissonance theory in the context of environmentally sustainable tourism behavior and LCT tourism (McDonald et al., 2015). A few researchers have hypothesized the relationship between tourists' awareness of climate change and vacation intentions by observing cognitive dissonance (McDonald et al., 2015). For example, Hare et al. (2010: 472) hypothesized that "it is possible they may have aligned their attitudes towards holidays and climate change to be consistent with their behavior." Miller et al. (2010) postulate that although people are highly concerned about the environmental problems associated with climate change, they will not change vacation plans; instead, they will simply travel with emotional dissonance. People can adjust their cognitive dissonance by simply igoring negative information about tourism-related impacts on climate change (Miller et al., 2010). Thus, the positive relationship between awareness of climate change and intentions to do Arctic cruise activities in the current study highlights the fact that there is an awareness-behavior gap in Arctic cruise tourism. Contrary to other studies, which have found that the connection between awareness of climate change and travel intentions is weak or lacking (Moser, 2015; Bronfman et al., 2015; Newton and Meyer, 2013; Whitmarsh, 2009; Poortinga et

al., 2004), our results indicate that environmental awareness of climate change plays a vital role in people's intentions to take travel vacations (Hares et al., 2010; Scott et al., 2010; Gössling et al., 2015; Reis and Higham, 2017), and there is a strong connection between awareness of climate change and intentions to do Arctic cruise activities. People who have a higher awareness of climate change have higher intentions to do Arctic cruise activities. This tension gap could be explained by cognitive dissonance theory from the psychological perspective (Hare et al., 2010; Miller et al., 2010).

Our third major result explores the strong relationship between sensitivity to LCT messages and intentions to do Arctic cruise activities. This finding provides two important implications. First, it partially supports the idea that the motivation of LCT, shaped by media coverage, indirectly impacts on people's awareness of climate change and their intentions to visit LCT destinations (Lemeline et al., 2010; Groulx et al., 2016; Lemieux et al., 2018). Although the moderator effect of sensitivity to LCT messages does not strongly affect the relationship between people's awareness of climate change and intentions to Arctic cruise activities, we found that people's sensitivity to LCT messages is directly and positively influenced their intentions to do Arctic cruise activities (ß = 0.469, p = 0.000).

It also highlights the important role of media influence on people's perceptions (Dawson et al., 2010; Lemelin et al., 2010; Eijgelaar et al., 2010; Lemieux and Eagle, 2012; Groulx et al., 2016; Stewart et al., 2016; Piggott and Mcnamara, 2016). We found that 56% of participants spent over 6 hours using various media sources (e.g., online, TV, radio, magazines) looking for information or doing research prior to travelling. At the same time, it also supports the argument that "a selective coverage emphasizing the direct and indirect impacts of climate change on tourism" is supported (Ma and Kirilenko, 2020). In this study, two LCT cards bridge the knowledge gap between the problem of climate change and the Arctic cruise tourism. The LCT cards convey the selective introduction of the Arctic ice landscape and polar bear situations from academic journals and official news. The results show that participants are highly sensitive to the situation regarding the Arctic ice landscape and polar bears with average score of 4.17 out of 5. One of the pre-test participants made the comment that "I am very concerned regarding the disappearance of polar bears and ice for them after reading the cards." These findings indicate that the LCT information released by media influences people's sensitivity to the Arctic situation and shifts tourist flows to Arctic cruise activities (Ma and Kirilenko, 2020), which leads to increased demand for Arctic

cruise tourism demand. However, few studies examine the potential impact of news media coverage regarding LCT messages on people's intentions to visit natural-based vulnerable destinations (Eagle et al., 2018; Ma and Kirilenko, 2020).

Our study also supports the argument that messages related to LCT information are likely to stimulate people's urgency to visit vulnerable destinations (Lemelin et al., 2010). In the studies of LCT, scholars and practitioners have identified LCT motivation as one of the most important factors in the evaluation of the overall LCT-destination experience (Groulx et al., 2016; Stewart et al., 2016; Piggott and McNamara, 2017; Lemieux et al., 2018). For example, Eijgelaar et al. (2010) found that 33% of tourists who visited the Antarctic were motivated by the "before it disappears" idea. In a similar study, when the respondents were asked to rank "what motivated you to visit Antarctica?," "Last Chance" has a mean score of 3.58 on a five-point Likert scale (Maher et al., 2010). In this study, the mean score of all 8 items which aim to measure sensitivity to LCT messages related to the Arctic is 4.14 out of 5. It shows that participants possess a strong concern about, and an appreciation for, the Arctic.

Previous studies suggest support for the behavior intention formation model by Fishbein and Manfredo (1992) from the perspective of cognitive psychology, and for the sustainable tourism behavior model for tourists at Penghu Islands investigated by Cheng and Wu (2013). However, a higher sensitivity to environmental problems does *not* lead to pro-environmental behavioral intentions in the context of the Arctic cruise activities. Based on previous research that explored the role of LCT motivation in LCT market and cruise tourism market (Lemelin et al., 2010; Stewart et al., 2016; Piggott and McNamara, 2017; Lemieux et al., 2018; Palma et al., 2019; Wu et al., 2020), our study investigates whether the LCT information related to the Arctic increases people's intentions to do Arctic cruise activities. The results of our study indicate that higher sensitivity to LCT messages related to the Arctic does indeed lead to more intentions to do Arctic cruise activities; it also supports the argument that there is a close relationship between environmental sensitivity and pro-environmental behavioral intentions (Hungerford and Volk, 1990; Cheng and Wu, 2015). Over 80% of participants agreed that "I am concerned about the ecological preservation of the Arctic" and "I am concerned about the preservation of polar bears in the Arctic." Similarly, the data show that around 70% of participants view the Arctic landscape and the polar bears as the biggest negative impact of climate change after reading the LCT cards. Surprisingly, 75% of the

participants agree that they want to take a cruise to the Arctic sometime in the future to see polar bears and Arctic landscapes, assuming they will have the financial means to do so.

In addition, a lack of knowledge might not a barrier for a lack of behavioral intentions change in the Arctic cruise context, even though it has been identified as one of the most important barriers in the aviation travel context (Becken, 2007; Reis and Higham, 2017; Árnadóttir et al., 2021). There is a knowledge gap between science and the public (Ma and Kirilenko, 2020). It is difficult for most people to understand the complicated interconnectivity of the climate system, the risks from climate change, and conflicting views about the impact of climate change (Eagle et al., 2018; Ma and Kirilenko, 2020). The role of the mass media is to bridge this knowledge gap through disseminating of climate change information to the public, and the media are one of the most influential scientific platform areas (Taddicken et al., 2018). People's attention and understanding are affected by news coverage which determines the importance of the climate issues in specific areas (Taddicken et al., 2018). When less LCT information is received by people, it might be a barrier for their behavioral intentions due to a lack of knowledge (Árnadóttir and Heinonen, 2021). Participants may still to choose to do Arctic cruise activities after receiving information from the LCT cards about problems with the Arctic landscape and with polar bears. The result of this newly identified variable structure of sensitivity to LCT messages makes significant contributions to the tourism and LCT literature and our study is the first empirical research to identify what exactly the Last Chance Tourism phenomenon is by using LCT cards.

This strong relationship between people's sensitivity to LCT messages and intentions to do Arctic cruise activities has further proved the occurrence of LCT-concept Arctic cruise tourism. However, the increasing demand for LCT-concept Arctic cruise tourism has been identified as a double-edged sword for the core challenge of sustainability (Dawson et al., 2010; Hovelsrud et al., 2021). The rapid growth of Arctic cruise tourism has a partial positive impact on economic sustainable development for the Arctic region. The results of our study suggest that cruise companies/operators will benefit by motivating new and repeat tourists by LCT messages about the disappearing Arctic ice landscape and the endangered polar bears. Some operators have noted the increasing opportunities of Arctic cruise tourism in changing sensitive Arctic ecosystems (Dawson et al., 2010). However, the development of an LCT-driven Arctic cruise development that depends on disappearing geographic location or fauna is extremely risky in the long run (Dawson et al., 2010).

Most cruise operators do not view Arctic cruise activities as LCT activities. One respondent said that he wants tourists to visit this fantastic place rather than attend its funeral (Dawson et al., 2010). Tourism operators might commonly reject LCT-concept Arctic cruise tourism because of their desire to be involved in economically sustainable tourism. For example, they don't participate in the discussion of Churchill tourism in the forum (Dawson et al., 2011). This study further confirms that LCT messages exist as a function of people's motivation based on empirical questionnaires. It indicates that the Arctic cruise operator shouldn't underestimate or ignore that the increasing economic profit is potentially driven by LCT concept tourism. It is suggested that tour operators should shift people's focus from the disappearing Arctic ice landscape and polar bears to more localized products such as Arctic unique culture while ensuring the transition is sustainable (Hovelsrud et al., 2021). The cruise programs could focus on environmental and community-related activities rather than only focusing on charismatic megafauna (Hovelsrud et al., 2021).

When weighing economic and environmental demands, Arctic cruise operators face a dilemma: how do we balance the economic and environmentally sustainable aspects of Arctic tourism?) For example, Svalbard is one of the most popular cruising destinations in the high Arctic (Bystrowska, 2019). The number of guest nights have increased from 82,831 in 2010 to 162,949 in 2019, and cruise visitors have increased from 31,545 in 2010 to 62,342 in 2018 (Epinion, 2019; Port of Longyearbyen, 2018). With the population of Arctic cruise activities and accessibility of Arctic cruise lines, Svalbard tourism has shifted from seasonal to year-round tourism, from land-based tourism to marine-based tourism, and has established as a tourism destination rather than a transit hub (Olsen et al., 2019). The tourism industry has explored previously inaccessible areas and expanded the cruise ship season (Olsen et al., 2019; Hovelsrud et al., 2021).

The increase of Arctic cruise demand boosts local employment and income, but brings overcrowding and strong pressure on the environment and the infrastructure (Hovelsrud et al., 2021). It calls attention to the issue of limiting the impact of cruise tourism on the vulnerable Arctic environment (Olsen et al., 2019). From the perspective of climate change, cruise ships often navigate in a more carbon-intensive way than air travel does (Walnum et al., 2019). Similar to Churchill tourism, Dawson et al (2010) notes that long-haul travellers who view polar bears contribute a disproportionately large amount of carbon-dioxide emissions. Until 2020, heavy fuel oil for all vessels around Svalbard had been prohibited by Norway's announcement (Hovelsrud et

al., 2021). The heavy fuel oil contains a higher amount of nitrogen oxides, ash, sulphur content, methane, carbon dioxides, and black carbon. Although the black carbon (BC) is a small proportion of total emission from combustion of fuel oil, it is one of the important factors which contributes to the Arctic sea-ice melting by absorbing sunlight (Arctic Council, 2009). Cruise ships have been identified as one of the major pollution sources of marine ecosystems by the United Nations Environment Programme. A cruise ship Environmental Impact Model (EIM) presents emissions related to the marine environment, which includes cruise waste, exhausted gases, oil, collisions and noise (Carić & Mackelworth, 2014). The floating waste of plastic debris generated by tourists on cruise ships may be eaten by marine mammals (Barnes et al., 2009). That plastic floating waste contains persistent organic pollutants (POPs), which threaten the stomach digestion function of marine mammals and then affects the food chain of local marine mammals (Gobas et al., 2009). Similarly, exhausted gases, such as NOx, SOx, COx, and oil spills will also aggravate marine pollution and endanger the survival of marine mammals (Carić & Mackelworth, 2014). In addition, the underwater anthropogenic noise generated by cruise ships disrupts the behavior of marine mammals (Rako et al., 2012), which also increases the possibilities of collision with marine vertebrates, such as whales (Peel et al., 2018). The ecosystem of the Arctic, including sea ice, Arctic marine creatures, and fauna are indirectly affected by the boom in Arctic cruise activities (Hovelsrud et al., 2021), thereby influencing the sustainability of Arctic cruise tourism.

Given these problems, balancing the economic growth aspects and the environmental aspects should be a priority consideration for government policies and local cruise operators. Although the Svalbard governance requires the tourism industry to develop the cruise activities in a sustainable way to protect the fragile environment, these new regulations provide little practical guidance for tourism operators (Hovelsrud et al., 2021). The complex regulatory framework is not a challenge for Svalbard tourism, but it is a challenge for Arctic cruise tourism. The previous successful example of BalancingAct in Svalbard tourism (Hovelsrud et al., 2021) suggests that Arctic cruise operators, researchers, and educators are responsible for pursuing ways to ensure Arctic cruise sustainable development in the long run.

Chapter 6 Conclusion

6.1 Theoretical implications

The present study proposes and empirically tests a theoretical model encompassing awareness of climate change, sensitivity to LCT messages, and intentions to do Arctic cruise activities. It validates the measurement scale of awareness of climate change and sensitivity to LCT messages from a North American perspective in the context of Arctic cruise tourism. The findings build a solid foundation for research on the LCT market and provide three theoretical implications. First, this study introduces and develops the psychological construct of sensitivity to LCT messages into Arctic cruise tourism research to better understand the stages of people's decision-making in the LCT context. Currently, little empirical work has examined LCT motivation as one of the most important stimulations for travel intentions from an individual perspective (Groulx et al., 2016). Furthermore, no model aims to investigate people's environmental sensitivity in the LCT context, though environmental sensitivity has been viewed as a strong potential factor which will influence people's vacation intentions (Cheng and Wu, 2015). This study opens up a new line of research for tourism scholars by investigating this unique variable that could impact key behavioral intentions in the Arctic cruise activities context. Different from previous studies which only use a simple sentence to describe the LCT motivation (e.g., "last time to see"), this study designed an LCT card combined with a selective introduction of the Arctic ice landscape and polar bear situation from the sources of academic journals and official news and two related images of the Arctic. LCT cards provide much more detailed information about such scientific climate change phenomena in the Arctic region and reduce participants' knowledge bias while they complete questionnaires regarding Arctic tourism.

Second, neither a relationship between awareness of climate change and intentions to do Arctic cruise activities in the LCT context, nor the potential role of sensitivity to LCT messages as a moderator in this relationship, have been identified in the cruise tourism literature. Our study supplements knowledge of the LCT travel market by reinforcing findings from other tourism studies, such as the attempt by Cheng and Wu (2015) to address the mediating role of environmental sensitivity in the relationship between environmental awareness and pro-environmental behaviour in the Penghu tourism context. Although sensitivity to LCT messages does not moderate the relationship between awareness of climate change and intentions to Arctic

cruise activities, it starts to open the black box indicating that the attitude-behavior gap occurs not only in aviation travel (Hares et al., 2013) but also in LCT travel for Arctic cruise tourism.

Third, the results of this study provide new information that the sensitivity to LCT messages has a strong positive impact on intentions to do Arctic cruise activities. The higher the sensitivity to LCT messages, the higher the intentions to do Arctic cruise activities. It establishes a new psychological aspect to analyze people's intentions to do Arctic cruise activities, even though a rich history has examined socio-psychological foundations of LCT (Groulx et al., 2016).

6.2 Managerial implications

The results of this study suggest that cruise companies or operators will find benefit not only from motivating new and repeat tourists with LCT messages about the disappearing Arctic ice-landscape and the endangered polar bears, but also in peoples' awareness–behavior gap in the LCT Arctic cruise tourism vacation context. It demonstrates the need for tourism policymakers and Arctic cruise operators to understand the factors that drive demand for Arctic cruise tourism and to better understanding the improvement of Arctic Cruise TSCM.

The results contribute insights on product development for Arctic Cruise TSCM and Arctic cruise tourism sustainable development strategies for the future. People's awareness of climate change and higher sensitivities to LCT messages will lead to a deeper understanding of customer needs and the root causes of potential motivations to do the Arctic cruise activities. From the perspective of short-term sustainable Arctic cruise tourism development, it will bring economic benefits to local communities in the Arctic. From the perspective of long-term sustainable Arctic cruise tourism development, it is short-sighted to drive LCT-concept Arctic cruise tourism solely by emphasizing the vanishing Arctic ice landscape and polar bears. Of more concern is that continued repetition of statements in the media and academic reports that the Arctic landscape is disappearing, or polar bears are dying is likely to reinforce perceptions that any individual action to mitigate ice-melting speed or extinction of polar bears will be useless. The information about "last time" further strengthens this perception and stimulate people's curiosity to see the dying Arctic region without creating any individual responsibility to protect the Arctic (see, for example GBR, Eagle et al., 2018). It might not have a positive effect on Arctic environmental sustainable development in the long run if Arctic cruise tourism demand continues to increase. There is a need to empower all stakeholders—Arctic tour operators, all levels of Arctic governments, and news

media managers—to participate in knowledge exchange when providing climate change information or Arctic-related information to the public. In addition, there should be more attempts to counter negative media coverage about LCT cruise marketing. Instead of focusing on charismatic megafauna, Arctic tour operators could transfer cruise programs to more localized products such as experiencing unique Arctic culture to ensure the transition is sustainable.

This research has identified the emergence of LCT in Arctic cruise activities, and has provided some ideas for demand management in the Arctic Cruise TSCM. It seems plausible that the demand for Arctic cruise activities tourism may actually increase as a result of the LCT-concept. This population trend also brings a huge potential challenge to the supply-side response from increasing tourism capacity. This further obstructs political decision-makers in formulating policies on balancing the economy and environmentally sustainable development simultaneously. On the one hand, there is a need to minimize the negative impact on the Arctic environment due to increasing Arctic cruise ships (cruise waste, exhausted gases, oil, collisions and noise, and the construction of the ports). On the other hand, more needs to be done to maximize the positive economic outcomes from Arctic tourism.

6.3 Limitations and future research

As with any academic investigation of human travel intentions, this study is not without limitations. First, this study has focused on people's awareness of climate change and intentions to do Arctic cruise activities as a general concept. Future research is needed which explores specific factors for environmental awareness about the Arctic region and how those factors influence Arctic cruise activity programs such as wildlife sightseeing, Arctic community exploration, and Arctic marine life learning. Second, this study has focused on the views of North America tourists. However, because the Asian market also has a large potential for Arctic cruise tourism (Yui-yip et al., 2022), future replications should target Asian cruise tourists to determine whether they are sensitive to LCT messages, and if there is an awareness-behaviour gap in the Arctic cruise context. Future research could use qualitative methods to get Arctic cruise operators' opinions about the LCT-concept in Arctic cruise tourism, and how to balance economic sustainability and environmental sustainability issues. This would clarify the trend of Arctic cruise tourism development. Third, the existing literature has examined evolving demand for Arctic cruise activities (Maher et al., 2011; Wu et al., 2020), but there is much slower progress on the

supply-side, and that hinders our understanding of the hazards of increasing cruise ships and their impact on the fragile Arctic environment (Maher et al., 2011). Researchers should make more effort to develop broader frameworks and methodologies to provide in-depth insights about the root causes of the population of Arctic cruise tourismFinally, this study has explored a new area of sensitivity to LCT messages from an individual perspective. Future studies are needed with far more observations of individuals' perceptions of climate change and their decisions process when deciding to travel. For example, future studies could investigate the effects of language use LCT.

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Appendix

Arctic cruise activities survey

Filter question

How interested would you be in learning about Arctic cruise tourism?

An Arctic cruise typically involves taking a cruise ship to the Arctic to see polar bears, whales, and the midnight sun, and involves all the typical amenities provided on a cruise (i.e., food, beverages, sleeping cabin, entertainment, etc.).

- □ Very interested
- □ Interested
- □ Not at all interested

[If the respondent chooses "Very interested" or "Interested," then they are qualified to do the questionnaire. If the respondent chooses "Not at all interested," then they are excluded from our respondent pool.]

Background Information

Please provide some basic background information.

1. Please choose your gender:

   ☐ Female ☐ Male ☐ Non-binary
2. Please choose your age:

   ☐ 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55+
3. What country do you live in?

   ☐ Canada ☐ United States of America
4. What province/state do you live in?

   [INSERT LIST OF PROVINCES/STATES – TO BE DONE BY PRA]
5. What is your highest level of education?

   - □ No certificate, diploma, or degree
   - □ High school certificate or equivalent
   - □ Apprenticeship or trades certificate or diploma
   - □ College, CEGEP, or other non-university certificate or diploma
   - □ University certificate or diploma below the bachelor level
   - □ University certificate, diploma, or degree at the bachelor's level
   - □ University certificate, diploma, or degree above the bachelor's level
6. How many cruises (that is, a cruise requiring at least one overnight on-board stay) have you been on before?

□ None
□ One
□ Two
□ Three
□ Four
□ Five or more

7. **[ASK IF Q6 > 0]** Have you been to the Arctic as part of a cruise?

□ Yes
□ No

8. Approximately, how much time do you spend using various media sources (e.g., online, TV, radio, magazines) looking for information or doing research prior to travelling?

□ Less than one hour
□ 1 – 5 hours
□ 6 – 10 hours
□ 10 – 19 hours
□ 20 – 39 hours
□ 40 or more hours

9. How important are the following media sources when looking for information prior to travelling?

Please rate how important each media source is on a scale from 1 to 5 (where 1 is not at all important and 5 is very important).

	Not at all important ⟷ Very important				
TV or radio	1	2	3	4	5
Travel books / brochures / agencies	1	2	3	4	5
Newspapers / magazines	1	2	3	4	5
Websites / online searches	1	2	3	4	5
Social media (e.g., Facebook, Twitter, Instagram, blogs)	1	2	3	4	5

Awareness of Climate Change

The following questions ask about your awareness of climate change. Please rate your level of agreement or disagreement with each statement on a scale from 1 to 5 (where 1 is strongly disagree and 5 is strongly agree).

	Strongly disagree ◄——► Strongly agree				
Awareness of climate change					
10. Climate change could be listed as one of the greatest threats to humanity	1	2	3	4	5
11. Climate change brings many weather-related challenges (e.g., heavy rain, limited snowfall, etc.)	1	2	3	4	5
12. Humans are contributing to changes in the global climate	1	2	3	4	5
13. Climate change is not as dangerous as we are told	1	2	3	4	5

Sensitivity to LCT messages

Please **carefully** read the following information about the situation in the Arctic **and then complete the questions that follow.** Please rate your level of agreement or disagreement with each statement on a scale from 1 to 5 (where 1 is strongly disagree and 5 is strongly agree).

Last Ice Area: Arctic Landscape

-------"We are facing a seasonally ice-free Arctic Ocean"

According to Mark Serreze, director of the United States' National Snow and Ice Data Center (NSIDC), "The year 2020 will stand as an exclamation point on the downward trend in Arctic sea ice extent. We are headed towards a seasonally ice-free Arctic Ocean, and this year is another nail in the coffin."

Based on data from the NSIDC, more than half of the Arctic's ice landscapes have vanished in just 20 years.

As reported by CNN in August 2020, "The Arctic is getting hotter, greener and less icy much faster than expected." Greenland's ice sheet has melted five times more in the past two decades than it has in previous decades.

The image below shows an aerial view of Alaska, one of the most popular Arctic travel destinations. It shows that Alaska's land is becoming much greener. In other words, the snowy land of Alaska has been vanishing over time. The World Wildlife Fund reports that, "by 2040, scientists predict that only a fringe of ice will remain in Northeast Canada and Northern Greenland when all other large areas of summer ice are gone."

Image source:
https://www.cnn.com/2020/12/08/weather/noaa-arctic-report-card-2020-climate-change/index.html

Extinction Risk: Arctic Polar Bears

-------"A dire warning - As the Arctic Sea-ice goes, So go the polar bears"

When thinking about creatures threatened by climate change in the Arctic, the polar bear is likely the first to come to mind.

Although they are the largest terrestrial carnivores on Earth, their fate is strongly connected with sea ice conditions. "Without sea ice, there is no sea ice ecosystem and losing that ecosystem includes losing polar bears," reports Professor Andrew Derocher, expert in polar bear ecology and conservation at the University of Alberta.

In 2015, polar bears were listed as a vulnerable species based on the International Union for Conservation of Nature's criteria, which found high potential for reduced global population of polar bears due to climate change and the loss of sea ice.

The worst forecast indicates that, even if you can control or mitigate the effects of climate change, polar bears may still struggle to survive in 2021 (Drew Kann, CNN news, July 2020).

Image source:
https://www.euronews.com/living/2020/12/09/huge-victory-for-polar-bears-as-trump-s-arctic-drilling-project-rejected-by-court

	Strongly disagree ⟷ Strongly agree				
Sensitivity to LCT Messages					
14. I am concerned about the ecological preservation of the Arctic	1	2	3	4	5
15. I am concerned about the preservation of polar bears in the Arctic	1	2	3	4	5
16. I care about the impact of my living habits on the natural environments of the Arctic region	1	2	3	4	5
17. I care about the impact of my living habits on the survival of polar bears in the Arctic	1	2	3	4	5
18. I appreciate the natural environment in the Arctic	1	2	3	4	5
19. I appreciate the polar bears in the Arctic	1	2	3	4	5
20. I think the biggest negative impact of climate problems in the Arctic is the risk to the ice landscape	1	2	3	4	5
21. I think the biggest negative impact of climate change in the Arctic is the risk to polar bears	1	2	3	4	5

Motivations to take an Arctic cruise

The following questions ask about how important various reasons might be in your decision to take a cruise to the Arctic. Please rate how important each statement is to you on a scale from 1 to 5 (where 1 is not at all important and 5 is extremely important).

	Not at all important ⟷ Extremely important				
I am motivated to take an Arctic cruise because					
22. I want to discover new places and activities in the Arctic that provide a	1	2	3	4	5

thrill					
23. I want to escape to a remote place such as the Arctic	1	2	3	4	5
24. I want to view an iconic feature in the Arctic that may disappear in the future	1	2	3	4	5
25. Going to the Arctic will impress others	1	2	3	4	5
26. I want to interact with my family/friends during the Arctic trip	1	2	3	4	5
27. I want to meet different people during the Arctic trip	1	2	3	4	5

Intentions to take an Arctic cruise

The following questions ask about your intentions to take a cruise to the Arctic. Please rate your level of agreement or disagreement with each statement on a scale from 1 to 5 (where 1 is strongly disagree and 5 is strongly agree).

	Strongly disagree ⟷ Strongly agree				
Intentions to take an Arctic cruise					
28. I am interested in taking an Arctic cruise in the next five years (assuming I will have the financial means to do so)	1	2	3	4	5
29. I want to take a cruise to the Arctic sometime in the future to see polar bears and Arctic landscapes (assuming I will have the financial means to do so)	1	2	3	4	5
30. I would encourage friends and relatives to go on an Arctic cruise in the future	1	2	3	4	5
31. I would recommend an Arctic cruise	1	2	3	4	5

to others					

Environmentally responsible behaviours related to the Arctic

The following questions ask about your potential behaviours if you were to go on a cruise to the Arctic. Please rate your level of agreement or disagreement with each statement on a scale from 1 to 5 (where 1 is strongly disagree and 5 is strongly agree).

	Strongly disagree ◄——► Strongly agree				
32. I would pay more attention to reports, advertising, and books related to the environment of the Arctic	1	2	3	4	5
33. I would donate money to organizations that aim to protect the Arctic environment, creatures (e.g., polar bears), and culture	1	2	3	4	5
34. I would report to the authorities if I saw any behaviours made by travel agencies or tourists which were harmful to the Arctic environment or polar bears during the Arctic trip	1	2	3	4	5
35. I would pick up trash or plastic if I saw it during the Arctic trip	1	2	3	4	5
36. I would reconsider travelling to other destinations that could be damaged by tourists	1	2	3	4	5
37. I would post a topic about the Arctic (e.g., polar bear situation, ice landscape situation) on my social media (e.g., Facebook, Twitter, Instagram) to raise people's awareness	1	2	3	4	5

Final comments

Please rate your level of agreement or disagreement with each statement on a scale from 1 to 5 (where 1 is strongly disagree and 5 is strongly agree).

	Strongly disagree ◄——► Strongly agree				
38. Arctic cruise activities negatively affect the Arctic ice landscape	1	2	3	4	5
39. Arctic cruise activities negatively affect the living environment of polar bears in the Arctic	1	2	3	4	5
40. Arctic cruise activities negatively affect global climate change	1	2	3	4	5

Thank you very much for your cooperation!