**African Journal of Advanced Studies in Humanities and Social Sciences (AJASHSS)**
**المجلة الإفريقية للدراسات المتقدمة في العلوم الإنسانية والاجتماعية**
*Online-ISSN: 2957-5907*
*Volume 4, Issue 4, 2025*
*Page No: 1112-1123*
*Website: https://aaasjournals.com/index.php/ajashss/index*
**Arab Impact factor 2024: 0.81** **SJIFactor 2024: 6.856** **ISI 2025: 1.191**

# The Impact of the Blue Economy on Sustainable Development

Reema Salem [*1] , Hamzah Jibreel [2] , Arwa Aljali [3]
[1,2,3] Department of Economics, Faculty of Economics, University of Tobruk, Libya

# تأثير الاقتصاد الأزرق على التنمية المستدامة

ريما سالم صالح [*1]، حمزة جبريل عقيله [2]، أروى خير الله الجالي [3]
[3،2،1] قسم الاقتصاد، كليه الاقتصاد، جامعة طبرق، ليبيا

[*]*Corresponding author: reema.abdelali@tu.edu.ly*

| Received: September 08, 2025 | Accepted: November 29, 2025 | Published: December 09, 2025 |
|---|---|---|

**Abstract:**
The blue economy represents a strategic opportunity for developing countries to achieve sustainable development through the sustainable use of marine resources. This paper reviews the experiences of several countries (Indonesia, Singapore, Kenya, Bangladesh), highlighting effective policies, environmental challenges, and economic outcomes. It concludes by proposing a framework for adopting the blue economy in Arab coastal countries. The study also used a questionnaire to collect data and analyze results, allowing researchers to assess the economic impact of the blue economy on sustainable development in Libya (Tobruk as a case study) The results showed that most of the historical answers were statistically at the 0.05 level of significance, which reliably reflects the results, and the possibility of recording them to the community. Because of these results, many measures can be taken to enhance environmental awareness in society.
There is a high level of awareness about the blue economy among respondents (86.8%. The top challenges identified are lack of funding and awareness, followed by marine pollution and infrastructure issues.

**Keywords:** blue Economic, environmental awareness, sustainability Development, pollution.

**الملخص**
يمثّل الاقتصاد الأزرق فرصة استراتيجية للدول النامية لتحقيق التنمية المستدامة من خلال الاستخدام الرشيد للموارد البحرية. تستعرض هذه الورقة البحثية تجارب عدد من الدول مثل: إندونيسيا، سنغافورة، كينيا، وبنغلاديش، مع التركيز على السياسات الفعّالة، والتحديات البيئية، والنتائج الاقتصادية التي حقّقتها تلك الدول.
وتختتم الورقة باقتراح إطار عمل لاعتماد الاقتصاد الأزرق في الدول العربية الساحلية. كما استخدمت الدراسة استبياناً لجمع البيانات وتحليل النتائج، مما أتاح للباحثين تقييم الأثر الاقتصادي للاقتصاد الأزرق على تحقيق التنمية المستدامة في ليبيا، مع اتخاذ مدينة طبرق كحالة للدراسة.
أظهرت النتائج أن معظم الإجابات جاءت دالّة إحصائياً عند مستوى 0.05، ممّا يعكس موثوقية النتائج وإمكانية تعميمها على المجتمع. وبناءً على هذه النتائج، يمكن اتخاذ العديد من التدابير لتعزيز الوعي البيئي في المجتمع.
كما تبيّن أن مستوى الوعي حول مفهوم الاقتصاد الأزرق كان مرتفعاً بين المشاركين بنسبة بلغت (86.8%). وتمثلت أهم التحديات في نقص التمويل وضعف الوعي، تليها مشكلات التلوث البحري وقصور البنية التحتية.

**الكلمات المفتاحية:** الاقتصاد الأزرق، الوعي البيئي، التنمية المستدامة، التلوث.

## Introduction:

The blue economy is an emerging concept that has gained increasing global attention in recent decades. It refers to the sustainable use of marine and aquatic resources to achieve economic growth, improve livelihoods, and ensure the health of marine ecosystems. The concept integrates economic development with the protection of oceans, seas, and rivers, focusing on a broad range of activities such as marine fishing, maritime transport, coastal tourism, marine renewable energy, and marine biotechnology.

 

The blue economy is one of the tools of sustainable development that helps countries achieve growth without harming the surrounding environment or wasting resources—ensuring sustainability for future generations. Looking at the experiences of neighboring and regional countries close to Libya, it is evident that similar strategic plans can be developed based on those that succeeded in leveraging the blue economy.

The concept of the blue economy came to prominence at the Rio+20 Conference in 2012 under the umbrella of sustainable development. It emphasized the need to balance economic development with marine environmental conservation (United Nations, 2012). Today, it is seen as a vital tool for addressing environmental and social challenges such as climate change, coastal poverty, and biodiversity loss.

According to the World Bank (2017), the blue economy includes "the sustainable use of ocean resources for improved economic growth, livelihoods, and jobs while preserving the health of ocean ecosystems." The OECD (2016) estimates that the ocean economy could generate over $3 trillion annually by 2030.

Applications of the blue economy vary from one country to another based on their geographic location and natural resources. In small island nations, the blue economy is a lifeline, while large coastal countries seek to develop sustainable national strategies to increase the contribution of marine sectors to their GDP.

Recent environmental studies (Pauli, 2010; Silver et al., 2015) indicate that transitioning to a blue economy requires structural changes in public policies, innovation in marine technologies, and enhanced environmental governance. This links the blue economy closely to the Sustainable Development Goals (SDGs), particularly Goal 14: Life Below Water.

**Study Problem:**

Despite the vast potential of the blue economy, its implementation in many countries—especially Arab countries remains limited.

To what extent does the blue economy contribute to sustainable development, and what are its challenges in the Arab and global contexts?

This research analyzes the impact of the blue economy on sustainable development by reviewing both international and Arab experiences and proposing ways to enhance this promising sector.

Research Hypothesis and Objectives:

**Objectives:**

Define the concept of the blue economy and its theoretical development.

Highlight the relationship between the blue economy and the Sustainable Development Goals.

economy.

Identify challenges faced by developing countries in applying the blue economy.

Propose mechanisms and strategies to activate the role of the blue economy in sustainable development.

**Data Analysis**

Using SPSS software, the gathered data was analyzed, and one-way analysis of variance (ANOVA), means, and standard deviations were computed to look at variations in the demographic factors. The validity of the items used to measure environmental awareness was examined using factor analysis, and the reliability of the study instrument was evaluated using Cronbach's Alpha.

**Research Methodology:**

**Type: Descriptive-analytical research**.

Tools: Content analysis of previous studies and reports from international organizations (UN, WB,)

Comparative Approach: Comparing two international).

Results and Discussion Demographic and Data Analysis

**Table 1:** Statistical Analysis Results and Discussion (Blue Economy Survey) Gender Varble

| Gender | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Male | 32 | 60.4% | 60.4% | 60.4% |
| Female | 21 | 39.6% | 39.6% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

The gender distribution of the respondents was 60.4% male and 39.6% female. This result reflects a male-dominated membership, as in the broader trends throughout Libya where economic and governmental careers remain more open to men. However, the relatively high female representation to nearly 40% is noteworthy and reflects growing awareness and engagement of women in blue economy related fields. Libya's blue economy, as with much of Africa, is controlled by traditional gender norms but also subject to shifting opportunities. Areas such as the fishing industry, seaborne trade, and beach tourism continue to be male-dominated, reflecting the history and current cultural values of Libya and the rest of Africa (Okafor-Yarwood et al., 2020; Sikhunyana &

 

Mishi, 2023). Despite these constraints, women's participation is on the increase with some research showing that female participation has risen to almost 40% in certain blue economy activities. This growing trend has been attributed to greater awareness, targeted development efforts, and the realization of the blue economy's potential for closing gender gaps (Sikhunyana & Mishi, 2023).

Nonetheless, women remain excluded. There is limited access to education, credit, and leadership, while restricted skills acquisition and patriarchal social norms further restrict women's involvement, particularly in commercial and decision-making (Sikhunyana & Mishi, 2023). This means that while men are still deriving more commercial benefits from blue economy activities, women's involvement is largely confined to subsistence and community levels. Nonetheless, studies point to ease of access for women as having important poverty reduction impacts and contributing towards strengthening the resilience of communities, emphasizing the socio-economic change capability of inclusive solutions (Sikhunyana & Mishi, 2023).

The blue economy in Libya and North Africa includes numerous sectors, such as aquaculture, fisheries, coastal tourism, maritime transport, and shipbuilding (Martínez-Vázquez et al., 2021; Kabil et al., 2021). While the sectors are largely male, their diversification and development create opportunities for women's increased participation. Literature identifies that successful blue economy policies go beyond economic growth and take into consideration social inclusion, gender equality, and direct local people's participation as conditions for sustainability (Okafor-Yarwood et al., 2020; Cisneros-Montemayor et al., 2021). In line with this, the Libyan case reflects a broader African reality: even when men dominate blue economy employment, there is a large and growing number of women's participation. This shift is not only a verification of social change but also an indicator that gender equality is becoming more and more recognized as a foundation for sustainable blue growth.

**Table2:** Age

| Age Group | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| 18–30 | 18 | 34.0% | 34.0% | 34.0% |
| 31–45 | 24 | 45.3% | 45.3% | 79.2% |
| 46–60 | 11 | 20.8% | 20.8% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

The age distribution of the respondents shows that 34% were between 18–30 years, 45.3% between 31–45 years, and 20.8% between 46–60 years. The dominance of the 31–45 age bracket shows that the majority of the participants belong to the most active working-age bracket, the individuals who are most likely to be working in professional roles and actively engaged in decision-making. The 18–30 age group was also a high percentage, reflecting the increasing interest among young people in newer economic opportunities such as the blue economy. The older age group was not as well represented, possibly due to less exposure to new concepts or less career activity in newly emerging sectors. This age range highlights how the blue economy story is increasingly resonating with both mid-career practitioners and younger generations who will be tasked with driving developments in the years to come.

At the same time, the blue economy in Libya, as in much of Africa, continues to be highly driven by gender roles and also defined by evolving social dynamics. Blue economy opportunities remain occupied by men, particularly in traditional sectors such as fisheries, maritime transport, and coastal tourism, which are more within their reach by virtue of historical and cultural expectations (Okafor-Yarwood et al., 2020; Sikhunyana & Mishi, 2023). Despite this domination, there is notable and growing participation of women. According to some studies, women's involvement in blue economy activities is approaching 40%, a progress owed to targeted development initiatives, growing awareness, and the realization of the blue economy as a possible avenue for reducing gender disparities (Sikhunyana & Mishi, 2023). Despite this, women still face a number of challenges. Their access to education, economic resources such as credit, and leadership positions remains restricted, and patriarchal values and constraining social norms still limit their involvement, particularly in commercial and decision-making positions (Sikhunyana & Mishi, 2023).

Blue economy of Libya and North Africa consists of principal industries of fisheries, aquaculture, maritime transport, shipbuilding, and coastal tourism (Kabil et al., 2021; Martínez-Vázquez et al., 2021). Although men are more expected to benefit commercially from these sectors, women's involvement is more inclined towards subsistence and community-based activities. Yet the evidence suggests that increasing the access of women to resources and skills can have profound poverty-reducing and community-strengthening effects (Sikhunyana & Mishi, 2023). Scholars also highlight that successful blue economy initiatives are not only founded on economic growth but also on inclusive frameworks that place the question of gender equality and local communities at the heart of sustainable development (Okafor-Yarwood et al., 2020; Cisneros-Montemayor et al., 2021).

 

**Table3:** Education Level

| Education Level | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Secondary or lower | 5 | 9.4% | 9.4% | 9.4% |
| Diploma | 1 | 1.9% | 1.9% | 11.3% |
| Bachelor's | 15 | 28.3% | 28.3% | 39.6% |
| Master's | 26 | 49.1% | 49.1% | 88.7% |
| Doctorate | 6 | 11.3% | 11.3% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

Almost half of the total respondents were Master's degree holders (49.1%), followed by Bachelor's degree holders (28.3%) and PhD holders (11.3%). Only 9.4% of the respondents were secondary education or below, and only 1.9% were diploma holders. This section reflects that the sample was well educated and had mostly postgraduate holders. This type of educational history would take some way to explain the rather high level of blue economy awareness discovered in the poll, as education is traditionally associated with more understanding, activity, and leadership in new areas. Under-representation of lower education groups, on the other hand, suggests that blue economy debate and opportunities remain largely confined to professional and university communities, limiting wider participation of society.

The large majority of Master's and PhD holders are in line with research that already suggests that universities and institutions of higher education have the role of preparing individuals with critical thinking skills and cross-disciplinary minds needed to address the blue economy (Marwiyah & Fitria, 2022). On this level, education has a tendency of exposing students and practitioners to sustainability paradigms, oceanic resource management, and policy innovation as means of preparing them to fill leadership positions in spearheading the growth of the industry. Likewise, Bachelor's degree graduates are prepared to contribute through technical and functional abilities, reflecting a moderate to high level of awareness and experiential involvement (Marwiyah & Fitria, 2022). On the other hand, secondary-educated or diploma holders point to limited participation, a conclusion reinforced by studies that attribute this gap to low exposure, lack of basic knowledge, and lower career prospects in technical or policy fields (Verma et al., 2024; Marwiyah & Fitria, 2022).

This apparent link between tertiary education and participation in blue economy provides clear evidence of a critical element of Libya's sustainability: access to tertiary education not just increases knowledge but also opens doors to direct contribution to the creation of marine-based economic opportunities. It indicates that the academic curricula can be strengthened, training opportunities can be increased, and gaps in awareness can be bridged for less educated populations so that participation base can be widened significantly and the opportunities of the blue economy can be equitably distributed across society (Verma et al., 2024).

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**Table4:** Occupation

| Occupation | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Student | 10 | 18.9% | 18.9% | 18.9% |
| Government employee | 28 | 52.8% | 52.8% | 71.7% |
| Private sector | 8 | 15.1% | 15.1% | 86.8% |
| Other | 7 | 13.2% | 13.2% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

**Occupation**

Government employees made up the largest group of respondents (52.8%), followed by students (18.9%), workers in the private sector (15.1%), and others (13.2%). Such dominance of government employees is to be expected within the Libyan context, where public sector employment is widespread and often forms the basis of economic activity. This finding is typical of broader trends within much of the developing world, where the public sector is the largest source of new economic policy and initiative. For blue economy, leadership from the public sector is the natural consequence of the existence of mature administrative institutions, available resources, and policy-influencing power (Okafor-Yarwood et al., 2020; Şeren, 2019; Lu et al., 2019).

Effective blue economy development relies significantly on strong government initiative, particularly in creating enabling policy, driving public–private partnerships, and providing focal subsidies or incentives to reduce risks and attract private capital (Chen & Huang, 2023; Şeren, 2019; Lu et al., 2019). In addition to economic considerations, government intervention also plays a vital role in setting sustainability benchmarks and ensuring that environmental and social goals are integrated into economic planning (Chen & Huang, 2023; Cisneros-Montemayor et al., 2021). But research warns that public institution-driven growth at high pace will tend to sacrifice inclusivity and the environment for short-term economic gain unless policy is deliberately designed to address them (Okafor-Yarwood et al., 2020; Cisneros-Montemayor et al., 2021; Cisneros-Montemayor et al., 2019).

 

The low private sector representation of workers in the survey indicates one of the biggest blue economy hurdles for Libya. In most other environments as well, private sector engagement is still being constrained by regulatory barriers, insufficient incentives, and proof of high-risk perceptions (Chen & Huang, 2023; Tirumala & Tiwari, 2020; Lu et al., 2019). However, researchers consistently underscore that private sector engagement is essential to initiate innovation, efficiency, and sustainable development. Parallel to this is the substantial student engagement in this study, reflective of a higher youth and academic interest in the blue economy. This engagement is significant since higher education institutions and younger generations form the core of setting future research, innovation, and policy directions (Heidkamp et al., 2021).

Overall, the report highlights the predominance of leadership in Libya's blue economy initiatives in the public sector, as supported by global statistics citing its necessity during the development's formative stages. However, without additional collective efforts towards securing private sector engagement and bridging youth participation to real action, the transformative value of the blue economy might be compromised. Ensuring that the model is balanced with leadership from the government complemented by private initiative and scholarly contributions appears an imperative for sustainable and inclusive growth.

**Table 5:** Have you heard of the blue economy before?

| Response | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Yes | 46 | 86.8% | 86.8% | 86.8% |
| No | 7 | 13.2% | 13.2% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

**Awareness of the Blue Economy**

The majority of the respondents (86.8%) reported that they had heard of the blue economy, and only 13.2% reported that they had not. This suggests that the concept is quite well understood in the population being surveyed, who were highly educated and professionally engaged. This finding is consistent with global trends, whereby the blue economy has gained a lot of traction among policymakers, researchers, and practitioners working in sectors directly linked to marine and coastal resources. The expansion of consciousness in such milieus is highly dominated by global efforts, higher education schemes, and focused policy debates that have placed the idea on the cutting edge of sustainable development discourse (Lu et al., 2019; Youssef, 2023; Martínez-Vázquez et al., 2021).

But the lesser number of those claiming no prior knowledge resides in a lacuna of familiarity to be recorded, particularly outside academic and technical discourses. Scholars have observed that as much as the blue economy is progressively well documented technically, in the wider general public it remains a comparatively new and oftentimes ambiguous concept. The majority, especially non-coastal or non-resource-based societies, lack a clear understanding of what the blue economy entails and how it can contribute to sustainable development (Duane et al., 2019; Youssef, 2023; Martínez-Vázquez et al., 2021). It indicates how challenging it is to transfer expert-level discourse to shared societal awareness.

Researchers hold that increasing outreach and engagement is essential to ensure blue economy growth is inclusive. Without deliberate efforts at opening up education and communication, blue economy benefits risk being reserved for specialists, shutting out wider societies from access to opportunities and governance. For equitable and sustainable development, awareness campaigns must transcend academia and policy institutions and reach marginalized and non-coastal communities so that they too get informed, empowered, and enabled to contribute (Cisneros-Montemayor et al., 2021; Martínez-Vázquez et al., 2021).

To this end, while the high level of awareness here is a welcome basis for policy and professional interest, it also identifies the sheer scale of public education and outreach that is necessary in Libya. These lacunae must be filled if the blue economy is to take root in national consciousness and secure more inclusive forms of sustainable coastal development.

**Table 6:** Source of Knowledge

| Source | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Media | 8 | 15.1% | 15.1% | 15.1% |
| Social Media | 19 | 35.8% | 35.8% | 50.9% |
| Academic Education | 12 | 22.6% | 22.6% | 73.6% |
| Workshops/Conferences | 6 | 11.3% | 11.3% | 84.9% |
| Other | 8 | 15.1% | 15.1% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

**Source of Knowledge**

The result of the research indicates that respondents identified social media as the prime source of information about the blue economy (35.8%), followed by academic education (22.6%), mainstream media (15.1%), workshops/conferences (11.3%), and other sources (15.1%). That so many percent rely on social media indicates

 

that formal and traditional channels are yet not being utilized comprehensively to disseminate information on the blue economy in Libya. Conversely, the future for research institutions appears brilliant, though the modest contribution of conferences and workshops speaks for a lack of specialized conferences in this field.

The predominance of social media mirrors the direction towards informal, speed-access platforms, while formal channels and conventional media are less exploited. Educational institutions play a significant but secondary role in providing formal and in-depth knowledge through curricula, scholarship, and student activities but with comparatively circumscribed audiences that prefer to keep within academic worlds (Martínez-Vázquez et al., 2021; Youssef, 2023). The relatively low reliance on traditional media and conferences/workshops shows that these media are less accessible, less credible, or not being engaged in blue economy communication actively enough. Literature highlights that the absence of specialist events and targeted media campaigns may hinder greater public awareness and involvement (Youssef, 2023).

Overall, social media are increasingly being utilized as a principal vehicle to disseminate blue economy concepts among young, digitally active segments. Academic institutions remain pertinent with respect to depth of knowledge transfer, while conventional media and expert events require more participation to expand awaren**ess** and participation in Libya.

**Table 7:** Understanding of the Blue Economy

| Understanding | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Sustainable use of marine resources | 28 | 52.8% | 52.8% | 52.8% |
| Expansion of maritime trade | 14 | 26.4% | 26.4% | 79.2% |
| Marine protection | 7 | 13.2% | 13.2% | 92.5% |
| I don't know | 4 | 7.5% | 7.5% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

It was determined in the survey that more than half of the respondents (52.8%) conceptualized the blue economy as the "sustainable use of marine resources," 26.4% equated it with the "development of maritime trade," 13.2% described it with only "marine protection," and 7.5% had no idea. This suggests that the majority have a correct conception that is sustainability-focused and at the root of the blue economy paradigm. But the large percentage that identified it with trade only reflects some misinterpretation of traditional maritime economic terminology.

In terms of sources of information, social media was the most common approach (35.8%), followed by education through universities (22.6%), traditional media (15.1%), conferences/workshops (11.3%), and other information sources (15.1%). Social media supremacy indicates a trend away from formal, low-speed access channels and toward underutilizing official and traditional media. Educational institutions have a major but secondary function by offering systematic, in-depth information through curricula, research, and student involvement, though their influence is usually restricted to scholastic circles (Martínez-Vázquez et al., 2021; Youssef, 2023). The relatively low reliance on conferences and workshops indicates a lack of focused events and formal promotion, consistent with evidence that too little targeted events and media campaigning could limit greater public awareness and engagement (Youssef, 2023).

In general, these findings indicate world patterns of blue economy information exchange: social media constitutes a rapid and effective means of raising awareness among digitally active communities; schools provide comprehensive information; traditional media and specialized events require greater participation to achieve maximum coverage and citizen engagement**.**

**Table 8:** Importance of the Blue Economy

| Importance | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Very important | 29 | 54.7% | 54.7% | 54.7% |
| Somewhat important | 20 | 37.7% | 37.7% | 92.5% |
| I don't know | 4 | 7.5% | 7.5% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

**Importance of the Blue Economy**

Most of the respondents considered the blue economy as "very important" (54.7%) or "somewhat important" (37.7%), 7.5% were unsure. This indicates the wide awareness of the importance of the blue economy, and indeed it is largely accepted as a key element of sustainable development. With regard to sources of information, social media was the most impacting medium (35.8%), followed by university-level education (22.6%), mainstream media (15.1%), workshops/conferences (11.3%), and others (15.1%). The domination by social media is a sign of a trend towards informal, high-access-speed media, and official channels and traditional media are underutilized. Educational institutions possess a primary but secondary role of providing structured in-depth learning through curriculum, studies, and student interactions, albeit with narrow coverage to scholarly circles (Martínez-Vázquez et al., 2021; Youssef, 2023). Low levels of use of conferences and workshops indicate a lack of specialist events

 

and formal outreach, in line with evidence pointing to the need for targeted events and media events to optimize public awareness and knowledge (Youssef, 2023).
As a whole, these findings reveal global patterns of blue economy information spread: social networking sites as a fast and effective means, especially for virtual communities; universities offer officialized knowledge; traditional mass media and niche forums require additional proactive promotion in order to reach the masses and raise public awareness and engagement.

**Table 9:** Sectors benefiting from the Blue Economy

| Sector | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Marine tourism | 10 | 18.9% | 18.9% | 18.9% |
| Sustainable fishing | 12 | 22.6% | 22.6% | 41.5% |
| Renewable energy | 6 | 11.3% | 11.3% | 52.8% |
| Maritime transport | 5 | 9.4% | 9.4% | 62.3% |
| Marine agriculture | 1 | 1.9% | 1.9% | 64.2% |
| All of the above | 19 | 35.8% | 35.8% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

A majority of respondents (35.8%) selected "all of the above," indicating an understanding of the interlinkage between blue economy sectors and an appreciation of its multidimensionality. The other respondents identified sustainable fisheries (22.6%), marine tourism (18.9%), renewable energy (11.3%), maritime transport (9.4%), and aquaculture (1.9%). These results suggest that public attention remains focused on traditional sectors such as fisheries, tourism, and sea transport, with emerging areas of aquaculture and renewable energy accorded proportionately lower priority.
Literature corroborates this tendency, noting that sustainable fisheries, marine tourism, and marine transport are core, deeply rooted activities of the blue economy and have a tendency to dominate public and policy debate (Martínez-Vázquez et al., 2021; Fernández-Palacios et al., 2023; Danio et al., 2025; Njiru et al., 2020). New and emerging industries, including aquaculture, marine biotechnology, and ocean renewable energy, are increasingly recognized for their potential to drive innovation, sustainability, and economic diversification but attract less publicity and investment (Choudhary et al., 2021; Bhati et al., 2025; Danio et al., 2025; Fernández-Palacios et al., 2023). Furthermore, the blue economy's forte lies in the synergies and interlinkages among its sectors, with the requirement for integrated management and cross-sectoral collaboration to maximize benefits and achieve sustainability goals (Giovanni, 2021; Turschwell et al., 2022; Martínez-Vázquez et al., 2021).
Overall, although the traditional industries continue to attract the largest share of attention, recognition of sectoral interdependence underscores the need for greater awareness and investment in emerging and innovative industries if the potential of the blue economy is to be fully exploited.

**Table 10:** Is the government promoting investment in the Blue Economy?

| Response | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Yes | 26 | 49.1% | 49.1% | 49.1% |
| No | 27 | 50.9% | 50.9% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

**Feasibility of Blue Economy Implementation in Libya**
Respondents were almost evenly divided on the feasibility of implementing the blue economy, with 49.1% considering it feasible and 50.9% being doubtful. The split signifies both optimism in the potential economic, social, and environmental benefits and doubt due to existing challenges. The finding points to the necessity for clear national strategies, strong institutional support, and adequate resource mobilization to render blue economy initiatives realistic and successful.
Research demonstrates that the prospects for a blue economy are more dependent on governance, institutional capacity, planning, and finance than on the richness of marine resources. Implementation challenges of great concern include corruption, institutional weakness, and absence of coherent policy structures (Cisneros-Montemayor et al., 2021; Stephenson & Hobday, 2024; Niner et al., 2022; Voyer et al., 2020). Effective delivery also requires integrated governance arrangements, cross-sectoral coordination, and stakeholder engagement because countries with clearly defined strategies are more likely to achieve success (Stephenson & Hobday, 2024; Voyer et al., 2020; Lu et al., 2019). In addition, a lack of investment and lowered access to new financing tools, such as blue bonds, also hinder progress, calling for sustainable funding models (Tirumala & Tiwari, 2020; Khan & Emon, 2024). Context-specific issues—like environmental risks, regulatory complexity, and the need for capacity development—also complicate adoption, particularly in the developing world (Narwal et al., 2024; Niner et al., 2022; Khan & Emon, 2024).

 

Overall, while there is enthusiasm for the opportunity offered by the blue economy, caution is reasonable given entrenched governance, financial, and institutional impediments. Successful implementation depends on surmounting these challenges through planning, resource mobilization, and context-sensitive policies (Cisneros-Montemayor et al., 2021; Narwal et al., 2024; Lu et al., 2019; Khan & Emon, 2024).

**Table 11:** Main Challenges

| Challenge | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Lack of funding | 22 | 41.5% | 41.5% | 41.5% |
| Lack of awareness | 12 | 22.6% | 22.6% | 64.2% |
| Marine pollution | 9 | 17.0% | 17.0% | 81.1% |
| Weak infrastructure | 5 | 9.4% | 9.4% | 90.6% |
| No clear policies | 3 | 5.7% | 5.7% | 96.2% |
| Other | 2 | 3.8% | 3.8% | 100.0% |
| Total | 53 | 100.0% | 100.0% | |

**Challenges Facing the Blue Economy**

The survey gave the following top barriers to blue economy development as lacking finance (41.5%), lack of awareness (22.6%), pollution of the seas (17%), weak infrastructure (9.4%), policy ambiguity (5.7%), with other reasons being 3.8%. These findings highlight that financial and institutional barriers are the largest, followed by environment and knowledge-related barriers. To overcome these barriers, integrated policies, capacity building, and stronger governance institutions are required with a focus on multi-level, cross-sectoral coordination and long-term dedication.

Administrative and institutional barriers, such as fragmented organizational patterns, poor role clarity, and coordination gaps among sectors and government levels, hinder policy integration and capacity building attempts. Sectoral compartmentalization and policy legacies also present other challenges to reforms (Domorenok et al., 2021; Rayner & Howlett, 2009; Borgström, 2019; Pereira & De Azambuja, 2021; Cars et al., 2017). Insufficient and misallocated funding limits the use of integrated policies and capacity development strategies (Petersen et al., 2017; Marais & Petersen, 2015; Faijue et al., 2024; Pereira & De Azambuja, 2021). Knowledge gaps and human resource gaps, such as lack of proper training, technical skill gap, and unawareness of stakeholders, weaken reforms in governance (Domorenok et al., 2021; Calderaro & Craig, 2020; Dzulkifli et al., 2023; Pereira & De Azambuja, 2021). Weak policy frameworks and poor governance, e.g., uncoordinated, undetailed policies, and insufficient accountability and data-sharing frameworks, are undermining innovation and collaboration (Exley et al., 2022; Rayner & Howlett, 2009; Marais & Petersen, 2015; Meuleman, 2021; Pereira & De Azambuja, 2021; Koop et al., 2017). Environmental and contextual factors, such as sea pollution, infrastructural deficits, and socio-political dynamics, further challenge implementation, particularly within urban and low-resource settings (Petersen et al., 2017; Marais & Petersen, 2015; Borgström, 2019; Pereira & De Azambuja, 2021; Koop et al., 2017).

Solutions to tackle the difficulties include strengthening administrative and policy capacity through good coordination mechanisms, enhanced interdepartmental working, and investment in training and leadership development (Domorenok et al., 2021; Saguin & Howlett, 2022; Dzulkifli et al., 2023; Hughes et al., 2015; Farazmand, 2009). Participatory, collaborative governance approaches, prioritizing stakeholder engagement, cross-sector collaborations, and participatory decision-making are essential in promoting buy-in and flexibility (Exley et al., 2022; Meuleman, 2021; Pereira & De Azambuja, 2021; Cars et al., 2017). Aligning resources and facilitating innovation through the use of committed funds, budgeting policy priorities, and the application of digital technology can improve service delivery and monitoring (Petersen et al., 2017; Dzulkifli et al., 2023; Pereira & De Azambuja, 2021). Finally, continuous learning and adaptive governance frameworks, like iterative testing and policy learning, are needed to meet evolving challenges (Domorenok et al., 2021; Meuleman, 2021; Borgström, 2019; Koop et al., 2017).

Evidence from multiple countries and sectors all strongly point towards institutional and financial barriers as the primary handicaps, and cross-sectoral collaboration and capacity development are key to effective integration (Domorenok et al., 2021; Petersen et al., 2017; Marais & Petersen, 2015; Pereira & De Azambuja, 2021; Exley et al., 2022; Meuleman, 2021; Saguin & Howlett, 2022; Dzulkifli et al., 2023; Cars et al., 2017). Policy congruence and coordination, for instance, coordinated policies, budgets, and reporting systems, slightly enhance governance outcomes via stimulating innovation and accountability (Rayner & Howlett, 2009; Exley et al., 2022; Meuleman, 2021; Pereira & De Azambuja, 2021; Koop et al., 2017).

 

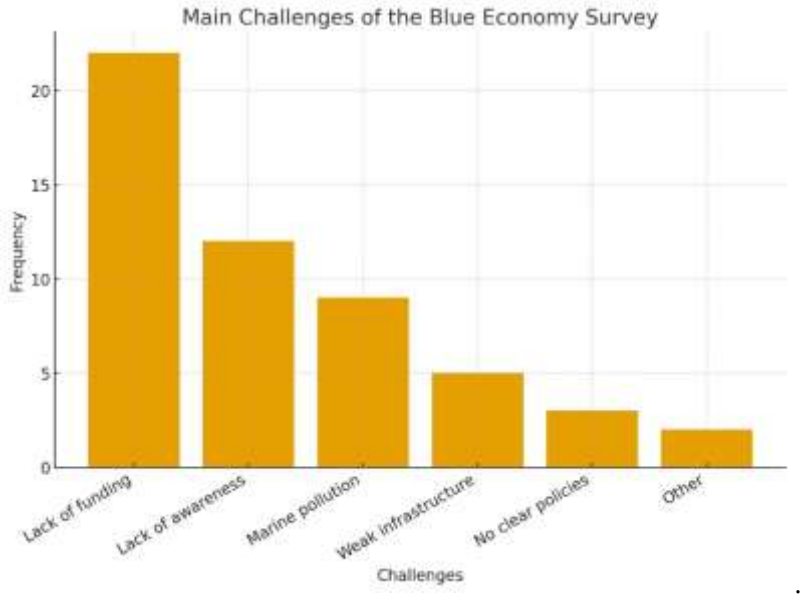


**Figure 1:** Main Challenges of the Blue Economy Survey.

**Challenges and Risks:**
Balancing economic growth and environmental sustainability remains difficult.
Local and coastal communities may be marginalized if growth is prioritized.
Effective marine resource management and ecosystem protection require international cooperation and coordination among stakeholders.

**Comparison between Previous Studies and the Current Study Results**
The findings of this study are largely consistent with the results of international and Arab studies, particularly regarding the pivotal role of the blue economy in achieving sustainable development. However, they differ in several important details. International studies, such as those conducted by the **World Bank (2018)** and the **OECD (2020)**, have demonstrated that the implementation of the blue economy contributes to tangible improvements in GDP, job creation, and balanced economic and environmental development, mainly due to the availability of adequate funding and supportive legislative frameworks.
In contrast, the current study revealed that the main challenges facing the implementation of the blue economy in Libya are **weak financial resources, inadequate legislative frameworks, and low institutional awareness**, which hinder the effective utilization of the country's available marine resources.
The results of this study are also similar to those of many Arab studies in terms of the **limited practical application** of the blue economy concept. However, they differ with respect to **public awareness levels**. While several Arab studies have reported low public awareness, the findings of the current study indicate a **relatively high level of awareness (86.8%)** in Libya. This difference can be attributed to the growing academic and media interest in sustainable development and blue economy issues in Libya in recent years.
Additionally, the findings align with the **FAO (2019)** study in highlighting the significance of the fisheries sector for sustainable development. However, this study adds a **local empirical dimension** through field survey data, which enhances its practical value within the Libyan context

**Conclusion and Recommendations.**
The study highlights a relatively high level of environmental awareness.
This study examined the concept of the blue economy as an effective tool for achieving sustainable development through the responsible and sustainable use of marine and aquatic resources. The findings revealed a growing level of awareness among individuals in the city of Tobruk regarding the importance of the blue economy, especially in light of the environmental and economic challenges facing the region. The experiences of several countries—such as Singapore and Indonesia—demonstrate that tangible economic outcomes can be achieved when clear policies and sustainable investments are adopted in marine-related sectors.
However, several challenges limit the effectiveness of the blue economy in the Arab context, most notably: lack of funding, low public awareness, inadequate infrastructure, and the absence of clear regulatory frameworks. Therefore, activating the blue economy requires strong political will and comprehensive strategies that include education, legislation, and the promotion of sustainable investment in this sector.

 

**Importance of Discourse Analysis:**
Analyzing different narratives surrounding the blue economy helps understand diverse approaches to ocean and sea use, assess related challenges and risks, and develop effective strategies for sustainable development in this field.

**Compliance with ethical standards**

*Disclosure of conflict of interest*

The author(s) declare that they have no conflict of interest.

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