Assessing the Seafaring Intention of Maritime Students in Hong Kong

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Abstract

Seafaring as a matter of human resources is one of important shipping policies in a country. Many developed countries are facing the problems of shortage of qualified and skilled seafarers for their maritime industries. Although previous researches tried to unravel the scarce seafarer dilemma, there are very few studies especially in the discussion of the factors affecting the intention to work on-board or go seafaring. This research investigates the effects of shipping knowledge, attitude and reference group opinions on the intention of maritime students to work on-board basing on the knowledge, attitude and intention (KAI) model. Using questionnaire surveys collected from 243 students studying in the maritime and logistics related departments at The Hong Kong Polytechnic University (PolyU) and Maritime Services Training Institute (MSTI) in Hong Kong. This research finds that the attitude and reference group opinions positively influence students' intention to work on-board. Although the research hypothesis of the direct influence of shipping knowledge on the intention to work on-board was not supported. Specifically, this research finds the indirect influence of shipping knowledge and reference group opinions on students' on-board intention through attitude. This research provides a comprehensive insight to understand the determinants of students' on-board intention. Managerial and theoretical implications from the research findings are discussed in this research.

Keyword: Seafaring intention, On-board, Knowledge, Attitude, Intention.

1. Introduction

More than 80% of world trade is carried by seagoing vessels (UNCTAD, 2016). However, many developed countries are facing a shortfall of qualified and skilled officer seafarers to serve in the maritime industry (Guo et al., 2006; Lewarn, 2009; Thai et al., 2013). Hong Kong is the world's fourth largest ship register port (Hong Kong Trade Development Council, 2016),

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the shipping and logistics industry is a traditional pillar industry of Hong Kong. While the shortage of local seafarers becoming a critical problem in developed countries, Hong Kong is inevitable to suffer this issue. As shown in Figure 1, the number of newly registered ocean-going seafarers has decreased between 1998 and 2006. The number of seafarers in Hong Kong has remained generally a steady trend since 2007. This reflects the problem of seafarer shortage in Hong Kong (Tai, 2016). There are numerical previous studies discussing why the seafarer shortage exists. According to Chen's (2001) research on Taiwan maritime graduates, the lack of social cognition about the seafaring industry was a factor influencing university graduates' intention to work on-board. In addition, the encouragement and cultivation of maritime knowledge from educational institutions is one of important determinants of seafaring intention.
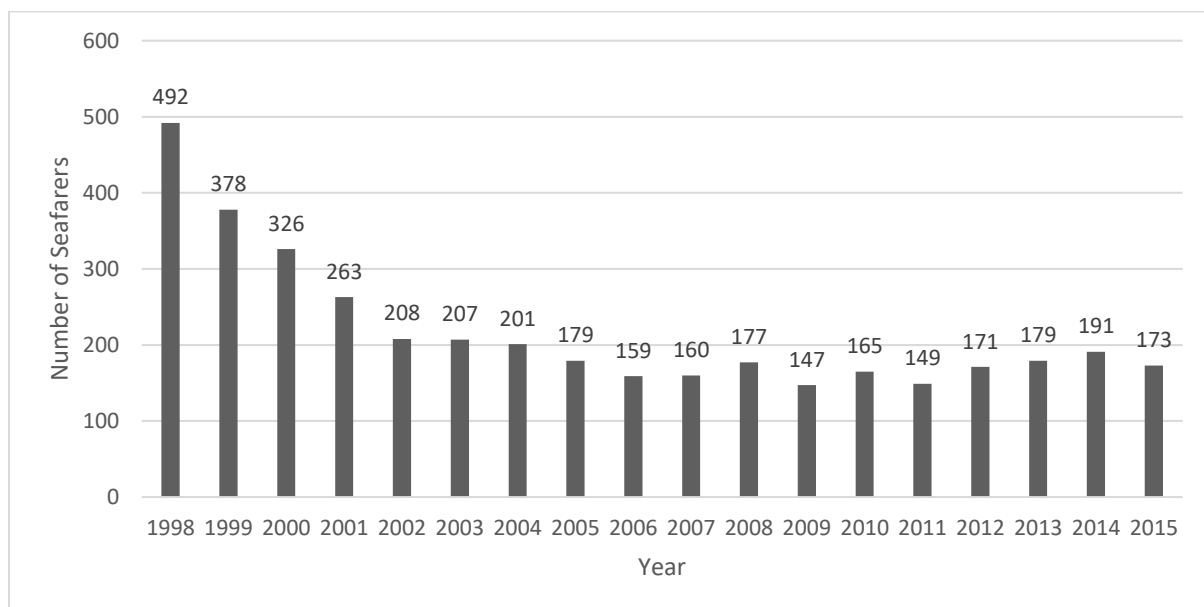

Figure 1 Ocean-going vessels registered seafarers.

Source: Marine Department of Hong Kong (1998-2015)

Tai (2016) revealed that ship owners had difficulty to recruit enough local seafarers to manage their ships, especially ocean-going vessels since late 1980s. When the economy of Hong Kong became better and better, young people would like to work on land rather than at sea. On the other hand, when the costs of employing Hong Kong seafarers were high (Gorski, 2007), Hong Kong ship owners would prefer to employ foreign seafarers from developing or less developing countries to reduce their ship operational costs.

Previous studies have identified the key factors affecting the seafaring decision. Lin et al. (2015) indicated that having self-motivation and developing opportunities in the career played significant roles in job consideration. Thai and Balasubramanyam (2013) conducted a case

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study in Singapore seafaring market. They found that seafaring-related works needed to be marketed more effectively to enhance their images and then attract more employees. Thai and Latta (2010) also indicated that building brand strategy and improving industry unique characters to distinguish from other careers were important to overcome the seafaring shortage. Yu et al. (2013) revealed that a positive feedback from the social network of maritime vocational students was a critical factor affecting their on-board decision. This reflected that public perception on seafaring image, especially impression from the reference group such as family and friends, could significantly affect seafaring decision.

Wang's (2005) study demonstrated four major reasons that the maritime related graduates were willing to work on-board include: higher salaries; personal interest; experiencing different cultures and applying the professional training. However, the negative factors influencing the career choice of maritime graduates include concern of living and working away from home and society, tough environment and less attractive salaries and opportunities. Chen (2001) found that the graduates with a higher fulfillment of personal need and social need, showed a higher intention of working on-board. However, the previous studies did not consider graduates' attitude and shipping knowledge in their decision to work on-board. To fill this gap, this research proposed the model of knowledge, attitude and behavioral intention (KAI) and reference group opinions to explain the seafaring intention of students at maritime related departments.

This research is organized as follows. First, the paper begins with an introduction. Section 2 discusses the theoretical background and the research hypotheses. The research methodology is demonstrated in Section 3. Section 4 describes the results and findings from the exploratory factor analysis, structural equation model and one-way analysis of variance (ANOVA). Conclusions from the research findings, limitations, and future research are addressed in the final section.

2. Theoretical background

2.1. Knowledge, attitude and intention (KAI)

This study is drawn on the notion of KAI which is widely adopted in the medical research (McCaffery et al., 2003) and public health discipline (Herzog et al., 2013; James et al., 2005; World Health Organization, 2007). The KAI model was used to identify factors influencing behavior and the relationships between knowledge, attitude and behavior change (McCaffery

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et al., 2003; World Health Organization, 2007). McCaffery et al. (2003) addressed the knowledge of colorectal cancer and its relationship with attitudes to cancer, and the intention to engage in early detection behaviors in the UK. To increase the knowledge could reduce the negative public perceptions of cancer which would positively affect the intention to participate in screening. Herzog et al. (2013) analyzed the relationships between the healthcare workers' knowledge, attitudes about vaccines and their intention to vaccinate people based on a systematic review. They found that higher knowledge about vaccines and more favorable attitudes toward vaccines are related to higher intention to vaccinate people they served. Accordingly, this study argues that why the maritime students have low intention to work on-board may result from the lack of shipping knowledge, misperceptions in seafaring, and combined with a high perceived risk of ship operations.

Despite the previous studies have been identified the important factors affecting on-board intention such as salary, working condition, and social factors (Chen, 2001; Tai, 2016), the reference group opinions from the parents, friends of the maritime students or shipping professionals are key players in recommending seafaring and encouraging the decision to work on-board. Herzog et al.'s (2013) study, pointed out that there is a significant impact of health professionals and media as the most important source of information on vaccination. Therefore, the reference group opinions to recommend seafaring is crucial. In this context, we posed the following questions: Is there a relationship among reference group opinions, maritime students' shipping knowledge, their attitudes towards seafaring and their intention to work on-board? To answer this question, we performed a conceptual model on the subject to compile the current information and identify the factors affecting the intention of maritime students to work on-board based on the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and the Theory of Planned Behavior (TPB) (Ajzen, 1985, 1991).

TRA which is commonly adopted in the studies of social psychology is a model to explain determinants of intended behaviors (Fishbein and Ajzen, 1975). TRA model consists of six constructs, namely: beliefs and evaluations, normative beliefs and motivation to comply, attitude toward behavior, subjective norm, behavioral intention, and actual behavior. According to TRA, the behavioral intention of a person is determined by his or her attitude towards behavior and subjective norm. Attitude toward behavior refers to an individual's negative or positive feeling about performing the behavior. Subjective norm can be explained as perceived social opinions to perform the behavior (Fishbein and Ajzen, 1975). TPB built on TRA and specifically considers the perceived behavioral control to predict behavioral intention

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(Ajzen, 1991). Many researchers have examined the factors that influence attitude. However, the important factors that should be considered in the seafaring intention - knowledge and reference group opinions – seem to have been ignored in previous studies.

2.1.1 Shipping knowledge

Knowledge is a complex concept, and scholars define it differently, depending in part on what fields they study. Knowledge has been viewed as a strategic resource for organizations to enhance competitive advantage (Grant, 1991; Drucker, 1993; Zack, 1999; Hult et al., 2006). In the field of maritime studies, the knowledge management has been a crucial organizational capability to enhance competitive advantage (Yang et al., 2009). There is still not a comprehensive definition of what knowledge is. One of the common definitions of knowledge is the capacity to acquire the principal, truths, discernment and skill. According to Bellinger et al (2004), knowledge is a collection of information. Ackoff (1999) believed that knowledge is conveyed by education, course, and instruction. Knowledge is the ability to receive the instruction, being familiar with the message, able to retain and transform the instruction to information. After comprehending the meaning of the message, people would able to deal with the knowing things and even predict what will happen next (Bernstein, 2009).

There are a number of publications discussing knowledge management in the shipping industry context (Fei, 2009; Lee and Song, 2015; Yang et al., 2009). For instance, Fei (2009) examined the effects of human mobility on the organizational knowledge based on knowledge management in the Chinese shipping industry. An effective knowledge transfer practices consisted of crucial management dimensions, namely: culture, leadership, and technology. Yang et al. (2009) identified crucial knowledge management enablers in liner shipping. Information technology played an important enabler in knowledge management and positively related to organizational performance. Lee and Song (2015) defined shipping knowledge is a know-how and useful information to increase shipping management. However, the previous studies defined knowledge from a shipping carrier's perspective. The acquisition of shipping knowledge of maritime students mainly come from the educational institutions. "Education is the prerequisite of the knowledge" (Iibrahim, 1995). Students would acquire their shipping knowledge by attending academic courses. There is a lack of empirical studies examining the relationships between shipping knowledge, seafaring attitude, and on-board intention. In this research, the shipping knowledge from a student's perspective consists of the knowledge about ship operations, cargo transportation, maritime law, shipping finance and economic, port

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operations, and international shipping conventions. Students are assumed to be more familiar with shipping knowledge if they take more shipping related courses.

2.1.2 Attitude

Attitude refers to the feelings and behavioral tendencies on an object of an organization. It is the inclination to react in a certain way to a certain situation (Hogg and Vaughan, 2005). Eagly and Chaiken (1993) mentioned that attitude is the degree of favor or disfavor towards an object. Attitudes have been commonly used to be a reliable predictor of intention and behavior in the TRA and TPB models (McCaffery et al., 2003). However, it seems that little research has been paid to the attitude in seafaring. Attitudes toward seafaring, and specifically work at sea, have been shown to vary by social and economic factors such as respect from society, salary, and self-realization (Tai, 2016; Wang, 2005; Yu et al., 2013). In the TRA, attitudes play a moderating factor between individual's beliefs and evaluations and intention (Fishbein and Ajzen, 1975). Social and economic factors are conceived as predictors, exerting their effects on behavior through attitudes (Guo et al., 2006; McCaffery et al., 2003). However, attitude has been little attention given in the seafaring behavior research, and how it impacts on on-board intention and behavior.

2.1.3 Reference group opinion

Reference groups can be defined as people whose opinions, attitudes, behavior, and values are used by an individual as the guidance for his or her behavior, values, and conduct, such as family, friends, or colleagues (Kurtz, 2016). In the context of marketing, consumers will usually ask the perceptions of their reference groups before they make a purchase decision. Park and Lessig (1977) explained that a reference group meant an actual group that had significant relevance upon one's aspiration, examination or even behavior. A reference group is a person or a group of people who significantly influence an individual's intended behavior (Bearden and Etzel, 1982). Accordingly, we propose that reference group opinion could significantly influence the maritime students' decisions of work on-board.

2.1.4 On-board intention

Intention is the belief, desire and the perception of a person. Behavioral intention is an important predictor of an individual's subjective probability to perform in a given behavior (Ajzen *et al*., 2009). Intention should be stable and has a certain degree of stability, that is, intention could not be changed easily (Cohen, Morgan and Pollack, 1990). Ajzen (1991) revealed that particular behavior was determined by an intention to perform certain behavior.

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Guo et al. (2006) examined the maritime students' intention to work on-board ships based on one item using an 11-point scale of probabilities of joining seafaring. Their research findings pointed out that the learning schemes of the students positively influenced their intention to work on-board. In this research, the measures of on-board intention were based on the students' participations in shipping related courses, qualification exams, and willing to be a seafarer after graduation.

2.2. Research hypotheses

The research model of this study is illustrated in Figure 2. It shows the impact of three antecedent factors including shipping knowledge, seafaring attitude, and reference group opinion on maritime students' on-board intention in Hong Kong. The model proposes the effects of shipping knowledge on seafaring attitude and on-board intention. Note that the shipping knowledge and reference group opinion are expected to influence indirectly the on-board intention through its effects on seafaring attitude. The network of relationship among the variables in the model and the rationale for the proposed linkages are elaborated below.
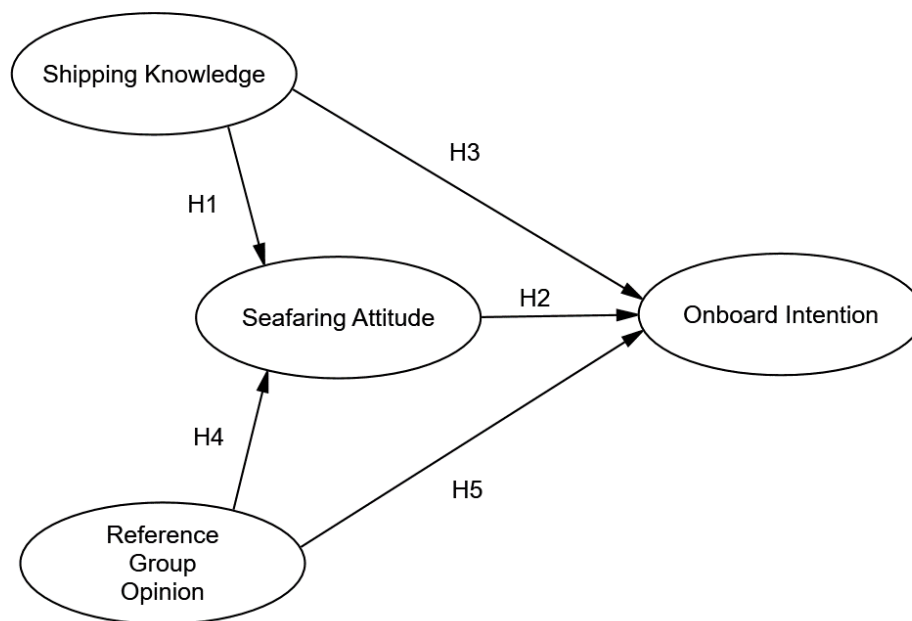

Figure 2 Research Model

Knowledge is one of the factors influence attitudes towards work on-board. Prior studies evidenced the relationships between knowledge and attitude (Aertsens *et al.,* 2011; Bang et al., 2000; Helland et al., 2013; Sung et al., 2015). Aertsens *et al.* (2011) illustrated that the higher level of organic food knowledge was related to more positive attitudes towards organic food.

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Sung et al. (2015) studied that the nursing students with more knowledge might develop more positive attitude towards sexual health care. Helland *et al. (*2013) identified similar result that an individual who had comfortable attitude towards sexuality tend to hold more relevant education. Experience and knowledge may guide to the formation of attitude (Bruess and Greenbreg, 2008). Accordingly, this study suggests that the higher shipping knowledge level would result in more positive attitude towards seafaring. When people gain more knowledge on seafaring, they can understand that seafaring is not a high-risk work. Some common misunderstanding on seafaring can be corrected during the education of shipping knowledge. Therefore, this study hypothesizes that:

H1 Shipping knowledge positively influence students' seafaring attitudes.

According to the theories of TRA and TPB (Ajzen, 1985, 1991; Fishbein and Ajzen, 1975), an individual's intention can be explained by his or her attitude (Raudsepp et al., 2010). Schultz and Oskamp (1996) found a positive relationship between undergraduates' attitudes of environmental concern and intention to perform a recycling. Ng and Rahim (2005) revealed that attitude was one of the crucial factors to influence the intention to practice computer security. Hsu and Lu (2004) examined the reasons why people played on-line games. Attitude significantly influenced the intention to play on-line games. Accordingly, if the students have a positive attitude towards seafaring and they confront with the opportunities to work on-board, then they will actually behave in a certain way participated in their subject choices such as navigation, shipping finance, ship and port operations. Therefore, this research posits that:

H2 Seafaring attitude positively influences maritime students' on-board intention.

The notion of knowledge has in particular been discussed in the TRA (Fishbein and Ajzen, 1977). According to the TRA, attitude is determined by a group of beliefs and evaluations. Beliefs are based on knowledge, or that one's perceives to be true. Shipping knowledge is referred to the understanding, information, and skills of shipping operations learnt or acquired through education or experience. Guo et al. (2006) found that the maritime students' learning schemes significantly influenced their intention to work on-board. Education and training schemes were suggested to foster the intention of the maritime students to join seafaring. The influence of knowledge on intention has been discussed in other research disciplines (Bang et al., 2000; Mihalik et al., 2013; Zaller et al., 2005). Bang et al. (2000) examined the influence of consumer knowledge on attitude toward renewable energy based on the TRA. They

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concluded that the marketing efforts should be paid attention on building consumer knowledge through information-based campaigns to increase beliefs of using renewable energy.

Zaller *et al.* (2005) studied the blood donation revealed that the potential donors might have higher intention to donate blood when the availability of correct information on donation was increased. Mihalik *et al.* (2013) examined the influence of knowledge on the athletes' concussion-reporting behavior in a high school. Athlete knowledge was significantly related to the people reporting of recalled events. However, a better understanding of a shipping knowledge does not lead to a decision to join seafaring career for maritime students, rather it provides 'informed' decision which could be positive or negative. Therefore, this research hypothesizes that:

H3 Shipping knowledge significantly influences maritime students' on-board intention.

Reference group is highly related to one's racial attitudes and behavior (Fendrich, 1967). Reference group opinion influences the individual attitude and behavior (Walsh *et al*., 1976). Lee (1991) suggested that if a person had high motivation to follow the group norms, then this individual had a group-determined attitude. Bock *et al.* (2005) indicated that the norms related to knowledge sharing might have some extent to modify an organizational member's particular attitude towards knowledge sharing. These studies have highlighted the importance of the reference group opinion towards individual attitude formation. This paper assumes that the reference group opinion in favor on-board career could influence students' attitude towards work on-board. Therefore, this research posits that:

H4 Reference group opinion significantly influences on maritime students' seafaring attitude.

Thai et al. (2013) examined the seafarer shortage problem in Singapore. Parents' decisions were considered in the attraction of the seafaring career. Guo et al.'s study (2006) proposed that the social factor such as family, teacher, and friends' opinions influenced maritime students' decisions to enter seafaring. The reference group influence is suggested by Park and Lessig (1977), Terry and Hogg (1996), and Wang and Lin (2011). Wang and Lin's (2011) study pointed out that the social factors, such as opinions from surrounding people, could significantly affect the bloggers' usage intention. Park and Lessig (1977) analyzed the influence of reference group on brand selection between students and housewives. Students were more susceptible in terms of the influence of reference groups on brand selection than housewives. Terry and Hogg (1996) found that the perceived norms of the reference group positive associated with students' health-related and behavioral intention. Accordingly, this

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research proposes that the social influence, particularly references opinion could have a significant effect on students' seafaring intention. Families and friends' encouragement on seafaring careers would promote the students' work aboard ships. It is understandable that the peers such as friends have a dominant influence on the behavior of a youngster (Ward, 1974). Through the support from the social context, the seafaring determination of the people could be reinforced. We therefore hypothesize the following:

H5 Reference group opinions significantly influence on maritime students' on-board intention.

3. Methodology

3.1. Measures

Data collection of this study was obtained from a questionnaire survey. According to the theoretical background of previous studies, the 17 measurement items are classified into four latent variables: shipping knowledge, seafaring attitude, reference group opinion and on-board intention. Seven items in shipping knowledge are designed based on students' knowledge level of maritime subjects offered by the programs of International Shipping and Transport Logistics (ISTL) at PolyU and MSTI. Other items were drawn from previous related studies (Guo *et al*., 2012; Guo *et al*., 2006; Chen, 2001; Lin, 2015). To measure validly the intention of the sample group, measurement items in on-board intention are ordered in a steady progress, from the intention to learn related knowledge to the intention to work on-board. The four items in on-board intention are ordered as "I am interested in courses related to seafaring", "I would like to attend seafarer qualification exam", "I would like to take an intern as seafarer", "Without considering external factors (e.g. families' opinion), I would like to choose to be a seafarer."

Two versions of the questionnaire were produced, a Chinese version for Chinese readers, and an English version for readers of other languages. The questionnaires were verified by the supervisor of this research, who has plentiful research experiences in related field. The questionnaire was conducted based on a five-point rating scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). For the ethical issues, participants were reminded that the questionnaire survey was entirely voluntary. The information gathered in this survey would be treated in the strictest confidence and be used only for research purpose. Thus, no individual person could be identified from the survey.

3.2. Sample

The population of this research is maritime students in Hong Kong. Two education institutions offering related academic programs are selected, including the PolyU and the MSTI. The

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sample in this research consists of 292 students in 4-year bachelor degree program (BBA) majoring in ISTL; and 119 students in 2-year higher diploma (HD) majoring in International Transport Logistics (ITL) in PolyU; and 109 students in 2-year HD majoring in Maritime Studies in MSTI. Students majoring in these academic programs have the potential to become seafarers after their study. We collected 243 responses including 135 respondents from ISTL (PolyU), 53 from ITL (PolyU), and 55 from MSTI, respectively. The response rate was 47.7%.

Table 1 shows the demographic composition of the respondents. ISTL and Global Supply Chain Management are 4-year bachelor programs. 6.2% of the respondents are from other bachelor programs, such as engineering. The reason is that some engineering students took subjects in the Department of Logistics and Maritime Studies as free electives. ITL is a 2-year higher diploma program in PolyU. The Maritime Studies is a 2-year HD program in MSTI. Almost half of the respondents, namely 48%, are majoring in ISTL, followed by a quarter of students from MSTI.

Table 1. Respondents' profile

	Number of respondents	Percentage of respondents
Gender		
Male	124	51.0
Female	119	49.0
Grade		
Year 1	87	35.8
Year 2	50	20.6
Year 3	53	21.8
Year 4	53	21.8
Education institutions		
PolyU	188	77.4
MSTI	55	22.6
Family monthly disposable income[a]		
Less than 5,000	26	10.7
5,000 - 9,999	23	9.5
10,000 - 29,999	92	37.9
30,000 - 49,999	34	14.0
50,000 - 69,999	14	5.8
More than 70,000	11	4.5

Note: a represents 43 respondents (17.6% of respondents) did not provide this information.

The number of year 1 students exceeds other grades for 15%. This may be because the HD students majoring in ITL and MS are studying for 2 years only, and the class attendance rate

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of year 1 students is higher than the others. More than 60% of the respondents have taken less than three maritime courses, from which can be implied that these students have limited know-how in seafaring.

Regarding the family disposable income, 17.6% of the respondents gave no replies, which may affect the accuracy of conclusion to some extent. The reason for the low response rate could be that the respondents might have considered that the family disposable income was an individual privacy matter. Another reason may be that students are not aware of the income distribution in their family.

3.3. Research methods

Methods of this research include instrument development, an exploratory factor analysis, a confirmatory factor analysis, a test of a structural model and a one-way ANOVA analysis. According to the hypotheses, this research examines four latent variables, which are shipping knowledge, seafaring attitude, reference group opinions and on-board intention. Instrument development includes steps of literature review, theory research, hypotheses development and questionnaire design. The questionnaire was designed based on prior studies and interviews with five shipping practitioners in industry and five professionals in university.

Exploratory factor analysis (EFA) is used to classify different measure items in the questionnaire into factors. The factors in the latent variables and variance could be identified. A reliability test for each factor is processed based on Cronbach's Alpha which is one of the most widely used metrics for reliability evaluation (Koufteros *et al.*, 2001). The Cronbach's Alpha should exceed 0.7 to prove reliability (Lehman, 2013). For latent variables with more than one factor, the new factors will be observed variables and be used in the next step. For latent variables with only one factor, the original measurement items in the questionnaire will become observed variables in the next confirmatory factor analysis (CFA).

The CFA processes a measurement model which is used to test the validity of factors. Statistical tests can then be employed to determine whether the data confirm the substantively generated model (Long, 1983; Garver and Mentzer, 1999). In other words, this model tests whether there is a significant relationship between observed variables and latent variables. Before the result of CFA being analyzed, a fit test determines whether the model of this research is acceptable. Kline (2016) recommends the model is fit if Chi-Square/Degree of Freedom, goodness-of-fit index (GFI), adjusted goodness-of-fit-index (AGFI), comparative fit index (CFI), root mean square residual (RMR), root mean square error of approximation (RMSEA) are all acceptable.

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The CFI, NFI and GFI have to be greater than 0.9. The RMR should be smaller than 0.05. The RMSEA should be smaller than 0.08. It will be better if Chi-square/Degree of Freedom is smaller than 2 (Hair et al., 2010). The result of CFA includes a factor loading of each observed variable and a value called R^2 to account the influence from latent variables to their observed variables. The result also includes an assessment of average variance extracted to test the validity of each latent variable. The average variance extracted of each latent variable should be larger than the squared correlation between itself and other latent variables. It proves that latent variables could be clearly differentiated and the construct measurement model is effective. Finally, construct reliability of each latent variable describes the reliability of construct measurement model.

The final structural equation model (SEM) comes from the CFA result. A SEM measurement model, basing on the hypotheses, will be designed and processed. With the help of AMOS, the effect between the latent variables, including direct, indirect and total effect, can be decided. The standardized estimates can describe the relationship of latent variables of this model quantitatively. Hypotheses of this research can be verified then. Each respondent is different in the demographic characters. Because of that, the sample can be divided into different groups according to the demographic information. A one-way ANOVA test is added to compare the on-board intention between different demographic based groups.

4. Results

4.1. Descriptive analyses

The responses of the mean and standard deviation on 17 items are given in Table 2. For shipping knowledge, the mean slightly fluctuates around 3.0. Only two items have the mean over 3.0 based on a 5-point scale. These are: "I understand different patterns of ship operation" and "I understand different patterns of cargo transportation." It is reasonable because the knowledge is taught in a compulsory subject of all the respondents. Regarding the seafaring attitude, although the respondents held a positive image of seafaring jobs, they still found the seafaring jobs not attractive (whose mean is lower than 3.0). Table 2 indicates that the degrees of respondents' intention to work on-board not being influenced by family (mean = 2.905) are lower than friends (mean = 3.152). The respondents were asked to indicate their on-board intention in terms of courses preference, seafarer qualification exam, internship, and choose to be a seafarer. The results show that the mean score of the intention to take related courses was 3.156. However, the mean score of the intention to take seafarer qualification exam and seafaring internship were 2.942 and 2.930, respectively. Respondents showed their lowest

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agreement in the intention of "being a seafarer" (mean = 2.708). Not surprisingly, because the majority of surveyed students enrolled in the ISTL programs (Bachelor and Higher Diploma) at the Business School, PolyU. Logistics and maritime businesses are their major career choices. Students would like to take maritime courses because they may want a land-based job that requires knowledge in nautical science or marine engineering.

Table 2 Mean and standard deviation scores for measurement items

	Mean	Standard deviation
Shipping knowledge		
I understand different patterns of ship operation.	3.416	0.826
I understand different patterns of cargo transportation.	3.391	0.823
I understand maritime law and carriage law.	2.860	0.952
I understand knowledge of navigation.	2.959	0.966
I understand knowledge of shipping finance and economic.	2.630	0.915
I understand knowledge of port and shipping businesses.	2.835	0.875
I understand international shipping rules and conventions.	2.794	0.931
Seafaring attitude		
SA1: I think working on-board as seafarer is safe.	3.235	0.913
SA2: I think being a seafarer is attractive.	2.914	1.055
SA3: I am positive of being a seafarer.	3.202	1.002
SA4: I will talk to others being a seafarer is good.	3.210	0.854
Reference group opinions		
RO1: My intention to work on-board will not be influenced by opinions of my family.	2.905	1.030
RO2: My intention to work on-board will not be influenced by opinions of my friends.	3.152	0.948
On-board intention		
OI1: I am interested in courses related to seafaring.	3.156	0.909
OI2: I would like to attend seafarer qualification exam.	2.942	1.074
OI3: I would like to take an intern as a seafarer.	2.930	1.132
OI4: Without considering external factors (e.g. families' opinion), I would like to choose to be a seafarer.	2.708	1.080

Note: The mean score was based on a 5-point scale (1=strongly disagree, 5=strongly agree)

4.2. Exploratory factor analysis

The exploratory factor analysis with VARIMAX rotation was conducted to recognize the factors behind the questions. The factor analysis of four latent variables is listed below. Items with a factor loading greater than 0.5 on one factor will be extracted on this factor (Hair, 2014). The factor with Eigenvalues larger than 1 will be chosen. Factor analysis of shipping knowledge is presented in Table 3. Two factors, whose Eigenvalue is larger than 1, are identified and they account for 72.3% of the total variance. The two factors will be the two observed variables of shipping knowledge in the CFA.

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(1) Factor 1: Shipping Management knowledge

Factor one accounts for 38.12% of the total variance. It contains four items: "I understand knowledge of shipping finance and economic", "I understand international shipping rules and conventions", "I understand maritime law and carriage law" and "I understand knowledge of port and shipping businesses." These questions mainly measure the knowledge of the respondents related to shipping business and operations. Therefore, we identified this factor as "shipping management knowledge".

(2) Factor 2: Navigation knowledge

Factor two accounts for 34.14% of the total variance. It contains three items, namely, "I understand different patterns of ship operations", "I understand different patterns of cargo transportation", and "I understand knowledge of navigation." We found that the item "I understand knowledge of navigation" has loading factors of 0.429 and 0.590 on Factor 1 and Factor 2, respectively. We deleted the cross loadings of this item to avoid effect on the final result. Table 4 indicates that the first factor (shipping management knowledge), after the elimination of the items as stated above, ranged from 0.678 to 0.849 and the second factor (navigation knowledge) ranged from 0.913 to 0.928. The percentages of variance explained of these two factors were 42.84% and 33.95%. These two factors accounted for 76.79% of the variance.

Table 3 Factor analysis of shipping knowledge

Shipping knowledge	Factor 1	Factor 2
Factor 1 (*Shipping management knowledge*) (SK1)		
I understand knowledge of shipping finance and economic.	0.842	0.152
I understand international shipping rules and conventions.	0.801	0.287
I understand maritime law and carriage law.	0.770	0.238
I understand knowledge of port and shipping businesses.	0.661	0.460
Factor 2 (*Navigation knowledge*) (SK2)		
I understand different patterns of ship operation.	0.192	0.928
I understand different patterns of cargo transportation.	0.256	0.899
I understand knowledge of navigation.	0.429	0.590
Eigenvalues	4.042	1.016
Percentage of variance	38.117	34.141

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Table 4 Further Factor analysis of shipping knowledge

Shipping knowledge	Factor 1	Factor 2
Factor 1 (*Shipping management knowledge)*		
I understand knowledge of shipping finance and economic.	0.849	0.118
I understand international shipping rules and conventions.	0.811	0.289
I understand maritime law and carriage law.	0.775	0.231
I understand knowledge of port and shipping businesses.	0.678	0.424
Factor 2 (*Navigation knowledge*)		
I understand different patterns of ship operations.	0.223	0.928
I understand different patterns of cargo transportation.	0.287	0.913
Eigenvalues	3.603	1.005
Percentage of variance	42.841	33.952

Factor analysis was conducted to identify the constructs of "seafaring attitude", "reference group opinion", and "on-board intention." Results indicated all items of these constructs to a single factor. Seafaring attitude items accounted for 63.40% of the total variance, containing all the four questions, namely: "I think being a seafarer is attractive", "I am positive of being a seafarer", "I will talk to others being a seafarer is good" and "I think working on-board as seafarer is safe." Reference group opinions items accounted for 80.37% of the total variance, including "My intention to work on-board will not be influenced by opinions of my friends" and "My intention to work on-board will not be influenced by opinions of my families". On-board intention items accounted for 77.9% of the total variance, namely: "I would like to take an intern as a seafarer", "I would like to attend seafarer qualification exam", "Without considering external factors (e.g. families' opinion), I would like to choose to be a seafarer", and "I am interested in courses related to seafaring."

4.3. Reliability test

Cronbach's Alpha statistic is used to evaluate the reliability of the previous conducted five factors from the exploratory factor analysis (Koufteros, 1999). Table 5 shows the Cronbach's Alpha values of each factor, all factors have a Cronbach's Alpha value exceeding 0.7, which justifies the result. These factors have satisfied the reliability for basic research (Litwin, 1995).

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Table 5 Reliability test results

Constructs	No. of items	Mean	Standard deviation	Cronbach's Alpha
Shipping management knowledge	4	2.287	0.756	0.841
Navigation knowledge	2	3.404	0.794	0.922
Seafaring attitude	4	3.140	0.761	0.804
Reference group opinions	2	3.029	0.887	0.754
On-board intention	4	2.934	0.928	0.905

4.4. Confirmatory factor analysis

CFA is used in this research to test whether the construct of latent variables in the measurement model are unidimensional, reliable and valid (Hair, 2014). In other words, it tests whether there is significant cause-effect between observed and latent variables in a measurement model. CFA hypothesized model presents the measurement model with four latent variables: shipping knowledge (SK); seafaring attitude (SA); on-board intention (OI) and reference group opinion (RO). Two observable variables are identified and loaded onto the shipping knowledge and named as shipping management knowledge (SK1) and navigation knowledge (SK2); four observable variables are loaded onto the seafaring attitude and named as SA1, SA2, SA3, SA4; four observable variables are loaded onto the on-board intention and named as OI1, OI2, OI3, OI4; two observable variables are loaded onto reference group opinions and named as RO1 and RO2. The detail of items in Figure 3. The straight arrow pointed from the latent variables to the observed variable shows the causal effect of the latent variable on the observed variable (Lu et al., 2007). The curved arrows between the two latent variables indicate the correlation between the latent variables. The factor loadings are set as the standardized factor loading, which is setting one of the loadings in each construct as 1.0, so that all other factor loadings are between 0 and 1, to make the constructs comparable (Koufteros, 1999). As the Chi-square statistic CMIN/DF is 1.878, which is smaller than 2 (Hair et al., 2010), the Chi-square test of this model is acceptable. The CFI is 0.973, GFI is 0.941, the AGFI is 0.904 after making an adjustment of degrees of freedom relative to the number of variables. These three indexes are greater than 0.9, which is satisfied for model fitness. The AGFI indicates 90.4% of the variance and covariance of the observed data can be predicted by this estimated SEM model.
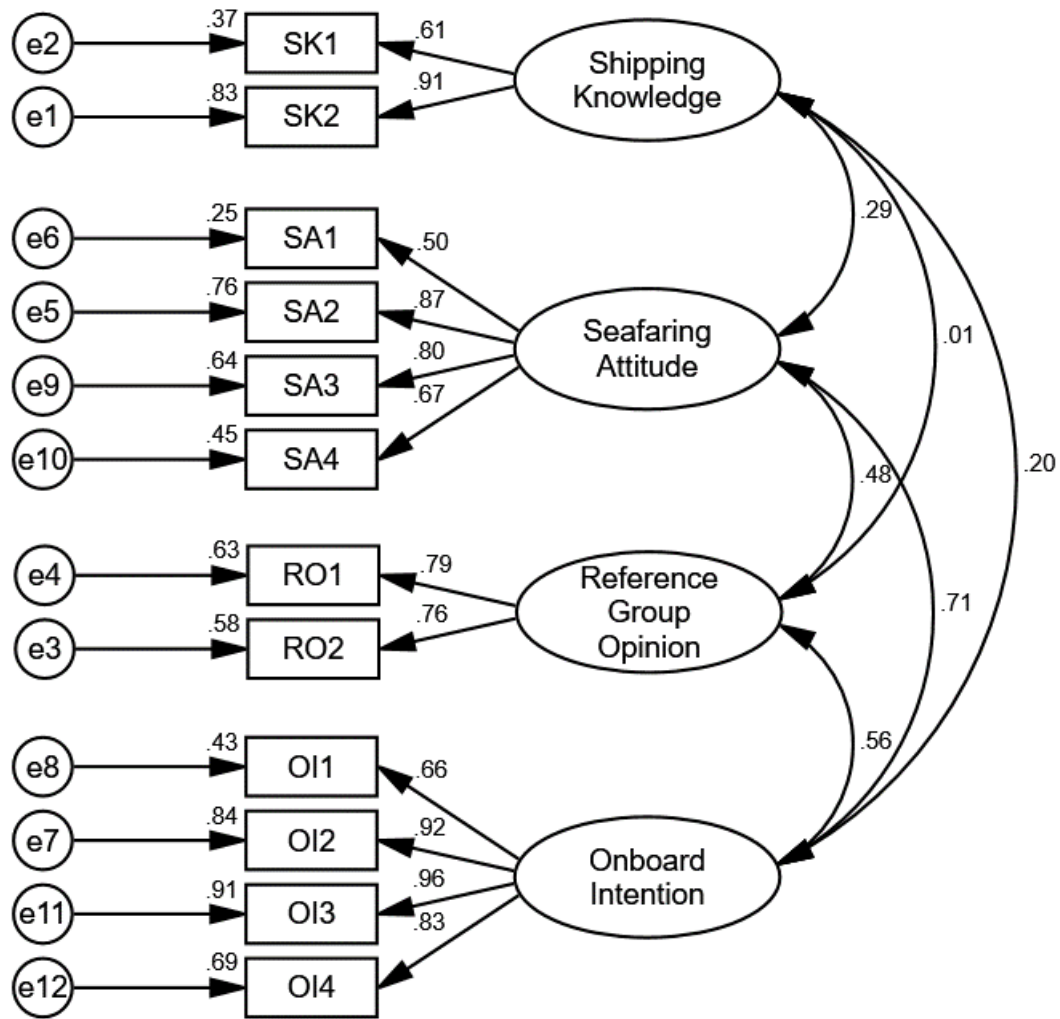
Figure 3 CFA measurement model

4.5. Convergent validity and items reliability

In Table 6, T-value, which is shown as critical ratio, is calculated by standardized factor loading divided by standard error. At 0.05 level of significance, statistical significance is implied if a T-value is greater than 1.96 or smaller than -1.96 (Koufteros, 1999). With a statistical significance, the factor loading explains the intensity of evidence that the observed and latent variables have relationships. The larger the factor loading, the stronger the evidence. R^2, as the square of factor loading, is used to measure the reliability of observed variables. It accounts for the influence from the latent variables to the observed variables. R^2 is accepted if it is larger than 0.3.

Table 6 Estimates, standard errors, critical ratios and R^2 for the proposed model

Latent variable item	Standardized factor loading	Standard error	Critical ratio	R^2
Shipping knowledge				
SK1	0.610	0.193	3.310	0.372
SK2	0.909	-	-	0.825
Seafaring attitude				
SA1	0.500	0.063	7.846	0.250
SA2	0.872	-	-	0.760
SA3	0.799	0.066	13.137	0.639
SA4	0.671	0.058	10.769	0.450
Reference group opinions				
RO1	0.794	0.155	7.269	0.639
RO2	0.765	-	-	0.577
On-board intention				
OI1	0.658	0.049	12.378	0.429
OI2	0.917	-	-	0.839
OI3	0.956	0.041	26.504	0.913
OI4	0.832	0.049	18.608	0.687

Note: SK1: shipping management knowledge, SK2: Navigation Knowledge, SA1: I think being a seafarer is attractive. SA2: I am positive of being a seafarer, SA3: I will talk to others being a seafarer is good, SA4: I think working onboard as seafarer is safe, RO1: My intention to work onboard will not be influenced by opinion of my friends, RO2: My intention to work onboard will not be influenced by opinions of my families. OI1: I would like to take an intern as a seafarer, OI2: I would like to attend seafarer qualification exam, OI3: Without considering external factors (e.g. families' opinion), I would like to choose to be a seafarer, OI4: I am interested in courses related to seafaring.

4.6. Discriminant validity

The discriminant validity proves that the latent variables distinguish from each other and these variables have no significant cross effect. It can be tested by comparing the average variance extracted (AVE) with the squared correlation (Fornell and Larcker, 1981). To get the acceptable discriminant validity, it is sufficient to have the AVE larger than the squares of squared correlation of each latent variable. However, for more accurate evidence, the AVE should larger than the squared correlation. In Table 7, the average variance extracted of the latent variables are presented. Every latent variable has an AVE larger than the squared correlations between this latent variable and others. This accurately proves the discriminant validity of this model.

4.7. Construct reliability and variance extracted measures

The consistency of the construction measurement is measured by construct reliability. A construct with high reliability means that indicators in it are highly inter-correlated and measure the same construct (Lu *et al*. 2007). In Table 8, the construct reliability of shipping knowledge, seafaring attitude, reference group opinions and on-board intention are 0.742, 0.727, 0.756 and 0.909 respectively. The results of all constructs are greater than the recommended level of 0.7 (Hair, 2014), showing a good intragroup uniformity of contribution.

Table 7 Assessment of average variance extracted and squared correlation

Measure	AVE	Shipping knowledge	Seafaring attitude	Reference group opinions	On-board intention
Shipping knowledge	0.599	1.000			
Seafaring attitude	0.520	0.294 (0.085) [a]	1.000		
Reference group opinions	0.756	0.013 (0.000)	0.479 (0.228)	1.000	
On-board intention	0.717	0.205 (0.040)	0.707 (0.500)	0.562 (0.314)	1.000

Note: Average variance extracted = (sum of squared standardized loadings)/[(sum of squared standardized loadings) + (sum of indicator measurement error)].
All correlations are significant at the level of 0.001
[a] Squared correlation

Table 8 Descriptive statistics and construct reliability

Measure	Mean	Standard deviation	Construct reliability
Shipping knowledge	3.092	0.683	0.742
Seafaring attitude	3.140	0.761	0.727
Reference group opinions	3.029	0.887	0.756
On-board intention	2.934	0.928	0.909

Note: The mean score was based on a 5-point scale (1=strongly disagree, 5=strongly agree) Construct reliability = (sum of standardized loadings)^2 / [(sum of standardized loadings)^2 + (sum of indicator measurement error)].

4.8. *Results of hypotheses testing*

The result in Figure 4 is the basis of testing the hypotheses. As the Chi-square statistic CMIN/DF is 1.832, which is smaller than 2 (Hair *et al*., 2010), the Chi-square test of this model is acceptable. The CFI is 0.974, the GFI is 0.943 and the AGFI is 0.909 after making an adjustment of degrees of freedom relative to the number of variables. These three indexes are larger than 0.9, proving the fitness of the model. AGFI indicates 90.9% of the variance and covariance of observed data can be predicted by this estimated SEM model.

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Table 9 presents the relationship between each indicator. Shipping knowledge is positively related to the seafaring attitude. Hypothesis 1 is supported by the result based on a t-test (estimate = 0.291, p<0.05). Hypothesis 2 that the attitude on seafaring is positively related to the intention of undertaking seafaring, is also justified (estimate = 0.554, p<0.01). However, Hypothesis 3 that the knowledge on seafaring is positively related to the intention of undertaking seafaring, is not supported as the p-value is greater than 0.05. The results indicate that Hypothesis 4 "Reference group opinions has a positive impact on seafaring attitude" is supported with an estimate of 0.477 and the p-value is smaller than 0.001. The results also find that the reference group opinion has a positive impact on the intention to undertake seafaring jobs. Therefore, Hypothesis 5 is justified (estimate = 0.296, p<0.01).

In addition, the direct and the indirect effects of shipping knowledge, attitude, and reference group opinion on students' on-board intention were examined. Table 10 shows that reference group opinion had the strongest total effect on on-board intention of maritime students, followed by seafaring attitude and shipping knowledge. The standardized coefficient of total effect for each was 0.560, 0.554, and 0.161, respectively. Although the direct effect of shipping knowledge on on-board intention was not significant in this study, shipping knowledge had an indirect positive effect on on-board intention via seafaring attitude. Results indicated that reference group opinion had a positive effect on seafaring attitude and an indirect effect on on-board intention.
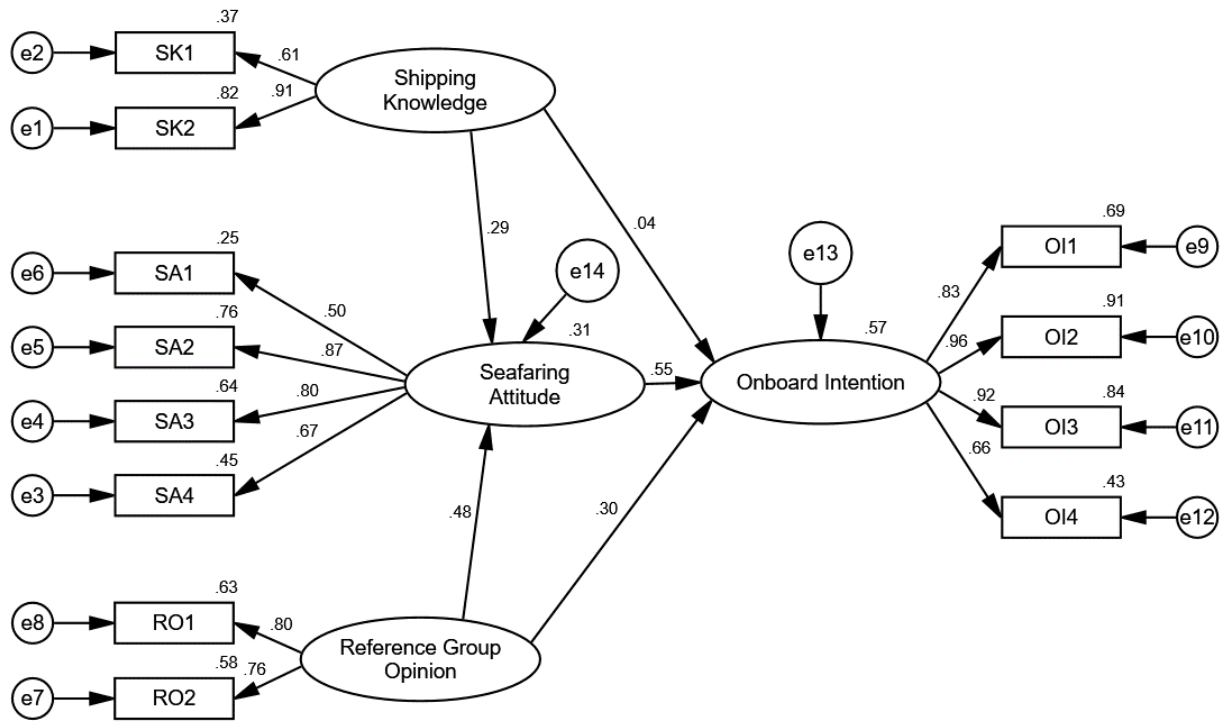
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Figure 4 The SEM model.

Table 9 Results of the structural equation modeling

Variables	Standardized estimate	Standard error	Critical ratio
H1 Shipping knowledge —> Seafaring attitude	0.291*	0.082	2.812
H2 Seafaring attitude —> On-board intention	0.554**	0.133	6.536
H3 Shipping knowledge —> On-board intention	0.039	0.073	0.675
H4 Reference group opinion —> Seafaring attitude	0.477**	0.070	5.379
H5 Reference group opinion —> On-board intention	0.296**	0.089	4.109

Note: *p<0.05, **p < 0.01

Table 10 Results of research hypotheses

Hypotheses	Direct effect	Indirect effect	Total effect
H1 Shipping knowledge —> Seafaring attitude	0.291*	0.000	0.291
H2 Seafaring attitude —> On-board intention	0.554*	0.000	0.554
H3 Shipping knowledge —> On-board intention	0.039	0.161*	0.161
H4 Reference group opinion —> Seafaring attitude	0.477*	0.000	0.477
H5 Reference group opinion —> On-board intention	0.296*	0.264*	0.560

Note: *p<0.05

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4.9.   One-way analysis of variance results

One-way analysis of variance (ANOVA) was conducted to examine the level of agreement of on-board intention according to the respondents' characteristics in this research. Differences in the level of agreement assigned to on-board intention according to gender were examined. Table 11 indicated that the agreement accorded to three on-board intention measure by female and male respondents significantly differed at the 1% significance level, namely: seafarer qualification exam, to choose to be a seafarer, and interest in courses related to seafaring. For male respondents, the most agreement of on-board intention was to choose to be a seafarer, followed by to take an intern as a seafarer, attend seafarer qualification exam, and interest in courses related to seafaring. For female respondents, the most agreement of on-board intention was to take an intern as a seafarer. Conversely, the least agreement on-board intention for female respondents were interest in courses related to seafaring and to choose to be a seafarer. It was not surprising that male respondents had a higher mean score of on-board intention than female respondents.

Table 11 Agreement of on-board intention according to respondent gender

Measures	Mean Female (119)	Mean Male (124)	F-test
OI1 I would like to take an intern as a seafarer.	3.118	3.194	0.442
OI2 I would like to attend seafarer qualification exam.	2.689	3.185	13.648**
OI3 Without considering external factors (e.g. families' opinions), I would like to choose to be a seafarer.	2.622	3.226	18.557**
OI4 I am interested in course related to seafaring.	2.479	2.927	10.898**

  Note: *p<0.01

Table 12 compares the intention difference among the respondents categorized by their academic programs. There are significant differences between groups 1, 2 and 3 for their on-board intention. The on-board intention of group 3, students who study in MSTI 2-year higher diploma program (Maritime Studies), is higher than that of the other 2 groups. That means educational certificate holders from a lower level education institution would have higher intention to apply for on-board jobs. The main reason may be certificate holders from universities rather than lower level education institutions tend to have more career choices in different directions. By contrast, higher diploma students of MSTI have relatively limited access to other business fields and less bargaining power in the market.

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ANOVA analysis was conducted to test perceived differences in the agreement of on-board intention according to the respondents' academic programs. As can be seen in Table 12, results show that the respondents' on-board intention did significantly differ between these three academic programs at the 5% significance level. Even though respondents from the ISTL programs at the PolyU, the programs mainly emphasis on commercial and management matters. The on-board career direction is not compulsory to the bachelor degree holders. Even though for the higher diploma holders of ITL in PolyU, students' career choices can be wider and have chances to transfer their diploma to bachelor degree. While the teaching objects of MSTI curriculum is more practical, the on-board career is the major goal for them. Therefore, it is reasonable that MSTI students have higher on-board intention than other groups.

Table 12 Agreement of on-board intention according to respondents' academic programs

Measures	1(150) 4 years Bachelor PolyU	2 (38) 2 years HD PolyU	3 (55) 2 years HD MSTI	F-test	Scheffe test	Comparison
On-board intention						
OI1	3.000	3.211	3.545	7.729*	(1,3)	3>1
OI2	2.560	2.974	3.964	47.633*	(1,2) (1,3) (2,3)	3>2>1
OI3	2.507	2.947	4.073	56.115*	(1,2) (1,3) (2,3)	3>2>1
OI4	2.333	2.737	3.709	44.383*	(1,3) (2,3)	3>2>1

Note: *p<0.05

Table 13 shows the level of agreement accorded by the respondents' grades. Results indicated a disquieting phenomenon that year one students tend to have higher on-board intention than students of other grades. This general declined intention roughly trend continues from year one to year four. The main reason is that the majority of year one respondents were from MSTI. Year four students at PolyU have more opportunities to choose other shipping businesses for their careers. Most students at PolyU would like to choose a land-based job such as shipping business, chartering, marine insurance, and ship management, rather than to work on-board. This leads to the on-board intention of senior respondents were lower than junior respondents.

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Table 13 Agreement of on-board intention according to respondents' grades

Measures	1(87) Year 1	2 (50) Year 2	3 (53) Year 3	4(53) Year 4	F-test	Scheffe test	Comparison
On-board Intention							
OI1	3.322	3.260	2.981	2.962	2.694		
OI2	3.368	3.080	2.566	2.491	11.426*	(1,3) (1,4) (2,4)	1>2>3>4
OI3	3.391	3.080	2.509	2.453	12.165*	(1,3) (1,4) (2,4)	1>2>3>4
OI4	3.115	2.720	2.358	2.377	8.318*	(1,3) (1,4)	1>4>3

Note: *$p<0.05$

We analyzed the differences in the level of agreement of on-board intention according to the respondents' family disposable income and participation of seafaring courses. However, results indicated that on-board intention did not differ significantly between the categories of family disposable income and participation of seafaring courses at the 5% statistical significance level. This reflects that students' job choices of on-board work were not influenced by their family income in Hong Kong.

We attempted to use the respondents' participation of seafaring courses to understand their shipping knowledge level. The results are consistent with the results of SEM model as indicated in Figure 4. Despite the direct effect of shipping knowledge on on-board intention was not supported in this research. We found that shipping knowledge indirectly influences on the respondents' on-board intention via seafaring attitude.

5. Discussion and conclusions

5.1. Discussion

Although shipping companies have concerned the issue of seafarer shortage for decades, empirical research remains rather limited. We proposed a KAI model to explain maritime students' on-board intention in Hong Kong. We found that shipping knowledge significantly influenced maritime students' seafaring attitude. Thus, the H_1 is supported. This finding suggests that when a student has rich maritime and seafaring-related knowledge, such as navigation knowledge, ship and cargo knowledge and international conventions in the shipping industry, the potential of this student holding a positive attitude to seafaring is high.

The research findings showed that seafaring attitude had a positive influence on maritime students' on-board intention. Thus, the results support H_2. The KAI model in seafaring was

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provedd. In addition, we found that the reference group opinions positively influenced on maritime students' seafaring attitude. Thus, the results support H_4. It suggests that influences from social opinions may deepen or reduce one's attitude toward seafaring. For example, a student's attitude to seafaring may become negative if his friends are all holding a negative judgment for seafaring jobs, even if the original attitude of this student is neutral. In addition, we found that the reference group opinions positively influenced on maritime students' on-board intention. Thus, the results support H_5. The research findings were consistent with previous research of Fendrich (1967) and Walsh et al., (1976). Fourth, the results indicated that shipping knowledge which influenced on maritime students' on-board intention was not significant. Thus, H_3 was not supported in this research. We assume students who interesting the seafaring courses will have higher intention to work on-board. However, students in fact chose seafaring courses for land-base job that required seafaring knowledge. This could lead to shipping knowledge which is not significant influences. In addition, this was not surprising because the similar results were found in prior studies (Badran, 2004; Shitaye, 2017; Zaller et al., 2005). For students in a higher education, they have more opportunities in their career selections. Seafaring is a professional work; however, it may not be recognized as one of best job choices from a maritime student's perspective.

Specifically, differences in the relative agreement of on-board intention according to respondents' gender, academic program, grade, family disposable income and participation of seafaring courses were examined in this research. On-board intention was found to statistically significantly differ by the respondents' gender, academic program, and grade. Not surprisingly, we found that the female respondents had lower on-board intention than the male respondents. According to the studies of Belcher et al. (2003) and Jo (2010), they indicated that the participation rate of female in seafaring only accounted for 1 to 2 percent of the world's 1.25 million seafarers. The difficult elements for female seafarers working on-board including physical difficulties related to job, loneliness, sexual discrimination, marriage, nurturing children, gender inequality, and unequal promotion opportunities (Jo, 2010; Szozda et al, 2014; Thomas, 2004). This leads the lower on-board intention from the female respondents.

5.2. *Suggestions and implications*

This study investigates the effects of shipping knowledge, seafaring attitude, and reference group opinion on maritime students' on-board intention based on the KAI model. The research findings have several important theoretical and practical implications. This study offers a current profile of maritime students' on-board intention. Shipping companies and program

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leaders can use the results of the study to modify their current shipping policy, course subjects, education and training to establish a positive perception of seafaring to alter the concerned social attitude. The research findings show that students' personal attitude and social opinions pose a high level of influence to one's seafaring intention. We suggest that shipping companies could enhance the seafaring intention of the students through improving the reference group opinions and students' personal attitude towards the shipping industry. When it comes to the personal attitude transformation, a concentrated and positive education is essential for the students.

More importantly, insights into the maritime students' perceived differences of on-board intention according to their profiles may be of importance to shipping companies and maritime department for more effectively developing their seafaring marketing strategies. We suggest that shipping companies could promote the welfares of on-board jobs better than other businesses, brighter promotion prospects and safer working conditions. By conveying positive knowledge to students, their attitude to on-board careers might be more favorable. Third, reference group opinion plays an important role to influence maritime students' on-board intention. A positive attitude of reference group (e.g. parent and friends) towards work on-board will increase more maritime students to enter into the industry. We suggest that shipping companies and university program leaders can develop seafaring promotion activities such as ship visiting, job fair, orientation, and ocean camp to increase reference groups' positive opinions in seafaring.

5.3. Limitations and *future research*

The results of this research should be interpreted in light of the following theoretical and methodological limitations. First, we specifically investigated the effects of shipping knowledge, attitude and reference group opinions on on-board intention based on the knowledge, attitude and intention (KAI) model. Maritime students' willingness to work on-board could be affected by the external economic environment (e.g. salary) (Guo et al., 2006; Tai, 2016). Future research should therefore include economic variables in the model.

Second, we found that several respondents did not want to disclose their family disposable incomes. After all, the family disposable income is a sensitive personal information so this is reasonable that the respondents conceal their privacy. Future study could conduct an interview and offer a private environment for the respondents to answer the questionnaire to increase the response rate.

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Third, this research examined on-board intention from a maritime student's perspective. How ship owners prefer to recruit seafarers? Future research on gap analysis between ship owners and maritime students is needed to understand the major factors affecting on-board intention. This will be helpful to clarify the seafaring recruitment issue, particularly for the shortage of seafarers in developed countries. Fourth, this research used a cross-sectional research method, which means all the research data are collected within a specific period of time. Future research could conduct a longitudinal research to track the on-board intention of maritime students. Finally, this research only focused on maritime and logistics students in Hong Kong. Future study could undertake the same issue of seafaring investigation in developed countries such as Japan, USA, and the United Kingdom.

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Appendix

Questionnaire of research

Measurement items

Knowledge

I understand different patterns of ship operation.

I understand different patterns of cargo transportation.

I understand maritime law and carriage law.

I understand knowledge of navigation.

I understand knowledge of shipping finance and economic.

I understand knowledge of port and shipping businesses.

I understand international shipping rules and conventions.

Attitude

I think working on-board as seafarer is safe.

I think being a seafarer is attractive.

I am positive of being a seafarer.

I will talk to others being a seafarer is good.

Reference group opinions

My intention to work on-board will not be influenced by opinions of my families.

My intention to work on-board will not be influenced by opinions of my friends.

Seafaring Intention

I am interested in courses related to seafaring.

I would like to attend seafarer qualification exam.

I would like to take an intern as a seafarer.

Without considering external factors (e.g. families' opinion), I would like to choose to be a seafarer.

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