

**WORK ENVIRONMENT AND SELF-EFFICACY: THE EMPIRICAL EVIDENCES OF SHIP CREW PERFORMANCE IN THE NATIONAL SHIPPING COMPANIES**

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**ABSTRACT**

This research was due to the high risks of working in the marine sector, especially the ship crew who worked in the challenging physical and psychological conditions, such as extreme weather, noise, vibration, high temperature, limited space, and social isolation on board the ship. Such conditions had potentials to lower the performance and at once endangered work safety. The aim of this research was to analyze the influence of human resources development and work environment on ship crew performance through self-efficacy, with a case study of PT Tanto Intim Line. The method used was quantitative approach with Structural Equation Modeling–Partial Least Squares version 4.0. Primary data was collected through questionnaire distribution to 178 ship crew from several ships owned by PT Tanto Intim Line, who were selected using a purposive sampling technique. The result of research indicated that the improvement of technical skills, leadership, communication, and emergency preparedness, as well as improvement of both physical and non-physical work conditions could increase the self-confidence of ship crew and encourage them to achieve an optimal performance. The practical implication of this research was the necessity for the management of PT Tanto Intim Line to establish an integrated and sustainable training program, increase the standard work facilities of the ship, and strengthen the psychosocial support for ship crew so that the ship's performance and operational safety could be better ensured.

**Keywords:** Self-Efficacy, Ship Crew Performance, Work Environment, National Shipping, Human Resources Development, Shipping Company

**1.0 INTRODUCTION**

Among the main challenges faced by PT Tanto Intim Line as a national shipping company are human resources management and work environment which have not been fully optimal in supporting its ship crew performance. Based on the result of preliminary observation, a case is found where the ship crew who have the certificate of expert seafarer level III, both in Nautical and Technical departments, are placed in the position of helmsmen or oilmen with no certainty of job promotion, limited work facilities in the ship, and lack of psychological support during the voyage. Such conditions have a potential to lower ship crew self-efficacy as well as an impact on the decreased productivity and ship's operational safety. Regarding the important role of ship crew in the smoothness of operational activity and in the compliance with the

international safety standards such as ISM Code, SOLAS, and STCW (IMO, 1980, 2010, 2014a, 2018b), it needs a study to analyze the influence of human resources development and work environment on ship crew performance through self-efficacy, with a case study of the ships owned by PT Tanto Intim Line.

Effective ship crew management is not only related to fulfilling the number of personnel, but also increasing the quality of competence, developing professional work attitudes, and creating safe and comfortable work environment. Among the main problems in the preliminary observation are; limited space and ship's physical condition, low self-efficacy, uncertainty and stress, unclear career path and job promotion, less attention to physical and mental well-beings, as well as poor communication and unclear tasks. In line with the identified problems, it is urgent to carry out this research to give a more comprehensive understanding of the interrelation among human resources development, work environment, self-efficacy, and ship crew performance in the national shipping companies. It is expected that the result of this research gives contributions to the development of theory in the human resources management and sea transportation management, as well as provides strategic recommendations for PT Tanto Intim Line and other national shipping companies in designing human resources development policies and effectively improving work environment to support ship crew safety and optimal performance. Some previous researches show that human resources development, including technical training, leadership strengthening, soft skill development, and work environment that support safety and well-being, can increase the ship crew self-confidence. However, the researches examining the correlation among the three variables simultaneously, especially in the context of national shipping company like PT Tanto Intim Line, are still limited in number.

High ship crew performance does not only give an impact on the smoothness of daily operation, but also on safety, communication effectiveness, and ability to face emergency situations. When ship crew feel more confident with their ability, they will be more proactive, able to work efficiently, and maintain their physical and mental health in the challenging condition. In PT Tanto Intim Line, the problems occur due to several factors, such as lack of training, poor communication among ship crew, as well as unclear tasks and responsibilities. These make ship crew face inefficiency in the ship operation, like delays in job completion and the deterioration of job quality. In addition, the less paid attention to the physical and mental conditions of ship crew can also influence their performance, regarding the highly demanding job in the sea and the limited facilities in the ship. The aim of this research is to analyze the direct and indirect influences of human resources development and work environment on ship crew performance through self-efficacy in the ships owned by national shipping companies. Therefore, this research focuses on examining empirically the influence of human resources development and work environment on ship crew performance with self-efficacy as the mediating variable.

## 2.0 THEORETICAL REVIEW AND HYPOTHESIS

### 2.1 Ship Crew Performance

Theoretically, according to Robbins & Judge, (2019), performance is the result of job function measured based on certain standards relevant with the job. Performance is the activity of the

employees who contribute well to the organizational goal (Colquit et al., 2019). In the context of shipping, ship crew performance can be understood as the performance shown through task implementation according to the regulations, safety procedures, and standard operation prevailing in the ship (Ricardianto, Prastiama, et al., 2021). Some other researches related to ship crew performance have been conducted (Malau et al., 2019; Mubin et al., 2023; Ricardianto, Prastiama, et al., 2021; Stevens & Parsons, 2002; Wang et al., 2002).

## 2.2 Self-Efficacy

Self-efficacy is an individual judgement of their capacity or competence to act, reach goals, or overcome challenges (Baron et al., 2006). Self-efficacy is very related to the commitment of an organization influenced by work autonomy, and work engagement (Akbar et al., 2018). Kim & Jang, (2018), specifying in the life of ship crew, state that self-efficacy is important for life quality, having direct and indirect effects. Some other researches concerning self-efficacy are very closely related to human capital management (Aziz et al., 2024; Firmansyah et al., 2022; Horcajo et al., 2022; Kanapathipillai et al., 2021; Nezami et al., 2016; Santoso et al., 2019)

## 2.3 Human Resources Development

In addition, human resources development creates an optimistic and goal-oriented work environment where employees are valued and acknowledged for their hard work and achievements (Ricardianto, 2018). Human Resources Management plays an important role in increasing the employee performance in an organization (Banu et al., 2025). The role of Human Resources Management in increasing employee performance is multifaceted and absolutely needed. The conditions of sea, main and auxiliary engines, and propeller rotation are the main causes of ship vibration at work (Jensen & Jepsen, 2014). Ship crew feel sensations in the whole body due to a mechanical vibration, which is communicated through the body components supporting the whole body (whole body vibration), such as feet while standing on a vibrating floor. Researches related to human resources development and ship crew have also been conducted before (Ricardianto & Sonny, 2021).

## 2.4 Work Environment

Theoretically, Horcajo et al., (2022), define work environment as all physical, emotional, and social aspects surrounding an employee that can influence their performance. The layout of work area, work atmosphere, cleanliness as well as the relationship with colleagues and superiors can also influence it. Whereas according to Ivancevich et al., (2018) work environment is the workplace necessary to be well paid attention because it influences significantly employee performance, so that it can help employees reach the company's goal. Non-physical work environment, according to Sunyoto, (2014), is related to the working relationship with superiors, colleagues, as well as subordinates. Some findings have been resulted in relation with ship's work environment (Budiyono et al., 2022; Ceyhun, 2014; Mangatur, 2024).

## 2.5 Conceptual Framework

Based on the theory, goals, and the results of some previous researches, as well as the formulated hypotheses, the framework of this research is developed based on the theoretical

studies and the results of previous researches concerning the influence of human resources development, work environment, and self-efficacy on ship crew performance. Then, the intervariable relationship in this research can be illustrated in the following framework (Figure 1).

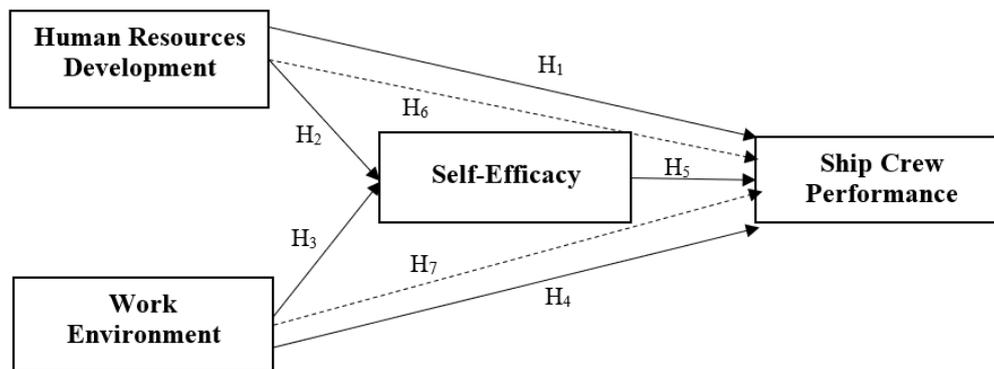


Fig. 1. The Constellation of Intervariable Relationship

2.6 Research Hypotheses

- H1: Human resources development directly influences ship crew performance
- H2: Work environment directly influences ship crew performance
- H3: Human resources development directly influences ship crew self-efficacy
- H4: Work environment directly influences ship crew self-efficacy
- H5: Self-efficacy directly influences ship crew performance
- H6: Human resources development indirectly influences ship crew performance through ship crew self-efficacy
- H7: Work environment indirectly influences ship crew performance through ship crew self-efficacy

3.0 METHOD

In this research, the researchers used Purposive Sampling method, because the selected sample had to fulfill certain criteria relevant to the aim of the research. In this research, only ship crew being subject to shift rolling process and having sufficient work experience on board the ship are considered as able to provide appropriate information related to human resources development, work environment, self-efficacy, and performance. In this research, the size of sample was determined using Slovin formula, obtaining 178 samples. The research approach used a survey, with the clients received questionnaire and the data was gathered using research tools. To ensure the intervariable relationship, the findings were analyzed further using Structural Equation Modeling. The relationship between two independent variables and one dependent variable was examined using this methodology. Data analysis was carried out using the method of Partial Least Square version 4.0, because this method was suitable for examining the complex and simultaneous relationship between latent variables. Hypothesis testing was done by seeing the calculated value of Path Coefficient through the steps of convergent, discriminant validity and composite reliability, and inner model tests.

4.0 RESULTS AND ANALYSIS

## 4.1 Results

### 1. Outer Model Evaluation

#### Convergent, Discriminant Validity and Composite Reliability Tests

Based on the result of Outer Loading test, individual indicators are considered as valid for having the correlation value above 0.70 ranging from 0.705 to 0.892. The result of Discriminant Validity test or Cross Loading test using SmartPLS-4 gives the value of Average Variance Extracted (AVE) above 0.50 for all constructs, ranging from 0.034 – 0.802. Based on the result of AVE test, it can be concluded that all the constructs have a high value of AVE and all the constructs have a value above >50, ranging from 0.531 to 0.747.

### 2. Inner Model Evaluation

#### Results of Composite Reliability and R-Square tests.

The conclusion of Composite Reliability test is that the variable of human resources development is reliable, because the composite reliability value of human resources development is  $0.726 > 0.7$ . The variable of work environment is reliable, because the composite reliability value of work environment is  $0.758 > 0.7$ . The variable of employee performance is reliable, because the composite reliability value of employee performance is  $0.714 > 0.7$  and the variable of self-efficacy is reliable, because the composite reliability value of self-efficacy is  $0.853 > 0.7$ . The R-Square value of Adjusted Model for path I is 0.681, meaning that the ability of the variables of human resources development and work environment to explain self-efficacy is 68.1%, thus the model is classified as moderate. The R-Square value of Adjusted Model for path II is 0.839 meaning that the ability of the variables of human resources development and work environment to explain employee performance is 83.9%, thus the model is classified as substantial or strong. The variable of human resources development against employee performance has the value of F2 as big as 0.373. So, there is a moderate effect of the exogenous variable on the endogenous variable. The variable of work environment against employee performance has the value of F2 as big as 0.332. So, there is a moderate effect of the exogenous variable on the endogenous variable. The variable of human resources development against self-efficacy has the value of F2 as big as 0.453. The variable of work environment against self-efficacy has the value of F2 as big as 0.368. So, there is a moderate effect of the exogenous variable on the endogenous variable. The variable of self-efficacy against employee performance has the value of F2 as big as 0.307. So, there is a moderate effect of the exogenous variable on the endogenous variable.

### 3. Mediation Effects

Table 1. Result of Direct Effects Test

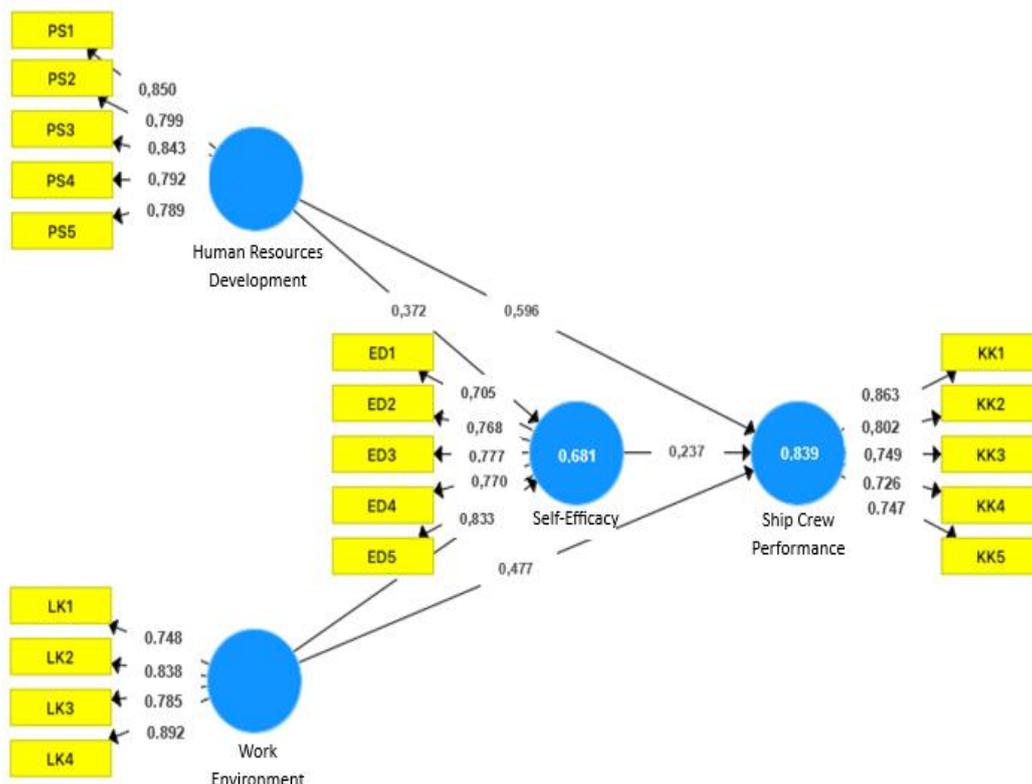
Original Sample (O)	Sample Mean (M)	Standard Deviation	T statistics	P values
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Human resources development -> Ship crew performance	0.596	0.513	0.053	4.946	0.000
Work environment -> Ship crew performance	0.477	0.408	0.037	4.071	0.040
Human resources development -> Self-efficacy	0.372	0.367	0.084	3.584	0.046
Work environment -> Self-efficacy	0.358	0.324	0.060	4.302	0.023
Self-efficacy -> Ship crew performance	0.237	0.212	0.036	2.384	0.014

4. Indirect Effects

Table 2. Result of Indirect Effects Test

	Original Sample (O)	Sample Mean (M)	Standard Deviation	T statistics	P values
Human resources development -> Self-efficacy -> Ship crew performance	0.410	0.392	0.005	3.206	0.037
Work environment -> Self-efficacy -> Ship crew performance	0.435	0.404	0.012	3.305	0.011



## Fig. 2. Mediation Effect

### 5.0 DISCUSSION

#### H1 – Human Resources Development Directly Influences Employee Performance

The path coefficient value of the human resources development variable toward employee performance 0.596 and the P-Value 0.000 ( $< 0.05$ ) are concluded as having a positive and significant influence. The hypothesis of direct influence concludes that employee performance is significantly influenced by human resources development. This indicates that employee performance and human resources development have a positive and substantial relationship. The relationship between human resources development and ship crew performance is very close because the improvement of human resources quality through education, training, and work experience will directly influence the ability, skills, and professionalism of ship crew in performing their job on board the ship. In addition to physical factors, the factors of non-physical work environment such as support from the Captain, good communication, team collaboration, and harmonious work atmosphere also influence ship crew performance and well-being.

The result of the first hypothesis testing supports the research by Kareem & Hussein, 2(019), showing a statistically significant correlation between organizational success and employee performance. Meanwhile, this research is also in line with the researches by Banu et al., (2025; and Tafese, (2024), mentioning the existence of positive contribution from human resources development practices to performance. So, organizations need to pay more attention to the human resources development strategy through training, increasing competence, and career development to encourage productivity and optimum performance achievement. IMO, (2010) emphasizes the importance of safety management system that encourages trainings, competence, and effective communication, so that it supports human resources development and creates safe work environment. Thus, based on these previous researches, it can be concluded from the result of the first hypothesis testing that human resources development positively and significantly gives a direct influence to employee performance.

#### H2 – Work Environment Directly Influences Employee Performance

The path coefficient value of the work environment variable toward employee performance is 0.477 and the P-Value 0.040 ( $< 0.05$ ), indicating a positive and significant influence. The hypothesis of direct influence concludes how well the employees do their job is much influenced by their workplace. Work environment is an important factor that influences employee performance and well-being, including ship crew working at sea. It seems that there is a strong correlation between comfortable workplace and employee productivity. The correlation between work environment and ship crew's performance is very important because a good condition of work environment will support the creation of safe, comfortable, and conducive work atmosphere. This can be done by improving physical facilities such as the lighting, ventilation, cleanliness, and comfort of working room, and developing harmonious work relations between superiors and subordinates as well as among colleagues. In addition, it is also important for the management to pay attention to the psychological aspects of employee by creating a positive working culture, providing moral supports, and opening an effective

communication room. By these ways, companies do not only improve employee performance, but also creates a healthier and sustainable work atmosphere.

The result of the second hypothesis testing is in line with the results of researches by Keke et al., (2023); Raisa et al., (2024); and M. Shammout, (2021) showing that there is a positive and significant influence of work environment on employee performance. This research also supports the studies of Darmayanti & Asrida, (2021); and Zhenjing et al., (2022) stating that positive work environment can improve employee performance. This research is also in line with another study, where work environment partially influences employee performance (Sabrina et al., 2021), in line with the implementation of standard safety according to IMO, (2010) that helps create safe work environment which is important for welfare and self-efficacy. Thus, based on the previous researches, it can be concluded from the result of the second hypothesis testing that work environment positively and significantly gives a direct influence to employee performance.

### **H3 – Human Resources Development Directly Influences Self-Efficacy**

The path coefficient value of the human resources development variable toward self-efficacy is 0.372 and the P-Value 0.046 ( $< 0.05$ ), indicating a positive and significant influence. The hypothesis of direct influence concludes that human resources development has a significant influence on self-efficacy. The correlation between human resources development and self-efficacy is very close because the efforts of human resources development through education, training, and work experience can increase individual confidence with their ability to perform their job. When the organization carries out a directed human resources development program, the employees or ship crew will obtain new skills, deepen their knowledge, and enhance their confidence to face work challenges. So, a directed and sustainable program of human resources development is necessary for increasing employee self-efficacy. This can be done through relevant trainings and education, career development, coaching, and providing opportunities to develop new skills in line with the job demand.

The result of the third hypothesis testing is in line with the research by Doto et al., (2023) indicating that the empowerment factor and the utilization process of human resources to each the company's goal involves self-efficacy and human resources development. This research is also in line with the report of IMO, (2010), as the basic of human resources development for seafarers, due to the establishment of minimum competence to be owned. STCW based trainings do not only enhance technical abilities, but also the seafarers' psychological aspects and self-efficacy (Berg, 2013; Fish, 2019; IMO, 2010). Thus, based on the previous researches, it can be concluded from the result of the third hypothesis testing that human resources development positively and significantly gives a direct influence to self-efficacy.

### **H4 – Work Environment Directly Influences Self-Efficacy**

The path coefficient value of the variable of work environment toward self-efficacy is 0.358 and the P-Value is 0.023 ( $< 0.05$ ), indicating a positive and significant influence. The hypothesis of direct influence concludes that self-efficacy is influenced significantly by work environment. This shows that self-efficacy and work environment have a positive and substantial relationship. Therefore, it is important to develop a supportive work environment

and empower the employees to enhance their self-efficacy. Good work environment, both physical and non-physical, will create a positive work atmosphere so that ship crew self-efficacy increases. Thus, a good work environment management will strengthen ship crew confidence with their ability. Having self-efficacy allows ship crew to feel more confident to perform their work, which may be useful for those who are easily overwhelmed by work.

The result of the fourth hypothesis testing supports the result of analysis by (Agustin et al., 2025), that in partial work environment contributes significantly to self-efficacy. This research is also in line with the implementation of IMO standard, helping create safe work environment which is important for well-being and self-efficacy (IMO, 2014b, 2018a; Popek & Bogalecka, 2007). Thus, based on the previous researches, it can be concluded from the result of the fifth hypothesis testing that work environment positively and significantly gives a direct influence to self-efficacy.

## **H5 – Self-Efficacy Directly Influences Employee Performance**

The path coefficient value of self-efficacy variable toward employee performance is 0.237 and the P-Value is 0.014 ( $< 0.05$ ), indicating a positive and significant influence. The hypothesis of direct influence concludes that self-efficacy has a significant influence on employee performance. This shows a positive and significant influence of self-efficacy on employee performance. The correlation between self-efficacy and ship crew performance is very close because the level of individual confidence with their ability will influence their way of facing the job and challenges on board the ship. High self-efficacy makes ship crew more confident, persistent, and never give up in completing works. Involving ship crew in all the works related to the company is a good way to maintain their level of self-efficacy. Since ship crew self-confidence and competence are closely interrelated, self-efficacy is an important performance indicator.

The result of the fifth hypothesis testing supports the result of the research by Kanapathipillai et al., (2021) indicating the statistically significant correlation between self-efficacy and innovative behaviour as well as employee performance. The result of the test by Chong & Ma, (2010) is also in line with the research saying that the confidence with self-efficacy is an important cognitive and social traits that determine and maintain work performance. Thus, based on the previous researches, it can be concluded from the result of the fifth hypothesis testing that self-efficacy positively and significantly gives a direct influence to employee performance.

## **H6 – Human Resources Development Indirectly Influences Employee Performance Through Self-Efficacy**

The path coefficient value of the variable of human resources development toward employee performance through self-efficacy is 0.410 with P-Value as big as  $0.037 < 0.05$ , so that self-efficacy can mediate the influence of human resources development on employee performance. This indicates that the influence of human resources development on employee performance mediated by self-efficacy is quite significant. Human resources development does not only give a direct impact to the improvement of ship crew performance, but also has an indirect influence through the strengthening of self-efficacy as the mediator in the correlation. The trainings

designed to increase self-efficacy, such as leadership training, mental strengthening, coaching, and mentoring, are needed to become an integral part of human resources development strategy in the ship's work environment.

The result of the sixth hypothesis testing is in line with the research by Zhang et al., (2023) indicating that human resources competence has an exponential impact on the organizational performance through the sustainable mediation role of the organization's identity and self-efficacy. Thus, based on the previous researches, it can be concluded from the result of the sixth hypothesis testing that human resources development significantly gives an indirect influence to employee performance through self-efficacy.

## **H7 – Work Environment Indirectly Influences Employee Performance Through Self-Efficacy**

The path coefficient value of the work environment variable toward employee performance through self-efficacy is 0.435 with P-Value as big as  $0.011 < 0.05$ , so that self-efficacy can mediate the influence of human resources development on employee performance. This indicates that there is a quite big impact of work environment on employee performance mediated by self-efficacy. So, the company must create and maintain the conducive, safe, and supportive work environment for all ship crew. Physically and psychologically healthy work environment will encourage employees to be more confident to perform their job. This effort can be realized through increased work facility, open communication between superiors and subordinates, effective stress management, as well as the implementation of positive and mutually respecting work culture.

The result of the seventh hypothesis testing is in line with the report from IMO, (2018b), emphasizing the importance of safety management system which promotes training, competence, and effective communication. SOLAS, with focus on safety of life at sea, requires training and use of appropriate safety equipment, which strengthen ship crew's preparedness and confidence to face the work situation (IMO, 2009, 2014b; Ricardianto, Sakti, et al., 2021). STCW plays a role in the training standardization and seafarer certification, which is the main foundation of ship crew's professional competence development (Fish, 2019; IMO, 2011). Thus, based on the previous researches, it can be concluded from the result of the seventh hypothesis testing that work environment significantly gives an indirect influence to employee performance through self-efficacy.

## **6.0 CONCLUSION AND POLICY RECOMMENDATIONS**

### **6.1 Conclusion**

Well-planned and sustainable human resources development through technical trainings, competence enhancement, leadership development, and mental and emotional development will strengthen employee's ability and work preparedness to face the operational demands in the field. Supportive work environment, either physically, socially, or psychologically, will provide the employees with the feelings of being comfortable, safe, and increase employee morale while on board the ship. Through appropriate training programs, continuous education, and technical and non-technical skills, employees will feel more confident to perform their duties and face the challenges in the dynamic work environment like in a ship. Positive work environment including work safety, comfort of facilities, harmonious work relationship, and

supports from superiors and colleagues will establish employee self-confidence with their ability to complete their duties.

A high self-efficacy reflects individual confidence with their ability to complete their duties and overcome the challenges in the marine work environment which is full of stress and risk. Self-efficacy mediates the correlation between human resources development and employee performance. Self-efficacy acts as the mediator that relates human resources development efforts to improved performance. Therefore, in addition to providing trainings and competence development, the companies also need to integrate the programs that can increase employee self-confidence with their ability. Self-efficacy can mediate the correlation between work environment and employee performance. Positive work environment such as good interpersonal relationship, adequate facilities, as well as moral supports from superiors and colleagues will increase employee self-confidence in performing their duties.

## 6.2 Policy Recommendations

This research strengthens the theories of human resources management and the psychology of organization stating that the development of individual competence and supportive work environment will increase self-efficacy, which finally have an impact on performance improvement. National shipping companies must understand that the investment in Human Resources Development and in the work improvement of environment does not only directly influence the performance but also enhances the self-confidence (self-efficacy) of ship crew in doing their tasks. The company management needs to formulate an integrated strategic policy, which does not only focus on technical trainings but also on employees psychological development. Managers need to be trained in the approach of supportive and empowering leadership, so that they can increase the self-efficacy and morale of team on board the ship.

The improved self-efficacy and performance of the employees on board the ship will create a more positive work atmosphere, increase job satisfaction, reduce conflicts, and lower turnover level. This will have an impact on the operational stability and team work effectiveness in the long term. The company needs to make self-efficacy as one of the key indicators in the human resources evaluation and development. Thus, the policy of employee development can be directed to create human resources who are not only competent, but also confident and tough in facing work challenges in the dynamic work environment at sea.

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