

Human Resources Certification and Ship Safety Competency in Lake Toba

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ABSTRACT

The aim of this research is to examine the effect of ship certification on ship safety mediated by human resource competency and ship stability. The research population was 135 crew members operating in Lake Toba port. The collection technique used non-probability sampling with purposive sampling. The sample in this study was 100 ship crew members. Data collection techniques included field research with questionnaires. The data analysis technique used Partial Least Squares of Structural Equation Modeling. The research results show that the certification process directly has a positive and significant effect on ship safety. The certification variable, mediated by ship stability, has a positive and significant effect on ship safety. However, when certification is mediated by human resources competency, it has no positive and insignificant effect. Further research is recommended related to standardization of port services to improve logistics' performance.

Keywords: ship safety, ship stability, human resource competency, ship Certification, PLS-SEM

A. Introduction

Indonesia is an archipelagic country that has a strategic role in sea transportation of both goods and people. Inter-island shipping in Indonesia is a means of transportation that can be oriented towards national development (Tanasale et al., 2023). Shipping is a very important thing for Indonesian people. The government uses it as a means of transportation to grow the economy and unity. National sea transportation has experienced quite a significant increase. The maritime sector in Indonesia has received great attention from the government for national development. Maritime transportation has a very good

impact in increasing the competitiveness of the shipping industry or domestic shipyards (Maemunah et al., 2023). Phenomenon in maritime transportation, the number of accidents that occur in Indonesian waters is still high.

The first cause is the condition of the fleet, where transportation ships are generally built without using certain safety standards. In addition, many ships in Indonesia's fleet are using ships purchased from other countries (Freitas et al., 2022). The maintenance of these ships is also below standard, the age of used ships used in Indonesian shipping is usually very old. The second cause is fleet operations, both ship and cargo aspects. This kind of

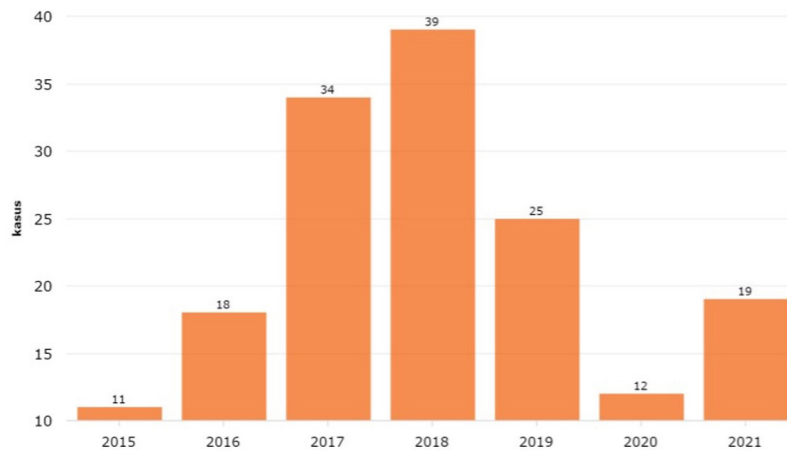


Figure 1 Number of shipping accident cases in 2015 – 2021

problem arises due to weak supervision of shipping safety standards which ultimately results in problems of overloading or dangerous cargo not being reported. Apart from that, there are many causes of accidents at sea, including: bad weather, fire including due to dangerous cargo, ship stability including shifting cargo (Dewanto et al., 2017) no reserve buoyancy due to excessive cargo, running aground, stranding, collision, imperfect design and structure, human negligence, Black Out.

Toba Lake is one of the water areas that is a water transportation or shipping route in Indonesia. The wide and open waters of Lake Toba make weather conditions a factor that is vulnerable to causing ship accidents (Kasim et al., 2020). Data shows that water transportation accidents on Lake Toba occur quite often. The results of direct investigations at the Lake Toba Harbor (Takano et al., 2019) indicate that accidents occur due to many factors such as excessive ship loading and a lack of competent human resources. Other factors such as human error and ship technical factors are the main causes of ship accidents (Bobermin et al., 2021).

According to Article 197, Law Number 17 of 2008 concerning Shipping, in the interests of shipping safety and security. The design and work of dredging shipping lanes

and harbor pools, as well as reclamation, must obtain government permission (Dewanto et al., 2017). The work of dredging shipping lanes and harbor pools as well as reclamation is carried out by companies that have the capability and competence. Certificates issued by authorized agencies in accordance with statutory provisions. Every ship that obtains a certificate must be maintained so that it continues to meet ship safety requirements according to article 130 paragraph (1), Law Number 17 of 2008 concerning Shipping (Meyer et al., 2021).

Any person who violates the provisions of Article 130 paragraph (1) regarding certificates will be subject to administrative sanctions. Sanctions are warnings, administrative fines, suspension of permits or suspension of certificates. Revocation of permits or revocation of certificates is carried out as well as not being given a certificate or not being given a Sailing Approval Letter. This is because ship certification is so important to maintain ship safety, certification is the standard for ships in sailing, so that ship accidents can be reduced. Certification has an influence on ship safety (Dewanto et al., 2017).

Determining the required competency threshold will of course be used as a basis for

the selection process, succession planning, performance evaluation and Human Resources development (Dilaver et al., 2023).

Stability is defined as the ability of a ship to return to an upright position after being subjected to external influences that cause the ship to tilt (such as wind pressure, waves, tilting due to turning motion, stacking of passengers on one side of the ship (Behdani et al., 2020), ballast system and regulation poor load, free surface on the tank, and so on). This phenomenon is controlled by the relationship between the center of buoyancy, whose location is influenced by the geometric shape of the ship's hull, and the ship's center of gravity, which is a function of the ship's weight distribution (Rodrigue et al., 2017) and overall load. vertically and longitudinally (Maemunah et al., 2023).

B. Methods

This research used Quantitative research method with the data sources were primary data and secondary data. The collection technique used nonprobability sampling with purposive sampling. The sample in this study was 100 ship crew members. Data collection techniques through field research was using questionnaires. The data analysis technique used Partial Least Squares (PLS) of Structural Equation Modeling (SEM).

C. Results and Discussion

SEM test results, a research results matrix shown in the following table 1.

Based on the results of the data analysis that has been carried out, the research results can be explained from the relationship between research variables. The explanation of the results of this research is as follows: firstly, the results of the research show that the ship certification variable (Bachtiar et al., 2021) has a positive influence on HR competency in traditional rivers and lakes on Lake Toba, this is proven by the t-count value of 2.538 and the value significance of 0.011. It can be

interpreted that increasing ship certification will directly affect the safety of ships on traditional rivers and lakes in Lake Toba (Onakpojeruo et al., 2023). This indicates that if there is an increase in Ship Certification on Traditional Rivers and Lakes in Lake Toba, then HR Competency will also increase.

A competent workforce is one of the important and main factors that a company must pay attention to in order to achieve its goals. The lack of skilled and competent employees results in the document processing process being hampered and inefficient (Dilaver et al., 2023). This will certainly result in less than optimal coordination between employees in the division of work.

Arsham Mazaheri et al. (2015) many ship accidents occur due to crew errors in reading the situation while navigating, resulting in errors in decision making. Mistakes occur due to weak competence, so it is very necessary to formulate regulations governing the competence of ship crews. This means that the certification provided is good, so it can have a positive influence or increase the human resource competency of traditional ship crews on Lake Toba (Ihsanti, 2014). With certification, the human resource competency of the ship's crew can be controlled and can be improved through certification. So that the HR competency certification for ship crew can become a reference and standard that states that a crew member has good competency.

Both research results show that the ship certification variable has a positive influence on ship stability on traditional rivers and lakes in Lake Toba (Lake et al., 2017), this is proven by a t-count value of 2.734 and a significance value of 0.006. It can be interpreted that increasing ship certification will directly affect the safety of ships on traditional rivers and lakes in Lake Toba. This indicates that if there is an increase in Ship Certification on Traditional Rivers and Lakes in Lake Toba, then Ship Stability will also increase (Kurniawan & Siahaan, 2021). According to (Burbach et al., 2021) Administrative requirements in the form of safety certificates such as

Tabel 1 Matriks Hasil Penelitian

	Hypothes	Results	SEM Analysis Results
H1	Ship Certification has a positive and significant influence on HR Competency	Proven and Significant	t value Calculate = 2.538 P value = 0.011 Accepted
H2	Ship Certification has a positive and significant influence on Ship Stability	Proven and Significant	t value Calculate = 2.734 P value = 0.006 Accepted
H3	Ship certification has a positive and significant influence on ship safety	Proven and Significant	t value Calculate = 4.375 P value = 0.000 Accepted
H4	HR competency has a positive and significant influence on ship safety	Proven and Significant	t value Calculate = 2.529 P value = 0.010 Accepted
H5	Ship Stability has a positive and significant influence on Ship Safety	Proven and Significant	t value Calculate = 4.079 P value = 0.000 Accepted
H6	Ship Certification does not have a positive and insignificant effect on Ship Safety mediated by Competency HR	Not Proven and No Significant	t value Calculate = 1.538 P value = 0.125 Rejected
H7	Ship certification has a positive but not significant influence on ship safety, mediated by ship stability	Proven and No Significant	t value Calculate = 2.722 P value = 0.007 Accepted

nationality certificates, measurement letters, safety certificates, ship construction, ship equipment safety certificates (Munasinghe et al., 2019), radio certificates and diplomas, as well as technical requirements such as safety support equipment at sea must first be met in order for the ship to obtain status. seaworthy (Maemunah, Batista, et al., 2023). This means that the certification has been given correctly, so it can have a positive influence or increase the stability of traditional ships on Lake Toba. This is in accordance with the mandate of Government Regulation Number

51 of 2002 concerning Shipping regarding the obligation to fulfill ship safety requirements so as to support seaworthiness as proven by a certificate before the ship can operate.

The third result shows that the ship certification variable has a positive influence on ship safety on traditional rivers and lakes in Lake Toba, this is proven by the t-count value of 4.375 and a significance value of 0.000. It can be interpreted that increasing ship certification will directly affect the safety of ships on traditional rivers and lakes in Lake Toba. This indicates that if there is an

increase in Ship Certification on Traditional Rivers and Lakes in Lake Toba, then Ship Safety will also increase. Law No. 17 of 2008 concerning Shipping states that ship seaworthiness is the condition of a ship that meets ship safety requirements (Meyer et al., 2021; Vega-Muñoz et al., 2021), prevention of water pollution from ships, manning, load lines, loading, welfare of crew and health of passengers, legal status of ships, safety management and prevention of pollution of the ship, and security management of the ship for sailing in certain waters as proven by a certificate (Indrayanto et al., 2021). It is hoped that the existence of regulations for safe ship operations can prevent ship accidents so that they do not harm the company concerned and the transport users themselves. For this reason, support from the company is needed for safe ship operations, environmental protection and good company management (Sadly, 2014).

The results of the four studies show that the HR Competency variable has a positive influence on ship safety on traditional rivers and lakes in Lake Toba (Munasinghe et al., 2019; Tsai & Lu, 2022), this is proven by a t-count of 2.529 and a significance value of 0.010. It can be interpreted that increasing HR competency in terms of 1) intellectual competency, 2) emotional competency, and 3) social competency, will directly influence the safety of ships on traditional rivers and lakes on Lake Toba. This indicates that if there is an increase in human resource competency on traditional rivers and lakes in Lake Toba, then ship safety will also increase. Byrd (2011) states that human resources are the most important asset in a company or organization. Employees will have potential if they are managed well and correctly, but will become a burden if they are mismanaged. Human resource management can be done by managing the various skills possessed by the organization's human resources.

In this context, management is related to management practices in achieving various goals, so it is not limited to operational employees only, but also includes managerial

aspects. Performance competency can be defined as the behavior demonstrated for those who have high, consistent, effective and efficient performance compared to those who have average performance. A competency-based performance management system is a formal way to shape employee skills and behavior to be successful in their current roles for future organizational growth (Setiono et al., 2021). The main benefit of using competencies in an organization is primarily to move human resources towards the targets the company wants to achieve. In addition, competency will encourage employees to acquire and apply knowledge, understanding, abilities/skills, values, attitudes and interests in accordance with job requirements, because this is an important instrument for achieving organizational targets (Maliota et al., 2021).

The results of the fifth research show that the ship stability variable has a positive influence on ship safety on traditional rivers and lakes in Lake Toba, this is proven by the t-count value of 4.079 and a significance value of 0.000. It can be interpreted as increasing ship stability in terms of 1) fulfillment of material requirements for ship construction, 2) physical care and maintenance of the ship, 3) ship stability, 4) suitability of ship design to the water conditions in Indonesia, 5) availability of shipping navigation aids to assist shipping vessels and 6) information about the weather to ships, will directly affect the safety of ships on traditional rivers and lakes in Lake Toba (Akani et al., 2024). Alvarez Santollano and Souto-Iglesias (2014) analyzed the relationship between ship stability and safety using data from ships. Caamano et al. (2018), developed a system to identify vessel GM and evaluate its stability using lateral fluctuations on medium-sized fishing vessels. Terada et al. (2018) proposed a system to evaluate the GM of ships by measuring the natural frequency of roll motion for container ships. Gonzo alez et al. (2016) conducted a study to evaluate the stability of vessels operating in real time on a fishing vessel. This means that the better the stability of the ship (Haralambides, 2019), the

safety of traditional ships on Lake Toba will increase. This is very in line with shipping science that ship stability is a very important aspect in operations (Dilaver et al., 2023).

The results of the sixth research show that the ship certification variable does not have a significant influence on ship safety mediated by human resource competency on traditional rivers and lakes in Lake Toba, this is proven by a t-count value of 1.538 and a significance value of 0.125. It can be interpreted that increasing Ship Certification will not indirectly affect ship safety on Lake Toba through HR competency (Tahir et al., 2019). This indicates that if there is an increase in Ship Certification on Traditional Rivers and Lakes in Lake Toba, then Ship Safety will also increase after being mediated by HR Competency but it will not be significant. Of the many factors, and IMO investigations it is known that 80% of accidents are caused by human factors and 20% by the ship itself, so standard rules are needed so that they can be used as guidelines and references for service activities and actions at sea (Mayank Faunni Nailiyi et al., 2019).

As many as 80% of ship accidents occur due to human error, 75% of these human errors are caused by poor management systems. From this statement, accidents often occur due to human factors and management and organizations that do not fully provide support for the need for safe ship operations and prevention of marine pollution (Maemunah & Marta Anggoro, 2022). Based on the results of a survey of traditional ship crews on Lake Toba, it can be seen that 95% of them consider it easy to obtain a crew member HR competency certificate so that ship crews ignore the certification process which is expected to improve ship safety.

The results of the seventh research show that the ship certification variable has a positive influence on ship safety on traditional rivers and lakes in Lake Toba, this is proven by a t-count value of 2.722 and a significance value of 0.007. It can be interpreted that increasing ship certification will indirectly affect the

safety of ships on traditional rivers and lakes in Lake Toba. This indicates that if there is an increase in Ship Certification on Traditional Rivers and Lakes in Lake Toba (Dewanto et al., 2017) then Ship Safety will also increase after being mediated by Ship Stability. Loss of complete stability, due to any of the causes presented in this article, will lead to dangerous situations that will directly affect the safety of navigation.

This article also reveals that continuous learning and training and experience of deck officers is essential to avoid dangerous situations where the crew, ship and cargo could become targets. The human factor remains the determining factor for assessing safety, regardless of developments in onboard automation (Maemunah, Damanik, et al., 2023). For dynamic instability of the ship, which is actually generated by parametric rolling or pure loss of stability, preventive measures are used such as simple changes of the ship's direction and speed based on how the ship reacts to external forces (Pazara et al., 2016).

D. Conclusion

Certification is important in supporting ship safety control. Ship owner certification is required to meet the requirements for fulfilling the stability and competency of human resources to support the required ship safety. Based on the results of data analysis, from all hypotheses, the variables used have a positive and significant influence except for the sixth hypothesis where the certification and HR competency variables do not have a positive and insignificant influence on ship safety. Several indications state that the competency certification variable does not directly have a positive and insignificant influence, among others, due to the ease of obtaining HR competency certificates so that ship crews tend to underestimate the certification process which results in a negative impact on ship safety. The ease of the process of obtaining a certificate is a positive thing in service, but

too much tolerance will make this certification process just a formality.

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