

## A safety marketing stimuli-response model of passenger behaviour in the ferry context

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### ABSTRACT

This study proposes a safety marketing stimuli-response model to explain passengers' safety behaviour in the ferry services context. Structural equation modelling (SEM) was conducted to examine the impact of safety marketing stimuli on passengers' safety awareness and behaviour. Using data obtained from a survey of 316 ferry passengers in Hong Kong, we found that passengers' perceptions of ferry safety marketing stimuli positively affected their safety awareness, and safety awareness positively affected passengers' safety behaviours. Specifically, we found that safety awareness played a mediating role in the relationship between ferry safety marketing stimuli and passengers' safety behaviours. The empirically validated scales can be adopted to practices of safety marketing, while providing a helpful information for ferry operators to evaluate their efforts of safety marketing, and implications for improvement.

**Keywords:** safety marketing stimuli; safety behaviour; ferry services; structural equation modelling; safety awareness.

## **1. Introduction**

In recent years, several ferry accidents and disasters have occurred in the East Asia region which have resulted in loss of life. For example, a ferry accident in Hong Kong on 1<sup>st</sup> October, 2012, and the collision between the Sea Smooth and Lamma IV ferries at Lamma Island, resulted in the deaths of 39 passengers (Kim, 2016). On 16 April 2014, the Sewol ferry disaster on the southwestern coast of South Korea, caused the deaths of 300 passengers and crew members (Woo et al., 2015). Overloading and improperly secured cargo were the main causes. On 1 June 2015, the Eastern Star (Dong Fang Zhi Xing) sank in strong winds and heavy rain on the Yangtze River in China and 442 passengers lost their lives (Wang et al., 2016). Human error is a major factor and contributes to around 80% of maritime accidents (Kirwan, 1987). Most accidents and fatalities are due to collisions between vessels, overloading of passengers, and lack of emergency response training (Lu and Yang, 2011).

Many previous studies have paid attention to ship safety (Wang and Fonikis, 2001; Lois et al., 2004), determinants of injuries in passenger vessel (Yip and Talley, 2015), and organizational safety climate and safety behaviour (e.g. Lu and Yang, 2011). However, an evaluation of the impact of safety marketing stimuli on passengers' safety awareness and behaviours is lacking. Passengers' understanding of safety knowledge and information during a voyage can reduce the possibilities of injuries and death in an accident. Passengers' lack of safety knowledge and inadequate safety behaviours can negatively affect the likelihood of survival, and lead to serious injuries or even death (Telley et al., 2006; Fabianmo et al., 2010).

A stimuli-response model of consumer behaviour has commonly been used to understand the buying behaviour of individual consumers (Kanagal, 2016; Kotler, 1997). The model contains four marketing stimuli dimensions namely: product, price, place, and promotion. Consumers are also influenced by other stimuli in the environment such as political, economic, technological and cultural stimuli (Kanagal, 2016). Drawing on the stimuli-response model, this study aimed to fill the highlighted research gaps by conducting confirmatory analysis to examine how safety marketing stimuli dimensions affect passengers' safety awareness and behaviours.

Safety marketing can be thought of as a kind of social marketing which focuses on the delivery of safety value and merits to a target group. Social marketing integrates the

marketing mix of product, place, price, and promotion into a unique strategy and framework to benefit the industrial or society as a whole (Fourali, 2016). Safety marketing stimuli have been examined in different industries. For instance, the safety marketing stimuli have been discussed in relation to alcohol-related traffic fatalities (Smith & Scott Geller, 2009) and drivers' attitudes and behaviours (Donovan et al., 2010). To the authors' knowledge, no previous study has examined safety marketing stimuli and their impact on passengers' safety awareness and behaviour in the ferry service context. Hence, the research objectives of this study were as follows: (1) to understand passengers' perceptions of safety marketing stimuli, safety awareness, and safety behaviour in the ferry services context; (2) to validate the measures and constructs of safety marketing stimuli; and (3) to analyse the influences of safety marketing stimuli on passengers' safety awareness and safety behaviours.

Following this introduction to the motivations for the research, the subsequent section reviews the theoretical background and develops the research hypotheses. Next, we describe the research methodology, including questionnaire design and study participants, measures, and analytical procedures. The empirical findings and their implications for ferry operators and ferry safety are then discussed.

## 2. Theoretical background and research hypotheses

### 2.1. *The concept of marketing and marketing mix*

Marketing refers to the processes for identifying, anticipating and satisfying customer requirements (Fourali, 2008) and organizational objectives (Jobbes, 2003; American Marketing Association, 2016; The Chartered Institute of Marketing, 2016). Kotler et al. (2001) defined marketing as a social and managerial process whereby individuals and groups obtain what they need and want through creating and exchanging products and value with others. Borden (1964) proposed the concept of 'marketing mix' which compares the marketing activities of manufacturers, namely: product planning, pricing, branding, channels of distribution, personal selling, advertising, promotions, and servicing. Marketing mix is also known as the 4Ps, which consists of product, promotion, price, and place (McCarthy, 1975). Kotler (1997) defined marketing mix as 'a set of controllable variables that an organization can use to influence the receiver's response' and blend to deliver mutually satisfying exchanges with a target market. Such variables can also be blended into a marketing strategy (Gronroos, 1994) or blended

together to achieve optional goals (Lamb, 2011). In traditional marketing, the 4Ps are constructed as marketing mix for tangible goods (Gitlow, 1978; Kotler, 1997; Shamah, 2013). However, there is a significant difference between services and goods in that “goods are produced whereas services are performed” (Rathmell, 1974). As a result, previous studies have proposed three more marketing variables, namely: people, physical evidence, and process in the service sector (Baron, 1995; Gronroos, 2004; Lovelock, 2011; Helm and Gritsch, 2014).

## 2.2 *Safety marketing stimuli-response model*

Drawing on the marketing stimuli-response model (Kotler, 1997; Kanagal, 2016), this study proposes a safety marketing stimuli-response model to examine passenger safety behaviour. This model consists of three elements: safety marketing stimuli, safety awareness perception; and safety behaviour as illustrated in Figure 1. Safety marketing stimuli compare the influential factors of product, price, place, and promotion. The second element of safety awareness perception leads to the third element of safety behaviour and awareness of the need to use safety equipment.

< Insert Figure 1 about here >

Safety marketing stimuli in this study refer to a combination of marketing activities that ferry operator engaged in to raise the safety awareness of ferry services’ passengers. Price is an important determinant of transportation choice, we excluded it because price is not part of the generally accepted understanding of safety services in the literature (Dabholkar et al., 1996).

### (1) Product (or service)

What an organization offers for sale may include products or services (McCarthy, 1975; Charles et al., 2011). Product can be either tangible goods or services that provide customer value. They may also be anything offered to the market for consumption that satisfies the wants or needs of customers. In the transportation industry, an operator’s core product is carrying passengers from one place to another. In the ferry services context, safety is an important marketing factor and should comply with relevant statutory requirements and meets the specific safety needs of passengers. Ferry crew members should perform their duties and obey safety procedures to ensure passengers’ safety during the voyage (Asiegbu et al., 2012). Services delivery is an important indicator of differentiation with competitors (Lovelock et al., 2007; Asiegbu and Powei,

2012; Asiegbu et al., 2012). Crew members' response abilities such as judgment, decision-making, and communication with passengers are critical to reduce accidents (Lois et al., 2004). Passengers' awareness of safety facilities and information from crew members such as safety guidance, emergency demonstration, safety alertness and routine checks are important service attributes in ship safety (Lu and Tseng, 2012; Lu and Yang, 2011).

## (2) Place

Place can be defined as where a product or service is sold or obtained, while the channel of distribution is the mechanism whereby products are moved from the service provider to customers (Lamb et al., 2011; Vliet, 2013). Place refers to the physical location where an organization makes products or services available to customers or the distribution channels used to reach markets (McCarthy, 1975). Previous studies indicate that place in safety practices includes the accessibility to safety equipment and the delivery of safety information to passengers as to how to use safety equipment when an accident occurs (Hinton and Henley, 1993; Norman, 2004; Oppenheimer, 2005; Schifferstein and Cleiren, 2005).

## (3) Promotion

Promotion can be defined as policies and procedures relating to trade promotion (Borden, 1964). It comprises advertising, public relations, sales promotion, and personal selling. Promotion can raise customers' awareness of products or services to generate sales and create brand loyalty, which can facilitate mutually satisfying exchanges with target markets, through informing, educating, persuading, and reminding customers about the benefits of products (Bonne and Kurtz, 2016).

Promotion is an important determinant in safety marketing stimuli. The application of promotion tools in safety services can raise passenger's awareness, and draw their attention to safety. Safety promotion refers to the distribution of safety information to passengers to raise safety awareness by informing, educating, persuading, and reminding (Lamb et al., 2011). Examples of promotion tools in the ferry services context may include print media (e.g. safety cards in the seat pocket and safety demonstration, DVDs), electronic media, or outdoor media (e.g. signage and/or posters).

## (4) Physical equipment

Physical equipment can be defined as 'any tangible component facilitating service

performance or communication between service employee and customers within an environment where service is delivered (Zeithaml and Bitner, 2003; Vliet, 2013; Mohammed, 2016). Physical equipment in ferry safety includes life-saving accessories (e.g. life jacket and lifebuoy), safety net, guard rail, and fire extinguisher. Fire-fighting equipment should be in readiness, while life-saving appliances should be sufficient in number, in working order, and ready for immediate use (Wonham et al., 2000; Duz, 2003). The visible presence of fire-fighting components (such as fire detecting sense, fire alarm balls, extinguishes and manual call points at doorways) and life-saving appliances (such as lifebuoys, lifejackets, life-raft, life-jacket donning instruction, and evacuation procedures) can influence passengers' perceptions of ferry safety (Lu and Tseng, 2012). Accordingly, passengers will pay more attention to safety if ferry operators provide effective delivery of safety information and accessibility to safety equipment. Thus, we posit the following hypothesis:

H1: Safety marketing stimuli positively affect passengers' safety awareness.

According to Klein et al. (1993), individuals with a strong sense of safety awareness feel accountable for their own behaviour and collectively for the performance of their teammates. Safety awareness is being aware of safety issues and potential hazards to oneself and others. However, making everyone aware of safety may not be easy, as individuals vary in their understanding of the situation (Klein et al., 1993). A constant state of situation awareness such as mindfulness need to be maintained (Weick et al., 1999). Quality of judgement may be affected if passengers are not aware of the hazards onboard and such lack of awareness may lead to erroneous decisions (Klein et al. 1993). Awareness of the situation and the physical environment can reduce loss of human life, and damage to the vessel. A sense of safety is an indicator of how an individual will behave in an emergency (Brave and Nass, 2002). However, passenger's safety awareness may be affected by the level of attention paid to safety information, including onboard announcements, safety notices and signage. Edwards (1990) stated that the aim of passenger education is to reduce stress or panic caused by emergencies and to enable passengers to prepare in advance for coping with danger. A combination of panic and stress in an emergency situation may have fatal consequences (Hystad et al., 2016). Passenger's knowledge of how to respond in an accident or emergency is crucial. Raising passengers' safety awareness will reduce panic, injuries or death should an accident occur (Edwards, 1990). Chang and Liao (2008) found that educating

passengers about cabin safety positively influenced passenger behaviour. However, few passengers had sufficient knowledge about cabin safety and how to react in an emergency, thus putting themselves and others in danger (Chang and Liao, 2008). Safety marketing can therefore increase safety knowledge, raise passengers' situation awareness, and foster proactive behaviour in emergencies.

An individual can be influenced by his or her feelings and knowledge (Laurel, 2003). Once passengers understand the importance of about safety while on board. Passengers can acquire shipboard safety knowledge from demonstrations of how to use a lifejacket, appropriate safety measures, emergency evacuation, and muster drill. These will positively influence their safety reaction and behaviour (Hystad et al., 2016). In the aviation industry, Muir et al. (1996) found that aircraft accident investigation suggests that passenger behaviour during the course of an emergency evacuation can have a dramatic effect on their survival chances. Similarly, consciousness or safe behaviour on a ferry can improve the efficiency and effectiveness of emergency and evacuation procedures. Lee et al. (2003) stated that evacuation is primarily dependent on evacuees' behaviour. A good safety environment will increase passenger awareness and reduce the possibility of damage and loss. An awareness of safety is an indicator of how an individual will behave in an emergency (Brave and Nass, 2002). Accordingly, we posited the following hypothesis:

H2: Passengers' safety awareness positively affects their safety behaviours.

Empirical studies on safety behaviour in a particular industry have been very much confined to safety motivation (Griffin and Neal, 2000; Lu and Yang, 2010; Pang and Lu, 2018), safety climate (Zohar, 1980; Lu and Shang, 2005; Lu and Tsai, 2010; Lu et al., 2017), safety policy (Kennedy and Kirwan, 1998; Lu and Tsai, 2010), safety training (Vredenburg, 2002; Lu and Yang, 2010), safety management (Mearns et al., 2003; Lu and Tasi, 2010), and emotional intelligence (Lu and Kuo, 2016) influencing employee or worker safety behaviour. There is a lack of attempt to examine safety marketing stimuli as factors to increase passenger safety behaviour. Safety marketing stimuli such as fastening a seat belt, understanding how to use a fire extinguisher, wearing a life jacket and life buoy, reinforces passengers' safety behaviours. Informational (safety announcement, safety video, safety guidance) and tangible reinforcements (life-saving equipment, safety net, and fire-fighting equipment) are also important safety marketing stimuli. Well-designed safety marketing stimuli can help to modify and reinforce

passenger safety behaviour. We, therefore proposed the following hypothesis:

H3: Safety marketing stimuli positively affect passengers' safety behaviours.

### 3. Methodology

#### *3.1 Questionnaire development and participants*

The research data was obtained from a questionnaire survey of ferry services' passengers in Hong Kong. Questionnaire development procedures based on Churchill and Iacobucci (2010) including appropriate question type, wording content, design and sequence, questionnaire layout and administration method. The questionnaire consisted of few parts. The first part elicited respondents' demographic information. They were asked their age, monthly salary, education level, occupation, marital status, number of children, and travel frequency to Macau per year. The second part investigated respondents' satisfaction level with ferry operators' safety marketing stimuli utilizing a five-point Likert scale ranging from "1= strongly dissatisfied" to "5= strongly satisfied". The third and fourth part examined respondents' agreement level with their own safety awareness and safety behaviour, respectively utilizing a five-point Likert scale ranging from "1= strongly disagree" to "5= strongly agree".

Survey participants were passengers who were travelling to Macau by ferry. The survey of passengers was carried out from 5<sup>th</sup> November 2016 to 9<sup>th</sup> November 2016. Three hundred and twenty-five questionnaires were distributed to people in the ferry terminal in Sheung Wan, Hong Kong. The total number of usable responses was 316. The effective response rate was 97.2%.

#### *3.2. Measures*

Respondents were asked to indicate their levels of satisfaction with ferry operators' safety marketing stimuli. Fifteen items were used to assess five dimensions of safety marketing (service, people, promotion, physical evidence, and place). A sample item was, "clarity of explanation about safety information by ferry crew".

We used a five-item scale developed by Lu and Yang (2011) and Lu and Tseng (2012) to assess the extent of safety awareness. They were asked to indicate their level of agreement with these items on a five Likert scale range from 1 = strongly disagree to 5 = strongly agree. A sample item is, "I am aware of the location of fire extinguisher on ferry."



We used four items to measure passenger safety behaviour based on the studies of Lois et al., (2004), Lu and Yang (2011), and Lu and Tseng (2012). These items include “I fasten a seat belt”, “I understand the usage of fire extinguisher”, “I understand the correct wearing of life jacket” and “I understand the usage of life buoy.”

### *3.3 Analytical procedures*

The statistical IBM Statistical Packaging for Social Science SPSS 24.0 was used as a statistics tool to calculate and analyze the data collected from the survey. The analytical tools were descriptive analysis; reliability and validity analyses; exploratory factor analysis (EFA); confirmatory factor analysis (CFA), and structural equation modelling (SEM).

## **4. Empirical analyses results**

### *4.1. Respondents' profile*

Table 1 shows that just over half of respondents (50.95%) were male and the remaining (49.05%) were female. A third of respondents (33.86%) were aged 30 or under, while the remaining two-thirds were aged 31 and over. More than half of respondents (56.33%) were from the service industry and a quarter (25.32%) were students. A third of respondents (33.23%) had a monthly salary between HK\$30,000 and HK\$49,999, 29.43% of respondents had a monthly salary below HK\$10,000, and 25.63% had a monthly salary between HK\$10,000 and Hk\$29,999. Almost thirds of respondents (65.51%) held a bachelor degree. More than half of respondents (56.01%) were married and 62.34% did not have children. Over half of respondents (60.13%) chose the ferry operator TurboJet when travelling to Macau. Most respondents (88.61%) travelled to Macau for recreation purposes. More than half of respondents (57.28%) travelled to Macau 3 to 4 times per year, while 21.84% travelled to Macau 1 to 2 times per year.

A comparison of respondents approached in the early and later stage of the questionnaire survey was conducted to test non-response bias through independent sample T-tests (Armstrong and Overton, 1977). The 316 respondents were divided into two different groups according to their time of response. There were 230 early respondents, accounting for 72.8% of total respondents, who were assumed to represent the respondent sample, while 86 late respondents, accounting for 27.2% of total respondents, were assumed to represent the non-respondent sample. Independent sample T-tests were conducted on the two groups' perceptions of safety marketing,

safety awareness and safety behaviour. The non-response bias test results showed that most of the measures did not significantly differ at the 0.05 level between the two groups. Only one safety marketing item ‘safety patrol by ferry crew’ and one safety awareness item ‘I am aware of the location of the ferry’ were found to significantly differ between two groups at the 5% significance level. The results indicated that non-response bias was not a problem in this study since most early responses and late responses were consistent.

< Insert Table 1 about here >

#### *4.2 Importance-satisfaction analysis of safety marketing stimuli*

Figure 2 illustrates the results of the importance-satisfaction analysis of safety marketing stimuli attributes applying the importance-satisfaction analysis method introduced by Martialla and James (1977). This analysis method was employed to compare importance and satisfaction level with safety marketing stimuli attributes as perceived by respondents. It was used to help identify areas requiring more allocation of resources for future improvement. The mean scores of importance and satisfaction levels with all 15 safety marketing stimuli attributes are shown as four quadrant scatter-plots. The aggregated mean score for importance (X-axis) was 4.00 and that for satisfaction (y-axis) was 3.45 as shown on the figure. The first quadrant of “keep up good work” represented respondents’ perceptions of items in the quadrant as important and their satisfaction with them. The second quadrant of ‘improvement should be concentrated here’ represented respondents’ perception of items in this quadrant as important and their current dissatisfaction with them and therefore need for improvement. The third quadrant of “low priority” represented theme perceived as not important by respondents as well as their low satisfaction with them. The last quadrant of ‘possible over-investment’ represents items not considered important by respondents as well as their current satisfaction with them. The contents of the four quadrants are described and discussed below.

##### *(1) Quadrant I: Keep up good work*

In the 15 safety marketing stimuli attributes, there were 8 attributes in the ‘keep up the good work’ quadrant. They were ‘Stability of sailing’, ‘Adequacy spacing for emergency evacuation’, ‘Attention drawn by safety instruction’, ‘Life-saving equipment (such as life jacket and lifebuoy)’, ‘Fire-fighting equipment (such as fire

extinguisher)', 'Safety installations (such as net and guard rail) to prevent falling overboard', 'Accessibility of life jacket', 'Accessibility of lifeboat', and 'Accessibility of fire extinguisher'. These safety marketing stimuli attributes had high mean scores for both importance and satisfaction rating. Thus, ferry operators should maintain their high level of performance in these attributes.

< Insert Figure 2 about here >

#### (2) Quadrant II: Improvement should be concentrated here

Among the total of the 15 safety marketing stimuli attributes, five were in the 'Improvement should be concentrated here' quadrant. They include 'Clarity of explanation about safety information by ferry crew', 'Safety patrol by ferry crew', 'Safety guidance initiatives and ferry crew alertness', and 'Attention drawn by safety instruction'. Since all the satisfaction level mean scores of these four safety marketing attributes were lower than those for the importance level, improvement should be made for satisfying passengers. For example, regarding attribute of initiatives of safety guidance and alertness by ferry crew, respondents perceive such item is important (mean score of importance level is 4.10), but their perceived satisfaction is relatively low (mean score of satisfaction level is 3.10). Therefore, ferry operators therefore need to provide training to improve safety guidance initiative and ferry crews' alertness.

#### (3) Quadrant III: Low priority

There are only two marketing stimuli attributes in this quadrant, including: 'Attention drawn by safety video' and 'Attention drawn by safety announcement'. These two items were perceived as not important and not satisfied. Since these two marketing attributes are low-prioritized, ferry operators shall devote or alter their resources to the items in quadrant I and II as main focus.

#### (4) Quadrant IV: Possible over-investment

There is no marketing stimuli attribute in this quadrant. It implies that ferry operators have appropriate allocation of resources without wastage in investment.

### *4.3. Exploratory factor analysis results*

As shown in Table 2, we carried out exploratory factor analysis (EFA) of the developmental 15 safety marketing stimuli attributes. Four factors were identified, which accounted for approximately 67.85 per cent of the total variance. The results

indicate that Cronbach's  $\alpha$  statistic of each factor was well above the value of 0.73, considered to reflect a satisfactory level of reliability (Hair et al., 2010; Nunnally, 1978). The factors were labeled and are addressed below:

#### (1) Factor 1 – Physical equipment

Factor 1 comprises of three items, namely 'Life-saving equipment (such as life jacket and lifebuoy)', 'Fire-fighting equipment (such as fire extinguisher)', and 'Safety installations (such as net and guard rail) to prevent falling overboard'. These items are related to the physical safety facilities of a ferry, hence the factor was designated physical equipment. Factor 1 accounts for 35.856% of the total variance. 'Life-saving equipment (such as life jacket and lifebuoy)' had the highest factor loading. A conservative criterion is to extract variables with a factor loading of at least 0.5 (Kim and Muller, 1978; Hair et al., 2010), therefore since 'Cleanliness of shipboard cabin' had a factor loading of less than 0.5, this item was removed from further analyses.

< Insert Table 2 about here >

#### (2) Factor 2 – Promotion

Factor 2 comprised five items namely: 'Attention drawn by safety video', 'Safety guidance initiatives and ferry crew alertness', 'Attention drawn by safety announcement', 'Clarity of explanation about safety information by ferry crew', and 'Attention drawn by safety instruction'. These items were promotion-related safety marketing stimuli attributes therefore Factor 2 was labelled promotion. Factor 2 accounted for 15.82% of the total variance.

#### (3) Factor 3 – Place

This factor consisted of three items, namely: 'Accessibility of life jacket', 'Accessibility of fire extinguisher', and 'Accessibility of lifeboat'. These items are place-related safety marketing factors about accessibility of safety facilities. Factor 3 accounts for 9.28% of the total variance, where the attribute of 'Accessibility of life jacket' had the highest factor loading.

#### (4) Factor 4 - Service

Factor 4 consisted of three items, namely: 'Safety patrol by ferry crew', 'Adequacy spacing for emergency evacuation', 'Stability of sailing'. Since these three items were service related safety marketing stimuli attribute, factors 4 was labelled service. Factor

4 accounts for 6.89% of the total variance.

We also conducted confirmatory factor analysis (CFA) of the constructs using IBM SPSS AMOS 24.0 statistical software. As indicated in Figure 3, the CFA specified four items for safety marketing stimuli, four items (A1-A4) for safety awareness, and four items (B1-B4) for safety behaviour. In the CFA model, we constrained each construct to fall under a single factor and allowed the constructs to correlate.

< Insert Figure 3 about here >

Table 3 shows the CFA result as follows:  $\chi^2/df = 5.971$ , goodness-of-fit index (GFI) = 0.869, adjusted goodness-of-fit index (AGFI) = 0.800, comparative fit index (CFI) = 0.831, and root mean square residual (RMR) = 0.050, indicating that the model had an acceptable fit (Hair et al., 2010).

< Insert Table 3 about here >

There are several criteria to measure the convergent validity, namely critical ratio (CR) and  $R^2$  values (Hair et al., 2010). The CR indicates whether the measured factors can represent the underlying constructs. If the factor loadings are large, then the evidence is stronger (Bollen, 1989). According to Koufteros (1999) and Hair et al. (2010) if the absolute value of CR is greater than 1.96, the estimate will be acceptable. Table 3 shows that all of the CR values were greater than 1.96, so the estimate was acceptable. The  $R^2$  value is used to measure item reliability (Koufteros, 1999). If it is more than 0.3 the reliability is acceptable (Hair et al., 2010). An examination of Table 3 reveals that  $R^2$  values of two constructs, 'Promotion' and 'Service' variables were slightly lower than 0.3. Because these are important constructs in explaining the safety behaviour, they were included in the model. Nearly all of the  $R^2$  values are greater than 0.3, therefore convergent validity was reliable.

Table 4 presents means, standard deviations and correlations among variables. It can be seen that safety services ( $\gamma = 0.11$ ) and safety awareness were positively related to safety behaviour. The coefficient alpha value is an indicator of reliability. The coefficient alpha value for each construct was well above 0.7, denoting adequate internal consistency (Hair, et al., 2010).

Assuming an adequate model fit, further psychometric analysis of the measurement model was performed. The discriminant validity test is important (Koufteros, 1999). In Koufteros' (1999) study, a model was constructed for all possible pairs of latent

variables within each instrument. The model was analyzed: (1) with the correlation between the latent variables fixed at 1.0, and (2) with the correlation with the latent variables free to assume any value. The difference in Chi-square values for the fixed (or constrained) and free solutions indicated whether a one-dimensional model would be sufficient to account for the intercorrelation among the variables observed in each pair. A significantly lower Chi-Square value for the model in which the trait correlations were not constrained to unity would indicate that the traits were not perfectly correlated, and that discriminant validity could be inferred (Anderson, 1987). Results indicated that the differences in  $\chi^2$  between the fixed and free solutions were statistically significant (i.e. the minimum  $\chi^2 = 304.532$ ,  $P < 0.01$ ,  $df = 1$ ) thereby demonstrating that discriminant validity was satisfied.

< Insert Table 4 about here >

< Insert Table 5 about here >

The AVE for a construct should be substantially higher than the squared correlation between that construct and all other constructs. In Table 5, the highest squared correlation was observed between safety marketing and safety awareness and it was 0.073. This was significantly lower than their individual AVEs. The AVE for the latent variables was 0.679, 0.745 and 0.753, respectively. The results demonstrated evidence of discriminant validity for the study constructs.

#### 4.3 Hypotheses testing

In testing Hypotheses 1, 2, and 3, we simultaneously considered the three constructs of safety marketing stimuli, safety awareness, and safety behaviour in the structural equation model (SEM) (see Figure 4). The results are shown in Table 6. The GFI was 0.885. After adjustment for the degree of freedom relative to the number of variables, the (AGFI) was 0.813, implying that 81.3% of the variance and covariance manifested in the data was predicted by the model. The RMR was 0.05. The SEM was thus found adequate. However, the relationship between safety marketing and safety behaviour was not supported ( $\beta = -0.03$ ,  $p > 0.05$ ). A positive relationship between safety marketing and safety awareness ( $\beta = 0.214$ ,  $p < 0.05$ ), and between safety awareness and safety behaviour ( $\beta = 0.652$ ,  $p < 0.05$ ) was supported. The results provide a general support for Hypotheses 1 and 3. The results indicated that safety marketing had an influence on safety awareness and indirectly affected respondents, safety behaviours.

< Insert Figure 4 about here >

< Insert Table 6 about here >

Although the results indicated that the direct effect of safety marketing on safety behaviour was not significant, a mediating effect can occur if the effect of an independent variable on a dependent variable is reduced in magnitude and becomes not statistically significant (Hair et al., 2010). We therefore tested the mediating effect of safety awareness on the relationship between safety marketing and safety behaviour. As shown in Figure 5, safety marketing stimuli as in independent variable was found to significantly influence safety behaviour ( $\beta = 0.75$ ,  $p < 0.05$ ). The results revealed that the mediating model had a good fit as the GFI was 0.967, AGFI was 0.914, CFI was 0.965, and the RMR was 0.021. The findings indicated that safety awareness mediated the relationship between safety marketing stimuli and safety behaviour.

< Insert Figure 5 about here >

## 5. Discussions and implications

The aim of this research was to examine the effect of safety marketing and safety awareness on safety behaviour, as well as the role of safety awareness as a mediator of the observed relationship between safety marketing stimuli and safety behaviour. For this purpose, we examined ferry passengers' perceptions of safety marketing stimuli in terms of four constructs: physical equipment, promotion, place, and service. As expected, the findings indicated that safety marketing stimuli were positively related to safety awareness, and safety awareness was positively related to safety behaviour. Safety awareness mediated the relationship between safety marketing stimuli and safety behaviour. Our findings were consistent with those reported in (Klein et al., 1993; Nilsson et al., 2012). People create awareness through their perceptions and paying attention to the environment onboard ferry transport (Nilsson et al., 2012). Klein et al. (1993) suggested that people who have a strong level of safety awareness are be much more aware of potential risks and feel accountable for their safety behaviour. Enhancing passengers' safety awareness can reduce panic and injuries in an accident. Safety marketing stimuli and safety awareness facilitate safety behaviour and decrease the occurrence of accidents (Edwards, 1990).

In the face of growing concern about the safety issue, safety marketing has emerged as an important topic in maritime operations and management research. However, since prior studies have paid limited attention to safety marketing practices, thereby hindering safety implementation, this study is one of the first attempts to fill this research gap by empirically validating and theoretically conceptualizing measures of safety marketing stimuli based on the marketing stimulus-response model (Kotler, 1997; Kanagal, 2016) and marketing mix (Borden, 1964; McCarthy, 1975; Kotler, 1997). The study findings have valuable implications for ferry operators' implementing and execution of safety practices. First, ferry operators should adopt safety practices beyond statutory requirements and constantly review their effectiveness in order to improving safety level. The findings indicated that safety marketing stimuli positively influenced passengers' safety awareness, thus foster change in safety behaviour. The main constructs of safety marketing stimuli consist of equipment, promotion, place, and service, and these provide useful criteria for ferry operators to assess their safety operations.

Second, this research suggested that several safety marketing stimuli attributes need to be improved. These include clarity of explanation about safety information by ferry crew, safety patrol by ferry crew, safety guidance initiatives and ferry crew alertness, and attention drawn by safety instruction. Passengers perceived these four attributes to be important, but ferry operators did not perform them to a satisfactory level. Ferry operators should allocate more resources to emphasizing these four items for future safety level improvement.

Third, a theoretical model was developed to explain the relationships between safety marketing stimuli, safety awareness and safety behaviour. This study highlighted the importance of safety marketing stimuli for ferry safety. According to the authors' knowledge, this study is the first to attempt to analyze the effects of safety marketing stimuli on passengers' safety awareness and safety behaviour in the ferry context. Its findings provide useful information for ferry operators to improve their safety marketing practices. We found that an increase in passengers' safety awareness is crucial for reinforcing safety behaviour. We therefore suggest that ferry operators should increase the attention paid to the safety video, guidance, and announcement in order to enhance to their increased passengers' safety awareness. Passengers will reinforce their safety behaviours by their increased awareness of safety marketing



stimuli.

#### 6. Limitations and directions for future research

While this is a valuable study in the safety marketing field, it does, however, have several limitations. First, this study was limited to ferry transportation between Hong Kong and Macau, thus was constrained by its small number of study participants. Second, this study specifically focused on the safety marketing stimuli of ferry services. Future studies could apply the critical safety marketing stimuli identified in this study to other transportation services, such as rail, road, and airlines. Third, since this study was based on a cross-sectional survey, future research could conduct a longitudinal surveys to observe the dynamic impact of safety marketing stimuli on passengers' safety awareness and safety behaviours over a longer period of time and therefore more accurately modify safety marketing strategies. Fourth, this study focused on the impact of safety marketing stimuli based on passengers' self-reported safety behaviour. Previous studies have suggested that safety education (Chang and Liao, 2009) and safety attitude (Donovan et al., 2010) may influence passengers' safety behaviours, future research could therefore consider the relationship between safety education and safety attitude, and its impact on safety behaviour. A more comprehensive understanding of the determinants of safety behaviour could help reduce accident occurrence. Finally, safety marketing activities are provided by transportation operators. A comparison of the perceived differences between passengers and transportation operators of safety marketing activities is vital to evaluate the affect were of safety marketing strategies.

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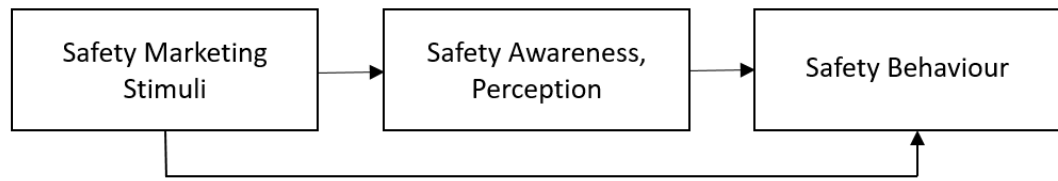


Figure 1. Safety marketing stimuli-response model

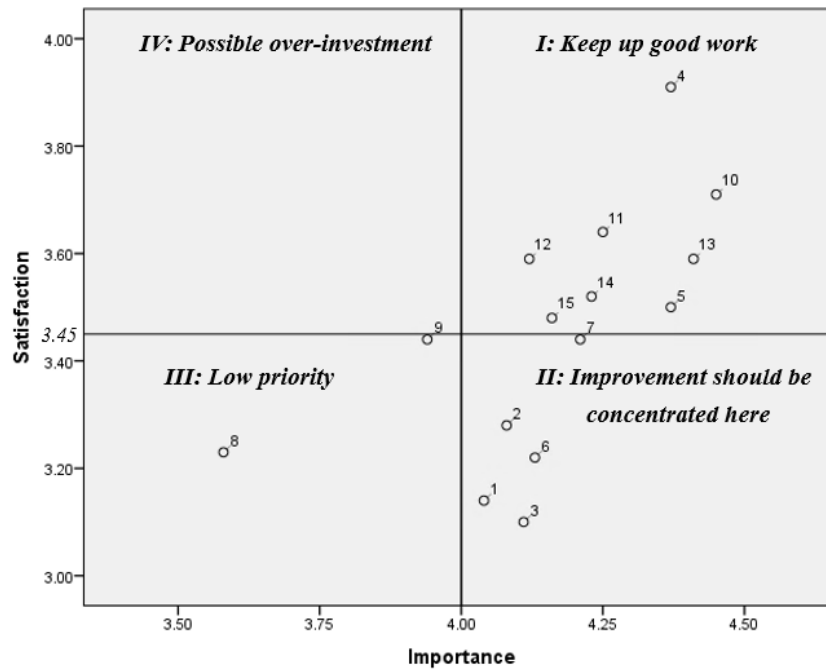


Figure 2. Importance-satisfaction analysis of safety marketing stimuli

Note: Safety marketing stimuli were numbered as follows:

1. Clarity of explanation about safety information by ferry crew
2. Safety patrol by ferry crew
3. Safety guidance initiatives and ferry crew alertness.
4. Stability of sailing
5. Adequate spacing for emergency evacuation
6. Cleanliness of shipboard cabin
7. Attention drawn by safety instruction
8. Attention drawn by safety video
9. Attention drawn by safety announcement
10. Life-saving equipment (such as life jacket and lifebuoy)
11. Fire-fighting equipment (such as fire extinguisher)
12. Safety installations (such as net and guard rail) to prevent falling overboard
13. Accessibility of life jacket
14. Accessibility of lifeboat
15. Accessibility of fire extinguisher





Figure 3. The confirmatory factor analysis model

Note:

M1: Physical equipment

M2: Promotion

M3: Place

M4: Service

A1: I am aware of the location of the fire extinguisher in the cabin.

A2: I am aware of the location of the life jacket in the cabin.

A3: I am aware of the location of the life buoy in the cabin.

A4: I am aware of the emergency evacuation route in the cabin.

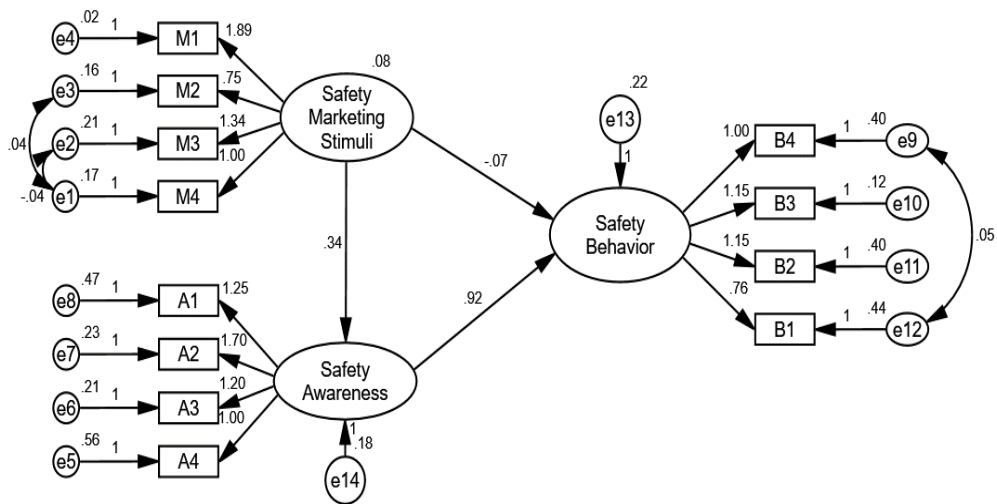
B1: I fasten the seat belt after the safety demonstration.

B2: I understand the usage of the fire extinguisher after the safety demonstration.

B3: I understand the correct wearing of the life jacket after the safety demonstration.

B4: I understand the usage of the life buoy after the safety demonstration.

e1-e12 are seen as errors in manifest or observed variables.



Note: e1-e14 were seen as errors in manifest or observed variables

Figure 4. The structural equation model

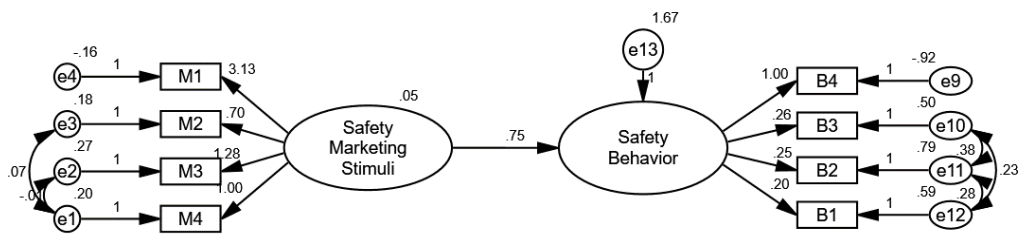


Figure 5. The relationship between safety marketing and safety behavior

Table 1 Profile of respondents (n=316)

| Characteristics of respondents                     |                                | Frequency | %     |
|--|--------------------------------|-----------|-------|
| <i>Gender</i>                                      | Male                           | 161       | 50.95 |
|  | Female                         | 155       | 49.05 |
| <i>Age</i>   | Below 20                       | 33        | 10.44 |
|  | 21 to 30                       | 74        | 23.42 |
|  | 31 to 40                       | 69        | 21.84 |
|  | 41 to 50                       | 61        | 19.30 |
|  | 51 to 60                       | 52        | 16.46 |
|  | 61 or above                    | 27        | 8.54  |
| <i>Occupation</i>                                  | Student                        | 80        | 25.32 |
|  | Service Industry               | 178       | 56.33 |
|  | Teacher                        | 15        | 4.75  |
|  | Industrial                     | 11        | 3.48  |
|  | Civil servant                  | 16        | 5.06  |
|  | Others                         | 16        | 5.06  |
| <i>Monthly salary (in HKD)</i>                     | Below 10,000                   | 93        | 29.43 |
|  | 10,000 to 29,999               | 81        | 25.63 |
|  | 30,000 to 49,999               | 105       | 33.23 |
|  | 50,000 or above                | 37        | 11.71 |
| <i>Education level</i>                             | Primary or Secondary education | 71        | 22.47 |
|  | Bachelor degree                | 207       | 65.51 |
|  | Master degree or above         | 38        | 12.03 |
| <i>Marriage status</i>                             | Single                         | 139       | 43.99 |
|  | Married                        | 177       | 56.01 |
| <i>Number of child</i>                             | 0                              | 197       | 62.34 |
|  | 1                              | 68        | 21.52 |
|  | 2 or above                     | 51        | 16.14 |
| <i>Ferry operator chosen</i>                       | TurboJET                       | 190       | 60.13 |
|  | Cotai Water Jet                | 126       | 39.87 |
| <i>Reason of travelling</i>                        | Recreation                     | 280       | 88.61 |
|  | Visiting friends or relatives  | 30        | 9.49  |
|  | Working or others              | 6         | 1.90  |
| <i>Frequency of travelling to Macau (per year)</i> | 1 to 2 times                   | 69        | 21.84 |
|  | 3 to 4 times                   | 181       | 57.28 |
|  | 5 to 6 times                   | 51        | 16.14 |
|  | 7 times or above               | 15        | 4.75  |

Table 2. Factor analysis of safety marketing stimuli items

| Safety marketing attributes  | Factor<br>1  | Factor<br>2  | Factor<br>3  | Factor<br>4  |
|--|--------------|--------------|--------------|--------------|
| Life-saving equipment<br>(such as life jacket and lifebuoy)                    | <b>0.865</b> | 0.020        | 0.121        | 0.116        |
| Safety installations (such as net and guard rail) to prevent falling overboard | <b>0.793</b> | 0.044        | 0.212        | 0.197        |
| Fire-fighting equipment<br>(such as fire extinguisher)                         | <b>0.721</b> | 0.219        | 0.150        | 0.259        |
| Cleanliness of shipboard cabin   | 0.486        | -0.102       | 0.304        | 0.463        |
| Attention drawn by safety video  | -0.002       | <b>0.757</b> | 0.196        | -0.148       |
| Safety guidance imitativeness and ferry crew alertness                         | 0.090        | <b>0.742</b> | -0.124       | 0.264        |
| Attention drawn by safety announcement   | 0.011        | <b>0.732</b> | 0.293        | -0.204       |
| Clarity of explanation about safety information by ferry crew                  | 0.014        | <b>0.687</b> | -0.273       | 0.223        |
| Attention drawn by safety instruction  | 0.361        | <b>0.540</b> | 0.209        | 0.277        |
| Accessibility of life jacket   | 0.051        | 0.101        | <b>0.859</b> | 0.257        |
| Accessibility of fire extinguisher   | 0.391        | 0.151        | <b>0.752</b> | 0.137        |
| Accessibility of lifeboat  | 0.447        | -0.093       | <b>0.742</b> | 0.216        |
| Safety patrol by ferry crew  | 0.403        | 0.175        | 0.061        | <b>0.730</b> |
| Adequate spacing for emergency evacuation                                      | 0.042        | 0.246        | 0.376        | <b>0.722</b> |
| Stability of sailing   | 0.279        | -0.100       | 0.159        | <b>0.669</b> |
| Eigenvalues  | 5.378        | 2.373        | 1.392        | 1.035        |
| Percentage variance (%)  | 35.85        | 15.81        | 9.28         | 6.89         |
| Cumulative percentage variance (%)   | 35.85        | 51.67        | 60.95        | 67.85        |
| Cronbach alpha   | 0.818        | 0.750        | 0.860        | 0.735        |
| Mean   | 4.280        | 3.976        | 4.263        | 4.273        |
| Standard deviation   | 0.684        | 0.875        | 0.662        | 0.572        |

Table 3 Parameter Estimates, Critical Ratios, and R<sup>2</sup> for the Research Model

| Latent variable  | Item | Unstandardized factor loading | Completely standardized factor loading | Standard error <sup>a</sup> | Critical ratio <sup>b</sup> | R <sup>2</sup> |
|--|------|-------------------------------|--|-----------------------------|-----------------------------|----------------|
| 1. Marketing   |      |                               |  |                             |                             |                |
|  | M1   | 1.961                         | 0.978                                  | 0.234                       | 8.385                       | 0.957          |
|  | M2   | 0.763                         | 0.462                                  | 0.109                       | 6.998                       | 0.213          |
|  | M3   | 1.333                         | 0.613                                  | 0.156                       | 8.523                       | 0.376          |
|  | M4   | 1.000                         | 0.545                                  | --                          | --                          | 0.297          |
| 2. Awareness   |      |                               |  |                             |                             |                |
|  | B4   | 1.246                         | 0.623                                  | 0.164                       | 7.600                       | 0.389          |
|  | B5   | 1.693                         | 0.839                                  | 0.214                       | 7.906                       | 0.703          |
|  | B6   | 1.198                         | 0.753                                  | 0.150                       | 7.991                       | 0.567          |
|  | B7   | 1.000                         | 0.506                                  | --                          | --                          | 0.256          |
| 3. Behavior  |      |                               |  |                             |                             |                |
|  | B8   | 0.766                         | 0.592                                  | 0.078                       | 9.784                       | 0.350          |
|  | B9   | 1.133                         | 0.748                                  | 0.094                       | 11.996                      | 0.560          |
|  | B10  | 1.115                         | 0.892                                  | 0.810                       | 13.830                      | 0.795          |
|  | B11  | 1.000                         | 0.711                                  | --                          | --                          | 0.505          |
| Goodness-of-fit statistics   |      |                               |  |                             |                             |                |
| $\chi^2(51)=304.53$ $p=0.000$ ; $\chi^2/df=5.971$ ; GFI=0.869; AGFI=0.800; CFI=0.831 |      |                               |  |                             |                             |                |
| 2;   |      |                               |  |                             |                             |                |
| RMR=0.050  |      |                               |  |                             |                             |                |

Note: a. S.E. represents an estimate of standard error of covariance

b. C.R. represents the critical ratio (calculated by dividing the estimate of the covariance by its standard error). A value exceeding 1.96 represents a significance level of 0.05

Table 4. Means, standard deviations, and correlations among variables

|                        | Mean | SD   | 1      | 2      | 3      | 4      | 5       | 6      | 7      | 8       | 9      | 10     |
|------------------------|------|------|--------|--------|--------|--------|---------|--------|--------|---------|--------|--------|
| 1. Age                 | 3.34 | 1.47 |        |        |        |        |         |        |        |         |        |        |
| 2. Income              | 2.27 | 1.01 |        |        |        |        |         |        |        |         |        |        |
|                        |      |      | 0.40** |        |        |        |         |        |        |         |        |        |
| 3. Education           | 1.90 | 0.58 |        |        |        |        |         |        |        |         |        |        |
|                        |      |      | 0.06   |        |        |        |         |        |        |         |        |        |
|                        |      |      |        | 0.59** |        |        |         |        |        |         |        |        |
| 4. Frequency of travel | 2.04 | 0.76 |        |        |        |        |         |        |        |         |        |        |
|                        |      |      | 0.20** | 0.07   | 0.00   |        |         |        |        |         |        |        |
| 5. Physical equipment  | 3.64 | 0.54 | - 0.05 | 0.03   | 0.04   | 0.07   | (0.82)  |        |        |         |        |        |
| 6. Promotion           | 3.27 | 0.45 | - 0.02 |        | 0.13*  | 0.11   | 0.44**  | (0.75) |        |         |        |        |
|                        |      |      |        | 0.14** |        |        |         |        |        |         |        |        |
| 7. Place               | 3.53 | 0.59 | - 0.20 | - 0.14 | - 0.09 | - 0.10 | 0.60**  | 0.28** | (0.86) |         |        |        |
| 8. Service             | 3.56 | 0.50 | 0.07   | 0.11   | 0.05   | 0.17** | 0.53**  | 0.44** | 0.21** | (0.74)  |        |        |
| 9. Safety awareness    | 3.96 | 0.51 | 0.00   | - 0.04 | - 0.05 | - 0.08 | - 0.11* | - 0.06 | 0.08   | - 0.22* | (0.76) |        |
| 10. Safety behavior    | 3.48 | 0.59 | - 0.08 | 0.04   | - 0.05 | - 0.06 | 0.10    | 0.06   | 0.09   | 0.11*   | 0.25** | (0.82) |

Note: SD: Standard deviation; Coefficient alpha reliabilities are in parentheses along the diagonal; \*  $p < 0.05$ ; \*\* $p < 0.01$ .

Table 5. Correlations and squared correlations between safety marketing, safety awareness, and actual safety use.

| Measures             | No of items | Construct reliability <sup>c</sup> | AVE   | 1                                | 2                   | 3       |
|----------------------|-------------|------------------------------------|-------|----------------------------------|---------------------|---------|
| 1. Safety Marketing  | 4           | 0.758                              | 0.679 | (0.824) <sub>b</sub>             |                     |         |
| 2. Safety Awareness  | 4           | 0.785                              | 0.745 | 0.645***<br>(0.416) <sup>c</sup> | (0.863)             |         |
| 3. Actual safety use | 4           | 0.794                              | 0.753 | 0.106<br>(0.011)                 | 0.294***<br>(0.073) | (0.868) |

Note: a. Average variance extracted (AVE) = (sum of squared standardized loading)/ [(sum of squared standardized loading) + (sum of indicator measurement error)]; Indicator measurement error can be calculated as 1-(standardized loading)<sup>2</sup>

b. The square root of the AVE.

c. Squared correlation

d. \* Correlation is significant at the 0.05 level, \*\* Correlation is significant at the 0.01 level.

Table 6. The structural equation model results

|                  |                    | Estimate | C.R.   | P-value |
|------------------|--------------------|----------|--------|---------|
| Safety marketing | → Safety awareness | 0.342    | 3.085  | 0.002   |
| Safety marketing | → Safety behavior  | -0.068   | -0.556 | 0.578   |
| Safety awareness | → Safety behavior  | 0.915    | 6.683  | 0.000   |

Note: Estimate was based on standardized regression weights.