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Analysis of Unemployment Duration for Seafarers in Tanzania

By

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ABSTRACT

This study intended to analyze unemployment duration of seafarers in Tanzania. The study determined the influence of socio-economic factors using Kaplan-Meier survival curves, determined socio-demographic influence and the influence of area of residence on unemployment duration of seafarers in Tanzania. The study was executed in Dar es Salaam involving 510 certified Seafarers and the data collection was done electronically through e-questionnaire dispatched to sampled seafarers through email and whatsApp.

The analysis revealed that, majority of seafarers were male (94.71%), with a notable minority being female (5.29%). A substantial proportion of seafarers are currently unemployed (60.59%). Most of the seafarers do not possess a Certificate of Competency (COC) (79.22%), potentially impacting their employability. Furthermore, the dataset included individuals employed in various countries, with Tanzania being the predominant employer (83.26%), followed by Zanzibar (13.40%) and other countries with smaller proportions. The average age of seafarers was roughly 33 to 34 years. But also, Seafarers held an average of 2 certifications, suggesting diversity in the qualifications held by Seafarers.

The average duration of unemployment among seafarers was about 4 to 5 years, highlighting variability in employment status and potential challenges in securing employment within the maritime industry. Holding a Certificate of Competency (COC) is associated with a substantial decrease in unemployment duration, as evidenced with a high level of significance ($p < .001$). Besides, seafarers with an Overall Rating certification also experienced a significant decrease in unemployment duration ($p < .001$). Conversely, other certification statuses such as Mandatory, Diploma, Bachelor's and Master's Degrees do not show significant associations with unemployment duration. However, being male is positively associated with a higher unemployment duration ($p < .01$). Moreover, age also demonstrated a significant positive relationship with unemployment duration ($p < .001$). The findings suggested a slight influence of area of residence on unemployment duration, meaning that other factors may play a more significant role.

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ABBREVIATIONS

AFT	Accelerated failure time
AIC	Akaike information criteria
ANN	artificial neural network
COC	Certificate of Competency
DMI	Dar es Salaam Maritime Institute
EASTC	Eastern Africa Statistical Training Centre
GPA	Grade Point Average
ILO	International Labour Organization
KM	Kaplan-Meier
MoT	Tanzania Ministry of Transport
NIT	National Institute of Transportation
OLS	Ordinary Least Squares
PH	Proportional hazard models
PSSR	Personal Survival and Social Responsibility
PST	Personal Survival Training
SPSS	Statistical Package for the Social Sciences
STATA	Statistics and Data
TASAC	Tanzania Shipping Agencies Corporation
TPA	Tanzania Ports Authority
UNDP	United Nations Development Programme

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CHAPTER ONE
INTRODUCTION

A. Overview

This chapter introduces the study on the analysis of unemployment duration among seafarers in Tanzania. It includes the background, problem statement, general objective, specific objectives, hypotheses, significance and scope of the study.

➢ *Background of the Study*

A seafarer is an individual involved in sailing or working aboard a ship. They may be referred to by various titles, such as sailor, seaman, or mariner. Seafarers are responsible for navigating waterborne vessels or serving as crew members to assist in the operation and maintenance of ships (Lalith, 2018).

Youth unemployment is a particularly pressing issue in developing countries, where high levels of poverty necessitate that everyone works to ensure survival (International Labor Organization, 2011). The root cause of unemployment is often linked to the inadequacy of employees' education and skills to meet the demands of modern jobs (Fatunde, 2013). According to the National Employment Policy of the United Republic of Tanzania (2014), graduate unemployment is driven by the growing number of graduates and the mismatch between the courses offered by tertiary institutions and the needs of industries.

Unemployment duration refers to the amount of time that an individual remains unemployed (Ciucă & Matei, 2010). The analysis of unemployment duration for seafarers seeks to understand and quantify factors influencing the length of time seafarers remain unemployed in Tanzania. This analysis is rooted in the recognition that unemployment is a dynamic process influenced by a numerous of economic, social and individual factors. In Tanzania, like many other coastal states, seafaring is not only a vital source of employment but also a basis of the national economy. Despite of its implication, the maritime industry faces various challenges, including high rates of unemployment among seafarers.

Government policies concerning seafarer training and certification can significantly affect the skills and employability of seafarers (Rochdi, 2009; UNDP, 2021). Besides, the maritime industry's cyclical nature, driven by global trade cycles and technological advancements in vessel operations, plays a crucial role (Nogué-Algueró, 2020). These factors influence both the demand for seafaring professionals and the length of unemployment between contracts. The maritime sector, which handles over 90 percent of global trade by tonnage, is highly sensitive to global economic trends and demand for goods. Despite this, the global supply of seafarers available for international shipping was estimated at 1,647,500, with women representing just 1 percent, or approximately 16,575 (ILO, 2019).

In Africa, ranking of unemployed workers in the South African labour force can be thought as a combination of the quality of educational attainment and geographical location (Nakimuli, 2012). However, economic downturns in Africa and global shipping industry trends have implications for job availability and the duration of unemployment (Halonen & Liukkunen, 2020). Moreover, Demographic factors, such as age, education and socioeconomic background, can influence seafarer employment experiences (Brown, 2022). Understanding these factors is essential for a nuanced analysis of unemployment duration.

In Tanzania, the economic landscape significantly impacts seafarers' employment whereby the maritime industry, encompassing shipping, fishing and related sectors, plays a vital role in the nation's economy. Understanding the nuances of this industry is essential for assessing seafarer employment patterns (Updated National Ports Master plan, 2018). The survival analysis of unemployment duration among seafarers in Tanzania constitutes a critical exploration into the dynamics of maritime employment in the East African context. The maritime industry in Tanzania, positioned along the Indian Ocean, is subject to various global, regional and local factors that influence the employment experiences of seafarers (Ulandssekretariatet, 2018).

B. Statement of the Problem

Duration of unemployment among seafarers, remains underexplored as there are limited number of studies done with regard to survival analysis of unemployment duration of seafarers in Tanzania. The existing literature indicates that 50.5% of seafarers remain unemployed for more than 180 days, while 49.5% find employment. This balance in the dataset, combined with an accuracy that exceeds the average reported in similar studies, highlights the need for further investigation.

This study is set to address the Limited Understanding of Unemployment Patterns to seafarers, the translation of global maritime influences into local employment realities. Moreover, demographic factors of age, education and socioeconomic background sought to be observed as potential disparities in seafarer employment experiences. Nevertheless, the use of Kaplan-Meier survival curves provided visual representation of the unemployment duration distribution. This uncovered patterns, identify critical time points and offered a comprehensive overview of how seafarers experience periods of unemployment over time.

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C. Objectives

➢ *General Objective*

The general objective of this study was to analyze unemployment duration of seafarers in Tanzania.

➢ *Specific Objectives*

The study specifically focused on the following objectives;

- To determine the influence of socio-economic factors on unemployment duration of seafarers in Tanzania
- To determine the influence of socio-demographic factors on unemployment duration among seafarers in Tanzania
- To determine the influence of area of residence on unemployment duration to seafarers in Tanzania.

D. Research Questions

This study intends to respond on the listed research questions:

- What is the influence of socio-economic factors on the unemployment duration of seafarers in Tanzania?
- How do socio-demographic factors influence the unemployment duration among seafarers in Tanzania?
- What is the influence of area of residence on the unemployment duration of seafarers in Tanzania?

E. Significance of the Study

The research study on the survival analysis of unemployment duration among seafarers in Tanzania holds significant importance for various stakeholders. Firstly, the findings of the study can offer crucial insights into the significant factors influencing the duration of unemployment among the seafarers. This knowledge is vital for policymakers and regulatory bodies in the maritime sector, enabling them to formulate targeted interventions and policies aimed at mitigating unemployment risks and enhancing the resilience of seafarers in the face of economic uncertainties. Moreover, the research outcomes can inform industry stakeholders, such as shipping companies and maritime training institutions, guiding them in optimizing workforce management strategies and curriculum development to align with the dynamic employment landscape. Additionally, the study intended to empower seafarers themselves by suggesting factors impacting their employability, enabling them to make informed career decisions and pursue avenues for skill development.

F. Scope of the Study

This study sought to take the case of Mainland Tanzanian maritime regions including Dar es Salaam, Pwani, Tanga, Mtwara, Kigoma, Mwanza, Mara, Kagera, Geita, Rukwa and Kyela as displayed on Map 1.1 where most of the qualified seafarers are looking forward to work. Moreover, Tanzania is the coastal country recognized internationally. This study employed secondary data collected daily from TASAC for the period of 6 years from 2018 to 2023 and collected primary data for completion of dataset from the individual seafarers. Secondary data allowed the researcher to build on existing research, which definitely led to better results and save time, efforts and expenses.

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CHAPTER TWO
LITERATURE REVIEW

A. Overview

This chapter deliberate literature review of the study on survival analysis of unemployment duration of seafarers in Tanzania. It details on definition of terms, theoretical literature review, empirical literature review, empirical summary, synthesis of review, literature gap and conceptual framework of the study.

B. Definition of Terms

Here are some definitions for terms related to the proposed study on the survival analysis of unemployment duration for seafarers in Tanzania. These definitions serve to clarify the key terms used in the proposal and provide a foundational understanding for readers and stakeholders reviewing the proposal.

- *Survival Analysis*

Survival analysis is a statistical method used to analyze the time until an event of interest occurs (Kidede and Kazuzuru, 2017).

- *Measurement Scale*

The measurement scale in this research proposal pertains to the range and type of variables used to quantify and categorize data (Cox, 2015)

- *Seafarer*

Seafarer is an individual employed in various capacities on ships, including but not limited to officers, engineers and deckhands (Halonen & Liukkunen, 2020).

- *Age of the Seafarer*

Age of the Seafarer typically refers to the chronological age or period in life of an individual who works as a seafarer (Gekara and Sampson, 2021).

- *Gender of the Seafarer*

Gender of the Seafarer is the categorization of individuals working as seafarers based on their gender identity which is either male or female (Gekara and Sampson, 2021).

- *Unemployment Duration of the Seafarer*

Unemployment duration of the seafarer is the length of time a seafarer remains without employment within the maritime industry (Gekara and Sampson, 2021).

- *Time to Event*

Time to event approach, within the context of survival analysis, refers to the methodology used to analyze the time until a specific event occurs (Čabla & Malá, 2017).

C. Theoretical Review

- *Job Search Theory*

Job search theory is a conceptual framework within labor economics that explores the process by which individuals actively seek employment opportunities. Literatures highlighted the evolving nature of job search theory, incorporating insights from behavioral economics, policy evaluations and the psychological well-being of job seekers (Cockx, 2012).

Several theories address the extended period of unemployment. This study is based on the job search theory proposed by Lipman and McCall (1976) and Mortensen (1970), which is a widely adopted theoretical framework. Search models describe the decision-making process of individuals, determining whether they actively engage in the labor market or remain unemployed. To investigate the length of unemployment, the study specifically examines the job search behavior of unemployed individuals (Tahir et al., 2017).

It is assumed that the worker is actively seeking employment but lacks complete information, which may lead to encountering unsuitable jobs before finding the right one. When an unemployed individual receives a job offer, they must decide whether to accept or decline it based on a previously established set of criteria. These criteria play a crucial role in the decision-making process for both employers and workers. Employers place significant importance on these factors, which enhance a candidate's appeal when offering a position. The criteria include educational qualifications, local market conditions, skill level, and experience. The acceptance of a job offer by an unemployed person is influenced by their personal set of preferences (Tahir, 2017).

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Tahir (2017) conducted a cross-sectional analysis, using human characteristics as indicators in the decision-making process for both employers and employees. The results indicated a positive relationship between age and the length of unemployment. Additionally, human characteristics were found to significantly influence the duration of unemployment in various studies. These results seconded the observations from the study conducted by Roberto in 2011, which identified age as statistically significant in determining unemployment duration across all age groups. Other key indicators include educational attainment and the square of age, serving as a proxy for work experience, which employers highly value during the hiring process. Higher education is often seen as a reflection of accumulated human capital and increased worker productivity. However, employers are increasingly focused on worker productivity. In recent years, a large number of highly educated individuals have entered the labor market, but available job opportunities have been insufficient to meet their demands, leading even highly qualified individuals to face unemployment challenges (Nunez, 2010).

Tahir (2017) also identified gender as a significant factor in employment discrimination, noting that employers tend to favor hiring males over females, leading to gender inequality in employment opportunities. Furthermore, quantitative analysis of search models aimed at capturing the impact of labor market indicators on unemployment shows that an increase in wage dispersion and a decrease in unemployment incidence can significantly extend the average duration of unemployment (Hohmeyer and Lietzmann, 2020).

- *Social Network Theory*

Social network theory examines how the relationships and connections between individuals impact different aspects of their lives, such as the flow of information, exchange of resources and behaviours. It proposes that individuals are part of social networks and the structure of these networks influences their access to resources, opportunities and support.

Fischer et al. (2021) reinforce Granovetter's 1973 concept of the strength of weak ties, highlighting their critical role in job search success, particularly in gaining access to unique information about job opportunities and market trends. Additionally, Borgatti and Cross (2003) show that individuals who hold brokerage positions within social networks tend to be more innovative and have greater access to new information, including job prospects.

Nan Lin's concept of "Social Capital" highlights the resources found within social networks, including information, trust, and social support. Recent research by Ahuja (2020) demonstrates that individuals with high levels of social capital, characterized by strong and diverse networks, experience better job search outcomes, such as higher job satisfaction and quicker re-employment. Additionally, Ellison et al. (2007) explored how online social networks aid in job searches by offering access to job postings, professional contacts and valuable informational resources.

In the study on analyzing unemployment duration for seafarers in Tanzania, Social Network Theory provides a framework for understanding how social connections and networks influence job search behaviour and unemployment outcomes among seafarers by examining the influence of age and residence area being urban or rural that can affect the flow of information and networks.

Analysis on unemployment duration of seafarers in Tanzania incorporates insights from Social Network Theory, that uncover the mechanisms through which social networks influence unemployment duration for seafarers in Tanzania, providing valuable implications for policy, intervention and support programs aimed at addressing unemployment challenges in the maritime industry.

D. Empirical Literature Review

Kidede and Kazuzuru (2017) examined various individual factors among university graduates that could delay employment, independent of external conditions. The study explored how factors such as place of residence (urban versus rural), gender, access to information, GPA, field of study (science versus arts) and prior work experience affect the time taken to secure a job. The findings indicated that quicker employment was associated with better access to information, being female, residing in urban areas post-graduation, achieving a high GPA, studying arts or business-related subjects, and having prior work experience. The study recommended that the government and relevant stakeholders encourage universities to align curricula with the current job market, establish job market intermediaries to connect graduates with employers, and promote greater female enrolment in universities, as they have higher chances of employment.

Kaplan-Meier survival analysis was employed to estimate unemployment duration across various counties in Romania and to identify factors affecting the likelihood of leaving unemployment. The results showed that unemployment survival rates were influenced by factors such as age, education, and gender. The study recommended further research into jobseekers' areas of specialization to gain a deeper understanding of the causes behind their extended periods of unemployment (Ciucă and Matei, 2010).

Boškoski (2021) applied a variational Bayesian model for survival analysis, utilizing an artificial neural network to predict the likelihood of a job seeker in Slovenia finding employment over time. The estimation results revealed that the dataset was balanced, with 50.5% of individuals remaining unemployed for more than 180 days, and 49.5% securing employment before this threshold. The model's accuracy exceeded the average reported in previous studies. Based on these findings, the study recommended that authorities adopt the variational Bayesian model to more accurately identify job seekers who require additional support, potentially

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enhancing their services. Additionally, future research focusing on the differences between types of job exits and strategies to increase favorable outcomes would be highly valuable.

Kaplan-Meier survival analysis was employed to estimate the survival function of individuals, while the Weibull distribution was used to assess the impact of wage dispersion on long-term unemployment in Pakistan. The Kaplan-Meier estimation showed that the survival function decreases over time, indicating that the likelihood of remaining unemployed diminishes. The transition from unemployment to employment was significantly higher for males, older workers, and those with secondary or higher education levels. In contrast, younger workers experienced longer unemployment durations compared to older workers. The study also highlighted the prolonged duration of unemployment and its demographic associations in the labor market. Furthermore, it found that significant wage dispersion contributes to extended unemployment spells, as the economy is not generating sufficient jobs for qualified workers. Based on these findings, the study recommended the development of labor market policies targeting specific groups and suggested the implementation of vocational training programs and internships to facilitate the transition from unemployment to employment (Tahir, 2017).

The study utilized the unemployment ranking model proposed by Blanchard and Diamond (1990) to conduct a survival analysis of unemployment duration in South Africa from 2001 to 2004. The analysis examined the characteristics and determinants of unemployment duration by considering demographic, geographic, and educational diversity within the South African labour force. The findings revealed that the ranking of educational levels is strongly linked to race, with individuals lacking formal education experiencing worse labour market conditions. Further, the study found that a willingness to work in the informal sector significantly increased the chances of exiting unemployment for those with less than a secondary education. Based on these findings, the study recommended policies to enhance technical education for unskilled workers and to improve the quality of education in historically disadvantaged schools (Nakimuli, 2012).

Gunarathne and Jayasinghe (2021) utilized ordinal logistic regression to pinpoint significant factors affecting the unemployment duration of arts stream graduates among various variables analyzed in the study. Additionally, they employed the Semi-Parametric Cox Proportional model to examine the relationship between the time taken by graduates to secure their first job and the explanatory variables. The study identified factors influencing unemployment duration for both science and arts stream graduates in Sri Lanka. The findings indicated that female graduates from the science stream generally experience a longer period before obtaining their first job compared to their male counterparts. Graduates with specialized degrees were found to have better job prospects, whereas GPA did not significantly affect unemployment duration. The study recommended increased government investment in education to enhance the employability skills of young people.

The Kaplan-Meier estimator was used to evaluate the probability of an individual remaining unemployed for a specific period in a study on unemployment duration in South Africa. Moreover, the study employed a Markov chain to predict transition probabilities between labor market statuses (unemployment, employment, and inactivity) over time. The transition matrices revealed anticipated shifts in labor market conditions. The findings indicated that the likelihood of securing employment decreases as the duration of unemployment lengthens, with the overall exit rate from unemployment being low, leading to prolonged unemployment periods. This extended unemployment results in a decline in human capital, further reducing employability. The Markov chain analysis also showed that newly created jobs tend to be unstable, with many employees eventually transitioning back to unemployment. The study concluded that unemployment in South Africa is a complex, multifaceted issue (Nonyana & Njuho, 2018).

E. Empirical Summary

Generally, empirically most of the studies examined the factors that delay employment to graduates including Kazuzuru and Kidere (2017) discussed on the factors among the universityy graduates which could delay one's employment irrespective of the situation on the ground. Gunarathne & Jayasinghe (2021), applied an ordinal logistic regression to identify the significant variables of unemployment duration of the arts stream graduates among the variables considered for survival analysis of unemployment duration. Besides, the focus of this paper was centered on broadening the literature on the survival analysis of unemployment duration to seafarers in Tanzania.

F. Synthesis of Review

Kaplan-Meier estimation reveals a comprehensive understanding of the methodological landscape within the context of time to event information. The Kaplan-Meier estimator is broadly applicable in numerous studies, emphasizing its usefulness in analyzing and visualizing survival curves. Scholarly contributions including Kazuzuru and Kidere (2017), Nonyana and Njuho (2018), Gunarathne and Jayasinghe (2021) and Nakimuli (2012) highlighted the flexibility of this non-parametric technique in accommodating censored data, a common feature in longitudinal studies of unemployment duration. The literature reveals its utility in diverse fields, from medical research to social sciences, and now extending to the investigation of seafarers' unemployment duration in Tanzania.

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G. Research Gap

Seafarers, being a vital component of Tanzania's maritime industry, is subject to various economic, regulatory and global factors that influence the duration of unemployment experienced by seafarers. Most studies that employed survival analysis are conducted worldwide and few in Tanzania that establishes an average duration taken by graduates to secure employment and estimation reflected rates in unemployment are influenced by age, education and gender.

This study aims to address the gap in existing research by employing the Kaplan-Meier survival analysis to describe unemployment duration of seafarers in Tanzania. The study focused on describing unemployment patterns of seafarers, identify the significant factors contributing to prolonged unemployment durations and provide the basis for evidence-based policy recommendations in this specific occupational group of seafarers. Moreover, the study introduced new socio-demographic variables including area of residence, time from certification, number of certifications, type of certification and COC Status which altogether can influence seafarers' unemployment duration.

H. Conceptual Framework

The conceptual framework for this study involves both the dependent variable which is unemployment duration of seafarers and independent variables including socio-economic factors of time from certification, number of certifications, type of certification and COC status, socio-demographic factors of age and gender but also Area of residence for seafarers in Tanzania as displayed in figure 2.1.

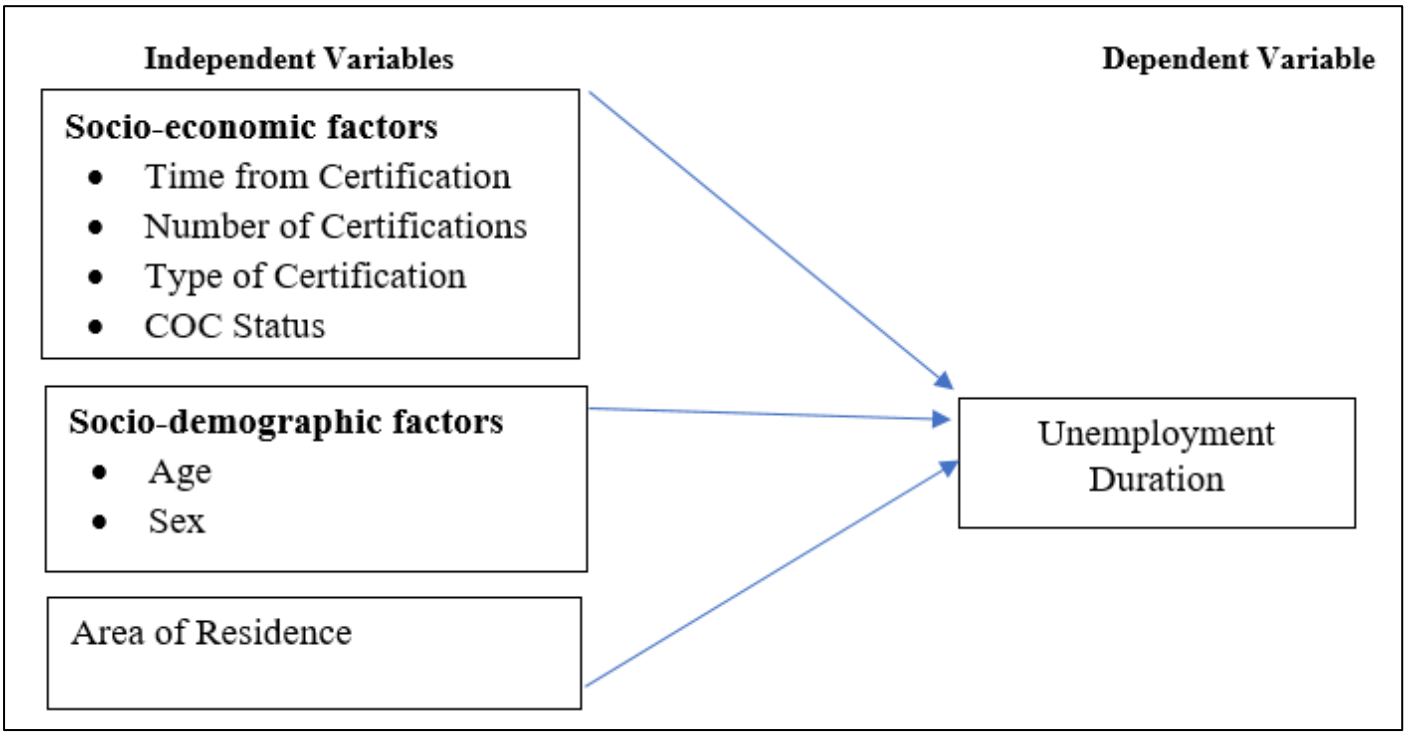

Fig 1: Conceptual Frame Work
Source: Author (2024)

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CHAPTER THREE
METHODOLOGY

A. Study Area

The study area comprised of key maritime regions, including major ports and coastal areas, with coordinates ranging from approximately 1.2921° S latitude to 36.8219° E longitude. The choice of maritime regions in Tanzania sought to be the areas where seafarers are likely to be available.

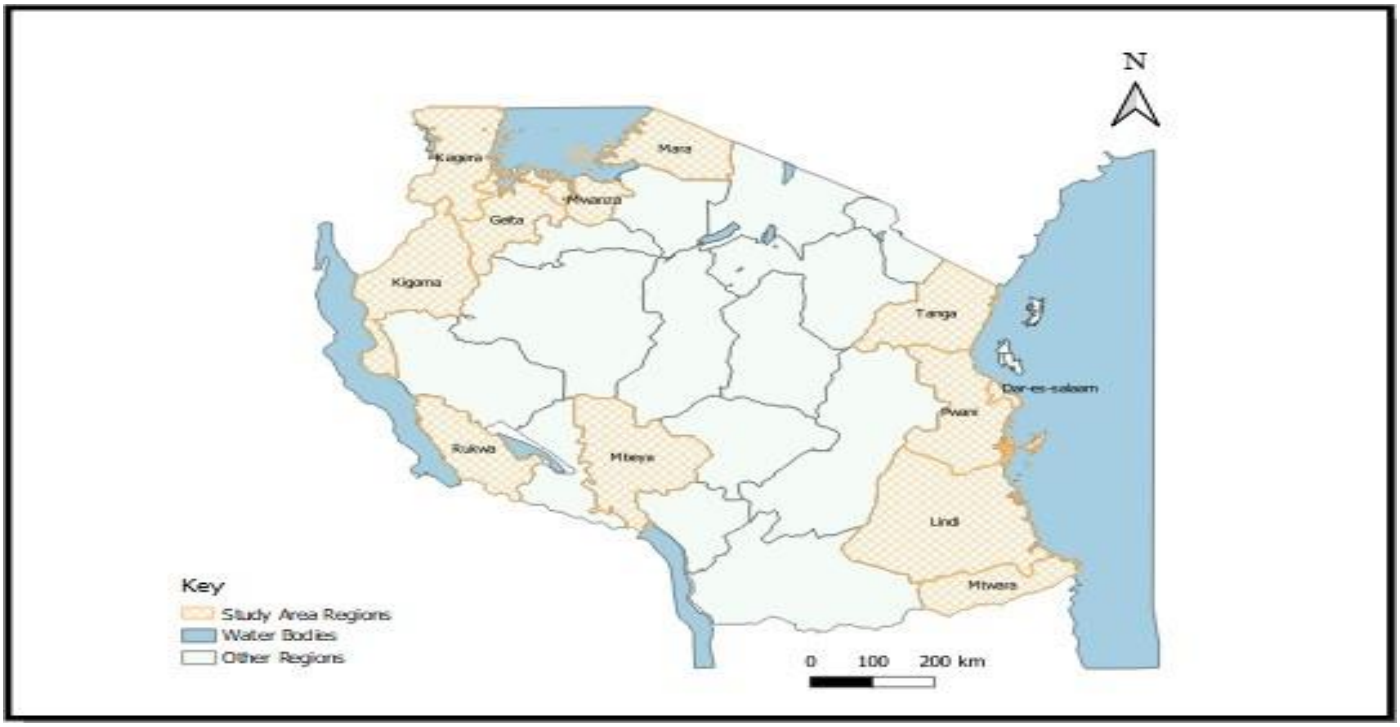

Fig 2: Study Area Map
Source: Author, 2024

B. Research Design

The research design for this study was quantitative with both (descriptive and inferential analysis) that employed administrative longitudinal data of seafarers from Tanzania Shipping agencies Corporation. The dataset employed for this research was time-to-event statistics which tracks individual seafarers' event of employment to occur. Moreover, the descriptive research for this study refers to the accurate portrayal of the characteristics of individual seafarers and inferential as the statistical justification of the secondary and primary data collected.

The descriptive and inferential design was selected because of its high degree of representativeness and the ease with which a researcher gathered participants' opinions. The secondary dataset for this research was analyzed and statistically inferred to the seafarers.

- *Research approach*

To achieve the research objectives and address the problem, the study adopted a quantitative approach to collect data and test the research hypotheses. The decision to use solely a quantitative method was aimed at facilitating the analysis of time-to-event data concerning the unemployment duration of seafarers in Tanzania.

- *Targeted Population*

According to TASAC Annual Statistical bulletin, 2023 there are 8,000 seafarers in Tanzania who graduated from different academic institutions with certificates of competence (COC). These seafarers are sought to form the target population of this study.

- *Sampling Techniques*

The purposive sampling approach was used in the study to select participants who were accessible via their mail address or WhatsApp and willing to respond to the research inquiry. This approach aimed to gather insights of unemployment duration from seafarers, further, primary data was collected by using questionnaires dispatched to respondents electronically through Kobo data collect based on the accessibility, involvement, knowledge of their employment status to complete the time-to-event dataset and incomplete information was treated as censored data.

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➢ *Sample Size of the study*

Sample size of this study was drawn from the target population of 8,000 seafarers certified by TASAC as by 2023 through purposive sampling. The researcher purposively identified and included 510 seafarers who met the specified criteria and were accessible through mail or WhatsApp.

➢ *Data Collection*

The study employed dual-data sources approach through combining secondary data from Tanzania Shipping Agencies Corporation (TASAC) with primary data of time to employment collected by using questionnaires dispatched to respondents electronically through Kobo data collect. This designed modality enriched the study's depth and provide valuable insights into the dynamics of the Maritime administration in Tanzania.

Secondary dataset obtained from TASAC included historical records of seafarers' database certified for the period ending December, 2023 and the primary data were collected electronically to complete the event of unemployment duration. Besides, the secondary dataset of seafarers which was purposively drawn from the long list of 8,000 seafarers were the grounds for completing the time-to-event dataset of 510 seafarers that formed the analysis.

➢ *Questionnaire*

The study deployed an electronic questionnaire as one of the techniques for primary data collection on the individual information towards completing the dataset on time to event on the survival analysis of unemployment duration of seafarers in Tanzania. Questionnaires was administered to individual seafarers through mail and whatsApp.

➢ *Variables and Measurements*

Variables for this study were socio-demographic variables of employment status, COC Status, Time from Certification, Number of Certifications and Type of Certification. Further, the study determined socio-economic variables of age and sex but also area of residence which may influence the duration of unemployment. The measurement scale employed in this research utilized both categorical and continuous variables, ensuring a comprehensive analysis of the seafarers' unemployment experience as indicated on table 1.

Table 1: Variables

Variable	Description	Measurement units	Scale	Data source
COC Status	Seafarers with certificate of Competence	Yes/No	Nominal	Individual Seafarers
Time from Certification	Time from Seafarers' certification to date of data collection	Years	Discrete	TASAC
Number of Certifications	Number of certifications possessed by the Seafarer	Number	Discrete	Individual Seafarers
Type of Certification	Academic qualification of the seafarer	Primary education, Secondary education or Bachelor Graduate	Ordinal	TASAC
Age	Age of the seafarer	Years	Discrete	TASAC
Sex	Gender of the seafarer	Male or Female	Nominal	TASAC
Area of Residence	Residential Region of the Seafarer	Regions	Nominal	TASAC
Unemployment Duration	Time taken by a Seafarer to secure employment	Years	Discrete	Individual Seafarers

Source: Author, 2024

C. Data Analysis

The analysis utilized both parametric and non-parametric models. Parametric estimation involved using regression analysis to estimate the hazard function, with non-linear functions allowing for the application of the maximum likelihood method. Additionally, the Kaplan-Meier estimator was used to determine the probability that an unemployed seafarer would remain unemployed for a given duration. The study employed Kaplan-Meier (KM) survival curves to describe and interpret survival data and used the log-rank test to assess whether two or more KM curves were statistically equivalent. Alternative tests to the log-rank test were also discussed. The time-to-event approach was applied using survival analysis techniques to model unemployment duration.

To see whether two or more survival curves are identical, this study used the log rank test based on looking at the seafarers included in the sample at each point of time. Seafarer leaving unemployment status and compute the expected number of days one can stay unemployed in proportion to the number of seafarers. Moreover, the chi-square test of independence was calculated.

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➢ *Data Quality Control*

Reliable secondary data on seafarers was obtained from TASAC administrative records. Additionally, the questionnaire for collecting primary data was meticulously developed through a detailed process that included multiple revisions to ensure high-quality data. Comprehensive procedures were put in place to ensure the accuracy, completeness, and reliability of the collected data.

➢ *Model Specification*

Nonparametric methods, such as those introduced by Kaplan and Meier, are valuable for estimating average unemployment duration. The Kaplan-Meier estimator, first presented by Kaplan and Meier in 1958, is widely used in medical research, where terms like "alive" and "death" are common. In this study, "alive" represents individuals who remain unemployed, while "death" indicates securing a job. The survival function shows the proportion of seafarers in various age groups who stay unemployed over time. This study presented survival functions based on different genders and age groups of seafarers.

$$\boldsymbol{T = \beta_0 + \beta_1 Sex + \beta_2 Age + \beta_3 Time\ from\ Certification + \beta_4 Number\ of\ Certifications + \beta_5 Type\ of\ Certification + \beta_6 COC\ Status + Area\ of\ Residence} \quad \textbf{Equation (i)}$$

Whereby T represents the duration of unemployment, and the other variables are independent. While the equation can be analyzed using Ordinary Least Squares (OLS), there are several issues with applying OLS to time variables. Greene (2003) highlighted these problems. Firstly, there is often a lack of normality, as time observations are frequently positively skewed. Secondly, many surveys involving time-to-event data suffer from censoring, meaning that observations are made before the study concludes, or the study ends before the event has occurred.

The former refers to left censoring, while the latter refers to right censoring. However, in this study, since seafarers were interviewed only after securing employment, censoring was not a concern. Another potential issue is that covariates like age may change over time, potentially violating the assumption that that $E(x'\varepsilon) = 0$ leading to inconsistent coefficients. If the duration is short, age-related changes may be negligible. Additionally, since ordinary least squares (OLS) predicts no certified seafarers with positive unemployment duration, this could affect the accuracy of predictions. Due to these challenges, the study opted for survival analysis instead of OLS.

➢ *An overview of Survival Analysis*

The review is based on the work of Cameron and Trivedi (2005). To start, one should consider the cumulative distribution of the variable time, as well as its corresponding density function by $f(x)$. The relationship between the two is such that;

$$\boldsymbol{f(x) = \frac{dF(t)}{dt}} \quad \textbf{Equation (ii)}$$

Or

$$\boldsymbol{F(t) = P(T \leq t) = \int_0^t f(s)ds} \quad \textbf{Equation (iii)}$$

An equally important concept in duration analysis is the *survival* function which is in fact the greater than or equal cumulative function, defined as:

$$\boldsymbol{S(t) = P(T \geq t) = 1 - F(t)} \quad \textbf{Equation (iv)}$$

This refers to the probability that a specific duration is equal to or exceeds time t. Another important concept is the hazard function, which represents the instantaneous probability of exiting a state given that the individual has survived up to time t. It is defined as:

$$\boldsymbol{\Lambda(t) = \lim_{\Delta t \to 0} \frac{\Pr[t \leq T \leq t + \Delta t / T \geq t}{\Delta t} = \frac{f(t)}{S(t)}} \quad \textbf{Equation (v)}$$

This follows from (x), that

$$\boldsymbol{\lambda(t) = -\frac{dlin(S(t))}{dt}} \quad \textbf{Equation (vi)}$$

Where:

$$\boldsymbol{S(t) = \exp(-\int_0^t \lambda(u)du} \quad \textbf{Equation (vii)}$$

A final related function is the cumulative hazard function or integrated hazard function define as

$$\boldsymbol{\Lambda(t) = \int_0^t \lambda(t)dt = -In\, S(t)} \quad \textbf{Equation (viii)}$$

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These functions can be estimated using both non-parametric and parametric approaches. Non-parametric estimation can be carried out as described below:

Let
d_j = Number of durations (spells) ending at time j;
m_j = Number of spells censored in (t_j, t_{j+1})
rj = Spells at risk at time t_j

Then according the hazard rate is estimated as:

$$\boldsymbol{Arc\ \lambda j = \frac{dj}{rj}} \quad \textbf{Equation (ix)}$$

and the survival function known as the Kaplan-Meier estimator as:

$$\hat{S}(\boldsymbol{t}) = \prod(\boldsymbol{Lim\ tj - t})(\mathbf{1} - \boldsymbol{Arc\lambda j(t)}) \quad \textbf{Equation (x)}$$

$$\hat{S}(\boldsymbol{t}) = \prod(\boldsymbol{Lim\ tj - t})(\frac{\boldsymbol{rj - Arc\lambda j(t)}}{\boldsymbol{rj}}) \quad \textbf{Equation (xi)}$$

Parametric estimation involves estimating the hazard function through regression analysis. Given that these functions are non-linear, the maximum likelihood method is used for estimation. Common hazard functions in survival analysis include the Exponential, Weibull, and Gompertz distributions, with hazard functions represented as γ, $\gamma\alpha t^{\alpha-1}$ and $\gamma\exp(\alpha t)$ respectively. These are examples of proportional hazard models (PH) because their hazard functions can be expressed as $\lambda\left(\frac{t}{x}\right) = \lambda_0(t,\alpha)\phi(x,\beta)$ where $\lambda_0(t,\alpha)$ represents the baseline hazard as a function of time and $\phi(x,\beta)$, denotes the relative hazard as a function of the individual's covariates.

➢ *Model Fitness*

In survival analysis, model fitness is crucial for evaluating the reliability and accuracy of predictions concerning the duration of unemployment for seafarers in Tanzania, especially when using the Kaplan-Meier estimation. This non-parametric method estimates the survival function over time, offering insights into the likelihood of seafarers remaining unemployed. The Kaplan-Meier model effectively captures variations in unemployment duration, providing a solid basis for interpreting the factors that influence seafarers' resilience in the labor market.

➢ *General Formula*

The Kaplan-Meier estimator is a non-parametric tool used to estimate the survival function from data on seafarers' unemployment durations. It is commonly used in survival analysis to calculate the likelihood of a seafarer being employed after a given period. Furthermore, the Kaplan-Meier estimator can estimate the survival function even in the presence of right censoring (Dalgaard, 2008). For data that is not censored, the standard sample survival function is described by the formula in equation 1. The general formula for the Kaplan-Meier estimator is as follows:

$$\hat{S}(\mathbf{t}) = \prod \mathbf{i}: \mathbf{ti} \leq \mathbf{t}\,(\mathbf{1} - \frac{\mathbf{di}}{\mathbf{ni}}) \quad \textbf{Equation (xii)}$$

Where:

$\hat{S}(t)$ Estimated survival function at time t,
d_i Number of events at time t_i (employed or unemployed),
n_i umber of seafarers at risk just before time

Explanation,

$(1 - \frac{di}{ni})$ probability of surviving beyond time t_i, for an individual who is at risk just before ti.

$\prod$ Over all distinct event times ti

$\hat{S}(t)$ Estimated survival function (t) at each time point

The Kaplan-Meier estimator provided a stepwise, non-decreasing function that estimates the probabilities of seafarers' survival at different time points based on observed data.

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➢ *Specific Formula*

The survival function S(t) = P (T > t), represents the probability that a seafarer remains unemployed beyond time t, where T is a random variable representing the time to find employment. The cumulative distribution of T is P (t) = P (T ≤ t) and the probability density function is p (t) = dP(t)/dt. This means the survival function is S(t) =1- P(t). Moreover, this study's survival analysis included the hazard function, which assesses the immediate risk of a seafarer remaining unemployed at time t, given that they have remained unemployed up until that point.

$$\mathbf{h}\,(\mathbf{t}) = \frac{\mathbf{p}(\mathbf{t})}{\mathbf{s}(\mathbf{t})}$$ ---------- **Equation (xiii)**

Where:

h (t) = Hazard function at Time t
S (t) = Survival function, the probability an event not occurred at time t
p (t) = Derivative with respect to time t

D. Ethical Consideration

Ethical considerations were paramount and informed consent was provided to seafarers participating in the study before responding to an electronically shared questionnaire.

E. Limitations of the Study

Censored data about seafarer's information is expected to be the potential limitation of the study. In essence, censoring happens when only partial information about individual seafarers' unemployment survival time is collected, leaving the exact duration of unemployment unknown.

In this study, the unemployment survival time data for seafarers was right-censored, meaning the actual duration of unemployment was unknown and exceeded the observed time interval, resulting in an observed survival time that was shorter than the true duration. This right-censoring allowed the observed survival time to be used to infer the true survival time. The effectiveness of electronic data capture was subject to the seafarers' willingness to participate and their accessibility.

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CHAPTER FOUR
RESULTS AND DISCUSSION OF FINDINGS

A. Introduction

This chapter presents the data which has been processed by using STATA-17 version and Excel-2019, interpretation and discussion of the major findings of the study based on primary data collected from individual seafarers and secondary data obtained from TASAC.

The discussions of findings based on established specific research objectives which included determining the influence of socio-economic factors on unemployment duration of seafarers in Tanzania using Kaplan-Meier survival curves, determining socio-demographic factors influence on unemployment duration among seafarers in Tanzania and determining the influence of area of residence on unemployment duration to seafarers in Tanzania. However, the chapter describes other important variables in relation to the analysis of unemployment duration of seafarers in Tanzania, especially the social characteristics of the respondents.

B. Descriptive Statistics of the Study Variables

The descriptive analysis of this study examined key study variables, including the period from certification, number of certifications, type of certification, age, sex, area of residence and duration of unemployment. By exploring the descriptive statistics of these variables, thus provides a clear understanding of individual seafarers' profiles and distinguish notable patterns dataset as presented on table 2 and 3.

Table 2: Descriptive Statistics of the study Variables

Variable	Frequency	Percent
Gender		
Female	27	5.29
Male	483	94.71
Total	**510**	**100.00**
Employment Status		
No	309	60.59
Yes	201	39.41
Total	**510**	**100.00**
Certification Status		
No	103	20.20
Yes	407	79.80
Total	**510**	**100.00**
COC Status		
No	404	79.22
Yes	106	20.78
Total	**510**	**100**
Area of Residence		
Rural	276	54.12
Urban	234	45.88
Total	**510**	**100.00**

Source: Author, 2024

Table 2 display the frequency and percentage distribution of seafarers based on socio-demographic, socio-economic and area of residence variables. Most of seafarers (94.71 percent) are male, while a small percentage (5.29 percent) are female. The results suggest that, predominance of male seafarers may reflect gender disparities within the maritime industry, potentially influencing employment opportunities and unemployment duration. Moreover, majority of seafarers (60.59 percent) are not currently employed, while a significant minority (39.41 percent) are employed. Further, most of seafarers (79.80 percent) have certifications, while only 20.20 percent do not have certifications with an implication that proportion of unemployed seafarers is substantial, indicating potential challenges in finding employment within the industry and potentially longer durations of unemployment.

A majority of seafarers (79.22 percent) do not have a Certificate of Competency (COC), while a smaller percentage (20.78 percent) do not have COC certification. Thus, may impact their employability and elongate unemployment duration. Additionally, the presence or absence of a COC may influence job opportunities and unemployment duration. Further, the majority of seafarers (54.12 percent) reside in rural areas, while the remaining (45.88 percent) reside in urban areas. This may suggest that, the distribution of seafarers across rural and urban areas may reflect differences in employment opportunities, which could influence unemployment duration.

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Table 3: Descriptive Statistics of the Study Variable Type of Certification

Type of Certification	Frequency	Percent
Master's Degree		
No	509	99.80
Yes	1	0.20
Total	**510**	**100.00**
Bachelor Degree		
No	497	97.45
Yes	13	2.55
Total	**510**	**100.00**
Diploma		
No	505	99.02
Yes	5	0.98
Total	**510**	**100.00**
Engineering		
No	483	94.71
Yes	27	5.29
Total	**510**	**100.00**
Mandatory Certification		
No	121	23.73
Yes	389	76.27
Total	**510**	**100.00**
Overall Rating Certification		
No	323	63.33
Yes	187	36.67
Total	**510**	**100.00**
Deck Rating Certification		
No	481	94.31
Yes	29	5.69
Total	**510**	**100.00**
Rescue Certification		
No	461	90.40
Yes	49	9.61
Total	**510**	**100.00**
Fire Certification		
No	467	91.57
Yes	43	8.43
Total	**510**	**100.00**
First aid Certification		
No	497	97.45
Yes	13	2.55
Total	**510**	**100.00**
PSSR Certification		
No	498	97.65
Yes	12	2.35
Total	**510**	**100.00**
PST Certification		
No	506	99.22
Yes	4	0.78
Total	**510**	**100.00**
Other certification		
No	462	90.59
Yes	48	9.41
Total	**510**	**100.00**

Source: Author, 2024

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Table 3 presents the frequency and percentage distribution of seafarers based on their type of certification. Almost all seafarers (99.80 percent) do not have a master's degree, while only a very small percentage (0.20 percent) have a master's degree. Similarly, the majority of seafarers (97.45 percent) do not have a bachelor's degree, while a small percentage (2.55 percent) have bachelor degree. Likewise, most of the seafarers (99.02 percent) do not have a diploma, while a very small percentage (0.98 percent) have diploma. Moreover, the majority of seafarers (94.71 percent) do not have an engineering certification, while a small percentage (5.29 percent) have engineering certification.

Majority of seafarers (76.27 percent) have mandatory certification, while a smaller percentage (23.73 percent) do not have mandatory certification. Further, the results reveal that most seafarers (63.33 percent) do not have an overall rating certification, while a smaller percentage (36.67 percent) have. Moreover, majority of seafarers do not have certifications on Rescue, Fire and prevention, First aid, Personal Safety and Social Responsibility (PSSR) Certification, Personal Survival Training (PST) Certification and Other certifications. These results imply that, the presence or absence of certain certifications may impact seafarers' employability and duration of unemployment. For example, having COC and mandatory certifications may increase job opportunities and reduce unemployment duration.

Seafarers with specialized certifications such as engineering or rescue certifications may have unique skills that make them more competitive in the job market, potentially reducing their unemployment duration. The prevalence of certain certifications among seafarers may indicate areas where training and certification programs could be expanded by the training institutions like Dar es Salaam Maritime institute (DMI) to improve employability and reduce unemployment duration within the seafaring industry. However, these findings could inform policymakers from the Tanzania Ministry of Transport (MoT) and industry stakeholders about the distribution of certifications among seafarers and guide the development of targeted policies and initiatives to address unemployment challenges and promote skill development within the seafaring workforce.

Table 4: Summary Statistics of Numerical Study Variables

Variable	Mean	Std. Dev.	Min	Max
Age	33.604	10.743	20	71
Time from certification	4.661	4.976	0	36
Number of Certifications	1.594	.861	1	5
Unemployment Duration	4.882	4.898	0	36

Source: Author, 2024

Table 4, presents an average age of the seafarers in Tanzania is around 33.6 years, with a standard deviation of about 10.7 years. The youngest seafarer was 20 years old, while the oldest was 71 years old. Thus, implies that an average age of seafarers in Tanzania is in the mid-thirties and the seafaring workforce consists of individuals in a relatively broad age range.

The average time from being certified by TASAC to the date where data was collected was 4.7 years, with a standard deviation of about 5 years. The shortest time from certification was 0 years, while the longest was 36 years. This implies that, time from certification and the number of certifications show variability among seafarers with some having recently obtained certifications and others having multiple certifications. Moreover, on average, seafarers have approximately 2 certifications, with a standard deviation of approximately 1 certification. The minimum number of certifications was 1 and the maximum was 5 certifications.

The average unemployment duration is approximately 4.9 years, with a standard deviation of approximately 4.9 years. The shortest unemployment duration is 0 years, while the longest is 36 years. This may suggest that, unemployment duration varies widely among seafarers, ranging from those who did not experience unemployment to others who survived 36 years of unemployment duration. The relatively high standard deviations for time from certification, number of certifications, and unemployment duration suggest considerable variability in these variables across seafarers, highlighting potential heterogeneity within the seafarers' cadre in Tanzania.

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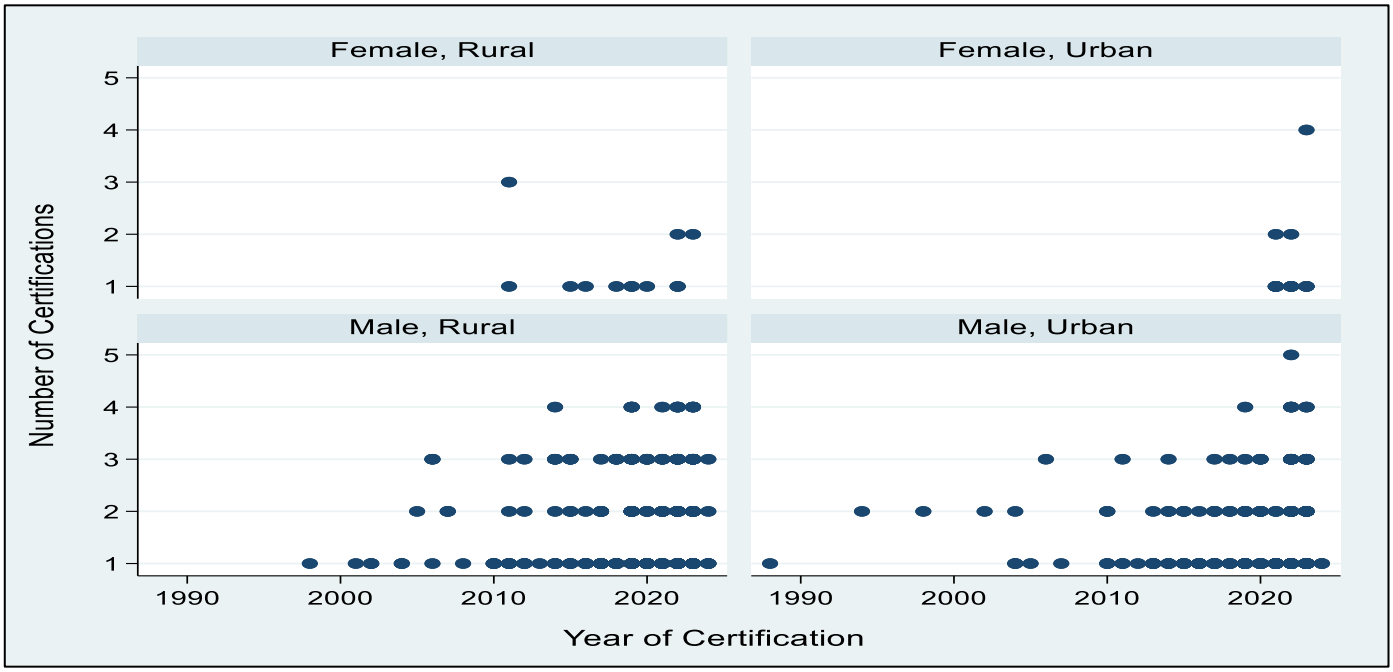

Fig 2: Distribution of Number of Seafarers' Certifications by Year by Sex and area of residence
Source: Author, 2024

C. Non-Parametric Models Analysis

➢ *The Influence of Socio-Economic Factors on Unemployment Duration of Seafarers in Tanzania Using Kaplan-Meier Survival Curves*

Socio-economic factors on the unemployment duration of seafarers in Tanzania is a critical endeavor, shedding light on the relationship between economic conditions and employment outcomes within the maritime industry. Kaplan-Meier survival curves was employed to explore how socio-economic variables, including Employment Status, Time from Certification, Number of Certifications, Type of Certifications and COC Status influence seafarers' unemployment duration.

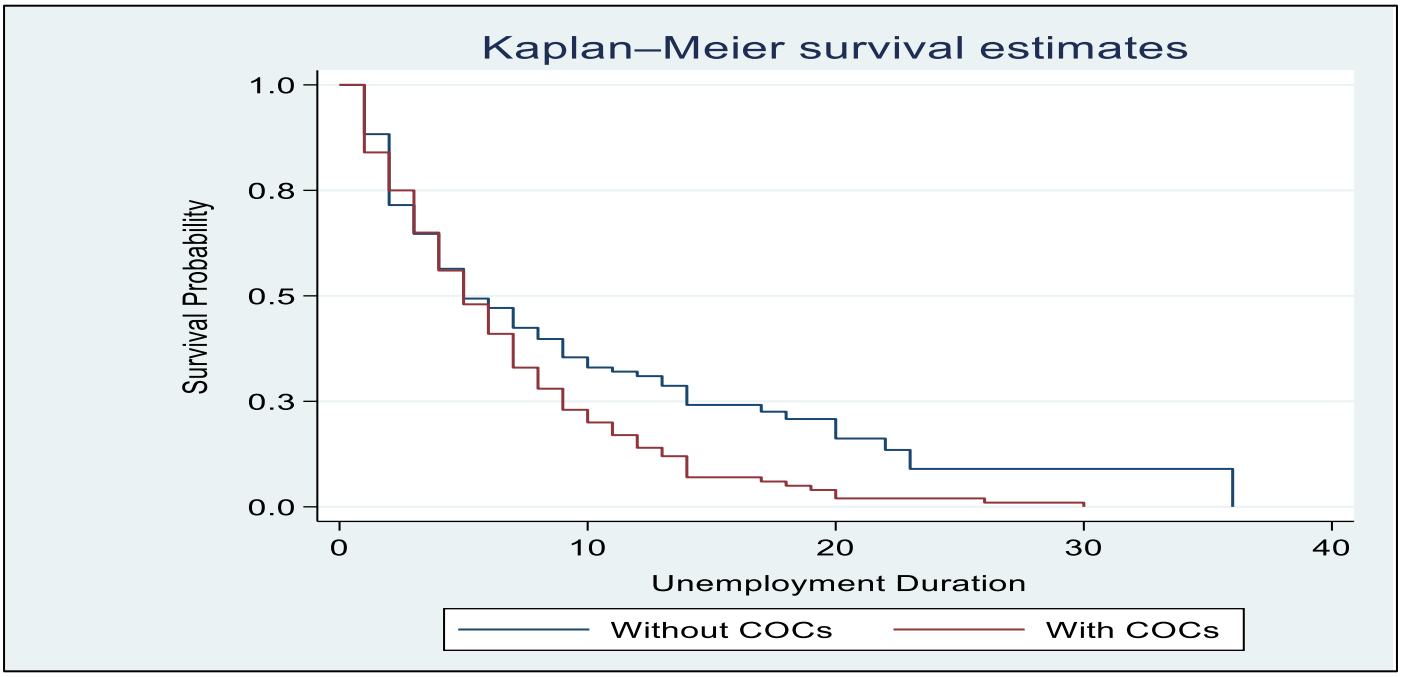

Fig 4.3.1: Kaplan-Meier Survival Curves based on COC certification
Source: Author, 2024

Figure 4.3.1 shows non-parametric Kaplan Meier survival function between seafarers who had COCs against those who had no. The results suggest that, more than 85 percent seafarers whose duration of an employment is shorter are those with COCs as the curve revealed that, most of seafarers with COCs secured employment in year 1.

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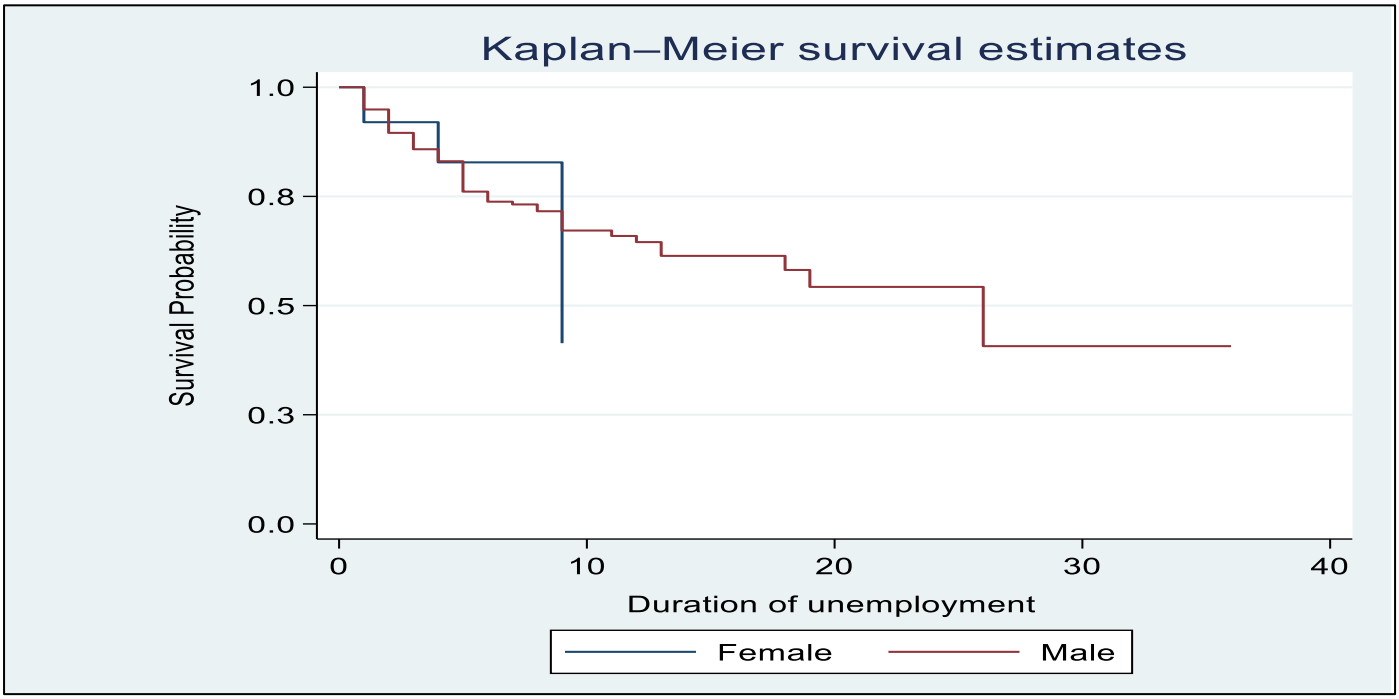

Fig 4.3.2: Kaplan-Meier Survival Curves based on Sex
Source: Author, 2024

Figure 4.3.2 show that median time spent by female seafarers to get employment was 9 years whereby more than 80 percent of certified female seafarers acquired employment, while 50 percent of male seafarers were employed after 9 years. Moreover, frequency table 1 revealed the percentage of male and female seafarers. These results, suggests that female seafarers' unemployment duration is shorter compared to male seafarers in Tanzania, further, the results suggests that the survival time follows under non-proportional model since the two curves cuts each other.

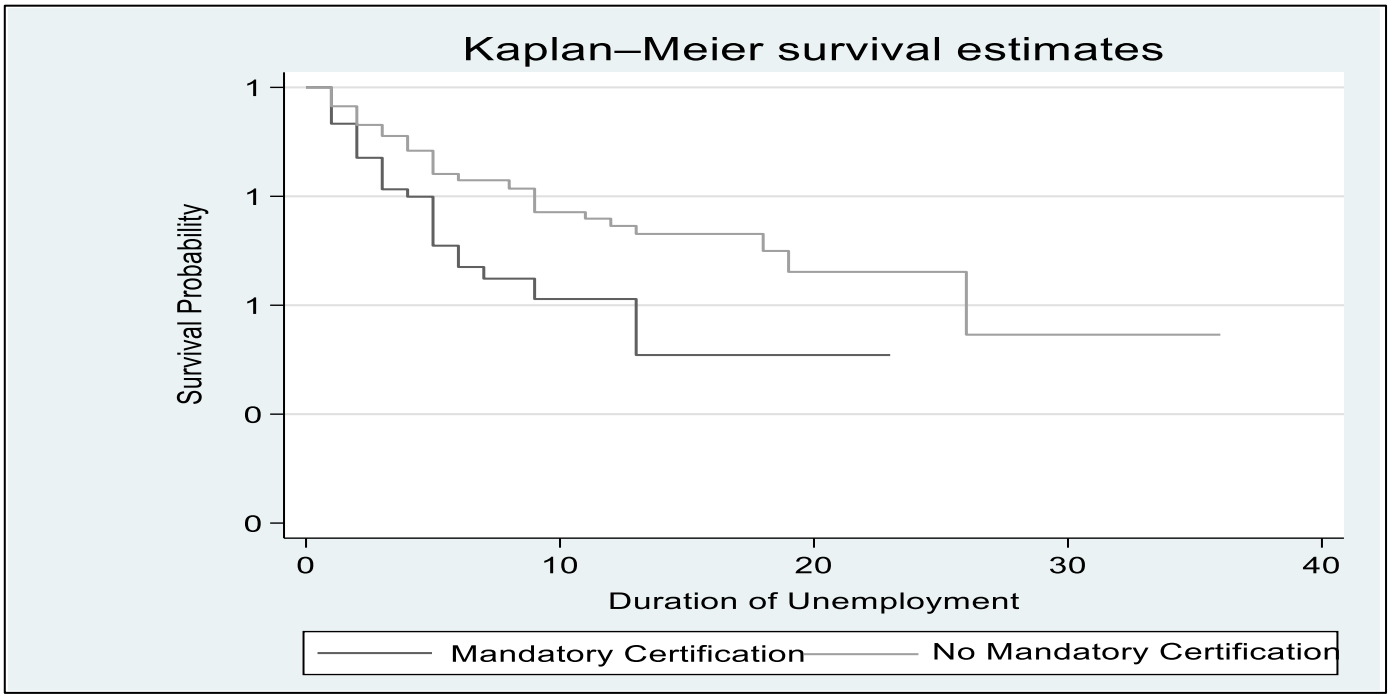

Fig 4.3.3: Kaplan-Meier Survival Curves based on Mandatory Certification
Source: Author, 2024

Figure 4.3.3 shows that most of the seafarers with either mandatory certifications or not spend more years to secure employment, as the Kaplan-Meier curves show the un-proportionality and median time for Seafarers with mandatory or without mandatory to secure employment was 12 years.

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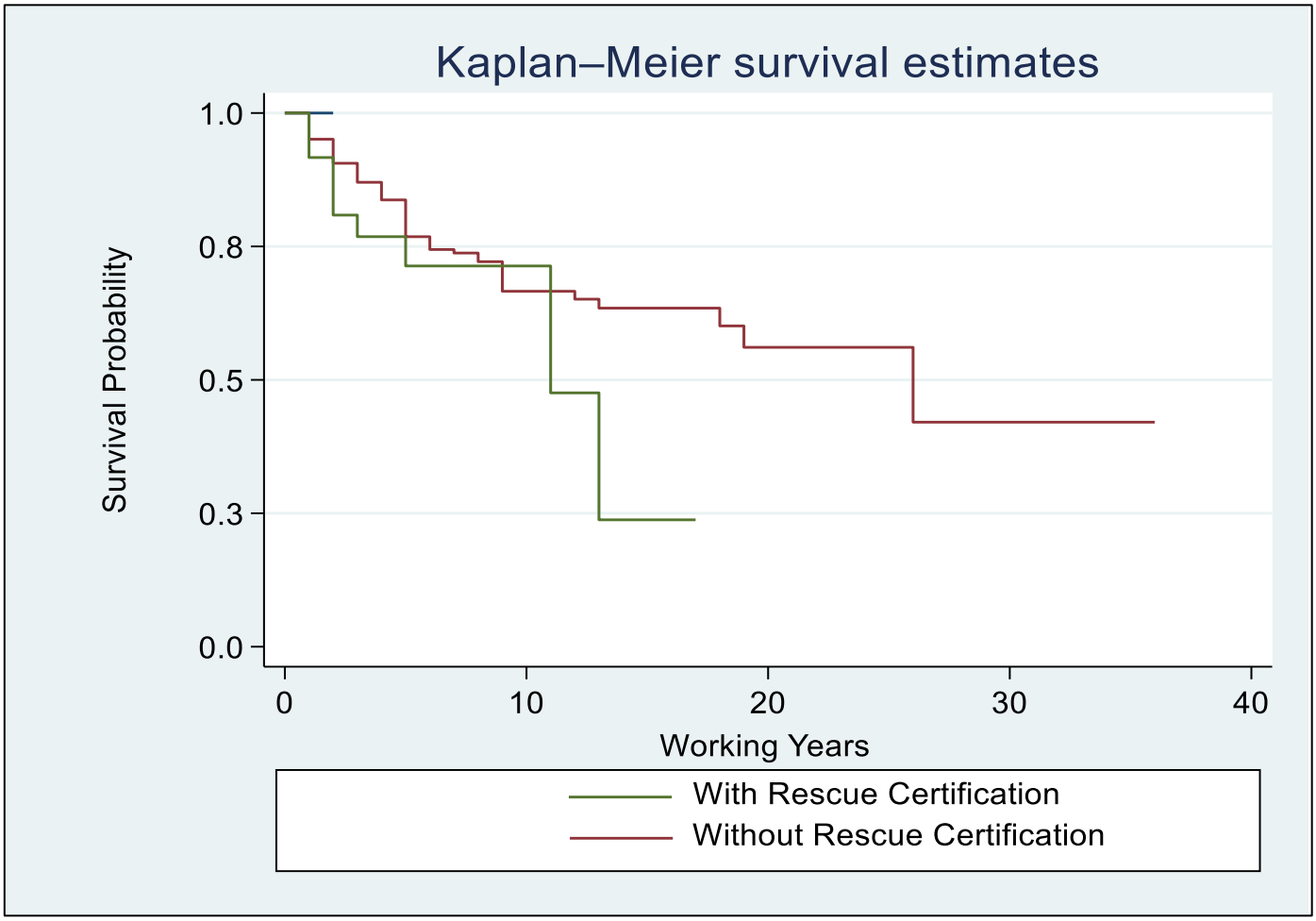

Fig 4.3.4: Kaplan-Meier Survival Curves based on Possession of Rescue Certification
Source: Author, 2024

Figure 4.3.4 shows the Kaplan-Meier curves cuts each other which implies that the survival time follows under non-proportional model. The results further revealed that, seafarers with rescue certification secure employment earlier as compared to those with no rescue certification.

➢ *Survival Analysis Results based on Parametric Models*

These results in 4.3.1 revealed that survival time follows non-proportional models as Kaplan-Meier curves cuts each other, thus imply that Accelerated failure time (AFT) models which are Weibull distribution Hazard and Cox-Proportional Hazard Model. When these models were fitted, log-like hood and Akaike information criteria (AIC) were employed to choose the right model to use in this study. Whereby a model with the least values of AIC were considered to be the best (Scott long, 1997). Table 5 provides the AIC values for the two models considered.

Table 5: AIC and Log-likelihood values from the survival models

Model	Log-like hood	AIC
Cox-Proportional Hazard Model	-1012.2177	2044.435
Weibull distribution Hazard	-375.97656	775.953

Source: Author, 2024

Based on table 5, both log-likelihood and AIC values suggest that the Weibull distribution Hazard model appears to provide a better fit to the data compared to the Cox-Proportional Hazard Model. This means that the Weibull distribution may better capture the underlying hazard function of the survival data on the analysis of seafarer's unemployment duration. Therefore, this study will use Weibull distribution Hazard model for further analysis and interpretation of the survival data on socio-economic variables.

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Table 6: Weibull Distribution Hazard Model for Socio-Economic Factors

_t	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
COC Status	20.052	8.529	7.05	0.000	8.712	46.155	***
Mandatory	1.117	0.174	0.71	0.476	0.824	1.515	
Diploma Certification	0.680	0.420	-0.62	0.533	0.203	2.284	
Bachelor Degree	0.687	0.219	-1.18	0.238	0.368	1.282	
Master's Degree	0.425	0.369	-0.99	0.324	0.078	2.327	
Deck Rating	0.959	0.498	-0.08	0.935	0.346	2.654	
Engineer Rating	1.226	0.560	0.45	0.656	0.501	3.001	
Overall Rating	3.827	0.701	7.33	0.000	2.673	5.481	***
Rescue Certification	2.819	1.240	2.36	0.018	1.190	6.678	**
Able Certification	2.966	1.842	1.75	0.080	0.878	10.017	*
Constant	0.028	0.052	-1.92	0.055	0.001	1.087	*
ln_p	0.157	0.050	3.14	0.002	0.059	0.254	***
Mean dependent var			4.95	SD dependent var		4.897	
Number of obs.			510	Chi-square		236.25	
Prob > chi2			0	Akaike crit. (AIC)		775.953	
*** p<.01, ** p<.05, * p<.1							

Source: Author, 2024

Table 6 presents the coefficients, standard errors, t-values, p-values, confidence intervals and significance levels of independent variables in a regression model predicting unemployment duration among seafarers.

The results revealed that, the coefficient of 20.052 with a standard error of 8.529 indicates that COC status has a statistically significant positive effect on the duration of unemployment. The t-value of 7.05 and the p-value of 0.000 confirm this significance level. Seafarers with Certificate of Competences (COCs) are expected to get employment earlier as compared to those without COC certification.

Type of certification including Mandatory Certification, Diploma Certification, Bachelor Degree, Master's Degree, Deck Rating, Engineer Rating and Able Certifications were not statistically significant to seafarers' unemployment duration as p-values found to be greater than 0.05 (p>0.05). Further, overall Rating, Rescue Certification, ln_p (natural logarithm of some variable) were statistically significant on the seafarers' duration of unemployment. Explicitly, Overall Rating and ln_p have positive effects, while Rescue Certification and Able Certification have positive effects as well but to a lesser degree. This conclusion is based on their coefficients being statistically different from zero and the p-values being less than 0.05. However, the same results observed by Kazuzuru and Kidere (2017) on their study of examining factors delaying graduate employment in Tanzania the case of Morogoro Municipality.

- *The influence of Socio-Demographic Factors on Unemployment Duration among Seafarers in Tanzania*

Table 7: AIC and Log-Likelihood Values from the Survival Models for Scio-Demographic Factors

Model	Log-like hood	AIC
Cox-Proportional Hazard Model	-1094.3871	2192.774
Weibull distribution Hazard Model	-454.92672	917.853

Source: Author, 2024

Table 7, show the log-likelihood and AIC values, the Weibull distribution Hazard model appears to provide a better fit to the data compared to the Cox-Proportional Hazard Model. This suggests that the Weibull distribution may better capture the underlying hazard function of the survival data on the analysis of seafarer's unemployment duration.

Table 8: Weibull Distribution Hazard Model for Socio-Demographic Factors

_t	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
Sex	1.835	0.384	2.90	0.004	1.218	2.765	***
Age	1.043	0.005	8.65	0.000	1.033	1.053	***
Constant	0.814	0.346	-0.48	0.629	0.354	1.875	
ln_p	0.221	0.053	4.21	0.000	0.118	0.324	***
Mean dependent var		4.95	SD dependent var		4.897		
Number of obs.		510	Chi-square		78.35		
Prob > chi2		0	Akaike crit. (AIC)		917.853		
*** p<.01, ** p<.05, * p<.1							

Source: Author, 2024

Table 8 presents the Weibull distribution Hazard Model for Socio-demographic factors including sex and age. The results

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revealed that, coefficient of 1.835 with a standard error of 0.384 indicates that sex has a statistically significant effect on the seafarers' unemployment duration. The t-value of 2.90 and the p-value of 0.004 confirmed sex being statistically significant as p-value is less than 0.05. This implies that, male seafarers had higher value compared to female seafarers. Moreover, the coefficient of 1.043 with a standard error of 0.005 indicates that age has a statistically significant effect on seafarers' unemployment duration. The t-value of 8.65 and the p-value of 0.000 confirm this significance level. Thus, the results suggest that as age increases, the unemployment duration also increases. Likewise, Ciucă & Matei (2010) found that survival rates in unemployment are influenced by age and gender. Hence, recommended further investigation on jobseekers' specialization.

➢ *The influence of Area of Residence Factor on Unemployment Duration among Seafarers in Tanzania*

Table 9: AIC and Log-Likelihood Values from the Survival Models for Scio-Demographic Factors

Model	Log-like hood	AIC
Cox-Proportional Hazard Model	-1118.2305	2238.461
Weibull distribution Hazard Model	-492.56795	991.136

Source: Author, 2024

Table 9, display the log-likelihood and AIC values, the Weibull distribution Hazard model appears to provide a better fit to the data compared to the Cox-Proportional Hazard Model as log-like hood and AIC figures are smaller compared to the figures of Cox-proportional Hazard Model. This suggests that the Weibull distribution may better capture the underlying hazard function of the survival data in determining the influence of area of residence on seafarer's unemployment duration.

Table 10: Weibull distribution Hazard Model for Area of Residence

_t	Coef.	St. Err.	t-value	p-value	[95% Conf	Interval]	Sig
Area of Residence	0.794	0.105	-1.75	0.08	0.613	1.028	*
Constant	16.592	3.482	13.39	0.00	10.997	25.034	***
ln_p	0.062	0.053	1.18	0.237	-0.041	0.165	
Mean dependent var	4.95			SD dependent var		4.897	
Number of obs.	510			Chi-square		3.067	
Prob > chi2	0.08			Akaike crit. (AIC)		991.136	

Source: Author, 2024

Table 10 presents the influence of an area of residence on unemployment duration for seafarers in Tanzania.

The coefficient for residence category is 0.794, with a standard error of 0.105. The negative t-value of -1.75 and the p-value of 0.08 indicate that the relationship between residence category and unemployment duration of seafarers is not statistically significant at the 0.05. This suggests that there may be some association between residence category and the duration of unemployment. These findings are contrary to the study conducted by Kazuzuru and Kidere in 2017 as for the case of university graduates, the location found to be statistically significant on favor of the graduates residing in urban areas.

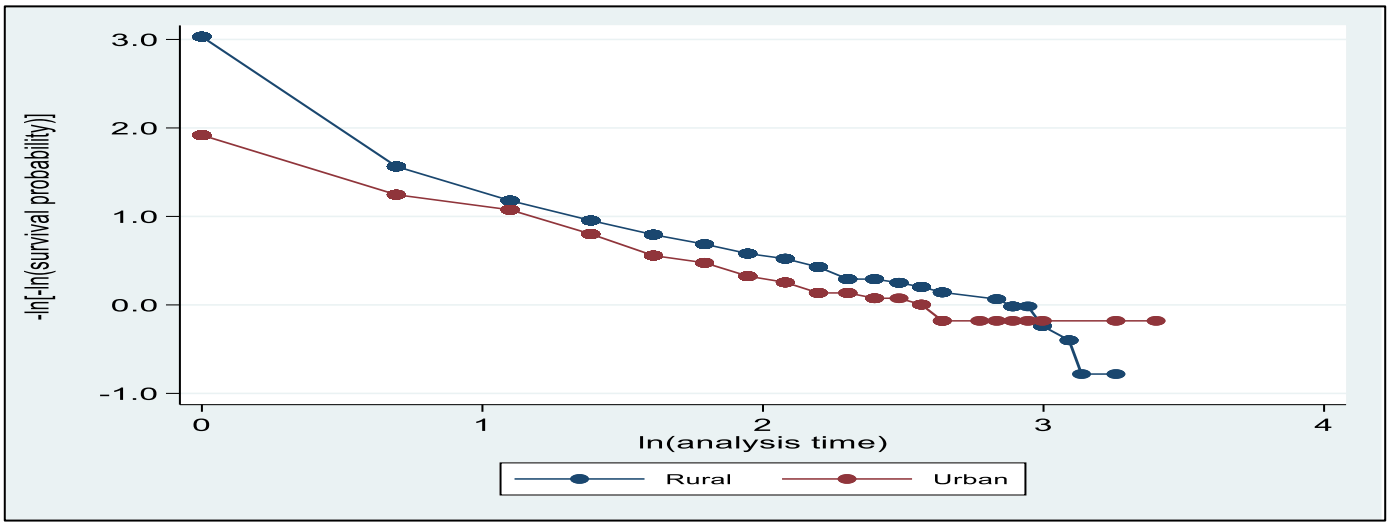

Fig 4.3.5: Log - Log Plot based on Area of Residence
Source: Author, 2024

Figure 4.3.5, presents the relationship between seafarers residing in urban and rural areas whereby Seafarers in rural areas found to acquire employment in shorter period of time compared to those residing in urban areas as per the survival probabilities.

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Further, the two graphs cut each other thus suggest un-proportionality of urban and rural dataset.

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CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

A. Introduction

This chapter presents the conclusion based on findings of the study. However, recommendations of the study have been presented as well. Further, the chapter presents areas for further research as identified by the study.

B. Conclusion

The study was carried out to analyze unemployment duration of seafarers in Tanzania, specifically to determine the influence of socio-economic factors on unemployment duration of seafarers in Tanzania using Kaplan-Meier survival curves, determining socio-demographic factors influence on unemployment duration and the influence of area of residence on unemployment duration to seafarers in Tanzania.

The analysis conducted in this study revealed valuable insights into the characteristics and profiles of seafarers in Tanzania, shedding light on socio-demographic, socio-economic factors and area of residence that may influence employment status and duration of unemployment to certified seafarers.

The distribution of seafarers based on gender, employment status, certification status, COC status, area of residence and country of employment. Revealed a significant gender disparity within the maritime industry, with the majority of seafarers being male. Furthermore, a substantial proportion of seafarers are currently unemployed, highlighting potential challenges in securing employment within the industry despite holding certifications. The predominance of rural residents among seafarers suggests disparities in employment opportunities between rural and urban areas, potentially impacting unemployment duration.

Generally, majority of seafarers do not possess academic certifications including diploma, bachelor degree and master's degrees. However, those with mandatory certifications may have increased job prospects and reduced unemployment duration. However, study variables of age, time from certification, number of certifications and unemployment duration showed diverse profiles and experiences among seafarers, emphasizing the need for tailored interventions to address their unique challenges.

Further, the results suggest that COC Status, Overall Rating, Rescue Certification and Able Certification are significant predictors of the seafarers' unemployment duration, while other variables such as Mandatory Certification, Diploma Certification, Bachelor Degree, Master's Degree, Deck Rating and Engineer Rating are not significant predictors. Moreover, the results suggest that Gender and Age are significant predictors of the seafarers' unemployment duration.

C. Recommendations

Based on the findings of the descriptive analysis, inferential and analysis of non-parametric model, several recommendations were drawn to different stakeholders including central Government, Maritime regulatory authorities and suggest areas for further studies to other researchers.

A. Recommendations to Central Government, Government Agencies and Maritime Regulatory Authorities

Promote gender equality within the maritime industry, as to encouraging more female participation through targeted recruitment and training programs that can help bridge the gender gap and create a more diverse and inclusive workforce.

Strengthen recruitment agencies to provide support services and programs which can assist unemployed seafarers in finding employment opportunities. This could include career counseling, job placement assistance and networking events to connect seafarers with potential employers.

Enhance existing certification programs provided by Maritime institutions to include specialized training in areas of certificate of Competence (COCs). By providing seafarers with a broader range of skills and qualifications, they can improve their employability and competitiveness in the local and international job market.

Develop initiatives aimed at increasing employment opportunities for rural residents within the maritime sector. This could involve setting up training centers and job placement services in rural areas, as well as providing incentives for companies to hire locally.

Broaden collaboration between government agencies, industry stakeholders and training institutions to develop comprehensive strategies for addressing unemployment challenges within the maritime industry. By working together, stakeholders can leverage their resources and expertise to implement effective solutions.

Central Government, Local investors and training institutions should work collaboratively to create a more supportive environment for seafarers in Tanzania, ultimately leading to improved employment outcomes and a more resilient maritime workforce.

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B. Recommendations for Further Studies

This paper contributes to the existing literature by exploring the analysis of unemployment duration for seafarers in Tanzania using Kaplan-Meir survival curves and Weibull distribution Hazard model.

Researchers can complement quantitative analyses with qualitative research methods, such as in-depth interviews or focus group discussion with individual seafarers, to gain a deeper understanding of the socio-economic, socio-demographic factors and area of residence which can influence employment outcomes among seafarers. Qualitative insights can offer context-rich perspectives on the challenges and barriers faced by seafarers in securing employment and advancing their careers.

Further, other researchers can conduct comparative studies across different regions or countries to assess variations in the influence driven from the socio-economic, socio-demographic factors and area of residence towards unemployment duration among seafarers. Comparing findings across diverse contexts can explain the contextual factors shaping employment dynamics within the maritime industry and inform targeted interventions.

Moreover, other researchers can examine the dynamics of certification acquisition and its effects on job prospects and unemployment duration can provide valuable insights into the long-term career pathways of seafarers in Tanzania.

To explore the potential impact of residence category on unemployment duration in more detail.

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APPENDIX

APPENDIX I: QUESTIONNAIRE

INTRODUCTION

My name is _____, I am undertaking the research study on the analysis of unemployment duration for seafarers in Tanzania. I greatly appreciate your participation in this research.

CONSENT

This survey aims to gather information on the unemployment duration for Seafarers in Tanzania. The data collected will be used for research and academic purposes only. Moreover, your responses will be treated with the utmost confidentiality. All data collected will be anonymized and aggregated to ensure that individual responses cannot be identified. Your personal information will not be shared with any third parties.

Your participation in this survey is entirely voluntary. You have the right to withdraw at any point without providing a reason. Your decision to participate or not will not have any impact on your current or future employment status.

Questions – Primary Data

- *Date of sending the e-questionnaire through WhatsApp/Email Contact* _____

- *Are you currently in possession of a valid Certificate of Competency (COC)?*

- Yes
- No

- *What seafarers' certification do you have (If the response for Q1 above is No)*

- Fire
- COP
- SAT etc.

- *What is the name of the institution where you completed your seafarers' studies*

- DMI
- NIT etc.

- *When did you Complete seafarers' studies in Tanzania?*

- *What is your current employment status? Are you employed?*

- Yes
- No

- *Which institution are you currently working with?*

- *In which country are you currently employed? Please enter the name of the country*