

National Culture and Human Errors in Container Shipping Operations

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Outline

1. Introduction
2. Theory and research hypotheses
3. Methodology
4. Results of empirical analyses
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1. Introduction

- ➔ Over the past three decades, there has been a significant change in the supply of seafarers for international shipping operations. A new system, called the “flag of convenience” (FOC), emerged and has spread widely in the shipping industry.



➔ The popular nationalities of crew members on board vessels were Chinese, Filipino, Indian, Polish and Russian. The emergence of multinational crews drawn from different countries working on the same ship has important managerial implications for work safety in international container ship operations (Wu and Moris, 2006).



➔ Container shipping services are cargo transportation services provided by liner shipping companies whose cargo-carrying ships operate between scheduled, advertised ports of loading and discharging on a regular basis (Lu et al., 2005; Lu, 2007; Brodie, 1994; Lun et al., 2009). The sea has always been a potentially hazardous and dangerous working environment (IMO, 2006).



→ The loss prevention claims made in recent years as a result of marine accidents, more than 53% of them were attributed to human errors (UK P & I Club, 2004).



➔ According to the ministry of Transportation & Communication (2002), over 56% of maritime accidents in Taiwan resulted from human errors.



➔ Multiculturalism on board could be a factor influencing work safety on ships as cultural difference is very often considered a weakness in ship operations (Theotokas and Progoulake, 2007). Kahveci and Sampson (2001) observed problems related to mixed nationality crews on board among culturally diverse crews.



➔ Progoulaki (2003) observed the impacts of multicultural crews on effective crew management and ship operations in Greek shipping companies. Thus, studying the impact of national culture on work safety in container shipping operations by comparing the behaviours of seafarers from different national cultures is an important research topic, whose findings will contribute to theoretical advancement and managerial practices of shipping operations.



➔ While the antecedents of national culture have been widely discussed in the operations-oriented literature, relatively little research except Theotokas and Progoulaki (2007) and Håvold (2005; 2007) has been conducted on the relationship between work safety in shipping operations and national culture. Filling this research gap, the objective of this study is to investigate the influence of critical national culture dimensions on work safety in shipping operations from the seafarer's perception.



2. Theory and Research Hypotheses

- ➔ Hostede (1980, p. 25) defined national culture as “... the collective programming of the mind which distinguishes the members of one group or society from another ...” Hostede used the data collected by questionnaire surveys from 117,000 employees in a multinational corporation (IBM) and its subsidiaries in 71 countries to examine national cultural differences.



➔ Hofstede (1980) identified four national cultural dimensions, namely power distance, individualism/collectivism, uncertainty avoidance, and masculinity/femininity. In an attempt to link national culture with economic growth,



➔ Hofstede and Bond (1988) added the fifth dimension, Confucian dynamism/long-term orientation. In line with this stream of research, we adopted these five dimensions as the key elements of national culture elements that will affect human errors in shipping operations in our research model (see Figure 1). .



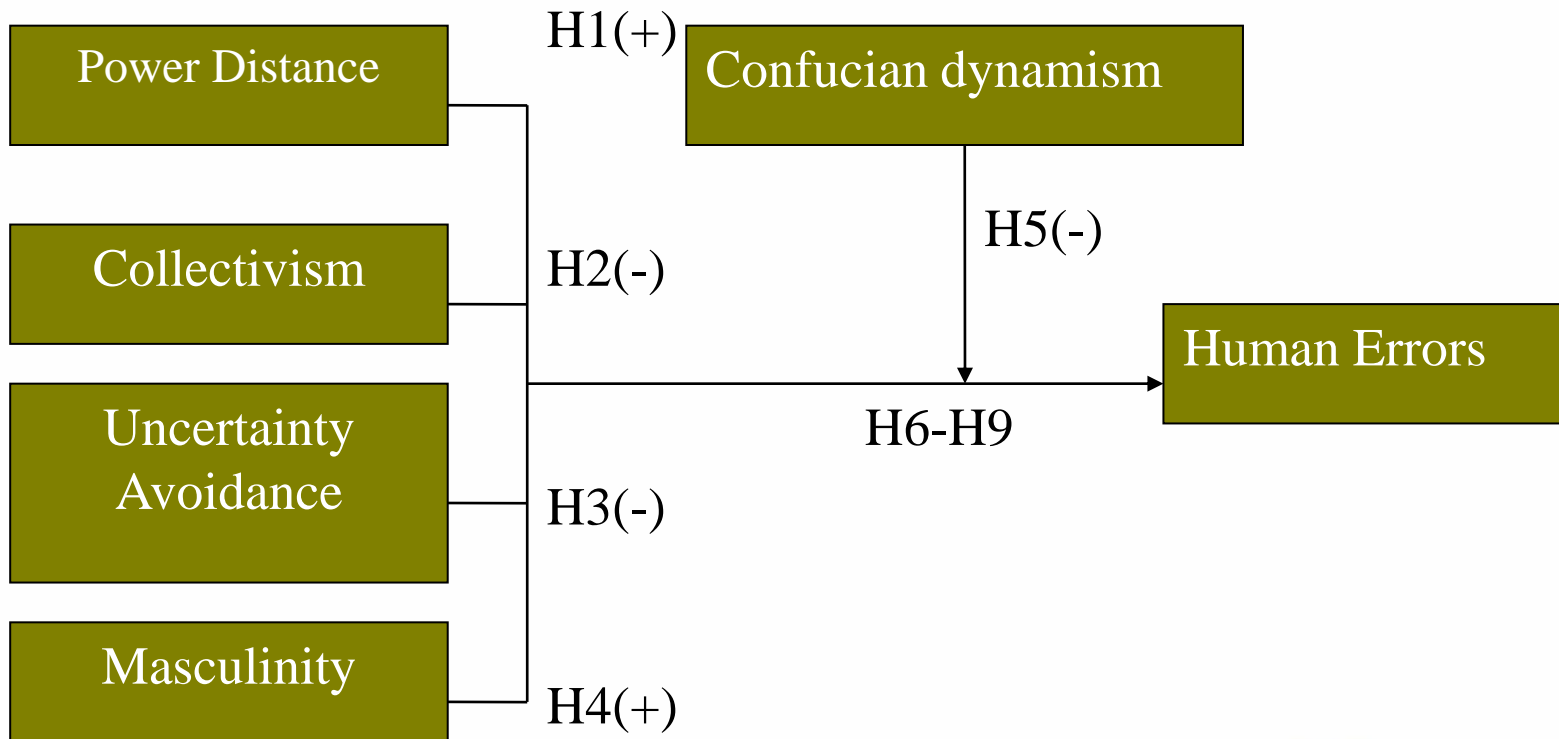


Figure 1 The moderating effects of national culture dimensions on human errors in container shipping operations



➔ Power distance refers to the degree to which people accept interpersonal inequality in power and organizational institutionalization of such inequality (Hofstede, 1991). Hofstede suggested that people who possess high power distance tend to prefer, or at least are more willing to accept, greater centralization of decision-making authority and participate less in decision-making processes (Merchant, 1995).



➔ Håvold (2005, 2007) examined the effect of national culture on work safety in a Norwegian shipping company. Similarly, he found a negative relationship between power distance and seafarers' safety attitudes and behaviour. Accordingly, we propose that:

H1: Power distance as experienced by seafarers is positively related to human errors in container shipping operations.



➔ Chow et al. (2001) also revealed that team members from the collectivist culture are significantly more satisfied with imposed, stretched safety performance standards as they show more concern for collective interests. Therefore, we argue that:

H2: Collectivism as experienced by seafarers is negatively related to human errors in container shipping operations.



- ➔ Uncertainty avoidance is the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity, which leads them to support beliefs promising certainty and to maintain institutional norms for protecting conformity (Hofstede, 1985, p. 347).



➔ Burke et al. (2007) found that uncertainty avoidance is an important factor influencing safety. Furthermore, Håvold (2007) indicated that low power distance and high uncertainty avoidance are positively related to safety orientation in Norwegian shipping companies. Thus, we hypothesize that:

H3: Uncertainty avoidance as experienced by seafarers is negatively related to human errors in container shipping operations.



➔ Masculinity refers to a preference for achievement, heroism, assertiveness, and material success, whereas femininity stands for a preference for relationships, modesty, caring for the weak groups, and quality of life (Hofstede, 1985). High masculine societies place a low value on caring for others, inclusion, cooperation, and solidarity.



➔ The study of Tice and Baumeister (2004) also suggested that high masculinity is negative related to work safety (Håvold, 2007). Following this logic, it is reasonable to posit that a higher level of masculinity will have a positive impact on human errors in container shipping operations. Accordingly, we suggest that:

H4: Masculinity as experienced by seafarers is positively related to human errors in container shipping operations.



➔ Hofstede and Bond (1988) found a fifth dimension of national culture, i.e., Confucian dynamism, based on a study of students in 22 countries around the world, using a questionnaire designed by Chinese scholars. Confucian dynamism are respectful of tradition, fulfilling social obligations, and protecting one's face (Hofstede and McCrae, 2007). According to Nakata and Sivakumar (1996), the positive values of Confucian dynamism attributes include persistence, hard work, thrift, shame, and regard for relationships.



➔ Håvold (2007) found that there is a negative relationship between Confucian dynamism and safety orientation of seafarers on Norwegian-owned vessels based on Hofstede's original index. Therefore, we postulate that:

H5: Confucian dynamism as experienced by seafarers is negatively related to human errors in container shipping operations.



➔ H6: Confucian dynamism strengthens the relationship between power distance and human errors in container shipping operations; specifically, high power distance will foster human errors as experienced by seafarers in container shipping operations when Confucian dynamism is high rather than low.



➔ H7: Confucian dynamism strengthens the relationship between collectivism and human errors in container shipping operations; specifically, high collectivism will lead to fewer human errors as experienced by seafarers in container shipping operations when Confucian dynamism is low rather than high.



➔ H8: Confucian dynamism strengthens the relationship between uncertainty avoidance and human errors as experienced by seafarers in container shipping operations; specifically, high uncertainty avoidance will lead to fewer human errors in container shipping operations when Confucian dynamism is low rather than high.



➔ H9: Confucian dynamism strengthens the relationship between masculinity and human errors in container shipping operations; specifically, high masculinity will lead to more human errors as experienced by seafarers in container shipping operations when Confucian dynamism is high rather than low.



3. Methodology



➔ The data used in this study were obtained from survey respondents working on 124 vessels from 13 of the top 20 global container carriers in the world. These container carriers included APM Maersk, APL/NOL, CMA CGM, Hapag Lloyd, MSC, Yang Ming, Evergreen group, Wan Hai Line, K-line, NYK, MOL, Hanjin, and Hyundai Marine.



- ➔ Container ships were selected randomly from the Port of Kaohsiung in Taiwan. The Port of Kaohsiung, located in the major trade routes - Eastern Asian coastal, Far East/Europe and Transpacific service lines.



➔ The data collection took place from the beginning of March to the end of May 2008. A total of 2,232 questionnaires were distributed to the target respondents who worked on container vessels. Overall, 773 respondents from 13 countries took part in the study, but only three countries had more than 100 respondents, which included the Philippines (267), Taiwan (208), and China (133).



➔ The small samples of respondents from certain countries were excluded in our data analyses because they were far from being effectively representative of the population. These respondents came such countries as Myanmar (29), Korea (24), India (21), Russia (15), Ukraine (12), Japan (3), and others (59). Thus, a total number of 608 usable questionnaire returns were obtained from the survey for data analyses, yielding an effective response rate of 27.7%.



➔ Nearly 44% of the respondents had been working on the ship for ten years. Most of the respondents (51%) were between 30 and 50 years' old. A majority of the respondents believed in Christianity (47.4%), followed by Buddhism (17.1%), and Taoism (5.1%). However, nearly 31% of the respondents did not indicate their religion.



Measures

Power distance

- ➔ I always feel free to express my opinions. (R)
- ➔ I think people are equal in society. (R)
- ➔ I feel easy and comfortable with the supervisor. (R)

Uncertainty avoidance

- ➔ I think clear and detailed organization rules are important.
- ➔ I like to seek more information for making decisions.
- ➔ I like to have elaborate planning before taking actions.



Masculinity

- ➔ I like self-recognition.
- ➔ I think altruistic action is not important.
- ➔ I stress quality of life less than developing a career.
- ➔ Advancing career is more important than developing good relationships with co-workers.



Collectivism

- ➔ I like to be instructed by the supervisor
- ➔ I think respect for rules and regulations is important.
- ➔ I think cooperating with colleagues is important.
- ➔ I think loyalty to organization is important.



Confucian dynamism

- ➔ I prefer a long-term outlook than seeking immediate benefits.
- ➔ I respect social and status obligations within limits.
- ➔ I think perseverance is important in my life.
- ➔ I keep large savings and find opportunities to invest.
- ➔ I think having a sense of shame is important.

Human errors measures:

- ➔ How many numbers of human errors in vessel did you experience last year? _____



4. Results of Empirical Analysis

4.1 Exploratory factor analysis

<Insert Table 1>



4. Results of Empirical Analysis

4.2 National level analysis

<Insert Table 2>



4.3 Hierarchical regression analysis result

<Insert Table 3>



Figure 2 The effect of power distance on human errors by the level of Confucian dynamism for Taiwanese seafarers

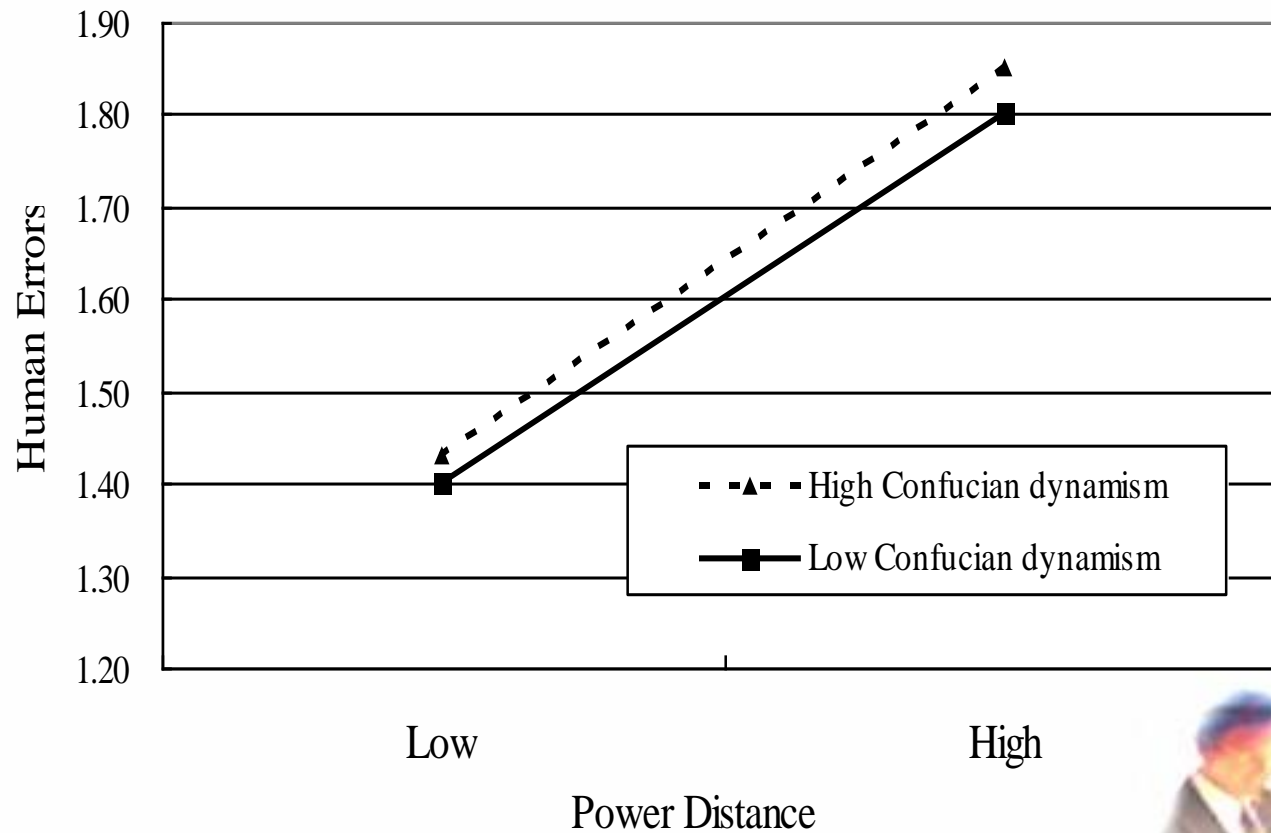


Figure 3 The effect of collectivism on human errors by the level of Confucian dynamism for Taiwanese seafarers

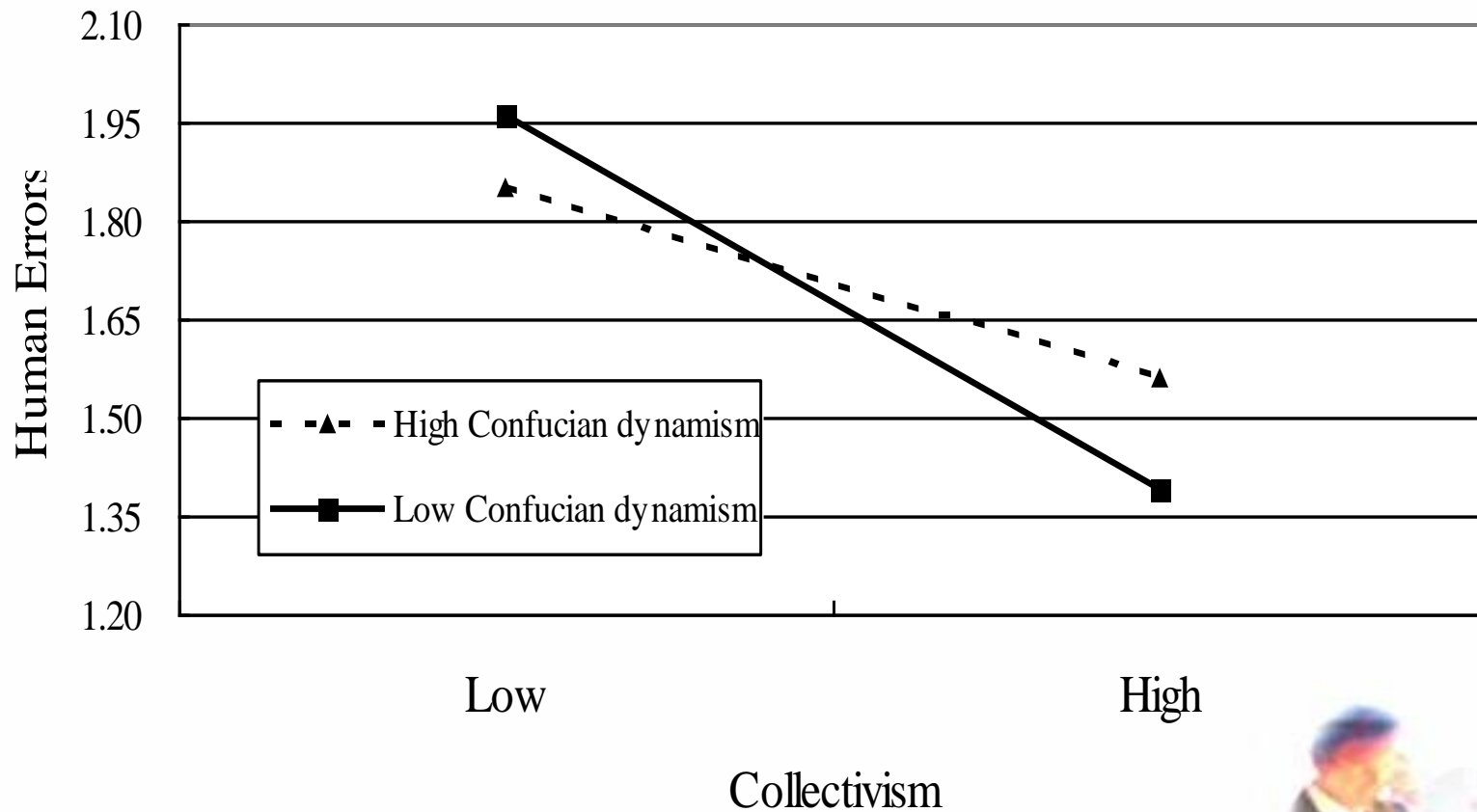


Figure 4 The effect of collectivism on human errors by the level of Confucian dynamism for total seafarers

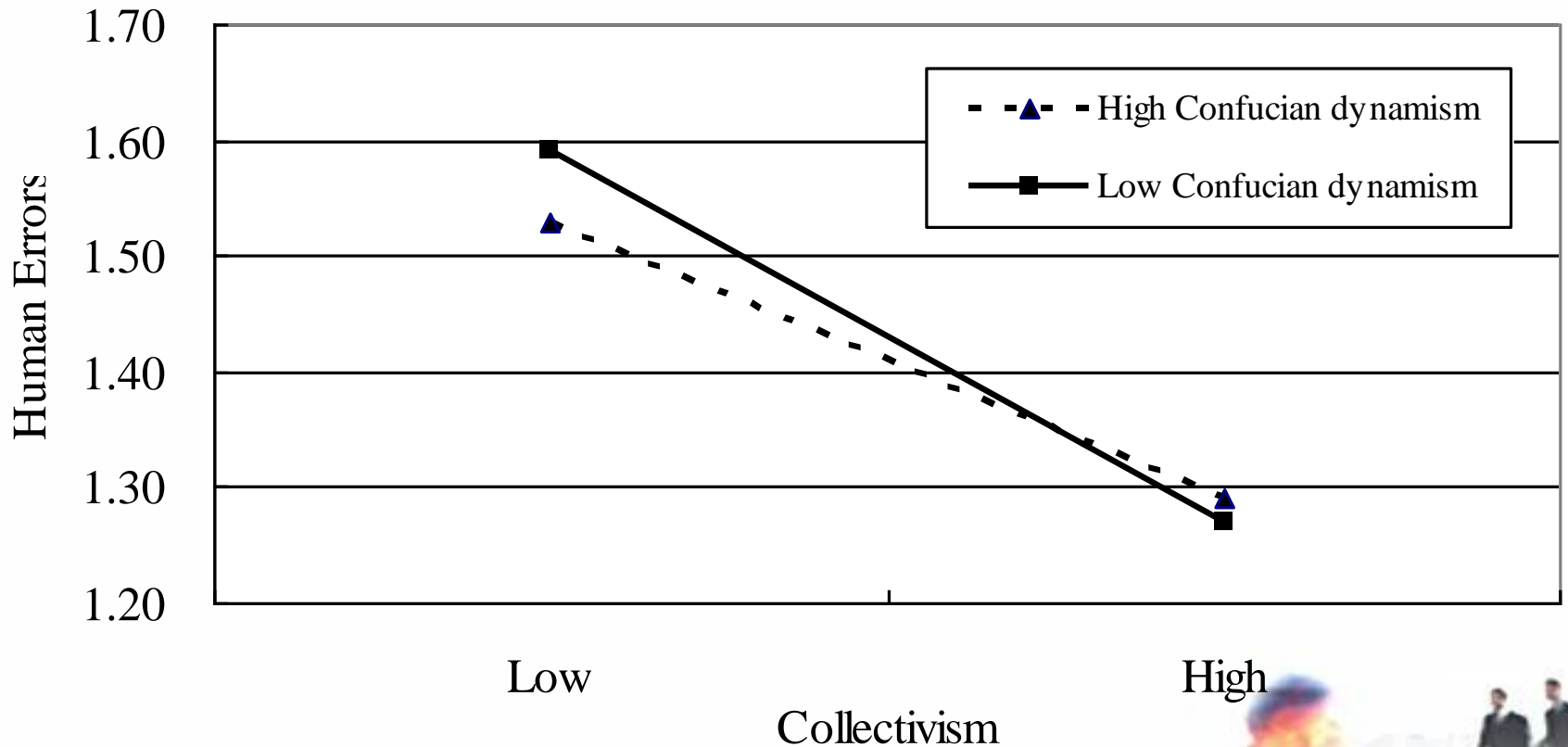
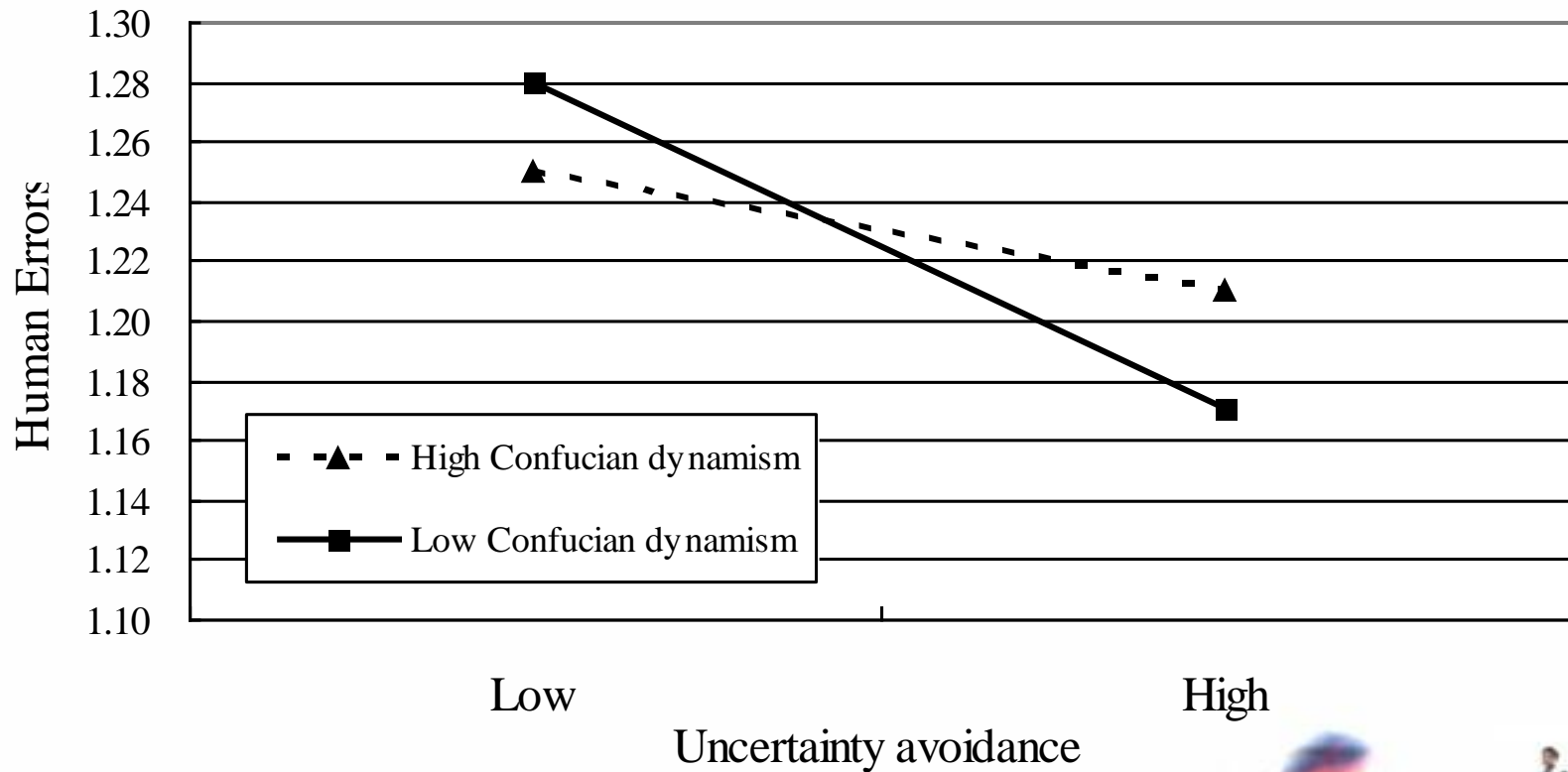


Figure 5 The effect of uncertainty avoidance on human errors by the level of Confucian dynamism for Filipino seafarers



5. Conclusion and Discussions

➔ 5.1 Implications

Several implications can be made from the key findings of this study. First, this study found that Filipino seafarers displayed the highest mean score on collectivism. This finding is consistent with Hofstede's (1984) and Theotokas and Progolaki's (2007) studies. This implies that Filipinos are more obedient, thereby establishing a more co-operative environment when working with seafarers from different cultures.



- ➔ Chinese and Taiwanese seafarers had their highest mean scores on Confucian dynamism, followed by collectivism, masculinity, power distance, and uncertainty avoidance. This finding is not surprising because the Chinese-based culture, typical of such countries/places as China, Hong Kong, Singapore and Taiwan, is regarded as characterized by the Confucian culture (Chow et al., 1999).



➔ The research findings of this study provide support for the beliefs that the high power distance society places a greater emphasis on hierarchy, and that there is an intense and pervasive emphasis on organizational hierarchy and face-giving in the Chinese-based culture.



➔ The findings of this study also indicate that low power distance and high collectivism are negatively associated with human errors. These results suggest that low power distance might be good for work safety. The environment of shipping operations is dynamic. Thus, seafarers should report any factors influencing ship operations to the master to prevent accidents. Seafarers from a low power distance culture are inclined to participate in safety decision-making and report potential risk, so the risk could be avoided.



➔ More importantly, this study indicates that Confucian dynamism interacts with power distance, collectivism, uncertainty avoidance, and masculinity in their effects on human errors. An important finding of this study concerning Taiwanese seafarers is that low numbers of human errors occurred when the power distance and Confucian dynamism were congruent with each other (see Figure 2). Human errors also decreased for Taiwanese seafarers when Confucian dynamism is low and collectivism is high (see Figure 3).



➔ This implies that in container shipping operations where seafarers possessing lower power distance or Confucian dynamism, fewer human errors can be expected. Considering all the seafarers, the result also indicates that fewer human errors are associated with low Confucian dynamism and high collectivism (see Figure 4). Another interesting result is that in container shipping where Filipino seafarers showed high uncertainty avoidance, together with low Confucian dynamism (see Figure 5), there were fewer human errors.



➔ This result suggests that Filipino seafarers are not willing to take risk when they lack safety information. Thus, complete or clear information from the master or ship owner is very important. This may increase seafarers' motivation and efforts to prevent human errors.



5.2 Limitations and future research

First, the collection of data on human errors and perceptions of national culture in container shipping may be subject to bias in terms of seafarers' willingness to report and respond. Seafarers may be reluctant to report human errors because of potential personal repercussions and an interest in avoiding lawsuits against the company.



➔ Second, this study was limited to five national culture dimensions based on the studies of Hofstede (1994; 2001), as well as Nakata and Sivakumar (1996; 2003). Although these five dimensions are important and by themselves explain human errors, national culture is a complex construct. Further studies should seek to identify other variables such as safety culture (Cox and Flin, 1998; Glendon and Stanton, 2000) or safety climate (Zohar, 1980).



➔ Third, future research should seek to explain how the national culture dimensions influence individual behaviour or attitude, particularly behaviours or attitude that may lead to human errors, and try to define the characteristics of such safety behaviour. In addition, it would be valuable to study the differences at individual levels of national culture (e.g., similar occupation status, race, and religion) versus using culture as a sociological, group-based construct (Bearden et al., 2006).



➔ Fourth, while this research focused specifically on seafarers from China, Taiwan, and the Philippines, it would be valuable to collect data from seafarers from other non-Asian countries to obtain a balanced view of the relationship between national culture and human errors in container shipping operations.



➔ Finally, future studies may also be conducted by using the longitudinal approach to investigate the short- and long-term effects of national culture on container ship operations.



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