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Modeling and Analysis of Factors Affecting Inefficient Management of Vessels: A Malaysian Case Study

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***Abstract* – During the time when there were no standard regulations or guidelines on safety, there were many accident cases were recorded with high fatality rates, loss of properties and environment pollution. Finally, ISM Code was introduced to enhance the maritime safety but it is only applied to vessels of >500 GRT and hence the ships below 500GRT are exempted from this regulations. Thus due to lack of proper management system onboard especially on smaller ships, many other factors affecting the safety of the vessels has arisen. In accordance with this, the accident rate does not fall down as it keeps rising. Therefore, the purpose of this study is to find out the factors contributing towards inefficient management as a result of lack of proper management system. A sample consists of 324 respondents from varies field in shipping industry was collected using questionnaire forms as an instrument and analyzed using descriptive and Structural Equation Modeling (SEM) method. As a whole, the findings indicate that the grand mean values of entire of the sections of the questionnaire are above 3.00 which prove that the hypothesis is accepted. Moreover, the result shows that inefficient management has gained the highest grand mean values of 4.11 followed by external factor which is 4.05 meaning thesetwo factors has contributed the most to maritime accidents in the absence of proper management system. Whereas, based on the SEM technique, it was proven that human error (β = 0.49, P = 0.050) and stability factor (β = 0.49, P = 0.002) are contributing directly to inefficient management while, the demography of the respondents (β = 0.18, P = 0.103) and external factor (β = 0.65, P = 0.000) are contributing indirectly to inefficient management. Therefore, the study proves that human error, stability factor and external factor are causal of inefficient management. This has occurred because most of the shipping companies are failed to implement an effective and skillful management system as this will lead to human error, stability factor, and will worsen the external factors, as an effective management system can provide a clear exposure to the staff and crews of a shipping company to manage the ship or company effectively, safely and systematically.**

***Keywords* - Ship Management, Safety Management Structure, Maritime Accidents.**

I. INTRODUCTION

In present days, shipping industry or seafaring occupations is not considered dangerous [11]. However, in the early decades, the shipping industry was associated with risks and problems due to lack of proper regulations, policies, proper safety guidelines and many other important criteria for a ship. This improper guideline has led towards ineffective and less safe navigation. Thus, serious marine accident which happens from time to time has increased rapidly. Due to this, the seafaring occupation has become one of the most dangerous jobs [20]. Therefore, ISM Code is being the most appropriate regulation code that contributes in abundance to prevent and reduce the number of accidents. Many studies and research shows that there is more positive outcome of the ISM Code in term of Greek Shipping [3]. Thus, positive impacts were proven especially in the tanker and roll-on-roll-off passenger sectors which dropped drastically from 85% to 55% [3].

However, according to the SOLAS Chapter IX, ISM Code is only applicable for conventional vessels while the non-conventional vessel which is under 500GRT is exempted from this ISM Code. Thus, the accident rates among non-conventional vessels especially the fishing vessels have continuously rise. This has happened because non-conventional vessels do not have proper guidelines on safety management and pollution preventions which should be followed for the purpose of safety. In accordance with this, many other factors have arisen and thus have led to inefficient management.

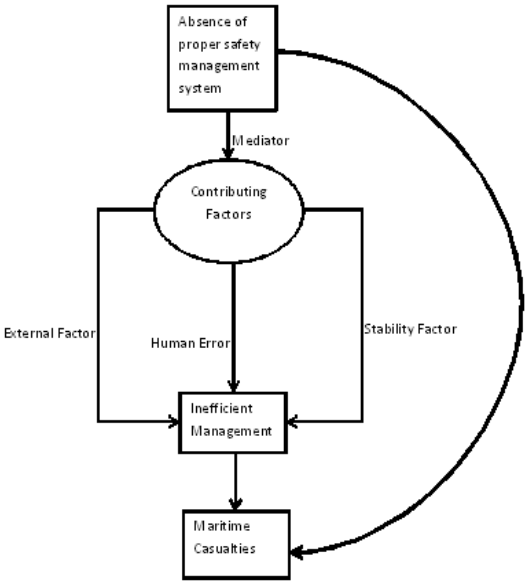

Fig.1. Consequences in the absence of safety management structure.

Therefore, the purpose of this study is to develop model of factors contributing toward inefficient management. The diagram below clearly shows that the absence of a proper management system is being the main root of occurrence of maritime accidents. When the shipping company or ship does not have a management system, it will led to human errors, stability problems and will worsen the external factors as well and thus, all this three factors will led to an inefficient management. Thus, it will end up with maritime casualties as the result of inefficient management of the vessel.

II. Literature Review

A Safety Management System (SMS), is always refers to organizations having a systematic approach in managing safety which includes organizations structures, accountabilities, policies and procedures. Moreover, SMS helps to create and develop a safety culture especially in the shipping industry.

Generally, when comes to marine casualties, human error are frequently linked as the main contributing factors. It is commonly accepted that maritime accidents which are due to human error is in the range of 75% - 96% [17], [18]. In relevant to this, studies have shown that human errors have contributes to various types of accidents in the range of 84% - 88% of tanker accidents, 79% of towing vessels groundings, 89% - 96% of collisions and 75% of fires and explosions [18]. On this side, an inappropriate or unstructured and incomprehensive operational procedure aboard ship is always leaded to trouble during distressed circumstances [16]. Moreover, the main problem solvent for human errors will be through safety management [21].

Correspondingly, stability matter, on the other hand, is another prime factor that leads to maritime accidents and casualties. A successful voyage is always depends on the good conditions of the particular ship where stability matters plays a crucial role. Therefore, as mentioned by [11], stability criteria are considered as a factor contributing to loss of ship stability accidents (LOSA).

Climate change and weather conditions can be considered as a global problem [13] and equally has impacts on the maritime industry. Fundamentally, shipping industry is a risky industry and specifically ships are always exposed to various external factors or conditions such as bad weather, low visibility, currents and many more which will lead to maritime casualties such as collisions, stranding or groundings [1]. Statistics showed that, 74% of maritime accidents which are happened due to fast current, heavy traffic and bad weather conditions, usually frequent on the month of April and May, as the bad weather falls on this two months respectively [12]. Thus, in the case of natural or external factors, a proper management or further actions should be taken in order to manage similar bad weather conditions in future.

The management of a vessel is potential to cause problems and stress to the seafarers in managing the vessel [24] and therefore a good management system is very important as it plays a crucial role in the industry. Correspondingly, in order to have a good management system, a good safety management system must exist. In fact, ISM Code has required all the shipping companies to develop and implement an effective safety management system (SMS) in order to have a safe operation at sea [9], and SMS do protect and prevent accidents from arising [22]. Safety management system (SMS) should be well documented and must be kept in every ship [23]. This is because the SMS would be very helpful during emergencies and any doubts regarding ship operation and management can be cleared by referring to the SMS. As described by [6], if an organization practices safety culture but without a SMS, then the organization is considered as it is on a risky path and obviously, SMS can be improved by identifying human factors and analyzing human interactions [5]. Therefore, to improve safety in shipping industry, management measures must be revised and assessed and come out with a good management system.

III. Methodology

A sample consists of 324 respondents from varies field in shipping industry was collected using questionnaire forms as an instrument and analyzed using descriptive analysis and Structural Equation Modeling (SEM) techniques.

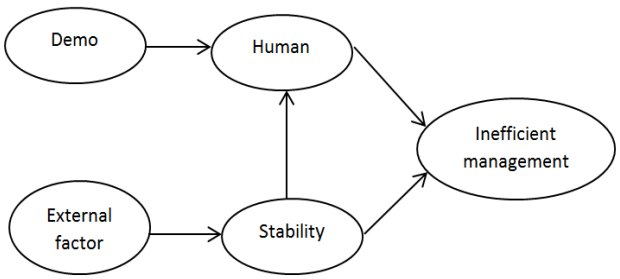

Fig.2. Conceptual Framework of Factors Affecting Inefficient Management of Vessels

A. Questionnaires

The questionnaire consists of five main sections. **Section A** comprises of the demography items such as sex, age, race, status, and education background of the respondents. **Section B** comprises of the 6 items for human error factor. They are:

1) Human error is the main factor for maritime accidents.
2) Crew should hire according to their competency level and qualification.
3) Advanced technologies onboard cannot overcome human errors.
4) Effective SMS can reduce human errors.
5) Human errors happen due to low qualifications of crews.
6) Communication problem is the main factor of human error.

Section C consists of 6 items of stability factor which has occurred in the absence of proper safety management system. They are:

1) Old vessels are difficult to be handle/operate.
2) Old vessels are less safe.

3) Improper ship designs can cause accidents.
4) Lack of attention on stability matters can cause accidents.
5) Vessels should be built complying to rules and regulations to avoid stability problems.
6) Vessels built using aluminium can get structural damage even in medium size waves.

Section D consists of 7 items of inefficient management and they are as follow:

1) Good SMS practices can lower the accident rates.
2) Clear safety management training for crews can prevent accidents.
3) Management system which stressed on safe working procedures and wearing protective clothing can maintain save environment.
4) Inappropriate ship management system can cause accidents.
5) Standard rules and operation procedures is an important factor to increase the safety of a ship.
6) If there is a SMS but not in used, then the system will not be effective.
7) Inefficient management system can cause human errors.

The last section of the questionnaire is the **section E** which comprises of 5 items of external factor. They are:

1) Heavy rain, fog and strong wind are hazardous towards navigation.
2) Natural factor is an important factor in causing maritime accidents.
3) Most of the accidents occurred during months of bad weather.
4) Small vessels frequently involved in accidents than large vessels during bad weather.
5) All captains should get the weather forecast before starting a voyage.

IV. Findings and Discussion

A. Sample Size Calculation

The calculation was solved by using a single proportion formula with anticipated population proportion, (p) = 0.838, level of significance = 5% and absolute precision (Δ) = 5% [4],[14], [15].

$$n = \left(\frac{1.96}{0.05}\right)^2 p(1-p),$$

Based on the formula given above, p is expected proportion of individuals in the sample with the characteristic of interest at the 100(1-α) % confidence interval.

Table 1: Sample Size Calculation

Previous research	Anticipated population proportion, p	Absolute precision (Δ)	Level of significance	Sample size
Safety culture aboard fishing vessels (Jon Ivor Havold, 2010)	0.838	5%	5%	209 respondents
Calculation	$n = \left(\frac{1.96}{0.05}\right)^2 0.838(1-0.838) = 208.6 \approx 209$ respondents			

From the Table1 above we can see that the sample size needed is 209[8]. Therefore, after adding 25% more data, the minimum sample needed to be collected is 209 + (209 x 0.25) = 261 respondents.

B. Demographics Profiles

The finding shows that 88 percent are males and 12 percent are female. Based on randomly chosen respondents, it was found that 42 percent of the respondents were more than 30 years old. With regard to race, most of the respondents were Malay as the percentage is 82.1 percent or 266 respondents followed by Chinese and Indian, 11.1 percent and 6.2 percent respectively. In addition, the findings also shows that 83.0 percent of respondents were from shipping organization and second highest were ferry operators which obtained 37 percent of the total respondents. Concerning education background, 32.4 percent had completed their higher education at university level and the highest level of education was certificate level which was 33.3 percent.

Table 2: Demographic Profile

Demographic Profile	Category	Frequency	Percentage
Gender	Male	285	88.0
	Female	39	12.0
Age	18 years and below	2	6.0
	19 to 25 years	75	23.1
	26 to 30 years	111	34.3
	Above 30 years	136	42.0
Race	Malay	266	82.1
	Chinese	36	11.1
	Indian	20	6.2
	Others	2	0.6
Status	Ship Management Unit (UPK)	23	7.1
	Fishermen	20	6.2
	Ferry Operator	12	3.7
	Shipping Organization	269	83.0
Education Background	Primary School	9	2.8
	Secondary School	102	31.5
	Certificate	108	33.3
	University	105	32.4

C. Reliability Test

The cronbach's alpha values for the factors in the study are as in the Table3. The alpha value for human error and stability factors are a pretty well level of reliability which are 0.634 and 0.690 respectively. Whereas, the alpha value of external factor is 0.724. The alpha value for dependent variable that is the inefficient management is 0.767. The alpha value as an overall for the whole questionnaire was 0.837. In short, the Cronbach Alpha test shows a decent reliability level and all the alpha values are higher than 0.6 meaning that the factors used in the study is suitable and can be accepted as a measurement [18].

Table 3: The Alpha Cronbach's Values

Dimensions	No. of Items	Alpha
Human Error	6	0.634
Stability Factor	6	0.690
Inefficient Management	7	0.724
External Factor	5	0.767

D. Descriptive Analysis

Table 4: Measurement Scale

Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
1	2	3	4	5

Table 5 shows the mean value of each item in the section B, Human Error. Based on the results, the mean values of all the items are above 3.00 which indicate that the respondents have accepted andagreed with the statements related to human error. Item B1 and B2 have obtained the highest mean values, 4.10 and 4.21 respectively compared to other items of the section. As an overall, the grand mean value of this section is 4.02 which prove that the hypothesis, 'H_1- Inefficientmanagement system will lead to human error' is therefore accepted.

Table 5: Mean Values of Section B (Human Error)

Item	Mean Value	Percentage (%)
B1	4.10	82.0
B2	4.21	84.2
B3	3.90	78.0
B4	3.96	79.2
B5	3.98	79.6
B6	3.99	79.8
Grand Mean	**4.02**	**80.4**

Whereas, based on the findings on the Table6, the mean values of the items in section C, Stability Factor were all in a convincing level meaning the mean values of all the items were exceeding 3.00. The grand mean value of this section is 3.96 and thus, indicates that the hypothesis, "H_2- Inefficient management system may cause stability/unseaworthiness problems' is therefore accepted.

Table 6: Mean Values of Section C (Stability Factor)

Item	Mean Value	Percentage (%)
C1	3.75	75.0
C2	3.77	75.4
C3	4.01	80.2
C4	4.18	83.6
C5	4.29	85.8
C6	3.77	75.4
Grand Mean	**3.96**	**79.2**

Table 7: Mean Values of Section D (Inefficient Management)

Item	Mean Value	Percentage (%)
D1	4.08	81.6
D2	4.19	83.8
D3	4.14	82.8
D4	4.12	82.4
D5	4.23	84.6
D6	3.99	79.8
D7	4.04	80.8
Grand Mean	**4.11**	**82.2**

Similarly, based on Table7, all the items in Section D were at a significant level. This shows that all the items were at a safe zone as they are above 3.00. In accordance with that, the grand mean value of this section is 4.11 meaning the hypothesis were accepted. The hypothesis is 'H_3-Inefficientmanagement system will lead to ineffective management is accepted'.

Table 8: Mean Values of Section E (External Factor)

Item	Mean Value	Percentage (%)
E1	4.26	85.2
E2	3.86	77.2
E3	3.89	77.8
E4	3.89	77.8
E5	4.36	87.2
Grand Mean	**4.05**	**81.0**

To sum up, based on the scale above in the Table4, the grand mean values of all the sections of the questionnaire is above 3.00 and it is shown in the figure 3 below, which proves that the hypothesis accepted agreed by the respondents as whole. Additionally, the discussion above demonstrates clearly that an efficient management system will lead to human error, stability factor, and will worsen the external factors. Therefore, the accident rates will rise up. This clearly shows that, a management is very important and it plays a very crucial role in bring up the maritime industry on a safe pathway.

According to the Table 8, all the items of the last section of the question are were at a productive level based on the mean values obtained. In addition, the grand mean of 4.05 has supported this section as overall and this proves that the hypothesis is acknowledged. The hypothesis is H_4- Inefficient management system will worsen the external conditions.

E. The Assessment of Fitness for the Model

Structural equation modeling technique was used to estimate multiple and interrelated dependence relationships and used to represent the unobserved concept in these relationships and account for the measurement error in the estimation process [7].

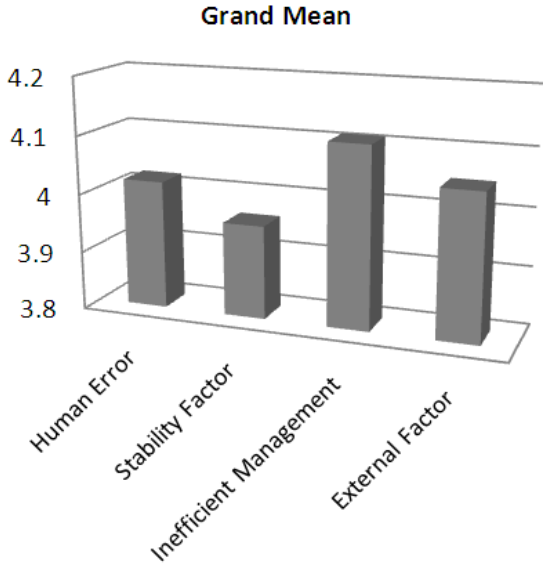

Fig.3. Grand Mean of Sections of Questionnaire

In this study the unobserved exogenous variables are demography, human error, stability factor, and external factor, and unobserved endogenous variable is inefficient management. Amos version 18 was used to measure the model fit. Several measures of goodness of fit were evaluated for the structural model: Chi-square/degree of freedom and Root mean square error of approximation (RMSEA).

Table 9: Guide for model fit

Goodness of fit model index	Recommended good fit value	Proposed Model
Chi-square		931.286
Probability	>0.05	0.000
df		365
Chi-square/degree of freedom	<2.00	2.55
RMSEA	<0.08	0.069

*Criteria suggested by [7] and [2]

The overall model fit is marginal with the values of chi-square, df and RMSEA. The likelihood ratio chi-square value 931.286 with 365 degree of freedom is statistically at the 0.05 significant levels. The RMSEA has a value which falls inside the acceptable range of 0.08.

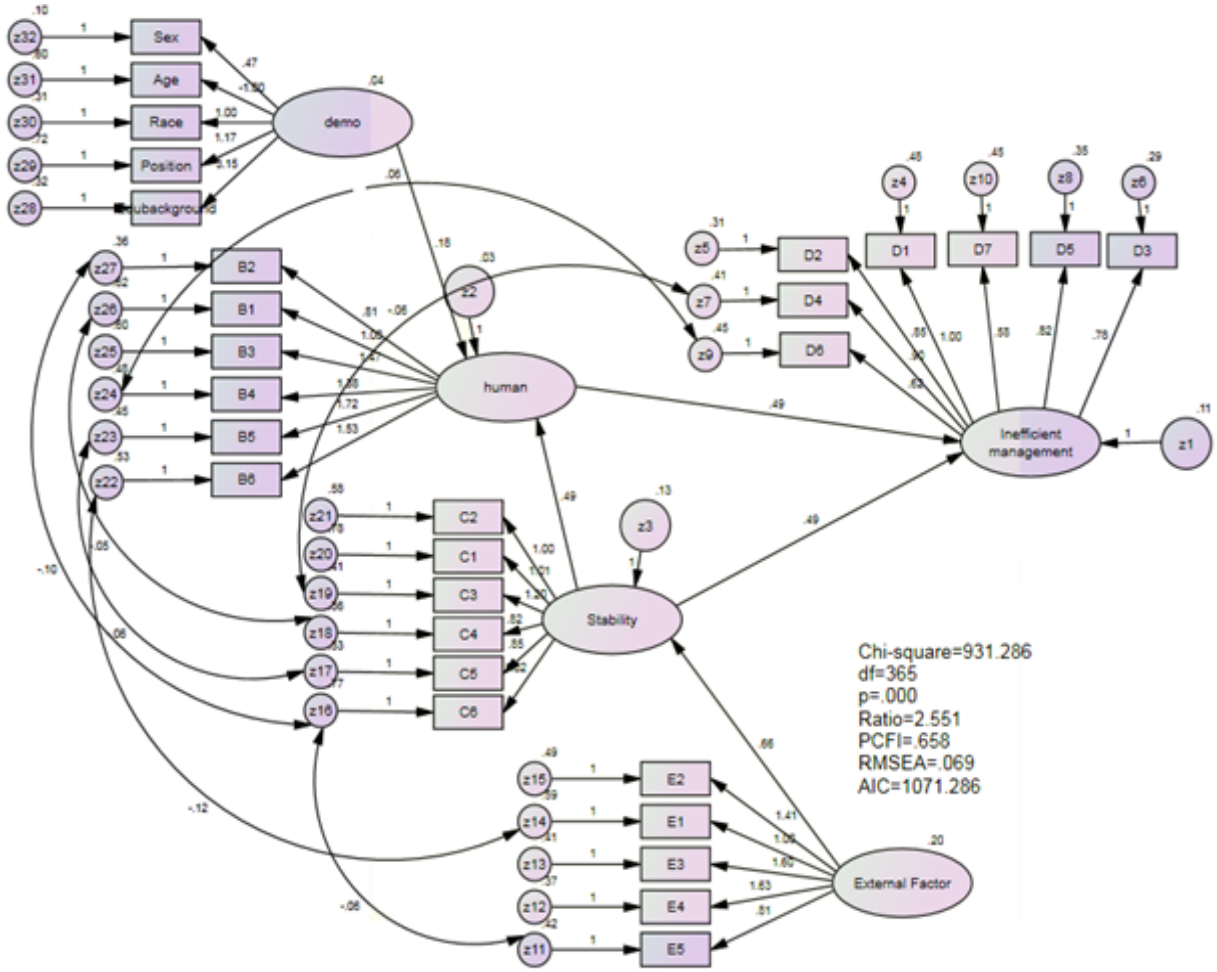

Fig.4. Modeling of Factors Affecting Inefficient Management of Vessels in

V. Discussions of the Modeling of Factors Affecting Inefficient Management of Vessels in Malaysia

Model was constructed based on the recommendations proposed by Amos 18.0 to ensure that this model fits the data.

The section of demography showed three items in term of standardized regression weights that contribute to these dimensions is race ($\beta = 1.00$, $p < 0.05$), position ($\beta = 1.17$, $p < 0.05$), and education background ($\beta = 3.15$, $p < 0.05$). Race is refers to the race of respondents which consists of Malay, Chinese, Indian and others. While position or status is refers to the job background of the respondents that comprises of staff of ship management unit (UPK), fishermen, ferry operator and shipping organization personnel. The next section indicates the education background of the respondents such as from primary, secondary, certificate level and university or higher level. Fundamentally, based on the model, it seems clear that the section of demography has an impact on human error. This means the occurrence of human errors has a high connectivity with the respondent's education background.

All the indicators in human error have contributed towards human error. The B3 which is the advanced technologies onboard cannot overcome human error, has the standardized regression weights of ($\beta = 1.47$, $p < 0.05$). B4 which is the effective SMS can reduce human errors, is ($\beta = 1.38$, $p < 0.05$) and B5 which is the human errors happens due to low qualifications of crews, has contributed more ($\beta = 1.72$, $p < 0.05$). The findings also indicated that the indicator B4 (effective SMS can reduce human errors) has a connection with D6 (If there is a SMS but not in used, then the system will not be effective) of inefficient management. On the other hand, the human factor has shown the overall effect of $\beta = 0.49$ on the inefficient management. Likewise, there are also a strong relation between B1 (Human error is the main factor for maritime accidents) of human error and C4 (Lack of attention on stability matters can cause accidents) of stability factor. It is likely that, human error has always leaded to stability problems and this can be overcome by an effective management system. Therefore, based on this result, it is clear that an effective management system is required in order to overcome issues related to human errors by providing applicable management, work modules or trainings to the crews besides hiring the crews based on the job requirement and qualifications as well.

The role of stability factor has been shown the overall effect of $\beta = 0.49$ to the human error and inefficient management respectively. All the sections in stability factor are at significant level and among the most contributed sections are C6 (Vessels built using aluminium can get structural damage even in medium size waves) with $\beta = 1.22$ and $p < 0.05$, C3 (Improper ship designs can cause accidents) with $\beta = 1.20$ and $p < 0.05$, and C1 (Old vessels are difficult to be handle/operate) with $\beta = 1.01$ and $p < 0.05$. Whereas, C3 (Improper ship designs can cause accidents) and D4 (Inappropriate ship management system can cause accidents) has a relation where a proper management system guideline has to be introduced so that a better and stabled vessels can be built in order to reduce the accident rate.

Similarly, the external factor has an overall effect of $\beta = 0.65$ on the stability factor. Whereas, in external factor all the items, has shown a significant contribution and for example E2 (Natural factor is an important factor in causing maritime accidents) shows the significance of ($\beta = 1.41$, $p < 0.05$), E3 (Most of the accidents occurred during months of bad weather) is ($\beta = 1.60$, $p < 0.05$) and E4 (Small vessels frequently involved in accidents than large vessels during bad weather) has the most significant contribution ($\beta = 1.63$, $p < 0.05$) towards the external factor. In short, lack of proper management skills has led to difficulties in handling vessels during bad weather especially for the small vessel where the number of accidents involving small vessels are always very high. There a systematic management system can overcome all the consequences.

Therefore, the study proves that human error, stability factor and external factor are contributing towards inefficient management. This has occurred because most of the shipping companies are failed to implement an effective and skillful management system. This is because an effective management system can provide a clear exposure to the staff and crews of a shipping company to manage the ship or company more effectively, safely and systematically.

VI. Conclusion

This study proves that all the hypothesis of the study has been proved or accepted as all the sections in the questionnaire has obtained fair and acceptable grand mean values. The hypotheses are as follows:

1) H_{1}- Inefficientmanagement system will lead to human error.
2) H_2- Inefficient management system may cause stability/unseaworthiness problems.
3) H_3-Inefficient management system will lead to ineffective management.
4) H_4-Inefficient management system will worsen the external conditions.

Besides that, based on the Structural Equation Modeling (SEM) technique, the results shows that the demography of the respondents has an effect on the human error towards inefficient management. Similarly, externalfactors has been the root of stability factors which lead to inefficient management. Therefore, it is very clear that, the absence of a proper safety management structure can lead to human error, stability problem, and worsen an external condition. Hence, this will affect the management efficiency of an organization or vessel and therefore more maritime casualties are more likely to happen.

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REFERENCES

[1] Akten, N., 2006. Shipping accidents: a serious threatfor marine environment. J. BlackSea/Mediterranean Environment, 12: 269304.
[2] Arbuckle, J.L., and Wothke, W. 1999. Amos 4.0 User's Guide. Chicago, IL: Small Waters Corporation.
[3] Bhattacharya, S., 2012. The effectiveness of the ISMCode: A qualitative enquiry. Marine Policy36: 528-535.
[4] Dupont, W.D and Plummer, W.D. 1990. Power andsample size calculation: A review and computer program. Controlled Clinical Trails, 116-128.
[5] Einarsson, S. and Brynjarsson, B., 2008. Improvinghuman factors, incident and accident reporting and safety management systems in the Seveso industry.Journal of Loss Prevention in the Process Industry 21: 550 554.
[6] Gordon, R., Kirwan, B. and Perrin, E., 2007. Measuring safety culture in a research and development centre: a comparison of two methods in the Air Traffic Management domain. Safety Science, 45(6): 669–95.
[7] Hair, J.F., Anderson, R.E., Tatham, R.L. and Black,W.C, 1998. Multivariate Data Analysis withReading, 5th edition.Englewood Clifts.NJ:Prentice Hall.
[8] Havold, J.I. 2010. Safety culture aboard fishingvessels. Safety Science, 48: 1054-1061.
[9] International Safety Management Code (ISM Code).1998. (IMO-117E).
[10] Krejcie, R.V., and Morgan, D.W. 1970. Determiningsample size for research activities.Educational and Psychological Measurement, 30: 607-610.
[11] Kobylinski, L., 2007. System and risk approach to shipsafety, with special emphasis of stability. Archives of Civil and MechanicalEngineering VII: 97-106.
[12] Le Blanc, L.A. and Rucks, C.T., 1996.A multiple discriminant analysis of vessel accidents. Pergamon 28: 501-510.
[13] Mark, J.K. and Piet, R., 2009. The impact of climate change and weather on transport: An overview of empirical findings. Transportation Research Part D, 14: 205-221.
[14] Mugusi, F.M., Mehta, S., Villamor, E., Urassa, W., Saathhoff, E., Bosch, R.J. and Fawzi, W.W. 2009. Factors Associated with mortality in HIV-infected and uninfected patients with pulmonary Tuberculosis. BMC Public Health.
[15] Naing, N.N. 2003. Determination of sample size, Malaysian Journal of Medical Science, 84- 86.
[16] National Transportation Safety Board [NTSB]. (1981) Major Marine Collisions and Effects of Preventive Recommendations. Report No. NTSB-MSS-81-1.
[17] Portela, R delaChampa. 2005. Maritime casualties analysis as a tool to improve research abut environment. Journal of Maritime Research, 2: 3-18.
[18] Rothblum, A. 2002. Human error and marine safety.U.S Coast Guard Research & Development Center.
[19] Sekaran, V. 2003. Research Method for Business: A skill Building Approach.4ed. John Willey & Sons, Inc. New York.
[20] Tarelko, W., 2012. Origins of ship safety requirement formulated by International Maritime Organization. Procedia Engineering 45: 847-856.
[21] Thematic Network for Safety Assessment of Waterborne Transport (THEMES) (2003) Report on suggestion for the integration of human factors in safety and environmental analysis. Available from: http://projects.dnv.com/themes/ deliverabes/deliberables.htm [Accessed 23 August 2013].
[22] Watcher, J.K. andYorio. P.L., 2013. A system of safety management practices and worker engagement for reducing and preventing accidents: An empirical and theoretical investigation. Accident Analysis and Prevention.
[23] Wu, W. J. and Jeng, D.J.P., 2012. Safety Management Documentation Models for the Maritime Labour Convention, 2006. The Asian Journal of Shipping and Logistics, 28: 41-66.
[24] Xhelilaj, E. and Lapa, K., 2010. The role of human fatigue factor towards maritime casualties. Maritime Transport & Navigational Journal, 2: 24-32.

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