

# The role of environmental knowledge and interest on perceived value and satisfaction

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**Aaron Tkaczynski** 

University of Queensland, Brisbane, Queensland, Australia

**Jinghua Xie**

University of Stavanger, Stavanger, Norway

**Sharyn R Rundle-Thiele**

Dept of Marketing, Griffith University, Nathan, Queensland, Australia

## Abstract

This study examines the interplay between whale watchers' knowledge and interest in protecting the environment on the perceived value and satisfaction of their whale watching experience. Despite an emphasis on examining 1) environmental insights into protecting the environment employed by tourists and tourism stakeholders; and 2) evaluating tourists' perceived value and satisfaction in the literature, it is unknown if whale watchers' knowledge and interest in protecting the environment influences their evaluation of a whale watching experience. To assess the relationships between these constructs, 1024 self-administered surveys were collected on three whale watching vessels within one Australian whale watching destination. Ordinary least square and logit regression determined that whale watchers' interest in protecting the environment and perceived value and satisfaction with their whale watching experience was high. Whale watchers' knowledge of protecting the environment was an insignificant predictor of perceived value and satisfaction. Conversely, whale watchers' interest in protecting the environment was a significant predictor of perceived quality and emotional value. Perceived value mediated whale watchers' interest in protecting the environment and satisfaction. To remain competitive whilst also protecting the environment, tourism stakeholders (e.g. Destination Marketing Organizations, whale watching operators) need to further market whale watching experiences to whale watchers in the targeted segment emphasizing environmental protection appeal. This study has provided several theoretical and practical contributions while future research opportunities are also outlined.

## Keywords

Australia, environment, interest, knowledge, perceived value, whale watching

## Introduction

Whale watching is a global tourism industry with an annual revenue in excess of two billion dollars (Richards et al., 2021). This nature-based activity, which is widely marketed as environmentally sustainable (Finkler and Higham, 2020; Tkaczynski et al., 2020), sees humans engaging with whales on land or in vessels (Orams, 2000; Reynolds and Braithwaite, 2001) where the 'focal organism (whales) is not purposefully removed or

permanently affected by the engagement' (Duffus and Dearden, 1990: 216). In addition to the opportunity to experience whales in their natural setting, whale watching provides whale watchers with the opportunity to learn about

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### Corresponding author:

Aaron Tkaczynski, PhD, University of Queensland, Brisbane, Queensland, Australia.

Email: a.tkaczynski@uq.edu.au

protecting the environment (García-Cegarra and Pacheco, 2017; Zeppel, 2008). Inspired by their whale watching experience, whale watchers may employ environmental measures such as recycling and limiting plastic usage into their daily lifestyle when returning home from vacation (Tkaczynski et al., 2020; Tkaczynski, 2021). This experience may also stimulate the whale watchers to become environmental advocates and supporters of environmental protection efforts.

The whale watching industry has recently faced large scale and ongoing threats (Amerson and Parsons, 2018; Gleason and Parsons, 2019). Increasing sea surface temperature has resulted in changing whale behavior, with modifications in whales' migration paths and activity levels evident (Noad et al., 2019). While some countries such as Australia (Department of the Environment and Energy, 2017) and New Zealand (New Zealand Government, 1992) have strict regulations on commercial whale watching operations, others such as the Philippines (Mustika et al., 2017) and Azores (Bentz et al., 2016) are less regulated. These regulation differences can create confusion of what whale watchers can expect when experiencing whale watching at different international destinations (Richards et al., 2021; Gleason and Parsons, 2019).

Protecting the environment is defined as "protection of ecosystems and their constituent parts from changes associated with human activities; and the prevention of unwanted natural changes to ecosystems and their constituent parts" (Hamilton and Macintosh, 2008: 1342). Environmental protection represents a potential strategy that can be communicated by whale watching operators to whale watching to mitigate the potentially damaging environmental effects from tourism. Here, whale watching operators may communicate to whale watchers through informative tours and educational material on actions they could initiate to contribute to protection of whales. Actions that could be encouraged include advocacy, increasing recycling and reusing their shopping bags (Tkaczynski et al., 2020; Tkaczynski, 2021). However, whale watchers may not pay attention to environmental messages when on a whale watching experience due to being distracted (e.g. socializing with others or managing children) or seeing whales as their priority (Tkaczynski et al., 2020; Orams, 2000). Rather than seeking to learn about the environment, whale watchers may also be interested in an activity such as whale watching for purely self-fulfilment purposes

(Champoux-Larsson and Knežević Cvelbar, 2021; Schultz, 2001). For example, activities such as taking a "selfie" with whales (Fennell and Yazdanpanah, 2020) or spending time with a significant others (Prebensen et al., 2018). Therefore, convincing tourists to employ environmental initiatives when on vacation or at home may be futile if whale watchers do not know the extent of the environmental damage, they are creating prior to the start of their whale watching experience.

If whale watching operators' pro-environmental actions such as using recycling bins and providing disposable cutlery during a whale watching experience brings enhanced perceived value and satisfaction to environmentally knowledgeable and interested whale watchers' experience, it might encourage them to protect the environment whilst on vacation (Kim and Filimonau, 2017). The literature (Chen and Chen, 2010; Rasoolimanesh et al., 2016) suggests that tourists will be satisfied if they perceive an experience is of value. For example, considerable research has identified that whale watchers perceive a whale watching experience is of value if they see whales being active in their natural surroundings at a reasonable price. This perceived value will ultimately result in satisfaction (Bentz et al., 2016; Xie et al., 2020). By employing environmental initiatives, whale watching operators may activate behavioral change in less environmentally knowledgeable but satisfied whale watchers that perceive a whale watching experience of value if they understand the need to protect the environment. At the same time, whale watchers that are knowledgeable and interested in protecting the environment may also have their environmental beliefs and actions reaffirmed by the whale watching operators' environmental focus. Therefore, it can be proposed that to first enhance whale watchers' perceived value and satisfaction via their pro-environmental actions (i.e. protecting the environment), or second to reaffirm the environmental focus of whale watchers, an understanding of their knowledge and interest in protecting the environment is required.

## **Study aim**

The aim of this study is to examine the interplay being whale watchers' knowledge and interest in protecting the environment with their perceived value and satisfaction of a whale watching experience. This research employs a conceptual framework (see Figure 1) which first seeks to identify whale watchers' knowledge and interest

in protecting the environment and second understand if whale watchers' environmental knowledge and interest (or lack of) influence their perceived value and satisfaction with a whale watching experience.

Despite considerable research into whale watching operators' pro-environmental initiatives (Mustika et al., 2017; Richards et al., 2021) and an emphasis on evaluating whale watchers' perceived value and satisfaction of their whale watching experience (Bentz et al., 2016; Xie et al., 2020), it is unknown if whale watchers' knowledge and interest influences their evaluation of a whale watching experience positively, negatively or at all. From a theoretical perspective, this study will identify if whale watchers' knowledge and interest in protecting the environment are required as antecedents to the evaluation of a whale watching experience. Knowledge and interest in protecting the environment may result in whale watchers perceiving a whale watching experience is of value which may or may not result in greater satisfaction. From a practical perspective, these findings will enable tourism stakeholders such as Destination Marketing Organizations (DMO) and whale watching operators to understand and satisfy current and future whale watchers whilst developing sustainable tourism products that can facilitate protecting the environment.

## Conceptual framework

### Knowledge

Tourist knowledge is the "degree of consumer (tourist) confidence in travel-relevant matters" (Lee et al., 2015: 475). It can be classed as subjective (individual's perception of what he/she knows) or objective (actual knowledge stored in long-term memory) (Brucks, 1985; Sujana, 1985). Studies have examined respondents' knowledge (or lack of) of the environment (Bögeholz, 2006; Kim and Filimonau, 2017) with whale watchers' lack of knowledge into the need to protect the environment evident (García-Cegarra and Pacheco, 2017; Stamation et al., 2007).

Positive human-nature relationships are essential for countering environmental problems (Liefländer et al., 2013; Orams, 1996). Given positive human-nature relationships are essential, this study proposes that whale watchers need to have knowledge of protecting the environment prior to evaluating their whale watching experience. Without this knowledge, the experience

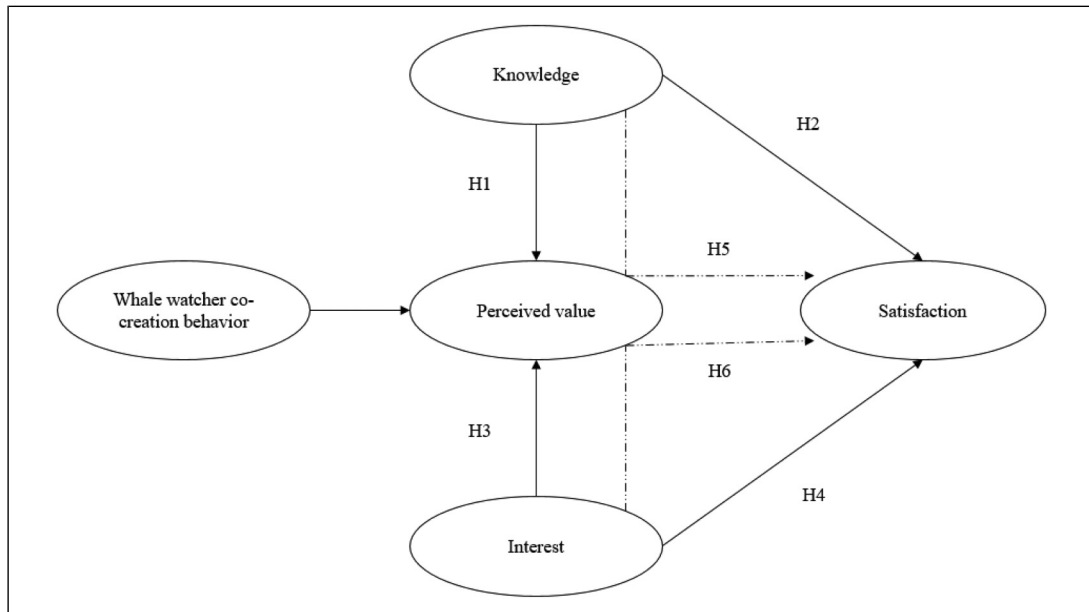
may be inaccurately assessed, as whale watchers may not understand the self-imposed or enforced regulations that whale watching operators are upholding to offer whale watchers a satisfactory experience of perceived value in a natural environment. Furthermore, whale watchers may not understand the actions they need to take (e.g. recycling and reusing shopping bags when at home) to help protect the environment. Therefore, a first hypothesis (H1) is proposed. Knowledge enhances tourist (whale watcher) satisfaction (García-Cegarra and Pacheco, 2017; Huang et al., 2016). Based on the premise that knowledge has previously been shown to enhance tourist satisfaction, a second hypothesis (H2) focusing on knowledge is also provided.

H1: Whale watchers' knowledge of protecting the environment directly influences their perceived value of their whale watching experience.

H2: Whale watchers' knowledge of protecting the environment directly influences their satisfaction of their whale watching experience.

Interest is defined as a "psychological state of engaging or the predisposition to re-engage with particular classes, of objects, events, or ideas over time" (Hidi and Renninger, 2006: 112). Interest involves increased attention, concentration and affect for the individual (Dahl, 2014; Hidi, 2006) and is seen as a motivation for a tourist to learn (Calver and Page, 2013; Iliev, 2020), participate in activities (Juric et al., 2002; Mesci et al., 2021) and/or change their behaviour (Dahl, 2014; Pearce and Kang, 2009). Tourist interest has been employed as both an antecedent (Calver and Page, 2013; Wong et al., 2016) and mediator (Mohsin et al., 2017; Wong, 2015) to measure a tourist's satisfaction (García-Cegarra and Pacheco, 2017; Wong et al., 2016) with varying results indicated.

Whale watchers can vary considerably in their interest in protecting the environment (Wilson and Tisdell, 2003; Lambert et al., 2010) and not surprisingly, those that are more interested perform more environmental actions (Catlin and Jones, 2010; Malcolm and Duffus, 2008). To identify if whale watchers' interest in protecting the environment directly influences their perceived value (H3) and satisfaction (H4), two further hypotheses are outlined.



**Figure 1.** Conceptual framework.

H3: Whale watchers' interest in protecting the environment directly influences their perceived value of their whale watching experience.

H4: Whale watchers' interest in protecting the environment directly influences their satisfaction of their whale watching experience.

### *Perceived value*

Perceived value is defined as a consumer's overall assessment of the utility of a product, service or experience based on an individual's perceptions of what is received and what is given" (Zeithaml, 1988: 4). Although experiencing the core attraction such as seeing whales in the natural environment will represent the primary purpose of a whale watcher choosing a whale watching experience (Bentz et al., 2016; Orams, 2000), interactions between tourists and employees during this experience represents tourist co-creation (Campos et al., 2018; Prebensen and Foss, 2011) which can contribute to perceived value (Li and Petrick, 2008; Morgan et al., 2009). Perceived value is multi-dimensional (Prebensen et al., 2013a; Sweeney and Soutar, 2001) with elements such as functional (Mohd-Any et al., 2015; Williams and Soutar, 2009), economic (Chen and Chen, 2013; Prebensen and Xie, 2017) or emotional (Jo et al., 2014; Prebensen et al., 2016) value employed with varying results to measure

tourists' perceived value of an experience in different settings.

### *Satisfaction*

Satisfaction represents a psychological state that results from the degree of overall pleasure or contentment felt by the customer (tourist) based on expectations, needs and prior feelings in relation to the service transaction (Orams, 2000; Spreng et al., 1996). As satisfaction is seen as an outcome of perceived value (Buonincontri et al., 2017; Jamilena et al., 2017), it is employed to measure tourists' post-purchase evaluations of an experience to identify whether the service was delivered in the way it was expected (Huang et al., 2016; Orams, 2000).

The mediating influence of perceived value has been employed to measure tourists' satisfaction based on antecedents such as emotions (Bonney-Claudet and Ghantous, 2013) and service quality perceptions (Hapsari et al., 2016). Current literature is limited in its evaluation of whale watchers' environmental knowledge or interest in protecting the environment as an antecedent to perceived value and satisfaction. This study proposes that if whale watchers' knowledge or interest in protecting the environment can provide significant perceived value or satisfaction to their whale watching experience, whale watchers will have an incentive to protect the environment. This study, therefore, uses

whale watchers' knowledge and interest in protecting the environment as latent variables to proxy their environment intentions. Additionally, perceived value represents a mediator between whale watchers' knowledge and interest in protecting the environment. This is outlined in the final two hypotheses.

H5: Perceived value mediates the relationship between whale watchers' knowledge of protecting the environment and satisfaction with their whale watching experience.

H6: Perceived value mediates the relationship between whale watchers' interest in protecting the environment and satisfaction with their whale watching experience.

## Method

### Study site

The Fraser Coast, a regional destination located approximately 300 kilometres (kms) north of Brisbane, the capital of Queensland (QLD), Australia, represented the study site. The destination is unofficially known as the *whale watching capital of Australia* and in October 2019 the Fraser Coast was listed by the World Cetacean Alliance as the world's first whale heritage site (Fraser Coast Tourism & Events, 2020). To commercially operate, each of the seven whale watching operators must obtain eco-certification (Fraser Coast Tourism & Events, 2020). Operators must also uphold the *Australian National Guidelines for Whale and Dolphin Watching 2017* guidelines such as 1) not approaching closer than 300 metres to any whale or dolphin; and 2) not emptying waste into the Pacific Ocean (Department of the Environment and Energy, 2017). All Fraser Coast whale watching operators also voluntarily employ measures such as using recycling bins and not providing plastic straws or cutlery to passengers which are promoted on their website and within on-board educational material (Hervey Bay Whale Watch & Charters, 2021).

A priority strategy for the regional DMO is to "build on Fraser Island's iconic status as a world heritage area, positioning Hervey Bay (the city where whale watching is conducted) as a high quality and unique destination for adventure, nature-based and marine activities" (Tourism and Events Queensland, 2017). The Fraser Coast target markets include both young and older families who live within a 400 km radius of the region or international tourists from the United

Kingdom (Tourism and Events Queensland, 2017). For the year ending March 2020, the region attracted 866,000 visitors which contributed AU\$730.3 million to the regional economy (Tourism and Events Queensland, 2020).

### Sample

Whale watchers that participated in a guided Fraser Coast whale watching tour during the 2015 whale watching season (July through to October) represented the research sample. Despite the number of individual operator whale watching experiences not being publicly disclosed, insight from a recent telephone discussion with the regional DMO manager indicated that approximately 55,000 tourists have annually experienced a Fraser Coast whale watching experience over the past decade.

Although all seven operators were approached to participate in this study, only three granted the researcher access to collect data on their vessels. Each of the vessels on which data were collected varied in passenger size but averaged between 50 to 70 whale watchers on each experience. The individual price of each whale watching experience across all whale watching operators was between AU\$95 and AU\$120. Each whale watching experience included a guided tour and light refreshments. The tour guide on each vessel discussed whale watching and also emphasized the role each operator played in protecting the environment. Measures communicated to whale watchers included whale watching operators needing to maintain a safe distance from whales (e.g. more than 300 metres) and not littering in the sea. Each tour guide also stated how each whale watcher could help to protect the environment through methods such as recycling and reusing plastic bags when on vacation or at home. Educational material such as posters and brochures that outlined the different cetacean species and the need to protect the environment were available on all whale watching vessels.

A non-probability convenience sampling method was chosen where on pre-determined days with the whale watching operators, whale watchers older than 18 were invited to complete an anonymous paper-based self-administered questionnaire on the return back to the shore (a 45 min journey). Prior to exiting the whale watching vessel, the whale watcher submitted the questionnaire by hand to the researcher. All seven days of the week were sampled to maximize variation of tourists. Data were also

collected across high (e.g. September school vacations) and shoulder (e.g. post September school vacations in October) passenger periods to minimize seasonal bias. Missing data (< 3%) and refusal rates (< 5%) were minimal and from 50 individual trips, the final sample was 1024 whale watchers. This included 429 respondents (18 trips) during August, 317 during September (14 trips) and 278 (18 trips) during October.

### Research instrument

Thirty-six perceived value items (Prebensen et al., 2013a; Williams and Soutar, 2009), 32 co-creation items (Yi and Gong, 2013), one tourist knowledge item (Falk et al., 2012), one interest item (Wong et al., 2016) and one satisfaction item (García-Cegarra and Pacheco, 2017) adapted from the literature were included. Seven point Likert scales were employed for each of these items to maximize variation in responses (Hair et al., 2006). Descriptive statistics were also included to provide a profile of respondents. Podsakoff et al.'s (2003) common method bias criteria were minimized through the procedural remedy of past literature in the questionnaire. Furthermore, input was provided from tourism stakeholders (regional DMO, local council, Fraser Coast whale watching operators) to identify the relevance of items for this study. All items were deemed appropriate for the research purpose by this reference group. Both customer co-creation (Yi and Gong, 2013) and perceived value (Williams and Soutar, 2009) have been previously confirmed and employed to investigate the influence of tourists' perceived value on satisfaction for a tourism experience (AUTHORS' NAMES SUPRESSED). Given the known influence of co-creation and perceived value items on satisfaction and perceived value, the constructs are included in this model estimation (Woolridge, 2016).

### Data analysis

Two types of econometric models using R programming were applied to answer the six hypotheses. First, to measure if whale watchers' knowledge (H1) and interest (H3) of protecting the environment directly influences their perceived value of their whale watching experience, a multivariate ordinary least square regression (OLS) was applied. The dependent variables in both hypotheses are the perceived value variables. These perceived value variables are composite variables, created by combining the items loaded into the same value construct. Since the

composite variables are continuous, OLS regression was applied (Hair et al., 2006). There are four value constructs, named quality value, economic value, emotional value, social and novel value, in this study. Consequently, the OLS estimation includes four equations to test the impact of knowledge and interest in protecting the environment on whale watchers' perceived value for each value construct. The regressions are specified as:

$$\begin{aligned} Value_{ij} = & \beta_{i0} + \beta_{i1} Know_j + \beta_{i2} Inter_j \\ & + \sum_{k=1}^5 \beta_{ik} Cvc_{kj} \\ & + \sum_{m=1}^M \beta_{im} Contr_{mj} + u_{ij} \end{aligned} \quad (1)$$

where  $j$  represents the individual whale watcher and  $i$  denotes the different perceived values. Therefore, the dependent variable  $Value_{ij}$  means whale watcher  $j$ 's perceived value for value  $i$  where  $i = 1, 2, 3$  and  $4$  for 1) quality value; 2) economic value; 3) emotional value; and social and 4) novelty value, representatively. For the explanatory variables,  $Know_j$  and  $Inter_j$  are whale watchers' knowledge and interest in protecting the environment respectively.  $Cvc_{kj}$  characterized co-creation and  $Contr_{mj}$  are control variables including both whale watchers' previous whale watching experience and demographics. These control items were coded as dummy variables.

A binary logit model was applied to test hypothesis two (H2), four (H4), five (H5) and six (H6). These four hypotheses were assessed in a single equation with satisfaction as the dependent variable. Logit regression was chosen instead of OLS to test these hypotheses because the dependent variable of satisfaction is not a composite variable of a factor. Instead, it is a single variable measured by seven point Likert scales ordered from 1 = "to a very little extent" to 7 = "to a great extent". In principle, the ordinal logit model is preferable since the choices are ordered from 1 to 7. However, only ten per cent of whale watchers rated satisfaction lower than 5 which means the data for the satisfaction variable are highly skewed. This is not uncommon in the literature (Vilares et al., 2010) for the reasons discussed by Williams and Soutar (2009) and Mehmetoglu (2014). Williams and Soutar (2009) explained that many respondents feel it is more correct to give a more favourable answer and Mehmetoglu (2014) concluded respondents generally have

positive value perceptions regarding their experiences. The highly skewed data means the low-point scales lose their representativeness in the sample (Prebensen and Xie, 2017). Therefore, this study follows the approach taken by Prebensen and Xie (2017) and categorized whale watchers into two categories and a binary logic model is applied. Specifically, whale watchers who scored 6 or 7 were classed into a “highly satisfied” category whereas the others were classified into a “less satisfied” category. The binary logit model, therefore, has the specification:

$$Satis_i = \begin{cases} 1 & \text{if a whale watcher is highly} \\ & \text{satisfied with the experience} \\ 0 & \text{else} \end{cases} \quad (2)$$

The probability that whale watchers’ are highly satisfied with their whale watching experience is a function of the factors that influence their satisfaction. Following the formulas given by Woolridge (2016),

$$Prob [Satis_i = 1] = \frac{e^{x'\beta}}{1 + e^{x'\beta}} \quad (3)$$

the empirical specification for the latent variable  $Y_j^* = x'\beta$  in the study is:

$$\begin{aligned} Y_j^* &= \gamma_0 + \gamma_1 Know_j + \gamma_2 Inter_j \\ &+ \sum_{k=1}^5 \gamma_k Cvc_{kj} + \sum_{l=1}^4 \gamma_l Value_{lj} \\ &+ \sum_{m=1}^M \gamma_m Contr_{mj} + u_j \end{aligned} \quad (4)$$

where  $Y_j^*$  is the latent variable for the observed variable (satisfaction), which is equal to 1 when whale watchers are highly satisfied and 0 otherwise.  $x$  is a vector of the explanatory variables, which are the factors affecting whale watchers’ satisfaction ratings. As presented in the equation (4), the model includes all the explanatory variables that have been defined in the value equations (1). In addition, the four value constructs  $Value_{lj}$  (quality value, economic value, emotional value, and social and novel value) are added into the model as perceived value is an antecedent of satisfaction in the literature (Chen and Chen, 2010; Rasoolimanesh et al., 2016).

## Results

### Descriptive statistics

Whale watchers’ *knowledge* ( $\bar{x} = 5.30$ ) of protecting the environment was positive but lower than

other variables in the study, whilst their *interest* in protecting the environment ( $\bar{x} = 6.30$ ) and *satisfaction* ( $\bar{x} = 6.41$ ) were both very high. The perceived value items rated the highest were that whale watching was *memorable* ( $\bar{x} = 6.58$ ) and *made me feel happy* ( $\bar{x} = 6.58$ ). Whale watchers were mostly *female* (65.4%), *first-time* (76.0%) and from within *QLD (<400kms)* (24.9%). Approximately two-fifths (42.4%) had a *university degree*. Almost a third (31.4%) had an annual household income of more than *AUS \$100,000*. Further information is available in Appendices 1 and 2.

### Regression

Table 1 presents the estimated results of the models. The variable of knowledge of protecting the environment was neither statistically significant in any value equation nor in the satisfaction equation. Therefore, H1 and H2 are rejected; whale watchers’ knowledge in protecting the environment had no direct effect on either their perceived value or satisfaction of their whale watching experience. Since H1 that knowledge of protecting the environment had a direct effect on perceived value is not supported, H5 that perceived value mediated the relationship between whale watchers’ knowledge of protecting the environment and satisfaction with their whale watching experience was also rejected.

The estimated results of interest in protecting the environment were statistically significant in the equations of quality value and emotional value but not in the equations of the economic value and social and novelty value (see Table 1). This means whale watchers’ interest in protecting the environment affects some of the their value perceptions (i.e. quality and emotional), but not all the values (e.g. economic, social and novelty). Consequently H3 that whale watchers’ interest in protecting the environment directly influences their perceived value of their whale watching experience can only be partially supported.

The estimated results of the interest variable is also statistically significant in the satisfaction equation, therefore, supporting H4 that whale watchers’ interest in protecting the environment directly influences their satisfaction with their whale watching experience. Furthermore, since hypothesis 3 is partially supported, H6 that perceived value mediates the relationship between whale watchers’ interest of protecting the environment and satisfaction with their whale

**Table 1.** Estimated results of the models.

	Quality value	Economic value	Emotional value	Social and novel value	Satisfaction
Intercept	2.023** (8.37)	0.838* (1.70)	3.165** (11.91)	0.51 (0.88)	-2.791** (-8.94)
Knowledge	-0.01 (-0.20)	0.012 (0.12)	-0.069 (-1.19)	-0.054 (-0.45)	0.037 (0.59)
Interest	0.111** (2.07)	0.042 (0.40)	0.182** (3.06)	0.003 (0.02)	0.141** (2.26)
Personal interaction	0.311** (7.20)	0.284** (3.35)	0.276** (5.76)	-0.048 (-0.49)	-0.001 (-0.04)
Responsible behavior	0.238** (5.90)	0.258** (3.27)	0.146** (3.28)	0.149 (1.60)	-0.015 (-0.51)
Helping	0.014 (0.70)	0.079** (-2.02)	0.057** (2.58)	0.373** (8.13)	-0.004 (-0.25)
Feedback	0.043** (2.06)	0.084** (2.09)	0.033 (1.42)	0.257** (5.40)	0.009 (0.62)
Tolerance	0.027 (1.22)	0.07 (1.55)	0.02 (0.81)	0.024 (0.46)	0.006 (0.39)
Quality value					0.176** (4.94)
Economic value					0.067** (3.91)
Emotional value					0.219** (5.28)
Social and novel value					-0.006 (-0.043)
Past experience	0.101* (1.75)	0.228* (1.91)		0.339** (2.43)	
Gender		-0.171* (-1.77)	-0.212 (-3.93)		-0.082 (-1.36)
Education		-0.187* (-1.73)		-0.23* (-1.83)	
Origin		-0.308** (-2.76)		-0.275** (-2.2)	
Age2		0.001 (-0.01)			
Age3		0.124 (0.76)			
Age4		0.143 (0.91)			
Age5		0.303* (1.82)			
Age6		0.181 (0.91)			
Income2	0.211** (2.22)			0.179 (0.81)	-0.021 (-0.18)
Income3	0.163* (1.82)			0.361* (1.72)	-0.143 (-1.33)
Income4	0.201** (2.24)			-0.147 (-0.69)	-0.075 (-0.70)
Income5	0.296** (2.50)			-0.182 (-0.84)	-0.23** (-2.25)
Income6	0.199** (2.50)			-0.405** (-2.13)	-0.014 (-0.14)
Income7	0.19 (1.35)			0.349 (1.06)	0.019 (0.11)
R2	0.37	0.30	0.31	0.37	0.60

\*Statistically significant at 10% level; \*\*statistically significant at 5% level.

watching experience is also partially supported. The relatively large positive magnitudes of the estimated coefficients of the interest variable that are statistically significant suggest whale watchers' interest in protecting the environment is significantly important in enhancing their perceived value and satisfaction of their whale watching experience.

The estimated coefficients of the descriptive variables produced several significant findings (see Table 1). Females are more satisfied with the economic value of the whale watching experience. Whale watchers with a higher level of education perceived higher economic value and social and novel value. However, these higher educated whale watchers are less satisfied with

their experience. International whale watchers are less positive with their whale watching experience evaluation. Whale watchers (mostly domestic) that had been on a Fraser Coast whale watching experience previously have a higher perceived value of their experience.

## Discussion and conclusion

This study examined the interplay being whale watchers' knowledge and interest in protecting the environment with their perceived value and satisfaction of a whale watching experience. Six hypotheses were proposed with one (H4) fully supported and two (H3 and H6) partially supported. The results are now discussed in turn.



**Table 2.** Hypothesis findings.

Hypothesis	Description	Outcome
H1	Whale watchers' knowledge in protecting the environment directly influences their perceived value.	Rejected
H2	Whale watchers' knowledge in protecting the environment directly influences their satisfaction.	Rejected
H3	Whale watchers' interest in protecting the environment directly influences their perceived value.	Partially supported
H4	Whale watchers' interest in protecting the environment directly influences their satisfaction.	Supported
H5	Perceived value mediates the relationship between whale watchers' knowledge of protecting the environment and satisfaction.	Rejected
H6	Perceived value mediates the relationship between whale watchers' interest of protecting the environment and satisfaction.	Partially supported

Table 2

### *Theoretical contributions*

The major theoretical contribution from this study is that it determined that whale watchers' interest in protecting the environment (and not knowledge in protecting the environment) is a valid precursor to perceived value (quality and emotional) and satisfaction with a whale watching experience. Therefore, future tourism research seeking to influence pro-environmental actions of tourists (e.g. whale watchers) should employ a model such as the updated conceptual framework (see Figure 2). Specifically, interest in protecting the environment should be incorporated as an antecedent to both perceived value and satisfaction.

Results from this study confirm the literature that a tourist's (whale watcher's) interest is directly related to their satisfaction with a tourism activity (Pearce and Kang, 2009; Wong et al., 2016). The finding that interest in protecting the environment directly influenced whale watchers' perceived quality and emotional value of their whale watching experience is a novel finding, whereas the indirect relationship between interest in protecting the environment and satisfaction as mediated by perceived value (quality and emotional) confirmed the tourism literature (Calver and Page, 2013). Vacation marketers responsible for marketing experiences such as whale watching will likely focus on the natural environment and the environmental focus of their operators when promoting to target markets (Pike and Page, 2014; Prebensen et al., 2018). Individual whale watching operators promote their professional service which represented the core experience (quality value) to attract whale watchers that

are very educated with high incomes (Parsons et al., 2003; Tkaczynski et al., 2020). Whilst this focus on high quality services in the natural environment should still be emphasized, the results from this study suggest that for a whale watcher to be satisfied and potentially perform environmentally-focused actions after being exposed to a pro-environmental behavioural campaign on a whale watching vessel, they need to have an existing interest in protecting the environment and also see the quality and emotional value of their whale watching experience.

This study confirmed that whale watchers are not omniscient in their knowledge of protecting the environment (García-Cegarra and Pacheco, 2017; Stamatou et al., 2007). Despite whale watchers' mediocre ratings of their knowledge of protecting the environment, these tourists still rated the perceived value and satisfaction of their whale watching experience highly. Therefore, knowledge is an insignificant predictor of whale watchers' positive or negative evaluation of a whale watching experience. A positive human-nature relationship was previously asserted to be essential for countering environmental problems (Liefländer et al., 2013; Orams, 1996). This study demonstrates that knowledge of whale watchers (e.g. recycling) and whale watching operators (e.g. not littering in the sea) environmental actions did not influence whale watchers' perceived value rating or satisfaction of their experience.

### *Managerial implications*

Satisfaction is an important precursor for word-of-mouth recommendations. Delivering a valued experience must remain a core focus for whale watching operators if they are to

extend reputation and attract future visitation. This study identified that interest in protection the environment influences value and satisfaction ratings and, therefore, any initiative that links operators to environmental protection will contribute to delivering high satisfaction. For example, inclusion of the world's first whale heritage site accreditation from the World Cetacean Alliance into all Fraser Coast destination materials and within whale watching promotions will assist in attracting individuals with an interest in protecting the environment who in turn are most likely to report a satisfying whale watching experience.

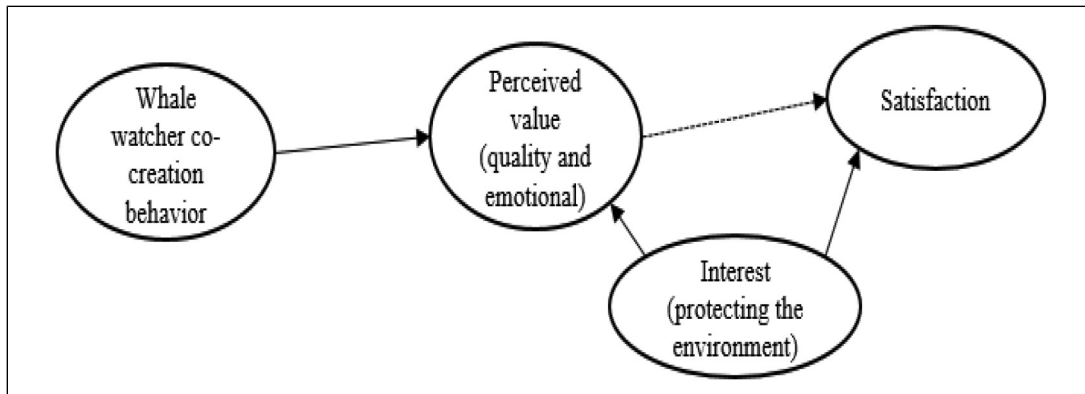
Whale watching operators must continue to focus on the external environment (e.g. natural scenery, migration path) and professional service (e.g. whale viewing, delivery of information) whilst simultaneously communicating to whale watchers the part that both whale watching operators and whale watchers can play in protecting the environment. A key finding in the present study was that knowledge of protecting the environment was low ( $\bar{x}=5.30$ ) when compared and contrasted with reported interest in protecting the environment. This finding indicates the whale watching experience itself can and should be used as an opportunity to improve whale watchers knowledge about actions they can take to protect the environment.

At present, information is presented through one-way channels (e.g. information brochures available on vessels and through whale watching operator talks), which is surprising given that two-way channels can potentially increase whale watchers' perceived value of their whale watching experience. Therefore, whale watching operators could redesign their presentations to allow whale watchers the time to ask questions or guide discussions to provide a more customized and personal tourist experience for whale watchers (Prebensen, 2014; Prebensen et al., 2018). More engaging and immersive approaches such as gamification can also be applied to effectively increase respondents' knowledge and desire to learn about tourism-related pro-environmental initiatives (e.g. Olszewski et al., 2018; Marconi et al., 2018). As noted by Tan (2018), gamification players do need to have prior mammal knowledge when in a marine context, although a positive attitude towards their habitat and conservation requirements can stimulate gamification usage. Therefore, the inclusion of gamified approaches could be considered by whale watching operators to create more interactive and

engaging platforms for whale watchers to learn about and gain more interest in protecting the environment. Whale watchers could compete in a short, trivia competition run in person or online, testing their environmental protection and whale knowledge while traveling from the shore to the whale watching sighting locations. Employing this process ensures that whale watchers will not miss the opportunity of seeing whales in their natural environment (Tan, 2018). This process could also enable whale watching operators to improve whale watchers' knowledge and interest levels of protecting the environment prior to the experience. This information could then be used by tourism stakeholders for future educational tours such as communicating environmental initiatives that currently exist but are not known or practiced by whale watchers.

### **Limitations and opportunities for future research**

This study is not without its limitations. First, this research has employed single item measures for knowledge, interest and satisfaction which were measured post-experience which can cause positivity bias. Single measures have been applied frequently applied (Kerstetter and Cho, 2004; Tkaczynski et al., 2018). Noting that single item measures may limit understanding, future research could employ additional items to 1) provide further insight into understanding components of the whale watching experience for where they are more satisfied; and 2) determine whether whale watchers are understanding current strategies employed by whale watching operators and to protect the environment and what environmental actions whale watchers need to employ at home and on vacation. Alternatively, a qualitative pilot study employing open ended items with whale watchers prior to the commencement of a tour could identify what protecting the environment means to them. This qualitative process could also determine how whale watchers compare on their knowledge of current environmental practices that they can employ to protect the environment when at home or on vacation. Additional opportunities for future research include utilization of customer co-creation methods (Buonincontri et al., 2017; Prebensen et al., 2013b). Further opportunities to include environmental items that capture how protecting the environment influences



**Figure 2.** Updated conceptual framework.

satisfaction is also recommended (e.g. items outlined in Cismaru et al., 2011; Dunlap et al., 2000).

Second, this research employed cross-sectional data for one activity at one Queensland destination. Consequently, this study's generalizability and reliability to both other activities dependent on the environment and alternative whale watching destinations is limited. Furthermore, this research was conducted prior to the coronavirus which has highlighted the impact people have on the planet (Cook et al., 2020; Richards et al., 2021). Consequently, whale watchers' knowledge and interest in protecting the environment may have increased as a result of this pandemic. Future research could be conducted longitudinally where whale watchers at multiple destinations are asked about their knowledge and interest in protecting the environment before the trip commences using the same questionnaire applied in this study. Next, at the end of the trip or at a later time (e.g. two weeks later), whale watchers could be interviewed by researchers to understand if their knowledge and interest in protecting the environment has increased and if their pro-environmental behaviour has changed as a result of the whale watching experience or educational material provided to them by the whale watching operators. Results can also be compared with the current research findings at the Fraser Coast Here, it can be identified if whale watchers' knowledge and interest in protecting the environment has increased and if these variables directly predict their perceived value and/or satisfaction of a whale watching experience.

A final research opportunity for tourism stakeholders is to develop a user-friendly, whale watching forum or social media application that

encourages past, current and future whale watchers to be environmental champions. Whilst on-site and post experience intervention programmes have had varying successful rates for protecting the environment (Bueddefeld and Van Winkle, 2018; Goh, 2019), empowering tourists own capacities for change have been successfully employed by academics (Baker et al., 2014; Champoux-Larsson and Knežević Cvelbar, 2021). Through following an environmental website or social media application designed by an official whale watching authority past, present and future whale watchers can communicate with each other their interest in whale watching and measures they are currently employing to protect the environment. This procedure will enable protecting the environment to be in the top-of-mind for whale watching tourists and can also facilitate both tourists and whale watching stakeholders in identifying new or alternative ways they can be environmental champions.

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#### **ORCID iD**

Aaron Tkaczynski  <https://orcid.org/0000-0002-3410-7602>

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## Appendix I. Descriptive statistics (perceived value, co-creation, knowledge, interest, satisfaction)

Item	$\bar{x}$	Item	$\bar{x}$
Quality value		Personal interaction	
All tasks performed by allocated time	6.43	I didn't act rudely to the employees	6.59
Visually appealing physical setting	6.38	I was polite to the employees	6.48
Employees were well dressed	6.37	I was courteous to the employees	6.48
Well designed whale watching experience	6.33	I was friendly to the employees	6.41
Consistent quality for whole experience	6.32	I was kind to the employees	6.36
Appearance of facilities	6.29	Responsible behavior	
Records were accurate	6.13	I followed all the employees' directives or orders	6.60
Up-to-date equipment	6.07	I performed all the tasks that were required	6.51
Economic value		I adequately completed all the expected behaviors	6.50
Offered value for money	5.70	I answered all of the employees' questions	6.33
Reasonably priced	5.41	Feedback	
Correctly priced	5.39	When I received good service from the employees, I let them know	5.42
Economical	4.93	When I experience a problem, I let the employees know about it	5.08
Emotional value		If I had a useful idea on how to improve the experience, I let employees know	4.60
Made me happy	6.58	Tolerance	
Memorable	6.58	If an employee made a mistake, I was willing to be patient	5.72
Authentic	6.56	If I had to wait longer than I normally expected, I was willing to adapt	5.68
Pleasurable	6.52	If the service was not delivered as expected, I was willing to put up with it	4.66
Made me feel good	6.51	Helping	
Exciting	6.47	I assisted other tourists if they needed my help	5.18
Gave me a sense of well-being	6.22	Other tourists increased the enjoyment of the experience	5.04
Stimulating	6.20	I helped others if they seemed to have problems	4.77
Relaxing	6.19	I gave advice to others customers	4.28
Social and novelty value		Knowledge of protecting the environment	5.30
Made me feel like an adventurer	5.09	Interest in protecting the environment	6.30
Helped me to meet like-minded people	4.29	Satisfaction with the experience	6.41
Enabled me to enhance new physical skills	4.12		
Allowed me to master my skills	4.01		
Helped me feel accepted	3.88		
Enabled me to make a good impression	3.73		
Improved the way I am perceived	3.65		
Gave me social approval	3.65		



## Appendix 2. Descriptive statistics (demographics).

Item	%
Age	
<25	15.9
25–34	19.0
35–44	15.4
45–54	16.6
55–64	17.3
65 +	15.0
Education (highest completed)	
Primary	3.4
Secondary	26.8
Trade Certificate/College	25.9
Bachelor Degree	27.8
Primary Degree	16.1
Experience	
Yes	22.8
No	77.2
Gender	
Male	34.6
Female	65.4
Income	
< AUS\$20,000	14.1
AUS\$20,000-AUS\$39,999	11.7
AUS\$40,000-AUS\$59,999	14.4
AUS\$60,000-AUS\$79,999	15.4
AUS\$80,000-AUS\$100,000	12.9
AUS\$100,000 +	31.4
Origin	
Domestic	
Resident	10.8
QLD (<400 kilometres)	25.3
Other QLD	3.0
New South Wales	12.0
Victoria	8.9
Other Australia	7.5
International	
United Kingdom	8.2
Germany	6.4
New Zealand	2.6
Other Europe	12.1
Other international	3.2