JSEG
JOURNAL OF SMART ECONOMIC GROWTH
www.jseg.ro ISSN: 2537-141X Volume 10, Number 3, Year 2025

THE IMPACT OF BLUE ECONOMY EXPENDITURE ON TAX REVENUE IN MAURITIUS

Fidel Nunoofio[a] and Bhavish Jugurnath[b]

[a]Faculty of Law and Management, University of Mauritius, Reduit, Mauritius

[b]Faculty of Law and Management, University of Mauritius, Reduit, Mauritius

[a]Correspondence: fidel.nunoofio@umail.uom.ac.mu or fnunoofio@gmail.com

[b]Correspondence: b.jugurnath@uom.ac.mu or bhavish.jugurnath@gmail.com

Abstract: In the the past few years, the Mauritian government has prioritised the development of the blue economy, launching initiatives to establish a robust maritime industry and the dedication of a ministry to handle the activities of the blue economy. In spite of these efforts, financing remains a significant hurdle to expansion with strategic plans put in place, and numerous conferences held to identify workable solutions. With this background, the study sought to assess the impact of the expenditure of blue economy on tax revenue in Mauritius for the period commencing 2016 and ending 2024. A quantitative analytical framework was employed, using the pooled least squares estimation regression model. It has been noted that the pooled least squares estimation regression model may be limitation to the study and not fully account for time dynamics. In future research, panel or time series models such as fixed effects and Autoregressive Distributed Lag model could be adopted because of their robust nature. Also, the analysis could be disaggregated into sub-sectors such as fisheries, shipping, aquaculture and ocean energy. The empirical results revealed that the nature of the nexus between each of the independent variable and the dependent variable. The impact of the expenditure on tax revenue showed a significant positive relationship and some of the variables and negative relationship for other variables. The details have been presented in the body of the article. As a result of the research findings, it was recommended among others that, access to financial resources to targeted groups in the blue economy like small-scale fishers and aquaculture operators is essential for achieving sustainable blue economy at a reduced cost. The development of specialised financial instruments, such as low-interest loans and micro-finance can enhance the growth of the sector and minimise the dependence on revenue from the central government.

JSEG
JOURNAL OF SMART ECONOMIC GROWTH
www.jseg.ro ISSN: 2537-141X Volume 10, Number 3, Year 2025

Keywords: Blue Economy, Sustainable Development Goals and Tax Revenue

1.0 Introduction

The blue (ocean) or maritime economy refers to the sustainable use of ocean resources for economic growth, improved livelihoods, and ocean health (Youssef, 2023). The blue economy encompasses a range of sectors, such as fisheries, aquaculture, shipping, energy, tourism, and marine biotechnology. The potential of the blue economy to contribute to sustainable development, and poverty reduction has gained attention from policymakers, scholars, and stakeholders (Smith-Godfrey, 2016).

The term blue economy has been used in different ways and it is understood as comprising a range of economic sectors and related policies that together determine whether or not the use of oceanic resources is sustainable in the long term. The concept of blue economy therefore seeks to promote economic growth, social inclusion, and preservation of livelihood whilst at the same time ensuring environmental sustainability. At the heart of the discussion of the blue economy is the decoupling of socio-economic development through ocean-related sectors and activities from environmental and ecosystems degradation (United Nations Conference on Trade and Development, 2014).

The blue economy has diverse components, including established traditional ocean industries such as fisheries, tourism, and maritime transport, but also new and emerging activities, such as aquaculture, seabed extractive activities and marine biotechnology and bioprospecting. A number of services provided by ocean ecosystems, and for which markets do not exist, also contribute significantly to economic and other human activity such as carbon sequestration, coastal protection, waste disposal and the existence of bio-diversity (World Bank and United Nations Department of Economic and Social Affairs, 2017).

As we face the depletion of terrestrial resources and consider the economic prospects available in our oceans, the concept of blue economy has gained importance in conversations about the management seas and oceans (Soma, 2018). In spite of this phenomenon, the concept has been embraced with several investments and legislations, but there is the lack of a precise definition for the blue economy that would be acknowledged by all and sundry (Eikeset, 2018).

Consequently, the mix of oceanic activities varies in each country, depending on their unique national circumstances and the national vision adopted to reflect its own conception of a blue economy. In order to qualify as components of a blue economy, as it is understood here, activities need to be based on clean technologies, renewable energy, and circular material flows that will reduce waste and promote recycling of materials among others (World Bank and United Nations Department of Economic and Social Affairs, 2017).

Although the definition and scope of blue economy has been a matter of debate amongst policy makers and scholars alike the growing interest in blue economy as an ocean governance and investment framework is attracting new actors and increasingly shaping news development pathways and financing opportunities through which multiple Sustainable Development Goals could be advanced (Benzaken et al., 2024)

In Mauritius, the blue economy is currently driven by established sectors such as coastal tourism, fishing, seafood processing, aquaculture, shipping and port-related services. There are other new sectors including but not limited to sea bed exploration, ocean-based energy and maritime digitisation amongst others (Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, 2023). The Ministry of Blue Economy, Marine Resources, Fisheries and Shipping in Mauritius is allocated an annual budget to fund their expenditure from the tax revenue mobilised by the government.

There are however challenges with the sustainable use of the marine resources and they include the impact of climate change in the form of rising sea levels, increased frequency and severity of extreme weather events, and rising temperatures. These unpredicted climatic conditions have direct and indirect impact on ocean-related sectors, such as fisheries, aquaculture, and tourism, and on maritime transport infrastructure with broader implications for international trade and for the development prospects of the most vulnerable nations and in particular coastal least developed countries and small island states like Mauritius (Bhikajee et al., 2023). The blue economy also has a greater potential to contribute to higher and faster growth rate in Mauritius but this potential has not been fully realised due to the dependence on revenue from the central government to finance their major budgetary items (Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, 2023).

This study therefore aims to assess the principal determinants affecting the blue economy expenditure in Mauritius, with a specific focus on the island provinces for the nine-year period

commencing 2016 and ending 2024. It offers critical insights for researchers, policymakers and governmental agencies involved in research, strategic planning, and policy formulation.

The primary contribution of this study is to enhance the effective management and sustainable use of marine resources in Mauritius and through a critical analysis of the key factors influencing the blue economy expenditure and provide policymakers with comprehensive evidence on the progression of blue economy initiatives as well as support the development of informed and strategic policies to address maritime challenges effectively.

The next section presents a literature review that outlines the components of the blue economy expenditure and tax revenue in Mauritius. Subsequently, the methods section describes the processes involved in collecting secondary data and the analytical techniques employed. The final sections present the results and discussion, followed by the conclusion.

2.0 Literature Review

The concept of the blue economy is gaining increasing global attention, particularly in relation to the Sustainable Development Goals. It focuses on the sustainable use of marine resources to enhance economic welfare whilst preserving the sustainability of marine ecosystems (Phelan et al., 2020). It is also economy emerged as a framework aimed at balancing economic growth with environmental sustainability in marine and coastal regions. The blue economy comprises a wide range of activities, including fisheries, aquaculture, marine tourism, and renewable energy, emphasising the sustainable use of ocean resources (Marwa et al., 2024).

The blue economy primarily aims to obtain economic benefits without harming the environment, while promoting the conservation of marine resources. This model also seeks to promote collaboration and knowledge-sharing among different sectors and communities to create innovative solutions that can benefit all stakeholders (Marcos, 2023).

The research on the blue economy has expanded rapidly as a global attention to the sustainability of marine environment and the role of the maritime economy in economic growth has grown in line with the United Nations Sustainable Development Goals that have set out a shared vision to end poverty, tackle inequality, combat injustice and address climate change by 2030 (United Nations Development Programme, 2020). This literature review compiles existing research on the blue economy expenditure and its nexus with tax revenue, focusing on key expenditure drivers in Mauritius such as Compensation of Employees, Goods and Services,

Subsidies, Recurrent Grant, Capital Grant, Acquisition of Non-Financial Assets, Social Benefits and Other Expenses.

2.1 Compensation of Employees

The sub-tropical island country of Mauritius in the Indian Ocean is surrounded by a vast exclusive economic zone of 2.3million square kilometres. The Mauritius blue economy activities excluding coastal tourism represent 10.3% of the Growth Domestic Product (GDP) and employ around 10,000 people, exclusive of coastal tourism. The Government aims at increasing the share of GDP of the blue economy to 20% in the medium term (Economic Development Board, 2025).

The blue economy is beginning to gain in importance and this is shown not only by employment data, but also by financial statistics (Majewska, 2024). The fisheries sector for instance employed around 20,000 people directly and indirectly in Mauritius and ensured food security for the population. The Government of Mauritius aims at maximising the potential of the fisheries sector through a number of measures and innovative initiatives including employment to ensure it becomes one of the most promising pillars of our economy (Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, 2021). The significant work force in the blue economy in Mauritius has made compensation a key component in the expenditure in the blue economy and their dependence on tax revenue.

2.2 Utilisation of Grant

One of the main funding programmes for the blue economy is the European Maritime, Fisheries and Aquaculture Fund from the European Union. It provides funding in the form of grant for projects in areas such as fisheries, aquaculture, protection of the marine environment and promotion of economic diversification in coastal areas. It also aims to improve training and capacity building in the sector. There is another important funding mechanism in the form of the Horizon Europe programme, which grants research and innovation projects in a wide range of areas, from marine renewable energy technology to marine and coastal bio-diversity management (Marcos, 2023).

In Mauritius, a grant not exceeding Rs4million was earmarked as available to co-operative societies to acquire semi-industrial vessels and a provision of Rs12.5million was also made to finance the purchase of ten floating cage structures to Fishermen Co-operatives to promote small-scale aquaculture. In a bid to provide shelter for approximately 120 fishing vessels the Mauritius Ports Authority proposed to undertake the construction of break waters at Fort William (Attri, 2018).

2.3 Subsidies

In addition to the application of grant in the blue economy, many countries also offer subsidies for projects related to the blue economy. These can range from funding research and development projects to supporting business start-ups and promoting innovation. The subsidies allocated to the blue economy and in particular fishing are estimated to be as high as US$35 billion worldwide, of which US$20 billion directly contributes to overfishing (UN Trade and Development, 2025). These subsidies effectively mean that taxpayers are paying for industrial boats to degrade the environment and to destroy the food security and livelihoods of vulnerable coastal communities.

With the fuelling of unfair competition between large fleet and individual artisanal fishermen, they are also fostering inequality. The recent agreement executed by members of the World Trade Organisation however seeks to eliminate the most harmful subsidies in fishing that will contribute to the development of a blue economy, making the ocean in the world healthier and potentially freeing up billions of dollars for financing sustainable activities (Okonjo-Iweala, 2022).

2.4 Non-Financial Assets

The acquisition of non-financial assets is relevant for the survival of the blue economy. In Mauritius, there is a strong and thriving blue economy but some sectors still need investment, execution and focus to realise their full potential. The pillars of the blue economy are fishing and aquaculture, port infrastructure and maritime transport, shipbuilding and repairs, marine salt harvesting as well as tourism and recreation. The operators of these sectors have developed a world class business model and the government aspires to increase their contribution to the Gross Domestic Product by deepening and diversifying the value chain with sustainable financial assets (Aubeeluckon, 2021). The eligible projects under the blue economy cover the

financing of investments and other related and supporting expenditure, as well as acquisition of financial assets including bank loan portfolio (Asian Development Bank, 2023).

2.5 Social Benefits and Other Expenses

The blue economy model in Mauritius aims at improving human wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities. The sector Ministry responsible for blue economy in Mauritius is committed to developing policies to enable the sustainable development of the economic potential of the marine resources. Importantly, the Government of Mauritius is committed to developing the blue economy sector whilst realising the social and economic development of fishers, fishmongers, seafarers and many others who depend on the sea for their livelihood (Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, 2021).

2.6 Goods and Services

The blue economy framework is also significantly bolstered by the procurement of goods and services. The goods and services expenditure including electricity or power consumption and usage of information communication technology are key elements of the blue economy, especially in the operations of the marines (Andersen et al., 2023). With the transitioning to renewable energy sources, such as offshore wind and solar power, aimed at reducing the carbon footprint of marine activities, the expenditure in relation to goods and services in the blue economy cannot be discounted (Menicou and Vassiliou, 2010).

2.7 Tax Revenue

The tax revenue generated by small island developing states are relatively small compared to other countries. The aforesaid states place emphasis on tax revenue to support their national budgets. In addition to development aid, of which they are one of the largest beneficiaries, these countries have constantly developed some kind of new tax framework. These taxes are applied to several government projects in the country including the blue economy (Majewska, 2024).

3.0 Methodology

The study sought to assess the impact of blue economy expenditure on tax revenue in Mauritius, for the nine-year period commencing 2016 and ending 2024.

3.1 Study Area

This study utilised secondary panel data from Mauritius Revenue Authority and Ministry of Blue Economy, Marine Resources, Fisheries and Shipping. The analytical framework is based on the expenditure incurred by the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping of Mauritius reported in their annual report, which include Compensation of Employees, Goods and Services, Subsidies, Recurrent Grant, Capital Grant, Acquisition of Financial Assets, Social Benefits and Other Expenses. A detailed description of these variables is provided in table 1 below:

Table 1: Description of Variables

S/N	Variables	Notation	Description
001	Tax Revenue	TAR	The tax revenue collected by the Mauritius Revenue Authority
002	Compensation of Employees	COE	The emoluments paid to employees
003	Goods and Services	GAS	The cost of procuring goods and services
004	Subsidies	SSD	The funding provided by the state to support the blue economy
005	Recurrent Grant	RGT	A funding allocation to support marine related activities periodically
006	Capital Grant	CGT	A funding allocation for the purchase of marine related equipment
007	Non-Financial Assets	NFA	These are investments in the form of real assets for the blue economy
008	Social Benefits	SBT	A social protection programme designed for the blue economy
009	Other Expenses	OEX	These are expenses of amorphous nature within the blue economy

Source: Author compilation (2025)

3.2 Model

A quantitative analytical framework was employed, using the pooled least squares estimation method as described by (Gujarati and Porter, 2009). The functional specification of the model, incorporating the variables in the table above, is represented by the following equation:

$$\mathbf{lnTAR = f(lnCOE,lnGAS,lnSSD,lnRGT,lnCGT,lnNFA,lnSBT,lnOEX)} \quad \mathbf{(1)}$$

In alignment with the function specified as equation (1), a regression equation is generated for the research model and expressed as:

$$\mathbf{lnTAR_{i,t}= \beta_0+\beta_1 lnCOE_{i,t}+\beta_2 lnGAS_{i,t}+\beta_3 lnSSD_{i,t}+\beta_4 lnRGT_{i,t}+\beta_5 lnCGT_{i,t}+\beta_6 lnNFA_{i,t}+\beta_7 lnSBT_{i,t}+\beta_8 lnOEX_{i,t}+U_{i,t}} \quad \mathbf{(2)}$$

Where:

lnTAR = natural logarithm of tax revenue

lnCOE = natural logarithm of compensation of employees

lnGAS = natural logarithm of goods and services

lnSSD = natural logarithm of subsidies

lnRGT = natural logarithm of recurrent grant

lnCGT = natural logarithm of capital grant

lnNFA = natural logarithm of non-financial assets

lnSBT = natural logarithm of social benefits

lnOEX = natural logarithm of other expenses

β_0 = This gives the mean value of lnTR when all the explanatory variables are zero

β_1, β_2, β_3, β_4, β_5, β_6 β_7 and β_8 represents the parameter estimates

i represents the time series nature of the data

t represents the cross-sectional dimension of the data

U_t = the standard error

This study employs a panel data regression model because it allows the combination of time series observations across multiple individuals or regions, providing deeper insights into the dynamics between the variables under investigation (Biørn and Han, 2016). This method

allows for the measurement of effects that may be missed when using only cross-sectional analysis (which compares differences between provinces at a single point in time) or time-series analysis (which tracks changes within a single province over time). The combination of both time and cross-sectional dimensions, panel data offers richer insights and more reliable estimates, supporting the evaluation of complex relationships with fewer restrictive assumptions (Marwa et al., 2024).

In this analysis, the random effects model was selected as the most appropriate approach for estimating outcomes. This model accounts for unobservable variations between individuals or provinces that could influence the dependent variable and assumes that these unobserved individual characteristics are random and uncorrelated with the independent variables. This assumption allows for more efficient and unbiased estimates, whilst accounting for the unique features of each province in the analysis (Bretó et al., 2020).

3.3 Justification of Independent Variables

The selection of independent variables for this study is based on their theoretical and empirical relevance, highlighting key factors that influence blue economy expenditure in Mauritius. These variables reflect their level of dependence of government revenue in Mauritius through tax collection. The variables were also chosen primarily because they are definitive expenditure approved by the state agency responsible for the supervision of activities affecting the blue economy in Mauritius (Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, 2023).

3.3.1 Tax Revenue

As the fiscal demands of governance grow, exploring viable avenues for revenue generation through taxation of the maritime industries has become imperative.The tax revenue has long been recognised as the lifeblood of state financing, must evolve to accommodate the dynamic realities of territorial waters and exclusive economic zones of countries globally. The taxes in the form of fiscal policy play a dual role in regulating economic activity and generating revenue for government expenditure (Nwakoby et al., 2025). Within the context of the blue economy, taxation has the potential and ability to serve as a transformative tool for achieving sustainable economic development. It can incentivise compliance with environmental standards,

discourage exploitative practices, and mobilise resources for marine ecosystem conservation across the world (Keen, 2021).

3.3.2 Compensation of Employees

Undeniably, remuneration is one of the most important factors that applicants consider when searching for work. There is attraction to organisations that offer higher pay because of an enhanced purchasing power. The remuneration depends on a variety of factors, not all of which are immediately controllable or negotiable in the framework of individual or collective contractual relationships. In the fisheries sector of the blue economy, the labour force are remunerated with a share system, where the crew receive a part of the revenue, and ultimately providing incentive based on the output achieved by the employed staff (McConnell and Price, 2006).

It is also known that many sectors of the blue economy employ personnel part-time or only during specific seasons. In 2021 for instance, the lowest value for the indicator was recorded for coastal tourism, which recorded an index of 0.62, indicating that an average European worker in this sector is employed for about 62% of a full-time load and similarly, workers in Marine renewable energy, on average, were employed for about 64% of a full-time load (Corluka, 2019).

3.3.3 Goods and Services

The blue economy makes it possible for the preservation of healthy Mediterranean marine and coastal ecosystems and ensures the continuous delivery of goods and services for present and future generations (Mancini and Comolet, 2020). The goods and services are procured in accordance with an approved procurement plan for most public institutions. The procurement of required goods and services are made in established quantities, times and places. There is also the need for compliance with regulations to prevent fraud and corruption (Connolly et al., 2020). The Goods and Services typically consist of recurrent expenses incurred and include cost of utilities, fuel and oil, rent, office expenses and maintenance costs (Accountant-General of the Government of the Republic of Mauritius, 2017).

3.3.4 Subsidies

According to Elston et al. (2024) the provision of tax incentives, subsidies, and grant funding by government agencies can encourage private-sector investment in sustainable marine industries and the blue economy as a whole. These subsidies seek to promote efficiency and productivity within the sector that they directed at in the long term and the blue economy is no exception. The quantum of the subsidies is however dependent on government revenue mainly from taxes. In theory subsidies can have an impact in the blue economy by changing relative prices of inputs and outputs. These effects may change the technical and economic performance on the players in the blue economy (Zhu and Lansink, 2008).

3.3.5 Recurrent & Capital Grant

In every economy, the government is believed to play a key role in promoting economic growth and innovation. This innovation activities are in general risky and prohibit the firm to invest in them. The firm is established to maximise profit with support from the government when necessary. The government support in the form of capital and recurrent grant plays a key role in the operations firms or businesses within the blue economy with innovation and product development (Chen, 2021).

3.3.6 Non-Financial Assets

The use of non-financial assets has been acknowledged as a powerful driver of economic growth across various sectors, including the blue economy. The Asian Development Bank (2023) has highlighted the application of non-financial assets in the blue economy and marine transportation. These real or fixed assets in their estimation can help achieve the goals of the blue economy (Ministry of Blue Economy, Marine Resources, Fisheries and Shipping, 2023). Consequently, non-financial assets were selected as an independent variable in this study to measure its impact on tax revenue since the usage in this case is a government agency by name the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping.

3.3.7 Social Benefits and Other Expenses

The social benefits and other expenses variable are measured based on the social protection programmes in the blue economy. It requires the usage of the marine resources for rural economic growth and improved livelihoods while maintaining the health of the ocean

ecosystem. This has the potential to sustain and improve small-scale fisheries among other benefits in the blue economy (Food and Agriculture Organisation, 2024). The social benefits also include basic retirement pension, social aid and other recurrent expenses for persons working in the blue economy sub-sector of the entire economy.

4.0 Results, Discussion, Limitation and Recommendations

An analysis and discussion of the research findings have been performed and the limitations of the research stated as a guide for future research. In line with the issues emanating from the study, recommendations have been made for implementation.

4.1 Results

As a result of limited data availability and time constraints, the study was limited to the period commencing 2016 and ending 2024. The Jacque-Bera test summarised in table 2 suggest that the dataset conforms to a normal distribution as evidenced by probability values exceeding the 0.05 threshold for most of the variables used in the analytical framework.

The skewness presented in table 2 is a measure of the asymmetry of the distribution of the variables in the model. The skew value of a normal distribution is supposed to be zero and signifying symmetric distribution (West et al., 1995). The positive skew value is an indication that the tail on the right side of the distribution is longer than the left side and the bulk of the values lie to the left of the mean. In contrast, the negative skew values are indicative of the fact that the tail on the left side of the distribution is longer than the right side and the bulk of the values lie to the right of the mean (West et al., 1995).

Table 2: Pooled Ordinary Least Square Output

Variables	Co-efficient	Error Term	t-Statistics	Probability	Skewness	Kurtosis	Jarque-Bera	P-Value
Constant	758.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
lnCOE	37.10	0.00	0.00	0.00	0.82	-1.67	2.06	0.36
lnGAS	-118.42	0.00	0.00	0.00	0.52	-1.51	1.26	0.53

lnSSD	-87.01	0.00	0.00	0.00	-0.83	0.90	1.34	0.51
lnRGT	45.74	0.00	0.00	0.00	1.18	-0.25	2.11	0.35
lnCGT	42.07	0.00	0.00	0.00	1.12	-0.10	1.88	0.39
lnNFA	4.33	0.00	0.00	0.00	-1.89	3.68	10.41	0.01
lnSBT	37.73	0.00	0.00	0.00	-0.86	-1.71	2.20	0.33
lnOEX	-2.31	0.00	0.00	0.00	-0.85	-1.71	2.17	0.34
lnTAR					-1.96	3.94	11.55	0.00
R-Squared								0.97
Adjusted R-Squared								0.96
F-Statistic								0.00
Durbin-Watson Statistic								0.30

Source: Computation Using Microsoft Excel, R Programming and the Data Available

In addition to the results of the Jacque-Bera test, the cross-section likelihood ratio test and the cross-section dependence test all exhibit probability values exceeding the five percent significance level. In particular, the probability values of the Jacque-Bera test exceeded the five percent threshold for all the variables with the exception of natural logarithm of non-financial assets and natural logarithm of tax revenue, leading to the conclusion that the null hypothesis of regression cannot be rejected. This suggests that the residuals of the regression model adhere to the normal distribution.

The co-efficient for the natural logarithm of compensation of employees is positive and statistically significant. This finding indicates that an increase in compensation of employees is directly associated with the share of the tax revenue in Mauritius. The data show that a unit increment in compensation to employees corresponds to a 37.10 increase in tax revenue. This direct relationship suggests that a heightened level of compensation to employees may influence the proportion of tax revenue linked to the blue economy of Mauritius positively in the long run.

Conversely, the co-efficient for natural logarithm of goods and services as well as other expenses, presents anomalous results. While the negative co-efficients theoretically implies that increased expenditure on goods and services as well as other expenses could reduce the tax revenue share to the blue economy, this relationship lacks statistical significance. The low

t-statistic relative to the critical value from the t-distribution indicates that the presumed negative impact of tax revenue on the blue economy is not empirically robust.

The analysis also confirms anticipated results for the natural logarithm of subsidies, which exerts a negative effect on tax revenue. The coefficient for the natural logarithm of subsidies stood at -87.01, suggesting that a unit increase in subsidies would lead to decline in tax revenue by -87.01 in the blue economy. In contrast, the natural logarithms of recurrent and capital grant variables showed a positive coefficient, indicating that an increase in recurrent and capital grants is associated with a rise tax revenue in the blue economy of Mauritius**.**

Furthermore, the co-efficients for the natural logarithm of non-financial assets and social benefits variable are both positive, with the values 4.33 and 37.73 respectively. These co-efficients suggest that a unit increase in the expenditure relative to non-financial assets and social benefits would lead to an increase in the tax revenue by 4.33 and 37.73 respectively highlighting the crucial role of those expenditures in the blue economy of Mauritius.

Utilising the random effects model, it is evident that the combined effects of the independent variables collectively account for 97% of the variance in the tax revenue, as indicated by the R-squared value of 0.97. The remaining 3% of the variance is attributable to unobserved variables, suggesting the potential presence of additional determinants influencing the relationship between the expenditure in the blue economy and tax revenue. The remaining 3% of the variance is also attributable to factors not captured by the model, indicating the presence of other variables or dynamics influencing tax revenue in the blue economy. The results provided in the table below represents the correlation among the study variables in addition to the already summarised regression analysis output.

Table 3. Correlation matrix

Variables	lnTAR	lnCOE	lnGAS	lnSSD	lnRGT	lnCGT	lnNFA	lnSBT	lnOEX
lnTAR	1.00	-.0.02	-0.11	-0.07	-0.08	0.07	-0.14	0.10	0.27
lnCOE	-0.02	1.00	0.92	0.71	0.91	-0.40	0.43	-0.44	0.53
lnGAS	-0.11	0.92	1.00	0.78	0.87	-0.14	0.49	-0.39	0.55
lnSSD	-0.07	0.71	0.78	1.00	0.71	0.03	0.17	-0.04	0.34
lnRGT	-0.08	0.91	0.87	0.71	1.00	-0.44	0.39	-0.65	0.45

lnCGT	0.07	-0.40	-0.14	0.03	-0.44	1.00	-0.43	0.33	0.32
lnNFA	-0.14	0.43	0.49	0.17	0.39	-0.43	1.00	-0.26	0.10
lnSBT	0.10	-0.44	-0.39	-0.04	-0.65	0.33	-0.26	1.00	-0.51
lnOEX	0.27	0.53	0.55	0.34	0.45	0.32	0.10	-0.51	1.00

Source: Computation Using Microsoft Excel, R Programming and the Data Available

The information displayed in the table 3 suggests that there is low multicollonearity among the variables in the model. The vast majority of the relationship indeed showed no sign or evidence of multicollineraity hence the reliability of the model is relatively high. The presence of multicollinearity among the variables in the model would have reduced the level of reliability (Garson, 2012).

There are other conclusions that can be drawn from the correlation matrix. It can be seen that there exists a negative relationship between the dependent variable and almost all independent variables with the exception of social benefits expenditure and other expenses. The relationship among the explanatory variables also exhibits a diverse relationship. The negative co-efficients suggest that as one variable is increasing the other would be declining and vice versa. Similarly, the positive co-efficients is also an indication of a simultaneous rise or decline of two relational variables.

4.2 Discussion

The ocean makes life possible and support the livelihoods of all and sundry in several forms globally. The importance of marine life has been emphasised through Sustainable Development Goal 14 that deals with life below water (Association of Chartered Certified Accountants, 2025). The concept of sustainable blue economy relies on maintaining a balance between ecological and economic imperatives. The blue economy has been described as the use of ocean and associated resources sustainably for economic development while protecting the ecosystem (Smith-Godfrey, 2016). The dual role of the blue economy presents genuine challenges that requires financing. The source of the financing is primarily the responsibility of the government and Mauritius is no exception.

The challenges are multifaceted and they include traditional fisheries and aquaculture for instance contaminated and overfished water bodies. Also, agricultural, industrial, and sanitary

effluents harm marine ecosystems and communities. The climate change batters coastlines with rising sea and increasing storm intensity. The emphasis on clean technologies and renewable energy sources within the blue economy framework is however salient in the context of climate change and environmental degradation. The transition to renewable energy and adopting circular material economy practices can significantly reduce the environmental footprint of coastal and marine activities. This transition not only mitigates climate impact but also fosters innovation and economic growth in emerging sectors, thereby enhancing overall societal resilience. It requires huge financing that the government must play a lead role with the use of tax revenue (Marwa et al., 2024).

The public or government intervention in the blue economy has been justified in several forms and in countries like Seychelles, Sri-Lanka, India, Maldives, Mauritius, Kenya and South Africa there are dedicated government ministry, department and agency established to steer the affairs of the activities of the blue economy. The objective of these state institutions is meant to regulate the activities of the players of the blue economy among others. In addition to the internal organisation requiring the establishment of state agencies, the Africa Union has also developed an Africa Blue Economy Strategy (Africa Union, 2025).

The vision of the aforesaid strategy is to ensure that there is inclusive and sustainable blue economy that significantly contributes to the transformation and growth of Africa. The objective of the Africa Blue Economy Strategy is to guide the development of an inclusive and sustainable blue economy that becomes a significant contributor to continental transformation and growth, through advancing knowledge on marine and aquatic biotechnology, environmental sustainability, the growth of an Africa-wide shipping industry, the development of sea, river and lake transport, the management of fishing activities on these aquatic spaces, and the exploitation and beneficiation of deep sea minerals and other resources (Africa Union, 2025).

The initiative of the Africa Union suggests that there is no shortage of forward thinking with regards to the management of the blue economy in a sustainable manner. The main pillars of the blue economy have been expanded based on the strategic plan to include good governance, vision, technology, blue management, monitoring, institutional and regulatory reforms. This integration is especially pertinent to the current findings, which emphasise the necessity of

aligning sectoral expenditure within the blue economy framework to achieve comprehensive economic and environmental benefits.

The inclusion of the diverse expenditure under the blue economy umbrella can aid in economic development and contribute to sustainable management practices that benefit both the economy and the environment. The estimated results from this study reveal a positive effect of compensation and social benefits in the blue economy on tax revenue. The findings illustrate the interplay between compensation of employees and tax revenue. The findings indeed affirm the a priori view that increased compensation and related payment in the form of social benefits would lead to increased tax revenue due to the imposition of direct taxes (Lestari and Yolanda, 2022). The challenge lies in managing the desire for tax revenue through the imposition of direct taxes on earnings of personnel working within the blue economy of the country. The policy initiative of the tax authorities should be broad base and ensure that the vast majority of the individuals earning income and receiving social benefits in the blue economy pay the required taxes without necessarily imposing higher taxes.

The implementation of the blue economy framework necessitates substantial investment, especially when sustained over a long period. These investments in the form of procurement of goods and services requires both vertical and horizontal collaboration among governmental and non-governmental entities (Mahardianingtyas et al., 2019). The role of maritime infrastructure is crucial in supporting resource allocation, global value chains, trade, and economic growth.

The investment indicator in this study, proxied by the acquisition of goods and services, show a negative impact on tax revenue and may be due to the aggregation of tax incentive across the various sub-sectors of the blue economy. In order to enhance the contribution of goods and services acquired in the blue economy to tax revenue, the tax incentive need to be more targeted, promoting specific investment in the sector such as sustainable fisheries, marine technology, and coastal infrastructure.

A similar finding to the acquisition of goods and services is the provision of subsidy to the blue economy. The subsidy of the government has exerted negative effect on tax revenue. The allocation of subsidy to ameliorate the cost of operations in the blue economy in the form of infrastructure and marine resource exploration, serves as a leakage to tax revenue. This finding aligns with Ginn (2024), who assert that subsidies is a cost to taxpayers with the imposition of

increased taxes in the long term. Consequently, policies that encourage government subsidy should be for a brief period with an underlying project or activity. The subsidy is a drain to government revenue and should be removed upon the completion of the particular activity that the sought to promote or protect in the value economy.

In stark contrast, the recurrent grant demonstrates a positive impact on tax revenue. This research outcome is at variance with the stance taken by Diaz-Sanchez et al. (2021) that revealed that grants and tax revenue in the Comoros appear to have a negative relationship in the long-run. They argued extensively that the inverse relationship is explained by the fact that grants are a politically less costly source of finance, reducing the urgency of Comorian fiscal planners to expend their reduced political capital and administrative capacity on tax collection reforms. The outcome of the current study is as a result of the quality of the expenditure with the grant allocated to the blue economy and the Government of Mauritius may want to direct the expenditure of the recurrent grant into taxable activities in order to cushion the tax revenue of the state.

The positive relationship between capital grant expenditure in the blue economy and tax revenue suggests that an increase in tax revenue is dependent on rising capital grant expenditure all other things being equal. This finding contradicts the assertion of Blöchliger and Petzold (2009) that suggested that grants spending could have a stabilising role for government tax revenue but actually play destabilising effect especially in countries with a small tax base and large grant systems. They argued further that a grant system more closely based on the needs of the central government could reduce the revenue volatility of the government and improve the stabilisation properties of grants (Blöchliger and Petzold, 2009). The finding is however in consonance with the fact that businesses that receive government grant or subsidy to augment their business income or support their cashflow, the income will generally be taxable because the inclusion in their tax return (Association of Chartered Certified Accountants, 2025).

The direct relationship between non-financial assets and tax revenue is akin to the nexus between grant-based expenditure and tax revenue. The non-financial assets or real assets has a positive effect on tax revenue. The source of such taxes is the property tax in some parts of Africa and council tax in the United Kingdom (Ali et al., 2017). There are studies that indicates that tax revenue rises as a result of the increase in taxes associated with non-financial assets

and vice versa (Awasthi et al., 2020). The research outcome of Awasthi et al. (2020) affirms the findings of the current study.

The findings relative to the other expenses variable in the model depicts a negative impact on tax revenue. This research outcome is based on the fact that these operating expenses in the blue economy are admissible for tax purposes as reported by Mehmood (2024) in a previous study. In the aforesaid study, the qualifying criterion for tax admissibility was clearly eluciated to include expenditures incurred wholly and exclusively for the purpose of conducting a business. These expenses are deductible from the total income of the taxpayer, thereby reducing the taxable income. The rationale behind allowing these deductions is to ensure that only the actual profit from the business is taxed. This enables businesses to claim necessary costs directly associated with generating revenue, maintaining operational assets and complying with legal obligations as deductions (Mehmood, 2024).

4.3 Study Limitations

There are a few limitations of the study that may affect the generalisation of the results and they include the time frame and variables utilised. Even though, these variables are significant, they do not encompass the full spectrum of potential determinants expenditure heads of the blue economy. In future, researchers could explore the synergies among other expenditure lines and their collective impact on the growth of the blue economy as well as identify the best practices that can be implemented at local, national, and international levels to foster a resilient blue economy.

It has also been noted that the pooled least squares estimation regression model may be a limitation to the study and not fully account for time dynamics. In future research, panel or time series models such as fixed effects and Autoregressive Distributed Lag model could be adopted because of their robust nature. Also, the analysis could be disaggregated into sub-sectors such as fisheries, shipping, aquaculture and ocean energy.

4.4 Recommendations

The findings of the study and the challenges of the blue of the blue economy can be resolved with the development of a comprehensive strategy. The strategies should encompass strengthening oversight mechanisms for marine and coastal activities, enhancing institutional

capacity for resource management and law enforcement, expanding allocations for sustainable energy initiatives as well as improving data collection methodology.

In line with the findings of the study discussed and the challenges, the following specific, actionable and tailored policy recommendations are proposed to advance the sustainability of the expenditure of the blue economy in Mauritius.

First and foremost, there is the need to enhance institutional capacity at local, regional, and national levels in order to improve data management and accuracy of record keeping of expenditure of the blue economy. This also requires strengthening the technical and operational capabilities of enforcement agencies in order to identify any potential mis-reporting of blue economy related activities.

Also, integrating information and communication technology into all aspects of the blue economy is an important innovation for optimising data collection and analysis. The adoption of technology-driven platforms like mobile applications and online databases enables real-time data collection of underlying records for revenue and expenditure such as catch sizes, species distribution, and fishing effort for instance. This enhanced data management framework would provide a robust empirical foundation for decision-making in the long run.

Furthermore, advancing research and development in sustainable financial management of the blue economy is crucial for driving economic growth. Consequently, collaboration between academic institutions and the stakeholders of the blue economy should be prioritised in order to develop and disseminate research findings to the public. These innovations are key to ensuring prudent fiscal management of the sector.

Fourthly, providing access to financial resources to targeted groups in the blue economy like small-scale fishers and aquaculture operators is essential for achieving sustainable blue economy at a reduced cost. The development of specialised financial instruments, such as low-interest loans and micro-finance can enhance the growth of the sector and minimise the dependence on revenue from the central government.

Lastly, enhanced public awareness is fundamental to promoting the activities of the blue economy in Mauritius. The collaborative public education campaign by the ministry responsible for the blue economy, educational institutions, non-governmental organisations and media platforms among others are essential for informing consumers about the activities of the blue economy.

5.0 Conclusion

The blue economy is an unsettled arena of knowledge of that is being addressed by a growing number of scientific and non-scientific publications. The boundaries of the concept of blue economy have been addressed differently by stakeholders. A common theme for the varying definition is the inclusion of a strong sustainability view. In this study, the blue economy is understood as the selection of ocean-related economic activities that are sustainable for economic growth, improved livelihoods, and ocean health (Youssef, 2023).

The study sought to examine the nexus between the expenditure in blue economy and tax revenue in Mauritius for the period commencing 2016 and ending 2024. The underlying expenditure for the blue economy in Mauritius were identified as compensation of employees, goods and services, subsidies, recurrent grant, capital grant, non-financial assets, subsidies and social benefits. A quantitative analytical framework was employed, using the pooled least squares estimation to arrive at the findings.

The analysis of the data utilised for the study revealed that compensation of employees, recurrent grant, capital grant, non-financial assets and social benefits have a positive effect on the tax revenue. The tax revenue increases with a unit rise in each of the aforesaid independent variables albeit of different magnitude. Similarly, goods and services, subsidies and other operating expenses have an inverse relationship with tax revenue based on the statistics used for the study. Consequently, a unit rise in each of them would lead to a decline in tax revenue and vice versa.

The restricted timeframe and study variables are a limitation that can stifle generalisation of the study results and future research may want to explore the synergies among other expenditure lines and their collective impact on the growth of the blue economy as well as identify the best practices that can be implemented at local, national, and international levels to promote a resilient blue economy.

In addition to the above study limitation, there were challenges or pitfalls identified as inimical to the growth and development of the blue economy. These challenges include traditional aquaculture practices such as contaminated and overfished water bodies. Also, agricultural, industrial, and sanitary practices harming marine ecosystems and communities are other pitfalls that the blue economy is saddled with in Mauritius. The climate change effects along the

coastlines, rising sea and increasing storm intensity are additional challenges. The emphasis on clean technologies and renewable energy sources within the blue economy framework is key in the context of climate change and environmental degradation. The transition to renewable energy and adaptation to circular material economy practices can reduce the environmental footprint of coastal and marine activities.

The study therefore recommends institutional capacity at local, regional, and national levels in order to improve data management and accuracy of record keeping of expenditure of the blue economy. The fusion of information and communication technology into all aspects of the blue economy would also be useful for optimising data collection and analysis. An integral part of the utilisation of the information and communication technology system is the use of technology savvy platform that enable real-time data collection of underlying records for revenue and expenditure such as catch sizes, species distribution and fishing effort.

The advancement of research and development in sustainable financial management of the blue economy is crucial for driving economic growth. Consequently, collaboration among all the stakeholders of the blue economy should be prioritised in order to develop and disseminate research findings to the public.

The recommendations made would play a significant role in shaping the nature of the expenditure in the blue economy in future. The current level of expenditure in the blue economy in Mauritius underpinned by tax revenue can change in the long term with the implementation of the proposed recommendations based on the study findings and challenges faced by the blue economy in Mauritius.

References

Asian Development Bank. (2023). *Bonds to Finance The Sustainable Blue Economy: A Practitioner's Guide.* Manila: Asian Development Bank.

Accountant-General of the Government of the Republic of Mauritius. (2017). *Annual Report of the Accountant-General and The Accounts of the Government of the Republic of Mauritius for the Financial Year Ended 30 June 2016.* Port Louis, Mauritius: Ministry of Finance and Economic Development.

Africa Union. (2025). *Home: Launch of the Africa Blue Economy Strategy*. Retrieved August 03, 2025 from Africa Union: https://www.au-ibar.org/news/latest-news/launch-africa-blue-economy-strategy

Ali, M., Fjeldstad, O.-H., & Katera, L. (2017). *Property Taxation in Developing Countries.* Bergen, Norway : Chr. Michelsen Institute.

Andersen, J., Al-Hamdani, Z., Carstensen, J., Karen Edelvang, & Egekvist, J. (2023). Are European Blue Economy Ambitions in Conflict with European Environmental Visions? *Ambio, 52*, 1981-1991.

Association of Chartered Certified Accountants. (2025). *About us: Our commitment: UN sustainable development*. Retrieved August 03, 2025 from ACCA global: https://www.accaglobal.com/gb/en/about-us/sustainable.html

Attri, V. N. (2018). *An Emerging New Development Paradigm of the Blue Economy in IORA; A Policy Framework for the Future.* Reduit, Mauritius : Indian Ocean Rim Association (IORA), University of Mauritius.

Aubeeluckon, R. (2021). *Why Mauritius is key to Unlocking Africa's Blue Economy*. Retrieved July 20, 2025 from How we made it in Africa: https://www.howwemadeitinafrica.com/why-mauritius-is-key-to-unlocking-africas-blue-economy/115201/

Awasthi, R., Le, T. M., & You, C. (2020). *Determinants of Property Tax Revenue: Lessons from Empirical Analysis.* Washington D. C., United States of America : World Bank.

Benzaken, D., Adam, J. P., Virdin, J., & Voyer, M. (2024). From Concept to Practice: Financing Sustainable Blue Economy in Small Island Developing States, Lessons Learnt from the Seychelles experience. *Marine Policy, 163*.

Bhikajee, M., McCafferty, J., Sauer, W., & Chikhuri, K. (2023). *Policy for the Blue Economy in Mauritius.* Rome, Italy : Food and Agriculture Organisation of the United Nations.

Biørn, E., & Han, X. (2016). Revisiting the FDI Impact on GDP Growth in Errors-in-Variables Models: A Panel Data GMM Analysis Allowing for Error Memory. *Empirical Economics, 53*, 1379-1398.

Blöchliger, H., & Petzold, O. (2009). *Taxes and Grants: On the Revenue Mix of Sub-Central Governments.* Paris, France : Organisation for Economic Co-operation and Development.

Bretó, C., Ionides, E. L., & King, A. A. (2020). Panel Data Analysis via Mechanistic Models. *Journal of the American Statistical Association, 115*, 1178-1188.

Chen, R. (2021). The Impacts of Government Grants on Firm Behaviors. *Advances in Economics, Business and Management Research, 203*, 226-234.

Connolly, C., Pasquale, F. D., & Noel, S. (2020). *Public Procurement as a Driver of the Development of an Impact Economy: Tools to Move Towards Its Implementation.* Toronto : International Development Research Centre.

Corluka, G. (2019). Tourism Seasonality–An Overview. *Journal of Business Paradigm, 4*(1), 21-43.

Diaz-Sanchez, J. L., Tagem, A., & Mota, J. (2021). *Tax Revenue Effort and Aid in Fragile States: The case of Comoros.* Washington D. C., United States of America : World Bank Group.

Economic Development Board. (2025). *Home: Blue Economy*. Retrieved July 20, 2025 from https://edbmauritius.org/blue-economy: https://edbmauritius.org/blue-economy

Eikeset, A. M. (2018). What is Blue Growth? The Semantics of Sustainable Development of Marine Environments. *Marine Policy, 87*, 177-179.

Elston, J., Pinto, H., & Nogueira, C. (2024). Tides of Change for a Sustainable Blue Economy: A Systematic Literature Review of Innovation in Maritime Activities. *Sustainability, 16*(24).

Food and Agriculture Organisation. (2024). *In Brief to the State of World Fisheries and Aquaculture 2024. Blue Transformation in action.* Rome, Italy: Food and Agriculture Organisation.

Garson, G. D. (2012). *Testing Statistical Assumptions.* Statistical Associates Publishing.

Ginn, V. (2024). *The Hidden Costs of Tax Increment Financing: Subsidies That Drain Prosperity.* Wichita, Kansas, United States of America : Kansas Policy Institute.

Gujarati, D. N., & Porter, D. C. (2009). *Basic Econometrics* (5th ed.). New York, United States of America: The McGraw-Hill.

Keen, M. (2021). *Taxation and the Environment: An Overview of Key Issues for Developing Countries.* Clermont-Ferrand Cedex, France: Mobilisation des Ressources Intérieures Publiques.

Lestari, F. A., & Yolanda, D. Z. (2022). The Effect of Economic Growth, Poverty and Wages on Tax Revenue. *Eduvest - Journal Of Universal Studies, 2*(11), 2295-2306.

Mahardianingtyas, S., Safitra, D. A., & Agustio, A. (2019). A Blue Economy for Better Economic Development: A Case Study of East Nusa Tenggara, Indonesia. *Advances in Economics, Business and Management Research, 89*, 165-173.

Majewska, J. (2024). The Ocean Economy in SIDS – Environmental Taxation. *Ekonomia XXI Wieku, 27*, 1-9.

Mancini, R., & Comolet, A. (2020). *Blue Economy in the Mediterranean: Case Studies, Lessons and Perspectives.* Nairobi, Kenya: United Nations Environment Programme.

Marcos, M. (2023). *A Blue Economy for Sustainable Development: Available Grants*. Retrieved July 20, 2025 from FI Group: https://grants.fi-group.com/blue-economy-for-sustainable-development-available-grants/

Marwa, T., Muizzuddin, Bashir, A., Andaiyani, S., & Cahyadi, A. (2024). Determinants of the Blue Economy Growth in the Era of Sustainability: A Case Study of Indonesia. *Economies, 12*, 299.

McConnell, K. E., & Price, M. (2006). The Lay System in Commercial Fisheries: Origin and Implications. *Journal Environmental Economics and Management , 51*(3), 295-307.

Mehmood, S. A. (2024). *Admissible and Inadmissible Expenses under the Income Tax Ordinance, 2001: Concept, Rational, and Detailed Overview*. Retrieved August 03, 2025 from Taxation | Compliance | Finance:

https://www.linkedin.com/pulse/admissible-inadmissible-expenses-under-income-tax-2001-mehmood-zjknf/

Menicou, M., & Vassiliou, V. (2010). Prospective Energy Needs in Mediterranean Offshore Aquaculture: Renewable and Sustainable Energy Solutions. *Renewable and Sustainable Energy Reviews, 14*, 3084-3091.

Ministry of Blue Economy, Marine Resources, Fisheries and Shipping. (2021). *Annual Report on Performance for Financial Year 2019 - 2020* . Port Louis: Ministry of Blue Economy, Marine Resources, Fisheries and Shipping.

Ministry of Blue Economy, Marine Resources, Fisheries and Shipping. (2023). *Annual Report on Performance for Financial Year 2021-2022.* Port Louis, Mauritius: Ministry of Blue Economy, Marine Resources, Fisheries and Shipping.

Nwakoby, G. C., Bielu, K., & Ezewudo, V. (2025). Taxation of the Blue Economy in Nigeria and a Quest for Economic Renaissance. *Journal of Private and Property Law, 2*(1), 63-75.

Okonjo-Iweala, N. (2022). *Fisheries Subsidies Deal will Contribute to Sustainable Blue Economy*. Retrieved July 20, 2025 from WTO: https://www.wto.org/english/news_e/spno_e/spno28_e.htm

Phelan, A., Ruhanen, L., & Mair, J. (2020). Ecosystem Services Approach for Community-based Ecotourism: Towards an Equitable and Sustainable Blue Economy. *Journal of Sustainable Tourism, 28*, 1665-1685.

Smith-Godfrey, S. (2016). Defining the Blue Economy. Maritime Affairs:. *Journal of the National Maritime Foundation of India, 12*(1), 58-64.

Soma, K. (2018). Social Innovation – A Future Pathway for Blue Growth? *Marine Policy, 87*, 363-370.

UN Trade and Development. (2025). *Home/Projects/Regulating Fisheries Subsidies*. Retrieved July 20, 2025 from UN Trade and Development: https://unctad.org/project/regulating-fisheries-subsidies

United Nations Conference on Trade and Development. (2014). *Small Island Developing States: Challenges in Transport and Trade Logistics.* Geneva, Switzerland : United Nations Conference on Trade and Development.

United Nations Development Programme. (2020). *Human Development Report 2020: The Next Frontier: Human Development and the Anthropocene.* New York, United States of America : United Nations Development Programme.

West, S. G., Finch, J. F., & Curran, P. J. (1995). *Structural Equation Models with Non-normal Variables: Problems and Remedies.* Newbery Park, California, United States of America : Sage.

World Bank and United Nations Department of Economic and Social Affairs. (2017). *The Potential of the Blue Economy: Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries.* Washington DC, United States of America: World Bank.

Youssef, M. (2023). Blue Economy Literature Review. *International Journal of Business and Management, 18*(3), 12-18.

Zhu, X., & Lansink, A. O. (2008). *Technical Efficiency of the Crop Farms Under the Various CAP Reforms: Empirical Studies of Germany, the Netherlands and Sweden.* Sevilla, Spain.