Analysis of the Influence of Seafarers' Competencies on Salaries in the Indonesian Shipping Industry

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Abstract

The international shipping industry is the backbone of global trade, with around 90% of international trade carried out by sea. As an integral part of the global transportation system, this industry plays an important role in facilitating the exchange of goods and services between countries. In this context, the quality and competence of seafarers is a crucial factor in ensuring the safety and efficiency of ship operations. This research explores the influence of Certificate of Competency (COC) and Certificate of Proficiency (COP) diplomas on seafarers' salaries in Indonesia, a developing country with unique maritime industry characteristics. Using a quantitative approach, this research analyzed data from 49 seafarers, and found that COC had a significant positive influence on wages, while COP did not show a statistically significant influence. These findings emphasize the importance of COC certification in increasing seafarers' earning potential, and suggest that the focus of seafarers' career development be directed at achieving higher COC levels for career advancement in the maritime industry.

Keywords: *COC, COP, Seafarers' Salaries, Maritime Industry.*

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A. INTRODUCTION

The international shipping industry is the backbone of global trade, with around 90% of international trade carried out by sea. This industry forms a complex network of global trade flows (Kosowska-Stamirowska, 2020) . Statistics show that the shipping industry not only occupies a central position in global trade but also plays an irreplaceable role in maintaining the dynamics of global logistics, transportation and trade flows (Wang, 2024) . As an integral part of the global transportation system, the shipping industry facilitates the exchange of goods and services between countries at low costs and a high level of security (Wu, Zhang, Li, Wang, & Zhen, 2023) . Thus, the international shipping industry plays a vital role in supporting global trade and maintaining economic connectivity between countries.

In this context, the quality and competence of seafarers are crucial factors that influence the safety and efficiency of ship operations. Accidents at sea are often caused by human error, including lack of seafarer competence, fatigue, lack of implementation of safety culture, and difficulties in interpreting information and communication (Kumara, 2024) . Indonesian seafarers need to increase their professionalism and expertise in order to compete with seafarers from other countries, which emphasizes the importance of competence in maintaining safety at sea (Kundori, Ariyanto, Dewi Rejeki, Arifah, & Budiyanto, 2024) . Seafarer competency also plays a role in the safety climate and safety behavior on ships, where the

continuity of shipping is very dependent on the competence possessed by seafarers (Kurniawan, Widanti, & Syanti, 2023) .

Two main certifications that are recognized globally, namely the Certificate of Competency (COC) and Certificate of Proficiency (COP), play an important role in determining the qualification level of seafarers. COC and COP serve as formal evidence that shows that a seafarer has the skills and knowledge necessary to operate efficiently in challenging conditions (Setyawan & Purwatiningsih, 2024) . This competency certification allows the business or industrial world to recognize that workers who have undergone this program have abilities that match their qualifications (Nawanksari, Sudira, & Mutohhari, 2021) . This certification is formal proof of a seafarer's skills and knowledge, demonstrating that they have the necessary abilities to function efficiently in difficult conditions (Setyawan & Purwatiningsih, 2024) .

Global standards regulated by the International Maritime Organization's Standards of Training, Certification, and Watchkeeping (STCW) aim to harmonize maritime education and training standards across countries (Barus, Simanjuntak, Siahaan, Toko, & Resmayasari, 2024) . Research shows that there is a strong perception of alignment with international standards among participants, which emphasizes the importance of consistency and global recognition in maritime education (Sihombing, Dwiyani, Martha, Hutabarat, & Sutrisno, 2024) . This shows that COC and COP certification play a crucial role in ensuring that seafarers meet globally recognized competency standards.

However, although there have been several studies regarding the effect of certification on a person's wages, studies that specifically discuss seafarers are still limited, especially in the Indonesian context (Iwan, Rahman, & Romeli, 2023; Nurniah, Sukriah, & Dahsan, 2018; Wulandari & Woyanti, 2023) . This leaves a gap in the literature regarding the economic impact of seafarer certification in developing countries such as Indonesia, which has its own maritime industry characteristics. Therefore, this research aims to fill this gap by exploring the specific influence of having a COC diploma and COP certificate on seafarers' salaries in Indonesia.

B. METHODS

This research uses a quantitative approach to measure the effect of having a Certificate of Competency (COC) and Certificate of Proficiency (COP) on seafarers' salaries. Quantitative methods were chosen because they allow the collection of numerical data that can be analyzed statistically to identify patterns and relationships between variables.

Quantitative methods allow the collection of data that can be measured numerically, such as test scores, questionnaires, and other statistical data. This allows for more accurate and systematic analysis (Izzatin & Nurmala R, 2018; Maulinda, Anggoro, & Gunawan, 2023).

The population of this research is seafarers who work in the shipping industry in Indonesia, with research samples taken randomly from various shipping

companies operating in Indonesia. The sampling technique used is simple random sampling to ensure that each member of the population has an equal chance of being selected. The targeted sample size is 49 sailors who have COC and COP diplomas.

The main instrument used in this research is a questionnaire designed to collect data regarding the respondent's profile, namely the type of COC certification they have, the number of COP certifications they have, and the monthly salary of seafarers. The collected data was analyzed using inferential techniques. Inferential analysis, such as linear regression, is used to test the effect of having a COC diploma and COP certificate on seafarers' salaries. Statistical software such as SPSS is used for data analysis.

C. RESULTS AND DISCUSSION

1. Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,973 [a]	,948	,945	579278.411

a. Predictors: (Constant), Number of COP Certifications (X2), Type of COC Certification (X1)

The results of the analysis show that there is a very strong correlation between the independent variables, namely the number of COP certifications and the type of COC certification, with the dependent variable, namely salary, with an R value of 0.973. The R Square (R^2) value of 0.948 indicates that approximately 94.8% of the variation in salary can be explained by a model that includes these two independent variables. The Adjusted R Square of 0.945, although slightly lower than R^2, still indicates that the model is very powerful in explaining variation in wages after adjusting for the number of predictors. Std. Error of the Estimate of 579,278,411 shows the average prediction error in salary units.

2. ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	279274909685740.800	2	139637454842870.400	416.128	,000 [b]
	Residual	15435919946912.309	46	335563477106.789		
	Total	294710829632653.100	48			

a. Dependent Variable: Salary (Y)

b. Predictors: (Constant), Number of COP Certifications (X2), Type of COC Certification (X1)

The F statistic resulting from the analysis is 416.128, which is a very high value. This indicates that the overall regression model is significant in explaining variation in wages. Sig value. (P-value) of 0.000 is much smaller than 0.05, indicating that this model is very statistically significant.

3. Coefficients

Coefficients [a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1957486,700	262098.867		7,469	,000
	COC Certification Type (X1)	2094571.332	99311.236	,995	21,091	,000
	Number of COP Certifications (X2)	-27710.713	41554.432	-.031	-.667	,508

a. Dependent Variable: Salary (Y)

The constant (Intercept) in this model is 1,957,486,700, which is the expected salary value when all independent variables are zero. This value is significant with a p-value of 0.000. For the COC certification type variable (X1), the unstandardized regression coefficient (B) of 2,094,571,332 indicates that each increase in the type of COC certification will increase salary by 2,094,571,332 units, assuming other variables are constant. The standard coefficient (Beta) of 0.995 confirms that the type of COC certification has a very strong influence on salary. The t test value for the COC certification type coefficient is 21.091, which is highly statistically significant with a p-value of 0.000. In contrast, for the variable number of COP certifications (X2), the unstandardized regression coefficient (B) is -27,710,713, indicating that every one unit increase in the number of COP certifications will reduce wages by 27,710,713 units, although this effect is very small compared to the effect of the type of certification COC. The standard coefficient (Beta) of -0.031 shows that the number of COP certifications has a very weak influence on salary, and the t test value of -0.667 shows an insignificant effect with a p-value of 0.508.

The multiple linear regression model used in this study is very significant in explaining salary variation, with 94.8% of salary variation explained by the number of COP certifications and the type of COC certification. The type of COC certification has proven to be a very significant and powerful factor in determining salary, with a huge positive impact. In contrast, the number of COP certifications has a very weak and insignificant effect on salary. Overall, the type of COC certification is a much stronger predictor of salary than the number of COP certifications.

The results of this study show that the type of COC certification has a very significant influence on seafarer salaries, with a regression coefficient of 2,094,571,332 and a very strong significance level ($p < 0.001$). This indicates that any increase in the type of COC certification substantially increases the wages received by seafarers. In contrast, the number of COP certifications does not have a significant effect on salary, with a regression coefficient that is much smaller and not statistically significant ($B = -27,710.713$, $p > 0.05$). Overall, the multiple linear regression model used in this study shows that 94.8% of the variation in salary can be explained by the type of COC certification and the number of COP certifications, with the type of COC certification as the dominant factor. These findings emphasize the importance of the type of COC certification in determining seafarer salaries, while the number of COP certifications, although important, does not have a significant impact on financial compensation.

4. Effect of COC Certification Type on Salary

The type of COC (Certificate of Competency) certification has proven to be a major determining factor in the variation in salaries received by seafarers. The high and statistically significant regression coefficient ($B = 2,094,571.332$, $p < 0.001$) indicates that each increase in COC certification type substantially increases seafarer wages. This can be explained by the fact that COC certification reflects the level of qualifications and competencies required to occupy important positions on board ships, such as captain, chief engineer and officer. The higher the type of COC certification held, the greater the responsibility and expertise expected, which in turn contributes to the salary received.

In the context of the maritime industry, COC certification is considered an essential professional standard, covering the technical and managerial competencies necessary to carry out ship operations safely and efficiently. Shipping companies tend to provide higher compensation to seafarers who have higher COC certification because they bring the expertise necessary to manage and operate vessels in complex and challenging conditions. These findings are consistent with previous literature showing a strong positive correlation between the type of professional certification and individual earnings in various industries.

Other studies also show that professional certification has a positive impact on individual performance and salaries in various sectors, including education and other industries (Anwar, Sudrajat, & Padillah, 2022; Wiranata, Surur, & Aisyah, 2023) . Formal recognition of skills through certification increases an individual's value in the job market, ultimately contributing to increased financial compensation. Previous research has proven that certification not only improves individual performance, but also has a significant impact on their income (Sodirin & Erawan, 2020) .

In the maritime industry, possession of COC certification not only serves as proof of competency, but also opens up opportunities for seafarers to access positions with greater responsibility and higher salaries. Therefore, COC certification remains one of the key factors influencing seafarer salaries, because this certification is often a requirement for promotion to higher positions on board ships (Hamzah, Muzakkir, Mardhiah, Andi Mattoliang, & Majid, 2023) . Thus, investing in obtaining and improving this type of COC certification is essential for seafarers who wish to enhance their careers and earnings in the maritime industry.

5. Effect of Number of COP Certifications on Salary

In contrast, the number of Certificate of Proficiency (COP) certifications shows a very small and insignificant effect on salary, as evidenced by the low and statistically insignificant regression coefficient ($B = -27,710.713$, $p > 0.05$). COP certification usually covers more specific technical skills and is often considered a complement to COC certification. This certification is regulated by the International Convention on Standards of Training, Certification and Safeguarding for Seafarers (STCW), which sets minimum standards for the training and certification of seafarers worldwide (Han, Li, Wang, Zhang, & Liu, 2023) . The Skills Training Program, which is included

in COP certification, aims to improve seafarers' knowledge and skills in accordance with STCW provisions (Sukur, Tjahjanto, & YM, 2020) . This shows that COP certification is not just a formality, but also an integral part of seafarers' professional development. According to (Setyawan & Purwatiningsih, 2024) , this certificate serves as proof that a sailor has been trained and declared competent in dealing with challenging conditions at sea. This is in line with the STCW's goal of establishing minimum requirements for seafarer certification, which aims to improve maritime safety and environmental protection (Han et al., 2023; Lee, Dhesi, Phillips, Jeong, & Lee, 2021) . In the context of maritime education, COP certification also reflects the quality of education received by seafarers. Sihombing (2024) noted that many trainees felt their programs were in line with international standards, indicating high confidence in the relevance and quality of their educational experience (Sihombing et al., 2024) . Thus, this certification not only functions as a formal document, but also as an indicator of the quality of education and training received by seafarers.

While having more COP certifications may indicate that a seafarer has a variety of additional skills, the results of this study indicate that possession of COP certifications does not necessarily translate into a significant increase in salary. Most likely, the added value of COP certification in the salary context is limited to certain roles or more as a prerequisite for obtaining higher COC certification. In many cases, shipping companies may focus more on the COC certification type when determining salary structures, as COC certification is considered more critical in determining the qualifications and competencies required for positions with greater responsibility. COP certification, while important, often only makes an additional contribution that is not significant enough to impact overall compensation.

Although COP certification shows that a person has met high professional standards and can improve work quality and confidence in carrying out complex tasks (Pramana, 2020) , the results of this study indicate that the financial benefits of COP certification may not be as important as COC certification. This may be because COP is focused more on specific skills rather than managerial qualifications which are generally more highly valued in salary structures in the maritime industry. Therefore, while COP certification remains relevant in an operational context, its impact on overall wages may be more limited compared to COC certification.

D. CONCLUSION

This research clearly shows that the type of COC (Certificate of Competency) certification is a very significant factor in determining seafarer salaries, with a much greater contribution than the number of COP (Certificate of Proficiency) certifications. The results of multiple linear regression analysis reveal that an increase in the type of COC certification substantially increases salaries, while the number of COP certifications does not have a significant effect on salaries. This indicates that in the maritime industry, higher COC certification provides seafarers with a significant competitive advantage in terms of financial compensation.

These findings have important implications for seafarers and shipping companies. For seafarers, the main focus in career development should be directed at achieving higher COC certification to increase income. Meanwhile, for shipping companies, these results emphasize the need to pay attention to the type of COC certification in determining salary structures and in human resource development strategies. Overall, this research confirms the importance of COC certification type as a primary predictor of seafarer salary, while the number of COP certifications has a much more limited influence.

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