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Comprehensive Assessment of the Role of the Private Sector in the Implementation of Environmental-related Sustainable Development Goals: The Case of the Large Industrial Sector in Bahrain

A Thesis Submitted in Partial Fulfilment of the Requirements for the Ph.D. Degree in Environment and Sustainable Development

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The student is awarded a grade A in the thesis subject.

☐ Without making any changes to the thesis.

☒ After making the modifications attached with this decision.

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Abstract

The adoption of the 2030 Agenda aims to strengthen and harmonize global efforts towards conserving the environment in balance with economic and societal needs. This Agenda affirmed that, the private sector - the industrial sector is the largest part - is a key stakeholder in achieving the sustainable development goals (SDGs) because this sector is the driver of the economy, and it has direct and indirect impacts on the environment. This study aims to assess the extent of contribution of Bahrain's large industrial sector and its role in achieving the SDGs. To achieve this goal, the latest findings of a wide range of current literature were investigated and analyzed in depth to identify the main issues that should be considered toward attaining the SDGs. Moreover, Bahrain's environmental legal tools were reviewed to evaluate their consistency with the SDGs, the study confirmed that recognition of the challenges highlighted in 2030 Agenda and developing a holistic implementation approach would lead to successful inclusions of SDGs within the current environmental legislation. Additionally, the corporative sustainability reports published by companies in Bahrain were analyzed using materiality matrices to identify and prioritize the most significant issues to be improved in future reporting and in the environmental performance. Out of 30 annual and sustainability reports, 15 were sustainability reports; 3 were focused on their environmental efforts in Bahrain. A content analysis method was used to analyze 11 reports for 3 companies published during 2016-2020. The results revealed that the companies which have used materiality analysis in their reporting have better capability in monitoring and measuring their environmental performance and thus

implementing SDGs. The analysis of the reports also revealed the focus on sustainability-related aspects and the commitments of stakeholder's engagement.

A structural interview and questionnaire were conducted to identify the status of the industrial sector in implementation the SDGs. The results showed that the industrial sector has several initiatives, sustainable future projects, and sustainable practices, which are the basis for sustainability governance, so there is a need to orient these efforts in the context of SDGs and integrate them into their business plans and strategies. Furthermore, the results indicated that the high priority ranked SDGs for the industrial sector were 12,13,9,7 and 8, and Bahrain faces major challenges in achieving SDGs 9,11,12, 13, 14, and 15. The study concluded with several recommendations for both industrial companies and the government to improve the implementation of SDGs.

Publications

Rashed, A. H., & Shah, A. (2021). **The role of private sector in the implementation of sustainable development goals**. *Environment, Development and Sustainability, 23*(3), 2931-2948.

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Dedication

TO

My Father “God Safeguard Him”

My Late Mother “God Bless Her Soul”

My Family

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Foremost, I am deeply thankful to God for giving me strength and patience during my study journey and helping me complete this thesis.

I would like to extend my great thankfulness to those who supported me during my research for their valuable assistance and continuous encouragement. Especially the companies which accepted to participate and provided me with valuable time and full support to conduct the interview during the stern period of Pandemic COVID-19, without them, I could not complete this study.

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To all, I dedicate this thesis.

Abdulkarim Hasan Rashed

November 2022

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List of Abbreviations

AAAA	Addis Ababa Action Agenda
ABC	Arabian Business Community
ALBA	Aluminium Bahrain
BAT	Best Available Techniques
BAPCO	Bahrain Petroleum Company
BIIP	Bahrain International Investment Park
BLZ	Bahrain Logistics Zone
CAN	Charter of National Action
CDP	Carbon Disclosure Project
CE	Circular economy
CER	Corporate environmental responsibility
CIP	Competitive Industrial Performance index
CERES	Coalition for Environmentally Responsible Economies Principles
CSA	Corporate sustainability assessment
CSR	Corporate Social Responsibility
EIA	Environmental impact assessment
EMAS	Eco Management and Audit Scheme
EP	Environmental Performance
ESG	Environmental, Social, and Governance
ETP	Effluent Treatment Plant
GCC	Gulf Cooperation Council
GDP	Gross domestic product

GHGs	Green House Gases
GIP	Green Industrial Performance index
GPIC	Gulf Petrochemical Industries Company
GRI	Global Reporting Initiative
GSSB	Global Sustainability Standards Board
GWh	Gigawatt-hours (billion watt-hours)
HSE	Health, safety, and environmental
IIRC	International Integrated Reporting Council
IOMC	Inter-Organization Programme for the Sound Management of Chemicals
ISO	International Organization for Standardization
KPIs	Key Performance Indicators
LLOC	Legislation and Legal Opinion Commission
MARPOL	International Convention for the Prevention of Pollution from Ships
MDGs	Millennium Development Goals
MIC	Ministry of Industry and Commerce
NAQS	National Air Quality Strategy
NSE	National Strategy for the Environment
OECD	Organisation for Economic Co-operation and Development
POPs	Persistent organic pollutants
PPP	Public Private Partnership
QSHE	Quality, safety, health and environmental
R&D	Research & Development
SAICM	Strategic Approach to International Chemicals Management

SASB	Sustainability Accounting Standards Board
SCE	Supreme Council for Environment
SD	Sustainable Development
SDGs	Sustainable Development Goals
SEA	Strategic environmental assessment
SID	Sustainable industrial development
SIDS	Small Island Developing States
SIJILAT	Business Licensing System
SSE	Sustainable Stock Exchanges initiative
TBL	Triple Bottom Line
TCFD	Task Force on Climate-related Financial Disclosures
TJ	Terajoule
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNGC	United Nations Global Compact
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
VNR	Voluntary National Review
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

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Appendix (3) List of environmental legal tools

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Chapter One

INTRODUCTION TO THE STUDY

1.1 Overview

On September 25, 2015, the Sustainable Development 2030 Agenda was agreed and adopted, which consists of 17 sustainable development goals (SDGs) and 169 targets. It expressed a global call for urgent actions to save the planet and its people from the environmental impacts. The private sector was one of the key stakeholders that has been involved in the negotiations and discussions due to its essential role as a development actor in the implementation of SDGs. Significantly, under this new agenda, the private sector must tackle a fundamental responsibility to accelerate the SDGs implementation process. Further, the 2030 Agenda, which covers the SDGs, is guided by a number of international legal instruments, specifically the UN Charter (signed in 1945), the Universal Declaration of Human Rights (accepted in 1948), and the Rio Declaration on Environment and Development (adopted in 1992) (UN, 2012). Further, the Addis Ababa Action Agenda [1] (AAAA) considered sustainable and resilient infrastructure as fundamental thematic field, given that investment in energy, water and sanitation, and transportation sectors is a precondition for attaining the SDGs (UNDESA, 2015). In this regard, Aizawa (2018) mentioned that both – the

[1] The Action Agenda establishes a strong foundation to support the implementation of the 2030 Agenda for sustainable development. It provides a new global framework for financing sustainable development by aligning all financing flows and policies with economic, social, and environmental priorities (www.un.org).

2030 Agenda and AAAA assign significance to sustainable and resilient infrastructure for the accomplishing sustainable development. Thus, the SDGs provide guidelines for regulations to achieve a broad purpose (Dong & Hauschild, 2017). The SDGs were agreed upon at the international level, and all countries were expected to establish procedures to formulate policies aligned with national development planning to attain the SDGs (Chapman & Shigetomi, 2018).

The attention of the private sector is growing towards sustainable development goals (SDGs) (Hacking, 2019). Therefore, the private sector is an important stakeholder under Agenda 2030 (Fukuda-Parr & McNeill, 2015; Lalaguna & Dorodnykh, 2018), and plays an active role in leading the progress of the SDGs implementation (Scheyvens *et al*., 2016) because this sector comprises the largest part of the economy (Abe *et al*, 2019) because it is a job maker, driver of technological innovation and fundamental for capital and tax income, which are robust key drivers for the economy, society, and environment (Fry & Sabbatino, 2018). Further, this sector has the capabilities to assist in achieving the SDGs, including technology innovation, responsiveness, competences, requirement of experiences and resources, and enforcement role (Scheyvens *et al*., 2016; Pedersen, 2018; Marx, 2019). For instance, Pineda-Escobar (2019) found that the companies showed concern in implementing the SDGs as an element of their sustainability plan and strategy.

As a result, the private sector can attain a competitive benefit *via* complying with SDGs through efficient energy and resource consumption (Bocken *et al*., 2014). Furthermore, through the adoption of sustainability practices such as recycling strategies, natural resources protection and saving energy, creation

of safer and more efficient working environmental conditions, cleaner production and eco-friendly products, provision of health and safety measures for the entire society (Ardakani & Soltanmohammadi, 2019). In addition, the emphasis on development of green products will lead to focus on minimizing waste effectively, efficient use of raw material and producing and designing recyclable and eco-friendly product to save the environment (Malviya *et al*., 2018). According to a "Better Business, Better World report", implementing inclusive sustainable business models could open economic investment opportunities valued at least $12 trillion annually and create up to 380 million jobs opportunities by 2030 (BSDC, 2017).

In this regard, the private sector can play the role of a development actor through effective public-private and civil society partnerships *via* SDG 17 (Partnerships for the Goals), and initiating new partnerships among concerned stakeholders through science, policymakers, private sectors, and the local societies (Nilsson *et al*., 2018). In this context, Fowler & Biekart (2017) and Georgeson & Maslin (2018) argued that realizing the role and institutional position of multi-stakeholders are essential for increasing the possibility of successful implementation of SDGs.

1.2 Background of the Study

The adoption of the 2030 Agenda for Sustainable Development aims to unify and strengthen the global environmental efforts and complement the previous environmental initiatives and agendas since the first conference on the environment in 1972. The continuous impacts of human activities in

various sectors cause the destruction of the developing progress of decades. Therefore, there is an urgent need for the activation of the 2030 Agenda's vision and its SDGs to lead and harmonize the global efforts towards conserving the environment in balance with the economic and societal needs. Stevens & Kanie (2016) highlighted that in the SDGs' era, sustainability is the principal aim, and it reflects the key questions of the international political vision and should be implemented at both regional and national levels.

In the perspective of the SDGs, it is obligatory that the private sector to support the implementation procedures, considering the social, economic, and environmental aspects. The effective and feasible partnership among public and private sectors is an essential approach to create valuable opportunities and tackle the challenges toward achieving the SDGs in an appropriate time. Therefore, it becomes imperative that the private sector starts to modify their plans and develops strategies which are aligned with SDGs requirements. Indeed, the private sector already has taken actions to contribute to the SDGs implementation via several voluntary initiatives, such as corporate social responsibility (CSR), ISO certifications, circular economy, and other environmental voluntary initiatives. Many researchers declare that the private sector holds powers to perform the SDGs (Lalaguna & Dorodnykh, 2018; Hacking, 2019; Buhmann et *al*., 2019). Some recent studies revealed that the companies that are CSR certified found are oriented toward SDGs, whereas other studies specified that some companies themselves have initiated to disclose their obligations and activities on their sustainability reporting (Lu *et al*., 2019; Kumi *et al*., 2020; Fallah Shayan *et al*. 2022).

Due to the vital role of the industrial sector, the consensus about the significance of industrial development in driving economic growth has increased globally (UNIDO, 2016 & 2018). Therefore, the industrial sector is accountable for controlling their environmental impacts through its compliance with the legislative frameworks for achieving sustainable industrial development. Additionally, the SDGs' contributors in the industrial sector are urge the governments to enable businesses to implement SDGs and must enact convenient legislations further environmental obligation and social responsibilities (Scheyvens *et al.*, 2016). Figure 1.1 summarizes the significant factors of studying the industrial sector's role in the implementation of SDGs.



Fig. 1.1: The significant factors of studying the industrial sector's role in the implementation of SDGs (author's own depiction)

1.3 Bahrain’s Industrial Sector

Bahrain is similar to other the Gulf States has depended on oil and gas as its primary source of economy. Although oil and natural gas sector is so called the backbone of Bahrain’s economy, however in 1975, the industrial program was established to diversify away from depending on this sector's products alone. Therefore, Bahrain pays great attention to the industrial sector as an income source and shifting away from a reliance on oil. At the beginning of the seventh decade of the century when the aluminum factory “Alba” was established, and the sector plays a fundamental role in absorbing the national work force and moving the wheel of economic growth out of dependence on the other hand on oil export.

The private industries have produced 42.22% of the total gross domestic product (GDP) for the year 2017, and the workforce is 92,857 in this sector (SMES, 2019). The Ministry of Industry and Commerce (MIC) commands Bahrain's industrial sector; and its strategy for this sector relies on more development and diversification of the current main industries such as aluminum and petrochemicals sectors and establishing other basic industrial sectors (Figure 1.2) with high added value in a bid to increase the manufacturing contribution of the sector to the economy (OBG, 2019).

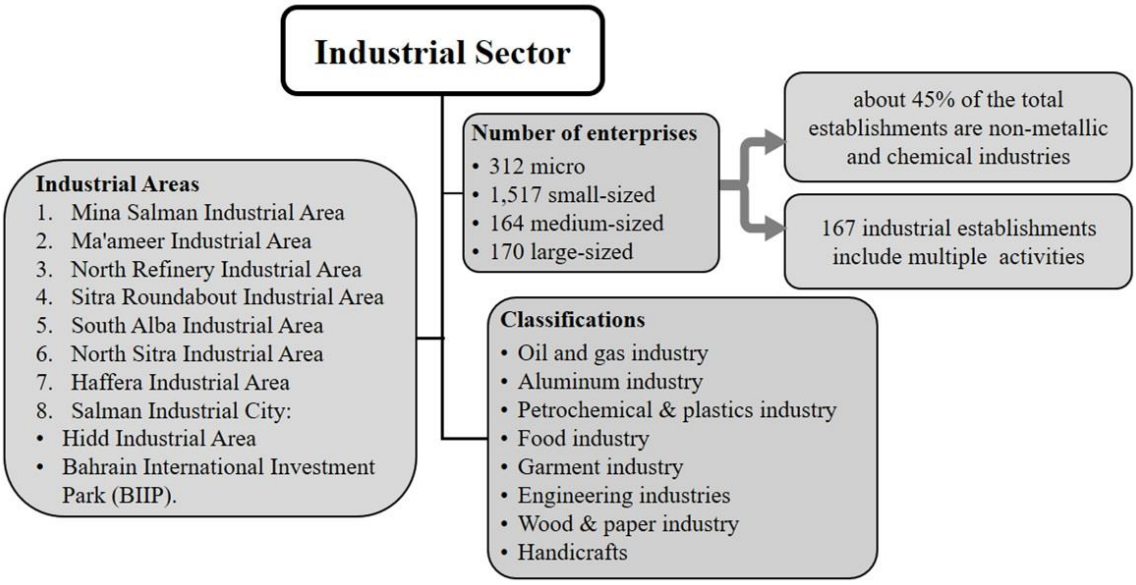


Fig. 1.2: An overview of the components of Bahrain's industrial sector (information and data sources: SMES, 2019; eGovernment, 2021).

The vision of Bahrain's industrial sector is to achieve sustainable, balanced, and integrated industrial development align with the environmental vision via the mechanisms of a free economy and the contribution of the private sector in providing quality job opportunities and indigenizing advanced industrial technologies. Furthermore, Bahrain Economic Vision 2030's focuses on sustainability and Bahrain has adjusted the portfolio of foreign investments by attracting them to reduce reliance on heavy industries, which depend mainly on gas to generate electricity and may negatively affect the air quality (Derasat & UNDP, 2018).

According to Bahrain's Third National Communication report (2020) that totalled Green House Gases (GHGs) emissions of industrial processes and product use sectors were about 30%, whereas the waste sector emitted nearly 1% of total emissions. Consequently, Bahrain is undertaking some energy

efficiency projects at large industries such as Aluminum Bahrain (ALBA), Bahrain Petroleum Company (BAPCO), and the Gulf Petroleum Industries Company (GPIC).

Figure 1.3 (A) depicts the projected target energy savings for the industrial sector throughout the years 2015-2030. By 2025, the annual total predictable energy savings is 786 GWh (around 14% of the target energy saving), and by 2030 the accumulative total energy savings might reach 7,862 GWh. While Figure 1.3 (B) illustrates the current value of the costs and benefits throughout 2015-2030, the current measures of industrial energy efficiency have saved a net total of US$ 82 million (SCE, 2020). The industrial activities are regulated by two key legislation includes the Gulf Cooperation Council (GCC) Common Industrial Law of 2009 and the Decree-Law No. 28 of 1999 concerning the Establishment and Organization of Industrial Areas (eGovernment, 2021).

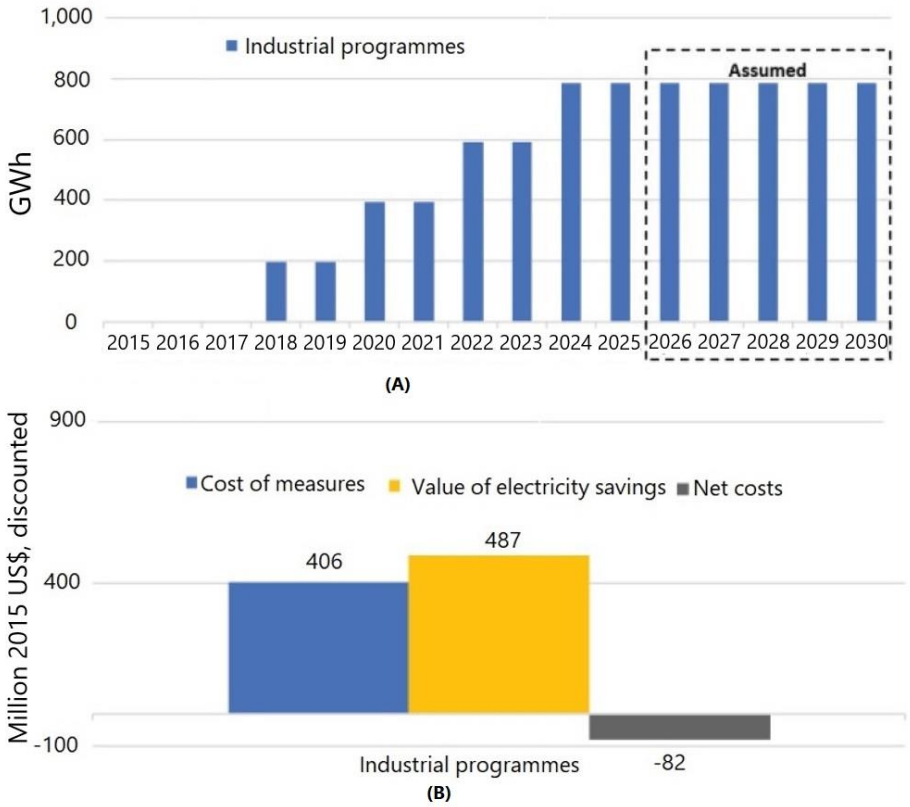


Fig. 1.3: (A) Target industrial sector primary energy savings, 2015-2030; (B) Costs and benefits associated with target primary energy savings in industrial sector (SCE, 2020).

Bahrain spent vast efforts seeking industrial diversification in recent years and considers this sector a key stakeholder in the country's economic development process. Thus, Bahrain's industrial sector is capable to adopt sustainable policies that could consistently and comprehensively support economic growth. The number of enterprises based on 2018 records of the Ministry of Industry and Commerce (MIC) was increased to 2,163 in 2018 compared to 366 industrial establishments in 2015, i.e., the rate of grew increased by 490.9% in three years. One of the MIC's medium-term

objectives is supporting small and medium-sized enterprises to expand it from 36,000 enterprises as of 2019 to 43,000 by 2024 (OBG, 2020).

The industrial and manufacturing activities are distributed at eight areas (Table 1.1); the Salman Industrial City is the modernist area launched in 2010 and it embraces the largest and most developed free zones, which are Bahrain International Investment Park (BIIP) and the Bahrain Logistics Zone (BLZ). According to the detailed land use map of 2030, the industrial areas cover about 13% of the total land use (GDUP, 2016). Figure 1.4 shows the locations of light and heavy industrial areas on Bahrain map.

Table (1.1): Number of activities in Bahrain's major industrial parks

Industrial Parks	Number of activities
Al-Mazara'a	196
Sitra	207
Ma'ameer	110
Mina Salman	27
Hafeera	17
Al-Lhaasay	160`
Salman Industrial City: Hidd Industrial Area	105
Salman Industrial City: Bahrain International Investment Park (BIIP)	114

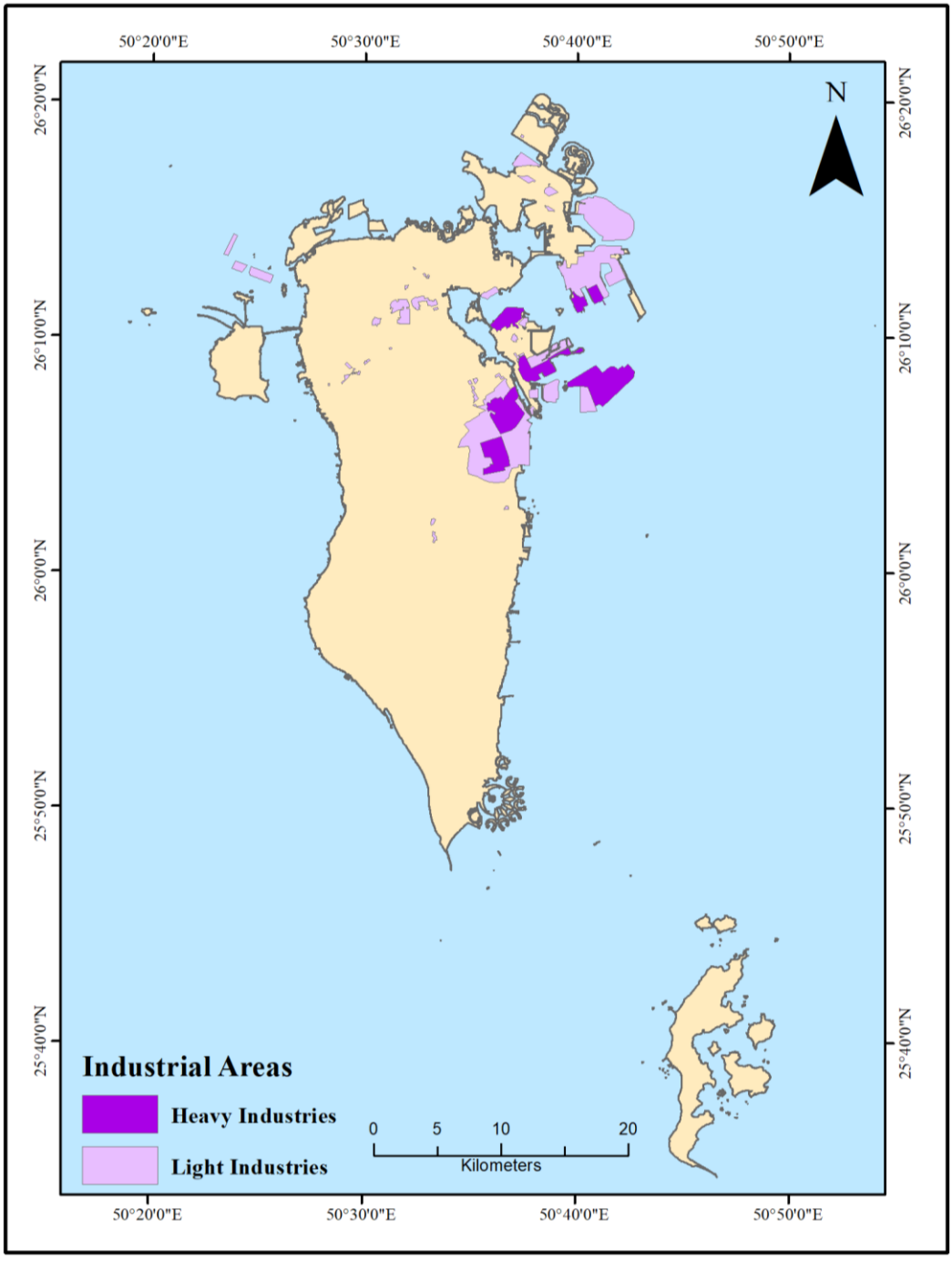


Fig. 1.4: The locations of Bahrain's light and heavy industrial areas (extracted from detailed land use map of 2030 (GDUP, 2016)) (author' own depiction).

Furthermore, the industrial sector in Bahrain is one of the fastest-growing sectors due to its high contribution to the economy concerning jobs creation, increase exports, and attract other investments. The heavy industrial sector comprises petroleum processing and refining, aluminum smelting, iron pelleting, and ship repair. Aluminum Bahrain (ALBA) started operations in May 1971 and has the highest value of production and considered the prime strategic sector that contributes to economic diversification. Globally, ALBA is one of the largest single-site aluminum smelters, and the biggest aluminum producer in the Middle East. Another heavy industry is Arab Shipbuilding and Repair Yard (ASRY) which was founded in 1977, a repair and conversion facility for commercial and naval ships, rigs, and fabrication and engineering. Then, Gulf Petrochemical Industries Company (GPIC) incorporated in 1979, producing ammonia, methanol, and urea, and is considered as the largest manufacturer of chemicals and petrochemicals in Bahrain.

Other heavy industrial company is Bahrain Steel, which was established in 1984 and is the major iron ore pellets producer in the region. The food and beverages sector has remarkably become the third most promising industrial sector in Bahrain (see figure 1.5). Mondelez International company was operated in 2008 and is one of the world's largest snack companies and serves as a center for exports to the Gulf region, Levant, and Africa. Furthermore, the various industrial have enhanced a range of light and medium companies comprise aluminum extrusions and assembly, paper, steel, asphalt plants, wool and wire-mesh, cables manufacturing, plastics, marine services, and prefabricated furniture and buildings have been established (OBG, 2019; SMES, 2019; BEDB, 2021; eGovernment, 2021; OBG 2020).

The percentages of major activities of Bahrain's industrial sector are shown in figure 1.5.

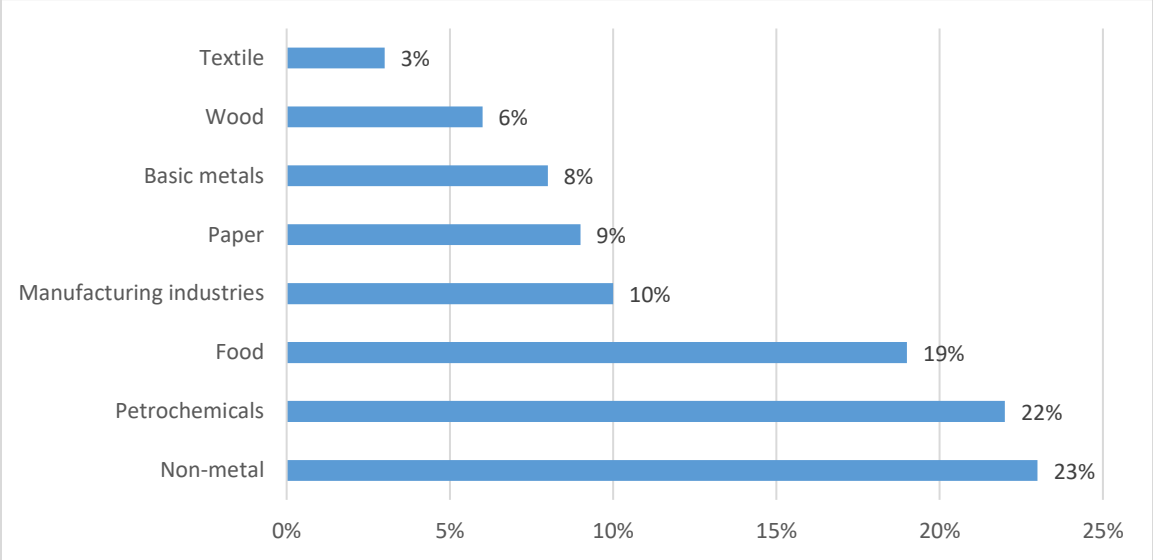


Fig. 1.5: The percentages of major activities of Bahrain's industrial sector (data sources: SMES, 2019; eGovernment, 2021).

The Industrial Sector Strategy (2022-2026) (see figure 1.6) is considered a core pillar in the national economy, and its key aims are to increase the contribution of this sector to the overall GDP, increase national origin exports, and create more job opportunities. In addition, the strategy supports the adoption of the "Fourth Industrial Revolution", implements the "Circular Carbon Economy", promotes investments in digitalization, and assists to improves the regional supply chain.

Further, the strategy is based on five pillars namely, promoting local industries, investing in infrastructure, improving investors' experience, providing career guidance for Bahrainis, and updating legislations. The

strategy has three key performance indicators that are the percentage of employed Bahrainis, the industrial sector's contribution to the GDP, and the contribution of the industrial sector to the gross exports. The targeted industries in the strategy are aluminium, petrochemicals, renewable energy sectors, blue and green hydrogen, food, pharmaceuticals, and micro-electronics (MIC, 2022).

Within the strategy, large investment projects costing more than 90 million Bahraini dinars (≈ US$239 million) are intended to be planned which includes the establishment of the US Trade Zone (USTZ) by June 2025, with an area of 1.1 million square meters with a cost of 75 million Bahraini dinars (≈ US$199 million), a new industrial zone (Fasht Al-Azem) with a total area of 104 million square meters, and aluminium transformative industry land with an area of 477,000 square meters (MIC, 2022).

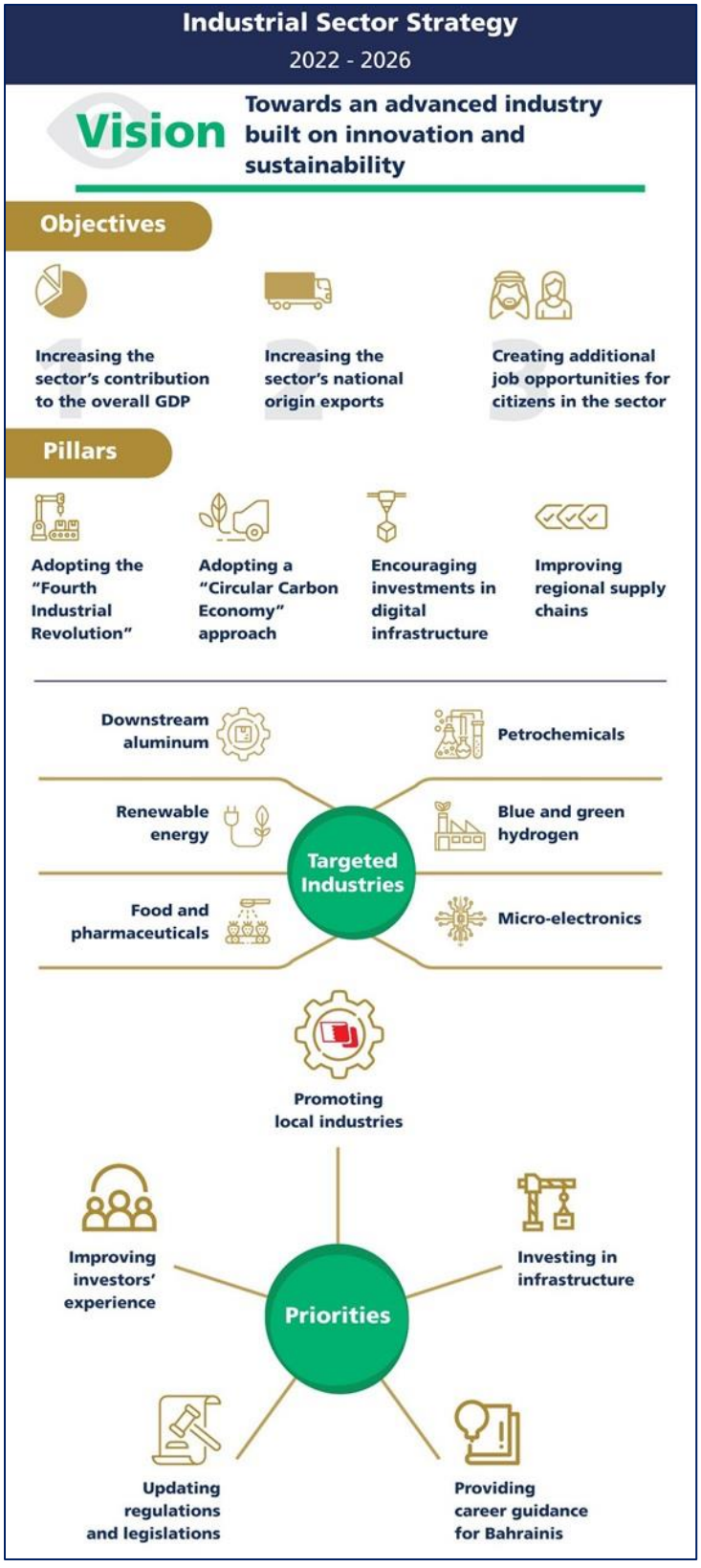


Fig. 1.6: Industrial sector strategy 2022-2026 (MIC, 2022)

1.4 Bahrain's Environmental Legal Tools

The Kingdom of Bahrain is a small developing state that is facing several environmental challenges due to the rapid population growth and industrial development. To tackle these issues, Bahrain has legislated several laws and environmental regulations on sustainable development and has ratified and signed all major multilateral environmental conventions to reaffirm its compliance with the global environmental obligations. Further, over the last decades, Bahrain has made huge leaps in terms of the three sustainable development pillars – economic, social, and environmental – by pursuing sustainable and harmonious growth across the different fields to attain the Millennium Development Goals (MDGs), and efforts are continuing to achieve the SDGs. The Supreme Council for Environment (SCE) is the government entity responsible for developing programmes, regulating policies, and formulating strategies to attain environmental sustainability across different fields. Its core mission is 'protecting Bahrain's natural habitat and human environment, ensuring the sustainability of its components, and preserving and developing its resources for future generations' (eGovernment, 2020).

Since 1996, the environment law and 16 technical ministerial decrees have been enacted to address and control several environmental issues relating to air quality monitoring, chemicals management, industrial wastewater discharge, hazardous waste disposal, and environmental impact assessment. Accordingly, the SCE has implemented a variety of efficient actions that for executing the environmental control programme, which includes monitoring

air pollution caused by transportation and industrial sectors, ruling hazardous industrial chemicals and wastes, and monitoring the pollution due to land-based activities to protect the marine environment and coastal areas. In addition, it ensures that technological and legal control standards are adopted to minimize the impacts of the various sources of pollution. For example, to monitor and control air pollution due to industrial sources, the relevant companies are required by the law to follow the best available techniques to control the emissions and ensure that the permissible limits of emission are maintained and thus no emission of harmful substances which might affect public health or the environment directly or indirectly (Miracle, 2010).

In 1979, the first initiative reflecting Bahrain's interest in environmental affairs was undertaken with the establishment of the Commission for the Conservation of Environment, chaired by Ministry of Health, which was later promoted to the Committee for the Protection of the Environment in 1980; its environmental efforts had continued until the issuance of the Environment Law in 1996 and the establishment of the Environmental Affairs. The scope of work entailed establishing and expanding the Commission for the Protection of Marine Resources, Environment, and Wildlife in 2002. In 2012, the Supreme Council for the Environment was established to tackle environmental issues in the country till now. Figure 1.7 illustrates the chronological evolution of the environmental institutions in Bahrain.

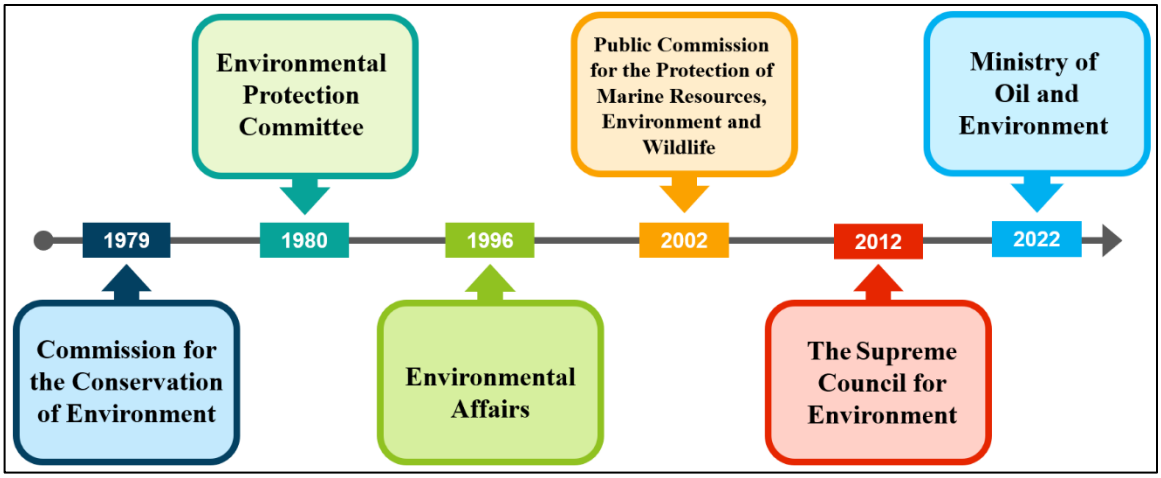


Fig. 1.7: The chronological evolution of environmental institutions in Bahrain (Author's own depiction, data sources: MoI, 1980; eGovernment, 2020)

The Charter of National Action (CNA), adopted in 2001, highlights the basis of the overall development of the national sustainable policy, aimed at achieving the balance between economic, social, and environmental sectors. Section 3.5 states that due to the increasing pressure on limited natural resources, the state seeks to optimize the exploitation of natural resources and enhance development that are not harmful to the environment and public health. The charter considers the global concerns in preventing and addressing major environmental problems and develops a national strategy for environmental protection. Further, taking all appropriate legislative measures and procedures to reduce the pollution from various sources, providing facilities for industrial companies to switch to cleaner production, and conducting environmental assessment studies before starting the implementation of projects (LLOC, 2011). The Constitution of 2002 also does not neglect the importance of the environment, as Article 9(h) states that 'the State shall take the necessary measures for the protection of the environment and conservation of wildlife'. As a result, in 2006, the National Strategy for

the Environment (NSE) was approved by the Cabinet, and it covered the following sectors: air, water, land uses and agriculture, marine and coastal environment, environmental health, oil, industry and energy, environmental awareness and tourism, and biological diversity (PCPMEW & UNDP, 2006). It should be noted that following this strategy is one of the priorities of the first MDGs report (MoFA & UNDP, 2003).

Bahrain's strategic goal for environmental policy is to raise and integrate the environmental matters related to human health protection and natural resources management within the entire national policies, strategies, programmes, and projects. In the short term, the aim is to minimize the current pollution levels and health hazards to improve the quality of human life, while the medium-term goal is to protect the nation's natural resources, biodiversity, and heritage within the context of sustainable development (Derasat & UNDP, 2018). According to Al-Khalifa (2015), there is a low level of basic awareness in Bahrain's private sector about the three core pillars of sustainable development as well as about the officially adopted national sustainable strategies and practices. Therefore, it is essential to establish a foundation for SDGs awareness among all stakeholders because efficient implementation depends on their level of understanding of the national policies.

Further, Dutta (2015) mentioned that there is a dearth of economic initiatives and an absence of a cohesive policy to enhance and strengthen a green-technology industry in Bahrain. The findings of Basarir & Arman (2014) showed that Bahrain's environmental protection policies do not impact the economic development and that the gross domestic product (GDP) growth leads to a decrease in environmental pollution. Furthermore, Naser (2015)

argued that strategic environmental assessment (SEA) might result in an ecologically sound development in the marine and coastal environment in Bahrain.

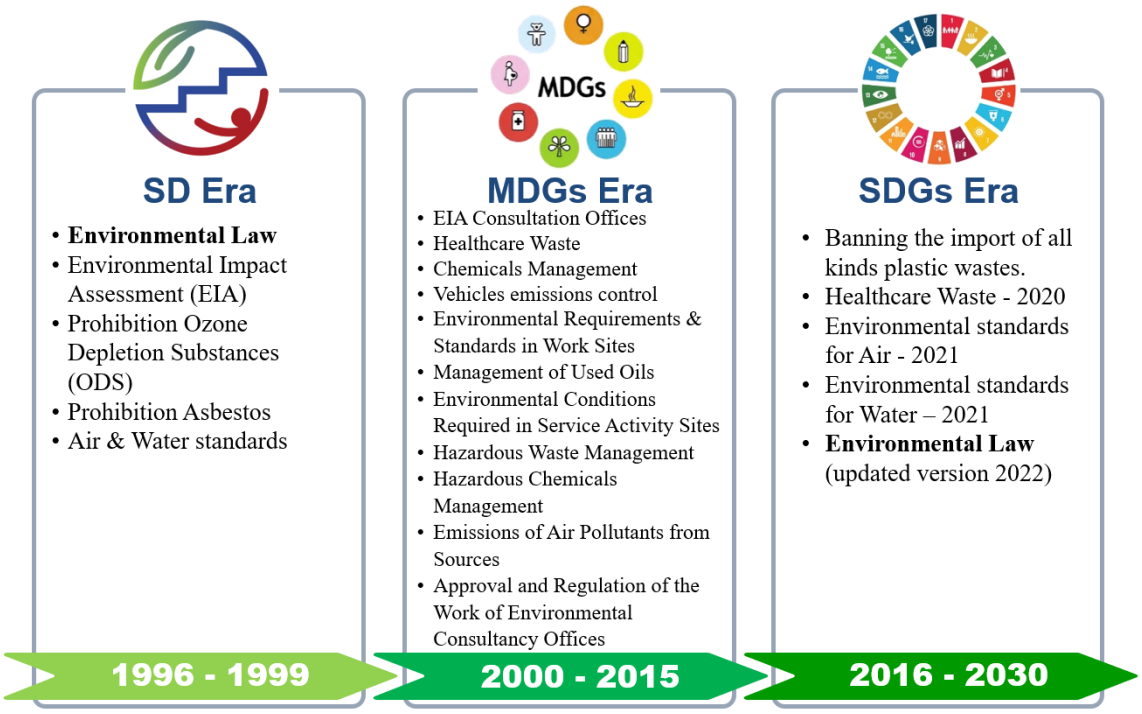


Fig. 1.8: The evolution of environmental legal tools in Bahrain (Author's own depiction; data sources: MoI, 1996, 1998, 1999a, 1999b, 1999c, 2000, 2001, 2002a, 2002b, 2002c, 2005a, 2005b, 2005c, 2006a, 2006b, 2006c, 2014a, 2019, 2021a; 2021b;2022).

Figure 1.8 indicates that most of the environmental legal tools were adopted in the MDGs' era, although the main environmental law was issued in the SDGs' era with the first executive tools being EIA, air, and water standards' edicts. Both edicts form a base law for controlling and monitoring environmental impacts. During the MDGs' era, most executive tools were issued to complete the set of legal tools to include a broad scope of

environmental issues. In the SDGs' era, one legislative order aimed at banning the import of all types of plastic wastes was issued.

Remarkably, the first Environmental Law was issued in 1996, and was amended in 1997. This law consists of 33 Articles that are aimed at protecting the environment from polluting sources and factors, stopping its deterioration by implementing the necessary plans and policies to reduce the harmful effects of activities that cause harm to human health, agricultural crops, marine and wildlife, other natural resources, and the climate, and implementing such plans and policies. Further, it promotes all the appropriate actions and measures to stop environmental degradation, prevents or combat environmental pollution in all its forms, and reduce it for the benefit of present and future generations by setting sustainable development objectives. The Environment Law stipulates the conservation of the environment, the enactment of environmental standards, and the control, monitoring, and mitigation of environmental pollution from its sources.

The Environmental Law No. 21 of 1996 includes a broad scope of environmental issues and is consistent with the famous definition of sustainable development in the Brundtland Commission Report (WCED, 1987); it summarizes its conclusive aim for achieving sustainable development goals. It should be noted that the definition does not refer to the SDGs that were adopted in 2015, because they were not established by then. It seemingly refers to the principles of the 1992 Rio Declaration on Environment and Development (UNCSD, 2012).

The environmental policies in Bahrain rest on four principles, namely the precautionary principle, the polluter pays principle, the concept of sustainability, and the concept of shared responsibility (SCE, 2012). For example, Article No. 3 of Law 21 is consistent with Principle 11 with regard to the enactment of effective environmental legislations; Article No. 4.6 is consistent with Principle 17 with respect to environmental impact assessment; Articles 11, 15, 16 and 21 are consistent with Principle 15 that calls for the necessity of employing precautionary approaches to protect the environment; and Article No. 29 states the offences and penalties and prohibits the activities of the polluters, and this text is consistent with Principle 15. By implication, the environmental law and legislations are fundamental tools to achieve sustainable development.

Further, Legislation Decree No. 21 is the backbone that protects the environment; therefore, there is an urgent need to amend it to reflect the national and global changes in the past 24 years in environmental governance. Also, it was issued before adopting the MDGs and SDGs. Similarly, the related environmental legal tools also need to be updated. The 2018 Bahrain Human Development Report states that there is a need to review the environmental issues, consequently requiring the updating of the legislations, standards, and indicators correlated to soil, air, ground, and surface water pollution, in addition to assurance of sufficient funding for improvement (Derasat & UNDP, 2018).

From 1998 till 2019, legislations and policies on environmental protection to support the Environment Law have been issued. These legislations were intended to control, prevent, and manage the environmental

media from any pollution and correct the negative practices and impacts on the environment. In 1998, Edict No. 1 was issued based on the environmental assessment of the projects; it stated that all new projects, as well as the development of existing projects, are subject to the submission of a data forms for assessing the environmental impacts of the project or development (e.g., expansions) for their mitigation. Essentially, the edict sets out the procedures and methods to identify the pre-considerations to mitigate environmental impacts before obtaining environmental licenses. The Supreme Council for Environment (SCE) is an empowered entity that studies the environmental assessment of projects. According to Naser (2012 & 2015) the EIA system in Bahrain clearly specifies the duties and responsibilities of the concerned parties in the assessment process, representing the effectiveness of the edict. Therefore, the implementation outcomes of the EIA system within fifteen reflect the strength of the environmental policy objectives and the sustainable development principles. In addition, Yaqoob *et al*. (2019) stated that the Bahrain's EIA system has positively contributed to improving the environmental situation and sustainable development.

To facilitate the implementation of the EIA Edict, two ministerial orders were issued: Ministerial Order No. 3 of 2000 regarding the approval of consultation offices specialized in the environmental assessment of projects and environmental studies, and Ministerial Order No. 4 of 2014 regarding the approval and regulation of the work of environmental consultancy offices. Both orders organize the scope of work of private consultancy offices with regard to EIA studies, set standards for the accreditation of such offices, and determine the allowable types of studies. Moreover, the SCE conducts annual assessments of the quality of the reports as per Annex 3 of the Ministerial

Order No. 4 of 2014. Figure 1.9 shows the number of projects that have undergone the environmental impact assessment process since the issuance of the EIA edict until 2019.

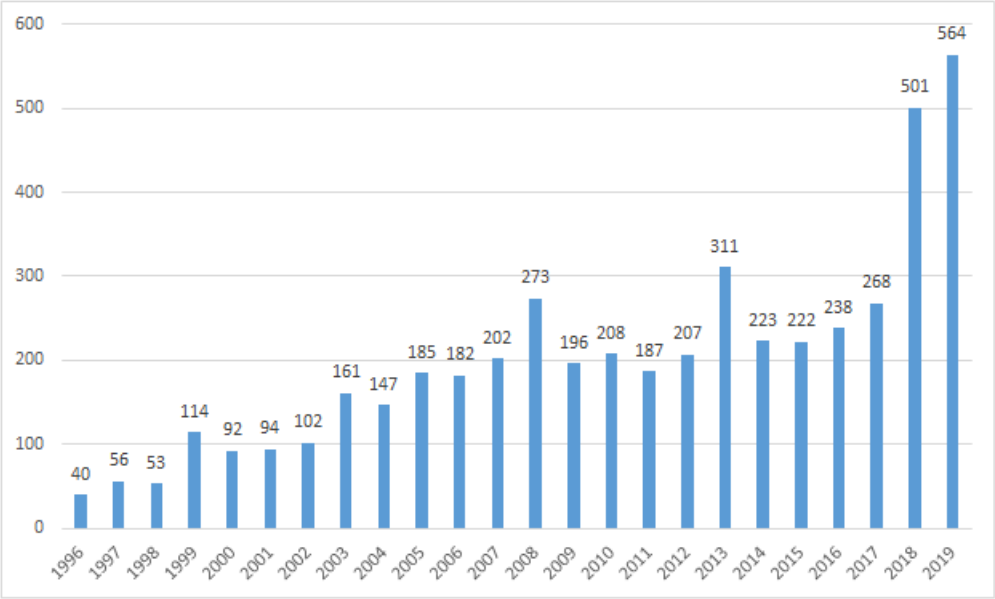


Fig. 1.9: The number of projects that have undergone the EIA process for the period 1996–2019 (Author's own depiction, data sources: SCE, 2016, 2017, 2018, 2019).

The figure indicates a steady growing in the number of environmental impact assessments of projects, which is a positive sign that reflects an efficient implementation of EIA edict. The highest number of projects assessed was between 2018 and 2019. The two edicts of 2000 and 2014 concerning the licensed private EIA offices encouraged the environmental authority to approve more projects per year.

Although the degree of importance varies among several environmental legislations, they are all integrated towards achieving the core goal of the Environment Law. The aim of Ministerial Order No. 10 of 1999 concerning the environmental standards for air and Water and Ministerial Order No. 2 of 2001 on amending some provisions of this order -10 of 1999- is to organize and assess the projects according to the environmental provisions and standards. In 2006, Ministerial Order No. 10 regarding the emission of air pollutants from sources was issued, which supported the aforementioned orders. It is worth mentioning that Bahrain's first national report on climate change, (2005) mentioned that the main sources of emissions where the energy sector (70.7%), solid and liquid wastes (12.9%), industrial activities (9.6%), and the transportation sector (6.6%) (PCPMEW, 2005). Romano *et al*. (2016) reported that Bahrain is one of the SIDS with high levels of pollution and energy consumption; thus, it needs to move toward energy sustainability.

Regarding issues caused by waste and chemicals, a range of edicts covering chemicals management, chemical waste, industrial and healthcare waste, and used oil waste were issued; these edicts covered inspections, identification, labeling, storage, transportation, treatment, and disposal procedures. Ministerial Order No. 1 of 1999 pertained to the control on substances that deplete the stratospheric ozone layer, followed by Ministerial Order No. 1 of 2001 concerning the management of hazardous healthcare waste and Ministerial Order No. 7 of 2002 requiring the control on the import and use of banned and severely restricted chemicals. Three years later, Ministerial Order No. 4 of 2005 concerning the management of used oils was issued, followed by Ministerial Order No. 3 of 2006 pertaining to hazardous

waste management, and Ministerial Order No. 4 of 2006 related to hazardous chemicals' management. In 2013, Ministerial Orders No. 3 and 4 of 2006 that amended Ministerial Orders No. 6 and 7 were issued. At this point, it is worth noting that the country showed great concern for the environment; the merits of these legal tools are that they included all aspects of chemicals and waste management and that there is some integration among them. Additionally, the regulations on chemicals cover licensing import and export, transportation, storage, production, handling, and the use of chemicals.

Besides the previously discussed environmental legal tools, there are three other important ministerial orders focused on environmental work issues as well human health and safety. Ministerial Order No. 2 of 2001 concerning the procedures of environmental inspection; this ministerial legislation is the legal eye for field monitoring in support of environmental legislation, as it aims to verify the extent of compliance with legislative requirements and their implementation in environmental work through periodic inspections of industrial facilities. In 2005, Ministerial Orders No. 3 and 5 were issued, one on the environmental requirements and standards in worksites and the other on environmental conditions required in service activity sites. Both legislations are important to protect workers and their safety, and the other legislations protects people from the effects of service activities by controlling licensing in the proximity of residential areas.

From the foregoing arguments, the legal legislative system has covered the most important environmental issues, following the passage of 24 years since the issuance of the Environment Law, followed by technical and executive tools. These legal tools are still operative and efficient in terms of monitoring

and controlling pollutants released by the industrial sector, but they require updating to fill the gaps, resolve any lack in the current legal tools, and close them with sustainable development goals requirements to keep up with the rapid changes, as the current era is the fourth industrial revolution (Industry 4.0).

The environmental policies in Bahrain rest on four principles: the precautionary principle, the polluter pays principle, the concept of sustainability, and the concept of participatory responsibility (SCE, 2012). Participatory responsibility is a form of the public-private partnership (PPP) that requires an assessment and analysis approach to environmental and economic impacts to enhance the existing procedures for strategic environmental and economic evaluation (Spremberg *et al*., 2017). According to Hodge and Greve (2017), the success of PPP dimensions is oriented towards policy and governance. Thus, Bahrain needs to activate the participatory responsibility concept to shift from the sanctions and penalties principle to the prevention principle (i.e., from reactive to proactive policies). This concept will strengthen the monitoring system, improve enforcement, and maximize compliance with the regulations to avoid the accumulation of the industrial sector's adverse impacts on the environment and human health. In the era of SDGs, it has become essential to change the relationship between the public and private sectors from considering the private sector as a polluter to a partner towards sharing environmental protection responsibility in the context of the participatory responsibility concept to build an effective PPP.

In sum, the policy integration seeks to adopt a proper approach that facilitates its alignment within the SDGs' context. The themes associated with environmental legal tools should be combined to be used as one effective tool.

1.5 Research Problem

Sustainable Development (SD) is the topmost of the environment global agenda since the Stockholm Conference in 1972, and it's completed fifty years (Stockholm+50); and to continue the journey, the Millennium Development Goals (MDGs) Agenda became part of the 2030 Agenda and its Sustainable Development Goals (SDGs). Thus, the focus has increased since the SD concept was considered the core of the SDGs. Within the 2030 Agenda, the private sector was mentioned - 9 times in 8 paras - as a key stakeholder and has an essential role than before in guiding the path towards a better sustainable future. Specifically, Goal 17 clarifies the role required through a 'Global Partnership' that brings all concerned stakeholders jointly, that are governments, the private sector, the United Nations, civil society, and other parties; along with that, mobilizes the available resources to assure successful and complete implementation of the SDGs and "leaving no one behind" to accomplish a commitment to a better world.

Therefore, the role of the private sector is becoming increasingly essential in achieving the 2030 Agenda. Given the novelty of the SDGs, which were adopted in 2015 and came into force in 2016, only a few studies have been conducted about how the private sector should play this role to attain the SDGs. According to Garrido-Ruso *et al*. (2022), since 2019 most of the

literature (80%) discussed the role of business in achieving the SDGs, but it has not been particularly fruitful so far. In addition, López-Concepción *et al*. (2022) stated that the existing literature on the business sector's contribution efforts to the accomplishment of the SDGs is still fragmented and unstructured. Other literature (e.g., Scheyvens *et al*., 2016; Agarwal *et al*., 2017; Chakravorti, 2017) claims that the private sector can lead the SD process if its existing business model (business-as-usual) is subjected to a comprehensive review to be competent to play a role in implementing the SDGs; and some challenges could be facing this sector when endeavoring to integrate SDGs into the company's strategy and plans.

Bahrain's manufacturing industrial sector contributes 14.5%, and other industrial services 18.7%, while the oil sector alone is 20.8% of total Gross Domestic Product (GDP), where Bahrain's annual economic growth is 5% on average[2]. Bahrain's seeking to triple the GDP contribution of the industrial sector; therefore, the industrial areas increased from eight to eleven (MIC, 2022). The large enterprises acquire 40% of the total workforce[3]. Further, one of Bahrain's Economic Vision 2030 [4] strategic priorities is to "achieve sustainable quality growth", which enunciates "placing the private sector at the forefront of driving development through policies that foster entrepreneurship, growth and innovation."

[2] https://www.mia.gov.bh/kingdom-of-bahrain/business-and-economy/?lang=en accessed on 25 December 2021.
[3] https://lmra.bh/portal/en/page/show/89#2 accessed on 25 December 2021.
[4] National Development: Bahrain Vision 2030 | Invest in Bahrain (bahrainedb.com) accessed on 15 October 2021.

Besides that, the primary aim of the newest industrial strategy (2022-2026) is to transform this sector to step inside the Fourth Industrial Revolution by promoting the circular economy and carbon, environmental and social governance, investments in technological infrastructures and digitising manufacturing. Another important driver is the global demands, changes, and pressures, which include the opportunities, threats and competitiveness of the global markets and novelty of industrial marketing strategies; increasing industrial globalization - that noticed clearly during the COVID-19 pandemic -; innovation and evolution of products and technologies; and emerging issues and obligations of the environmental treaties and conventions that are related to the entire business sector.

Based on the above, for the industrial sector to play its sustainable role, it must integrate the SDGs into its core corporate strategy. So far, a very confined number of Bahrain's large companies have integrated SD into their corporate strategy and start implementing some SDGs. For this purpose, the present study will focus on Bahrain's large industries by examining their efforts, initiatives, and strategies from a sustainability perspective and the role they should play in adopting the SDGs. Then, developing a framework that may be helpful to companies seeking a path to implement the SDGs and incorporate it into their core strategy. Worth to mention that transforming into a sustainable corporate strategy is highly demanded, where the 2030 Agenda and its SDGs affirmed tangible benefits and sustainable growth. Finally, results from this research contribute academically to the sustainability literature on the role of the private sector in implementing the SDGs.

1.6 Research Questions

To attain the study objective; the main research question is:
What role should Bahrain's large industrial companies play in implementing SDGs?
The following sub-questions will be addressed:

1. Are the SDGs (Goals 8, 9, 11, 12, 13, 14, 15, &17) applicable and suitable for the private industrial sector in Bahrain?
2. How to implement those SDGs by Bahrain's private sector in terms of the impact of this sector on the environment directly or indirectly?
3. What is the range of implementation of those SDGs in the private industrial sector in Bahrain?
4. Are the existing environmental legislation and regulations related to the private industrial sector compatible with SDGs requirements?
5. What are the benefits of implementing SDGs practices by the private industrial sector on Bahrain’s environment at large?
6. What are the obstacles and challenges for the implementation of SDGs practices in the private industrial sector in Bahrain?
7. What is the suitable implementation framework of SDGs for Bahrain's private industrial sector?

1.7 Research Objectives

The main aim of this study is to conduct a comprehensive assessment of the extent of contribution of the large industrial sector and role it should be

playing in achieving the SDGs. To that end, the study will focus on Bahrain's large industrial sector, selected due to its direct impact on the economy (GDP), the environmental policy implementation, its high capabilities for change, and its interest in sustainability's future. The research methodology plan consists of a four-phase approach: first a systematic literature review of the most pertinent existing scientific research journal articles and other publications will be conducted. Second, perform a content analysis of national environmental legal tools (law, legislations, and standards) that address the environmental dimension. In phase three, the sustainability reports published by the industrial companies will be analysis to assess the status of SDGs implementation and the sustainability performance. The last phase (4) is the interview and questionnaire which is the most important phase to extract the required primary information and data.

The four-phases analyses' outcomes will strengthen and broaden the research understanding of why and how Bahrain's large industrial sector - as a key stakeholder - is playing an essential a role in implementing SDGs to a national level.

1. To study the applicability, viability, and suitability of specific SDGs (Goals 8, 9, 11, 12, 13, 14, 15, &17) for the private industrial sector in Bahrain.
2. To examine the implementation of those SDGs by the private sector in Bahrain in terms of the influence and impact of this sector on the environment directly or indirectly.
3. To predict the range of implementation of those SDGs in the private industrial sector in Bahrain.

4. To review the existing environmental legislation and regulations related to the private industrial sector in terms of their compatibility with SDGs requirements.
5. To study the benefits of implementing SDGs practices by the private industrial sector on Bahrain's environment at large.
6. To identify the obstacles and challenges for the implementation of SDGs practices in the private industrial sector in Bahrain.
7. To establish an applicable framework for the implementation of SDGs by the private industrial sector in Bahrain.

1.8 Research Significance

The Ministry of Industry and Commerce (MIC) commands Bahrain's industrial sector, and its strategy for this sector relies on more development and diversification of the current main industries, such as the aluminum and petrochemicals sectors, and establishing other basic industrial sectors with high added value in a bid to increase the manufacturing contribution of the sector to the economy (OBG, 2019). Bahrain's Economic Vision 2030 focuses on sustainability, and Bahrain has adjusted the portfolio of foreign investments inducing them to reduce the reliance on heavy industries, which depend mainly on gas to generate electricity and may negatively affect air quality (Derasat & UNDP, 2018). Private industries produced 31.5% of the total gross domestic product (GDP) in quarter one of 2021 (MFNE, 2021), which is the highest among the GCC countries (Mordor Intelligence, 2022), and the workforce in this sector was 92,857 (OBG, 2020).

The number of enterprises, based on the 2018 records of the MIC, increased to 2163 compared with 366 industrial establishments in 2015, i.e., the rate of increase grew by 490.9% during the three years (OBG, 2020). Further, the various industrial areas attracted a range of light exports and medium-sized companies comprising aluminum extrusions and assembly, paper, steel, asphalt plants, wool and wire-mesh, cables manufacturing, plastics, and marine services, with prefabricated furniture and buildings being established (OBG, 2019, SMES, 2019, eGovernment, 2021, OBG, 2020; BEDB, 2021). Furthermore, new industrial projects were tripling the contribution of this sector to GDP in 2020, besides increasing the number of industrial zones from six to eleven. These economic indicators are one of the main justifications for conducting this study. Notably, this study will be the first comprehensive effort to explore the status of the implementation of SDGs in the large industrial sector in Bahrain.

Other reasons are the likely effects of the industrial sector's direct and indirect impacts on the environment and human health. In addition, this sector can potentially exert more influence on the country's environmental legal tools.

Furthermore, due to the novelty of the subject, there is no SDGs implementation framework in this sector, and the recent literature asserts that there is a shortage of studies on this subject (Garrido-Ruso *et al*., 2022; Calabrese *et al*., 2021; Hummel & Szekely, 2021; van Zanten & van Tulder, 2021) because the SDGs were adopted in 2015 and entered into force in 2016. In 2019, this subject began to gain traction in the academic literature, where several researchers have given an interest in examining the role should act by

companies in implementing the SDGs, and still, their efforts have yet to bear fruit, and this underscores that this topic is a recent and emerging research issue in the academic world (Garrido-Ruso *et al*., 2022). In addition, the SDGs become an urgent need to adopt in this sector to achieve sustainable industrial development (SID) approach, which is essential to establish a long-term strategy for fulfilling economic and environmental global transformations on the scale required for sustainable development.

1.9 Limitations of the Study

As in other studies, any study is subject to certain limitations during the research process, which has slightly hampered gaining the optimum results of the study aims. These limitations were summarized as follow:

1. The major limitation of this study was that most interviews were conducted at the height period of the COVID-19 pandemic where most interviewees were working from their homes.

2. The scope of this study is confined exclusively to registered companies in the Kingdom of Bahrain. Therefore, the geographical domain of this study is bound to Bahrain's large industrial sector.

3. The interview and questionnaire are the core part of the study aiming to gather primary data and information on several environmental issues. The strict COVID-19 pandemic precautions affected the response rate, which caused a relatively delayed response.

4. In part of the interviews with managers or management personnel (such as human resource managers), the researcher preferred environmental specialists responsible for environmental issues in the company due to their experience.

5. Some interviewees were hesitant to complete the questions or provide data and information to avert revealing their company's attitude towards environmental issues. That was mainly due to their reluctance to disclose a critical opinion about their companies' management or provide confidential or sensitive information about their operational activities, which delay and reduce the response rate.

6. Usually, difficult to gain an overall consistency, thus, the responses are not consistent due to the different levels of knowledge, education, and experience. The researcher tried hard to overcome this by re-contacting respondents to obtain some clarifications.

7. This study focuses on a single sector (industry), and the findings showed that the sustainability issue is emerging in limited reports of companies of this sector, therefore needing more cross-sectoral studies.

8. The study of SDG reporting is a new research topic, despite the increased disclosure because of the awareness of the importance of SDGs. The results of this study cannot be generalized to the entire industrial sector in Bahrain because the data were limited to the five years from 2016 to 2020.

These limitations provide scope for future research by extending the reporting period for further investigating environmental disclosures. While this study is a first effort towards earning an ample and deep understanding of this novel topic about the relation between SDGs and the industrial sector. Therefore, the author believes that the study could contribute to theory notions and practice in sundry ways. The study explored novel research subjects about SDGs and industrial sector at the national level, which may contribute to the practice field and pave the way for the required future steps. Moreover, the study highlighted different outcomes of multidisciplinary literature that explored the subjects of sustainable development and raised a set of recommendations for future research. Furthermore, extending existing research through narrative or explanatory reviews of the literature could assist conduct investigating more deeply the academic discussion on industry sector role and the SDGs, also, the future studies are essential to explore the potential benefits of SDGs on other business sectors.

1.10 Structure of the Thesis

This thesis is structured as follows: Chapter 1 includes the introduction, the study aims, the research questions, an overview of Bahrain's industrial sector, the definition of terminologies, and limitations; while Chapter 2 presents a literature review on the main knowledge aspects and broad understanding to the research subject; and Chapter 3 presents a detailed of the methodology employed to accomplish the goals of the research, which underlines quantitative and qualitative processes. Followed by Chapter 4 which includes a presentation, discussion, and synthesis of the main results

and contributions to literature. Finally, Chapter 5 presents the conclusions, recommendations, and future research.

1.11 Definition of Terms

2030 Agenda	is a new global plan of action for the people, planet, and prosperity, and comprises 17 Sustainable Development Goals (SDGs), 169 targets, and 232 indicators that seek to build on the Millennium Development Goals (MDGs) and complete what they did not accomplish. (UN, 2015)
Best available technique (BAT)	refers "to the available techniques which are the best for preventing or minimising emissions and impacts on the environment. BAT include both the technology used, and the way your installation is designed, built, maintained, operated, and decommissioned." (Greenstone, 2022)
Circular economy (CE)	is "an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling, and recovering materials in production/distribution and consumption processes." (Kirchherr *et al*., 2017)

Content analysis	is a "method employed is a type of textual analysis and it is a combination of qualitative and quantitative research approaches." (Bengtsson, 2016; Landrum & Ohsowski, 2018)
Corporate environmental responsibility (CER)	is the firm's capability to incorporate environmental aspects within its environmental plan and daily operations to comply with the provisions of environmental law to achieve corporate environmental commitment and SDGs. (Kim *et al.*, 2017; Phiri *et al*., 2018; Li *et al*., 2020)
Corporate social responsibility (CSR)	refers to "voluntary activities undertaken by a firm to operate in an economic, social and environmentally sustainable manner." (Riyadh *et al.*, 2019)
Environmental auditing	is "essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards." (Mussa & Mussa, 2018)
Environmental impact assessment (EIA)	is a "tool to promote environmentally sustainable development and for environmental management, focusing on a combination of alternatives, process re-design and mitigation to reduce impacts and

	risks to as low as reasonably practicable levels." It is designed to reduce the adverse effects of development proposals. (Jenkins, 2019: Abaza *et al.*, 2004)
Environmental Performance (EP)	is "the measurable results of the environmental management system in relation to the firm's control over its environmental aspects, aims, and environmental targets." (Albertini, 2016)
Large industrial sector	The sizes of establishments are classified based on the total number of workers and/or the annual revenues of all branches registered in the commercial register. A large enterprise has a workforce of more than 100 workers (101 worker and above) and annual revenues of more than three million Bahraini dinars, or whichever is higher. (MoI, 2017)
Materiality	is "the organization prioritizes reporting on those topics that reflect its most significant impacts on the economy, environment, and people, including impacts on human rights". (GRI, 2020c, p.8)
Materiality analysis	is "a process aims to identify and prioritize pertinent aspects and issues of the company, the

	result of which is a materiality matrix that designates the company and stakeholder views on the importance of related issues." (Bellantuono *et al.*, 2016)
Materiality matrix	is "a typical tool to report on compliance and dissent of stakeholder and management views in sustainability and integrated reporting" (Beske *et al.*, 2020)
Millennium Development Goals (MDGs)	are eight goals for the year 2015 and derived from the United Nations Millennium Declaration (signed in Millennium Summit, September 2000) obligates to fight poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. (UN, 2000)
Scoping review	is an approach employed to analyses all existing literature reviews on a particular topic to provide recommendations for improving policy or practice and identify the aspects that have not been addressed, and this methodology minimizes the author's bias. (Piñeiro *et al.*, 2020)

Strategic environmental assessment (SEA)	"Extends the aims and principles of EIA to the higher levels of decision-making when major alternatives are still open and there is far greater scope than at the project level to integrate environmental considerations into development goals and objectives." It is designed to ensure that environmental considerations are incorporated in policies, plans and programs. (Jenkins, 2019; Abaza *et al*., 2004)
Sustainability	is "concerned with preserving the environment, combating climate change, and supporting social growth without harming life on Earth or leaving anybody behind. This concept aims to meet our immediate demands without jeopardising future generations' resources." (Greenstone, 2022)
Sustainability reporting	is "a robust incentive and strategic tool for a company to disclose their contribution practices to the SDGs, and assists in engaging the stakeholders, supporting the sustainable decision-making process on all levels, forming the business strategy, leading innovations, best performances, better value creation, and brings investments" (GRI & UNGC, 2017 & 2018)

Sustainable Development	is a “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” (Brundtland, 1987)
Sustainable Development Goals (SDGs)	are an integrated cluster of 17 inter-linked global goals to be attained by 2030 and were developed to be a "blueprint to achieve a better and more sustainable future for all" and for tackling complex economic, environmental, and social issues globally. (UN, 2015)
Sustainable industrial development (SID)	is “a key driver for the successful integration of the economic, social and environmental dimensions of sustainable development.” (UNIDO, 2015)
Triangulation	is a method that assists in data validation; used in quantitative and qualitative studies; used to increase the credibility and validity of research findings; assists to overcome the primary biases originating from the employ of a single method; assists to explain the study findings and give it more confidence; and enrich the research through datasets to discuss different aspects of the research area. (Heesen *et al.*, 2019; Noble & Heale 2019)

1.12 Summary

The MDGs' development journey during fifteen years covered a set of eight aspirant goals that have not been accomplished entirely, and to continue the efforts of the sustainable development path, on September 25, 2015, the 2030 Agenda was agreed upon and adopted, which consisted of 17 SDGs and 169 targets were adopted for another fifteen years to achieve a better world. It expressed a global call for urgent actions to save the planet and its people. The private sector was one of the key stakeholders that has been involved in the negotiations and discussions due to its essential role and duty as a development actor in the implementation of SDGs. Significantly, under this new Agenda, the private sector must tackle a fundamental responsibility to accelerate the implementation process. Therefore, the private sector must be involved as one of the main stakeholders in the implementation process of SDGs. The corporate social responsibility (CSR) and the environmental initiatives are required to support the SDGs. Moreover, there is a need for a reliable set of measurable indicators to support the private sector in measuring the implementation progress.

Sustainable development is highly prioritized in Bahrain and considered one of the national core objectives in the Government Action Plan. Bahrain has enacted several environmental legislations addressing the main environmental issues that are ultimately aimed at environmental conservation and protecting human health. Furthermore, it has ratified major multilateral environmental conventions, reflected in several regulations that align with some treaties, for instance, the Basel Convention. The current environmental

legislations are sector-based (e.g., addressing chemicals, waste issues, etc.) and media-based (e.g., addressing air, water, and land issues). The government adopted the National Environment Strategy to provide the key stakeholders guidance to develop their action plans for achieving national goals in their own respective areas.

The successful integration of SDGs with the current environmental legal tools can be carried out by recognizing the challenges highlighted in the 2030 Agenda. This study suggests the quick updating and improvement of the current environmental legal tools in line with the context of the SDGs. There is still room for improvement, and more comprehensive and sustainable approaches need to be developed in the environment dimension to stay on track to reach the SDGs. Policy coherence should be leveraged in developing a holistic and integrated management approach in the implementation, considering the international conventions' obligations. The study also attempts to examine the consistency of the SDGs with the national environmental legal framework to enhance the sustainable practices in Bahrain. Moreover, the study develops a simple framework that can assist in review, keep the national legislation and strategy consistent with the SDGs, and concludes by providing a set of recommendations that would help update environmental legal tools.

Today, there is a strong call for the involvement of industry sector within the global 2030 Agenda development priorities. The industrial sector plays a vital role in economic development; therefore, there is a necessity to integrate sustainability into industrial development to maintain the economy and avoid any degradation impacts on the environment, and thereafter on

society. The study examines the sustainability reports of companies by analyzing the status of sustainability aspects in their materiality matrices to assist in identifying and prioritizing the most significant sustainability issues for advancement in their future reporting and to improve their environmental performance.

This study employs a content analysis approach and analyzes 11 reports from the period 2016–2020 for three companies in Bahrain's large industrial sector. The study reveals that the companies using materiality analysis in their reporting benefit from better monitoring and measuring of their environmental performance, and from implementing SDGs. Furthermore, the study indicates that the utilization of a materiality matrix as a reporting tool can define and improve report contents by considering stakeholders' views, consequently, improving the quality of the sustainability reports.

In sum, given the essential role of the private sector -focusing on the large industrial sector- in achieving the SDGs as stated in the 2030 Agenda. This study investigates and analyzes the breadth and depth of the latest findings comprehensively wide range of current literature to identify the main issues on this sector's critical role that should play toward attaining the SDGs. Thus, this study contributes to the literature, and, to the best of my knowledge, it is the first of its kind to study a deep and broad understanding of the status of SDGs implementation in the large industrial sector in Bahrain. The result of this study and analysis will assist in identifying and prioritizing the significant issues of sustainability for better environmental performance and encouraging other companies who did not yet plan or implement it to begin that.

Chapter Two

LITERATURE REVIEW

2.1 Introduction

In September 2015, a new agenda for sustainable development entitled ‘‘Transforming our world: the 2030 Agenda for Sustainable Development’’ was approved globally and made up of 17 sustainable development goals (SDGs) (figure 2.1) and 169 targets represent an enthusiastic world plan for action by 2030 to tackle the major global challenges, e.g., environmental degradation and poverty (UN, 2015; UNGA, 2015), and those SDGs are substantially interconnected which creates great potential for synergistic effect toward attaining them at different tiers. The SDGs are a non-obligatory agreement, and request countries to identify their national priorities, and targets in-line with SDGs requirements (Allen et *al*., 2019). This agenda is a guiding vision for governments, private sector, and civil society for sharing actions (Hajer et *al*., 2015) and for a challenging transition toward sustainable development (Le Blanc, 2015), and the private sector is a pivotal in common sustainability issues (D'Amato et *al*., 2019). To implement the 17 SDGs there is a need for a substantial change in the patterns of societies and economies because the 17 SDGs activated a new phase which requires sharing of responsibility at national, regional, and global levels (Bexell & Jönsson, 2017).



Fig. 2.1: Sustainable Development Goals (UN, 2015)

The range of issues of sustainable environment and economic development are expanding, and over time a new conceptual content is included considering the priority of environmental factors. According to Dotsenko *et al*. (2021), still, there are several unresolved issues due to their dynamism, versatility, and the various factors of sustainable development. The 2030 Agenda and its SDGs jointly compose a comprehensive approach to understand and address various issues. The sustainable development concept has taken broader scope with the 2030 Agenda based on five core dimensions: people, prosperity, planet, partnership, and peace (known as the 5Ps, as shown in figure 2.2). Tremblay *et al*. 2020 stated that categorizing the SDGs based on the five core dimensions provides a better understanding of the complexity of the SDGs.



Fig. 2.2: Categorization of the 17 SDGs among the 5 Ps (author's own depiction)

Further, the SDGs can be categorized as per the sustainable development pillars, which are environment (biosphere), society (people), and economy. The biosphere's capacity forms the basis for the economy and society, both embedded within it, and it is the foundation on which all SDGs sit (figure 2.3). Therefore, the social and economic issues should be resolved before tackling environmental issues. Also, it is challenging to operate an economy and save society where the environment is damaged. It is the time to integrate the various approaches and perspectives about the development to sustain the capacity of environment (biosphere), which is a key condition to achieving sustainability for society and economy (Folke *et al.*, 2016). Thus, the integrated and systemic approaches will lead to addressing the entire scope of transformational challenges associated with fulfilling all SDGs and reap the advantages of synergies for attaining them all, and no goal will be leaving behind.

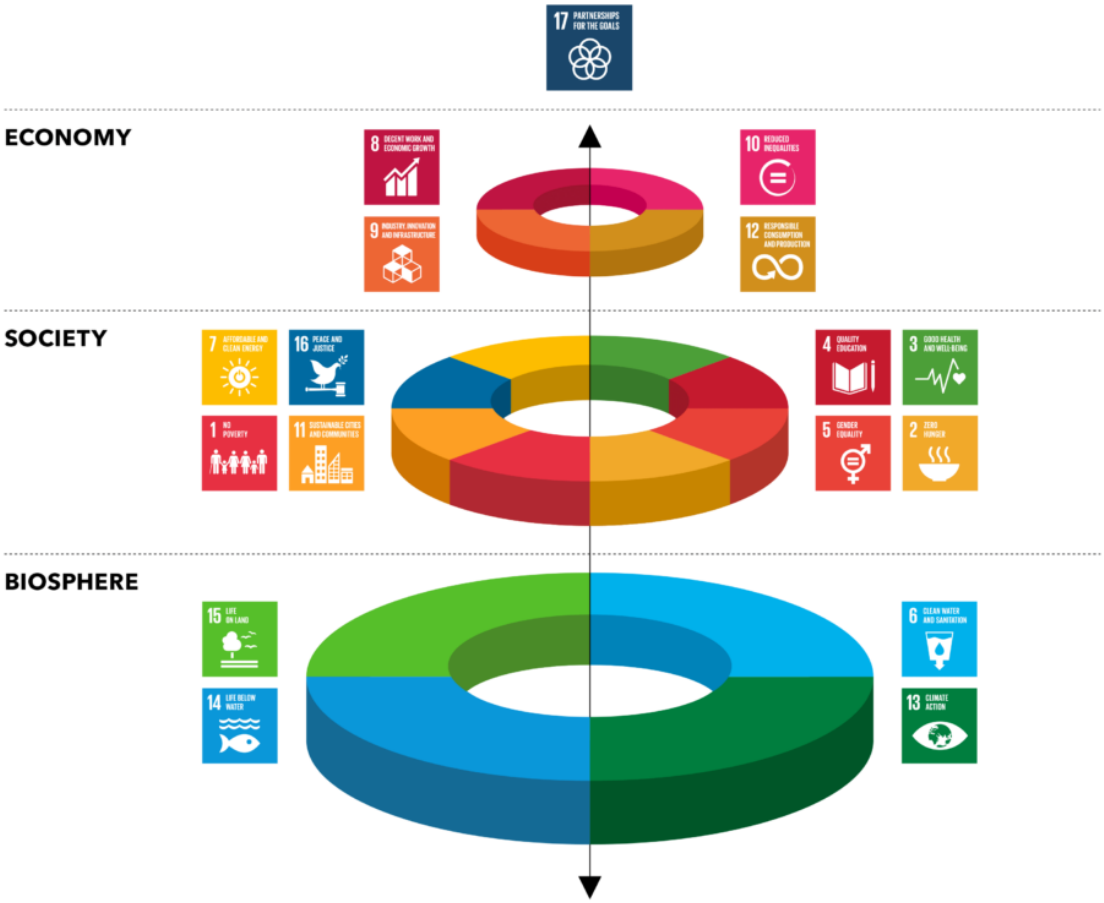


Fig. 2.3: Categorization of the 17 SDGs among the environment (biosphere), society, and the economy (Source: Stockholm Resilience Centre, 2016)

Since 2008, the UN Global Compact organizes the annual summit of the UN Private Sector Forum, and it aimed to enhance the dialogue between governments, and the private sector. This forum substantially focused on the SDGs since they were adopted in 2015, including the obligations of multinational companies to support the SDGs with particularly measures pilot projects, gender quota or investment in sustainable infrastructure (Abshagen et *al.*, 2018). The attention of the private sector is growing towards

Sustainable Development Goals (SDGs) (Hacking, 2019). The private sector is an important stakeholder under Agenda 2030 (Fukuda-Parr & McNeill 2015; Lalaguna & Dorodnykh, 2018), and can play an active role in leading the progress in achieving the SDGs (Scheyvens *et al*., 2016; Topple et *al*., 2017) because this sector comprises the largest part of the economy (Abe *et al*, 2019).

Indeed, the private sector is a critical player because it is a job maker, source of technological innovation and fundamental for capital and tax income, which are the main solution drivers for the economy, society, and environment (Frey & Sabbatino, 2018). Further, Buhmann et *al*. (2019) stated that private sector can create value to the society via expertise, knowledge, technology, and financial resources. Several researchers have confirmed that private sector has different capabilities which assist in achieving the SDGs including technology innovation, expertise and experiences, responsiveness, and sufficient resources (Scheyvens *et al*., 2016; Pedersen, 2018; Marx, 2019). Pineda-Escobar (2019) reported that companies should consider the implementation of SDGs as an element of their sustainability plans and strategies.

Nevertheless, Frey and Sabbatino (2018) stated that, though the 17 SDGs are entirely but unevenly related to the private sector, all of them are related to all companies. In this regard, Pineda-Escobar (2019) found that the private sector companies at the beginning are readily determining the specific SDGs that are relevant to the company's operations. According to Allen *et al*. (2018), obligation to the SDGs is hindered due to lack of an efficient framework, insufficient awareness and lack of technological capability

concerning integrated planning and policy coherence, owing to the modernity and complexity of the SDGs.

In this regard, some scholars pointed out that policy coherence is considered one of the major challenges facing SDGs implementation (Warchold *et al.* 2021; Zhao *et al*. 2021). Thorlakson *et al*. (2018) pointed out that the private sector mainly pays attention to the rights of workers and complies with local regulations; therefore, there is a critical need to include social and environmental concerns, which are expected to be a great motivation in achieving the SDGs. Moreover, the economy is one of the three dimensions of sustainability, therefore the private sector is considering a key stakeholder in the SDGs implementation process. For instance, Allen *et al*. (2019) concluded that the Arab countries that are starting to implement the SDGs are developing essential basic evidence for action for succeeding the future studies. Therefore, there is a need to conduct broader studies to explore and investigate the private sector role in the implementation of SDGs.

The SDGs should be adopted as an integrated approach (Allen *et al*. 2019; Merry 2019; Elder & Olsen, 2019; Gasper *et al*., 2019; Saner *et al*., 2019). In this regard, Frey & Sabbatino (2018) stated that the SDGs' framework was developed to be implemented entirely within the companies' influences; all the 17 SDGs are committed to being viewed in its plans. The SDGs' framework is quite extensive and considerably complex, and it is necessary to prioritize the primary step in implementation of the SDGs and its indicators to match national priorities. In this context, Thorlakson *et al*., (2018) conducted a global survey of 449 companies for answering an important issue of how the private sector can participate in the implementation

including SDGs 2 (Zero Hunger), 8 (Decent Work and Economic Growth), 12 (Sustainable Consumption and Production), 15 (Life on Land), and 16 (Peace, Justice and Strong Institution) via sixteen sustainable sourcing practices -e.g. change the product's formulation to make it more sustainable and made products from recycled materials-, which defined as "voluntary practices companies pursue to improve the social and/or environmental management of their suppliers' activities." Allen *et al*. (2018) also carried out an extensive survey based on "evidence-based approaches to the SDGs: systems thinking, analysis and modeling" of 26 countries concerning the implementation of the SDGs in terms of the fulfillment of primary planning stages by establishing coordination mechanisms, engaging various stakeholders in the consultations, and customizing of SDGs into national strategies. Kumar *et al*. (2018) study investigated the complex relationships among the SDGs and utilizing the interpretive structural modeling technique to present them in a hierarchical framework.

Moreover, Weitz *et al*. (2018) studied the synergies between the SDGs concerning the policy and planning and utilized a systemic and contextual perspective via developing a network analysis and basic means of synergies. By this stage, the authors declared that the valid methodologies would obviously provide a greater understanding of the connections among the SDGs, which will facilitate the SDGs' implementation. However, certain arguments in these research methodologies and approaches need further research. For instance, according to Kumar *et al*. (2018) 29% of the 169 targets are adequately explained whereas 54% require more efforts for clarification, and the remaining 17% are incomplete and/or worthless. Moreover, Merry (2019) in line with Elder & Olsen (2019) stated that there

are many weak indicators excluding many environmental elements that hinder an integrated approach. It is worth mentioning that Weitz *et al*. (2018) analyzed the SDGs at the level of targets because targets are very particular than goals.

To reduce the SDGs targets' complexity, there is a necessity to develop practical means for assisting the country in prioritizing their targets (Elder & Olsen 2019; Allen *et al*. 2019). It was suggested that the private sector should modify their plans with the SDGs (Saner, 2019 & Scheyvens *et al*., 2016) and the fundamental concerns are how to connect the SDGs and how to treat the trade-offs among them (Hacking, 2019). Another issue raised by Pedersen (2018) is that most of the private sectors are still striving to specify their actions and to modify their plans and strategies according to the SDGs requirement. While these primary references help in contributing knowledge dissemination regarding SDGs, however organized scientific literature about the private sector role and implementation of SDGs are limited. Hacking (2019), Pineda-Escobar (2019) and Salvia *et al*., (2019) mentioned that there is a need for further investigations to examine the role of the private sector in the context of SDGs. Whereas the private sector is affirmed as one of the main stakeholders for the successful implementation of SDGs, there is a sparse in the academic literature work that links the private sector to the SDGs (Witte & Dilyard, 2017). In addition, Mio *et al.* (2020) remarked that there is a need for further research studies to understand the companies' role as a sustainable development factor. Therefore, this chapter is reviewing the scholar’s contributions to this essential and vital field of merging the SDGs in the plans and strategies of the private sector.

2.2 The Private Sector Role

In the early 21st century, serious environmental global issues such as increasing environmental overshoot, deteriorating climate change, and insufficiency of human needs caused unsustainable consumption of natural resources (Bengtsson *et al.* 2018). Hence, the delay of the integration of environmental and social aspects with the economic aspect of sustainability in private sector activities may lead to accumulation of negative impacts on human health and the environment. Agenda 2030 considered that the private sector is an essential stakeholder (Lalaguna & Dorodnykh, 2018) and has an influential part in the progress of the SDGs (Scheyvens *et al*. 2016; Ridho *et al*. 2018), because this sector is a crucial player in the economic investments (Sullivan *et al*. 2017).

The SDGs' implementation depends on voluntary efforts (Elder & Olsen, 2019), although the tensions between compulsory and voluntary SDG responsibility will continue, due to the intense debates among countries and the private sector about the implementation roles of sustainability issues (Bexell & Jönsson, 2017). Therefore, the private sector should perform a major role in sustainability, not merely from an economic progress angle but considering the social and environmental issues requirements (Sullivan *et al.* 2017).

Furthermore, the private sector should amend their plans and strategies to comply with the SDGs (Saner *et al*. 2019; Scheyvens *et al*. 2016, Pedersen, 2018) and as the new holistic approach of business strategies emphasizes more

on how further profits may be gained by putting more focus on the social and environmental outcomes beside economic gains (Baldassarre *et al*., 2017). Similarly, Lima *et al*. (2017) mentioned that there is a need for further coordination and support of public sector to enable the private sector to invest more resources for positive SDGs outcomes. Further, the technology and innovation capacity of this sector is required besides their obligation for supporting the SDG implementation (Hajer *et al*., 2015). Topple *et al.* (2017) has suggested that the use of impact assessments is an essential method for increasing drive for facing sustainability challenges in the private sector. According to Roos *et al.* (2020) that there are potential benefits of carrying out an environmental impact assessment including the conserve of biodiversity and ecosystem; allow society participation and access to information; mitigation of environmental impacts; and comply with regulations and proper enforcement, and these benefits help the private sector to attain sustainable development.

The private sector also responsible for environmental degradations. Therefore, the attention on the global industrial development has increased due to its negative impacts on the human health and environment (Ardakani & Soltanmohammadi, 2019), and the accumulation impacts of industrial development (revolution) due to unsustainable patterns of production and consumption is the result of preferring the economic benefits over protection of environment, which led to environmental unsustainability and abuse of ecosystems (Kopnina, 2016). On the other hand, the SDGs clearly encourage 'sustainable industrialization' and 'sustainable use of land'. Most of the SDGs focus obviously on the environmental dimensions, by preventing environmental degradation, pollution, climate change, waste management and

promoting resource recovery. Therefore, there is a need for urgent actions towards the challenging aspects of the economic growth, which led to adverse impacts on the environment and human society (Leal Filho, *et al.*, 2018).

Furthermore, Gobierno De Colombia (2018) mentioned that the mining and energy sector consumes more than 70% of ground and surface water, the food and manufacturing sectors consumes more than 50% of the water from public canals, this high consumption of non-renewable energy such as natural gas led to significant indirect impacts on biodiversity due to operations of companies through their supply chains. The developed countries achieved some progress on waste management and recycling and energy efficiency. But so far and due to continuous excessive consumption of non-renewable energy and the primary resources, these countries have not been able to dissociate the economic growth from increased consumption of energy and other resources, (Osborn *et al.*, 2015). In this regard Xiao *et al.* (2017) stated that global trade business has a significant impact on sustainable development issues inclusive the environment, in particular climate change, natural resources consumption and food security.

For instance, the oil and gas sector is an essential industry and one of the largest private sectors globally. This sector consumed more than 57% of total global fuel. Moreover, this sector has both positive and negative impacts on an array of scopes aimed by the SDGs, and its extensive global footprint presents valuable opportunities to create a significative and sustainable effect on the achievement of the SDGs, therefore it may contribute to the challenges that SDGs seek to tackle, for example, climate change, environmental

degradation, economic inequality, and raised hazards of some health issues (IPIECA, 2017).

A recent study conducted in Colombia reveals that the companies are willing to include the SDGs in their sustainability reports and incorporating them in their sustainability strategy (Pineda-Escobar, 2019). According to 2018 KPMG study on corporate reporting on the SDGs, the study highlighted that 55% of reporting companies are paying the most attention to SDG 4, 8 and 12, while 26% or less of reporting companies are paying the least attention to SDG 2,15, and 14 (Blasco *et al.*, 2018). Another study conducted on Indonesian and Russian companies reveal that the private sector had contributed appropriately to a specific number of SDGs, but more efforts are needed to increase company's implementation to achieve other goals of SDGs (Ridho *et al.* 2018). Concomitantly, other studies on different aspects were conducted to assess a range of voluntary actions for improving the environmental and social issues within the private sector. Thorlakson *et al.* (2018) reported that within 52% of firms practice one voluntary sustainable practice is found. Working in this field, Fleming *et al*. (2017) concluded that the SDGs are still unconfirmed in the private sector practices due to the differences in the language utilized in the SDGs when compared to the business; the required changes are difficult and complex, and few regulatory tools incentivize the SDGs' adoption. Another study by Moldavska (2017) concluded a lack of knowledge about sustainable development in the private sector. Hacking (2019) pointed out that there is increasing attention to adopting the SDGs in the private sector, but they also found that the impact assessment community is slow.

Further, there is a call for corporate sustainability assessment (CSA) at a global level (Zijp *et al*., 2015), and the private sector is considered one of the main stakeholders (Dijk *et al*., 2017). The real value of CSA is an adoption voluntarily for measuring sustainable development (Topple et *al*., 2017). The existing CSA still do not adequately cover the SDGs, and the researchers are so far uncertain regarding its weaknesses and difficulties (Moldavska & Welo, 2019). Undoubtedly, the private sector has an essential responsibility towards achieving the SDGs because it acts as a development actor through business activities. In doing so, the SDGs implementation strongly encourage this sector to eliminate or stop their negative impacts on the human and the environment, enhancing their positive participation, for example, minimizing the air pollution through implementation of the SDG 7 (Affordable and Clean Energy), which is linked directly to SDG 13 (Climate Action). In this regard, Axon & James (2018) stated that the chemical industrial sector has contributed to scientific and technological solutions that address various global challenges, e.g., pollution prevention.

Adoption of circular economy (CE) is another role of private sector towards implementation of SDGs. Morseletto (2020) defined the CE as "an economic model aimed at the efficient use of resources through waste minimization, long-term value retention, reduction of primary resources, and closed loops of products, product parts, and materials within the boundaries of environmental protection and socio-economic benefits." Rizos *et al*. (2016) stated that the private sector is part of CE and the main barrier to attain it is the company environmental culture. Additionally, D'Amato *et al*. (2019) mentioned that the private sector is considered pivotal for the development of

CE strategies at the national and regional level, and this concept leads to corporate sustainability reporting strategies.

Further, Kirchherr *et al.* (2017) revealed that the concept of the CE implies its ability to attain beyond present efforts of sustainable development. In line with this notion, Geissdoerfer *et al.* (2017) stated that companies are increasingly conscious of the opportunities promised by the CE and have begun to recognize its potential benefits for their companies and stakeholders. Furthermore, Stahel (2013) believed that the role of the private sector in a sustainable society is yet a premium summary of the CE. Indeed, Schroeder *et al.* (2019), stated that circular economy practices are closely linked with SDG 12. As a result, Camacho-Otero *et al.* (2018) stated that the concern of the scholars has increased in the field study of consumption in the context of the circular economy and its solutions.

Furthermore, Mao *et al.* (p.42, 2018) mentioned that the principle of circular economy is reduction, reuse and resource-based. According to Millar *et al.* (2019), the current economic growth may hinder the adoption of the circular economy as a tool to achieve sustainable development. While Korhonen *et al.* (2018) believed that the power of circular economy can bring the business sector and policymaking to work together towards sustainability.

As a result of this focus, the private sector can attain a competitive benefit *via* complying with SDGs through efficient energy and resource usage (Bocken *et al*., 2014). The standard of living could be improved through the adoption of sustainability practices such as recycling strategies, natural resources protection and saving energy, creation of safer and more efficient

working environmental conditions, cleaner production and eco-friendly products and provision of health and safety measures for the entire society (Ardakani & Soltanmohammadi, 2019). Malviya *et al*. (2018) stated that the emphasis on development of green products will lead to focus on minimizing waste effectively, efficient use of raw materials and producing and designing recyclable and eco-friendly products to save the environment. In this regard, the private sector can play the role of a development actor through effective public-private and civil society partnerships *via* SDG 17 (Partnerships for the Goals).

Moreover, Nilsson *et al*. (2018) pointed out that SDGs interactions means initiating new partnerships among concerned stakeholders through science, policymakers, private sector, and the local societies. On that note, SDGs may utilize to facilitate the implementation of sustainable development strategies in both public and private sectors (Leal Filho et *al*., 2019). In the context of roles, Fowler & Biekart (2017) argued that the role and institutional position of multi-stakeholders are essential for increasing the possibility of successful implementation of SDGs. Similarly, Georgeson & Maslin (2018) stated that the private sector is particularly more accountable for multi-stakeholder partnerships and development.

Consequently, this sector must find an efficient means to amend and improve their plans and strategies in line with the requirement of Agenda 2030 towards proper implementation of SDGs. Additionally, both the governments and the private sector should increasingly commit to Agenda 2030 by appropriately embedding the SDGs within the assessment rules for facilitating decision-making. According to Abshagen *et al.* (2018) that due to increasing

private sector commitment in the implementation of the SDGs, governments tend to hand over more of their services duties *via* privatizations, especially in the social services sector such as water and energy infrastructures, healthcare, and transportation. Table 2.1 describes some roles of private sector and its relation to the SDGs, and figure 2.4 illustrates the importance of the private sector.

Table (2.1): The private sector roles in the implementation of SDGs

Sustainable Development Pillars	**Related SDG**	**Private Sector Roles**	**Scholars' studies**
Environment	All goals	Comply with local regulations	Thorlakson *et al*., 2018
	All goals	Comply with international treaties	Borghesi *et al*., 2015 Pavoni & Piselli, 2016 Oliver *et al*., 2021
	All goals	Sustainability reporting	Bose & Khan, 2022 Datta & Goyal, 2022
	11, 12 & 13	Efficient energy and resource usage	Bocken *et al.* 2014
	11 & 12	Natural resources protection, saving energy, and cleaner production	Ardakani & Soltanmohammadi, 2019
	6 &12	Minimizing waste, and efficient use of raw materials	Malviya *et al*., 2018
	12	Corporate sustainability assessment	Zijp *et al*., 2015
	11& 13	Minimize the impacts of future disasters	Abe *et al*, 2019
	9, 11, 12 & 15	Environmental impact assessment	Roos et *al*. 2020
	13	Net zero emissions	Bataille, 2020 van Sluisveld, *et al*. 2021

Sustainable Development Pillars	Related SDG	Private Sector Roles	Scholars' studies
Economy	8 & 17	Job maker, source of technological innovation, and fundamental for capital and tax income	Frey & Sabbatino, 2018
	8 & 17	Technology innovation, and manpower of particular experiences	Scheyvens *et al*., 2016
	8 & 9	Expertise and experiences	Marx, 2019 Buhmann et *al*. (2019)
	12 & 13	Recycling strategies and eco-friendly products	Ardakani & Soltanmohammadi, 2019
	12	Development of green products	Malviya *et al*., 2018
	12 & 17	Technology and innovation capacity	Hajer *et al*., 2015 Buhmann et *al*. (2019)
	8 & 9	Driver of largest part of economy	Abe *et al*, 2019
	8, 9 & 12	Circular economy	Morseletto (2020); Rizos *et al*. (2016); D'Amato *et al*. (2019); Kirchherr *et al*. (2017); Geissdoerfer *et al*. (2017); Schroeder *et al*. (2019); Camacho-Otero *et al*. (2018); Mao *et al*. (p.42, 2018); Millar *et al*. (2019); Korhonen *et al*. (2018)
Societal	17	Social sustainability	Leal Filho *et al*., 2022
	17	Rights of workers	Thorlakson *et al*., 2018
	8 & 9	Creation of safer and more efficient working environmental conditions	Ardakani & Soltanmohammadi, 2019
	17	Partnerships among concerned stakeholders	Nilsson *et al*., 2018 Fowler & Biekart, 2017

Sustainable Development Pillars	Related SDG	Private Sector Roles	Scholars' studies
			Georgeson & Maslin, 2018
	All goals	Corporate social responsibility (CSR)	Mishra, 2021 Leal Filho *et al.*, 2022
	All goals	Increased disclosure of information	Bengtsson *et al.* 2018

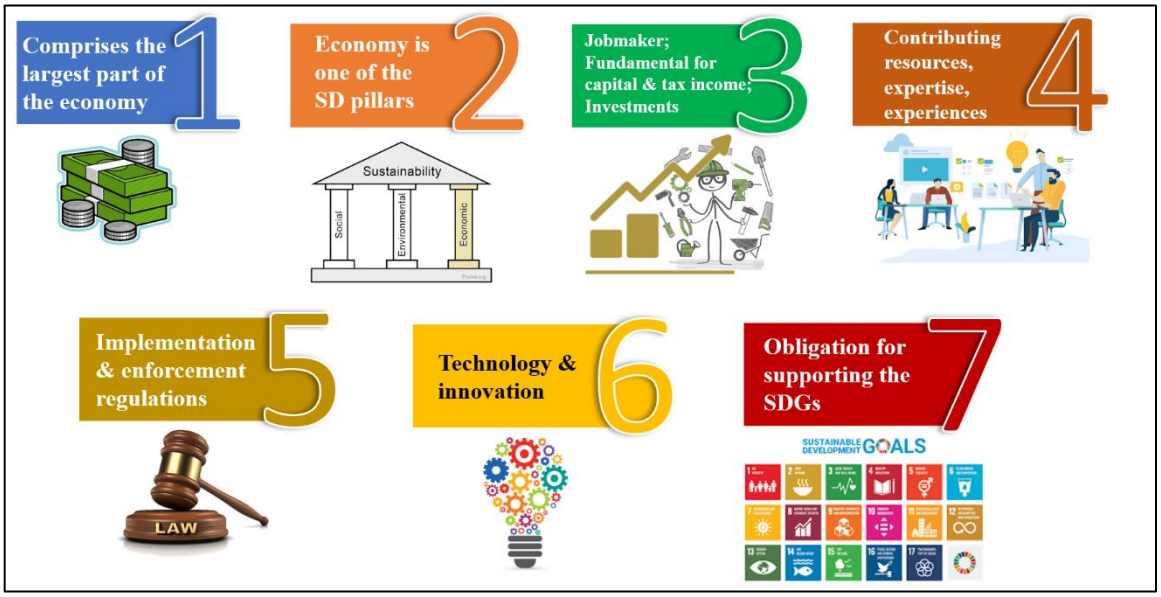


Fig. 2.4: The importance of the private sector (author's own depiction)

2.3 SDGs and Corporate Social Responsibility (CSR)

The essential aim of the SDGs is to begin a revolution in responsibility by engaging fit-for-purpose to treat the environmental impacts (Caballero, 2019). In the context of 2030 Agenda, the private sector has a key part to perform in accelerating the achievement of the SDGs through strengthening public-private partnerships, eco-friendly investments, and CSR (Bexell & Jönsson, 2017; Lalaguna & Dorodnykh, 2018). Further, there is copious

overlapping between the SDGs and the aims of CSR (Buhmann *et al*., 2019) and the CSR programs is embedded in the economic, social, and environmental sustainability obligations of private-sector practices (Kumi *et al*., 2020). Accordingly, CSR is fundamental to sustainability, economic competitiveness, and innovation, and it is strongly linked with the successful implementation of SDGs. Consequently, the main concern is how both countries and societies gain CSR benefits to tackle main sustainable development challenges, e.g., poverty, health, education, energy, and environment (Lu *et al*., 2019). In this regard, D'Amato *et al*. (2019) stated that CSR, environmental efficiency, and environmental innovations practices define a lot of the present industrial sustainability agenda. According to Riyadh *et al*. (2019) CSR is defined as "the voluntary activities undertaken by a firm to operate in an economic, social and environmentally sustainable manner".

Out of 17 SDGs, 13 goals emphasize on social inclusiveness and take some environmental aspects into account (Gupta & Vegelin, 2016), and the researchers have focused primarily on SDGs 1, 4, 6, 8, 12, and 17 (ElAlfy *et al*., 2020). The concern of scholars on this concept is increasing, for instance, "Responsibility to Protect" concept (Bellamy, 2015), CSR, and the necessity to discuss the climate change, waste management, and other pressing environmental issues. Moreover, Taylor *et al*. (2018) study found that the CSR and the environmental initiatives lead to sustainability and consequently will enhance a company's profit. Furthermore, Ortiz-de-Mandojana and Bansal (2016) found that the companies that adopted social and environmental actions recorded lesser financial losses, greater growth, and extended period that reaches 15 years. Pogge and Sengupta (2015) suggested that qualified

actors who stipulate their roles and mandates should be designated for fulfilling the SDGs responsibilities.

Furthermore, most companies reporting on the SDGs are found in countries with higher CSR's certification, which spend more time in the education sector and protection of employment (Rosati & Faria 2019). The CSR is considered a prerequisite to contributing to the SDGs (Schönherr *et al*. 2017) because it is a primary initiative that requires the companies to tackle the social and environmental issues in their operations and then motivate them to identify the significant issues to start environmental improvements (Thorlakson *et al*., 2018). Regulating private sector responsibility via obligatory laws is politically critical and draws a controversial debate on CSR (Kolks, 2016). In this regard, it was found that 52% of the selected sample of global supply chain companies in their annual reports include some components of social or environmental issues (Thorlakson *et al*., 2018). Furthermore, CSR reporting is one of the various terminologies of sustainability (Siew, 2015). Moreover, KPMG international CSR Survey of 2017 was covered 49 countries and revealed that 93 % of the 250 largest global corporations reported on CSR, and 43% of the companies connected their CSR activities to the SDGs (Blasco & King, 2017). Fallah Shayan *et al*. (2022) recommend that companies could utilize the SDGs as a framework to improve their CSR practices and environmental contributions. Thus, responsibility inclusiveness is at the global, regional, and national levels while responsibilities different for dealing with global environmental problems at each level.

Consequently, CSR is interpreted into voluntary sustainability standards (ISO 26000) and has become a common standard used by companies globally. Moreover, it is considered an essential component of public policy in the environmental and social dimensions towards achieving SDGs (Marx, 2019 & Moratis, 2018).

Further, Basta *et al*. (2018) found that the most factors for measuring sustainability are the CSR, sustainable reporting, and the social lifecycle evaluation. Moreover, there is an increasing demand for CSR certification for better transparency and broader measures for private sector accountability (Fleming *et al*., 2017). In this regard, Palmer and Flanagan (2016) mentioned that the CSR reports provide examples of companies' sustainability efforts such as greenhouse gas reduction. Furthermore, Kumi *et al*., (2020) concluded that the private sector contributions in promoting the SDGs in the context of CSR include the provision of social services such as education, health, and creation of jobs. According to Fallah Shayan *et al*. (2022) that, some industries' CSR contributions are minimizing harm to the environment and assisting society (charity).

2.4 SDGs and Corporate Environmental Responsibility (CER)

The Brundtland Report (Our common future) confirmed that corporate environmental responsibility (CER) is an essential aspect towards sustainable development; and needs to enforce to ensure an adequate environment for present and future generations (WCED, 1987). In addition, the environment

is one of the ten principles of the United Nations Global Compact (UNGC), which articulate that "businesses should support a precautionary approach to environmental challenges; undertake initiatives to promote greater environmental responsibility; and encourage the development and diffusion of environmentally friendly technologies" (UNGC, 2021).

CER is an integral facet of corporate social responsibility (CSR), and both are parallel dimensions for corporate sustainability (Cai *et al*., 2016) and the social and environmental responsibilities were combined under the CSR umbrella (Sinkovics *et al*., 2021) and an essential factor or feature for competitive advantage (Lloret, 2016; Myroshnychenko *et al*., 2019; Kasych *et al*., 2020). In addition, CER enhances CSR for the sake of cleaner production and pollution prevention (Wang, 2016). Thus, CER is the firm's capability to incorporate environmental aspects within its environmental plan and daily operations to reduce the adverse impacts of the firm's activities on the environment and strengthen the compliance with the provisions of environmental law to achieve corporate environmental commitment and SDGs (Kim *et al*., 2017; Liu *et al*., 2017; Phiri *et al*., 2018; Li *et al*., 2020). Due to the environmental pollution concerns, the attention to CER issues has increased, and it is considered an essential driving factor for companies to include environmental protection with their values (Li *et al*., 2020).

Since embracing the 2030 Agenda for sustainable development, global concern leans increased towards corporate sustainability and responsibility, where six of the 17 SDGs directly relate to the environment (SDGs 6, 7, 12, 13, 14 and 15). Kasych *et al*. (2020) stated that there is a necessity to form a holistic vision to improve the corporate environmental responsibility via a

strategic approach perspective based on the principles of sustainable development. Further, the UNDP STOCKHOLM+50 report mentioned that the business sector is requested to contribute to the SDGs through effectual CER practices for the best environmental performance (UNDP, 2022), which will accelerate the implementation process of SDGs (Qin *et al*., 2019). The firms can contribute to implementing the SDGs through various activities, but that contribution depends on the depth of the CER actions and practices (Sinkovics *et al*., 2021).

Many scholars point out several essential internal and external factors (Figure 1) that beneficially influence the adoption of CER, which leads to attain better corporate environmental performance towards achieving the SDGs (Sáez-Martínez *et al*., 2016; Kim *et al*., 2017; Herghiligiu *et al*., 2019; Qin *et al*., 2019; Kasych *et al*., 2020). In terms of the environmental dimension, the CER, in essence, become an important competitive advantage and corporate ethical commitment to self-orientation towards comprising the environmental goals (i.e., SDGs) in their strategic priorities to ensure the dynamism of environmental continuous improvement. Further, as per the current conditions where environmental issues are significantly exacerbated and are gaining a global character, it is crucial to take robust actions in the formation of a comprehensive vision for improving the CER through a legal and SDGs perspective.

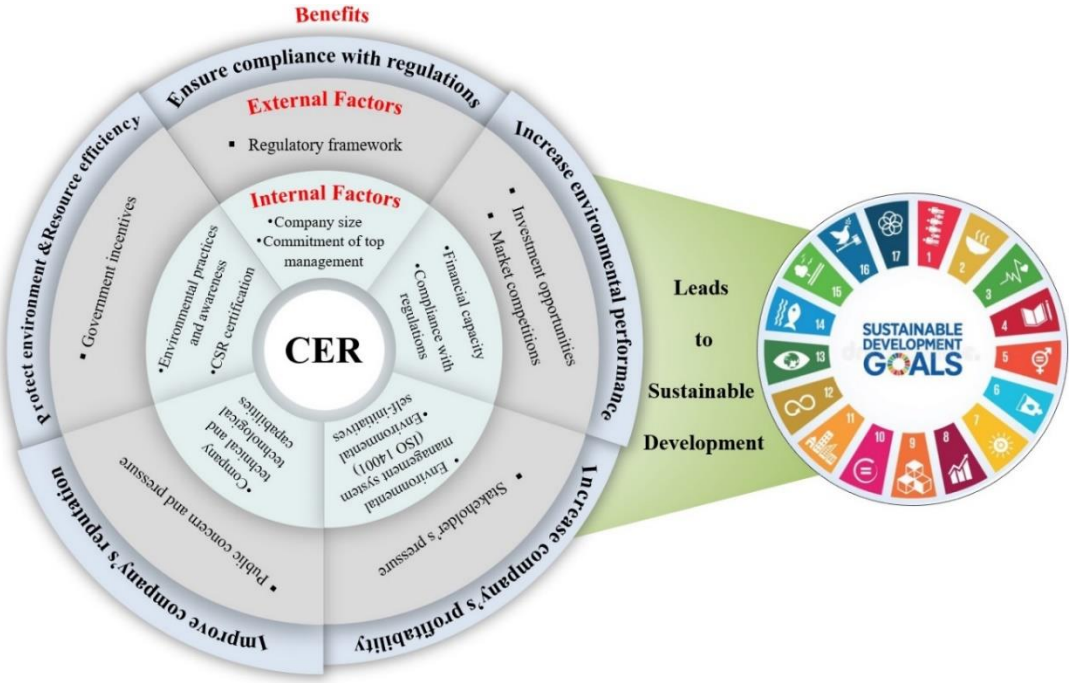


Fig. 2.5: The external and internal factors and benefits of CER (Author's own depiction)

The SDGs are not legally binding, but the key stakeholders must commit to drive forward a stronger global healthy environment to solve sustainable development challenges. According to Singh (2016) there are several challenges for achieving SDGs, such as lack of influential leadership, lack of harmonious partnerships, shortage of investments, the dearth of implementation, and measurable indicators with effective data collection. Notwithstanding, there are some essential initiatives that should be adopted in order to succeed, such as CSR, CER, and other environmental initiatives, which are considered as hub between this sector and SDGs. It is because those initiatives demand more ethical, responsible, and sustainable business practices. For this to occur comprehensively, governments should enact appropriate legislation to oblige the private sector and then enforce it to change efficiently in the future, because currently there is no enforcement

mechanism (Fukuda-Parr & McNeill, 2016). In this context, Ardakani & Soltanmohammadi (2019) mentioned that there are positive impacts of the best environmental management practices such as carbon emissions management, hazardous waste management, and efficient energy consumptions on CSR, which are type of obligation to laws in respect of reducing production costs and environmental risks.

2.5 The SDGs Targets and Indicators related to Private Sector

The shift in global politics towards the role of the private sector is explicit in the SDGs *via* the involvement of industrial sector leaders in developing the SDGs (Buhmann et *al*., 2019). Further, the SDGs need new pivotal tracks to sustainability, and knowledge mobilization, which can operate among various sectors and regions (Singh, 2016). All the SDGs are interrelated to each other (Kumar *et al*. 2018), and the substantive interactions are more specific *via* targets than goals (Weitz *et al*. 2018), thus giving the 2030 Agenda an 'integrated' advantage (Horvath *et al*. 2022). The 17 SDGs are entirely but unevenly related to the private sector but are related to all companies (Frey & Sabbatino, 2018). In this regard, Tosun & Leininger (2017) reported that private sector competence is assigned to attain SDGs 2 (Zero Hunger), 6 (Clean Water & Sanitation), 8 (Decent Work & Economic Growth), 9 (Industry, Innovation & Infrastructure) and 12 (Sustainable Consumption &Production). Salvia *et al*. (2019) pointed out that SDGs 4, 6, 11, 12, 13 and 15 are the most extensively investigated, while the SDGs 4 (Quality Education), 11 (Sustainable Cities and Communities), and 13 (Climate

Action) were most globally highlighted. Gupta & Vegelin (2016) reported that most of the targets are national-level targets with primary responsibilities.

The main challenge facing SDGs implementation is the exhaustiveness and complexity of interlinkages among the goals and their targets (Allen *et al.* 2019; Tremblay *et al*., 2020), and unclarity of how these interlinkages accurately work (Allen *et al*. 2018). In this regard, Guevara & Julián, (2019) stated that the Inter-Agency Expert Group on SDG indicators has adopted about half of the indicators to monitor the implementation progress of the SDGs that inadequately coverage country or consent on their methodologies. An important concern raised by Yonehara *et al*. (2017) is that the emphasis of the SDGs indicator system is only on the quantitative information, consequently, ignoring the hidden issues where some goals may be left behind. Some examples of vague targets and gaps among SDGs and their indicators are provided in Table 2.2.

Table (2.2): Examples that demand further clarity between SDGs targets and their indicators

Target number of the SDGs	Indicator	Clarification required
4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture	Percentage of 15-year-old students enrolled in secondary school demonstrating at least a fixed level of knowledge across a selection of topics in environmental science and geoscience. The	The indicator only discusses a part of the education for the sustainable development agenda that the target promotes.

Target number of the SDGs	Indicator	Clarification required
of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development."	exact choice/range of topics will depend on the survey or assessment in which the indicator is collected.	
7.2: "By 2030, increase substantially the share of renewable energy in the global energy mix."	7.2.1 Renewable energy share in the total final energy consumption.	Global reporting cannot easily determine what progress would be "substantial."
8.4: "Improve progressively, through 2030, global resource efficiency in consumption and Production and endeavour to decouple economic growth from environmental degradation, in Accordance with the 10 Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead."	8.4.1 Material footprint, material footprint per capita, and material footprint per GDP 8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.	Sustainable growth indicates growth that proceeds social, economic and environmental aspects into account, but this does not reflect that a real decoupling will require a drastic redefinition of what constitutes growth.
10.2: "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin,	Proportion of people living below 50% of median income, disaggregated by age	This target includes three types of inclusion to be achieved across nine different categories of potential exclusion.

Target number of the SDGs	Indicator	Clarification required
religion or economic or other status."	group, sex and persons with disabilities.	However, the indicator measures only the three kinds of exclusion, which are age, gender, or disability status.
12.6: "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle."	12.6.1 Number of companies publishing sustainability reports	"Encourage" is an unmeasurable word, then it is hard to assess this target.

In this regard, Le Blanc (2015) stated that out of the 107 targets, only 60 are referred to one different goal than it belongs to it; for example, 19 targets are linked with three goals or more, either directly or indirectly (as shown in Figure 2.6). Instead, Barbier and Burgess (2017) observed that the indicator levels' connections have improved with most of the SDGs. Moreover, Esquivel & Sweetman (2016) stated that Agenda 2030 and its SDGs are well designed. Put differently, greater interest in the connections between SDGs may lead to improved efficiency of implementation and lessen the related costs (Elder *et al*. 2016). Despite these caveats, sustainability could be achieved only by balancing the three aspects of environment, economy, and society.

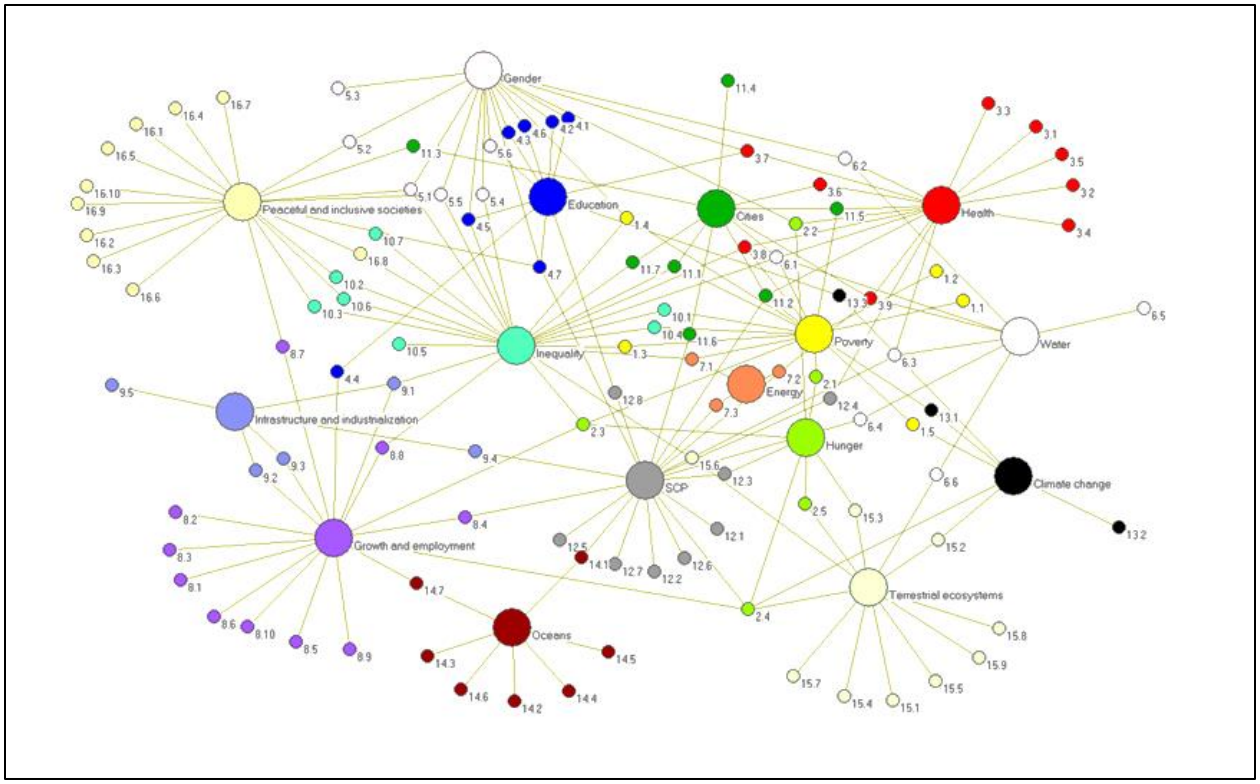


Fig. 2.6: The SDGs as a network of targets (reprinted with permission from Le Blanc, 2015)

For instance, in Colombia, 19 companies' reports were studied, and it was found that only five reports have used the keyword "17 SDGs," and three reports have used the keyword "169 targets" (Pineda-Escobar, 2019). Another study found that the annual reports of 52% of the randomly selected global companies address some social or environmental issues (Thorlakson *et al*., 2018). To clarify that, Scherer *et al*. (2018) found that the social goals are related to higher environmental impacts. Thomas *et al*. (2016) stated that the worldwide concern in assessing results is overtaking the capability of states to collect the required information. Therefore, the private sector should focus on ensuring the minimum data set and gathering capacity for tracking the implementation progress of SDGs (Stafford-Smith *et al*. 2017).

Notwithstanding this logic, there is a need to expand our perception of the sustainable development system and interactions among the SDGs and targets to facilitate the implementation (Reyers *et al*. 2017). Therefore, the underlying concern is how to measure the progress implementation of SDGs (Yonehara *et al*. 2017).

2.6 Overview Interlinkages of SDGs through an industrial lens

The study focuses specifically on only 8 (SDGs 8, 9, 11, 12, 13, 14, 15, and 17), which are related directly to the industrial sector, whereas the other goals are indirectly related. These SDGs are at the foreground of the global priority on gross domestic product growth and its risks effect on the environment because the environmental degradations impact significantly on a weaker population (Costanza *et al*., 2016). The focus on single SDGs without recognizing linkages among the SDGs may lead to potential deficiencies in the implementation (Alcamo *et al*., 2020), thus considering the advantage of the integrated nature of the SDGs and their interlinkages will be a prerequisite for attaining it (Cling & Delecourt, 2022). Hickel (2019) stated that five SDGs (6, 12, 13, 14, and 15) are directly dealing with sustainability, and Hegre *et al*. (2020) concluded that there are prevail synergies among and within the SDGs except SDG 10. Thus, it is significant to enhance the synergies and minimize trade-offs of the SDGs for attaining it globally (Zhao *et al*., 2021) and take advantage of the synergies identified between the goals (Pradhan *et al*., 2017).

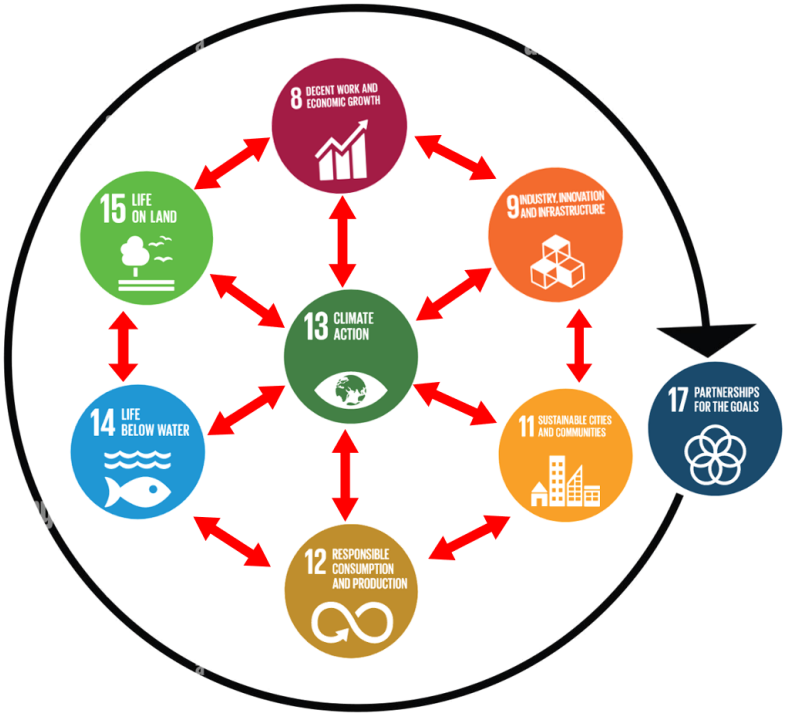


Fig. 2.7: The interlinkages of SDGs that related the industrial sector (author's own depiction)

The 17 SDGs entirely need a great effort to handle the climate change (SDG 13) issue, which is a crucial pillar to attaining sustainable development; thus, it is almost impossible to achieve the SDGs without SDG 13 (Figure 2.7). Therefore, the SDGs could be attain pursued in tandem; if the economic growth (SDG 8) is unsustainable will potentially impact negatively other SDGs that specifically have an environmental dimension. Therefore, it will lead to an increase in greenhouse gases (GHGs) emissions (SDG 13) and threaten or contaminate environmental ecosystems (e.g., terrestrial and seas) and vital natural resources (SDGs 14 and 15).

Furthermore, sustainable infrastructure is considered the core of the development of sustainable cities (SDG 11). Thus, resilient infrastructure

(SDG 11) in vulnerable communities may lead to an increased adaptive ability to climate change (SDG 13). If industrial projects do not stick to strict and effective environmental performance standards, that could cause severe impacts on climate (SDG 13), life below water (SDG 14), and life on land (SDG 15). Thus, the best inventing investments in sustainable industrial processes and green products will lead to further efforts to enhance sustainability in goods and services production (Goal 12). Rapid industrial development growth (SDG 9) and infrastructure expansions (SDG 11) may lead to more negative impacts on the environment if the hazards of that impacts are not strictly controlled (Goals 14 and 15).

In addition, increasing green areas in the industrial zones (SDG 15), resource efficiency management (SDG 12), reduced emissions through sustainable infrastructure design and control of pollution sources (SDG 9) will fulfil the obligations of climate action (SDG 13). Sustainable production and consideration of environmental impacts (SDG 12) will minimize the pollution of land and water; consequently, it will reduce the loss of deforestation and biodiversity (SDGs 14 and 15), thus indirectly will avoid obstructing climate actions and negative impacts on work conditions (Goal 8) when adopting resource-efficient production (SDG 12) that considers inputs activity (raw materials feeding in the manufacturing process) by labours. The strengthening ability for adaptation to climate change (SDG 13) and sustainable production (SDG 12) have tangible benefits for enhancing decent work (SDG 8) and sustaining the cities (SDG 11).

Protecting water bodies (e.g., oceans, seas, rivers) from illegal disposal of industrial solid waste, effluents, and oil spills through shipment of raw

materials and goods will contribute to conserving the natural carbon sinks and controlling climate patterns (SDG 13) and life below water (SDG 14). Furthermore, protecting terrestrial ecosystems (SDG 15) contributes to conserving natural carbon sinks (SDG 13) and ensure responsible consumption and production (SDG 12). There is a solid link among the SDGs 14 and 15 manifested in the shared benefits from actions to preserve land and water ecosystems.

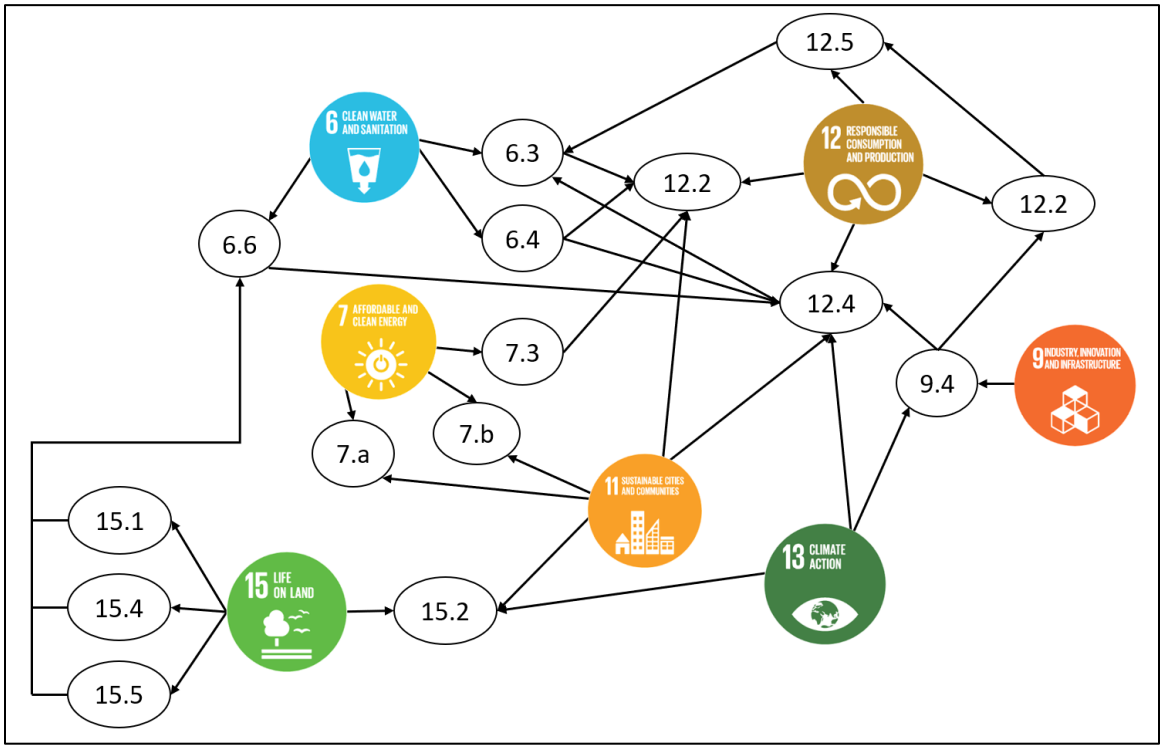


Fig. 2.8: The interlinkages between the targets of the SDGs (author's own depiction)

Figure 2.8 illustrates the linkages among the SDGs that this study focuses on, which directly related to the private sector. Undoubtedly, these linkages mean that implementing one goal effectively can support to achieve other goals. For example, recycled and reused water in targets 6.3 and 6.4, are

linked to target 12.2 regarding sustainable management, and efficient use of natural resources. Additionally, target 6.3 linked with 12.4 and 12.5 which concerning the type of waste and disposal method. Further, target 12.5 (prevention, reduction, recycling, and reuse) linked to 15.2 (increase afforestation and reforestation globally). Moreover, target 12.2 linked to 7.3 regarding the reduction of energy consumption, which drives to achieving SDG 13. Hence, the private sector when adopting these goals in their plans, and strategies will contribute to increased recycled and reused water; reduce energy consumption; minimize the significant impact of activities on biodiversity and maximize the recycling and reuse materials.

A successful national plan to achieve the SDGs needs to build partnerships (SDG 17) upon a shared vision and goals among all stakeholders, and the private sector is an essential partner. Where all 17 SDGs strive to address the various global challenges across national borders; for instance, climate change (SDG 13) is a global issue, thus the private sector's role is just as essential as governments in combating it. Further, industrial innovation (SDG 9) and sustainable production (SDG 12) require a global partnership (SDG 17) among the industrial sectors, manufacturers, and scientists to exchange technological experiences and knowledge to attain decent work (SDG 8), and to avoid industrial's negative impact on the ecosystems (SDGs 14 and 15) and sustain communities (SDG 11).

For example, the climate change issue is overlapping with all the SDGs, and this goal (SDG 13) should be considered with each goal. Climate change may affect the poor, and most vulnerable people, thus lead to weakening efforts to end poverty (SDG1), attain gender equality (SDG5), and lessen

inequality or variation among countries (SDG10). Further, increasing stress on water resources (SDG6), changing ecosystems, and damaging biodiversity (SDGs 14 and 15), would threaten food security (SDG2). Those changes may be spreading infectious disease patterns that affect global health (SDG3). Consequently, these impacts may threaten peace and security (SDG16). On the other hand, by encouraging improved energy efficiency, developing carbon capture and storage, and energizing investment in cleaner- combustion of the natural gas besides the renewable energies and technologies (SDG7), may provide promising economic investment opportunities (SDG8) in the oil and gas sector, figure 2.9 summarizes the key issues areas for oil and gas mapped to the SDGs (IPIECA, 2017).

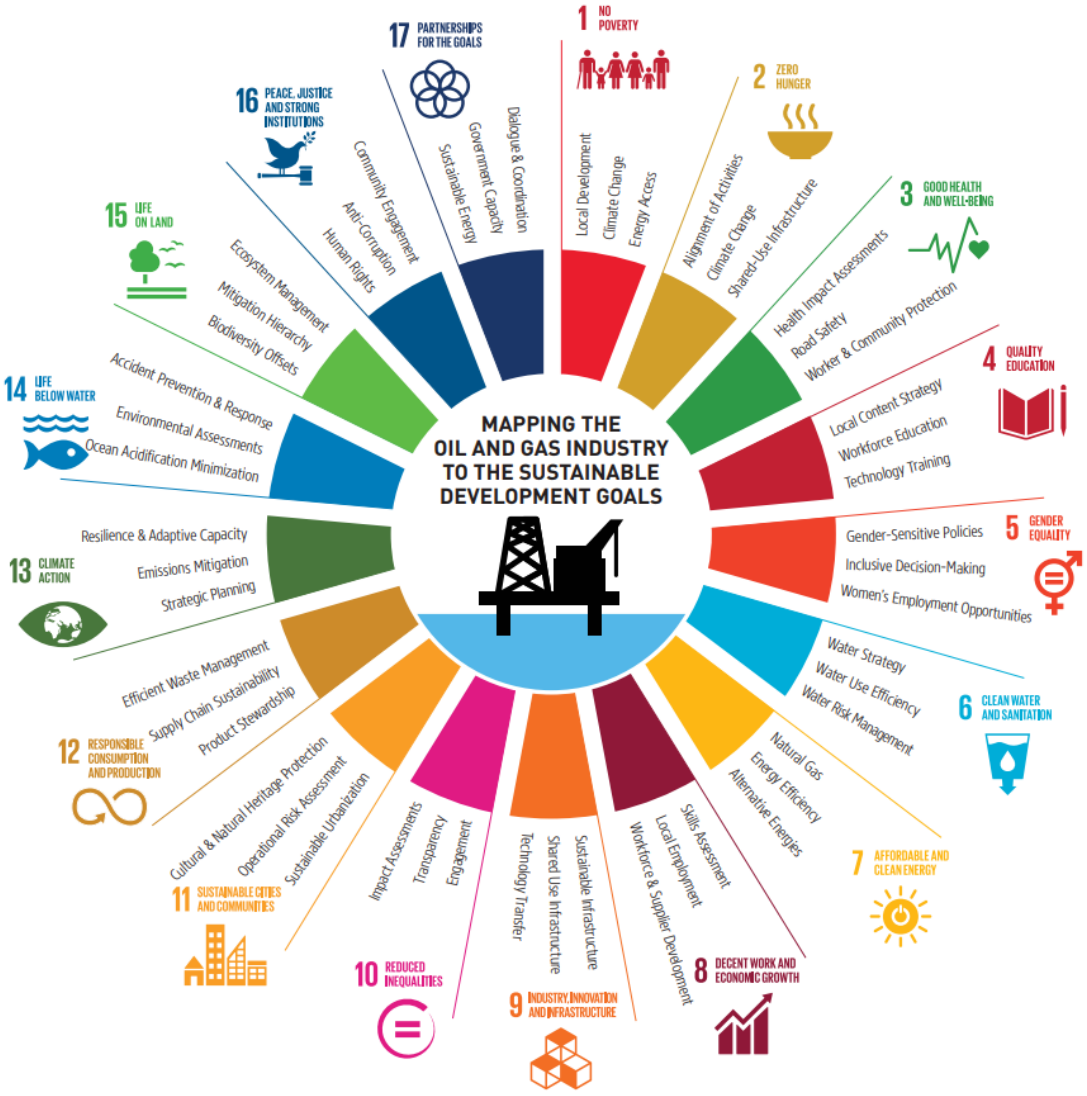


Fig. 2.9: Key issues areas for oil and gas mapped to the SDGs (IPIECA, 2017)

As mentioned previously, indicators are essential for measuring the achievement of implementing the sustainable goals and their targets, but still, there are no clear cases of activities that strengthen the implementation of the SDGs, specifically in the private sector (Sullivan *et al*. 2017). The recent literature concerning the 2030 Agenda and its SDGs revealed that the

interlinked among the SDGs and their targets have multi-synergetic possibilities. Thus, the companies can benefit from the SDGs synergies to better attain it by studying the relation of the SDGs targets to the private sector areas. Gupta & Vegelin (2016) concluded that the successful implementation of SDGs means identifying a powerful linking connection among the goals and finding the ways of their integration into the global society.

The existing SDGs indicators are neither comprehensive nor final because some target areas lack indicators that are still not defined or weak in the method part and require strengthening (Saner *et al*. 2019). About half of the indicators seem to be appropriate for the targets, and the scope of the other half is too narrow (Elder & Olsen, 2019; Merry, 2019). In this regard, 49 (29%) out of the 169 targets are well defined and developed, whereas 91 (54%) need to be improved and the remaining 29 (17%) are weak or require substantial work (Stokstad 2015; Hak *et al*. 2016; Kumar *et al*., 2018). A study conducted by Palmer & Flanagan (2016) on 22 out of 50 large companies in U.S. identified 389 goals; most of them concentrated on the environment, and the companies list 18 goals in sustainability, including 7 goals for "people", 3 for "overarching" and 8 for "planet." A piloted contemporary study in Montenegro (Galli *et al*. 2018) found in the first reporting period planned for 2019 that only 26 organizations can provide data for measuring 137 indicators out of the 241 indicators (56.8%). It is a good sign that some businesses already started integrated sustainability aspects or some of the SDGs into their plans and strategies.

Several issues of the three dimensions of sustainable development should be recognized as having the same importance level because the SDGs

must be implemented entirely as integrated rather than in a fragmented way, as the sustainable goals and targets are interlinked. Vital as this is, the efforts have been concentrated, especially on integration between the goals and targets.

2.7 Environmental Legal Tools

The outcome document – the Stockholm Declaration – of the first historical conference on environment, which contained 26 principles for the sound management of the environment, set the primacy of environmental issues among global concerns. Principle 11 of the declaration states as follows:

> *"The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries, nor should they hamper the attainment of better living conditions for all, and appropriate steps should be taken by States and international organizations with a view to reaching agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures*." (UN, 1973)

This was followed by Agenda 21 (adopted in 1992), which refers to the national legislation in Chapter 8, stating that 'laws and regulations suited to country-specific conditions are among the most important instruments for transforming environment and development policies into action...' (UNCED, 1992). Following this principle and Agenda 21, the Sustainable Development

Goals (SDGs) are anchored in international law and made consistent with commitments articulated in several international agreements and non-binding law instruments (Ladan, 2018; Kim, 2016).

Further, the 2030 Agenda, which covers the SDGs, is guided by a number of international legal instruments, specifically the UN Charter (signed in 1945), the Universal Declaration of Human Rights (accepted in 1948), and the Rio Declaration on Environment and Development (adopted in 1992) (UN, 2012). In this regard, the SDGs provide guidelines for regulations to achieve a broad purpose (Dong & Hauschild, 2017). The SDGs were agreed upon at the international level, and it was expected that all countries carry on procedures to formulate policies aligned with national development planning to help attain the SDGs (Chapman & Shigetomi, 2018). According to Beier *et al*. (2018), the negotiations outcomes of the green economy concept (GEC), and the SDGs affected the global sustainable development policies for the next decade.

Therefore, implementing the SDGs needs further policy coherence, and besides that, the involvement of non-governmental parties i.e., the private sector (Breuer *et al*., 2019) and strategies need to be supported by the national law (Ladan, 2018). Furthermore, the sixth UN Global Environment Outlook report – GEO-6 (UNEP, 2019) mentioned that extensive efforts were taken to advance methods for enhancing environmental governance by strengthening the regulations, empowering the policies to promote voluntary actions, and encouraging the stakeholders to practice self-governance. The Addis Ababa

Action Agenda[1] (AAAA) considered sustainable and resilient infrastructure a fundamental thematic field, given that investment in energy, water and sanitation, and transportation sectors is a precondition for attaining the SDGs (UNDESA, 2015). In this regard, Aizawa (2018) mentioned that both – the 2030 Agenda AAAA assign significance to sustainable and resilient infrastructure as a precondition to accomplishing sustainable development. Stevens & Kanie (2016) highlighted that in the SDGs' era, sustainability is the principal aim, and it reflected the key questions of the international political vision and should be implemented at both regional and national levels.

The commitments of the private sector towards the SDGs include ensuring the continuous maintaining of labor standards continuously, implementing environmental regulations, and complying with them, and ensuring that business is continued without any adverse impacts (Abtew, 2017). Relevant to the same context, Agarwal *et al.* (2017) stated that good regulation is one of the most feasible solutions for some SDG issues that are related to the private sector. In line with this view, Ridho (2018) argued that companies need empowering regulatory frameworks to participate in sustainable development through clear laws and regulations that are easily accessible.

From an economic point of view, companies are trying to make an impact on the regulations and public policy on sustainability (Baumgartner & Rauter,

[1] The Action Agenda establishes a strong foundation to support the implementation of the 2030 Agenda for sustainable development. It provides a new global framework for financing sustainable development by aligning all financing flows and policies with economic, social, and environmental priorities (www.un.org).

2017). Additionally, the SDGs' contributors in the industrial sector are eager that governments must make it suitable for businesses to implement SDGs and must enact convenient legislations to obligate further environmental and social responsibilities (Scheyvens *et al*., 2016). Within this context, Asghar *et al*. (2019) affirmed that it is the time to formulate and implement effective environmental policies, particularly in the industrial sector. In some cases, influential laws and regulations encourage companies to implement more sustainable and efficient production processes (Dhahri & Omri, 2018). For instance, there are various initiatives of sustainable supply chains concerning standards and certification (e.g., ISO 14001), which often fill the regulative gaps due to the dearth or absence of local regulations and efficient international environmental policies (Brandi, 2017). Due to the vital role of the industrial sector, the consensus about the significance of industrial development in driving economic growth has increased globally (UNIDO, 2016 & 2018).

Therefore, the industrial sector is accountable for controlling environmental impacts through its compliance with the legislative frameworks for achieving sustainable industrial development. In this regard, Roni *et al*. (2017) reported that both policy and regulations aim to control the possible harmful impacts caused by the industrial sector; the newest empirical results propose that policy and regulations have positive impacts on driving sustainability practices. Rashed and Shah (2020) have suggested that updating and reformulating effective legislations implement SDGs' requirements is one way to involve the private sector in SDGs' implementation processes. Moreover, Buganová & Hudáková (2015) stated that legislative requirements are one of the motivations to invest in sustainable projects. In fact, studies

indicate that the country's legislative framework is the most significant factor that affects the environmental performance of the companies, and legislative (e.g., laws and regulations) and quasi-legislative (e.g., standards guidelines) factors encourage desirable behaviors (Morseletto, 2020; Pechancová *et al.* 2019). Abdul-Rashid *et al*. (2017a) concluded that adequate regulations and incentives can be a driver for innovations that enable companies to increase their competitiveness indirectly. A study by Dahlmann & Bullockb (2020) found that the managerial devices of companies have various responses towards multiple sustainability challenges, including compliance with the laws and regulations, supporting sustainability legislations, and responding to amendments in legislations. Given the benefits of sustainable development, Thabit *et al*. (2019) pointed out that the companies that integrate sustainable development into their policies and strategies will obtain long-term benefits such as improved performance and productivity, maximized profits with least costs, increased investments and new clients, reduced commitments, enhanced trust, and increased reliability and market share.

The study of Banik & Lin (2019), which supports the findings of other studies, concluded that imposing several sustainable development regulations still poses a key challenge. Poulsen *et al*. (2016) stated that there is a lack of global regulations correlated with sustainable industrial initiatives and other multi-stakeholders. According to Renda (2017), before proposing new regulations, an 'evaluate first' principle should be employed to ensure that the comprehensive evaluation of any issue will be done based on regulation and the potential gaps in the current legislation. As a case in point, Ribeiro & Kruglianskas (2015) argued that there is a need to improve the environmental regulations in developing countries. Similarly, de Oliveira-Neto *et al.* (2018)

stated that it is important for governments to improve and develop environmental regulations to minimize carbon dioxide (CO_2) emission due to industrial activities, especially in the transportation sector. Furthermore, the United Nation Environment Programme (UNEP) highlights in its revised environmental impact assessment legislation the great significance of both strategic environmental assessment (SEA) and environmental impact assessment (EIA) in attaining the 2030 Agenda (UN, 2015; UNEP, 2018), and there is consensus on their effective role in enhancing sustainable development (Del Campo *et al*., 2020).

EIA is a process intended to minimize the negative impacts of development projects on the environment, and SEA is aimed at ensuring that the environmental factors have added policies, strategies, and programmes (Jenkins, 2019). Further, EIA, if fully implemented, will provide a platform for the attainment of the SDGs (Abija, 2018). The EIA system is employed as a reaction to the proposed development, whilst the sustainable development is a proactive pursuit to attain sustainable results of development (Jenkins, 2019). In this context, Joseph *et al*. (2019) stated that the EIA system allows for an efficient framework for the integration of environmental policies and developmental strategies that drive sustainable development.

It is evident from the studies that it is vital to review and assess the existing environmental regulations, strategies, and policies periodically and pinpoint the gaps and deficiencies in them to be able to propose essential amendments whenever the need arises. However, it should be noted that it is hard to address the gaps completely in the short term. Thus, the proposed amendments should

be ranked according to the priority and availability of capabilities and resources.

One of this study aims is to review and assess the appropriateness and consistency of Bahrain's environmental legal tools regarding the SDGs. The research methodology employed is a scoping review that scrutinizes their compatibility and effectiveness within the SDGs' context. The proposed framework consists of five actions to achieve SDGs from a coherent policy perspective at the national level. The successful implementation of the proposed review framework concerning the environment legal tools is based on the level of cooperation and coordination among the government authorities and other stakeholders in filling the gaps, overcoming the deficiencies, and making amendments and proposals.

2.7.1 Reviewing the Existing Environmental Regulations and Their Appropriateness Concerning the National and International Environmental Changes

The periodic reviewing of environmental regulations, whenever needed, is a fundamental approach to ensure their efficiency and robustness and verify that all environmental issues are under control and up to date at the local, regional, and global level. In this regard, Saner *et al*. (2019) proposed that international environmental conventions can be utilized to support and enhance the SDGs' implementation and provide countries with needful amendments to their national environmental laws. In line with this notion, Almannaei *et al*., (2020) suggested that one of the methods for revising

environmental policymaking to resolve environmental matters and assure sustainability is to address where national laws and policies intersect with international conventions and treaties; thus, global governance must take that into account when designing environmental laws and policies.

Furthermore, Takeuchi *et al*. (2017) indicated that policymakers can gain many benefits through the points of agreement and difference between multilateral environmental agreements and reliance on the existing legal tools for efficient implementation. In addition, Renda (2017) pointed out that future regulations should be better, depending on several additional actions and commitments to the SDGs. Further, Georgeson & Maslin (2018) stated that governments along with stakeholders and companies should shift essentially in stance towards development via adjusting their actions with respect to the SDGs. For instance, Boas *et al*. (2016) reported that the nexus approach provides new discussion grounds for policymakers on policy integration in sustainable development to increase the outcomes of the SDGs. According to Ben-Eli (2018), most policymakers and development specialists involved in improving the national sustainability agenda are not trained in the systemic methods and lack the adequate tools for treating the complexity effectively, thereby affecting the development of effective policies, regulations, strategies, and initiatives. In line with this notion, Galli *et al*. (2018) stated that the policymakers often lack the tools to identify the most significant issues that need to be addressed, and evidence to prove how specific interventions and policies assist or prevent the progress toward achieving goals.

The national planning mission for the SDGs took several years including unattained MDGs; meanwhile, some countries had already started and spent a long period to develop their national policies for the MDGs (Sarwar, 2015). In this regard, the former Commission on Sustainable Development (1992–2003) and the United Nations Conference on Sustainable Development (Rio+20) have guided how to translate sustainable development into national contexts (Risse, 2016). Therefore, an early quick start to take the SDGs' actions is a significant step to ensure further affirmative achievements by 2030 (Lucci & Lally, 2016). For instance, the Netherlands commenced improving their policies in response to the results of the assessment of existing regulations, which found that three out of forty-one environmental targets focused on the SDGs were not included and that the current policy targets have not been attained yet (Lucas *et al.* 2016).

The crucial role of environmental policy and institutions were broadly neglected in the SDGs' costing process and extreme attention was devoted to the financial needs; this concern was raised during the MDGs' era. Instead, the great significance of the primary focus on environmental policy, institutional, and formulating the strategies is to attain the SDGs (Vorisek & Yu, 2020). Consequently, Sarvajayakesavalu (2015) stated that the developing countries must design national planning and reviewing mechanisms and draft legislation associated with the SDGs to ensure their successful implementation. Environmental governance should comprise efficient regulations as well as equitable principles and systems within the context of the SDGs 9, 11, 12, 13, and 17 (Scharlemann *et al*., 2020) to encourage any improvement or reform during the policymaking process. By the same token, environmental assessment is a governance mechanism highly

pertinent to the inclusion of the SDGs in the decision-making process, and the SDGs could strengthen it (Kørnøv *et al*. 2020). Farahat (2016) reported that due to the economic and social overconsumption of energy, and the rapid growth in the major cities during the last 40 years in the Arabian Peninsula have caused steadily deterioration in the air quality to steadily deteriorate. Moreover, the increased growth and consumption have not been accompanied by rigorous regulations.

2.8 Industry and Environment

The industrial sector is a major part of the business sector, and it is more inclined to have negative sustainability effects due to its direct or indirect impacts on the environment. This raises concerns about attaining the environmental sustainability of industrial-based development, therefore, it is essential to develop strategies based on an industrial perspective for enhancing performance and implementation of the sharing economy (Gilli *et al*., 2017; Jiang *et al*., 2018; Govindan *et al*., 2020). Therefore, conflicts have arisen between the economic consequences that could be led to industrialization and the dangerous negative impacts of the natural resource's devastation and consumption and severe pollution (Hami *et al*., 2016; Liu, 2021). In this regard, Kopnina (2016) stated that when the economic gains placed prior to environmental protection, economic development goals are likely to outweigh environmental concerns. Barbier (2016) pointed that there is an agreement that ecosystems should be considered as economic assets because they provide the economy with necessary goods and services. In the same context, Dahlmann *et al*. (2020) showed that the "purpose ecosystem"

consists of various actors seeking to broadly improve private sector aims and encourages it to shift from seeing sustainability as side issue, being part of "business as usual" and profitability, to focusing on including sustainability considerations in their business strategies.

The linking of the industry and environment is an essential part of industrial enterprises performance (Moktadir *et al*., 2018), thus the industrial sector is an important area for the development of sustainability towards a better future (Trianni *et al*., 2017; Martins *et al*., 2020), and it is imperative to observe related transitions in this sector from the perspective of sustainability science (Niehoff & Beier, 2018). The industrial trend towards sustainable development clearly occurs through an improvement in the production operations that rely on technologies that utilize resources more efficiently, generate minimal waste (Lesníková & Schmidtová, 2019) and recognize air emissions as parameters for environmental sustainability (Moktadir *et al*., 2018).

In addition, Oliveira *et al*. (2016) reported that in the early 1990s, the concerned companies focus on the environmental impacts resulting from their production operations by applying of end-of-pipe treatment principle and recycling practices as a preventive and proactive process. In the same period, sustainability assessment has increasingly grown as a significant new evaluation approach for assisting both decision-making and policymaking in a wide range of sustainability components in various sectors globally (Sahimi *et al*., 2018), such as energy, transport, industry, infrastructure, finance, and land. In addition, more consideration has been given to the industrial sector and, specifically the most carbon-intensive industries (Figueres *et al*., 2017).

The industrialization is a dynamic economic process which creates incomes, employments, enhances businesses, and efficient use of resources (Kynclová *et al*., 2020). The 2030 Agenda promotes 'sustainable industrialization' under Goal 9 [2] (UN, 2015). Industrial development is considered the key driver of economic growth because the opportunities of major economies and technology multiplied (Gilli *et al*., 2017). The sustainable manufacturing notion is emanating from sustainable development concepts (Abdul-Rashid *et al*., 2017a; de Oliveira-Neto *et al*., 2018) and is one of the environmental initiatives (Abdul-Rashid *et al*., 2017b) and an essential notion that must be adopted to achieve full sustainable development (Bhakar *et al*., 2018). This can be accomplished through production operations with minimal environmental impacts by employing the product-life-cycle concept, and environmental integrated strategies within the management of manufacturing processes (Abdul-Rashid *et al*., 2017a).

In addition, globally, several industries recognize the significant economic and environmental benefits of sustainable manufacturing practices (Álvarez *et al*., 2017). For instance, the progressing concerns on environmental issues on greenhouse gas emissions, natural resources shortages, toxic waste production, rising stresses on sustainable and clean energy, have led to the development of green manufacturing paradigm to minimize the degradation and harmful environmental impacts affecting the planet (Seth *et al*., 2018).

[2] States that "Building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"

In the 1970s and 1980s, the environmental legislation became more robust by requesting the companies to prove their compliance; hence the environmental and social impacts of companies becoming increasingly important (Siew, 2015); consequently, the concept of sustainability compliance provides further opportunities for more studies (Turan *et al*., 2017). Different features of the industrial sectors influence the reporting practices concerning the Sustainable Development Goals (SDGs), though the existing monitoring and management practices of the SDGs are still far to achieve the optimality level at both national and global levels (Tsalis *et al*., 2020; Liu, 2020). For instance, Bakardjieva (2016) claimed that the failure of most companies to attain the SDGs is due to failure in employing sustainable practices e.g., remanufacturing, reusing, and recycling. The results of Jiang's et al. have concluded that there is a large gap in the sustainability reporting of companies and most of the reports recommended taking actions to improve sustainability performance (Jiang *et al*., 2018). Therefore, measuring, assessing, and developing industrial sustainability performance is a critical issue (Bhanot *et al*., 2017; Howard *et al*., 2019; Ferrero-Ferrero *et al*., 2021). Usually, developing countries faces problems when implementing new strategies, particularly with sustainable benefits, of these reasons: lack of regulations, lack of awareness and knowledge (Govindan *et al*, 2020).

2.9 Sustainability Reporting Tools and SDGs Reporting

In 1987, after the publication of the Brundtland report (Our Common Future), the companies' reporting content focused more on particular environmental issues like air pollution, wastewater, and water management,

with continuing incorporation social issues in the reports. In 2016 onwards, companies' sustainability researchers have focused on the SDGs of the 2030 Agenda (Tsalis *et al*. 2020). Since companies vary in their activities; then, they differ in their contribution on the SDGs implementation (Van Zanten & Van Tulder, 2021). Therefore, the content of sustainability reports diverges among companies in terms of environmental aspects and reporting quality; and presents substantial sustainability issues and practices (Stewart *et al*., 2018). In this context, Pizzi *et al*. (2021) stated that the presence of SDGs could be beneficial for differentiating compliance reports and identifying the reports aiming to impact sustainable development.

Significantly, however, the SDGs can play an essential role in the promotion of sustainability reporting (Rosati & Faria, 2019a), and the complete achievement of all the 17 SDGs requires the company to contribute efficient efforts in the organizational, administrative, and reporting aspects (Pizzi *et al.*, 2020). In this regard Van Zanten & Van Tulder (2021), mentioned that if the companies can improve their compatibility to include all SDGs, their sustainability strategies will be more successful. Further, PwC stated that the innovative characteristics of the SDGs can broaden the reporting quality concept (PwC, 2018). According to Acuti *et al*. (2020) the starting point of action to achieve the SDGs is lies behind more prominent attention to reporting the impacts of companies on resilience. While Engert *et al*. (2016) pointed that sustainability reporting should be harmonized and incorporates components in the company strategy to be sustainability efficient. In the same context, Haywood & Boihang (2020) highlighted that companies needed to demonstrate their obligation to the SDGs via reporting the alignment of their strategies, programs, actions or initiatives with specific

goals and target, and how have integrated those goals within their business plans and strategies. Furthermore, Stewart *et al*. (2018) reported that companies need to proactively deal with environmental issues associated with their activities and incorporate them into their environmental sustainability strategies. In addition, the SDGs afford a framework for a sustainable and resilient business growth strategy (Scheyvens *et al*., 2016).

During the period of 1979 and 1989 globe witnessed unmatched environmental disasters, thus the obligation of the private sectors in the localization of sustainable development issues becomes highly crucial (Busco & Sofra, 2021, p.193). Industrial development and urban growth are usually associated with severe pollution and resource consumption (Liu, 2021), which have risen environmental degradation and severely impacted the life quality (Alvarado & Toledo, 2017; de Moraes Hoefel *et al*., 2018, p.73). Consequently, the formulation of an appropriate corporate reporting systems that address the company's performance rather than its financial performance are crucial (Vaz *et al.* 2016).

A case in point, in 1989, the Coalition for Environmentally Responsible Economies Principles (CERES) issued a set of ten principles extending from common environmental concepts to specific disclosures which aimed to create a framework for the information flow needed to assess company performance based on its historical context and society's norms. Those principles represent a milestone in shaping a unified environmental reporting system that companies can voluntarily comply with and led to born of the Global Reporting Initiative (GRI) in 1997 to combine and unify the reporting standards of governance, economic, and corporate social responsibility (CSR)

into a unify sustainability reporting framework at the global marketplace (Rupley *et al.*, 2017).

As such, the GRI Standards guidelines become a voluntary reporting reference which is widely and globally adopted by companies (KPMG, 2015; GRI, 2016a; Stewart *et al*., 2018; PwC, 2018). The first effort of incorporating the SDGs by non-financial indicators developed via collaborative initiative among the United Nations, the Global Reporting Initiative (GRI), and World Business Council for Sustainable Development (WBCSD); which provided the SDG Compass to support companies in tailoring strategies, managing, and measuring their contribution to the SDGs (Pizzi *et al.*, 2021).

Recently, the European Union has displaced the misguiding "non-financial" concept with "sustainability" by issuing a new proposed Directive on Corporate Sustainability Reporting that could involve around 50,000 European companies (SUST4IN, 2021). According to Gibbon & Joshi (1999) that, although there is an absence of environmental accounting for external reporting purposes, Bahrain’s companies are aware that environmental issues will affect their practice in the future. Further, they revealed that about 50% of companies have environmental reporting for internal purposes, and more than 40% believe that their companies will start environmental reporting by 2000.

Historically, the corporate sustainability evolution has been classified into three essential periods; the first period (1950 and 1990) presents the era of Corporate Social Responsibility (CSR), the second period (1990–2005) presents a noteworthy evolution of CSR and the emergence of the Triple

Bottom Line (TBL) concept (economic prosperity, environmental quality, and social equity), and the third period (2005–2020) describes the development of modern corporate sustainability as a result of several novel concepts that have become common such as ESG (Environmental, Social, and Governance) (Taticchi & Demartini (2021, p.66). Table 2.3 summaries the sustainability reporting tools.

Table (2.3): Sustainability Reporting Tools: Frameworks, indices, and standards.

#	Framework/index/standard	Developer/ Founder	Established Year	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	Reference
1	SIGMA project	Motorola By Bill Smith	1986	All companies	Yes	Quality improvement, reduce waste, improve processes, and Increase customer satisfaction	9, 12, 13	Tăucean *et al*., 2019
2	ISO 9001 standard	International Organization for Standardization (ISO)	1987	All companies	Yes	Quality management system	1-16	Fonseca & Carvalho 2019 ISO 9001:2015 -. (2021) Zenchanka & Malchenka, 2018
3	DPSIR framework	Organization for Economic Co-operation and Development (OECD)	Late 1990s	All companies	No	D: driving forces (economic sectors, human activities) P: pressures (emissions, waste) S: states (physical, chemical, and biological) I: impacts on (ecosystems, human health and functions) R: responses (prioritization, target setting, indicators)	All	Khajuria, 2020 Chandrakumar & McLaren 2018

#	Framework/index/standard	Developer/ Founder	Established Year	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	Reference
4	Greenhouse Gas Protocol (GHG Protocol)	World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD)	Late 1990s	Large companies	No	Greenhouse gas (GHG) emissions	13	Johnsson *et al*., 2020 Jusoh & Hashim, 2018
5	Eco Management and Audit Scheme (EMAS)	European Commission	1993	All companies	Yes	Environmental management system	6,7,11,12, 13,14, and 15	EMAS – Environment - European Commission. (2021).
6	Triple Bottom Line (TBL)	John Elkington	1994	All companies	No	Economic prosperity, Environmental quality, and social equity	All	Ferro *et al*., 2019
7	World Business Council for Sustainable Development (WBCSD)	CEO-led organization	1995	All companies	No	Circular Economy, Cities & Mobility, Climate & Energy, Food & Nature, People & Society	All	WBCSD & DNV GL,2018 Cole & Broadhurst, 2021
8	ISO 14001 standard	International Organization for Standardization (ISO)	1996	All companies	Yes	Environmental management system	6,7,8,9,12 ,13,14, and 15	Fonseca & Carvalho 2019 Zenchanka & Malchenka, 2018 Ikram *et al*., 2021

#	Framework/index/standard	Developer/ Founder	Established Year	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	Reference
								ISO, 2016
9	Global Reporting Initiative (GRI)	Global Sustainability Standards Board (GSSB)	1997	All companies	No	Environment, Social and Governance	All	Szennay *et al*., 2019
10	The UN Global Compact	member of the United Nations Sustainable Stock Exchanges (SSE) initiative	2000	All companies	No	Stating 10 principles in the areas of human rights, labor, environment, and anti-corruption.	All	Rasche, 2020
11	Carbon Disclosure Project (CDP)	Founder Paul Dickinson	2000	Large companies, cities, countries, regions	No	Environment and Governance	6, 7, 11.b, 12.2, 12.6-12.8, 12.a, 13.1-13.3, 13.a, 15.1-15.3, 15.5, 15.7, 15.b	CDP, 2017 Greenstoneplus, 2021
12	Competitive Industrial Performance (CIP) index	UNIDO	2003	All companies	No	• Manufacturing value added (MVA) per capita • Manufactured exports per capita • Industrialization intensity	9	Upadhyaya, 2013

#	Framework/index/standard	Developer/ Founder	Established Year	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	Reference
						• Export quality		
13	ISO 4040 standard	International Organization for Standardization (ISO)	2009	All companies	Yes	• Life Cycle Assessment	9	ISO, 2021
14	The International Integrated Reporting Council (IIRC)	Founder Robert Eccles and Mike Krzus	2010	All companies		Environment, Social and Governance	All	Izzo *et al*., 2020 Nicolo *et al*., 2020
15	ISO 26000 standard	International Organization for Standardization (ISO)	2010	All companies	Yes	Guidance on social responsibility	All	ISO, 2018 Zenchanka & Malchenka, 2018 Ikram *et al*., 2021
16	The Sustainability Accounting Standards Board (SASB)	Founder Jean Rogers	2012	Large companies	Yes	Environment, Social and Governance	All	SASB, 2017 Greenstoneplus, 2021
17	Green Industrial Performance (GIP) index	UNIDO	2014	All companies	No	• Capacity to produce and export green manufacturers • The role of green manufacturers • Social and environmental aspects of green manufacturers	9	Alba & Todorov, 2018, 2020a & 2020b

#	Framework/index/standard	Developer/ Founder	Established Year	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	Reference
18	SDG Industry Matrix: Industrial Manufacturing	United Nations Global Compact and KPMG	2016	All companies	No	• Opportunities for shared value • Good practice principles, standards and tools • Multi-stakeholder partnerships and collaborations	All	UNGC & KPMG, 2016 Muhmad & Muhamad, 2020
19	Task Force on Climate-related Financial Disclosures (TCFD)	Financial Stability Board (FSB)	2017	All companies	No	Environment and Governance	7,9,12,13	TCFD, 2020 Greenstoneplus, 2020
20	ISO 45001	International Organization for Standardization (ISO)	2018	All companies	Yes	Replaced BS OHSAS 18001 (The Occupational Health and Safety Assessment Specification) standard	3,5,8,9,10,11,16	ISO 45001/18001 - . (n.d.) Fonseca & Carvalho 2019 Zenchanka & Malchenka, 2018
21	SDG Impact Standards for Enterprises	UNDP	2020	All companies	No	Strategy, Management Approach, Transparency, and Governance	All	UNDP, 2020
22	SDG Impact Assessment Tool	Gothenburg Centre for Sustainable Development (GMV)	2020	All companies	No	Assessing the SDGs for direct and indirect impacts	All	GMV, 2020 Johnsson *et al*., 2020

Sustainability reporting is a significant driver and catalyst towards companies' sustainability (Lozano, 2015; Lozano *et al.*, 2016), it includes environmental and social aspects (Wang, 2017), and acts as an incentive to integrate the SDGs within the business model (Adams, 2017; Rosati & Faria, 2019a). In addition, sustainability reporting assists to understand, measure, communicate, and lead their efforts to the SDGs, fixing internal aims and leading the shift towards further sustainable development (GRI, 2020a).

Adding to that, sustainability reporting and its disclosures tools are the key external communication method with the stakeholders (Engert *et al*. 2016) to keep, gain, or improve the reputation of the company (Deegan, 2019), and to satisfy their stakeholders' requirements toward greater transparency on sustainability issues (Lozano, 2015). Furthermore, the information's presentation and transparency are the basic principles of the report quality (Boiral *et al.*, 2019). Corporate sustainability reporting is defined as "a robust incentive and strategic tool for a company to disclose their contribution practices to the SDGs, and assists in engaging the stakeholders, supporting the sustainable decisions making process on all levels, forming the business strategy, leading innovations, best performances, better value creation, and brings investments" (GRI & UNGC, 2017 & 2018).

A recent study by García-Sánchez *et al*. (2021) found that environmental performance plays a mediating factor in the positive relationship between environmental innovation and integrated environmental disclosure. Another study conducted by Gerged *et al*. (2021) in the Gulf Cooperation Council countries (GCC) region reported that corporate environmental disclosure is significantly and positively related to a company's

value. Thus, sustainability reporting is the disclosure of both the impacts and progress of the company's environmental, economic, and social aspects in the context of the SDGs.

The SDGs are significant drivers for sustainability in many fields, including industry sector and green economy (Martins *et al.*, 2020; García-Sánchez *et al.*, 2021). There are some factors that may probably affect the quality of the disclosure on SDGs, like the listing status, industry size and type, certification of corporate social responsibility (CSR), external confirmation of sustainability reporting (Tsalis *et al.*, 2020), environmental sensitivity, corporate governance, ownership structure, stakeholder pressure, environmental performance, board characteristics (García-Sánchez *et al.*, 2021), and board size and independence (Gerged *et al.*, 2021). The industry sector is considered a factor that can influence the reporting practices that companies adopt concerning the SDGs due to various characteristics of every industrial sector and its impacts volume on sustainability dimensions (Tsalis *et al.*, 2020).

Currently, many companies have started the investigation of SDGs (Gerged *et al.*, 2021), and there is an increased number of international companies which disclosed the performances of environmental and social aspects in their annual reports (Beier *et al.*, 2018). Empirically, it is reported that very few companies mentioned the SDGs in their reports (Schramade, 2017; Rosati & Faria, 2019b) and the high level of the reporting of SDGs found in the large companies (Siew, 2015; KPMG, 2015; Gerged, 2021). For instance, a study conducted by KPMG revealed that only 40% of the top world companies documented the SDGs in their annual reports, and, of these, 84%

identified the most relevant SDGs to their business (KPMG, 2018). Though the importance of the SDGs to the industrial sector, there are few studies about this subject and thus there is a need to study this sector in different countries and especially at the national scale (Martins *et al.*, 2020). The SDGs reporting is yet under investigation (Rosati & Faria, 2019a), and the existing SDGs monitoring and management at both national and global levels are still far from optimizing level, besides that there is a dearth of studies on the interactions and interlinkages among SDGs indicators for the industrial development and protection of the environment (Liu, 2020 & 2021). However, few companies know how to implement the SDGs in their practices and report their achievements (KPMG, 2017; Hummel & Szekely, 2021).

2.10 Sustainability Reporting and Materiality Matrix

In 2013, the GRI launched G4 guidelines, which presents a materiality matrix (see figure 2.8) for identification of the related topics between the company and their related stakeholders. Thus, the report should include concerned stakeholders who are either greatly influenced by the company or themselves influence the successful implementation of the company objectives and address related topics (GRI, 2013a).

The materiality matrix is the more utilized method to define materiality issues (Jones *et al.*, 2016; Ferrero-Ferrero *et al*., 2021), and the most important and complex among other standards (Torelli *et al*., 2020) at global level (Mio *et al*., 2020). The concept of materiality understood as a reporting threshold (GRI, 2013b & c) and main guideline to reduce the issue of low credibility

(Fasan & Mio, 2017). In describing materiality, the GRI clarifies that “the report should cover aspects that: reflect the organization’s significant economic, environmental and social impacts; or substantively influence the assessments and decisions of stakeholders” (GRI, 2016b). The materiality matrix can also be defined as "a typical tool to report on compliance and dissent of stakeholder and management views in sustainability and integrated reporting" (Beske *et al*., 2020).

Further, GRI G4 guidelines focus on a multi-stakeholder approach other than sustainability reporting standards, and it provides flexibility to report on the issues that are most significant to the company and its related stakeholders (Landrum & Ohsowski, 2018), and encourage the stakeholders' participation in the materiality analysis, further, companies can improve their liability to their stakeholders and create sustainability efforts greatly effective (Calabrese *et al*., 2019). In the views of Ortar there is still a need for research contribution to explore the area of materiality to expand the applications of this methodology (Ortar, 2020). For instance, one of the research issues concerning the definition of materiality is that there is no final definition of materiality in inferential sustainability research and at an institutional level (Jones *et al*., 2016). In addition, Ferrero-Ferrero *et al.* studied evidence that, materiality assessment still faces many constraints in sustainability reports (Ferrero-Ferrero *et al*., 2021).

A matrix is prepared according to the outline of the GRI guidelines as an analytical tool for identifying significant issues for sustainability reporting. The matrix in sustainability reports expresses in a scatter plot diagram form, and the dots symbolize the sustainability aspects. The matrix

plots in two axes; the vertical axis represents an assessment of the importance of any sustainability issue to stakeholders, and the horizontal axis represents the significance of that issue to the company. The origin point of the axes is (0,0), where the significance of the issue is at its lowest, i.e., it is of no importance for both the stakeholders and the reporting company. Axis continuity to the midpoint is an assessment of moderate significance for both stakeholders and the company. The utmost point in the matrix is the most significant in the right-hand corner because the issue assessed gets the highest rating from both stakeholders and the reporting company. Figure 2.10 illustrates the GRI materiality matrix.

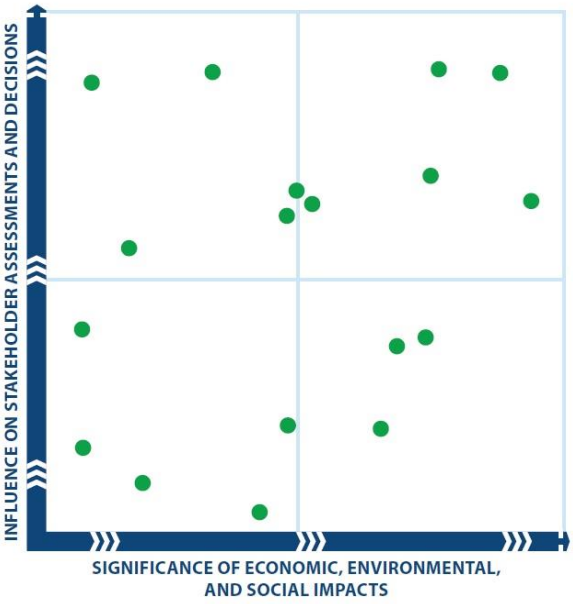


Fig. 2.10: The GRI materiality matrix (GRI, 2013b)

The materiality analysis process aims to identify and prioritize pertinent aspects and topics of the company, and the result of that process is a materiality matrix, which designates the company and stakeholder views of

the importance of related issues (Bellantuono *et al*., 2016). In the same notion, materiality analysis perceived as a methodical and strict process, which contributes to identifying important stakeholder-oriented measures of corporate sustainability (Calabrese *et al*., 2019). Thus, materiality analysis is essential to corporate sustainability because it provides the necessary integrated approach to setting sustainability strategies and preparing sustainability reports (Whitehead, 2017).

In this regard, some companies admitted having identified the significant sustainability issues related to stakeholders and reflected their views in formulating strategies and corporate reporting (Font *et al*., 2016). Remarkably, there is an increase in number of large companies seeking to adopt the materiality approach as an inseparable part of their sustainability reporting (Jones *et al*., 2016) and observing a transitional phase in sustainability reporting shifting from voluntary to more concrete (Ortar, 2020). Eventually, the credible materiality analysis process intends to overwhelm existing shortcomings in the authenticity and completeness of corporate sustainability reporting (Moroney & Trotman, 2016).

2.11 Conclusion

In the perspective of the SDGs, it is obligatory for the private sector to support the implementation procedures, considering the social, economic, and environmental aspects. Nevertheless, the effective and practicable partnership among public and private sectors is the approach to create valuable opportunities and tackle the challenges towards achieving the SDGs in the

assigned time, in order to succeed. Therefore, it becomes imperative that the private sector starts to modify their plans and develop strategies that could align with SDGs requirements. Indeed, the private sector has taken actions to advance SDGs *via* several voluntary initiatives that have already been implemented, such as CSR, circular economy, and other environmental voluntary initiatives on how this sector can provide its contribute to attaining the SDGs by 2030. Many researchers declare that the private sector holds powers to afford performing on the SDGs. Some recent studies uncovered that the companies that are CSR certified found their activities oriented towards SDGs. Other studies revealed that some companies themselves have initiated to understand their obligations and activities on their sustainability reporting.

Several challenges facing private sector for achieving SDGs, such as lack of influential leadership; lack of harmonious partnerships (effective and practicable partnership among public and private sectors); shortage of investments, the dearth of implementation; measurable indicators with effective data collection; the exhaustiveness and complexity of interlinkages among the goals and their targets; lack of monitoring, and evaluating methods for assessing the progress of implementation; and the indicator specifications and target monitoring need continuous improvement.

As a matter of fact, there is an urgent need for a reliable group of indicators to assist the private sector in monitoring the activities' impacts based on the environmental aspects related to the SDGs, in order to provide measurable data on the progress and the achievement of SDGs. Further, due to several essential challenges facing the SDGs implementation, e.g.,

monitoring, evaluating, and assessing the progress of implementation, the indicator specifications and target monitoring need continuous improvement. Hence, for gaining real and tangible results; the SDGs should be in line with the state's national strategies and plans. On the other hand, it is essential to understand the sequential connection among the SDGs, which will assist in specifying the prerequisite goal before planning to implement any other goal because some goals cannot be attained before the achievement of their prerequisite goal.

The private sector consists of a wide diversity of fields and complex activities. Therefore, the 17 SDGs are related all companies, but unevenly related to private sector. Importantly, companies are supposed to direct their attention towards SDGs, which are related to their significant economic, social, and environmental aspects, and include them in their plans, strategies, and the management. Moreover, the private sector is required to adopt a wider holistic method for sustainable economic growth without affecting the society and environment, such as circular economy. This field needs further research for the development of effective frameworks that clarify how to integrate the role of the private sector with the SDGs in a manner that could facilitate feasible, practical, and efficient implementation. Moreover, quantitative studies need to be conducted that analyze the benefits of the implementation to reach the targeted SDGs, to tackle the sustainability challenges in this sector in future.

It is, further, recommended to improve the reporting process and include the SDGs indicators as a benchmark for measuring the progress, facilitating data collection and monitoring, and strengthening the cooperation

and coordination among the public and private sectors. Besides that, update and reformulate efficient regulations in line with SDGs requirements.

Chapter Three

RESEARCH METHODOLOGY

3.1 Introduction

This chapter aims to discuss the methodology adopted to achieve the study objectives as outlined in Chapter One and the strategy and tools employed for data collection and data analysis methods. The research approach is based on a comprehensive review of pertinent literature and the structured interview questionnaire. The study utilized a triangulated methodology for qualitative and quantitative data collection tools. Triangulation is a method that assists in data validation; used in quantitative and qualitative studies; used to increase the credibility and validity of research findings; assists to overcome the primary biases originating from the employment of a single method; assists to explain the study findings with confidence; and enriches the research through datasets to discuss different aspects of the research area (Heesen *et al*., 2019; Noble & Heale 2019). This concept -triangulation- combines qualitative methods or articulates both quantitative and qualitative methods (Abdalla *et al*., 2018), and it is a research approach for entire scientific field (Nielsen *et al*., 2020). Further, Dzwigol (2020) reported that triangulation is an approach of great importance because it provides simultaneous access to various data sources, theories, methods, and experts' opinions and views.

The structured interview questionnaire was utilized as tool to obtain the primary data from the target population of this study, which covered Bahrain's

large industrial sector, including power generation, water, gas and oil refinery, steel and aluminum, chemicals and petrochemicals, plastics, and food, etc. The list of industries in Bahrain was taken from the official website of the Ministry of Industry and Commerce. The study focused on the large companies because they are considered the economic base of the country; their direct and indirect impact on a wide range of social, economic, and environmental issues because of their size of production plants; they more responsive to national policy measures than their small and medium counterparts, and the novelty of the research subject.

3.2 Conceptual framework

The industrial sector's lack of interest or orientation to include the environmental dimension in its strategies and policies - particularly in the absence of an integrated corporate plan or strategy - can be considered a substantial cause for deepening multiple complexities of tackling environmental issues needing joint-coordinated genuine efforts and actions at national level. In addition, the lack of awareness about the importance of the environmental dimension leads to low compliance or no commitment to the regulations that cause violations.

Further, the ineffective enforcement and weakness of the environmental regulations lead to difficulty in controlling the industrial impacts on the environment and human health. Besides that, some environmental impacts may appear late due to its nature which is another issue of concern that needs to be study studied.

Thus, the national drivers for industrial development (Figure 3.1) require continuous assessment based on national strategy and legal tools and to be improved as per national and global changes and in case of emerging issues. The manufacturing industrial sector contributes 14.5% of total Gross Domestic Product (GDP), and other industrial services 18.7%, while oil sector alone is 20.8%, where Bahrain's annual economic growth is 5% on average[1]. Bahrain is seeking to triple the GDP contribution of the industrial sector; therefore, the industrial areas increased from eight to eleven.

The large enterprises acquire 40% of the total workforce[2]. Further, one of Bahrain's Economic Vision 2030[3] strategic priorities is to "achieve sustainable quality growth", which enunciates "placing the private sector at the forefront of driving development through policies that foster entrepreneurship, growth and innovation." Besides that, the primary aim of the newest industrial strategy (2022-2026) is to transform this sector to step inside the Fourth Industrial Revolution by promoting the circular economy and carbon, environmental and social governance, investments in technological infrastructures and digitising manufacturing.

Another important driver is the global demands, changes, and pressures, which include the opportunities, threats and competitiveness of the global markets and novelty of industrial marketing strategies; increasing industrial globalization - that noticed clearly during the COVID-19 pandemic -;

[1] https://www.mia.gov.bh/kingdom-of-bahrain/business-and-economy/?lang=en accessed on 25 December 2021.
[2] https://lmra.bh/portal/en/page/show/89#2 accessed on 25 December 2021.
[3] National Development: Bahrain Vision 2030 | Invest in Bahrain (bahrainedb.com) accessed on 15 October 2021.

innovation and evolution of products and technologies; and emerging issues and obligations of the environmental treaties and conventions that are related to the entire business sector.

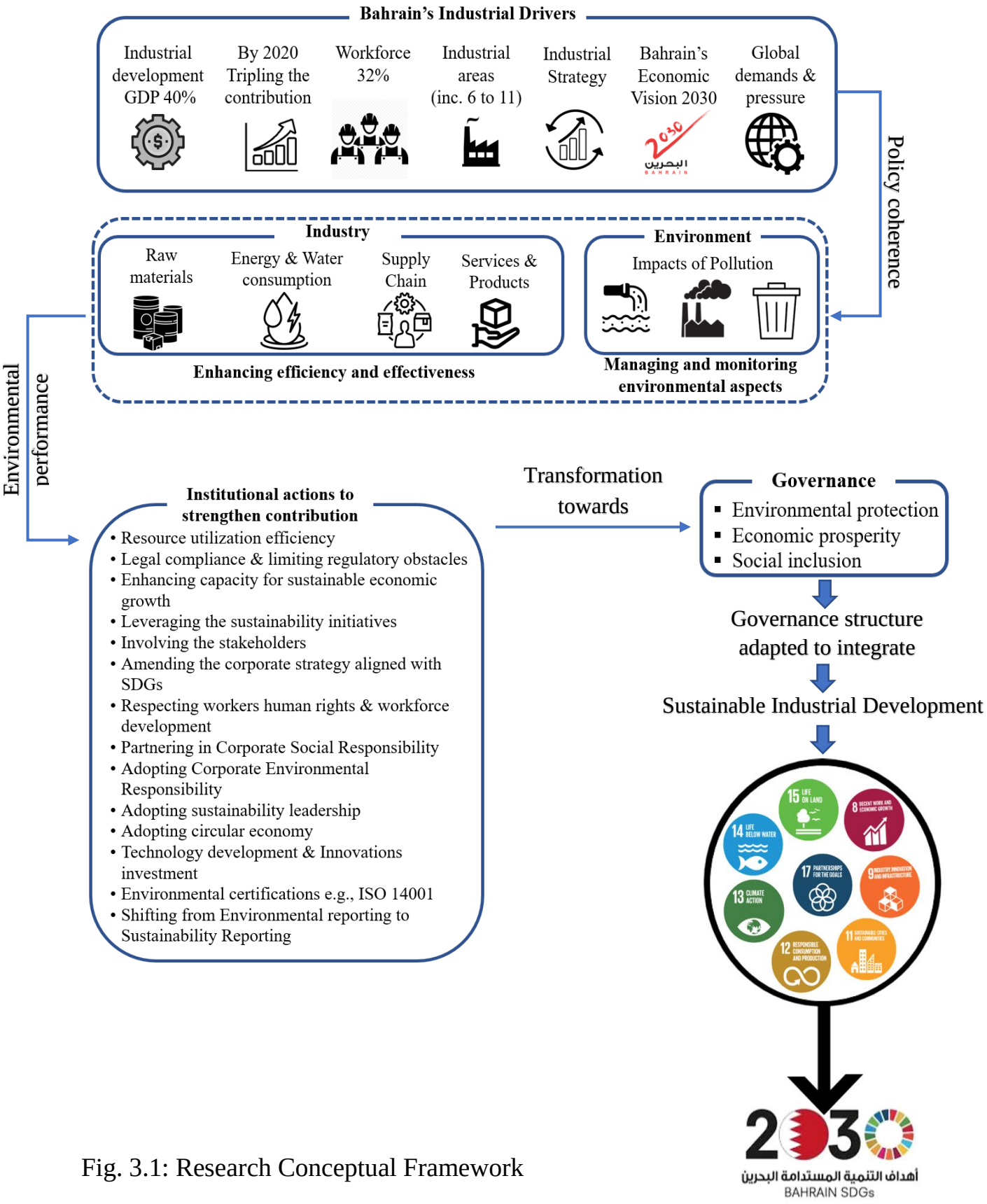


Fig. 3.1: Research Conceptual Framework

Policy coherence is essential due to the interconnection nature of the SDGs; the policy actions should be for one of the SDGs so that the progress is reflected on other SDGs while ensuring that progress is consistent among all goals. Further, policy coherence assists policymakers in better understanding of how their policy actions impact the future progress of sustainable development locally and globally because the challenge faced them is how to formulate coherent and integrated industrial policies that lead to achieving SDGs and how to maintain the pace of industrial development without putting more burdens on the environment and human health; therefore, sustaining economic growth by cutting off negative environmental impacts throughout the economy lifecycle.

Thus, strengthening the national environmental legal tools is a fundamental indispensable step for building a robust policy coherence that advances sustainable industrialization by controlling and managing the negative environmental footprints and enhancing social inclusion. It is common or normal to see that the policy coherence supports the government's plan to prioritize the sustainability implementation requirements and stimulates industrial efforts to ensure effective enforcement of the legislation, and that will encourage this sector to enhance their environmental performance.

If the environmental performance level is raised, industries will be capable and willing to adopt more institutional actions (Fig. 3.1) to strengthen their contribution toward sustainability. That meant both robust policy coherence and high environmental performance lead to sustainability. Thus,

environmental performance is significantly associated with sustainability. Therefore, that will facilitate the transformation towards adopting the SDGs. Sustainable development (SD) covers three pillars: environment, social and economic. Hence, to achieve SD, there is a need to balance the three pillars, while the industrial sector is paying more interest to the economic pillar at the expense of the other two pillars. Figure 3.1 shows that governance covers the sustainable development pillars; in sum, governance and sustainability are two sides of one coin. Development and economic growth are necessary for maintaining the balance of sustainability pillars; thus, they should be adoption of governance to enhance sustainable industrial development through SDGs implementation.

In summary, Figure 3.1 illustrates that multifarious vital national industrial sector drivers -the industrial sector base- and robust policy coherence will drive toward adopting sustainable development (governance) and then attaining sustainable industrial development based on the SDGs requirement. Where environmental performance is the key because the notion of sustainable industrial development aims to ensure continuous improvement in all environmental and economic aspects of the company. Thus, there is a need to establish and adopt an industrial policy coherence based on sustainable development pillars, especially the policy of sustainable industrial development toward implementing the SDGs in the national context.

3.3 Research design

In this study, the descriptive and exploratory research methods were employed by using a structured interview and questionnaire to obtain the primary data from the target population to formulate rational and sound conclusions and recommendations. Furthermore, due to the flexibility advantage of the descriptive method it is employed in qualitative and quantitative approaches. This methodology is useful and permits deep understanding of various processes and issues include gaining environmental and socio-economic information; understanding knowledge, views, values, or decision-making procedures of stakeholders; besides that, it strengthens research design and results (Young *et al*., 2018). The study utilized both structured interview and questionnaires (primary data) and published literature (secondary data) to combine the advantages of quantitative and qualitative approaches to overcome the research limitations.

The research design consists of four phases as following:

Phase 1 is the research base and built on a scoping literature review of the most pertinent existing literature such as scientific research journal articles and other publications (e.g., national, and international reports) published in the field of SDGs and the private sector that provides comprehensive implications about this subject. Further, to study and evaluate the current status of sustainability and SDGs in this sector to indicate the gaps highlighted and emphasized in that literature.

Afterwards, phase 2 involved a content analysis of national environmental legal tools (law, legislations, and standards) that address the environmental dimension. The content analysis was conducted on a coherent list of 17 legal tools consists of Environmental Law and 16 Ministerial Orders concerning various environmental issues and assess their compatibility with the sustainability and SDGs.

In phase 3, the sustainability reports published by the industrial companies were analyzed, to evaluate the current status of SDGs implementation and their sustainability performance.

The last phase (4) concerns the analysis of the conducted structural interview and questionnaire which is important to extract the required primary information and data. This phase consumed long time because the arrangements for interviews faced some difficulties due to COVID-19 pandemic precautions around the country. Table 3.1 Summaries the data and information collection methods.

Table (3.1): Data and information collection methods utilize within this thesis

#	Research objectives	Data and information collection, and research methods
1	To study the applicability, viability, and suitability of specific SDGs (Goals 8, 9, 11, 12, 13, 14, 15 &17) for the private industrial sector in Bahrain.	• Literature review • Structural interview and questionnaire
2	To study the implementation of those SDGs by the private sector in Bahrain in terms of the influence &	• Literature review

	impact of this sector on the environment directly or indirectly.	• Structural interview and questionnaire
3	To determine the range of implementation of those SDGs in the private industrial sector in Bahrain.	• Literature review • Content analysis
4	To review the existing environmental legislation and regulations related to the private industrial sector in terms of their compatibility with SDGs requirements.	• Literature review • Scoping review • Scoping qualitative analysis
5	To study the benefits of implementing SDGs practices by the private industrial sector on Bahrain's environment at large.	• Literature review • Structural interview and questionnaire
6	To identify the obstacles and challenges for the implementation of SDGs practices in the private industrial sector in Bahrain.	• Structural interview and questionnaire outcomes
7	To improve the ranking of Bahrain in global SDGs index ranking (specifically SDGs 8,9,11,12,13,14,15 and 17).	• Conclusion from the literature review and structural interview and questionnaire outcomes
8	To establish an applicable framework for the implementation of SDGs by the private industrial sector in Bahrain.	• Conclusion from the literature review and structural interview and questionnaire outcomes

3.3.1 Literature reviews

Scoping literature review is selected to answer the research key questions due to its reliable and accurate contribution to the compilation of the current academic yields of literature (Chalkiadaki, 2018; van Laar *et al*., 2017). The initial step was extracting appropriate literature related to SDGs and the private sector. Therefore, the searching process was grounded on the sources that have two keywords, namely the sustainable development goals and the private sector and their synonyms for ensuring the relevance of those sources for this study. Further, to increase the study's robustness, all types of articles (i.e., empirical, conceptual, case studies, results, and analyses) that are scrutinized should contain "SDGs" and "private sector" words or terms in their titles, abstracts, and keywords or synonyms (i.e., SDG, SDGs, Sustainable Development Goal(s), Global Agenda, 2030 Agenda, and Sustainable Development and 2030 Agenda), and (i.e., firm, industry, corporate, company, factory, and enterprise).

As a result, a comprehensive and elaborated analysis were carried out for the selected literature. It is essential to underline that, in the available published literature, there are a few studies and research that particularly investigate the current industrial sector roles and practices which contribute to or impede the progress toward SDGs attainment and the existing literature review highlighted importance evidence of the study. In this regard, Bhanot *et al*. (2015) suggested that the main reason for the lack of sustainability concept awareness in the manufacturing sector is the limited sustainability literature. Figure 3.2 illustrates literature review methodology procedures.

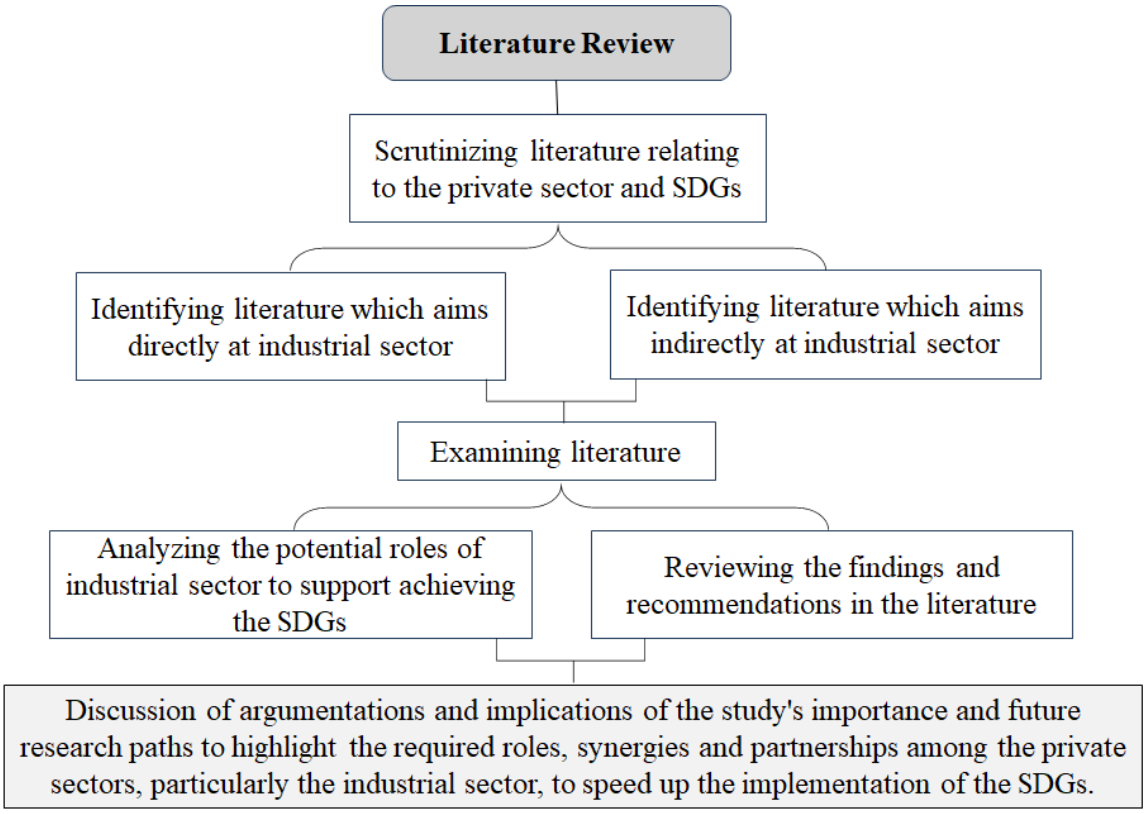


Fig. 3.2: The literature review methodology procedures (author's own depiction)

Subsequently, a comprehensive list of published documents, science books, research papers, statistics datasets, government reports, companies' reports, science journals, specialized internet sites, disclosure standards, and literature has been scrutinized, which are relevant to the concept, principles, and components of SDGs, besides that, various models of the SDGs frameworks, particularly that related to the industrial sectors. In this context van Laar *et al*. (2017) stated that "a review must cover all of the scientific literature in a field that is defined by the author, while a theoretical analysis only includes references to those works that are necessary for the analysis." The purpose of the literature review is to develop a sufficient level of understanding on the research subject, to:

- determine the applicability, viability, and suitability of SDGs for the industrial sector in Bahrain.
- identify and assess any differences that might exist among industrial sector in their ability to implement an SDGs.
- detect obstacles, benefits, and challenges for the implementation of SDGs practices.
- apply the gained knowledge to establish an SDGs framework towards high performance.

All the pertinent issues to this study that are elaborated on and discussed in this thesis are based on an intensive search for up-to-date information and data in the international search engines through the internet. Additionally, some authors, and specialized international organizations (e.g., United Nations and its affiliated organizations) were contacted via e-mail to get their studies documents. The study set the year 2015 as a base year for published research sources and due to the limited studies in Bahrain about this subject, some references and documents published before 2015 were used. The literature research result revealed that there are no studies or research concerning SDGs in the large industrial sector in Bahrain.

3.3.2 Analysis of Bahrain's Environmental Legal Tools

Studies regarding the integration of environmental policies principally examine the efficiency of different methods in implementing integrated approaches (Le Blanc, 2015; Tosun & Lang, 2017; Stevens, 2018). The current study uses a scoping review by employing the key concepts in the UN's formal documents on the SDGs to identify the synergies, gaps, the

extent of appropriateness and consistency between environmental legal tools and the SDGs, and how environmental legal tools are utilized and addressed by the government to facilitate the possibility of attaining the SDGs. Scoping studies adopt a basic approach for conceptual mapping within a research field of practice-based studies and evidence (ElAlfy *et al*., 2020), and they are more flexible than meta-analysis and the traditional systematic review.

Usually, the results of this approach are narrative, with little statistical data and more tables of information. This methodology is appropriate for research in practice, education, and policy (Peterson *et al*., 2017). Further, Munn *et al*. (2018) maintained that this approach is adequate when systematic reviews are unable to achieve the fundamental aims or knowledge requirements. According to Piñeiro *et al*. (2020), a scoping review analyses all existing literature reviews on a particular topic to provide recommendations for improving policy or practice and identify the aspects of that which have not been addressed. In addition, this methodology minimizes author bias.

Therefore, this approach was employed to study the environmental legal tools in Bahrain. Data on Bahrain's environmental legal tools were collected primarily by searching the Legislation and Legal Opinion Commission [4] database, and the keywords were 'environment', 'air', 'water', 'waste', 'chemicals', and 'environmental work'. The search was repeated for all

[4] The Legislation and Legal Opinion Commission is an independent judicial body established in 1970 and has since gone through several stages of development, leading to its complete independence from the executive authority and the strengthening of its judicial function. The authority has three main competencies since its inception until now: providing legal opinion, preparing, and drafting of the legislation, and the reviewing of contracts, which are the competencies stipulated in the Constitution of the Kingdom of Bahrain.

possible results to ensure that all the required environmental legal tools were obtained. The search results, as per the keywords, are as follows: environment – 213, water – 214, waste – 11, chemicals – 22, air – 5, and environmental work – 10, which contain various subjects of legal tools in different fields.

The outcome of the screening process was a list of 17 environmental legal tools to be utilized in the assessment and analysis process in this study. The collected environmental legal tools were divided into five categories, except the general environmental law: environmental impact assessment, air and water, chemicals management, waste management, and work. A scoping qualitative analysis was conducted for assessing the interlinkage and alignment between the existing environmental legal tools and the SDGs by examining the content addressed by each legal tool and identifying its related goals and policy gaps.

3.3.2.1 Reviewing the Existing Environmental Regulations and their Appropriateness Concerning the National and International Environmental Changes

The periodic reviewing of environmental regulations, whenever needed, is a fundamental approach to ensure their efficiency and robustness and verify that all environmental issues are under control and up to date at the local, regional, and global level. In this regard, Saner *et al*. (2019) proposed that international environmental conventions can be utilized to support and enhance the SDGs' implementation and provide countries with needful amendments to their national environmental laws. In line with this notion,

Almannaei *et al*., (2020) suggested that one of the methods for revising environmental policymaking to resolve environmental matters and assure sustainability is to address where national laws and policies intersect with international conventions and treaties; thus, global governance must take that into account when designing environmental laws and policies. Furthermore, Takeuchi *et al*. (2017) indicated that policymakers can gain many benefits through the points of agreement and difference between multilateral environmental agreements and reliance on the existing legal tools for efficient implementation. In addition, Renda (2017) pointed out that future regulations should be better, depending on several additional actions and commitments to the SDGs. Further, Georgeson & Maslin (2018) stated that governments along with stakeholders and companies should shift essentially in stance towards development via adjusting their actions with respect to the SDGs.

3.3.2.2 Assessing the consistency of the existing environmental regulations with the Sustainable Development Goals' requirements

The 2030 Agenda for sustainable development calls all actors from all levels to show commitment to policy coherence and create an appropriate environment for sustainable development (UNGA, 2015). The concept of policy coherence is not a creation of the SDGs, but it is an outcome of the discussions between academics and practitioners over the last three decades (Tosun & Leininger, 2017) and was first used by OECD in 1991 (Tosun & Lang, 2017). The lack of coherence within the SDGs' framework poses a significant challenge in their implementation (Kim, 2016). Therefore, there is

a need to harmonize the nexus among the national environmental legal tools and the SDGs; accordingly, the countries should revise and amend their legal tools to adopt sustainable development as an overarching aim.

One of the main tasks in analyzing and assessing the environmental laws, regulations, and policies is to find the gaps and inadequacies in the development programmes, strategies, and plans to facilitate and strengthen the legislations implementation and to solve the enforcement barriers pertaining to the regulations for achieving a sound and comprehensive environmental management. Furthermore, Amin-Salem *et al*. (2018) maintained that the role of assessments is to identify the significant issues that policymakers should focus on, and not to identify the policies, to achieve the SDGs. However, the policymakers still face the challenge of translating the 2030 agenda into workable development plans and policies (El-Maghrabi *et al*., 2018). Notably, the legal tool EIA, when carried out correctly and jointly within the set of environmental legal tools, policies, and programmes, may contribute to some extent in supporting the environment rights granted in the Constitution (Roos *et al*., 2020).

3.3.3 Analysis of Sustainability Reports

This study aims to verify the level of SDGs implementation in the large industries in Bahrain based on the disclosure documents published on their websites. The methodology used to achieve this objective is based on analysis of annual and sustainability reports of the large industrial sector published between 2016 and 2020. The large industrial sector was selected because it is

the major emitter of the various pollutants (the major source of pollution) that create continuous pressures and impacts on the environment. Those pressures and impacts have magnified the significant need for the adoption of sustainability reports to enhance the capability of this sector to comply with the national environmental regulations and benefit from the implementation of SDGs. These reports were used for data and information collection as the annual reports are the most informative, public documents that companies publish on their websites. In addition, there is a positive indication towards the adoption of sustainability reports among this sector.

According to the Voluntary National Review (VNR) of the Kingdom of Bahrain on the 2030 Agenda for Sustainable Development, one of the challenges is how Bahrain maintains sustainable economic growth to provide an attractive environment for investment and better and diverse employment opportunities for citizens. Besides that, the new industrial policy in Bahrain concentrates on creating a profitable and environment friendly sector that creates better economic prosperity and more jobs. Also, Bahrain is well-positioned to focus on manufacturing opportunities that will benefit its economy and make maximum productive use of the scarce land, water, and energy resources, while maintaining its high standards in environmental protection. In this regard, the 2030 Agenda stated that the industrial sector considers one of the main stakeholders in achieving SDGs because it is the driver of economic growth. Therefore, there is a need to integrate the SDGs in the industrial sector policies to address the environmental problems resulting from this sector to achieve better environmental performance towards attaining sustainable industrial development. To do so, environmental reporting (e.g., GRI) is an efficient tool to measure the environmental

commitments and performance of this sector. Figure 3.3 depicts the current research methodology.

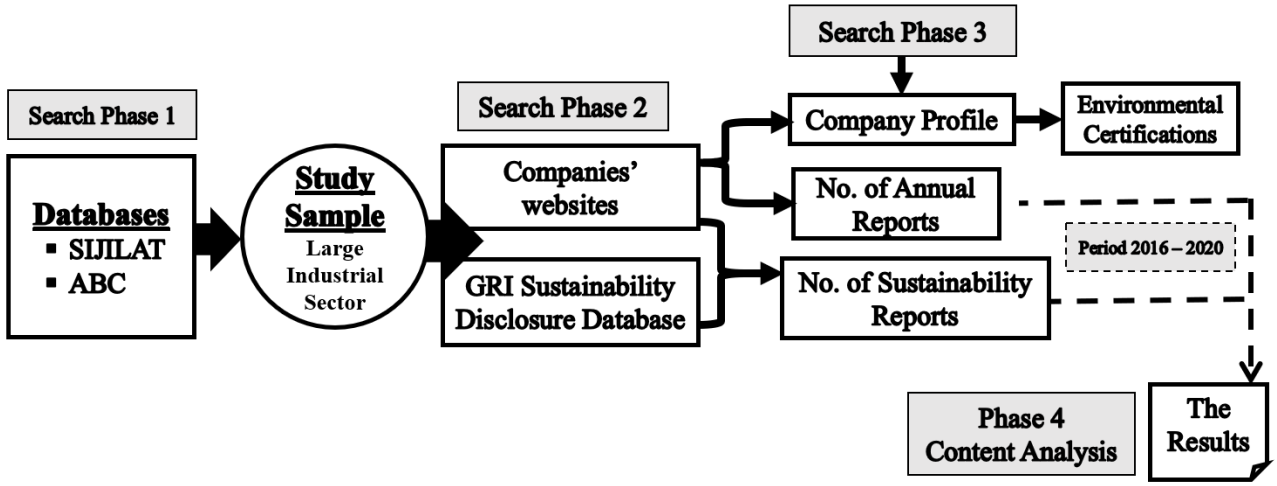


Fig. 3.3: A depiction of the study research methodology

3.3.3.1 Content analysis of annual and sustainability reports

The content analysis method employed is a type of textual analysis (Landrum & Ohsowski, 2018), and it is a combination of qualitative and quantitative research approaches (Bengtsson, 2016). This methodology is usually employed in studying CSR and sustainability reports (Dobbs & Van Staden, 2016; Lock &Seele, 2016) to gain insights into the sustainable manufacturing field (Moldavska & Welo, 2017). The study employed this method to assess the disclosed SDGs and the level of understanding of the SDG requirements. For this purpose, 13 reporting analysis parameters (Table 3.4) were obtained from the recommendations on SDG reporting provided by GRI, UN Global Compact, and the literature. The quantitative content analysis method was then applied to identify the frequency of concepts, such as words

or phrases, within the text. The study specified six keywords to be use in search queries on the annual and sustainability reports (Table 3.2).

Table (3.2): Units (keywords) of the content analysis.

Documents of Analysis	SDGs	Units of Analysis
Annual Reports Sustainability Reports	8, 9, 11, 12, 13, 14, 15, and 17	"SDG", "SDGs", "global goal", "sustainable", "sustainability", and "development"

At the end of the selection process, only 11 sustainability reports from 3 companies were obtained, as depicted in Table 3.3.

Table (3.3): The number of sustainability reports published by year.

Year	2016	2017	2018	2019	2020	Total
No. of reports	2	2	2	3	2	11

Table (3.4): Analysis parameters for evaluation the sustainability reports.

Analysis parameters	Gulf Petrochemical Industries Company (GPIC)					Aluminium Bahrain (ALBA)					Bahrain Petroleum Company (BAPCO)				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Does the CEO's statement show a reference to the SDGs?															
Does the report present brief information about the SDGs?															
Does the report provide a reference relating the SDGs to the company?															
Does the report rank the SDGs as per priority?															
Does the report refer to stakeholders?															
Does the report mention the method/tool utilized for disclosure of the SDGs?															
Does the report present the materiality assessment?															
Does the report link the company's environmental, economic, and social aspects with the SDGs?															
Does the report state that the company's KPIs are based on the SDGs?															
Does the report refer to the inclusion of sustainable development goals in the company's strategy/plan?															
Does the report provide the outcomes/benefits of the implemented SDGs?															
Does the report mention the current projects/actions for achieving the SDGs?															
Does the report mention the future projects/actions for achieving the SDGs?															

3.3.4 Research structural interview and questionnaire

The structured interview is an efficient method, and it has many advantages include it limits the researcher's subjectivity and bias, controlling the interview topics, and participants' responses comparable (Doody & Noonan, 2013). A well-designed questionnaire has many merits including it is relatively economical, studying a large population, easy to contact the targeting population across a broad geographical area, respondents can complete the questions at their convenient time, (Patel & Joseph, 2016), and an essential tool to collect meaningful responses, and quantifiable data efficiently (Bee & Murdoch-Eaton, 2016). Therefore, the structural interview and questionnaire were employed, which is the appropriate tool for gathering primary data and information (Annex 1) towards understanding the research subject in-depth and attaining the study objectives. In this logic, the target population of a large industrial sector is significant in its scope because the analyses of qualitative and quantitative rely on interpretation and integration.

The collected data and information through the structural interview and questionnaire aimed to conduct a qualitative analysis through studying and understanding the existing situation of sustainability implementation in the companies, how they understand and adopt sustainability practices and if their existing practices contribute to the attainment of the SDGs, are they implement or plan to implement the SDGs, and if the SDGs represent an opportunity for this sector to achieve their future investments. As well as the benefits they will gain from SDGs implementation and localize it at national level.

3.3.4.1 Study population

The population of this study is the large industries/companies operating in the Kingdom of Bahrain, which are registered under the Ministry of Industry and Commerce database (Business Licensing System (SIJILAT)), and no conditions on the area, location, industrial activity, or product type were assigned. In addition, the open database of the Arabian Business Community (ABC) Bahrain and the companies' websites were used to collect the required information. The total number of large industries operating in the country was 170 companies, which was the study sample size.

3.3.4.2 Procedures of the structural interview and Questionnaire

Yeong *et al*. (2018) mentioned that "the instruments used for the interview process should pass the reliability and validity tests before being considered as a reliable tool". So, to test the reliability and validity of the structural interview and questionnaire were subjected to the testing pilot on five interviewees' respondents (industry professionals); those respondents and their answers were not a part of the actual study. They were asked for any recommendations and required modifications to ensure further improvement and validity of the designed structural interview and questionnaire. Further, the five reviewed the structural interview and questionnaire questions were analyzed separately to study their feedback and comments.

Consequently, the structural interview and questionnaire questions were revised and modified based on the respondents' and reviewers' recommendations. Further, two academic professors reviewed the structural interview and questionnaire questions and provided the feedback and comments and consequently the irrelevant questions were eliminated, and vague and ambiguous words were altered by rewording or rewriting statements to ensure comprehension, clarity, answerability, simplicity, and accuracy.

Figure 3.4 illustrates the adopted procedures of the structured interview and questionnaire, where each step was repeatedly reviewed and amended according to the feedback and recommendations from the reviewers and the trial version. Then, the revised structural interview and questionnaire version has been reviewed again as a final step to guarantee that the questions are comprehensive enough to suit the entire study population; the neutrality and consistency of the interview; and obtain unbiases and quality information and data; and avoid deviating from research objectives during the interview process and enhance the interview accuracy. In this regard Perneger *et al*. (2015) stated that "the main purpose of the pre-test is to verify that the target audience understands the questions and proposed response options as intended by the researcher; and is indeed able to answer meaningfully." The interviews provide scholars with valued and detailed qualitative data to comprehend the interviewees' experiences (Castillo-Montoya, 2016). Furthermore, the interviews and preliminary outcomes were discussed first-hand with the Supervisor and peer Supervisor, and they advised, guided, and assisted me in critically reflecting on the results; this led to lessening the internal subjectivity issues.

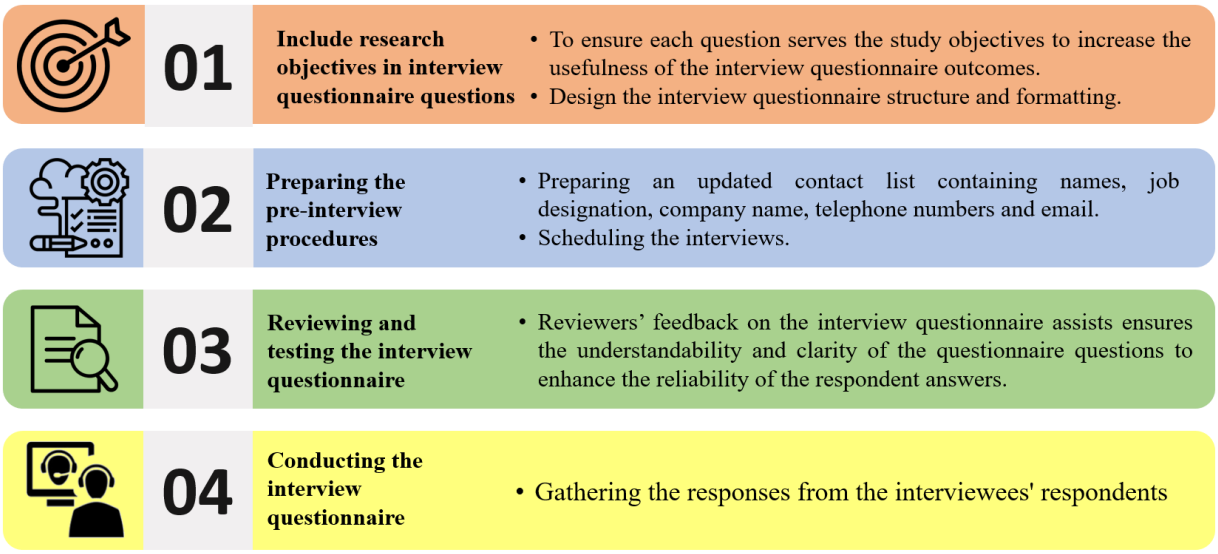


Fig. 3.4: Adoption procedures of the structural interview and questionnaire

3.3.4.3 Structure of the Interview and Questionnaire

The benefits of the standardized structural interview and questionnaire are qualified for a scoping comparison among each respondent's responses, results interpretation and lessening the subjectivity issues. The structural interview and questionnaire consist of five sections containing thirteen main questions and twenty-six sub-questions. Section one aimed to collect general information about an interviewed person: the company name, the job title and qualification of the person interviewed, and the contacts (email and telephone). Section two is about the company's environmental status, and the interviewee was asked a list of questions concerning the current environmental situation in the company. Section three is about environmental sustainability reporting, and the interviewee was asked a list of questions regarding sustainable development and some main environmental aspects, that the companies reported. Section four focuses on the sustainability and

sustainable practices, where the interviewee was asked a list of questions regarding the actions, initiatives, and practices that had been adopted and implemented at the company and asked to specify the factors which assist the progress of the practices. Section five is about sustainable development goals (SDGs) status interviewee was asked a list of questions to evaluate the status of SDGs in the company, and asked questions to evaluate the interviewed knowledge about the SDGs. This section is the core section of the interview, which aims to extract new information about SDGs. In sum, most of the survey questions are yes/no-type questions, followed by open-ended questions and close-ended questions (as shown in Figure 3.5). Further, Figure 3.6 shows the scheme for answering the structural interview and questionnaire.

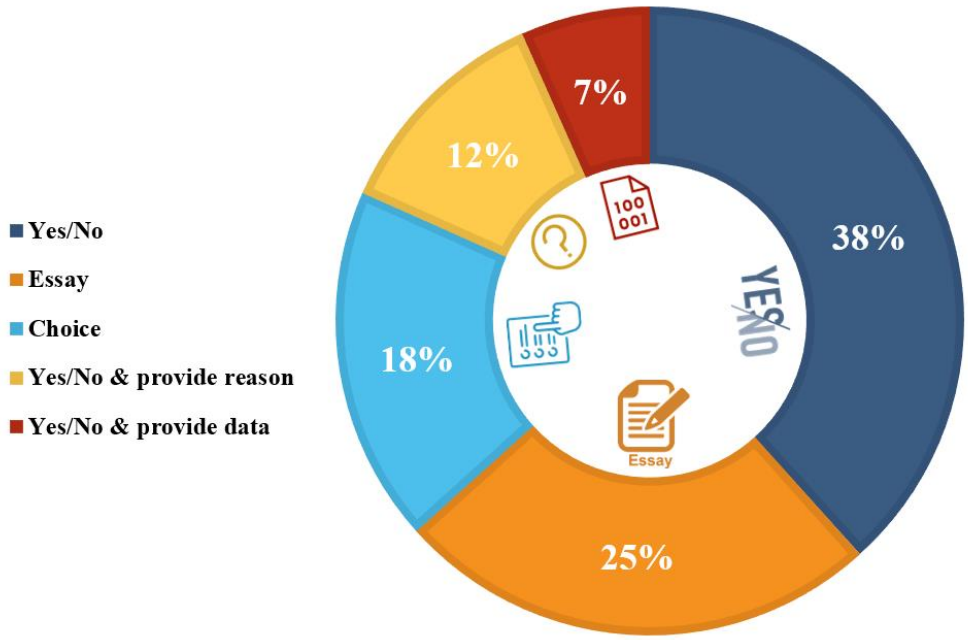


Fig. 3.5: Types and percentile of questionnaire questions

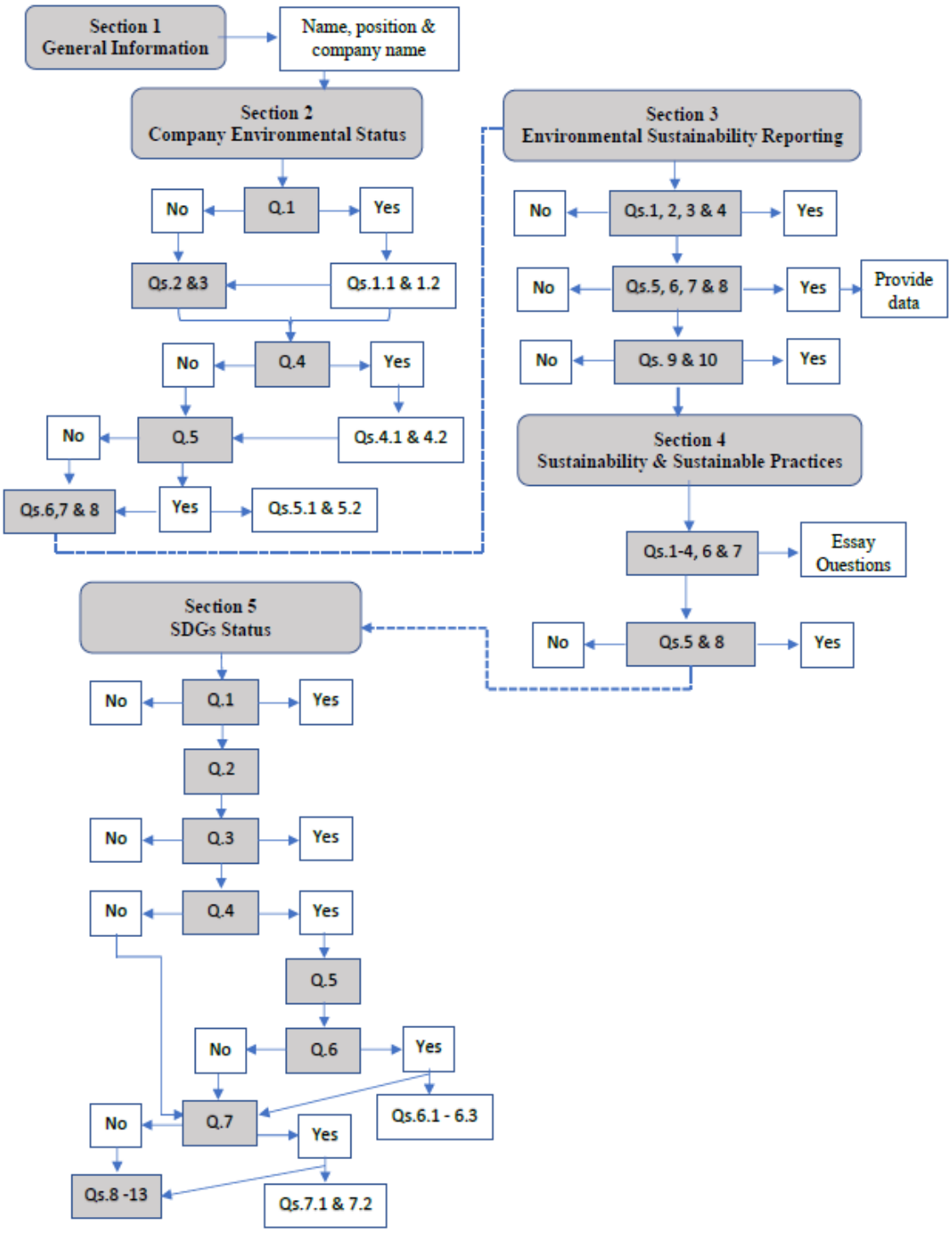


Fig. 3.6: The structural interview and questionnaire answering scheme

3.3.4.4 Interview preparation procedures

Cover letter (Annex 2) was emailed individually to each company in the selected list requesting participation in the study and to fix an appointment for an interview with the concerned professional at Environmental Departments (preferable) or any staff assigned by the company. The letter highlighted that confidentiality is highly protected and the company name will not be mentioned in the study and explained the purpose and importance of the study and its potential benefit to the large industrial sector in Bahrain concerning SDGs. Organizationally, each interview and questionnaire form has been placed coded to facilitate communication and follow-up with the interviewees until received after the interview and to communicate with them in case of any further clarification about their answers.

When the company responds by accepting participation in the study and appointing a person to do the task, the appointed person was contacted by phone and e-mail to arrange the interview appointment and give him an overview of the study aims and how to fill out the questions during the interview.

3.3.4.5 Confidentiality, trust, and voluntary participation

The interviewees were assured of the confidentiality of the interview and questionnaire, and only the responses would be studied and analyzed; to reassure them to answer the questions and express their ideas and experiences freely because they have valued experiences that do not unravel without

reassuring. In return, they promised not to use the original questionnaires publicly available on the websites or any other media for whatever reason and maintain their confidentiality.

Moreover, the interviewees' privacy was esteemed, and they were given absolute freedom for feel confident to answer every question as per their opinions, insights, and experience, and their answers were accepted without interference or modification. Similarly, the companies that refused to participate in this study were not pressured, and their decision was respected.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1 Introduction

Part one: Bahrain's environmental legal tools assessment

4.1.1 Background

The 2030 Agenda for sustainable development calls all actors from all levels to show commitment to policy coherence and create an appropriate environment for sustainable development (UNGA, 2015). The concept of policy coherence is not a creation of the SDGs, but it is an outcome of the discussions between academics and practitioners over the last three decades (Tosun & Leininger, 2017) and was first used by OECD in 1991 (Tosun & Lang, 2017). The lack of coherence within the SDGs' framework poses a significant challenge in their implementation (Kim, 2016). Therefore, there is a need to harmonize the nexus among the national environmental legal tools and the SDGs; accordingly, the countries should revise and amend their legal tools to adopt sustainable development as an overarching aim.

4.1.2 Assessing the consistency of the existing environmental regulations with the Sustainable Development Goals' requirements

One of the main tasks in analyzing and assessing the environmental laws, regulations, and policies is to find the gaps and inadequacies in the development programmes, strategies, and plans to facilitate and strengthen the legislations implementation and to solve the enforcement barriers pertaining to the regulations for achieving a sound and comprehensive environmental management. Furthermore, Amin-Salem *et al*. (2018) maintained that the role of assessments is to identify the significant issues that policymakers should focus on, and not to identify the policies, to achieve the SDGs. However, the policymakers still face the challenge of translating the 2030 agenda into workable development plans and policies (El-Maghrabi *et al*., 2018). Notably, the legal tool EIA, when carried out correctly and jointly within the set of environmental legal tools, policies, and programmes, may contribute to some extent in supporting the environment rights granted in the Constitution (Roos *et al*., 2020).

The following tables depict the existing set of environmental legal tools and a brief description of them, in addition to identifying the issues related to the SDGs and sorting the SDGs associated with each legal tool. The tables show some interesting results, which indicate that almost all main SDGs themes are generally reflected in the existing legal tools and that there are also parallels between most of the environmental legal tools' objectives and SDGs and their targets.

Table (4.1): Air and water Legislations and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to the SDGs	Relation to the SDGs	Notes
1	Ministerial Order No. 10 of 1999 is concerning the environmental standards (air and water) and their amendments	Lists the national environmental standards of air and water quality and outlines their regulations	Comprehensive legislation includes the standards of air and water pollution sources; annexures determine the air quality and the industrial effluent quality indicators, and air emissions.	Air (3.9, 9.4, 11.6, 12.4, & SDG 13) Water (3.9, 6.3, 6.5, 6.a, 12.4, & 14)	Supportive legislation for SDG 13 This order was rescinded on 8 April 2021 and replaced by two separate orders concerning air and water.
2	Ministerial Order No. 8 of 2002 concerning the standards for pollutants and materials emitted from vehicles or their exhausts and their inspection	Control and inspect the pollutants and materials emitted from vehicles or their exhausts.	Adopt clean technology Monitor ambient air quality.	Air (3.9, 9.4, 11.6, 12.4, & SDG 13)	The implementation of this edict has been assigned to the Traffic Department.
3	Ministerial Order No. 10 of 2006 on emissions of air pollutants from sources	Defines unified specifications for devices to monitor the emission of air pollutants from the source of pollution and establishes communication networks that link devices that process data on the emissions of air pollutants	Air pollutants' data form includes ten parameters, carbon dioxide being one of them. Online air monitoring system will add value to the	Air (3.9, 9.4, 11.6, 12.4, & SDG 13)	Not yet enforced in the industrial sector The authority working on the IT infrastructure

#	Environmental legal tools	Brief description	Issues related to the SDGs	Relation to the SDGs	Notes
		from the source of pollution	monitoring of emissions 24/7.		
4	Ministerial Order No.2 of 2021 concerning the Environmental Standards for Air	This resolution apply to projects at all stages, including design, establishment, construction and operation; its annexures determine the air emission standards from various sources and air quality standards.	Set of standards for control and monitor air emission sources. Allow utilizing measurements methods approved internationally.	Air (3.9, 9.4, 11.6, 12.4, & SDG 13)	Supportive legislation for SDG 13
5	Ministerial Order No.3 of 2021 concerning the Environmental Standards for Water	This resolution apply to projects at all stages, including design, establishment, construction and operation; its annexure determine standards of the waste water discharge to the sea.	Conserve marine environment	Water (3.9, 6.3, 6.5, 6.a, 12.4, & 14)	Supportive legislation for SDG 6 & 14

Table 4.1 presents the legal tools pertaining to air and water; since the issuance of the legislation on air and water legislation (No. 10) in 1999, for more than 20 years, only one amendment has been made according to order no. 2 of 2001. Due to the expansion of the industrial sector and the current

issue of climate change being at the top of the global agenda, reviewing and assessing the standards and the allowable limits based on the existing situation are crucial. Newly, this order was rescinded on 8 April 2021 and replaced with two separate orders, which are order no.2 of 2021 concerning the environmental standards for air, and order no.3 of 2021 concerning the environmental standards for water. Article 7 of order 2 allows the use of other measurements methods -not listed in Table 2- approved by environmental international agencies and organizations.

The environment authority has a favourable opportunity to amend this Article to align it with the SDG 13 requirement. Further, Article 15 of order 2 and Article 9 of order 3 stipulates that the projects are obligated to conduct periodic (quarterly) analysis and measurements and whenever requested. The environment authority has a favourable opportunity to amend this article to fulfil the SDGs' requirement. It is interesting to note from annexures that the orders on air and water standards combine two themes (air and water) reflected in the SDGs 3, 6, 9, 11, 13, and 14. Besides the edict, Bahrain employs the provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL Convention) as a basis for national legislation on marine oil spill, as Marzooq *et al*. (2019) argued that oil pollution in Bahrain exert significant pressure on the coastal and marine environments in Bahrain.

In 1993, Bahrain adopted the National Oil Spill Contingency Plan that intends to preserve the marine environment through a safe, timely, efficient administering and harmonic response during oil spill incidents affecting all stakeholders (SCE, 2013). Further, Al-Noaimi (2020) mentioned that

approximately 90% of industrial wastewater is treated before being discharged into the marine environment, and data has shown that this practice does not cause any harm to the marine environment since the treated industrial wastewater is subjected to standard disposal procedures, and it is mandatory to obtain disposal permit as per Resolution 3. These efforts meet the requirements of SDG 6: 'Ensure availability and sustainable management of water and sanitation for all', and SDG 14: 'Conserve and sustainably use the oceans, seas, and marine resources for sustainable development'.

Table (4.2): Environmental impact assessment legislations and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 1 of 1998 on the environmental assessment of projects	Requests EIA studies for all projects, outlines the mechanism of EIA, & lists the related categories of development	Article 9 defines thirteen of the factors and impacts that must be included in the environmental impact report that may result from the project.	11.a 13.2 13.b 17.15	This article covers the main issues of most SDGs
2	Ministerial Order No. 3 of 2000 on approving consultation offices specialized in the environmental assessment of projects and environmental studies	Lists the criteria adopted by the environmental authority for the registration of environmental consultants and their responsibilities	This order opened the way for consulting offices that have experience in preparing environmental reports by working with the private sector. It also highlights experts and specialists in the	9.5	This edict helps raise the efficiency of research and development in the environmental field.

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
			field of the environment.		
3	Ministerial Order No. 4 of 2014 concerning the approval and regulation of the work of environmental consultancy offices	Aims to approve the work of environmental consultancy offices working in the field of studies and environmental research related to the environment and economy of the Kingdom, especially environmental assessment studies for projects	This legislation classifies the registration of environmental consultancy offices into three categories A, B and C and established criteria for that classification, in addition to the criteria for evaluating the environmental impact study	9.5	This legislation enhances and integrates Legislation No. 3 of 2000

Table 4.2 presents EIA's legal tools; Article 8 of Edict 1 of 1998 specifies that the EIA report should contain elements that represent comprehensive requirements from the project proponent; specifically, this article offer's, there is a great opportunity to add a sustainability dimension because EIA as a tool plays an essential role in the environment and encourages integration in decision-making to attain sustainable development. In the same edict, Article 9 complements the requirements of Article 8 by identifying the impacts and factors that may result from the project, which must be considered to avoid any adverse impacts on the environment. Both Articles 8 and 9 are significant by means of imposing mitigation measures for

the possible results of project during the designing and before the implementation.

The edict on EIA is reflected in SDGs 9, 11, 12, and 15, and the extent of the impact assessment system will increase the number of SDGs covered by the impact assessment process. Naser (2012) stated that the EIA process generally lacks environmental guidelines. As a case in point, in the comparative study on EIA systems among the Gulf Cooperation Council (GCC) states, Al Azri *et al*. (2013) concluded that all the gulf states are considering alternatives to the legally obligated requirements, but they are not required in Bahrain. Further, the EIA system in the GCC states lack sectoral procedures, specific technical guidelines, and monitoring and implementation. Literature shows the EIA is an essential tool in the planning of sustainable development, and it would be a good idea to highlight some studies in this regard, Loomis & Dziedzic (2018) observed that still there is a lack of studies into whether the EIA system leads to a reduction in environmental impacts and how to measure it. Regarding the evolution of EIA systems, Suwanteep *et al*., (2016) asserted that the comparative analysis of countries' laws and regulations provide important support for policymakers to improve them.

Table (4.3): Legislations on chemicals management and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 1 of 1999 concerns	Outlines the regulations regarding the	Following this legislation, the import of	3.9 6.3	Attention was given to chemicals'

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
	the control on substances that deplete the ozone layer	protection of the ozone layer from substances that cause depletion	devices, equipment, and materials harmful to the ozone layer was stopped. In addition, it set a schedule for the disposal of substances that deplete the ozone layer.	12.4 It has a relation to SDG 13.	management since the passing of the legislation.
2	Ministerial Order No. 7 of 2002 regarding the control on the import and use of banned and severely restricted chemicals	Lists the regulations pertaining to the import and usage of banned and restricted chemicals	This legislation classified chemicals and their management, focused on banned and severely restricted chemicals, and encouraged the use of safe alternatives.	3.9 6.3 12.4	Lists of banned and severely restricted chemicals have not been updated since the legislation was issued.
3	Ministerial Order No. 4 of 2006 on hazardous chemicals' management, and its amendments	Describes the monitoring and management system for the management of hazardous chemical materials listed in Ministerial Order No. 7 of 2002	This legislation clearly aimed to protect human health, the work environment, and ambient environment from chemicals' impacts.	3.9 6.3 12.4	This legislation almost covered the whole chemicals' management supply chain

Table 4.3 illustrates the set of chemicals management legal tools. After examined them, it was observed that they were designed for the precaution

and prevention principles' context to reduce the exposure risk to chemicals and their adverse health impacts. Additionally, it covered the management aspects including the licensing, uses, storage, handling, and transportation of hazardous chemicals. For instance, Ministerial Order No. 7 of 2002 regulates the import and use of banned and severely restricted chemicals. Further, it specifies the purposes and areas for its use to end or diminish their harmful impacts on human health and the environment. From a legal point, the Ministerial Order 4 of 2006 stipulates an appropriate monitoring and management system for the hazardous chemical materials listed in Ministerial Order No. 7 of 2002. The proposed addition was to regulate and reduce chemical uses and prevent import in big quantities to avoid the expiration and generation of chemical waste.

Table (4.4): Legislations on waste management and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 4 of 1999 on licensing work in the maintenance of equipment and buildings containing asbestos, and removing and transporting their waste	Outlines the regulations on the disposal, handling, and treatment of asbestos	Precautions in the work environment (protect workers) and the safe disposal of hazardous waste	11.6 12.1, 12.4, 12.5, 12.6	This legislation falls between the environmental work and the management of hazardous waste.
2	Ministerial Order No. 1 of 2001 on the	Lists the regulations on the handling,	Avoid health hazards due to impact of waste	11.6 12.1, 12.4,	The legislation's articles refer to

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
	management of hazardous healthcare waste	transfer, and treatment of hazardous medical wastes in Bahrain	on humans and the environment and improve treatment processes (the adoption of clean and environmentally sound technologies)	12.5, 12.6 3.d	the edicts on EIA, and air and water. They also refer to Basel Convention.
3	Ministerial Order No. 4 of 2005 on the management of used oils	Defines the regulations regarding proper monitoring and control systems for the operations of storing, transporting, treating, and disposing used oils	Soil, water, and marine protection, and the adoption of recycling, and clean and environmentally sound technologies	11.6 12.1, 12.4, 12.5, 12.6	The legislation's articles refer to the edicts on EIA, and air and water edict. They also refer to regional and international conventions.
4	Ministerial Order No. 3 of 2006 concerning hazardous waste management and its amendments	Outlines the regulations concerning proper monitoring and control system for the operations of hazardous waste generation, storage, transportation, treatment, and disposal thereof or exporting it for treatment	Soil, water, and marine protection, and the adoption of recycling, and clean and environmentally sound technologies	11.6 12.1, 12.4, 12.5, 12.6	The legislation's articles refer to the edicts on EIA, and air and water. Also, they refer to regional and international conventions.

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
5	Resolution No.2 of 2019 concerning the ban on the import of all kinds plastic waste	Bans the import of all kinds plastic waste	Waste management	12.1, 12.4, 12.5, 12.6	Focus on one type of waste. Implement Basel Convention's provisions.

Table 4.4 represents the set of waste management legal tools; it is found that the legislations on waste management are comprehensive and integrated, covering all aspects of the waste management issue. Their provisions aim for an environmentally sound management of hazardous waste. Several provisions of legislations can also be described as regulatory, for instance, the Ministerial Order 3 of 2006 set proper monitoring and regulating systems and suitable guidance procedures for the generation, storage, transportation, treatment, disposal of hazardous, and the exporting of hazardous waste for disposal or treatment.

Concerning the legal tools relating to waste and chemicals, as mentioned in Tables 4.3 and 4.4, more monitoring, control, and liability regarding the environmental impacts, and sustainable consumption policies of natural resources must be adopted. Moreover, there is a need for extended producer and importer responsibilities towards controlling the quantity of chemicals imported as per the requirement to avoid expiration, damage, or the remaining of excessive quantities, consequently avoiding waste chemicals' generation. Given the importance of the issue of waste and chemicals, it is worth referring to some studies. Syeda (2020) stated that the sound

management of chemicals and waste is one of the significant drivers for attaining the SDGs. In addition, the Inter-Organization Programme for the Sound Management of Chemicals [1] (IOMC, 2019) mentioned that the management of chemicals and waste are included clearly in several SDGs, involving health, water, cities, human settlements, and responsible production and consumption. It plays a vital role in a circular economy wherein materials are recycled safely to avoid the loss of their value.



Fig. 4.1: Sound management of chemicals and waste as key factors for achieving the SDGs (source: IOMC, 2019).

[1] The Inter-Organization Programme for the Sound Management of Chemicals (IOMC) was established in 1995, which brings together nine intergovernmental organizations (FAO, ILO, UNDP, UNEP, UNIDO, UNITAR, WHO, World Bank, and OECD); IOMC's vision is to shape a sustainable future through coordinated global actions to achieve the sound lifecycle management of chemicals and waste for healthy lives and the environment.

Figure 4.1 illustrates the four core SDGs which directly correlated to chemicals and waste, while the remaining goals are linked to the core goals. This is where the complexity of the interconnectedness of the goals emerges; hence, one goal cannot be achieved separately.

Table (4.5): Legislations on environmental work and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 2 of 2001 concerns the procedures of environmental inspection	Outlines the procedures and requirements of environmental inspection and lists the terms of references of environmental inspectors	Enforce regulations	17.14	Supports all legislations via monitoring the compliance with the regulations
2	Ministerial Order No.3 of 2005 on the environmental requirements and standards in worksites	Dictates the regulations for protecting workers from environmental and occupational risks to provides a safe work environment for workers	Work environment precautions (protect workers)	8.8	This order should be integrated with the two legislations No. 15 and 38 of 2014, issued by the Ministry of Labour
3	Ministerial Order No. 5 of 2005 pertains to environmental conditions required in service activity sites	Approved classification lists the service activities that must be practised in service areas and service streets	Infrastructure planning	11.a	Classifying the areas to avoid any impacts on domestic areas in the future.

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
4	Ministerial Order No. 15 of 2014 on protecting workers from the dangers of flammable chemicals, gases and liquids in facilities and worksites	Describes the regulations of proper handling of dangerous flammable chemicals, gases, and liquids in facilities and work sites	Work environment precautions (protect workers)	8.8	Issued by the Ministry of Labour Supports Legislation No. 3 of 2005
5	Ministerial Order No. 38 of 2014 on determining the conditions and precautions necessary to protect workers from mechanical hazards in the work environment	Outlines the conditions and precautions necessary to protect workers from mechanical hazards in the work environment	Work environment precautions (protect workers)	8.8	Issued by the Ministry of Labour Supports Legislation No. 3 of 2005

Table 4.5 provides the set of work environment legislations. These regulations are aimed at ensuring a safe and healthy work environment for workers in industries and other workplaces. A case in point, Edict 3 of 2005 specifies physical and biological parameters, including moist heat, illumination rate, noise levels, and occupational exposure in workplaces, and placed a set of instructions that must be abided by the work proponent. Besides this set of legislations, there are two ministerial orders issued by the Ministry of Labour, which are directly related to the ministerial orders issued by the SCE. They are Ministerial Order No. 15 of 2014 on protecting workers from

the dangers of flammable chemicals, gases, and liquids in facilities and worksites; and Ministerial Order No. 38 of 2014 concerning the determination of the conditions and precautions necessary to protect workers from mechanical hazards in the work environment. From the viewpoint of policy, this is an advantageous opportunity as it opens a pathway for the legal coordination and integration among government parties.

4.1.3 Discussions

Regarding the SDGs' era, Gore (2015) identified some critical weaknesses that may limit the transformative possibility of the SDGs; there is a dearth of coherent fundamental policy frameworks and attaining the novel global goals will require novel global rules in return. In line with this, Galli *et al*. (2018) argued that including the SDGs within the national policy's context entails an evident and long-term vision propped by novel aims and the updated national policy towards 2030. Furthermore, the SDGs include 'means of implementation' that is represented in Goal 17 and its targets for all goals, acknowledging the necessity to reform policies and institutions if a transformational development is to occur (UN, 2015). Across 16 thematic goals, 42 targets concentrate on the 'means of implementation', albeit slightly unequal (Stafford-Smith *et al*., 2017).

The primary aim of formulating legislation policies is to implement and enforce a legal tool to prevent, minimize, or treat the impacts of business sectors on the environment. The regulatory tools based on information request require companies to provide a report for an appointed period (e.g., quarterly, annually, etc.) in the legislation to the environment authority. In contrast,

regulatory tools based on management request, oblige the regulated companies to develop a planning process or adopt a management system for tackling the regulatory issues (e.g., compliance plan). The review revealed that Bahrain's environmental legislation is a combination of information request and management request, which is reflected almost in all resolutions. Further, the regulations are consistent in their overall strictness and the requirements for compliance, in addition to being based on penalties and fines dictated by the Environment Law. Although the necessary requirements to improving national laws should be realized to implement environmental policies, the cooperation among government institutions is also required to compile their efforts to enforce and strengthen environmental legislation. Given the complexity of the policy evaluation process, it should be accelerated by facilitating the consultations among the concerned stakeholders.

To assess the appropriateness of the current environmental legal tools, and the extent of their conformity with the SDGs' requirements, a scoping review was carried out with a total of 17 legislative decrees covering the main environmental issues. Furthermore, from the viewpoint of policy, Bahrain must foster additional effective policies and measures to improve the current environmental state and adapt to future challenges and emerging social and economic needs to achieve sustainable development (PCPMEW, 2009). The challenges faced by the environment and development can neither be resolved via laws nor overseas development assistance solely. There is a need to raise the extent of integration among the environmental and economic policies, which could assist in resolving those challenges. Further, an innovative combination of policies, economy tools, and market-based standards are

needed, which leads to changes in the production and consumption patterns (Derasat & UNDP, 2018).

In this regard, Gibbon & Joshi (1999) concluded that there is a shared view among the majority of the companies in Bahrain that accounting regulations need enforcement to obligate companies' reporting on environmental accounting. According to Naser (2012 & 2015), the EIA system in Bahrain is still facing challenges, and to strengthen it, the improvements are critically needed for integrating all EIA system aspects, including public participation, accumulative impacts, and alternatives and provisions for SEA.

Additionally, Yaqoob *et al*. (2019) mentioned that oil and gas are two of the large industrial sectors and that their projects consumed high energy. Ministerial Order No. 1 of 1998 requires that the EIA report include a description of any potential increase in non-renewable resources' demand; however, there is no legal condition that binds the project owner to submit an energy management plan as a part of the EIA report. Edict 1 of 1998 covers the air emissions standards that are related to the use of fossil fuels. This gap could be narrowed by amending the legislation and placing guidelines to ensure the efficient consumption of non-renewable resources. Notably, in some developed projects, the impacts are low but cumulative, so one should consider that any development will generate environmental impacts, which need to be reflected in the EIA legislation's provisions.

There is an opportunity to add sustainability as a requirement in the EIA report, especially the issue of resource efficient utilization that is related to

SDGs 8, 11, and 12. According to Hannemann (2019), recently, consulting companies around the world have started qualifying specialized expertise to study the challenges of sustainable development and provide solutions; sustainability consultants represent an extremely small ratio, varying between 1% and 6% of consulting company employees. Another legal suggestion is that environmental auditing should considered an effective tool to measure the compliance with the regulations; it should be added to the private consultation offices' duties under the supervision of the SCE. According to Hakim & Yunus (2017), environmental audit is a significant factor for sustainable development, because it plays a crucial role in updating laws to create a legal frame for sustainable development. In addition, it is an essential policy tool for the assessment and development of environmental policies and plans' performance (Cook *et al*. 2016). Further, Asalos (2019) stated that some of environmental auditing's benefits lead to compliance with environmental regulations and sustainable development through the efficient utilization of resources.

The SDGs did not directly refer to air, although it is indicated clearly in two targets: Target 3.9, which is related to air pollution as a single mechanism harming human health, and Target 11.6, pertaining to an element of the environmental impact of cities. Also, the issue of air is included indirectly in some goals such as SDG 13. In this context, Bahrain has taken earnest actions to commit to the global efforts to fight climate change by signing the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, and the 2015 Paris Agreement. Adding to those efforts, the air quality standards were monitored since 1999, and plans have been developed to raise the number of air portable-monitoring stations to monitor

nitrogen and Sulphur dioxide emissions from motor vehicles. Moreover, SCE is mandated to formulate a National Air Quality Strategy (NAQS) to assess the current challenges (Derasat & UNDP, 2018).

The legislations on chemicals lack a mandatory annual inventory of chemicals. Also, there is a need to establish integration among government parties. The UNITAR & SCE's (2012) chemicals assessment report recommends that an effective chemicals management mechanism between must be established between the key stakeholders to avoid any illegal trade and breach of national legislations. Further, it is mentioned that there is a gap in the policies and legislations on chemicals as they do not explicitly address several significant issues such as persistent organic pollutants (POPs).

In addition, the management of chemicals and waste is one of the primary challenges that should be tackled by adopting and implementing legal tools that determine the liabilities of both the public and private sectors for monitoring chemicals and waste and improving legislation systems for compliance and enforcement (IOMC, 2019). Moreover, according to the Strategic Approach to International Chemicals Management (SAICM), UNEP set 2020 as the initial deadline to attain the sound management of chemicals via their lifecycle at global level (UNEP, 2006). Regarding the issue of waste, Bahrain employed the provisions of Basel Convention as a basis for national legislation pertaining to hazardous waste management until issuing the legislative on hazardous waste management.

The matter of human health, which most environmental legal tools referred to in their master aim, is considered an important indicator that

reflects the extent of a sound environment. Human health is representing the pillar of people, which is one of the 5 Ps: people, planet, prosperity, peace, and partnerships that shape the SDGs. It is covered in Goal 3: "Ensuring healthy lives and promoting well-being for all at all ages"; this goal indirectly meets with the requirements of SDGs. The aspects of occupational health and safety cannot be separated from the environmental aspect as both complement each other. The Ministry of Labour is the responsible entity for safety and the prevention of industrial accidents. It is also committed to conducting inspections of workplaces, performing occupational safety-related field studies, and providing information and guidance for employers and workers. This intersects with the work environment decisions issued by the SCE, thereby confirming the necessity of integration from a legal standpoint.

With reference to the concerns and recommendations of Bahrain's MDGs reports, the second MDGs report raised an important question on how Bahrain can achieve sustainable development, and how the economic growth can void the environmental considerations; this will lead to the weakening of economic development in the long run (MoSD & UNDP, 2008). In this regard, the third MDGs report reveals that 'the national strategies and government policies have not succeeded in controlling economic activities, particularly real estate activities, major construction projects and sea reclamation within a manageable and sustainable level consistent with Bahrain's environmental capacity' (CIO & UNDP, 2010). On a positive note, the 2015 MDGs endpoint report notes that significant national actions have been taken since the previous MDGs reports by including the national environmental priorities in the State Strategic Plan 2011 –2016, namely health and the environment,

energy and climate change, and urban growth and weak land-use planning (CIO & UNDP, 2015).

As a reflection, the Government Action Plan (2015–2018) is a short-term national development programme with goals and priorities in line with the SDGs, for example, SDG 6 Targets 6.1, 6.4, and 6.5 are included in the infrastructure, urban development, and environment pillars (Bahrain Government, 2015). Continuous progress, one of the priorities of the Government Action Plan (2019–2022), is facilitating an enabling environment for sustainable development, and section 6 of this priority prescribes regulating environmental protection and sustainability. This priority is focused on keeping up with international legislations and agreements considering the best environmental practices and developing national strategies to protect the environment as well as promote and activate environmental awareness (Bahrain Government, 2019).

The proposed framework (Fig. 4.2) was developed on the author's viewpoints based on the assessment outcomes, study recommendations, and the literature review findings. The framework consists of five actions, which could act as building blocks to encourage reviewing mechanisms and updating the current national legislation.



Fig. 4.2: The author's proposed framework of actions for reviewing the environmental legal tools by cooperating and coordinating with the government authorities and other stakeholders to fill the gaps, tackle deficiencies, and provide amendments and proposals.

The first action is the preparation of a second state of environment report to study the current environmental situation to get perspicacity into various issues of environmental priority related to the environment's state, the pressures underlying the environmental changes, and the impacts correlated with these changes. Also, such a report is required to evaluate the current legal tools and proposed policy actions to review and control the various environmental effects. The second action has to do with the updating of the national environment Strategy based on the outcomes and recommendations of the second state of environment report and including the SDGs. Environment strategy sets out the vision and goals, ranks the environmental priorities concerning the current state, and endeavours to recognize actions that enhance the efficiency of resources and attain various benefits in the

context of the SDGs. Actions three and four entail updating and proposing amendments that should translate the outcomes of the strategy. In this regard, the National Environment Strategy, which was adopted in 2006, suggested three scenarios; one of them is the 'The Policy First Scenario' that "envisions an improvement of human well-being and decrease of environmental degradation due to assigning higher priority to human resources development, health and environment protection than the Market First scenario." The last action is to set up environment action plan, including indicators to monitor the progress in the first three actions.

Concerning action 3 of the proposed framework, a new Law No. 7 of 2022 with respect to Environment was issued stipulates the repeal of Decree-Law No. 21 of 1996 on the environment, and it entered into force on September 15, 2022. The new law includes 18 chapters and 125 articles and aims to protect the environment and its sources from all activities and practices that cause pollution and deterioration of the environment and biodiversity. The new Law came at a very significant time as environmental and climate issues can no longer postpone for consideration in the future; meanwhile, many companies globally, including some Bahraini companies, are rushing to set the environment and sustainability at the forefront of their concerns.

Further, the new Law is comprehensive and includes the main topics of SDGs: chemicals, hazardous waste, environmental planning, strategic environmental assessment, biodiversity, natural and ecosystems conservation, fungal species, endangered species, sustainable use, inspections, and other terms related to the environment and climate.

The Law placed SCE's necessary powers to carry out monitoring roles in conserving the environment, including permit environmental licenses for all activities, facilities, or projects, whether those related to the establishment and construction of new projects or limited to mere modification or development. In addition to existing projects previously licensed, and the right to request data, information, or documents, or to conduct studies that it deems necessary from any party that practices or embarks on an activity that may lead to pollution or deterioration of the environment or disturbances in radiation or nuclear safety or security.

Another notable point is the establishment of the "National Fund for the Protection and Development of the Environment" affiliated with the SCE. And recommending granting environmental incentives and supporting environmental initiatives and activities carried out by associations and non-official bodies, supporting the preparation and development of research, studies, and scientific programs in the field of environmental protection, and contributing to preventive and development activities that have a positive impact on the environment.

Another significant matter stipulated in the Law is obligating project owners to conduct periodic waste analysis and monitor the effluent contents and pollutants resulting from these projects, keeping monitoring records and sending results reports to the competent department accordance to executive regulations.

The Law prohibited all dumping garbage or discharging sewage into the marine environment, and banned the import or use of machines, engines or vehicles that emit substances or pollutants from their exhausts, exceeding the permitted limits set in regulations.

4.1.4 Environmental policy's embodiment

The adoption of the 2030 Agenda for Sustainable Development aims to unify and strengthen the global environmental efforts and complement the previous environmental initiatives and agendas since the first conference on the environment in 1972. The continuous impacts of human activities in various sectors warn the destruction of the developmental progress of decades. Therefore, more than ever, there is an urgent need for the activation of the 2030 Agenda's vision and its SDGs to lead and harmonize the global efforts towards conserving the environment in balance with the economic and societal needs.

To achieve that, there should be an earnest serious action to foster the policy coherence for sustainable development starting from the national level. Further, environmental policies should not be formulated in an isolated manner regarding the global environmental changes and challenges, and they must reflect the environmental obligations of the conventions and treaties explicitly and systematically. To carry out the current legislations and make it more effective in Bahrain, there is a need to continuously enhance the legal and institutional capacity to cope with the emerging issues affecting the environment.

Furthermore, the environment cannot be reduced to environmental policies only, and should be addressed in the national socio-economic development plans and strategies. Sustainability can be accomplished by amalgamating the legal policy aspects of the environmental, technical, economical, institutional, and socio-cultural dimensions. More specifically, the SDGs are a strong support point for the integration among the national legal tools, because it is not possible to deal with each goal individually and must be approached as a set. The extent of concern for the environment is clear from the government action plans. Therefore, the government should take a step forward to study, identify, and address the inadequacies of the existing environmental legal tools.

For the successful implementation of the SDGs, the national strategies and plans need to be strengthened by effective environmental legal tools, and this is a significant pillar in the field of sustainable development law and in the aim of Principle 10 of the Rio Declaration. Against this background, it is essential to highlight the significance of reviewing and scrutinizing the current environment legal tools to eliminate the gaps, deficiencies, contradictions, and repetitions, and to clarify the documents and language, which will strengthen the capabilities crucial for the successful implementation and enforcement of these legal tools.

Part two: Corporate Sustainability Reports Assessment

4.2.1. Background

The study targeted large industrial companies, their annual and sustainability reports that were published on their websites. Based on an internet search, the results showed that 155 (91.2%) out of 170 companies have a website, 22 out of the 155 websites were not found, and 39 were poor websites lack information and data. The remaining are 74 websites provide some good information and data for local companies, and 20 websites were international, not containing or referencing to any information or data about their branch in Bahrain.

4.2.2 Sustainability Reports Analysis

The author has collected 30 (i.e., 17%) annual and sustainability reports from the firms' websites; 15 annual reports and 15 sustainability reports. Out of 15 annual reports, only seven (7) were focused on Bahrain, while eight (8) are international corporate reports without mentioning any information and data about their branches in Bahrain. As far as, sustainability reports are concerned, only three (3) were focused on their environmental efforts and achievements in Bahrain, three (3) were part of an annual report, and one was focused on the financial aspect. Therefore, this study will be focused on three (3) companies to assess the status and contribution of their sustainability reports in the implementation of SDGs in Bahrain for the period 2016–2020.

As far as the importance of environmental certifications, the quality, environment, health and safety, and CSR in the Bahrain's industry. Refer to Section 0.1. (General) of ISO 9001:2015 which stated that "the adoption of a quality management system is a strategic decision for an organization that can help to improve its overall performance and provide a sound basis for sustainable development initiatives" (ISO, 2015); and ISO 14000 International Standards series focus mainly on the environmental pillar of sustainability; ISO 14001 principally aimed to better environmental performance and sustainability (Da Fonseca, 2015). ISO 45001 is a proactive approach launched in 2018 to replace Occupational Health and Safety Management (OHSAS 18001:2007) aiming in assisting organizations to minimize their occupational health and safety risks by adopting efficient preventing and protection measures.

Further, CSR is considered a potent tool for strengthening synergies among stakeholders and reshape their responsibilities and enhancing the private sector role in attaining sustainable development. Further, there are thematic overlaps between CSR and SDGs which helps to improve a model for sustainability and development growth (Abdelhalim & Eldin, 2019). The search in companies' certification profile revealed that about 68 firms certified by ISO 9001, while 39 certified by ISO 14001, 31 firms certified by OHSAS and 17 with ISO 45001. As far as CSR's concerned, 24 firms published their CSR on their website. The results of this search do not represent the accuracy status of certification due to lack of information as mentioned above. However, the International Organization for Standardization (ISO) surveys have recorded notable certification growth between 2000 and 2019 in both ISO 14001 and ISO 9001 in Bahrain. Figure

4.3 showed a significant increase in the issuance of certificates since 2000. The number of certifications by ISO 9001 have increased from 33 to 256 between the years 2000 and 2009 and increased to 495 in 2021. Concerning ISO 14001, the number of certificate issuing was increased from 42 to 141 at the period of 2011-2012 and its reached 151 in 2021.

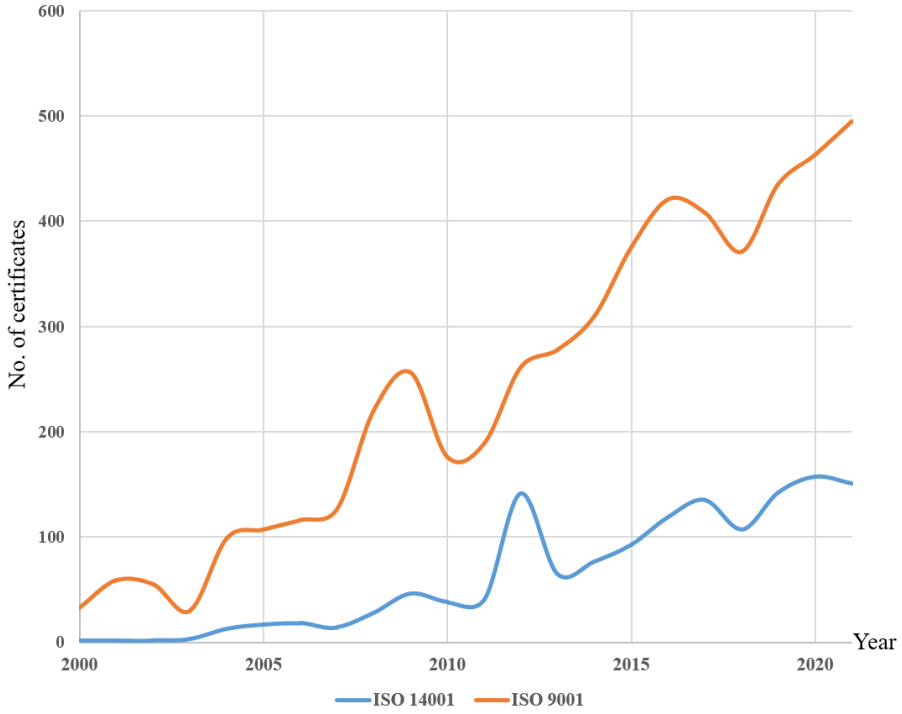


Fig. 4.3: ISO 14001and ISO 9001 certifications progress growth in Bahrain from 2000 to 2021 (Author own depiction; data sources: ISO, 2004, 2006, 2007, 2008, 2015, 2019, 2020;2021).

Table (4.6): Analysis parameters for evaluation the sustainability reports.

Analysis parameters	Gulf Petrochemical Industries Company (GPIC)					Aluminum Bahrain (ALBA)					Bahrain Petroleum Company (BAPCO)				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Does the CEO's statement show a reference to the SDGs?	Y	Y	Y	Y	Y	N	N	Y	Y	Y			Y		
Does the report present brief information about the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y	Y			N		
Does the report provide reference to the related SDGs to the company?	Y	Y	Y	Y	Y	N	N	N	Y	Y			N		
Does the report rank the SDGs as per priority?	Y	Y	Y	Y	Y	N	N	N	N	Y			N		
Does the report refer to stakeholders?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y		
Does the report mention the method/tool utilized for disclosure of the SDGs?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y		
Does the report link the company's environmental, economic, and social aspects with the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y	Y			N		
Does the report state that the company's KPIs based on the SDGs?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y		
Does the report refer to the inclusion of sustainable development goals in the company's strategy/plan?	Y	Y	Y	Y	Y	N	Y	Y	Y	Y			N		
Does the report provide the outcomes/benefits of the implemented SDGs?	Y	Y	Y	Y	Y	N	N	N	Y	Y			N		
Does the report mention the current projects/actions to achieving the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y	Y			N		
Does the report mention the future projects/actions to achieving the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y	Y			N		
Does the CEO's statement show a reference to the SDGs?	Y	Y	Y	Y	Y	N	N	Y	Y	Y			Y		

* BAPCO's report for two years 2018-2019; **Y**: Yes; **N**: No; **blank**: no report

Table 4.6 shows the number of SDGs reports for the period 2016-2020 of three companies in Bahrain (Gulf Petrochemical Industries Company (GPIC), Aluminum Bahrain (ALBA) and Bahrain Petroleum Company (BAPCO)). Among all sustainability reports, only one company referred to SDGs in the CEO's statements (GPIC). Since 2018, companies started to include SDGs in their reports.

It was noticed that the content and the quality of the SDG's reports were generally good and provide good information on the SDG's and only one company (GPIC) has included all the SDGs in details in its report for the five mentioned years. The reports of the other two companies lack referring to relevant SDG's. Regarding prioritizing the SDGs, only the GPIC report linked the priority areas to the SDGs where ALBA report indicated the priority areas without linking them to SDG's. It is worth mentioning that all the studied companies included their related stakeholders in their reports.

Furthermore, one company (GPIC) links their environmental, economic, and social aspects with the SDGs in its all reports; another company started in 2019, while the third company did not. Concerning the inclusion of SDGs in the company's strategy or plan, only one company (GPIC) has included all SDGs in its strategic plan since 2016, another company included SDGs 12 and 13 only in its plan, while the third did not include any of the SDGs in its plans. As seen in Table 4.6, the last three analysis parameters were presented in the reports of one company (GPIC), another company included them in its reports since 2019, while the third company did not provide information about these parameters in its reports.

An important note, according to the reports, all companies employed GRI standards as a method for sustainability reporting; then, it can be said that they implicitly refer to the SDGs indirectly. In this regard, the Global Reporting Initiative (GRI, 2020b) published valuable document (Linking the SDGs and the GRI Standards), which is linked the 17 SDGs and GRI standards, and disclosures that pertain to each of standard.

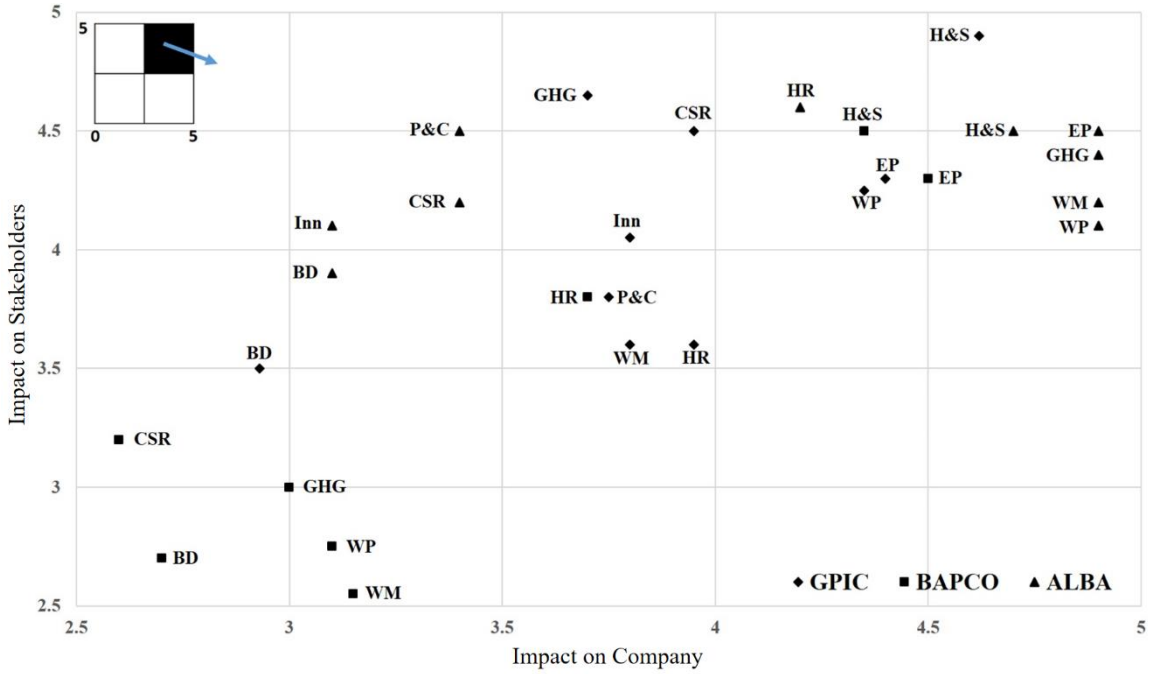


Fig. 4.4: Compiled sustainability materiality matrices for the three companies (Author own depiction; data sources: GPIC 2020, ALBA, 2019, BAPCO, 2019).

Key for figure 4.4

Economic Performance (EP)	Waste management (WM)
Health and Safety (H&S)	Biodiversity (BD)
GHG Emissions & Climate Change (GHG)	Innovation (Inn)
Wastewater/water pollution/effluent (WP)	Human rights (HR
Corporate Social Responsibility (CSR)	Partnership & collaborations (P&C)

Figure 4.4 illustrates the compiled materiality matrix for the three companies –ALBA, BAPCO, GPIC- based on their reports for the years 2019 and 2020. The report of materiality matrix is optional for the companies and the results clearly showed an increase information on how a company identify its related stakeholders and continuous reporting on materiality reflects their seriousness to address the significant aspects by conformity to the GRI Standards. The matrix showed that environmental aspects (e.g., waste management and wastewater) are highly significant, and most of them were adequately reported. In addition, the companies vary in rating the importance of the environmental aspects due to their different business activities, for example biodiversity has less impact on companies.

For instance, in Jordan, environmental disclosure of companies is still at an early stage and is related to pollution aspects followed by financial information aspect related to the environment (Gerged, 2021). In GCC, remarkably, the energy, service, financial and chemical companies adopt sustainability reporting more but have not yet considered the independent validation of sustainability reports. As far as, the number of sustainability reports is concerned, the United Arab Emirates led (148), followed by Qatar (76), Saudi Arabia (50), Kuwait (28), Oman (24), and Bahrain (5) (Uyar *et al*., 2019). Therefore, it is the significant that integrated reporting of environmental information devotes by requesting companies to disclose fully covering all relevant environmental aspects (Raimo *et al*., 2021).

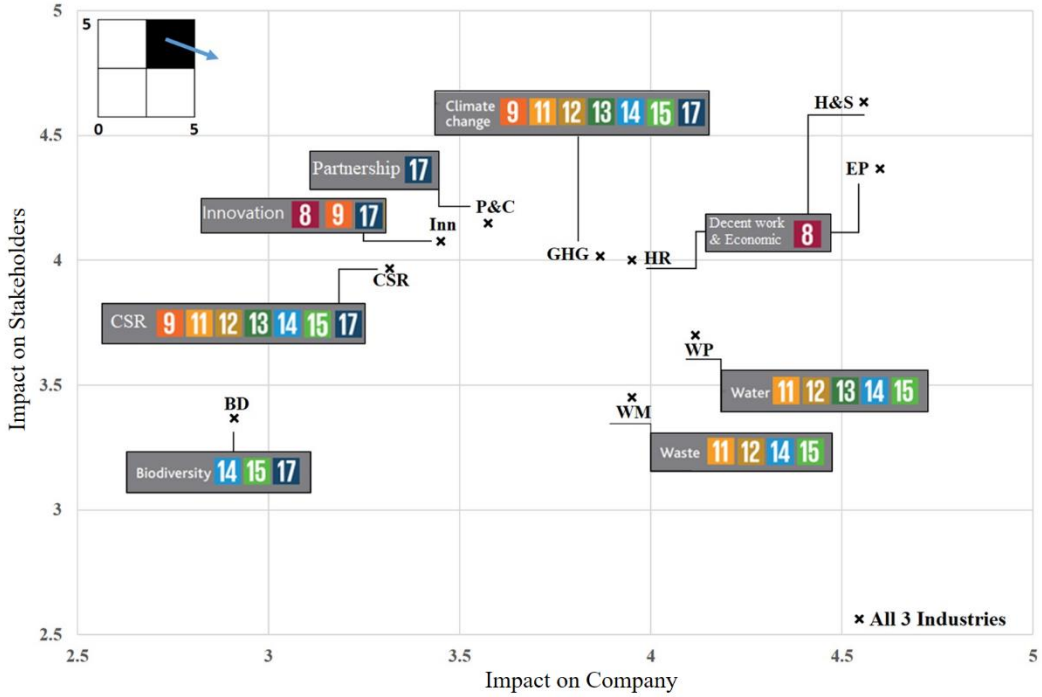


Fig. 4.5: Sustainability materiality matrix (mean) (Author own depiction)

Key for figure 4.5

Economic Performance (EP)	Waste management (WM)
Health and Safety (H&S)	Biodiversity (BD)
GHG Emissions & Climate Change (GHG)	Innovation (Inn)
Wastewater/water pollution/effluent (WP)	Human rights (HR
Corporate Social Responsibility (CSR)	Partnership & collaborations (P&C)

SDGs 9 11 12 13 14 15 17

Figure 4.5 illustrates the mean of results of the analysis of the three matrices and each aspect of the matrix has labelled with the related SDGs. The results of the upper right-hand quarter of the figure showed that greenhouse gases (GHS), waste management and water pollution are the most significant sustainability aspects for the companies and their stakeholders. In addition, the matrix showed additional environmental aspects which are health and safety, economic performance, and corporate social responsibility (CSR).

Furthermore, it is interesting to note that the results showed that human rights aspect is considered as one of the forefronts attentions of the industrial sector. The results indicated that the materiality matrix of sustainability reporting provides clear guidelines of efficient allocation of resources, and therefore should be invested as strategies for future to ensure achieving the expectations of stakeholders.

Overall, the spot of each sustainability aspect in the two matrices showed the consistency between the effectiveness of corporate sustainability reporting and the strategical importance of each aspect. Generally, this is a good indication due to the stakeholders' participation to provide their views and make a judgment about the adequacy of the companies' disclosure.

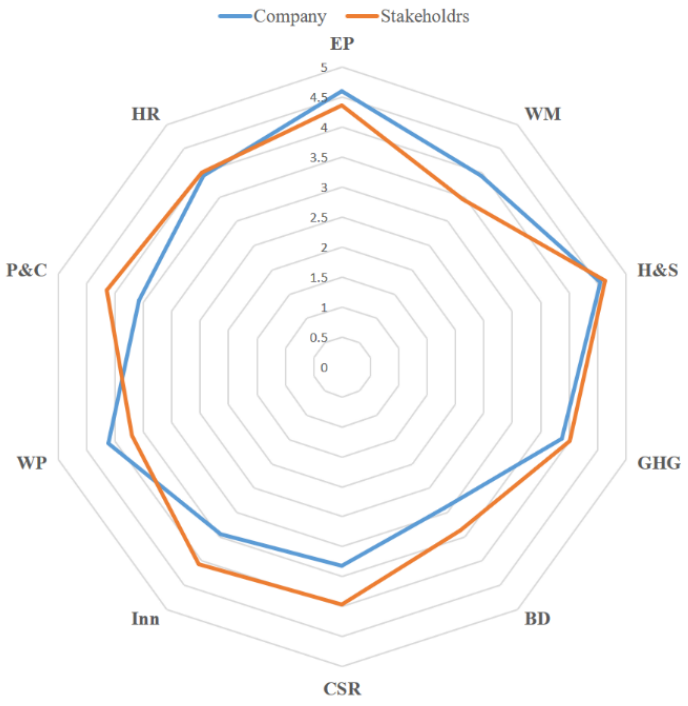


Fig. 4.6: Ranking of materiality according to the combined materiality matrix (Author own depiction).

Figure 4.6 illustrate the ranking of materiality aspects according to the combined materiality matrix (Figure 4.4), it shows that the companies paying great attention to economic performance (EP) and health and safety (H&S) aspects, whereas the stakeholders paying attention to the water pollution (WP) and partnership and collaborations (P&C) aspects. While both have similarly ranked the health and safety (H&S) and human rights (HR) aspects, almost with greenhouse gases (GHG) aspect with minimal difference. In contrast, there are variance in the ranking of most aspects, such as corporate social responsibility (CSR), waste management (WM), innovation (Inn), biodiversity (BD) and partnership and collaborations (P&C). This study would encourage the companies in using materiality matrix analysis and developing priority assessment measures to address and minimize the variance.

Table (4.7): The priority of the SDGs related to the industrial sector according to the compiled sustainability matrix for period 2019-2020.

SDG	**Brief description**	**Priority** (High, Medium, Low)	**Achievements**
	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all	High	• GPIC has injected in the national economy since its inception US$ 5.067 billion. (GPIC, 2020) • BAPCO Modernization Program (BMP) has created 150 high-skilled permanents jobs (BAPCO, 2019) • Aluminum sector represents about 12% of Bahrain GDP and will increase to 15% with the expansion of the Line 6 project (ALBA, 2019)

SDG	Brief description	Priority (High, Medium, Low)	Achievements
	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	High	• GPIC has won the Mohammed Rashid bin Maktoum Business Innovation Award in 2017 and 2019 (GPIC, 2019) • Bahrain Distributed Solar Energy Pilot Project has a future target to contribute to the national energy demand by 5% in 2025 and by 10% 2035 (BAPCO, 2019) • Solar Panel Farm pilot project that aims to secure eco-friendly energy (ALBA, 2020)
	Make cities and human settlements inclusive, safe, resilient, and sustainable	High	• The wasted heat generated from calciner plant is used to run a seawater desalination plant to produce potable water (+90%) for local community (ALBA, 2017) • Contributing to community (e.g., exhibitions, community engagement and awareness, farmers' market, etc.) (GPIC, 2020)
	Ensure sustainable consumption and production patterns	High	• Advocating Sustainability Reporting as part of target 12.6 (GPIC, 2017) • Recycled 9,197 MT of solid wastes, and hazardous waste has decreased by 5% (ALBA, 2019) • Since the launching of the recycling program in Feb. 2017, about 123 MT of recyclable materials has recycled (BAPCO, 2019)
	Take urgent action to combat climate change and its impacts	High	• Carbon Dioxide Recovery (CDR) plant captures about 450 MT/Day of CO2 from methanol reformer flue gases and recycles it (GPIC, 2016) • The intensity of GHG emissions has decreased by 14% between 2019 and 2020 (ALBA, 2020)

SDG	Brief description	Priority (High, Medium, Low)	Achievements
			• Solar energy consumption has increased to 12 TJ in 2019, compared to 2018 was 10 TJ (BAPCO, 2019).
	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	High	• Strict compliance with national legal requirements for effluent discharge as the total of sewage effluent recycled and reused was 188,510 m3 (ALBA, 2018, 2019) • Inauguration of the mangrove nursery was opened in 2018 (BAPCO, 2019)
	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	High	• Several Biodiversity projects were established e.g., bird sanctuary, mangroves plantation, fish farm, and date palm trees (GPIC, 2018) • Establishment of Princess Sabeeka Oasis, which was divided into an aquatic area (lake), a landscaped area and vegetable garden (ALBA, 2016). • Establishment of Princess Sabeeka Park which contains around 51,000 plants, 560 palms, and 342 fruit and ornamental trees (BAPCO, 2019)
	Strengthen the means of implementation and revitalize the global partnership for sustainable development	High	• Ongoing partnerships (e.g., UN Environment, Ministry of Education, INJAZ Bahrain, universities) (GPIC, 2020) • Ongoing partnerships (e.g., INJAZ Bahrain, Green School Award, universities) (BAPCO, 2019) • Training Workshops (e.g., INJAZ Bahrain and Tamkeen for young Bahrainis) (ALBA, 2020)

Table 4.7 illustrates the priority for each of the SDGs to each company based on the outcomes of the sustainability reports. Due to the limited number of sustainability reports, it was difficult to evaluate the contribution of each goal individually, and there is a need for better data to conduct sustainability ratings for the industrial sector. Thus, at this stage, the companies' interest is a positive indication to encourage other companies to start sustainability reporting.

4.2.3 Conclusion

Despite the concept of reporting is acknowledged in the 2030 Agenda and its SDGs, the role of the private sector in the implementation of SDGs is not an easy mission due to the broad scope of 17 goals, 169 targets and more than 230 indicators, towards addressing an extensive range of prime challenges at national and global levels. Therefore, there is a need for considerable transformation in business models, plans and strategies, specifically in terms of how this essential sector control their operational impacts by creating balance among sustainability pillars (society, environment, and economy).

The study of SDGs reporting is a new research theme despite the increase disclosure due to awareness of the importance of SDGs. The results of this study cannot be generalized to the entire industrial sector in Bahrain because the data was limited to five years from 2016 to 2020. The result of this study and analysis will assist in identifying and prioritizing the significant issues of sustainability to advance their future reporting for a better environmental

performance and encouraging other companies who did not set up their sustainability reports to follow suits. However, the study opens a new window for further studies on different business sectors and different types of cooperate reports to investigate the possible consequences of SDGs disclosure in terms of environmental, social, and economic.

Mentioning the SDGs in company reports is an opportunity to measure SDGs implementation and strengthen their disclosure. Despite the limited number of SDGs disclosures, it is necessary to study the potential impact of SDGs disclosure on corporate performance and critically identify the main related stakeholders who are more influential for increasing the corporate SDGs disclosures. The results showed that the companies that started sustainability reporting's and published them on their websites reflected company responsibility towards the environment and society. The subsequent sustainability reports showed tangible changes in the company in terms of the quality of data presented in the report, strategy, the role of related stakeholders, and reputation.

Materiality analysis is an essential part of both sustainability and integrated reporting, and it plays an important role in the disclosures. Therefore, sustainability materiality matrix is used to identify significant related environmental aspects; and outline the report content. The outcomes of the materiality matrix analysis in this study have confirmed the crucial role that the industrial sector plays in the implementation of SDGs. Thus, instead of placing short-period goals of limited benefit, SDGs have widened the scope for multiple future expectations concerning what should be developed and sustained and for how long. Besides that, the materials matrix analysis of the

reports of all companies revealed the focusing on sustainability-related aspects and commitments to stakeholder engagement. The purpose for the participation of stakeholders in materiality matrix is to push companies for more transparency and to provide better information in their reports. This study recommends that companies should use materiality analysis as a tool for reporting to reflect their commitments and improve report content by utilizing GRI guidelines.

Part three: Structural Interview and Questionnaire

4.3.1 Background

This part aims to present the result, data analysis and findings of the research interview and questionnaire, and discussions of quantitative and qualitative responses received based on the structural interview and questionnaire and data analysis of the results regarding each question.

The study was conducted based on the structured interview and questionnaire, which was designed to study the status of sustainability in the large industrial sector in Bahrain. The chosen companies were contacted through telephone and email to get their acceptance to participate in this study. After confirmation, appointments were arranged for having a telecommunication meeting in which the study objectives were explained and clarified regarding the interview questionnaire sections. Due to the COVID-19 pandemic, all companies were interviewed via telecommunication conversations and requested to send their replies by email.

4.3.2 Analysis of Responses

The population of this study is the large industries/companies operating in the Kingdom of Bahrain, which are registered under the Ministry of Industry and Commerce, with no conditions on the area, location, industrial activity, or product type. The total number of large industries operating in the country are 170 companies, which is the study sample size. Thus, out of 170

companies that were contacted, only 90 have accepted the interview, achieving an overall response rate of 53%. It was noted that the companies that issued sustainability reports provided 100% response, indicating that these companies have understood the importance of the study and find it an opportunity to present their achievements in this field.

In summary, the response rate can be considered adequate and acceptable for this study due to the abnormal situation of COVID-19 restrictions. The potential reasons for such responses are discussed and elaborated in Chapter 1 under the Research Limitations section.

4.3.3 Analysis of the Interview and Questionnaire

The interview and questionnaire questions were drafted after an intensive review of data, information, and similar research studies. The required information contained in the interview and questionnaire is of high importance and related to the research aims and is of a valuable contribution to the field. Most of the answers received were evident, matter of fact, and representative of the companies' environmental situation. In addition, some respondents recontacted to verify the accuracy of their answers and to ensure that the questions were clearly understood, which contributed to clarifying any ambiguous question and made the necessary amendments to the questions.

4.3.3.1 Section 1: General Information

This section aimed at gathering general information about the respondent, and the important information including the information on respondent's job title and qualifications. This information helped in assessing the respondent background and his experience in the field of environmental issues in his organization.

The analysis of the replies received, and the results showed that 13% of the respondents were responsible for environmental issues at their companies, while 87% of the respondents were from top management and administration staff. It is to be noted that during the communications with the companies regarding conducting this study, the representatives from the senior's management were contacted to get an acceptance of participation in the study. This aspect reduced the non-responsiveness, neglect, or delay in submission of replies from the Respondents and minimized the time and efforts in making further request for providing replies or follow-up.

It is believed that the senior managements were preferred to complete the interview questions and fill the questionnaire because they deal with the information or data which may be confidential and not to be shared with other competitors. Best efforts were tried to deal with the concerned staff directly who were in-charge on the environmental issues but not all companies allowed to contact them.

4.3.3.2 Section 2: Company Environmental Status

This section aimed at exploring the environmental status of the companies. The questions were as follow:

Q.1 Does your company have a formal environmental policy, which includes a commitment to legal compliance, continuous measurement, and continuous improvements in environmental performance?

Table (4.8): Percentages of answers to the question 1

Yes		**No**	
No. of responses	%	No. of responses	%
79	87.8	11	12.2

As shown in Table 4.8, an absolute majority (87.8%) of companies have an environmental policy. It should be noted that this policy is part of the environment, health, and safety policy, which is a positive sign for companies that have not yet implemented SDGs but still have an environmental policy. In contrast, 12.2% of companies do not have a policy.

Q.1.1 Which issues covered by this policy? Specify the issue(s) covered by this policy.

Table (4.9): The number of responses and percentage to the question 1.1

Issues	No. of responses	%
Energy consumption and greenhouse emissions	51	56.7
Water quality and consumption	45	50
Air quality	56	62.2
Waste reduction/recycling	79	87.8
Responsible Chemical Management	44	49

The issues mentioned above are related to the company's activities; therefore, each company has a different scope of activities. Thus, the percentage of each issue has reflected on the importance and priority and might be considered a significant aspect. In addition, the highest result shows that 87.8% were confined to waste management aspects, and 62.2% for air quality. This result indicates that these companies are aware of the negative impacts of those issues on the environment and quality of life.

It is clear from the results mentioned in Table 4.9 that there is environmental consciousness and seriousness among the companies regarding developing an environmental policy. It could be interpreted from the interviews' results that the companies actively considered the environmental issues in their management plans, even though the companies do not have an environmental policy. Further, it revealed that the companies believe in the utmost importance concerning the trustworthiness of international environmental certificates such as ISO 14001, which will assist in effectively

controlling environmental aspects towards sound environmental management. Overall, the results showed that the assessments are very positive and reflect the importance of environmental issues in the large industrial sector. That would lead to an increase in the motivation of other companies to include the environmental issues in their environmental policy.

Q.1.2. Does your company have annual (other: a three or five-year period, for example) objectives and activities to tackle the issues covered by the environmental policy?

The results showed that 88.6% of the companies have annual objectives and activities to tackle the issues covered by their environmental policy, whereas 11.4% answered "no". Due to its importance, one would strongly recommend, those companies' that have answered ‘no’ to review their objectives to be able to measure their performance and to ensure continuous improvement towards effective compliance.

Q.2. Does your company have an environmental management plan/program in-bound to monitor the environmental impacts?

The assessment of environmental management plan is a more delicate question especially for the companies that not yet think in the implementation of SDGs. The results showed that only 14 out of 90 companies have an environmental management plan or programs to control and monitor their environmental impacts.

Q.3. Does your company have a formal health & safety policy in-bound, which complies with local regulations, and international standards?

This question is correlated to Question 1; all interviewees mentioned that their companies comply with and implement the local regulations of health and safety as required by law, whereas 69% have a formal policy. And most of the companies are certified with an international standard such as ISO 45001:2018 for occupational health and safety. Further, most companies prefer a comprehensive policy that includes environmental, health, and safety issues. Thus, this perspective could lead to establishing an integrated and comprehensive system that may cover all the scope of services by these companies.

It is believed that for a better understanding of the environmental dimension, the following questions were substantial and aimed to investigate the companies' environmental situation concerning the control and the minimization of their environmental impacts.

Q.4. In the last five years 2015–2020, did your company invest in reducing the environmental impacts?

Q.4.1. If yes, why did your company invest in the last five years 2015–2020 in reducing the environmental impacts?

The interviewees were asked about their efforts which have been spent in five years in reducing their environmental impacts and their reasons, it was found that 62 companies said ‘yes’, and the reasons were as follows: corporate responsibility to save the environment; to cope with new challenges; to

improve environmental performance; legal compliance; towards enhancing sustainability practice; cost-saving; part of CSR; safe employees health; continuous improvement, improve the quality of the environment; avoid complaints; resource efficiency; create opportunities, and meet international standards. Also, the interviewees were asked to provide some examples of their effort's which are summarized in the following table:

Table (4.10): Examples of the efforts and projects of the companies in reducing their environmental impacts

Issues	Examples
Air quality	• Online monitoring emissions. • Recover CO_2 and reuse it. • Installation of bag filters, which are one of the main elements of minimizing both dust and Gas (Fume) in air. • Change of process to reduce VOCs • Installation of local exhaust ventilation for welding activities to reduce smoke and air pollution. • Certify ISO 14064 (Carbon footprint) to reduced carbon footprint generation. • Changing old technology with new high technology. • Installation of high technology that contains no emission. • Reducing GHGs emissions from design. • Planting trees.
Wastewater management	• Adding new filtration stage in the Effluent Treatment Plant (ETP) unit • Revamping and upgrading Effluent Treatment Plant (ETP) system for water and chemicals treatment. • Modification solvent recovery plant. • Installation of Effluent treatment plant. • Neutralizing chemicals before draining it. • Treat and reuse of wastewater and reject water.
Waste management	• Installation of waste treatment plant • Increase recycling volumes. • Installation of concrete reclaimer to recover sand and aggregate from fresh waste concrete • Deactivating the residual of some chemical to ensure that impact at the lowest level. • Incineration of Hazardous & Non- Recyclable Wastes. • Electronic waste processing for recycling.

Issues	Examples
	• Export solid chemical waste for incineration. • Reducing waste generation, reusing, aiming to zero waste. • Building waste fiber recycling plant that contribute to reducing waste quantities. • Installation of a new production line to recycle generated waste instead of disposing off. • Waste reduction - 5% yearly. • Introducing waste segregation programs • Waste minimization (50% sludge less),
Energy efficiency	• Installation of Solar Plant • Installation of LED lighting. • Installation of 290kW Solar Power Plant • Energy conservation. • Installing of more efficient equipment. • Mechanical equipment maintenance • Installation of power manager to reduce energy consumption. • Insulation of buildings
Resource management	• Monitored diesel consumption • Reducing raw materials • Reducing water consumption • using the bio-degradable materials • Sustainable projects

Q.4.2. How is the current environmental situation in your company compared to last five years?

As a result of the above questions, it's clear that the environmental situation has been improved in the industrial sector, this was evident in the high percentage (83%) of interviewees that reported their environmental status is better than that in the past five years ago (as illustrated in Figure 4.7). Interestingly, the interviewees were mainly focused on technological improvements' role as highlighted in question 4.1.

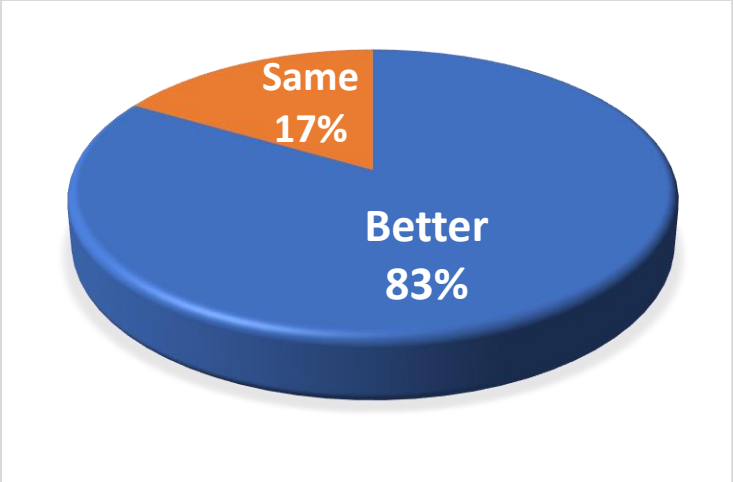


Fig. 4.7: The responses of the interviewees on Question 4.2

It is believed that the following questions were important to investigate the environmental situation of companies and its relationship with the governmental authorities responsible for environment, health, and safety. Also, to support the result of question (4).

Q.5. Does your company receive any violation(s) notices by the Health & Safety Authority or Environment Agency in the past 5 years?

Interestingly, the majority (78%) of interviewees said that no violation notices were received in the last five years, whereas 12% said 'yes'. Nevertheless, the violations mentioned are minor and unintentional, such as slight exceedance of some air parameters, expired licenses or permits, chemicals storage conditions, and improper waste sorting. All interviewees stated that they comply with the instructions and requirements by law to remedy the violation in a short time and under the supervision of environmental authority.

This result revealed that compliance with national environmental regulations is high in the large industrial sector, and it is consistent with the results of question 4.

Q.5.1. How often the governmental environmental inspectors visit your company?

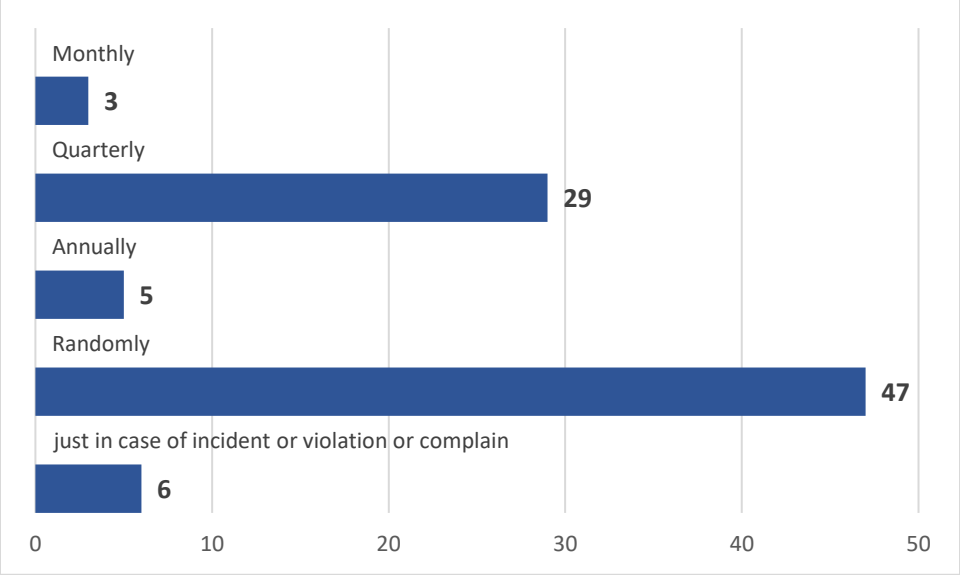


Fig. 4.8: The responses of the interviewees on Question 5.1

Based on figure 4.8, the results revealed that 47 of the interviewees stated that the environmental inspector visits their companies randomly, whereas 29 of the interviewees stated that the environmental inspector visited their company quarterly; while 6 interviewees stated just in case of incident or violation or complain, 5 interviewees stated annually, and 3 interviewees stated monthly. None of the interviewees mentioned that inspectors are visiting them half-yearly.

Q.5.2. For which of the following reasons has the inspector visited your company?

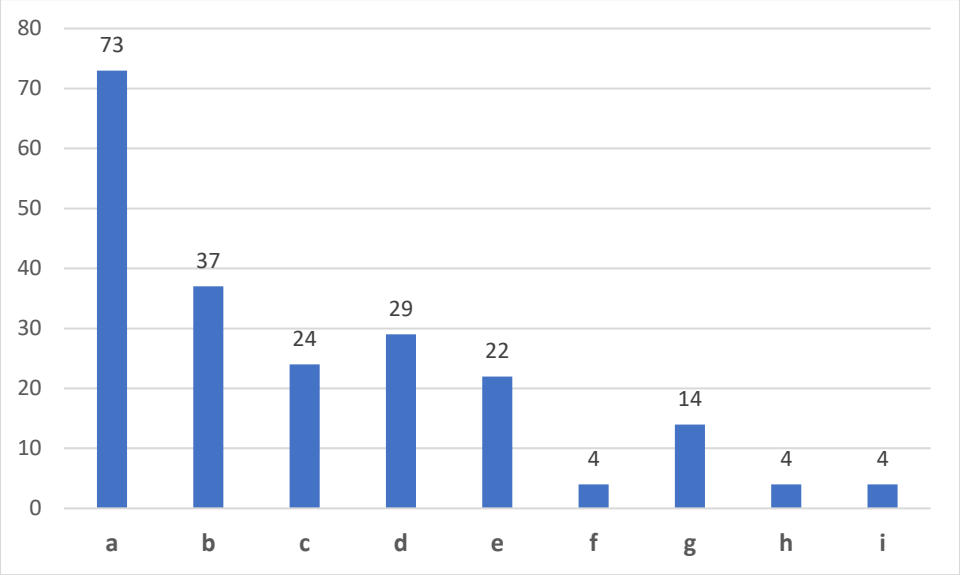


Fig. 4.9: The responses of the interviewees on Question 5.2

a. Routine or randomly visit, **b.** Compliance with regulations, **c.** Compliance with emissions permits, **d.** Compliance with the industrial waste disposal permits, **e.** Compliance with work environment conditions, **f.** Check and investigation of complaints, **g.** Request from company, **h.** Complain from the community, **i.** Other (please specify).

Based on figure 4.9 on a more specific question to specify the reasons for inspection visits, the results indicated that the majority (81%) of the interviewees stated that the environmental inspector visited their companies as a routine or random visits, while 37 (41%) of the interviewees stated that the inspector visited their company to check the compliance with environmental regulations. Whereas 29 (32%) stated that the visit was to check the compliance with the industrial waste disposal permits, while 24

(26%) stated the reason is to check the compliance with emissions permits, and 22 (24%) stated the reason is to check the compliance with work environment conditions. Other reasons which the interviewees mentioned were a request from a company 14 (15%), and the remaining reasons are to check and investigate complaints, complain from the community, and other reasons.

From an environmental perspective, it is observed that the relationship between environmental authority and companies is very important to ensure that environmental issues are undertaken and addressed appropriately. Furthermore, the joint working is assessing the enhancement of the cooperation and coordination to protect the environment from any type of pollutions and damages.

Q.6. Are other environmental issues like biodiversity being considered by your company?

This question explores the companies' concern on other environmental issues other than that required by law, such as self-environmental initiatives. The result revealed that the majority 59 (65%) said no. This result underscores the importance of more investigation into the companies' concern towards the environment.

Q.7. What are the primary challenges in your company impeding minimize the negative impacts on the environment?

Most of the interviewees stated the lack of finances is the main challenge to tackle the negative impacts on the environment. The same can be said about technological challenges because it is related to the availability of financial resources. Besides that, a lack of expertise and knowledge is another significant challenge. Other challenges are a lack of workforce awareness and training. These challenges comprise a real obstacle to minimizing the negative impacts on the environment.

Therefore, there is a need to study those challenges in-depth in terms of the best available eco-technology and economic perspective that may contribute to the improvement of the quality of the environment. This also, encourage the companies to address environmental concerns and compliance as a priority in their plans.

Q.8. Do your company schedule training/awareness programs to enhance environmental responsibility?

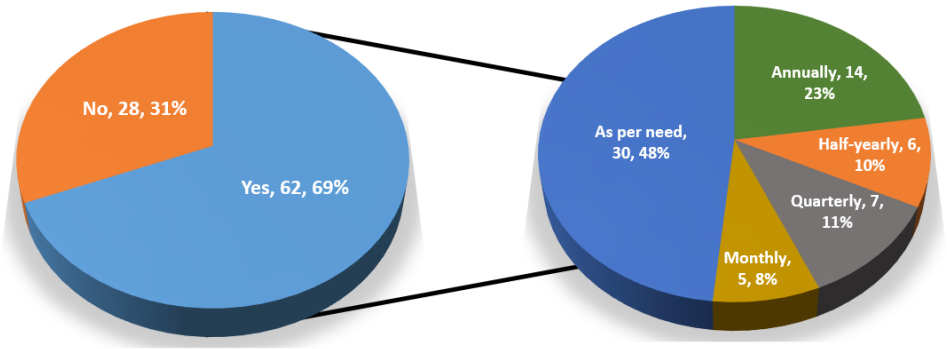


Fig. 4.10: The responses of the interviewees on Question 8

As shown in figure 4.10, a high percentage (69%) of companies have offered training programs in the field of environment, while 31% of the companies have not done so. Therefore, this is a clear commitment of the companies to raise the capacity building of their staff/officers in the environmental field, to protect the environment and comply with regulatory requirements. Consequently, ongoing training programs are an essential key tool in improving the environmental performance of companies.

4.3.3.3 Section 3: Environmental Sustainability Reporting

This section aimed at exploring the situation of Environmental Sustainability Reporting in the companies.

Q.1. Do you have any idea about the "Sustainable Development" concept?

The questionnaire results showed that 83% of interviewees had an idea about sustainable development concept, where not everyone has a piece of sufficient knowledge on the subject. During the interview, some interviewees were declared they have simple knowledge, mainly about the definition, while not all of them knows the three pillars of sustainable development. The reasons for the weak knowledge on sustainable development subjects could be the lack of competence, capacity building, expertise, time, training, motivations and not being included in the company plan objectives.

The concept of sustainability certainly exists within the large companies' sector and most importantly in comprehending what sustainability means to the company and how to make it one of the objectives and priorities.

Besides that, the motivations to integrate sustainability concept and the approach to identifying priorities.

Q.2. Does your company publish an annual sustainable or environment report?

Q.3. Does your company have KPIs (key performance indicators) of sustainability?

Environmental reporting is an important practice that documents the evidence of the environmental performance progress and the continual improvement efforts of the companies. In this question, some interviewees asked for clarification on the types of reports, so the researcher briefly explained the difference between the annual environmental report and sustainability report. All the interviewees mentioned that their companies submit an annual environmental report to the Supreme Council for Environment (SCE) (governmental authority) to disclose their compliance with the law requirements. Whereas six companies have sustainability reports and key performance indicators (KPIs) of sustainability.

The employment of KPIs pertinent to the SDGs provides a critical bridge among prioritizing the goals, including them in business planning and its strategy, that will lead to better reports. Thus, the company should set goals and KPIs and link them with its aims, and its report will show how they are taking tangible actions toward the SDG's implementation.

The result clearly shows that the great majority of the companies considered the submission of the annual environmental report sufficient; to

cover the adherence to SCE standards to comply with national environmental legislation.

Q.4. Does your company have an environmental management information system to maintain disaggregated records?

If yes, does your company evaluate this system to check its compatibility with the local regulations requirement?

A total of 56 companies said that they have an environmental management information system to maintain disaggregated records; however, not all of them evaluate the system to check its compatibility with the local regulations requirements. Further, most companies have simple system of environmental records such as lab analysis reports, waste disposal permits, and inspection reports.

The following sets of questions seek the company's monitoring system for some environmental aspects, which are wastewater, waste generation, fuel consumption and air quality, and if the response is yes, they were asked about the frequency of data collection.

Q.5. Does your company monitor wastewater/water quality?

Q.6. Does your company monitor all kinds of waste generation?

Q.7. Does your company have record on fuel usage and type?

Q.8. Does your company making efforts to monitor air quality including greenhouse gas emissions?

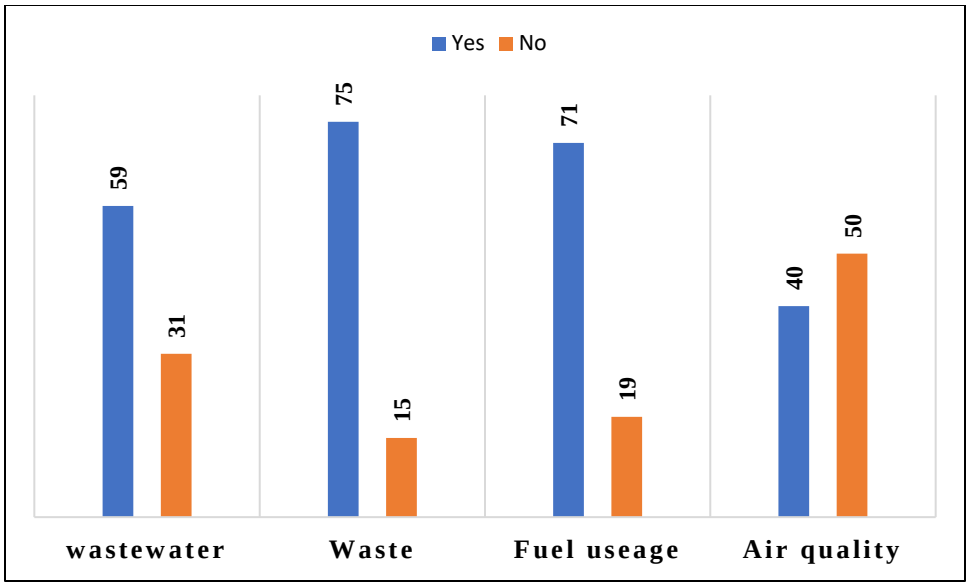


Fig. 4.11: The responses of the interviewees on Questions 5,6,7 & 8

Figure 4.11 showed that, waste is the most monitored aspect, while the least is the air quality. Further, the monitoring of fuel consumption aspect is higher than the wastewater, and waste monitoring is slightly more than the fuel consumption aspect. The results revealed that the companies pay attention to those environmental aspects, and the variance of the results is due to the variety of companies' activities. Further, the interviewees have considered the monitoring task to be a major challenge for compliance; besides that, they mentioned that monitoring of waste generation, wastewater and air quality aspects are carried out in accordance with legislation requirements, such as Ministerial Order No.2 of 2021 concerning the Environmental Standards for Air, and Ministerial Order No.3 of 2021 concerning the Environmental Standards for Water. Regarding the frequency of data collection, it appears that it is mostly carried out monthly.

The following questions complete the purpose of the above set of questions regarding internal monitoring measures taking by companies.

Q.9. Does your company enacted and implemented relevant measures of energy efficiency management and energy conservation?

Q.10. Does your company enacted and implemented any relevant measures of all kinds of waste disposal?

The results showed that 65 companies enacted and implemented energy efficiency and conservation measures, while 79 companies enacted waste management measures. This result indicates that companies pay great attention to the waste management aspect and confirming the results of question 6. In addition, the interviewees mentioned that these measures are part of their environmental policy and are subject to periodic review whenever the need arises.

4.3.3.4 Section4: Sustainability and Sustainable Practices

Q.1. Does your company have a formal written plan/strategy describing the purposes and objectives of the commitment to sustainability?

- **Does your company have created certain positions and committees, which reinforce this commitment?**

Interestingly, the results showed that 28 interviewees said their companies have a formal plan or strategy containing objectives of the commitment to sustainability. While most companies did not have specific positions or

committees to reinforce the plan or strategical commitment, most interviewees referred to the top management in this regard. The results of the following sets of questions are related to the questions of Section 5.

Q.2. What actions or initiatives your company has taken towards environmental sustainability?

This question revealed the companies' key sustainability aspects in their plan or strategy. To better understand the outcomes of the interviews, information was classified as per environmental aspects, which were summarized and categorized in the table 4.11.

Table (4.11): Summary and category of the "actions and initiatives" as per "sustainability aspects".

Sustainability aspects	**Actions and Initiatives**
Waste Management	• Waste monitoring and control. • Waste treatment • Recycling • Go paperless • Reuse of materials • Reducing waste generation • Plan to reach ZERO landfilling and incineration by end of 2022 • Convert waste to by-products • 50% reduction of virgin plastic in packaging by 2030 • Improving waste KPIs.
Water Management	• Reduce water consumption. • Improvement and upgrading Effluent Treatment Plan (ETP). • Recirculate the cooling water. • Reduction in water footprint by 2040.
Air Quality	• Emission monitoring and control • Improve the environmental footprint • Carbon neutral by 2040, 50% reduction in product carbon footprint by 2030.

	• 65% reduction in GHGs emissions in operations by 2030. • Net zero commitments toward Scope 1, 2 and 3 emissions.
Energy Efficiency	• Renewable energy: install solar power, panels. • Energy reduction. • Reduce the Greenhouse Gas emissions by 5000MTs globally. • 100% renewable electricity by 2030. • Heat recovery.
Resource Management	• Resource conservation. • Research BAT (Best Available Techniques) for the environment. • Using more efficient materials. • Using alternative resources. • Using sustainable materials. • 50% of net revenue from more Sustainable Products by 2030.
Others	• Implementing the plantation at working sites. • Noise reduction • Preventive maintenance. • Awareness programs. • Compliance with legal requirements. • Implemented ISO 14001 and other ISOs' certificates. • Consultation, cooperation, communication with the Supreme Council for Environment • Partnering with customers to deliver a more sustainable world (i.e., Sustainability Pathways: Decarbonization, Resource Stewardship, Asset Sustainability and Environment and Society) • Refer to sustainability reports.

Q.3. What kind of sustainability practices have been adopted at your company?

This question investigated the adopted sustainability practices in the companies. The companies interviewed cited existing practices on sustainability issues, which were summarized and categorized in the table 4.12.

Table (4.12): Summary and category of the sustainable practices as per sustainability aspects.

Sustainability aspects	**Sustainability practices**
Waste Management	• Reuse and recycling practices • Waste Minimization and reduction • Waste treatment • Monitoring waste generation and setting targets to reduce it. • Landfill and incineration reduction and eventually elimination. • Zero waste to landfill
Water Management	• Conserving water • Effluent Treatment Plan (ETP) enhancement • Recycle the water used in operation • Reduce industrial effluents • Reducing the company freshwater usage.
Air Quality	• Emission monitoring and control • Reducing GHGs
Energy Efficiency	• Energy reduction/saving • Adopting clean energy • Install solar panels • Monitor the power consumption
Resource Management	• Resource conservation • Control raw material quantity • Using sustainable materials • Making products sustainable • Use of more efficient materials • Enhancing the product quality • Use of recyclable materials • Avoid unnecessary resource consumption. • Use of sustainable technologies
Others	• Incident reporting • Noise Reduction • Publishing sustainability report • ISO 14021 for Environmental label declarations • Compliance with legislatives standards

Q.4. To what extent are company's sustainability practices have been integrated into the business plan and strategy?

The answer to this question complements the above questions. The interviewees elaborated on their plans or strategies. It turns out that most of the practices are part of their annual business plans; sustainability plan and strategy; quality, safety, health and environmental (QSHE) policy; ISO 14001 requirements; part of the new projects; marketing strategy; governance framework, and part of the integrated management system.

The interviewees in the companies that started sustainability reporting in 2016 emphasized that sustainability practices had an affirmative impact in focusing attention on performance and the significant environmental aspects, and the development of environment performance KPIs. Further, the companies have supported the environmental activities, initiatives, and programs, which are directly related to the main issues of the business to strengthen the sustainability practices.

Q.5. Does your company provide training (e.g., short courses, workshops) to encourage the employees to consider sustainability issues?

Almost half (43 out of 90 companies) of companies provide training concerning sustainability practices to their employees. The type of sustainability practices is mentioned in question 3, table 4.12.

It is worth mentioning that the companies need to conduct training programs due to the various tangible benefits that include: assisting in creating

an environmentally aware culture, improving the corporate environmental policy based on continuous improvement principle, strengthening liability, compliance with regulations requirements, employees' understanding of their responsibilities and liabilities, a positive image to stakeholders, motivating employees to become stewards of the environment, encouraging employees to participate actively in proactive environmental management, empowering employees to partake in the environmental improvement; and that will lead and assist the company to attain the environmental excellence.

Q.6. To what extent are company's employees involved in sustainability initiatives?

The extent of the companies' employee's involvement in sustainability initiatives varying from weak to strong; that depends on the opportunities available to employees to participate in environmental initiatives, besides the employees' knowledge and experience to augment the environmental efforts. There were similarities in the ways that the companies approached the issue involving the employees in sustainability initiatives, including meetings, handbooks, campaigns, initiatives, training, and awareness. Overall, all the companies agree on the importance of the engagement of employees in sustainability issues.

The interviewees in the companies that started sustainability reporting in 2016 emphasized that their companies encourage the employees to contribute by suggesting ideas and recommendations on the environmental issues; for instance, one of the companies has a "good idea" initiative, another company established a reward scheme to encourage employees following best practices.

More than one company said that the employees are usually involved in the environmental management certifications cycles, such as ISO 14001 and ISO 45001, which play an efficient role in enhancing the employees' experience and skills.

Consequently, employees' attitudes and behavior are a pre-condition and critical factor that determines the extent of engagement and responsibility towards the company's environmental issues. Another important factor is the level of environmental awareness of the employees which is a benchmark of their participation and contribution to the environmental efforts. Furthermore, employees' engagement will establish proactive responses, and they will be more interested in improving the working environment.

Q.7. What are the key factors that support the progress of environmental and sustainability issues at your company?

The following are the key factors mentioned by the interviewees that may support the companies in the progress of environmental and sustainability issues.

1. Improvement in compliance to environmental legal standards.
2. Involve the stakeholders.
3. Corporate social responsibility (CSR).
4. Strengthening the HSE departments.
5. Engage the employees in progress issues.
6. Implement environmental initiatives.
7. Promote environmental education, awareness, and knowledge.
8. Environmental and sustainability reporting.

9. Corporate environmental responsibility (CER).
10. Setting environmental target and objectives
11. Ethical and moral obligations.
12. Setting KPIs for sustainability reporting.
13. Top management commitment.
14. Financial factors, e.g., incentives and government subsidies.
15. Establish committees that follow up on initiatives and improvements.
16. Government support.
17. Certify the international environmental standards e.g., ISO 14001.
18. Strong governance.
19. Improve and enhance the employees' skills and qualifications.
20. Setting efficient monitoring system.
21. Reduction of hazardous waste, wastewater, air emissions, and energy consumption.

The interviewees mentioned that considering the key factors that support the progress of environmental and sustainability issues will facilitate designing the business plan and strategy and make the employees more aware of the key environmental issues. Further, interviewees emphasized that those factors are essential to improve the reporting system and sustainability performance. Therefore, some companies incorporated occupational health and safety targets into integrated plans linked with social and environmental aspects. Further, some companies consider those factors in the KPIs set. While some companies said they lack knowledge on how to identify the key factors that may impact disclosing the environmental issues in the reporting cycle.

Q.8. Does your company allocate a budget for research and development (R&D) specifically related to environmental matters?

The results revealed that most of the companies (71%) 64 mentioned 'no' and 26 (29%) 'yes'. Most interviewees said that their companies allocate budgets as per need, as per project requirements, or assign the task to a third party. Therefore, this provides evidence that R&D is not a priority in the industrial sector.

4.3.3.5 Section 5: Sustainable Development Goals (SDGs) Status

This is the most important section and based on structured interview, aim to explores the existing and future implementation of the SDGs in the context of thirteen questions. Questions 1 to 4 must be answered by all interviewees and if the answer to question 4 is "No", the interviewees were asked to answer questions 8 to 13. If the answer to Question 4 is "Yes", the interviewees were asked to answer all the questions, and this condition was applicable for 8 companies only.

Q.1 Have you read the UN's Sustainable Development Goals (SDGs)?
Q.2 How important is implementing SDGs in your company?
Q.3 Are the company's employees aware of SDGs?
Q.4 Does your company starting the implementation of the SDGs?

Interestingly 40 out of 90 interviewees read the SDGs and said it is important to implement in their companies. Whereas 50 interviewees have no idea about SDGs and do not know whether it is important or not to their

companies. Regarding companies' employees, only 7 interviewees said that the company employees know about SDGs and 9 interviewees said only the top management is aware of SDGs. In sum, only 8 companies had started implementation of SDGs.

Q.5 How did your company choose the starting point for implementation?

Six companies out of 8 said their starting point for implementation of SDGs was by focusing on the SDGs that are related to the company's activity and one company said their starting point was by focusing on the SDGs that have a direct impact, while one company said their starting point was by focusing on the SDGs that are related to company activity, and that can contribute positively, and that have a direct impact.

Q.5.1. which of the SDGs are most relevant to your company?

Q.5.2. Which of those SDGs require most urgent action?

Only 7 companies out of 8 answered these questions, as following:

Table (4.13): The most relevant and most required action SDGs

Company	Most relevant SDGs	SDGs require most urgent action
1	All	All
2	13	13
3	3,5,6,12,15	3,5,6,12,15
4	3	15
5	6,12	12
6	3	12
7	3, 7, 9, 13	3, 7, 9, 13

Q.5.3. Accordingly, does your company amend/update its plan or strategy in line with SDGs requirement?

Q.5.4. Does your company utilize a specific assessment tool to track the implementation progress of the SDGs (e.g., GRI)?

All the 8 companies were amending and updating their plans and strategy with the SDGs requirements. While 7 companies were utilizing the GRI as an assessment tool for reporting the implementation progress, and one company did not specify the assessment tool.

Q.6. Does your company reviewed and adopt the SDGs indicators? if yes, please answer the following questions.

Q.6.1 Do they cover all environmental aspects of your company?

Q.6.2. Are the data and information of your company compatible with SDGs indicators requirement?

Q.6.3. Have you found the SDGs indicators sufficiently defined and measured?

Only 7 companies out of 8 answered this question, 6 companies were reviewed and adopted the SDGs indicators, whereas one company did not. And 5 companies said that the SDGs indicators covered all their environmental aspects, whereas 2 companies did not. Further, one company said their data and information are compatible with SDGs indicator requirements, whereas 6 companies did not. Furthermore, 6 companies found the SDGs indicators sufficiently defined and measured, whereas one company did not.

Q.7 Does your company have an action plan to implement the SDGs and ensure their attainment? if yes, please answer the following questions.

Only 5 companies said ‘yes’, whereas 2 companies did not.

Q.7.1. What are the future strategies/opportunities linked to the SDGs?

Interestingly, the companies mentioned some future opportunities that are linked with SDGs. It is indicating that the companies will be able for competitiveness to industrial opportunities at the national and international levels when the capacity building of companies is established based on sustainability practices. Some interviewees said that the SDGs provide a unique opportunity to review the existing policies and strategies toward sustainable value creation in a business context. The companies’ future strategies/opportunities linked to the SDGs are as follows:

1- Scope 1, 2 & 3 net zero commitments.
2- Risk assessment and evaluation to tackle any impacts and conduct sustainable control measures.
3- Energy transition.
4- Sustainability pathways project direction via diversity and inclusion targets.
5- Innovation technology.

Q.7.2. Accordingly, what kind of projects that aim to improve sustainability do you consider to be more in line with your company's strategy?

The companies' projects that aim to improve sustainability are as follows:

1- Capture and storage of carbon dioxide.
2- Solar project to minimize energy consumption.
3- Marine biodiversity management and sea water quality management
4- Sustainable Solutions business process
5- Net zero road map and sustainability pathways
6- Alternative sustainable chemicals as per SDGs 3 and 12 requirements.

Although the industrial sector is a top priority in the country. It seems that most companies have not passed the phase for an understanding of SDGs, which indicates that there is an evident lack in how companies perceive the importance of SDGs and how to implement it in practice. Overall, trends from the interview give a strong feeling of positiveness about SDGs implementation as a path to success in the future. But they are not yet ready to make the necessary changes for SDGs implementation. Therefore, most interviewees faced difficulties mentioning projects or future opportunities linked to the SDGs.

Q.8. Does your company planned steps to strengthen the commitment to sustainability for preparing towards engagement in the SDGs?

According to companies' preparation to engagement in the SDGs, only 8 companies had started implementation, and 38 companies said they planned

step towards that, whereas 44 companies said not yet. Therefore, this provides evidence that the number of responses could consider a good starting point and sign of companies' awareness and commitment which indicates that sustainability is seen by companies as an essential environmental issue to be included it in their plans.

Consequently, the view on SDGs is changing. Therefore, the companies should confront and adapt to a range of challenges in the new industrial revolution that creates new business models in the context of SDGs. As a result, sustainability will become a part of the corporate scope based on accountability and responsibility.

Q.9. What are the main obstacles and challenges that hamper implementing the SDGs in your company?

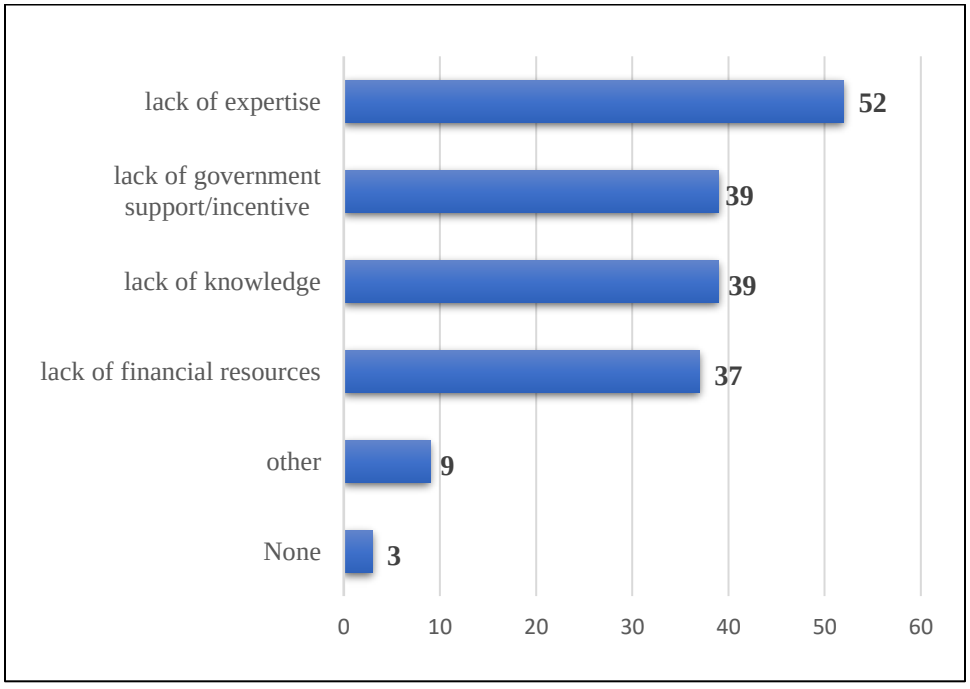


Fig. 4.12: The number of responses to question 9

As shown in figure 4.12 the major obstacle and challenge in the SDGs implementation is a lack of expertise, which is related to lack of knowledge as well. Another challenge is the lack of government support or incentive. Despite all the fanfare about financial challenges, the most significant obstacles are skills, knowledge, and experience. Furthermore, three companies said that there are no challenges now. The other obstacles and challenges mentioned by interviewees were:

1- Lack of clear vision and structured coordination between the government and large companies on goals and targets.
2- Lack of coordination among business sectors.
3- Lack of opportunities for investment and improvements.
4- Lack of initiatives to engage in the SDGs.
5- Difficulties in changing the behaviors and consumption patterns.

Q.10. What kind of assistance/capacity building does your company need for SDGs implementation?

The interviewees specify the required assistance to implement the SDGs, the following summarize the needed assistance:

1. Government support e.g., incentives.
2. Trainings to improve the top management mentality
3. Awareness, short training courses, consultations, knowledge, and expertise.
4. Financial support or initiatives.
5. Regulations, guidelines, and standards.
6. Sharing best practices and exchange the experiences among companies.
7. Survey studies.

8. Workshops, seminars, and conferences.
9. Feasibility studies.
10. Technology: new technologies and new innovations.

Q.10.1 Who could provide such assistance/capacity building?

The interviewees specify the following parties who can provide the assistance:

1. Supreme Council for Environment.
2. Government.
3. Academia.
4. Environmental consultants and experts.
5. UN agencies.
6. Business associations.
7. Research & Development.
8. Top management.
9. Chamber of commerce and industry.
10. Training and education institutes.
11. NGOs

Q.10.2 What are the most relevant stakeholders for achieving the SDGs?

The interviewees specify the most relevant stakeholders as in the following list:

1. Government authorities.
2. Shareholders.
3. Service providers.
4. Company employees.

5. Local community.
6. NGOs
7. Customers.
8. Trade associations.
9. Private sector.
10. Finance sector.
11. Clients.

Q.10.3 Which skills and expertise are most needed for implementing the SDGs?

The interviewees specify the required skills and expertise for the implementation of SDGs:

1. Business leadership skills.
2. Competence technical expertise with regards to best available technology.
3. Feasibility studies.
4. Experienced specialist.
5. Measuring, monitoring, evaluation skills
6. Technical.
7. Good communication between management and employees.
8. Collaboration and exchange of best practices among industries.
9. competent team of environmentally and socially aware management who can drive these initiatives.
10. Data collection and analysis.
11. Long term planning.
12. Measurement and monitoring of SDG set targets

The responses to questions 10 to 10.3 are essential because they identify the type of required assistance, assistance provider, relevant stakeholders, and skills and expertise needed for achieving the SDGs. In addition, the feedbacks were based on the interviewee's position and occupation, and the company that has implemented SDGs or has not yet started the implementation. The interviews results indicate a particular emphasis on various essential needs and skills to adopt the SDGs. The interviewees expressed that the industrial sector is facing real challenges -more than before due to the COVD-19 pandemic impacts on the economy- of increasing competition in the global economy due to the gap of not implementing the SDGs and how to cope with the requirements of the Fourth Industrial Revolution (Industry 4.0) in the global market.

Q.10.4 Do you think that lack of engagement with the SDGs could become a reputational issue?

The most positive one; the majority of firms 70 % (63 firms) believe that the lack of engagement with SDGs could become a reputational issue. This result makes it clear that the companies are interested in engaging with the SDGs when the opportunity allows.

This claims the importance of the government's role to regulate a national roadmap to provocatively encourage and support the implementation of the SDGs in the industrial sector and to make this sector able to plan their contributions and how they impact the SDGs. Besides that, to establish a unified reporting system to measure the progress towards a sustainable future.

Q.11. Please rank five of the SDGs that you believe your company has the greatest impact.

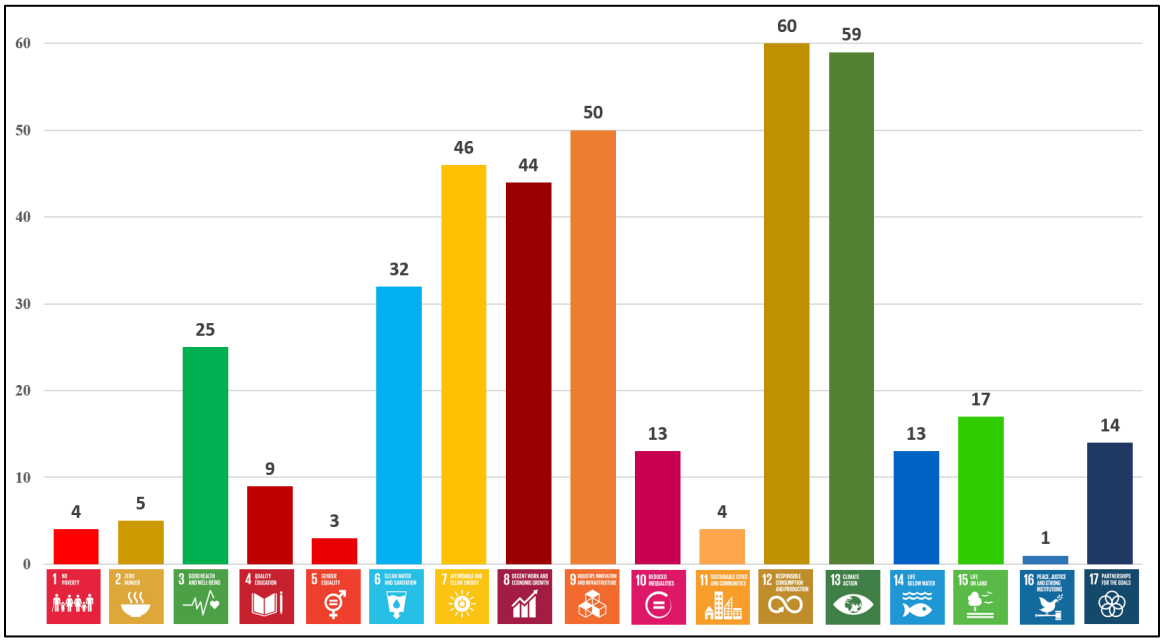


Fig. 4.13: The number of responses to question 11

The interviewees were asked to rank five SDGs they believed their companies could have a great impact on; the results (Figure 4.13) differ as per their point of view. The results revealed that both Responsible Consumption and Production (SDG 12) and Climate Action (SDG 13) are the top-ranked. The second place are Industry, Innovation, and Infrastructure (SDG 9), Decent Work and Economic Growth (SDG 8), and Affordable and Clean Energy (SDG 7) have almost the same ranking. Further, Clean Water and Sanitation (SDG 6) and Good Health and Well-being (SDG 3) have ranked moderate. Whereas the other SDGs received less ranking. At the same time, SDG 16 received the least ranking. Interestingly, all SDGs were ranked, although some received a low ranking.

Q.12. Please rank five of the SDGs that may represent a future business opportunity(s) for your company.

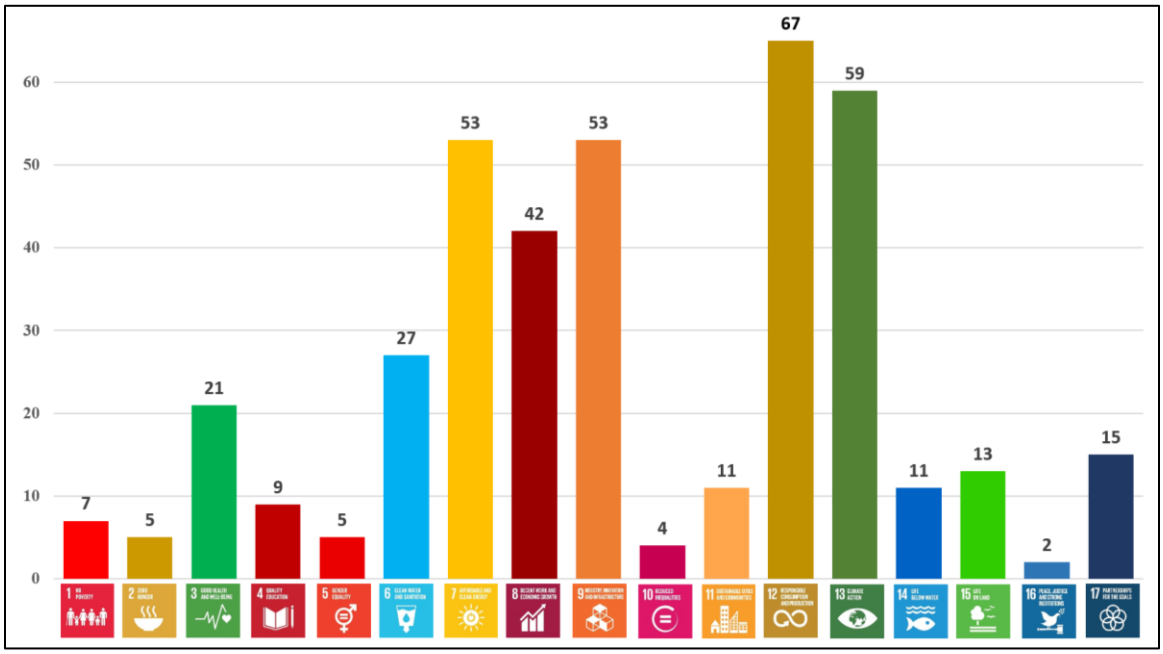


Fig. 4.14: The number of responses to question 12

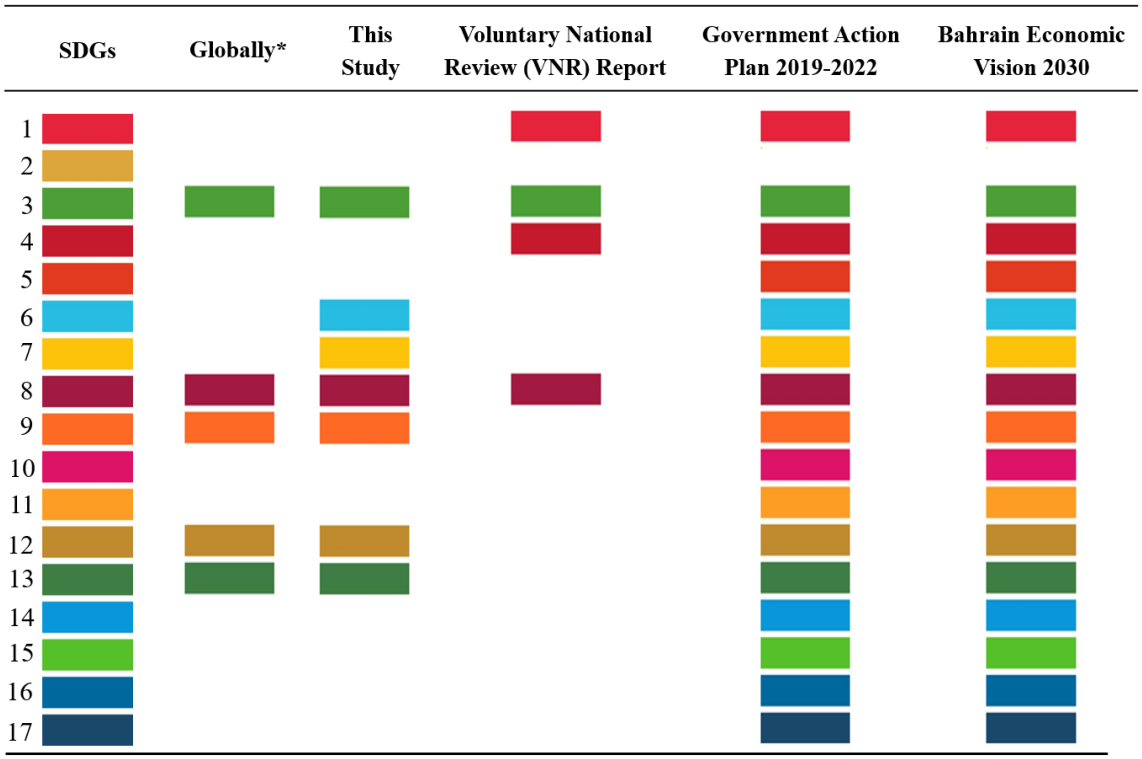
Again, the interviewees were asked to rank five SDGs they believed could represent a future business opportunity(s) for their companies; the results (Figure 4.14) differ as per their point of view. The results revealed that the high ranked SDGs are similar to question 11; Responsible Consumption and Production (SDG 12) and Climate Action (SDG 13) are the top-ranked. While, Affordable and Clean Energy (SDG 7) and Industry, Innovation, and Infrastructure (SDG 9) have the same ranking and scored second place. Whereas the third place is the Decent Work and Economic Growth (SDG 8). Further, Clean Water and Sanitation (SDG 6) and Good Health and Well-being (SDG 3) have ranked less than that in question 11. Whereas the other SDGs received less ranking. At the same time, SDG 16 received the least

ranking. Interestingly, all SDGs were ranked, although some received a low ranking.

The result of Figures 4.13 and 4.14 shows that the respondents attest to the fact that all the SDGs can be implemented by the industrial sector. This finding affirms the role of this sector in the implementation of SDGs. Further to draw on this result, there is a need to create cooperation and coordination mechanisms among the key stakeholders to drive the successful implementation process of the SDGs.

Concerning the less ranked goals namely, SDG 1 (no poverty), SDG 2 (zero hunger), SDG 4 (quality education), SDG 5 (gender equality), SDG 10 (reduced inequality), SDG 11 (sustainable cities and communities), SDG 14 (life below water), SDG 15 (life on land), SDG 16 (peace, justice, and strong institutions), and SDG 17 (partnerships for the goals); they seem to be the most related to company's core activity. For instance, SDG 2 was usually mentioned by food sector companies and SDG 14 by companies that produce industrial wastewater or effluents that directly affect marine environment. Despite that still, these goals are significant because these goals interlink directly or indirectly with goals that ranked high.

Table (4.14): The prioritized SDGs in the private sector at national and global level (author own depiction)



* Source of information: SDG Reporting Challenge 2019. Creating a strategy for a better world: How the Sustainable Development Goals can provide the framework for business to deliver progress on our global challenges. PwC network, www.pwc.com/sdgreportingchalleng.

Table 4.14 compares the SDGs ranking priority according to globally survey 2018, this study interview results, Voluntary National Review (VNR) report, Government Action Plan, and Bahrain Economic Vision. Concerning VNR, the government conducted three preparatory workshops aimed at prioritizing SDGs in Bahrain, one of them for the private sector, which affirmed that the priority SDGs were 1, 3, 4, and 8. While the Government Action Plan (2019-2022) in priority number 3: "Supporting an Enabling Environment for Sustainable Development", assured all the SDGs are a priority except SDG 2. The Bahrain Economic Vision embodies the SDGs at its core and is linked

with the Government Action Plan. At the global level, there are five top SDGs prioritized in the industrial sector, which agrees with the current study results. It is very clear that much consideration has drawn to the SDGs in both Government Action Plan and Bahrain Economic Vision, and both comprise the priority SDGs as per the industrial sector vision.

Table (4.15): Ranking of priority SDGs in the private sector at national and global level (author own depiction)

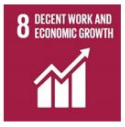
	Globally	Study	Voluntary National Review (VNR) Report
1			
2			
3			
4			
5			

Table 4.15 shows that the rank of SDGs varies between national and global levels. At the global level, SDG 8 ranked first, while ranked last according to this current study and ranked second in the VNR report. Only the second rank of priority goal is the same for global and this current study. Two SDGs (4 and 1) are a priority in the VNR report; however not a priority at the

global level and this study. Considering the results entirely, ranking the priority SDGs will unite the government and business perspectives. Further, it will lead to cohere the efforts of both the government and the companies and assist in embedding SDGs into the national strategies and companies' plans.

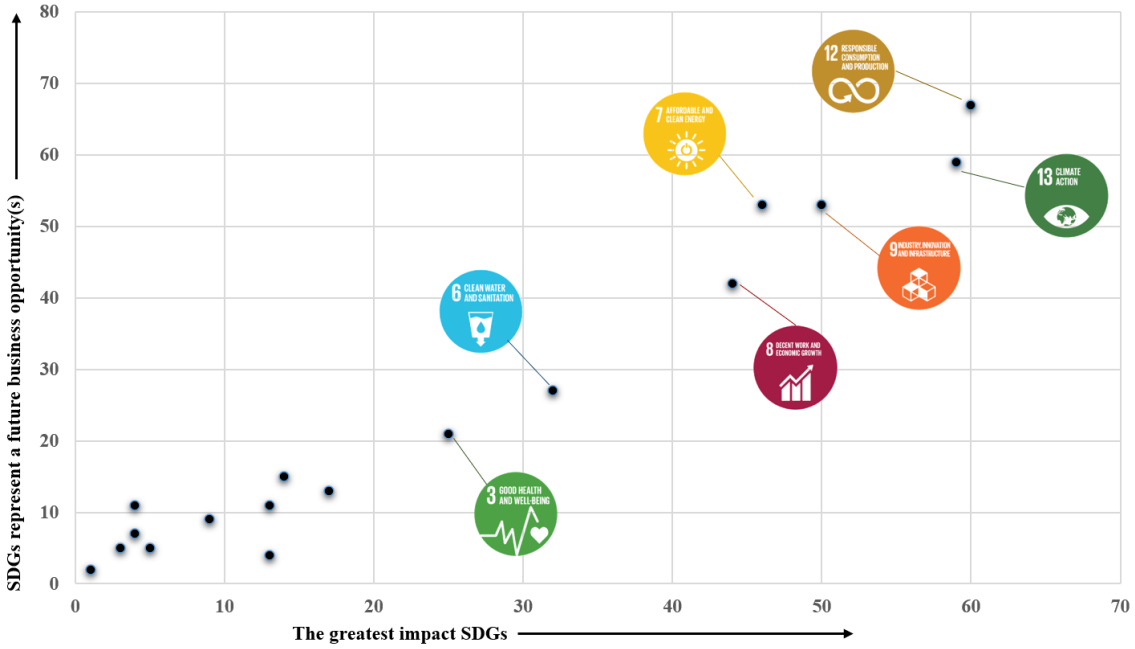
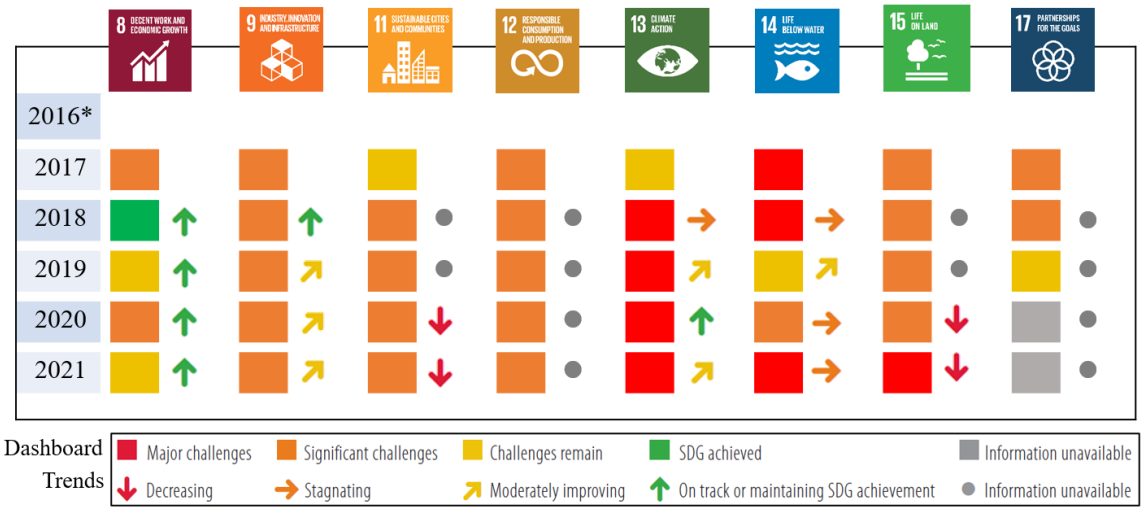


Fig. 4.15: SDGs represent a future business opportunity(s) vs. greatest impact SDGs (author own depiction)

Figure 4.15 depicts the future business opportunity(ies) of each goal in return for the most significant impact SDGs by the company. Conspicuously, five of the SDGs fall into the high-rank priority upper right-hand quarter. In particular, the companies are giving SDG 12 the higher ranked where the industry can have the most impact to make the highest contribution toward attaining the goals, followed by SDG 13. While SDGs 3 and 6 fall into the

middle ranking. In addition, the position of each SDG in the figure represents the level of significance ranking for the industry. Seven goals form 41% of the total SDGs; companies can effectively enhance their impact to create tangible value. The age of the SDGs global framework plan is15-years; almost half of its age has passed, and the clock has started tick to count down for the second half of the plan age. Therefore, each company should focus their activity on the SDGs where they can contribute vitally based on their strengths, capabilities, and experience and have the SDGs as a core part of their business plan towards advancing implementation.



* Bahrain is not included in the 2016 SDGs report due to insufficient data.

Fig. 4.16: Bahrain's SDGs dashboard and trends based on UN SDGs reports 2017 – 2021 (author own depiction, data sources: Sachs *et al*., 2016, 2017, 2018, 2019, 2020 & 2021)

Figure 4.16 represents the status SDGs dashboard and trends of Bahrain for the period 2017 - 2021; showed that Bahrain faces significant challenges in meeting most (57%) of the SDGs (9, 11, 12 and 15); whereas 20% of the SDGs (13 and 14) facing major challenges; while 15% the challenges have

remained, 5% of the SDGs facing absent of information, and only 2.5% of the SDGs is ahead to achieve. The 2021 SDGs report (The Decade of Action for the Sustainable Development Goals) stated that the "performance on SDG 13 (Climate Action) varies across Small Island Developing States (SIDS), with high levels of domestic or imported CO_2 emissions in some countries (for example, Bahrain and Singapore)" (Sachs *et al*., 2021, p. 31). Concerning the trends, both SDGs 12 and 17 are still facing data gaps since 2016. Only SDG 8 is on the achievement track, and SDG 9 is moderately improved.

Accordingly, from the above results, this current study expects that the concerned government authorities can benefit from the SDGs ranking as per companies' willingness to focus on the high ranked goals as a starting point, which could make the implementation performance more efficient and encourage them to embrace more SDGs in the future. Additionally, the companies could drive to work jointly with the concerned governmental authorities to focus on high priority SDGs in the national environmental agenda which may encourage the companies to SDGs reporting and increase their efforts to demonstrate their ability to localize the SDGs at the national level.

Q.13. What are the most urgent actions the private sector should take to increase resilience and ability to implement SDGs in the future?

This is an open question for the interviewees to express freely their opinions and feedback about the required urgent actions that can be taken by the private sector to increase their resilience and ability to implement SDGs in the future.

The most urgent need for action for SDGs implementation in the industrial sector is a governmental initiative and long-term partnership to make this sector sustainable through actual integration of sustainability into laws and regulations, which is the top priority.

In aspiring the opinions of some interviewees discussing the role of the government in implementing SDGs, this is what some had said:

> *"I think the starting point would need to come from the government to give clear mandate to the private sector bases on consultations and in-depth assessment. Then the private sector will have to implement objectives and targets and allocate the required resources to achieve these mandates. There must be periodic reports on the progress of implementation."*

> *"To have a clear information and support from Government agencies to implement SDGs."*

Most interviewees have repeated what they mentioned in questions 9, 10 and 10.3 concerning the challenges, assistance, capacity building, skills, and expertise. The following quotes are what some had said:

> *"Create economic opportunities, support the private sector in furthering their skills and connectivity through training and work experience, and encourage industrial innovation."*

> *"Increase awareness and education, training, sharing expertise and knowledge, sharing best practices, and financial assistance and subsidies."*

"Participate in efforts to improve environmental protection and understanding around the world and share appropriate pollution prevention technology, knowledge, and methods."

Concerning the most priority environmental issues that need most urgent actions mentioned by the interviewees are waste management (waste recycling and minimization, adopting sustainable consumption); climate change (control air pollution, reduce GHGs, renewable energy, and conservation energy); water management and water pollution (wastewater treatment, effluent and reduce water consumption); and resource management (reuse, purchase eco-friendly raw materials, minimize packaging materials). As indicated by interviewees that:

"Conserve natural resources by reusing and recycling materials, purchasing recycled materials, and using recyclable packaging and other materials."

"Develop, manufacture, and market products that are safe for their intended use, efficient in their use of energy, protective of the environment, and that can be reused, recycled or disposed of safely."

"Use development and manufacturing processes that do not adversely affect the environment, including developing and improving operations and technologies to minimize waste, prevent air, water, and other pollution, minimize health and safety risks, and dispose of waste safely and responsibly."

"Ensure the responsible use of energy throughout our business, including conserving energy, improving energy efficiency, and giving preference to renewable over non-renewable energy sources when feasible."

The interviewees ensured that from a private sector lens, the valuable lesson learned from the COVID-19 pandemic presents the importance of the comprehensive scope of SDGs and the needed urgent and forceful sustainable practice actions at global and national levels to conserve the environment to beat the implementation challenges. Further, the companies should seriously consider systematically embracing the 2030 Agenda accompanying SDGs as a framework toward a more holistic path to structure sustainability efforts. Therefore, the SDGs are considered an irreplaceable opportunity for companies to align them with their priorities, enhancing the collective global actions and impact more towards successful implementation.

The following quotes from what one of the interviewees pointed out that:

"We realize the importance of the environment and the significant damages caused by industries and other activities. To start long term planning to control the impacts of the business on the environment. The first action needed is to accept the SDGs as part of business requirements."

"Adopting the SDGs as an integral part of the strategic plans and goals and committing to supporting them. And today should realistically account for a budget towards SDGs implementation."



A



B

Fig. 4.17 a and b: Qualitative analysis of the interview and questionnaire responses by MAXQDA*

*MAXQDA is the world-leading software package for qualitative data analysis and mixed methods research.

Regarding the analysis of the groups of terms in the interview and the questionnaire, Figures 4.17 (a & b) showed that the aspect of “waste” is the

most common in the group of terms, and this result is consistent with the results of Table 4.9 and Figure 4.11. Therefore, it may be interesting to delve (to engage) into the context of the terms to see if the "waste" aspect has a relation to other terms. Then, on examining the table of results to compare the answers to the interview and the questionnaire, it turned out that the "waste" aspect has a relation with "air", “water”, "chemical" and "environmental management" aspects. Whereas the "financial" aspect carries a negative connotation with other terms, as it represents a challenge and an obstacle. Furthermore, the "waste" aspect has enough positive links to some terms, such as "reduce," "recycle," and "technology" as solutions, this result is consistent with the results of Table 4.11 and Table 4.12. The figure also illustrated that “impact” and “policy” terms are almost equivalent, which means the need for coherent policies to cut off the impacts of the industrial sector. Further, “sustainability” term has a positive connotation with other terms e.g., “energy” and “materials” as aforesaid (as mentioned) in Table 4.10. In brief, all environmental aspects are interrelated, and their importance varies from one company to another according to the nature of the activity, where it needs continuous monitoring and monitoring systems to comply with environmental regulations.

4.3.4 Conclusion

What is clear is that the existing situation of the industrial sector is not yet ready to adopt the SDGs. An important issue raised by the interviewees is that there are obstacles to improving the current companies' practice approaches unless the government provides

attractive triggers and initiatives to encourage them to embrace sustainability practices that drive the initiation of enforcing SDGs. Significantly, there is a need for the environmental accountability principle and legal liability that provides the base for sustainability governance and a unified understanding of the breadth to which companies integrate sustainability issues into their plans. The study revealed that the top five SDGs related to Bahrain's industrial sector are 12, 13, 9, 7 and 8 (priority ranked) and SDGs dashboard showed that Bahrain faces major challenges in achieving SDGs 9, 11, 12 and 15.

To perform any change in the company policy, the starting point is the top management. Therefore, the attitude of top management regarding the SDGs is a significant primarily factor in improving the environmental policy and arranging on incorporate the SDGs within the company's strategy. Further, they play a paramount role in motivating their employees to participate actively in the development process by providing valuable opportunities to raise their knowledge level, competency, and experience.

Chapter Five

CONCLUSIONS AND RECOMMENDATIONS

This chapter describes the study's conclusions and recommendations. It’s endeavours to represent the study into a synoptic summary of the essential findings that could be expanded beyond the study scope and reflected at the industrial scale in Bahrain.

This study investigates and analyzes the breadth and depth of the latest findings comprehensively wide range of current literature to identify the main issues on this sector's critical role that should play toward attaining the SDGs. Thus, this study contributes to the literature, and, to the best of my knowledge, it is the first of its kind to study a deep and broad understanding of the status of SDGs implementation and examine corporate SDG reporting efforts since SDGs adoption in the large industrial sector in Bahrain, thus contributing to the literature. Further, this study contributes to a new research area, specifically corporate SDGs reporting in the industrial sector. The analysis of SDGs reporting for three large companies, the current study enriches the understanding of reporting and calls for maximizing disclosures. Another contribution, by identifying the challenges and obstacles affecting the implementation of the SDGs, the current study affirmed that the industrial sector has paramount roles in the SDGs implementation and improving reporting system. This sector also can make a substantial difference in accelerating the implementation process.

The result of this study and analysis will assist in identifying and prioritizing the significant issues of sustainability for better environmental performance and encouraging other companies who did not yet plan or implement it to begin that. The study examines the sustainability reports of companies by analyzing the status of sustainability aspects in their materiality matrices to assist in identifying and prioritizing the most significant sustainability issues for advancement in their future reporting and to improve their environmental performance. Furthermore, the study indicates that the utilization of a materiality matrix as a reporting tool can define and improve report contents by considering stakeholders' views, consequently, improving the quality of the sustainability reports. Given the importance of sustainability in the industrial sector, the study's findings have value added for various stakeholders. Particularly, policymakers should seize the opportunity and continue their efforts to integrate the SDGs into national policies towards their localization.

5.1 Conclusions

The adoption of the 2030 Agenda for Sustainable Development aims to unify and strengthen the global environmental efforts and complement the previous environmental initiatives and agendas since the first conference on the environment in 1972. The continuous impacts of human activities in various sectors warn the destruction of the developmental progress of decades. Therefore, more than ever, there is an urgent need for the activation of the 2030 Agenda's vision and its SDGs to lead and harmonize the global efforts

towards conserving the environment in balance with the economic and societal needs.

In the perspective of the SDGs, it is obligatory for the private sector to support the implementation procedures, considering the social, economic, and environmental aspects. Nevertheless, the effective and practicable partnership among public and private sectors is the approach to create valuable opportunities and tackle the challenges toward achieving the SDGs in the assigned duration to succeed. Therefore, it becomes imperative that the private sector starts to modify its plans and develop strategies that could align with SDGs requirements. Indeed, the private sector has taken actions to advance SDGs via several voluntary initiatives that have already been implemented, such as CSR, circular economy, and other environmental voluntary initiatives on how this sector can provide its contribution to attaining the SDGs by 2030. Many researchers declare that the private sector holds powers to afford performing on the SDGs. Some recent studies uncovered that the companies that are CSR certified found their activities oriented toward SDGs. Other studies revealed that some companies themselves have initiated to understand their obligations and activities on their sustainability reporting.

For achieving SDGs, the private sector is facing several challenges such as lack of influential leadership; lack of harmonious partnerships (effective and practicable partnership among public and private sectors); shortage of investments, the dearth of implementation; measurable indicators with effective data collection; the exhaustiveness and complexity of interlinkages among the goals and their targets; lack of monitoring, and evaluating methods for assessing the progress of implementation; and the indicator specifications

and target monitoring. As a matter of fact, there is an urgent need for a reliable group of indicators to assist the private sector in monitoring the activities' impacts based on the environmental aspects related to the SDGs, to provide measurable data on the progress and the achievement of SDGs. The indicator specifications and target monitoring need continuous improvement. Hence, for gaining real and tangible results, the SDGs should be in line with the state's national strategies and plans. On the other hand, it is essential to understand the sequential connection among the SDGs, which will assist in specifying the prerequisite goal before planning to implement any other goal because some goals cannot be attained before the achievement of their prerequisite goals.

The private sector consists of a wide diversity of fields and complex activities. The industrial sector is the largest private sector and plays a vital role in the economy; therefore, there is a necessity to integrate sustainability into industrial development. Therefore, if the 17 SDGs are entirely but unevenly related to the private sector, all of them are related to all companies. Importantly, companies are supposed to direct their attention toward SDGs, which are related to their significant economic, social, and environmental aspects, and include them in the plans, strategies, and the management.

As SDGs reporting is too low over the period 2016-2020, it seems that companies are still in the decision process or have an insufficient understanding of the importance of SDG reporting adoption. Thus, it is the responsibility of the competent national authorities to promote the SDGs and make them relevant to various industries and how to capitalize on the benefits of adopting the SDGs. For improving, the reporting process inclusion of the SDGs indicators is recommended as a benchmark for measuring the progress,

facilitating data collection, and monitoring, and strengthening the cooperation and coordination among the public and private sectors. Besides that, it is recommended to update and reformulate efficient regulations in line with SDGs requirements.

Despite the reporting concept being acknowledged in the 2030 Agenda and its SDGs, clarifying the role of the private sector in contributing to the implementation of SDGs is not an easy task due to the broad scope of the 17 goals, 169 targets, and more than 230 indicators that address an extensive range of prime challenges at national and global levels. Therefore, there is a need for a considerable transformation of business models, plans, and strategies, specifically in terms of how this essential sector controls its operational impacts by creating balance among the sustainability pillars (society, environment, and the economy). After extensive investigation, this study reached a conclusion; among a large sector of Bahraini companies, “Bahrain Petroleum Company “BAPCO”, “Gulf Petrochemical Industry Company “GPIC”, and Aluminum Bahrain “ALBA” were found to have sustainability reports based on GRI guidelines.

Mentioning SDGs in company reports is an opportunity to measure the implementation of SDGs and to strengthen their disclosure. Despite the limited number of SDG disclosures, it is necessary to study the potential impact of SDG disclosures on corporate performance, and to critically identify the main related stakeholders who are more influential in increasing the number of these disclosures. The results showed that companies have started sustainability reporting; publishing reports on their websites reflects company responsibility towards the environment and society. The subsequent

sustainability reports showed tangible changes in the companies in terms of the quality of data presented in the reports, strategies, the role of related stakeholders, and reputation. Furthermore, this study focused on analyzing the sustainability reports to determine whether those companies have contributed to implementation of SDGs goals, targets, and indicators.

Materiality analysis is an essential part of both sustainability and integrated reporting, and it plays an important role in the disclosures. Therefore, a sustainability materiality matrix was used to identify significant related environmental aspects and outline the report content. The outcomes of the materiality matrix analysis in this study have confirmed the crucial role that the industrial sector plays in the implementation of SDGs. Thus, instead of having short-term goals of limited benefit, SDGs have widened the scope for multiple future expectations concerning what should be developed and sustained, and for how long. Furthermore, the materiality matrix analysis of the reports of all companies revealed a focus on sustainability-related aspects and commitments to stakeholder engagement. The purpose of stakeholder participation in a materiality matrix is to push companies to provide more transparency and better information in their reports. This study recommends that companies use materiality analysis as a tool for reporting to reflect their commitments and to improve the report content by utilizing GRI guidelines.

To achieve that, there should an earnest action to foster the policy coherence for sustainable development starting from the national level. Further, environmental policies should not be formulated in an isolated manner regarding the global environmental changes and challenges, and they must reflect the environmental obligations of the conventions and treaties

explicitly and systematically. To carry out the current legislations and make them more effective in Bahrain, there is a need to continuously enhance the legal and institutional capacity to cope with the emerging issues affecting the environment.

Furthermore, the environment cannot be reduced to environmental policies only, and they should be addressed in the national socio-economic development plans and strategies. Sustainability can be accomplished by amalgamating the legal policy aspects of the environmental, technical, economical, institutional, and socio-cultural dimensions. More specifically, the SDGs are a strong support point for the integration among the national legal tools, because it is not possible to deal with each goal individually and must be approached as a set. The extent of concern for the environment is clear from the government action plans. Therefore, the government should take a step forward to study, identify, and address the inadequacies of the existing environmental legal tools.

For the successful implementation of the SDGs, the national strategies and plans need to be strengthened by effective environmental legal tools, and this is a significant pillar in the field of sustainable development law and in the aim of Principle 10 of the Rio Declaration. Against this background, it is essential to highlight the significance of reviewing and scrutinizing the current environment legal tools to eliminate the gaps, deficiencies, contradictions, and repetitions, and to clarify the documents and language, which will strengthen the capabilities crucial for the successful implementation and enforcement of these legal tools.

5.2 Recommendations and the way forward

The following recommendations are based on the results of this study and literature review regarding the effective implementation of the SDGs by improving environmental legal tools in Bahrain. The national environment strategy and the state of the environment report were also taken into consideration. Recommendations can be considered as contributing and adding value material for policymakers and decision-makers to improve and accelerate the implementation process of sustainable development at the national level.

1. Amending the title and requirements of the environment report (quarterly or annually), which is requested from companies as per the terms of ministerial orders to the ‘sustainability report’, so that it is standardized and includes all environmental aspects (e.g., air emissions, wastewater, waste, chemicals, etc.) and is consistent with the requirements of sustainable development. It is time to adopt sustainability reporting into law. One of the aims of this study was to study sustainability reports to highlight their importance in enhancing the positive aspects of companies and to bring out the benefits of integrating SDGs into the reports.

2. Integrating the environmental dimension of the SDGs into policies; regulations is a substantial approach that should be given high priority. This depends on the level of awareness and effectiveness of the policymakers to translate it into practical actions, leading to the successful

implementation of the SDGs. Therefore, there is a need to raise the awareness of the policymakers to understand the importance of the SDGs.

3. The government should strategically recognize that the SDGs' era countdown has already begun and that the remaining period is 8 years. Therefore, there is a necessity to develop long-term plans for the environmental legal tools and strategies beyond 2030, and they should be subjected to periodic reviewing and updating so that they align with the emerging environmental issues by creating a participatory mechanism among the key stakeholders. This raises the importance of the government's role to regulate a national roadmap to encourage and support the implementation of the SDGs in the industrial sector and to make this sector able to plan their contributions and how they impact the SDGs.

4. At the national level, there is an urgent need for serious action to activate the vision of the 2030 Agenda and its core 17 SDGs by promoting policy coherence by amalgamating the legal policy aspects of the environmental, economic, technical, institutional, and sociocultural dimensions.

5. Establishing a national committee of specialists and experts to evaluate and review the effectiveness of the implementation of environmental legal tools to keep up with the emerging environmental issues at the national and international level; the mission of this committee is as following:

    - Updating and suggesting the best-required amendments or other alternative options.

- Ranking priorities and scheduling the required amendments and improvements in the current environmental legal tools towards facilitating and improving them within a time framework plan.
- Selecting a set of SDGs' indicators that are related to the national legal tools or developing new indicators to examine their effectiveness and determining which legal provisions need amendments and improvements or adding new articles.
- Establishing a unified reporting system to measure the progress towards a sustainable future.

6. Adopting a holistic approach in the policymaking process in dealing with environmental issues to enhance the success of the strategic planning, and classifying the legal tools as per themes, e.g., waste (industrial, domestic, healthcare, and agriculture).

7. Including sustainable development's aspects in the environmental impact assessment process, in addition to studying the feasibility of adopting environmental auditing within the services of private consulting offices, by making use of the experiences of countries that have implemented it in the industrial sector. In addition, in the planning process, it considers sustainable development's principles – precautionary principles – to protect the environment.

8. Translating the SDGs within the context of the national environmental policy and including environmental issues with priority by selecting the pertinent sustainable development indicators from the approved indicators' set to assist in the tracking and monitoring of the

implementation progress and to assess whether development is happening on a sustainable path.

9. The results of this study showed that SDGs are the key to improving corporate reporting to include all environmental aspects and may lead to a shift to the adoption of sustainability reports instead of annual reports. In addition, building an awareness of the importance of SDGs helps the companies to becoming more sustainability oriented. According to Lozano et al. (2016) to make companies more sustainability-oriented, it is essential to grasp the comprehensive characteristics of corporate reporting and the synergies among technical, management, and organizational operations across time.

10. To prevent the embellishment of a company's positive performance or reputation and to raise the credibility and authenticity of its reporting, this study recommends proposing and placing a list of the main environmental material aspects for each industrial sector based on local environmental laws and regulations, to ensure that the sustainability reports reflect the actual state of the environment.

11. Due to a lack of technical or vocational knowledge on aspects of company performance for some stakeholders, increasing the reporting efficacy and quality of the information in sustainability reports is recommended. In this vein, there is a need to increase the capacity-building of the stakeholders through training and consultation meetings, including effective coordination to agree on a resilience methodology of reporting.

12. It is essential to conduct a continuous evaluation of the company's sustainability efforts that enables the company to establish strategies to overcome resistance to institutional improvements and barriers to change. Thus, this study calls for compiling the current private sector environmental efforts towards strengthening the environment protection pillar in the context of the SDGs and enhancing further environment policy coherence and integration.

13. Since the companies that responded to self-sustainability reporting integrated the national legislation compliance requirements with sustainability reporting, this has given policymakers the opportunity to revise or amend future legislation to ensure compliance with the law through sustainability reporting activities.

14. The document "Linking the SDGs and the GRI Standards" assists and facilitates reporting by organizations by employing GRI standards to evaluate how they impact and comply with the SDGs. Therefore, companies should seize this opportunity to modify and improve their sustainability reports for the coming years.

15. Companies should invest in improvements through new initiatives targeting their stakeholders to enhance efficient cooperation and coordination on various matters and enable identification of those material aspects that are not adequately disclosed.

16. There is difficulty in localizing all SDGs at the national scale and addressing them all within a short time due to the diverse activities of

private sectors. Thus, their role should be starting to adopt the related SDGs at the company level by linking them to their plans.

17. Sustainability challenges are global and manifested in the context of the 17 SDGs. Therefore, it is a valued opportunity for companies to adopt the SDGs framework as a component of their business plan to accomplish the strategic goals that steer them toward corporate sustainability. Thus, the industrial sector should deem the SDGs framework as a long-term strategic vision beyond 2030.

18. The results revealed that the role of the industrial sector in adopting SDGs is affected by national policies and corporate practices. Therefore, an academic research role is required to provide a clear conceptual vision of SDGs and orient the role of this sector to an efficient implementation.

19. SDGs cannot be accomplished individually; thus, the industrial sector must comprehend how SDGs are linked to their business nature and needs to raise the capacity building of the SDGs implementation process.

20. The large industrial sector is considered a powerful exemplary driver to guide and lead the medium and small enterprises contribution to achieving the SDGs and tackling sustainability challenges by leading the sustainability partnerships and initiatives. The sectoral partnership is an important step that leads to building coherent partnerships in sustainability. Hence, the role of concerned governmental bodies is essential to establishing those partnerships. In this regard, the government should take the opportunity to build joint sustainable initiatives to makes room for the industrial sector to play its essential part as a key stakeholder at the national

level. It is also worth highlighting some companies' achievements regarding each SDG.

21. The study findings hold an academic message for the United Nations. The United Nations, in partnership with countries, should organize specialized workshops, conferences, meetings, and training sessions with the private sector to create awareness and the capacity-building to embrace the SDGs globally to enable the aspirations of the United Nations to be realized by 2030.

22. Globally, the SDGs are considerable opportunities for the companies which are ready to pledge and invest for the long term because there is a vast deal of room for business investments in technologies, innovations, and global partnerships within the goals scopes.

5.3 Future research

The private sector is obligated to adopt a wider holistic method for sustainable economic growth without affecting the society and environment, such as circular economy. This field needs further research for the development of effective frameworks that clarify how to integrate the role of the private sector with the SDGs in a manner that could facilitate feasible, practical, and efficient implementation. Moreover, case studies need to be conducted in-depth to analyze the benefits and challenges of SDGs implementation and to facilitate sustainability in this sector.

The result of this study and analysis will assist in identifying and prioritizing the significant issues of sustainability to advance their future reporting for a better environmental performance, and to encourage other companies that did not establish sustainability reports to follow suit. However, the study opens a window to further studies on different business sectors and different types of corporate reports, to investigate the possible consequences of SDGs disclosures in terms of environmental, social, and economic impact. In addition, this study opens a new window of further research by studying future trends and continuing commitment to corporate SDGs reporting.

In this regard, the companies' data on their air emissions, wastewater, effluents, hazardous waste production, chemicals and other environmental aspects data are kept exclusively at the companies and environment authority. Those data are rich reference resources that should be provided to researchers (as a neutral party) to conduct studies on evaluating the regulations' effectiveness and the extent of companies' compliance. Thus, provide researchers with results that help them to accurately setting their goals toward sustainability.

Further, conduct studies on evaluating the regulations' effectiveness and the extent of companies' compliance, for instance, studying the feasibility of adopting environmental auditing within the services of private consulting offices, by making use of the experiences of countries that have implemented it in the industrial sector.

The study reveals that, there are financial and technological challenges to tackling the negative impacts of the industrial sector on the environment. Therefore, there is a need to study those challenges in-depth in terms of the best available eco-technology and economic perspective that may contribute to improving the environmental quality. That could lead to encouraging the companies to address environmental concerns and compliance as a priority in their plans.

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Annex 1

Interview and Questionnaire

This interview and questionnaire are part of my PhD thesis entitled as "**Comprehensive Assessment of the Role of the Private Sector in the Implementation of Environmental-related Sustainable Development Goals: The case of the large Industrial Sector in Bahrain**"

Your participating in this study is highly appreciated and have a great impact to investigate and study the implementation of Sustainable Development Goals (SDGs) in the industrial sector in Bahrain. Please answer each question based on your best estimate and drawing upon your professional knowledge. Your response is essential to complete this study, and contribute to improve the ranking of Bahrain in global SDGs index ranking.

This study is target private large industrial sector in Bahrain.

I obligate that the company name will not be mentioned in any published work; only the responses will be studied and analyzed to reach valuable recommendations that benefit and support the industrial sector in implementing sustainable development goals.

AbdulKarim Hasan Rashed
A candidate for
PhD degree in Environment and Sustainable Development
At University of Bahrain

Supervisores

Dr. Suad Ahmed Rashdan

Prof. Dr. Ahmed Yusuf Ali-Mohamed

Thank you very much for your participating!

Interview No. ☐ Date: ……

Section 1: General information

Company name: ……..…….……..

Person interviewed: ……..……..……

Job Title: ……..…….……...……..

Qualification: ☐ Diploma ☐ BSc ☐ MSc ☐ Other (specify) ….....……

Telephone (mobile is preferred): ……

E-mail: ……

Section 2: Company Environmental Status

Q.1. Does your company have a formal environmental policy, which includes a commitment to legal compliance, continuous measurement and continuous improvements in environmental performance? (☐Yes/☐No)

If No, state the reasons here……..

If Yes, please answer the following questions.

Q. 1.1. Which issues covered by this policy?
Specify the issue(s) covered by this policy. (e.g. ☐ Energy consumption and greenhouse emissions - ☐ Water quality and consumption - ☐ Air quality - ☐ Waste Reduction/Recycling - ☐ Responsible Chemical Management)

Q.1.2. Does your company have annual (other: a three or five-year period, for example) objectives and activities to tackle the issues covered by the environmental policy? (☐Yes/☐No)

Q.2. Does your company have an environmental management plan/program in-bound to monitor the environmental impacts? (☐Yes/☐No)

Q.3. Does your company have a formal health & safety policy in-bound, which complies with local regulations, and international standards? (**if Yes,** *please indicate how you achieved certification*) (☐Yes/☐No)

……
……

Q.4. In the last five years 2015–2020, did your company invest in reducing the environmental impacts? (☐Yes/☐No) and **if Yes,** give example(s).

……

Q.4.1. **If yes,** why did your company invest in the last five years 2015–2020 in reducing the environmental impacts?

……
……

Q.4.2. How is the current environmental situation in your company compared to last five years? (☐ Better – ☐ Same – ☐ Worse)

Q.5. Does your company receive any violation(s) notices by the Health & Safety Authority or Environment Agency in the past 5 years?
(☐Yes/☐No) and if **Yes**, what kind of violation was found.

Q.5.1. How often the governmental environmental inspectors visit your company?
☐ randomly, ☐ monthly, ☐ quarterly, ☐ half-yearly, ☐ annually,
☐ just in case of incident or violation or complain.

Q.5.2. For which of the following reasons has the inspector visited your company?

a. Routine or randomly visit ☐
b. Compliance with regulations ☐
c. Compliance with emissions permits ☐
d. Compliance with the industrial waste disposal permits ☐
e. Compliance with work environment conditions ☐
f. Check and investigation of complaints ☐
g. Request from company ☐
h. Complain from the community ☐
i. Other (please specify)

Q.6. Are other environmental issues like biodiversity being considered by your company? (☐Yes/☐No)

Q.7. What are the primary challenges in your company impeding minimize the negative impacts on the environment? (e.g. financial, technological, lack of expertise)

……
……
……

Q.8. Do your company schedule training/awareness programs to enhance environmental responsibility? (☐Yes/☐No)

- **If yes,** what is the frequency of the training/ awareness sessions?
  ☐ monthly, ☐ quarterly, ☐ half-yearly, ☐ annually, ☐ as per need.

Section 3: Environmental Sustainability Reporting

Q.1. Do you have any idea about the "Sustainable Development" concept? (☐Yes/☐No)

Q.2. Does your company publish an annual sustainable or environment report? (☐Yes/☐No)

Q.3. Does your company have KPIs (key performance indicators) of sustainability? (☐Yes/☐No)

Q.4. Does your company have an environmental management information system to maintain disaggregated records? (☐Yes/☐No)

- **If yes,** does your company evaluate this system to check its compatibility with the local regulations requirement? (☐Yes/☐No)

Q.5. Does your company monitor wastewater/water quality? (☐Yes/☐No)

- **If yes,** what is the frequency of collection of this data? …….

Q.6. Does your company monitor all kinds of waste generation? (☐Yes/☐No)

- **If yes,** what is the frequency of collection of this data? ……

Q.7. Does your company have record on fuel usage and type? (☐Yes/☐No)

- **If yes,** what is the frequency of collection of this data? …….…….

Q.8. Does your company making efforts to monitor air quality including greenhouse gas emissions? (☐Yes/☐No)

- **If yes,** what is the frequency of collection of this data? …….

Q.9. Does your company enacted and implemented relevant measures of energy efficiency management and energy conservation? (☐Yes/☐No)

Q.10. Does your company enacted and implemented any relevant measures of all kinds of waste disposal? (☐Yes/☐No)

Section4: Sustainability and Sustainable Practices

Q.1. Does your company have a formal written plan/strategy describing the purposes and objectives of the commitment to sustainability? (☐Yes/☐No)

- Does your company have created certain positions and committees, which reinforce this commitment? (name it) ……..

Q.2. What actions or initiatives your company has taken towards environmental sustainability?

.....
.....

Q.3. What kind of sustainability practices have been adopted at your company?

.....

.....

Q.4. To what extent are company's sustainability practices have been integrated into the business plan and strategy? *(Please provide examples of this integration)*

.....

.....

Q.5. Does your company provide training (e.g. short courses, workshops) to encourage the employees to consider sustainability issues? (☐Yes/☐No)

Q.6. To what extent are company's employees involved in sustainability initiatives? *(Please provide examples)*

.....

.....

Q.7. What are the key factors that support the progress of environmental and sustainability issues at your company?

.....

.....

Q.8. Does your company allocate a budget for research and development (R&D) specifically related to environmental matters? (☐Yes/☐No)

Section 5: Sustainable Development Goals (SDGs) Status



Q.1 Have you read the UN's Sustainable Development Goals (SDGs)? (☐Yes/☐No)

Q.2 How important is implementing SDGs in your company?
☐ important ☐ not important ☐ I do not know

Q.3 Are the company's employees aware of SDGs? ☐Yes ☐No ☐Only top management

Q.4 Does your company starting the implementation of the SDGs? (☐Yes/☐No)

- *If No* (*move to Qs.8, 9, 10, 11, 12 & 13*)
- *If Yes (answer all questions)*;

Q.5 How did your company choose the starting point for implementation?
☐ by focusing on the SDGs that are related to company activity.
☐ Or on the SDGs that your company can contribute positively towards.
☐ Or on the SDGs that could your company have a direct impact.
☐ Other, specify……

Q.5.1. which of the SDGs are most relevant to your company? …….

Q.5.2. Which of those SDGs require most urgent action? …….

Q.5.3. Accordingly, does your company amend/update its plan or strategy in line with SDGs requirement? (☐Yes/☐No)

Q.5.4. Does your company utilize a specific assessment tool to track the implementation progress of the SDGs? (☐Yes/☐No) (e.g. GRI)

Q.6. Does your company reviewed and adopt the SDGs indicators? (☐Yes/☐No), if **Yes**, please answer the following questions.

Q.6.1 Do they cover all environmental aspects of your company? (☐Yes/☐No)

Q.6.2. Are the data and information of your company compatible with SDGs indicators requirement? (☐Yes/☐No)

Q.6.3. Have you found the SDGs indicators sufficiently defined and measured? (☐Yes/☐No)

Q.7 Does your company have an action plan to implement the SDGs and ensure their attainment? (☐Yes/☐No), if **Yes**, please answer the following questions.

Q.7.1. What are the future strategies/opportunities linked to the SDGs?

.....
.....

Q.7.2. Accordingly, what kind of projects that aim to improve sustainability do you consider to be more in line with your company's strategy?

.....
.....

Q.8. Does your company planned steps to strengthen the commitment to sustainability for preparing towards engagement in the SDGs? (☐Yes/☐No)

Q.9. What are the main obstacles and challenges that hamper the implementing the SDGs in your company?

☐lack of financial resources ☐lack of expertise
☐lack knowledge ☐lack of government support/incentive
☐ Other, ...

Q.10. What kind of assistance/capacity building does your company need for SDGs implementation?

.....
.....

Q.10.1 Who could provide such assistance/capacity building?

.....

Q.10.2 What are the most relevant stakeholders for achieving the SDGs?

.....

Q.10.3 Which skills and expertise are most needed for implementing the SDGs?

.....

Q.10.4 Do you think that lack of engagement with the SDGs could become a reputational issue? (☐Yes/☐No)

Q.11. Please rank five of the SDGs that you believe your company has the greatest impact.

.....

Q.12. Please rank five of the SDGs that may represent a future business opportunity(s) for your company.

.....

Q.13. What are the most urgent actions the private sector should take to increase resilience and ability to implement SDGs in the future?

.....
.....
.....

- -: I sincerely appreciate your participation and cooperation :- -

Annex 2

UNIVERSITY OF BAHRAIN
College of Science
Office of the Dean

جامعة البحرين
كلية العلوم
مكتب العميد

Date: 10th January 2022

To whom it may concern

The University of Bahrain believes in the importance of scientific research. It is my pleasure to offer you my greetings coupled with my best wishes to your honorable person with good health and wellness and to your company further progress and prosperity.

In order to strengthen the bonds of cooperation between state institutions to serve the Kingdom of Bahrain, we present to you this letter regarding a project (Thesis) of the student A.Kareem Hassan Rashid (University No. 19890491) for the PhD degree in Environment and Sustainable Development entitled "**Comprehensive Assessment of the Role of the Private Sector in the Implementation of Environmental-related Sustainable Development Goals: The Case of the Large Industrial Sector in Bahrain**" under the supervision of Dr. Suad Rashdan from Chemistry Department .

We will be very grateful, if your company participate in completing the proposed questionnaire. The successful accomplishment of this research and your approval will improve the implementation of SDGs in this sector and consequently enhance Bahrain's ranking in the global SDG Index.

The researcher obligates that the company name will not be mentioned in any published work and only responses will be studied and analyzed to reach valuable recommendations that benefit and support the industrial sector towards implementing sustainable development goals.

For further communication, do not hesitate to contact A.Kareem Hassan Rashid at Mobile number No.: 33733837, e-mail address: kme2001@hotmail.com

Thank you in advance for your cooperation.

Sincerely yours,

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Annex 3

Bahrain's Environmental Legal Tools

- Decree No. 7 of 1980 establishing the Environmental Protection Committee.
- Decree Law No. 21 of 1996 concerning the Environment.
- Ministerial Order No.1 of 1998concerning the environmental assessment of projects.
- Ministerial Order No.1 of 1999 concerning the control on substances that deplete the ozone layer.
- Ministerial Order No. 4 of 1999 concerning licensing work in the maintenance of equipment and buildings containing asbestos and removing and transporting their waste.
- Ministerial Order No. 10 of 1999 concerning environmental standards (air and water).
- Ministerial Order No. 3 of 2000 concerning approving consultation offices specialized in environmental assessment of projects and environmental studies.
- Ministerial Order No. 1 of 2001 concerning the management of hazardous waste of healthcare.
- Ministerial Order No. 2 of 2001 Amending some provisions of Ministerial Order No. 10 of 1999 concerning the environmental standards (air and water).
- Ministerial Order No. 7 of 2002 concerning the control on the import and use of banned and severely restricted chemicals.
- Ministerial Order No. 9 of 2002 concerning the environmental inspection procedures and assigning the necessary personnel to carry out its work.
- Ministerial Order No. 8 of 2002 concerning the standards for pollutants and materials emitted from vehicles or their exhausts and their inspection.
- Ministerial Order No. 3 of 2005 concerning the environmental requirements and standards in worksites.
- Ministerial Order No. 4 of 2005 concerning the management of used oils.

- Ministerial Order No. 5 of 2005 concerning environmental conditions required in service activity sites.
- Ministerial Order No. 3 of 2006 concerning hazardous waste management.
- Ministerial Order No. 4 of 2006 concerning hazardous chemicals' management.
- Ministerial Order No. 10 of 2006 concerning emissions of air pollutants from sources.
- Ministerial Order No. 6 of 2013 amending some provisions of Ministerial Order No. 4 of 2006 regarding the management of hazardous chemicals.
- Ministerial Order No .7 of 2013 amending some provisions of Ministerial Order No. 3 of 2006 regarding the management of hazardous waste.
- Ministerial No. 4 of 2014 concerning the approval and regulation of the work of environmental consultancy offices.
- Ministerial Order No. 15 of 2014 concerning protecting workers from the dangers of flammable chemicals, gases, and liquids in facilities and worksites.
- Ministerial Order No. 38 of 2014 concerning determining the conditions and precautions necessary to protect workers from mechanical hazards in the work environment.
- Ministerial Order No. 229 of 2017 concerning the classification of micro, small and medium enterprises.
- Ministerial Order No. 2 of 2019 concerning the banning the import of all kinds plastic waste.
- Ministerial Order No. 2 of 2021 concerning the environmental standards for air.
- Ministerial Order No. 3 of 2021 concerning the environmental standards for water.
- Decree Law No.7 of 2022 concerning the Environmental Law.

Annex 4

Publications

Rashed, A. H., & Shah, A. (2021). **The role of private sector in the implementation of sustainable development goals**. *Environment, Development and Sustainability, 23*(3), 2931-2948.

Rashed, A. H. (2022). **Bahrain's Environmental Legal Tools for Giving Effect to Sustainable Development Goals: An Assessment**. *Environmental Policy and Law, 52*(6), 39-54.

Rashed, A. H., Rashdan, S. A., & Ali-Mohamed, A. Y. (2022). **Towards Effective Environmental Sustainability Reporting in the Large Industrial Sector of Bahrain**. *Sustainability, 14*(1), 1-27.

Environment, Development and Sustainability
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REVIEW

The role of private sector in the implementation of sustainable development goals

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Abstract
On September 25, 2015, the Sustainable Development Agenda of 2030 was agreed and adopted by the United Nation. This agenda consists of 17 sustainable development goals (SDGs) and 169 targets. It expressed a global call for taking urgent actions to save the planet. In this regard, the private sector is one of the key stakeholders that could shoulder a fundamental responsibility for accelerating the SDGs implementation process. The current article reviews important aspects of the role of the private sector toward SDGs achievement. The corporate social responsibility, circular economy, and the environmental initiatives are required to support the implementation of SDGs. However, for achieving SDGs the private sector faces a number of challenges such as lack of influential leadership, harmonious partnerships, shortage of investments, exhaustiveness and complexity of interlinkages among the goals and their targets, and lack of monitoring and evaluating methods for assessing the progress of implementation. Moreover, there is a dire need for a reliable set of measurable indicators to support the private sector in measuring the implementation progress. This review article highlights the role of private sector in beating the challenges confronting the achievement of SDGs.

Keywords Sustainable development goals (SDGs) · Private sector · Corporate social responsibility (CSR) · Circular economy · Impact assessment

1 Introduction

In September 2015, a new agenda for sustainable development entitled ‘‘transforming our world: the 2030 Agenda for Sustainable Development’’ was approved globally. It represents an enthusiastic world plan for taking action by 2030 to tackle the global challenges

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of environmental degradation and poverty (UN 2015; UNGA 2015). This agenda is a non-obligatory agreement that demand countries to identify their national priorities and targets in-line with the requirements of SDGs (Allen et al. 2019). This agenda is a guiding vision for governments, private sector, and civil society for sharing actions (Hajer et al. 2015) and for an effective transition toward sustainable development (Le Blanc 2015; D'Amato et al. 2019). To implement the 17 SDGs, there is a need for substantial modifications in the patterns of societies and economies. Therefore, the 17 SDGs activate a new phase for sharing of responsibility at national, regional, and global levels (Bexell and Jönsson 2017).

Since 2008, the UN Global Compact has organized annual summits of the UN Private Sector Forum, aiming to enhance the dialogue between governments and the private sector. This forum substantially focuses on the SDGs since they were adopted in 2015, including the obligations of multinational companies to support the SDGs, particularly focusing on pilot projects, gender quota, and investment in sustainable infrastructure (Abshagen et al. 2018). The private sector is an important stakeholder under Agenda 2030 which can lead the progress for achieving the SDGs (Hacking 2019; Fukuda-Parr and McNeill 2015; Lalaguna and Dorodnykh 2018; Scheyvens et al. 2016; Topple et al. 2017) because this sector comprises the largest part of the economy (Abe et al. 2019). Private sector is a job creator, source of technological innovation, and fundamental for capital and tax income, which are the main solution drivers for the economy, society and environment (Frey and Sabbatino 2018). Buhmann et al. (2019) stated that private sector benefits the society via expertise, knowledge, technology, and financial resources. Scheyvens et al. (2016) also affirmed that private sector has different capabilities such as technology innovation, responsiveness, and manpower of particular experiences and resources to assist in achieving SDGs. In line with this notion, Pedersen (2018) stated that the private sector plays a significant role in attaining the SDGs through (Marx 2019) contributing resources, expertise, and experiences. Pineda-Escobar (2019) reported that companies consider implementation of SDGs as an element of their sustainability plans and strategies.

Nevertheless, Frey and Sabbatino (2018) stated that if the 17 SDGs are entirely but unevenly related to the private sector, all of them are related to all companies. In this regard, Pineda-Escobar (2019) found that the private sector companies at the beginning willingly determine the specific SDGs that are relevant to the company's operations. According to Allen et al. (2018), obligation to the SDGs is hindered due to lack of an efficient framework, insufficient awareness and lack of technological capability concerning integrated planning and policy coherence, owing to the modernity and complexity of the SDGs. Thorlakson et al. (2018) pointed out that the private sector mainly pays attention to the rights of workers and complies with local regulations; therefore, there is a critical need to include social and environmental concerns, which are expected to be a great motivation in achieving the SDGs. Moreover, the economy is one of the three dimensions of sustainability, which allows the private sector to join with the SDGs. For instance, Allen et al. (2019) concluded that Arab countries that are starting to implement the SDGs are developing essential basic evidence for action through subsequent studies. Therefore, there is a need to conduct broader studies to explore the role of private sector in the implementation of SDGs.

The SDGs should be adopted as an integrated approach (Allen et al. 2019; Merry 2019; Elder and Olsen 2019; Gasper et al. 2019; Saner et al. 2019). In this regard, Frey and Sabbatino (2018) stated that the SDGs' framework was developed to be implemented entirely within the companies' influences; all the 17 SDGs are committed to be viewed in their plans. The SDGs' framework is quite extensive and considerably complex, and it is necessary to prioritize the primary step in implementation of the SDGs and its indicators

to match national priorities. In this context, Thorlakson et al. (2018) conducted a global survey of 449 companies for answering an important issue of how the private sector can participate in the implementation of SDGs 2 (Zero Hunger), 8 (Decent Work and Economic Growth), 12 (Sustainable Consumption and Production), 15 (Life on Land), and 16 (Peace, Justice and Strong Institution) via 16 sustainable practices, e.g., change the product's formulation to make it more sustainable and make products from recycled materials, which were defined as "voluntary practices companies pursue to improve the social and/or environmental management of their suppliers' activities." Allen et al. (2018) also carried out an extensive survey based on "evidence-based approaches to the SDGs: systems thinking, analysis and modeling" of 26 countries concerning the implementation of the SDGs in terms of the fulfillment of primary planning stages by establishing coordination mechanisms, engaging various stakeholders in the consultations, and customizing SDGs into national strategies. Kumar et al. (2018) study looked into investigating the complex relationships among the SDGs and utilizing the interpretive structural modeling technique to present them in a hierarchical framework. Moreover, Weitz et al. (2018) studied the synergies among the SDGs concerning the policy and planning and utilized a systemic and contextual perspective via developing a network analysis and basic means of synergies. By this stage, the authors go on to declare that the valid methodologies would obviously provide a greater understanding of the connections among the SDGs, which will facilitate the SDGs' implementation. However, certain arguments in these research methodologies and approaches need further research. For instance, according to Kumar et al. (2018) 29% of the 169 targets are adequately explained whereas 54% require more efforts for clarification, and the remaining 17% are incomplete and/or worthless. Moreover, Merry (2019) in line with Elder and Olsen (2019) stated that there are many weak indicators excluding many environmental elements that hinder an integrated approach. It is worth mentioning that Weitz et al. (2018) analyzed the SDGs at the level of targets because targets are very particular than goals. To reduce the SDGs targets' complexity, there is a necessity to develop practical means for assisting the country in prioritizing their targets (Elder and Olsen 2019; Allen et al. 2019). In this regard, Saner et al. (2019) and Scheyvens et al. (2016) suggested that the private sector should modify their plans with the SDGs. In the same streak, Hacking (2019) point out that the fundamental concerns are how to connect the SDGs and how to treat the trade-offs among them. Another issue raised by Pedersen (2018) is that the majority of the private sectors are still striving to specify their actions and to modify the plans and strategies according to the SDGs requirement. While these primary references help in contributing knowledge dissemination regarding SDGs, there is dearth of organized scientific literature on the subject of the private sector role and implementation of SDGs. Hacking (2019), Pineda-Escobar (2019), and Salvia et al. (2019) mentioned that there is a need for further investigations to examine the role of the private sector in the context of SDGs. Therefore, the aim of the current review article is to organize the scholar's contributions to this essential and vital field of merging the SDGs in the plans and strategies of the private sector.

2 The role of private sector

In the early twenty-first century, serious environmental global issues such as increasing environmental overshoot, worsening climate change, and insufficiency of human needs caused unsustainable consumption of natural resources (Bengtsson et al. 2018). Hence, the

delay of the integration of environmental and social aspects with the economic aspect of sustainability in private sector activities may lead to accumulation of negative impacts on human health and the environment. Agenda 2030 considered that the private sector is an essential stakeholder (Lalaguna and Dorodnykh 2018) and has an influential part in the progress of the SDGs (Scheyvens et al. 2016; Ridho et al. 2018), because this sector is a crucial player in the economic investments (Sullivan et al. 2017). The SDGs' implementation depends on voluntary efforts (Elder and Olsen 2019), although the tensions among compulsory and voluntary SDG responsibility will continue, due to the intense debates among countries and the private sector about the implementation roles of sustainability issues (Bexell and Jönsson 2017). Therefore, the private sector should perform a major role in sustainability, not merely from an economic progress angle but considering the social and environmental issues and requirements (Sullivan et al. 2017). Furthermore, the private sector should amend their plans and strategies to comply with the SDGs (Saner et al. 2019; Scheyvens et al. 2016; Pedersen 2018). According to Baldassarre et al. (2017), and the new holistic approach of business strategies emphasizes more on how further profits may be gained by putting more focus on the social and environmental outcomes beside economic gains. Similarly, Lima et al. (2017) mentioned that there is a need for further coordination and support of public sector to enable the private sector to invest more resources for positive SDGs outcomes. Further, the technology and innovation capacity of this sector are required besides their obligation for supporting the SDG implementation (Hajer et al. 2015). According to Topple et al. (2017), impact assessments are an essential method to enhance motivation for facing sustainability challenges in the private sector. According to Roos et al. (2020), there are potential benefits of carrying out an environmental impact assessment that includes conservation of biodiversity and ecosystem; allowing society participation and access to information; mitigation of environmental impacts; and comply with regulations and proper enforcement. These benefits serve the private sector to attain sustainable development.

The private sector is also responsible for environmental degradations. Therefore, attention toward global industrial development has increased due to its negative impacts on the human society and environment (Ardakani and Soltanmohammadi 2019). According to Kopnina (2016), the accumulation impacts of industrial development (revolution) due to unsustainable patterns of production and consumption are the result of trying for economic benefits prior to protection of environment, which has led to environmental unsustainability and abuse of ecosystems. On the other hand, the SDGs clearly encourage "sustainable industrialization" and "sustainable use of land." Most of the SDGs obviously focus on the environmental dimensions, by preventing environmental degradation, pollution, climate change, waste management, and promoting resource recovery. Therefore, there is a need for urgent actions toward those challenging aspects of the economic growth, which has led to adverse impacts on the environment and human society (Leal Filho et al. 2018). Gobierno De Colombia (2018) pointed out that mining and energy sectors consume more than 70% of ground and surface water, while food and manufacturing sectors consume more than 50% of the water from public canals. Moreover, these cause high consumption of non-renewable energy such as natural gas and also significantly affect biodiversity due to operations of companies through their supply chains. Though the developed countries achieved some progress on waste management and recycling and energy efficiency, but so far, they have not been able to dissociate the economic growth from increased consumption of energy and other resources, due to continuous excessive consumption of non-renewable energy and the primary resources (Osborn et al. 2015). In this regard, Xiao et al. (2017) stated that global trade business has a significant impact on sustainable development

issues, in particular climate change, natural resources consumption, and food security. For instance, the oil and gas sector is an essential industry and one of the largest private sectors globally. This sector consumes more than 57% of total global fuel. Moreover, this sector has both positive and negative impacts on an array of scopes related to SDGs; therefore, it may contribute to the challenges that SDGs look to tackle, for example climate change, environmental degradation, economic inequality, and some health issues (IPIECA 2017).

A recent study conducted in Colombia reveals that the companies are willing to include the SDGs in their sustainability reports and consider incorporating it in their sustainability strategy (Pineda-Escobar 2019). According to 2018 KMPG study on corporate reporting of the SDGs, 55% of reporting companies are paying the most attention to SDG 4, 8 and 12, while about 26% reporting companies are paying the least attention to SDG 2, 14, and 15 (Blasco et al. 2018). Another study conducted on Indonesian and Russian companies reveals that the private sector had contributed suitably to a specific number of SDGs, but more efforts are needed to increase company's implementation to achieve other goals of SDGs (Ridho et al. 2018). Concomitantly, other studies on different aspects were conducted to assess a range of voluntary actions for improving the environmental and social issues within the private sector. Thorlakson et al. (2018) found that 52% of firms practice at least one voluntary sustainable practice but to a confined extent. Working in this field, Fleming et al. (2017) concluded that the SDGs are still unconfirmed in the private sector practices due to the differences in the language utilized in the SDGs when compared to the business; the required changes are difficult and complex, and few regulatory tools incentivize the SDGs' adoption. Another study by Moldavska (2017) concluded a lack of knowledge about sustainable development in the private sector. Hacking (2019) point out that there is an increasing attention to adopting the SDGs in the private sector, but they also found that the impact assessment community is slow. Further, there is a call for corporate sustainability assessment (CSA) at a global level (Zijp et al. 2015), and the private sector is considered one of the main stakeholders (Dijk et al. 2017). The real value of CSA is to voluntarily adopt for measuring sustainable development (Topple et al. 2017). The existing CSA still does not adequately cover the SDGs, and the researchers are so far uncertain regarding its weaknesses and difficulties (Moldavska and Welo 2019). Undoubtedly, the private sector has an essential responsibility toward achieving the SDGs because it acts as a development actor through business activities. In doing so, the SDGs strongly encourage this sector to eliminate or stop their negative impacts on the human and their environment, enhancing their positive participation, for example, minimizing the air pollution through implementation of the SDG 7 (Affordable and Clean Energy), which is linked directly to SDG 13 (Climate Action). For instance, Axon and James (2018) stated that the chemical industrial sector has contributed scientific and technological solutions that address various global challenges, e.g., pollution prevention.

Adoption of circular economy (CE) is another role of private sector toward implementation of SDGs. According to Morseletto (2020), CE is "an economic model aimed at the efficient use of resources through waste minimization, long-term value retention, reduction of primary resources, and closed loops of products, product parts, and materials within the boundaries of environmental protection and socio-economic benefits." Rizos et al. (2016) envision private sector as a part of CE, and the main barrier to its attainment is the company environmental culture. In this regard, D'Amato et al. (2019) mentioned that the private sector is pivotal for the development of CE strategies at the national and regional level, and this concept leads to corporate sustainability reporting strategies. Kirchherr et al. (2017) also mentioned that the concept of the circular economy implies its ability to attain beyond present efforts of sustainable development. In line with this notion, Geissdoerfer

et al. (2017) stated that companies are increasingly conscious of the opportunities promised by the CE and have begun to recognize their potential benefits for stakeholders. Furthermore, Stahel (2013) believed that the role of the private sector in a sustainable society is yet a premium summary of the CE. Schroeder et al. (2019) documented that circular economy practices are closely linked with SDG 12. As a result, the concern of the scholars has increased in the field study of consumption in the context of the circular economy and its solutions (Camacho-Otero et al. (2018)). Mao et al. (2018, p. 42) mentioned that the principle of circular economy is reduction-, reuse-, and resource-based. According to Millar et al. (2019), the current economic growth may hinder the adoption of the circular economy as a tool to achieve sustainable development. Thus, the power of circular economy can bring the business sector and policy-making working together toward sustainability (Korhonen et al. (2018)).

As a result of this focus, the private sector can attain a competitive benefit via complying with SDGs through efficient energy and resource usage (Bocken et al. 2014). The standard of living could be improved through the adoption of sustainability practices such as recycling strategies, natural resources protection and saving energy, creation of safer and more efficient working environmental conditions, cleaner production and eco-friendly products, and provision of health and safety measures for the entire society (Ardakani and Soltanmohammadi 2019). Malviya et al. (2018) stated that the emphasis on development of green products will lead to focus on minimizing waste effectively, efficient use of raw materials, and producing and designing recyclable and eco-friendly products to save the environment. In this regard, the private sector can play the role of a development actor through effective public–private and civil society partnerships via SDG 17 (Partnerships for the Goals). Moreover, Nilsson et al. (2018) pointed out that SDGs interactions mean initiating new partnerships among concerned stakeholders through science, policymakers, private sector, and the local societies. On that note, SDGs may utilize to facilitate the implementation of sustainable development strategies in both public and private sectors (Leal Filho et al. 2019). In the context of roles, Fowler and Biekart (2017) argued that the role and institutional position of multi-stakeholders are essential for increasing the possibility of successful implementation of SDGs. Similarly, Georgeson and Maslin (2018) stated that the private sector is particularly more accountable for multi-stakeholder partnerships and development. Consequently, this sector must find an efficient means to amend and improve their plans and strategies in line with the requirement of Agenda 2030 toward proper implementation of SDGs. Additionally, both the governments and the private sector increasingly commit to Agenda 2030 by appropriately embedding the SDGs within the assessment rules for facilitating decision-making. Abshagen et al. (2018) reported that due to increasing private sector commitment toward the implementation of SDGs, governments tend to hand over more of their services duties via privatizations, especially in the social services sector such as water and energy infrastructures, healthcare, and transportation. Some important roles of private sector and their relation to SDGs can be seen in Table 1.

3 SDGs and corporate social responsibility (CSR)

The essential aim of the SDGs is to begin a revolution in responsibility by engaging fit for purpose to treat the environmental impacts (Caballero 2019). In the context of 2030 Agenda, the private sector has a key part to perform in accelerating the achievement of the SDGs through strengthening public–private partnerships, eco-friendly investments,

Table 1 Private sector roles in the implementation of SDGs

Sustainable development pillars	Related SDGs	Roles of private sector	References
Environment	All goals	Comply with local regulations	Thorlakson et al. (2018)
	11, 12 and 13	Efficient energy and resource usage	Bocken et al. (2014)
	11 and 12	Natural resources protection, saving energy, and cleaner production	Ardakani and Soltanmohammadi (2019)
	6 and 12	Minimizing waste, and efficient use of raw materials	Malviya et al. (2018)
	12	Corporate sustainability assessment	Zijp et al. (2015)
	11 and 13	Minimize the impacts of future disasters	Abe et al. (2019)
	9, 11, 12 and 15	Environmental impact assessment	Roos et al. (2020)
Economy	8 and 17	Job maker, source of technological innovation, and fundamental for capital and tax income	Frey and Sabbatino (2018)
	8 and 17	Technology innovation, and manpower of particular experiences	Scheyvens et al. (2016)
	8 and 9	Expertise and experiences	Marx (2019) and Buhmann et al. (2019)
	12 and 13	Recycling strategies and eco-friendly products	Ardakani and Soltanmohammadi (2019)
	12	Development of green products	Malviya et al. (2018)
	12 and 17	Technology and innovation capacity	Hajer et al. (2015) and Buhmann et al. (2019)
	8 and 9	Driver of largest part of economy	Abe et al. (2019)
	8, 9 and 12	Circular economy	Morseletto (2020), Rizos et al. (2016), D'Amato et al. (2019), Kirchherr et al. (2017), Geissdoerfer et al. (2017), Schroeder et al. (2019), Camacho-Otero et al. (2018), Mao et al. (2018, p. 42), Millar et al. (2019) and Korhonen et al. (2018)
Societal	17	Rights of workers	Thorlakson et al. (2018)
	8 and 9	Creation of safer and more efficient working environmental conditions	Ardakani and Soltanmohammadi (2019)
	17	Partnerships among concerned stakeholders	Nilsson et al. (2018), Fowler and Biekart (2017) and Georgeson and Maslin (2018)
	All goals	Increased disclosure of information	Bengtsson et al. (2018)

and CSR (Bexell and Jönsson 2017; Lalaguna and Dorodnykh 2018). There is copious overlapping between SDGs and aims of the CSR (Buhmann et al. 2019). The CSR program is embedded in the economic, social, and environmental sustainability obligations of private–sector practices (Kumi et al. 2019). Accordingly, CSR is fundamental to sustainability, economic competitiveness, and innovation, and it is strongly linked with the successful implementation of SDGs. Consequently, the main concern is how both countries and societies obtain CSR benefits to tackle the main sustainable development challenges, e.g., poverty, health, education, energy, and environment (Lu et al. 2019). In this regard, D'Amato et al. (2019) stated that CSR, environmental efficiency, and environmental innovations practices define a lot of the present industrial sustainability agenda. According to Riyadh et al. (2019), CSR refers to "voluntary activities undertaken by a firm to operate in an economic, social and environmentally sustainable manner."

Out of 17 SDGs, 13 emphasize on social inclusiveness and take some environmental aspects into account (Gupta and Vegelin 2016). The concern of scholars on this concept is increasing, for instance, "Responsibility to Protect" concept (Bellamy 2015), CSR, and the necessity to discuss the climate change, waste management, and other pressing environmental issues. Moreover, Taylor et al.'s (2018) study found that the CSR and the environmental initiatives lead to sustainability and consequently will enhance a company's profit. Furthermore, Ortiz-de-Mandojana and Bansal (2016) found that the companies that adopted social and environmental actions recorded lesser financial losses, greater growth, and extended period that reaches 15 years. Pogge and Sengupta (2015) suggest that qualified actors who stipulate their particular roles and mandates should be designated for fulfilling the SDGs responsibilities. Furthermore, most companies reporting on the SDGs are found in countries with higher CSR's certification, which spend more in the education sector and protection of employment (Rosati and Faria 2019). The CSR is considered a prerequisite to contributing to the SDGs (Schönherr et al. 2017) because it is a primary initiative that requires the companies to tackle the social and environmental issues in their operations and then motivate them to identify the significant issues to start environmental improvements (Thorlakson et al. 2018). Regulating private sector responsibility via obligatory laws is politically critical and draws a controversial debate on CSR (Kolks 2016). In this regard, it was found that 52% of the selected sample of global supply chain companies in their annual reports include some components of social or environmental issues (Thorlakson et al. 2018). Furthermore, CSR reporting is one of the various terminologies of sustainability (Siew 2015). Moreover, KPMG international CSR Survey of 2017 covering 49 countries revealed that 93% of the 250 largest global corporations report on CSR, and 43% of companies connect their CSR activities to the SDGs (Blasco and King 2017). In scalar terms, responsibility inclusiveness is at the global, regional, and national levels but at different responsibilities for dealing with global environmental problems.

Consequently, CSR is interpreted into voluntary sustainability standards (ISO 26000) and has become a common standard used by companies globally. Moreover, it is considered an essential component of public policy in the environmental and social dimensions toward achieving SDGs (Marx 2019; Moratis 2018). Further, Basta et al. (2018) found that the most factors for measuring sustainability are the CSR, CER, and the social lifecycle evaluation. Moreover, there is an increasing demand for CSR certification for better transparency and broader measures for private sector accountability (Fleming et al. 2017). In this regard, Palmer and Flanagan (2016) mentioned that the CSR reports provide examples of companies' sustainability efforts such as greenhouse gas reduction. Furthermore, Kumi et al. (2019) reported that the private sector contributes in promoting the SDGs in

the context of CSR that includes the provision of social services such as education, health, and creation of jobs.

The SDGs are not legally binding, but the key stakeholders must commit to drive forward a stronger global healthy environment to solve sustainable development challenges. According to Singh (2016), there are several challenges for achieving SDGs, such as lack of influential leadership, lack of harmonious partnerships, shortage of investments, the dearth of implementation, and measurable indicators with effective data collection. Notwithstanding, there are some essential initiatives that should be adopted in order to succeed, such as CSR and other environmental initiatives, which are considered as hub between this sector and SDGs. It is because those initiatives demand more ethical, responsible, and sustainable business practices. For this to occur comprehensively, governments should enact appropriate legislation to oblige the private sector and then enforce it to change efficiently in the future, because there is no enforcement mechanism at the moment (Fukuda-Parr 2016). In this context, Ardakani and Soltanmohammadi (2019) mentioned that there are positive impacts of the best environmental management practices such as carbon emissions management, hazardous waste management, and efficient energy consumptions on CSR, which are type of obligation to laws in respect of reducing production costs and environmental risks.

4 The SDGs targets and indicators related to private sector

The shift in global politics toward the role of the private sector is explicit in the SDGs via the involvement of industrial sector in developing the SDGs (Buhmann et al. 2019). The SDGs need new pivotal tracks to sustainability and knowledge mobilization, which can operate among various sectors and regions (Singh 2016). All the SDGs are interrelated to each other (Kumar et al. 2018), and the substantive interactions are more specific via targets than goals (Weitz et al. 2018). But if the 17 SDGs are entirely but unevenly related to the private sector, all of them are related to all companies (Frey and Sabbatino 2018). In this regard, Tosun and Leininger (2017) mentioned that private sector competence is assigned to attain SDGs 2 (Zero Hunger), 6 (Clean Water and Sanitation), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), and 12 (Sustainable Consumption and Production). Salvia et al. (2019) pointed out that SDGs 4, 6, 11, 12, 13, and 15 are the most extensively investigated, while the SDGs 4 (Quality Education), 11 (Sustainable Cities and Communities), and 13 (Climate Action) were most globally highlighted. Gupta and Vegelin (2016) reported that the majority of targets are national-level targets with primary responsibilities. The main challenge facing SDGs implementation is the exhaustiveness and complexity of interlinkages among the goals and their targets (Allen et al. 2019), and still unclear how these interlinkages accurately work (Allen et al. 2018). In this regard, Guevara and Julián (2019) stated that the Inter-Agency Expert Group on SDG indicators has adopted about half of the indicators to monitor the implementation progress of the SDGs. An important concern raised by Yonehara et al. (2017) is that the emphasis of the SDGs indicator system is only on the quantitative information, consequently, ignoring the hidden issues where some goals may be left behind. Some examples of vague targets and gaps among SDGs and their indicators are provided in Table 2.

In this regard, Le Blanc (2015) stated that out of the 107 targets, only 60 are referred to one different goal than it belongs to it; for example, 19 targets are linked with three goals or more, either directly or indirectly (as shown in Fig. 1). Instead, Barbier and Burgess

Table 2 Examples that demand further clarity between SDGs targets and their indicators

Target no. as listed in the UN SDGs	Indicator	Clarification required
4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and nonviolence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development"	Percentage of 15-year-old students enrolled in secondary school demonstrating at least a fixed level of knowledge across a selection of topics in environmental science and geoscience. The exact choice/range of topics will depend on the survey or assessment in which the indicator is collected	The indicator only discusses a part of the education for the sustainable development agenda that the target promotes
7.2: "By 2030, increase substantially the share of renewable energy in the global energy mix"	7.2.1 Renewable energy share in the total final energy consumption	Global reporting cannot easily determine what progress would be "substantial"
8.4: "Improve progressively, through 2030, global resource efficiency in consumption and Production and endeavour to decouple economic growth from environmental degradation, in Accordance with the 10 Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead"	8.4.1 Material footprint, material footprint per capita, and material footprint per GDP 8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	Sustainable growth indicates growth that proceeds social, economic, and environmental aspects into account, but this does not reflect that a real decoupling will require a drastic redefinition of what constitutes growth
10.2: "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status"	Proportion of people living below 50% of median income, disaggregated by age group, sex, and persons with disabilities	This target includes three types of inclusion to be achieved across nine different categories of potential exclusion. However, the indicator measures only the three kinds of exclusion, which are age, gender, or disability status
12.6: "Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle"	12.6.1 Number of companies publishing sustainability reports	"Encourage" is an unmeasurable word, and then, it is hard to assess this target

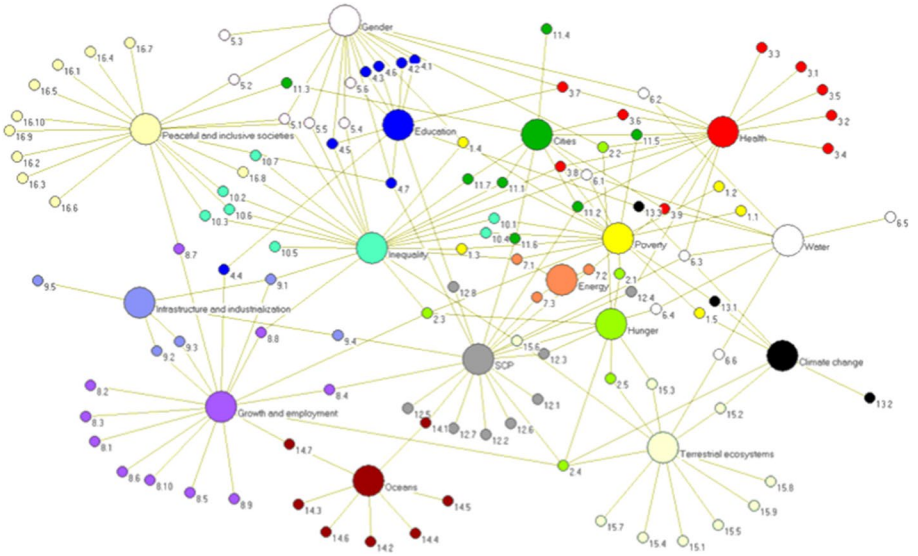


Fig. 1 SDGs as a network of targets [reprinted with permission from Le Blanc (2015)]

(2017) stated that the indicator levels' connections have improved with most of the SDGs. Moreover, Esquivel and Sweetman (2016) stated that Agenda 2030 and its SDGs are well designed. Put differently, greater interest in the connections between SDGs may lead to improved efficiency of implementation and lessen the related costs (Elder et al. 2016). Despite these caveats, sustainability could be achieved only by balancing the three aspects of environment, economy and society.

For instance, in Colombia, 19 companies' reports were studied, and it was found that only five reports have used the keyword "17 goals," and three reports have used the keyword "169 targets" (Pineda-Escobar 2019). Another study found that the annual reports of 52% of the randomly selected global companies address some social or environmental issues (Thorlakson et al. 2018). To clarify that, Scherer et al. (2018) found that the social goals are related to higher environmental impacts. Thomas et al. (2016) stated that the worldwide concern in the assessing results is overtaking the capability of states to collect the required information. Therefore, the private sector should focus on ensuring the minimum data set and gathering capacity for tracking the implementation progress of SDGs (Stafford-Smith et al. 2017). Notwithstanding this logic, there is a need to expand our perception of the sustainable development system and interactions among the SDGs and targets to facilitate the implementation (Reyers et al. 2017). Therefore, the underlying concern is how to measure the progress implementation of SDGs (Yonehara et al. 2017).

Figure 2 illustrates the linkages among some SDGs, which are directly related to the private sector. Undoubtedly, these linkages mean that implementing one goal effectively can support to achieve other goals. For example, recycled and reused water in targets 6.3 and 6.4 are linked to target 12.2 regarding sustainable management and efficient use of natural resources. Additionally, target 6.3 linked with 12.4 and 12.5 is concerned with the type of waste and disposal method. Furthermore, target 12.5 (prevention, reduction, recycling, and reuse) is linked to 15.2 (increase afforestation and reforestation globally). Moreover, target 12.2 linked to 7.3 regarding the reduction in energy consumption, which drives to

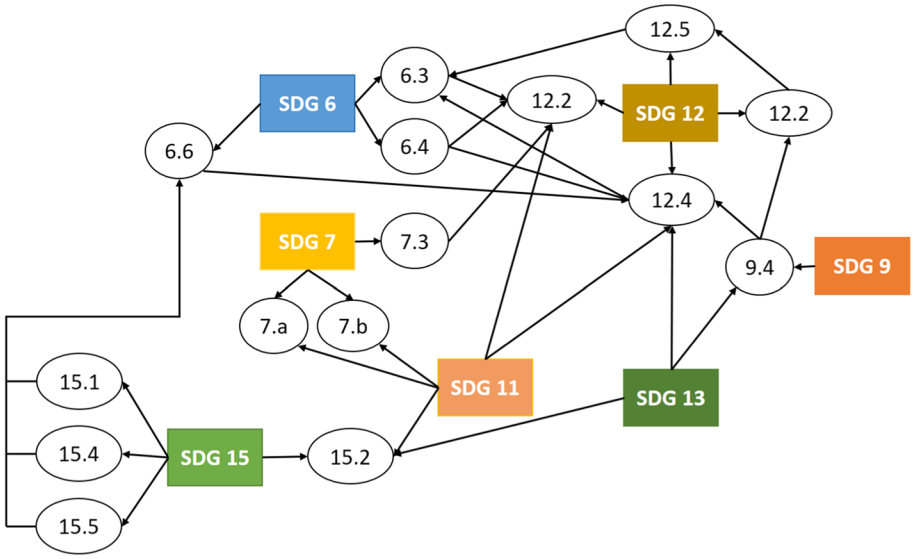


Fig. 2 SDGs related to the private sector

achieving SDG 13. Hence, the private sector when adopting these goals in their plans and strategies will contribute to increased recycled and reused water, reduce energy consumption, minimize the significant impact of activities on biodiversity, and maximize the recycling and reuse materials.

For example, the climate change issue is overlapping with all the SDGs, so this goal (SDG 13) should be considered with each goal. Climate change will affect the most vulnerable people, resulting in failure of the efforts to end poverty (SDG1), to attain gender equality (SDG5), and to lessen inequality among countries (SDG10). Similarly, increased stress on water resources (SDG6) will affect the ecosystems and damage biodiversity (SDGs 14 and 15), consequently threatening food security (SDG2). These changes may spread infectious disease patterns that would affect global health (SDG3). Consequently, these impacts may threaten peace and security (SDG16). On the other hand, by encouraging efforts for overcoming energy efficiency by the development of carbon capture and storage and energize investment in cleaner burning of the natural gas besides investing on renewable energies and technologies (SDG7), all these initiatives are expected to provide promising economic investment opportunities (SDG8) in the oil and gas sector (IPIECA 2017).

As noted previously, indicators are essential to measuring the achievement of implementing the sustainable goals and their targets, but still, there are no clear cases of activities that strengthen the implementation of the SDGs, specifically in the private sector (Sullivan et al. 2017). Gupta and Vegelin (2016) concluded that the successful implementation of SDGs means identifying a powerful linking connection among the goals and the ways of the integration into the global society. The existing SDG indicators are neither comprehensive nor final because some target areas lack indicators that are still not defined or weak in the method part and require strengthening (Saner et al. 2019). About half of the indicators seem to be appropriate for the targets, and the scope of the other half is too narrow (Elder and Olsen 2019; Merry 2019). In this regard, 49 (29%) out of the 169 targets are

well defined and developed, whereas 91 (54%) need more work and 29 (17%) are weak or require substantial work (Stokstad 2015; Hak et al. 2016; Kumar et al. 2018). A study conducted by Palmer and Flanagan (2016) on 22 out of 50 large companies in USA identified 389 goals; most of them concentrated on the environment, and the companies list 18 goals in sustainability, including seven goals for "people," three for "overarching" and eight for "planet." A piloted contemporary study in Montenegro (Galli et al. 2018) found in the first reporting period planned for 2019 that only 26 organizations can provide data for measuring 137 indicators out of the 241 (56.8%). It is a good sign that some businesses have already started integrated sustainability aspects in their plans and strategies. It is clear that several issues of the three dimensions of sustainable development should be recognized as having the same importance level because the SDGs must be implemented entirely as integrated rather than in a fragmented way, as the sustainable goals and targets are interlinked. Vital as this is, the efforts have been concentrated, especially on integration between the goals and targets.

5 Conclusion

In the perspective of the SDGs, it is obligatory for the private sector to support the implementation procedures, considering the social, economic, and environmental aspects. Nevertheless, the effective and practicable partnership among public and private sectors is the approach to create valuable opportunities and tackle the challenges toward achieving the SDGs in the assigned time, in order to succeed. Therefore, it becomes imperative that the private sector starts to modify their plans and develop strategies that could align with SDGs requirements. Indeed, the private sector has taken actions to advance SDGs via several voluntary initiatives that have already been implemented, such as CSR, circular economy, and other environmental voluntary initiatives on how this sector can provide its contribution to attaining the SDGs by 2030. Many researchers declare that the private sector holds powers to afford performing on the SDGs. Some recent studies uncovered that the companies that are CSR certified found their activities oriented toward SDGs. Other studies revealed that some companies themselves have initiated to understand their obligations and activities on their sustainability reporting.

For achieving SDGs, the private sector is facing several challenges such as lack of influential leadership; lack of harmonious partnerships (effective and practicable partnership among public and private sectors); shortage of investments, the dearth of implementation; measurable indicators with effective data collection; the exhaustiveness and complexity of interlinkages among the goals and their targets; lack of monitoring, and evaluating methods for assessing the progress of implementation; and the indicator specifications and target monitoring. As a matter of fact, there is an urgent need for a reliable group of indicators to assist the private sector in monitoring the activities' impacts based on the environmental aspects related to the SDGs, in order to provide measurable data on the progress and the achievement of SDGs. The indicator specifications and target monitoring need continuous improvement. Hence, for gaining real and tangible results, the SDGs should be in line with the state's national strategies and plans. On the other hand, it is essential to understand the sequential connection among the SDGs, which will assist in specifying the prerequisite goal before planning to implement any other goal because some goals cannot be attained before the achievement of their prerequisite goal.

The private sector consists of a wide diversity of fields and complex activities. Therefore, if the 17 SDGs are entirely but unevenly related to the private sector, all of them are related to all companies. Importantly, companies are supposed to direct their attention toward SDGs, which are related to their significant economic, social, and environmental aspects, and include them in the plans, strategies, and the management. Moreover, the private sector is required to adopt a wider holistic method for sustainable economic growth without affecting the society and environment, such as circular economy. This field needs further research for the development of effective frameworks that clarify how to integrate the role of the private sector with the SDGs in a manner that could facilitate feasible, practical, and efficient implementation. Moreover, quantitative studies need to be conducted that analyze the benefits of the implementation to reach the targeted SDGs, in order to tackle the sustainability challenges in this sector in future.

For improving, the reporting process inclusion of the SDGs indicators is recommended as a benchmark for measuring the progress, facilitating data collection and monitoring, and strengthening the cooperation and coordination among the public and private sectors. Besides that, it is recommended to update and reformulate efficient regulations in line with SDGs requirements.

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Global Policy and Legal Developments

Bahrain's Environmental Legal Tools for Giving Effect to Sustainable Development Goals: An Assessment

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Abstract. Sustainable development in Bahrain is considered one of the national core objectives in the Government Action Plan. Bahrain has enacted environmental legislation and adopted the National Environment Strategy. This study examines the appropriateness of the current environmental legislations in the context of SDGs. To achieve this goal; a scoping review was conducted to assess their compatibility. The study revealed that the successful integration of SDGs with the current environmental legislations can be carried out by recognising the challenges highlighted in the 2030 Agenda. This study suggests the quick-updating of the current environmental legislations in line with SDGs. There is still room for improvement, and more comprehensive and sustainable approaches need to be developed in the environment dimension to stay on track to reach the SDGs. The policies should factor in the possible linkage opportunities to develop a holistic management approach in the implementation, considering the international conventions' obligations. The study can be deemed as the first attempt to examine the consistency of the SDGs with the national environmental legal framework, which can be employed to enhance the sustainable practices. Moreover, the study develops a simple framework that can assist in reviewing, keeping the legislations and strategy consistent with the SDGs.

Keywords: Environmental impact assessment, polices and regulations, environmental auditing, SDGs, MDGs

1. Introduction

The outcome document – the Stockholm Declaration – of the first historical conference on environment, agreed on 26 principles, particularly principle 11 call the countries to enhance the environmental policies based on sustainable development concept.[1] This was followed by Agenda 21 (adopted in 1992), stating that laws and regulations of each country is the most important tools for transforming environmental and development policies into actions.[2] Further, the 2030 Agenda and its 17 sustainable development goals (SDGs),[3] is guided

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by a number of international legal instruments, [4,5] specifically the UN Charter (signed in 1945), the Universal Declaration of Human Rights (accepted in 1948), and the Rio Declaration on Environment and Development (adopted in 1992).[6] In this regard, the SDGs provide guidelines for regulations to achieve a broad purpose,[7] and called all countries to carry on procedures to formulate policies aligning with national development planning to attain the SDGs.[8] According to Beier et al.; the outcomes of the green economy concept (GEC) that the SDGs affected the global sustainable development policies for the next decade.[9] Therefore, implementing the SDGs needs further policy coherence, and involvement of the private sector,[10]and strategies need to be supported by the national law.[11] Furthermore, the sixth UN Global Environment Outlook report[12] mentioned that extensive efforts were taken to advance methods for enhancing environmental governance by strengthening the regulations, and empowering the policies to promote voluntary actions. In this regard, both – the 2030 Agenda and Addis Ababa Action Agenda[13] (AAAA) assign significance to sustainable and resilient infrastructure as a precondition to accomplishing sustainable development,[14] but in the SDGs' era, sustainability is the principal aim at regional and national levels.[15]

Due to the vital role of the industrial sector, the consensus about the significance of industrial development in driving economic growth has increased globally[16,17] because this sector is accountable for controlling environmental impacts through its compliance with the legislatives, [18,19] and a good regulation is one of the most feasible solutions for some SDG issues,[20] thus, this sector need empowering regulatory frameworks to participate in sustainable development.[21] From an economic standpoint, companies are trying to make an impact on the regulations sustainability,[22] therefore, the SDGs' contributors in the industrial sector are eager that governments must make regulations convenient to implement SDGs,[23] and formulate effective

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environmental policies.[24] In some cases, influential regulations encourage companies to implement more sustainable and efficient production processes,[25] such international standards (e.g., ISO 14001), which often fill the regulative gaps due to the dearth or absence of local regulations and international policies.[26] Rashed and Shah have suggested that updating and reformulating effective legislations based on SDGs' requirements is one way to ensure effective implementation.[27] Moreover, the legislative requirements are one of the motivations to invest in sustainable projects;[28] and adequate regulations and incentives can be a driver for innovations that enable companies to increase their competitiveness indirectly.[29] Some studies indicate that the country's legislative framework is the most significant factor that affects the environmental performance of the companies towards desirable behaviors.[30,31] In this vein, Thabit et al. pointed out that the companies that integrate sustainable development into their policies will obtain long-term benefits such as improved performance and productivity.[32] Another study by Dahlmann and Bullockb found that the companies' managerial devices have various responses towards supporting compliance with the sustainability legislations.[33]

Other studies concluded that imposing sustainable development regulations still poses a key challenge[34] due to lack of global regulations correlated with sustainable industrial initiatives,[35] thus, governments should improve the environmental regulations,[36] for instance, improving environmental regulations to minimize carbon dioxide emission, especially in the transportation sector.[37] Furthermore, the United Nation Environment Programme (UNEP) highlights in its revised environmental impact assessment legislation the great significance of both strategic environmental assessment (SEA) and environmental impact assessment (EIA) in attaining the 2030 Agenda[38,39] due to their effective role in enhancing sustainable development,[40] where EIA aims to minimise the negative impacts, and SEA ensure added environmental factors to policies and strategies.[41] Further, the EIA if

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35 Poulsen, R.T., Ponte, S., Lister, J., 2016. Buyer-driven greening? Cargo-owners and environmental upgrading in maritime shipping. Geoforum 68, 57–68.

36 Ribeiro, F.M., & Kruglianskas, I., (2015). Principles of environmental regulatory quality: A synthesis from literature review. J. Clean. Prod. 96, 58–76.

37 de Oliveira Neto, G. C., Pinto, L. F. R., Amorim, M. P. C., Giannetti, B. F., & de Almeida, C. M. V. B. (2018). A framework of actions for strong sustainability. *Journal of cleaner production*, *196*, 1629–1643.

38 United Nations (UN) (2015). *Resolution 70/1 in 2015: Transforming our World: The 2030 Agenda for Sustainable Development*. United Nations General Assembly.

39 UNEP (2018). *Assessing environmental impacts – A global review of legislation*. United Nations Environment Programme ISBN: 978-92-807-3679-3.

40 Del Campo, A. G., Gazzola, P., & Onyango, V. (2020). The mutualism of strategic environmental assessment and sustainable development goals. *Environmental Impact Assessment Review*, *82*, 106383.

41 Jenkins, B. R. (2019). *Comparison of Sustainable Development Goals and Environmental Impact Assessment*. In International Association of Impact Assessment conference (IAIA) website. Brisbane.

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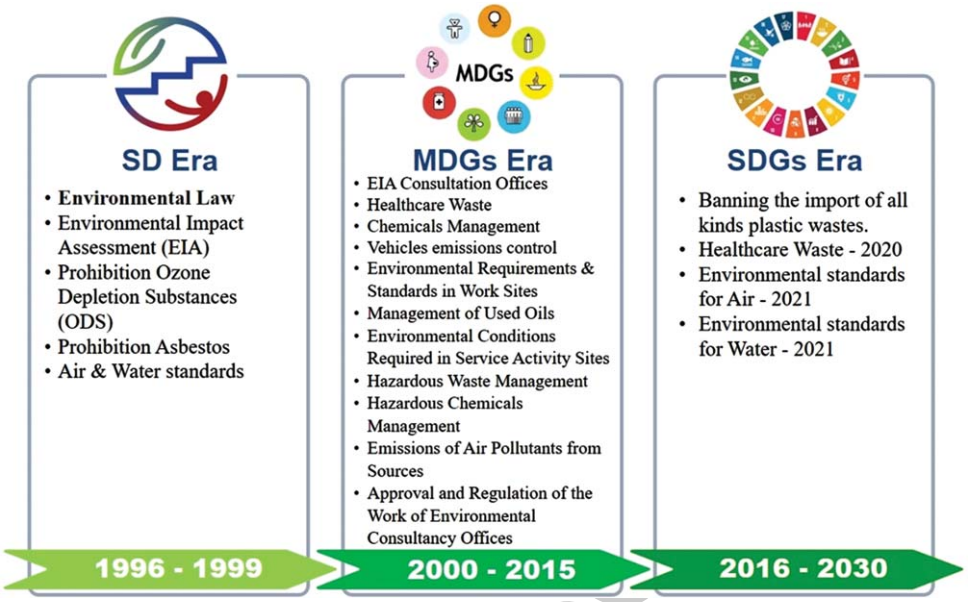


Fig. 1. The evolution of environmental legal tools in Bahrain (Author's own depiction; data sources.[45]

fully implemented will provide a platform for the attainment of SDGs.[42] In this context, the EIA system affords an efficient framework for the integration of environmental policies and developmental strategies which drive to attain the sustainable development.[43]

This study – to my knowledge – is the first that aims to assess the appropriateness of Bahrain's environmental legal tools with regard to the SDGs. The research methodology employed is a scoping review that scrutinizes their compatibility and effectiveness within the SDGs' context. The proposed framework consists of five actions to achieve SDGs from a coherent policy perspective at the national level.

2. Bahrain's Environmental Legal Tools

The Supreme Council for Environment (SCE) is the government entity responsible for developing programmes, regulating policies, and formulating strategies to attain environmental sustainability. Since 1996, the environment law and its technical ministerial decrees (see Fig. 1) have aimed to address and control several environmental issues that cover air quality, chemicals, wastewater, hazardous waste, and environmental impact assessment. For example, to monitor and control air pollution from industrial sources, it is required follow the best available techniques to ensure no harmful impacts on public health or the environment directly or indirectly.[44]

Besides the environmental legal tools, the Charter of National Action (CNA), adopted in 2001, highlights the basis of the overall development of the national sustainable policy,[46] and the Constitution of 2002, as Article 9(h).[47] As a result, in 2006, the National Environment Strategy (NES) was approved by the Cabinet, and it is one of the priorities of the first MDGs report. Bahrain's strategic goal for environmental policy is to integrate

42 Abija, F. A. (2018). Gap analysis and strategic implementation of environmental impact assessment a pathway to achieving the SDGs in Nigeria. *International Journal of Environmental Monitoring and Protection, 5*(4), 81–86.

43 Joseph, K., Eslamian, S., Ostad-Ali-Askari, K., Nekooei, M., Talebmorad, H., & Hasantabar-Amiri, A. (2019). Environmental Impact Assessment as a tool for sustainable development. *Encyclopedia of Sustainability in Higher Education*, 588-596.

44 eGovernment (2020). Environment protection in Bahrain. Kingdom of Bahrain. Access Date: 10/12/2020. The Supreme Council for Environment, Kingdom of Bahrain (sce.gov.bh)

45 Legislation and Legal Opinion Commission (LLOC) (2020). Access Date: 10/8/2020. www.legalaffairs.gov.bh

46 See, note 44.

47 The State shall take the necessary measures for the protection of the environment and conservation of wildlife.

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the environmental matters related to human health protection and natural resources management within the entire national policies.[48] According to Al-Khalifa, there is a low level of basic awareness in Bahrain's private sector about the sustainable development and the national sustainable strategies, thus, it is essential to raise awareness.[49] Further, there is a dearth of economic initiatives and an absence of a cohesive policy to enhance and strengthen a green-technology industry in Bahrain.[50] A positive finding of Basarir and Arman showed that Bahrain's environmental protection policies do not impact the economic development and the gross domestic product (GDP) growth leads to a decrease in environmental pollution.[51]

Based on previous studies in the area of assessing legal tools and sustainable development, the next section investigates the research method employed in the study to examine the appropriateness of the current environmental legal tools with regard to the SDGs.

3. Research Methodology

Studies on the integration of environmental policies principally examine the efficiency of different methods in implementing integrated approaches.[52,53] The current study uses a scoping review by employing the key concepts in the UN's formal documents on the SDGs, and it attempts to identify the synergies, gaps, the extent of appropriateness between environmental legal tools and the SDGs, and how environmental legal tools are utilised and addressed by the government to facilitate the possibility of attaining the SDGs. Scoping studies adopt a basic approach for conceptual mapping within a research field of practice-based studies and evidence.[54] Usually, the results of this approach are narrative, with little statistical data and more tables of information. This methodology is appropriate for research in practice, education, and policy,[55] and adequate when systematic reviews are unable to achieve the fundamental aims or knowledge requirements.[56] Furthermore, a scoping review analyses all existing literature reviews on a particular topic to provide recommendations for improving policy or practice and identify the aspects of that which have not been addressed. In addition, this methodology minimises author bias.[57] Therefore, this approach was employed to study the environmental legal tools in Bahrain.

Data on Bahrain's environmental legal tools were collected primarily by searching the Legislation and Legal Opinion Commission[58] database, and the keywords were 'environment', 'air', 'water', 'waste', 'chemicals', and 'work environment'. The search was repeated for all possible results to make sure that all the required environmental legal tools were obtained. The search results, as per the keywords, are as follows: environment – 213, water – 214, waste – 11, chemicals – 22, air – 5, and work environment – 10, which contain various subjects of legal tools in different fields.

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48 Derasat & UNDP (2018). *Bahrain Human Development Report 2018: athways to sustainable economic growth in Bahrain*.

49 Al-Khalifa, L. (2015). Advancing sustainable development in Bahrain through the triangulation approach. In Bryde David, Yusra Mouzughi and Turki Al Rasheed (Eds.), *Sustainable Development Challenges in the Arab States of the Gulf*. Berlin, Germany: Gerlach Press, pp. 113-138.

50 Dutta, A. (2015). Green Management and Sustainable Development: The Case of Kingdom of Bahrain. *Journal of Empirical Research in Accounting & Auditing*, *2*(1).

51 Basarir, A., & Arman, H. (2014). Sustainable development and environmental Kuznets curve in GCC countries. In *Proceedings of the 13th International Conference on Environmental Science and Technology*.

52 Tosun, J., & Lang, A. (2017). Policy integration: Mapping the different concepts. *Policy Studies*, *38*(6), 553–570.

53 Stevens, C. (2018). Scales of integration for sustainable development governance. *International Journal of Sustainable Development & World Ecology*, *25*(1), 1–8.

54 ElAlfy, A., Palaschuk, N., El-Bassiouny, D., Wilson, J., & Weber, O. (2020). Scoping the evolution of corporate social responsibility (CSR) research in the sustainable development goals (SDGs) era. *Sustainability*, *12*(14), 5544.

55 Peterson, J., Pearce, P. F., Ferguson, L. A., & Langford, C. A. (2017). Understanding scoping reviews: Definition, purpose, and process. *Journal of the American Association of Nurse Practitioners*, *29*(1), 12–16.

56 Munn, Z., Peters, M. D., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC medical research methodology*, *18*(1), 143.

57 Piñeiro, V., Arias, J., Dürr, J., Elverdin, P., Ibáñez, A. M., Kinengyere, A.,... & Torero, M. (2020). A scoping review on incentives for adoption of sustainable agricultural practices and their outcomes. *Nature Sustainability*, *3*(10), 809–820.

58 An independent body of a judicial nature; it has three main competencies, which are: legal opinion, preparation and drafting of legislation, and review of contracts.

The outcome of the screening process was a list of 19 environmental legal tools to be utilized in the assessment and analysis process in this study. The collected environmental legal tools were divided into five categories, except the general environmental law: environmental impact assessment, air and water, chemicals management, waste management, and work environment. A systematic qualitative analysis was conducted for assessing the interlinkage and alignment between the existing environmental legal tools and the SDGs by examining the content addressed by each legal tool and identifying its related goals and policy gaps.

3.1. Reviewing the Existing Environmental Regulations and Their Appropriateness Concerning the National and International Environmental Changes

The periodic reviewing of environmental regulations, whenever needed, is a fundamental approach to ensure their efficiency, robustness and verify that all environmental issues are under control. In this regard, Saner et al. proposed that international environmental conventions can be utilised to enhance the SDGs' implementation and provide needful amendments to the national environmental laws.[59] In the same vein, one of the methods for revising environmental policymaking to resolve environmental matters and assure sustainability is to address where national laws intersect with international conventions, and take into account the global governance when designing environmental laws.[60] Furthermore, the policymakers can benefit from the multilateral environmental agreements to strengthen the implementation of existing legal tools;[61] and future regulations should be better, covering several actions and commitments to the SDGs;[62] in addition, governments and companies should shift essentially towards development via adjusting their actions concerning the SDGs.[63]

The former Commission on Sustainable Development (1992–2003) and the United Nations Conference on Sustainable Development (Rio+20) have guided how to translate sustainable development into national contexts.[64] The national planning mission for the SDGs took several years, including unattained MDGs;[65] thus, an early quick-start to takes the SDGs' actions is a significant step to ensure affirmative achievements by 2030.[66] For instance, in the Netherlands, the assessment results of existing regulations found that three out of forty-one environmental targets focused on the SDGs were not included in the current policy targets and not yet attained.[67] Besides the attention to the financial needs, the environmental policy should count in the SDGs' costing process to avoid what happened in the MDGs' era in this regard, because the great significance focused on environmental policy, and formulating the strategies is to attain the SDGs.[68] Consequently, the developing countries have to design national planning and reviewing mechanisms and draft legislation associated with the SDGs.[69] For instance, during the last 40 years in the Arabian Peninsula, the economic and social overconsumption of energy

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59 Saner, R., Yiu, L., & Kingombe, C. (2019). The 2030 Agenda compared with six related international agreements: Valuable resources for SDG implementation. *Sustainability Science*, *14*(6), 1685–1716.

60 Almannaei, N. A., Akhter, M. S., & Shah, A. (2020). Improving environmental policy-making process to enable achievement of sustainable development goals. *Environmental Policy and Law*, (Preprint), 1–8.

61 Takeuchi, K., Osamu, S., Lahoti, S., & Gondor, D. (2017). Growing up: 10 years of publishing sustainability science research. *Sustainability Science*, *12*(6), 849–854.

62 Renda, A. (2017). How can Sustainable Development Goals be 'mainstreamed' in the EU's Better Regulation Agenda? *CEPS Policy Insights*, *12*.

63 Georgeson, L., & Maslin, M. (2018). Putting the United Nations Sustainable Development Goals into practice: A review of implementation, monitoring, and finance. *Geo: Geography and Environment*, *5*(1), e00049.

64 Risse, N. (2016). *Implementing the 2030 Agenda and its SDGs Where to Start?* International Institute for Sustainable Development (IISD).

65 Sarwar, M. B. (2015). *National MDG implementation: Lessons for the SDG era*. London, UK: Overseas Development Institute.

66 Lucci, P., & Lally, S. (2016). *Starting strong: The first 1000 days of the SDGs*. London, UK: Overseas Development Institute.

67 Lucas, P., Ludwig, K., Kok, M., & Kruitwagen, S. (2016). *Sustainable Development Goals in the Netherlands. Building blocks for environmental policy for 2030*. The Hague, Netherlands: PBL Netherlands Environmental Assessment Agency.

68 Vorisek, D. L. & Yu, S. (2020). *Understanding the cost of achieving the Sustainable Development Goals*. Policy research working paper no. WPS 9164. Washington, D.C.: World Bank Group.

69 Sarvajayakesavalu, S. (2015). Addressing challenges of developing countries in implementing five priorities for sustainable development goals. *Ecosystem Health and Sustainability*, *1*(7), 1-4.

and rapid urbanisation has led to deteriorating air quality; without strict regulations.[70] Therefore, environmental governance should comprise efficient regulations within the context of the SDGs 9, 11, 12, 13, and 17,[71] and environmental assessment is highly pertinent to foster any improvement during the policymaking process.[72]

The environmental policies in Bahrain rest on four principles, namely the precautionary principle, the polluter pays principle, the concept of sustainability, and the concept of shared responsibility.[73] The first Environmental Law (No. 21) was issued in 1996, which was amended in 1997. This law aimed to protecting the environment from polluting sources and factors, by implementing the necessary plans and policies; and includes a broad scope of environmental issues and is consistent with the famous Brundtland Commission definition of sustainable development.[74] It seemingly refers to the principles of the 1992 Rio Declaration on Environment and Development; for example, Article No. 3 of Law 21 is consistent with Principle 11 with regard to the enactment of effective environmental legislations; and Articles 11, 15, 16 and 21 are consistent with Principle 15 that calls for the necessity of employing precautionary approaches to protect the environment.

From 1998 till 2021, legislations on environmental protection to support the Environment Law have been issued. These legislations were intended to control, prevent, and correct the negative practices and impacts on the environment. In 1998, Edict No. 1 was issued based on the environmental assessment of the projects; it stated that all new projects, as well as the development of existing projects, are subject to the submission of a data forms for assessing the environmental impacts of the project or development (e.g., expansions) for their mitigation. The EIA system in Bahrain clearly specifies the duties and responsibilities of the concerned parties in the assessment process, representing the effectiveness of the Edict,[75,76] and positively contributing to improving the environmental situation and sustainable development.[77]

To facilitate the implementation of the EIA Edict, two Orders were issued: Order No. 3 of 2000 regarding the approval of consultation offices specialised in the environmental assessment of projects and environmental studies, and Order No. 4 of 2014 regarding the approval and regulation of the work of environmental consultancy offices. Both Orders organise the scope of work of private consultancy offices with regard to EIA studies. Figure 2 illustrates the number of projects that have undergone the environmental impact assessment process since the issuance of the EIA edict until 2019.

Although the degree of importance varies among several environmental legislations, they are all integrated towards achieving the core goal of the Environment Law. The aim of Orders Nos. 2 & 3 of 2021 concerning the environmental standards for air and water are to organise and assess the projects according to the environmental provisions and standards. In 2006, Order No. 10 regarding the emission of air pollutants from sources was issued, which supported the aforementioned Orders. It is worth mentioning that Bahrain's first national report on climate change, mentioned that the main sources of emissions where the energy sector (70.7%), solid and liquid wastes (12.9%), industrial activities (9.6%), and the transportation sector (6.6%).[79]

With regard to issues caused by waste and chemicals, a range of edicts covering chemicals management, industrial, healthcare, and used oil waste were issued; it covered inspections, identification, labeling, storage, transportation, treatment, and disposal procedures. Order No. 1 of 1999 pertained to the control on substances that

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70 Farahat, A. (2016). Air pollution in the Arabian Peninsula (Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Bahrain, and Oman): Causes, effects, and aerosol categorization. *Arabian Journal of Geosciences*, *9*(3), 196.

71 Scharlemann, J. P., Brock, R. C., Balfour, N., Brown, C., Burgess, N. D., Guth, M. K.,... & Kapos, V. (2020). Towards understanding interactions between Sustainable Development Goals: The role of environment–human linkages. *Sustainability Science*, *15*, 1573–1584.

72 Kørnøv, L., Lyhne, I., & Davila, J. G. (2020). Linking the UN SDGs and environmental assessment: Towards a conceptual framework. *Environmental Impact Assessment Review*, *85*, 106463.

73 see, note 44.

74 World Commission on Environment and Development (WCED) (1987). *Our Common Future*, Transmitted to the General Assembly as an Annex to document A/42/427 – Development and International Co-operation: Environment.

75 Naser, H. A. (2012). Evaluation of the environmental impact assessment system in Bahrain. *Journal of Environmental Protection*, *3*(2), 233.

76 Naser, H. A. (2015). The role of environmental impact assessment in protecting coastal and marine environments in rapidly developing islands: The case of Bahrain, Arabian Gulf. *Ocean & Coastal Management*, *104*, 159–169.

77 Yaqoob, M. E., Naser, H. A., Elkanzi, E. M., & Janahi, E. M. (2019). Towards an effective environmental impact assessment (EIA) in the industrial sector of Bahrain, Arabian Gulf. *Arab Journal of Basic and Applied Sciences*, *26*(1), 113–124.

78 See, note 44

79 See, note 44

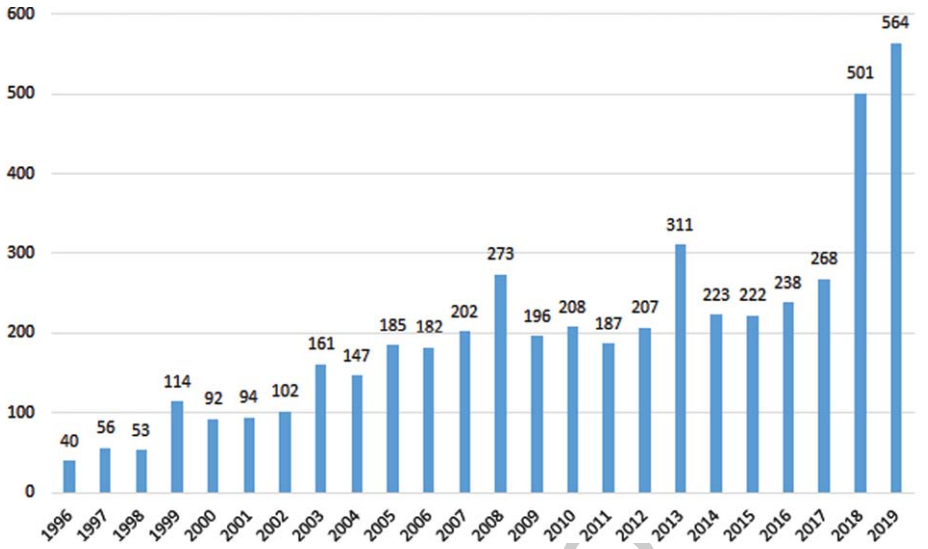


Fig. 2. The number of projects that have undergone the EIA process for the period 1996–2019 (Author's own depiction, data sources.[78]

deplete the stratospheric ozone layer, followed by Order No. 1 of 2001 concerning the management of hazardous healthcare waste and Order No. 7 of 2002 requiring the control on the import and use of banned and severely restricted chemicals. Three years later, Order No. 4 of 2005 concerning the management of used oils was issued, followed by Order No. 3 of 2006 pertaining to hazardous waste management, and Order No. 4 of 2006 related to hazardous chemicals' management. In 2013, Orders No. 3 and 4 of 2006 that amended Orders No. 6 and 7 were issued. At this point, the merits of these legal tools are that they included all aspects of chemicals and waste management and that there is some integration among them.

Besides the previously discussed environmental legal tools, there are three other important Orders focused on work environment issues and safety. Order No. 2 of 2001 concerning the procedures of environmental inspection; as it aims to verify the extent of compliance with legislative requirements and their implementation in work environment. In 2005, Orders No. 3 and 5 were issued, one on the environmental requirements and standards in worksites and the other on environmental conditions required in service activity sites.

In sum, it is clear that the legal legislative system has covered the most important environmental issues, following the passage of 24 years since the issuance of the Environment Law before adopting the MDGs and SDGs; therefore, there is an urgent need to amend it to reflect the national and global changes in environmental governance. The 2018 Bahrain Human Development Report states that there is a need to review the environmental issues, consequently requiring the updating the legislations correlated to soil, air, and water pollution.[80] Although, the current legal tools are still operative and efficient, but they require updating to fill the gaps, resolve any lack, and close them with SDGs requirements to keep up with the rapid changes, as we are in the era of the fourth industrial revolution (Industry 4.0).

3.2. Assessing the Consistency of the Existing Environmental Regulations with the Sustainable Development Goals' Requirements

The 2030 Agenda for sustainable development calls all actors from all levels to show commitment to policy coherence,[81] and this concept is an outcome of the academics and practitioners discussions over the last three decades,[82] and was first used by OECD in 1991.[83] The lack of coherence within the SDGs' framework poses

80 See, note 48

81 See, note 38.

82 Tosun, J., & Leininger, J. (2017). Governing the interlinkages between the sustainable development goals: Approaches to attain policy integration. *Global Challenges*, *1*(9), 1700036.

83 See, note 52

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Table 1
Air and water Legislations and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to the SDGs	Relation to the SDGs	Notes
1	Ministerial Order No. 10 of 2006 on emissions of air pollutants from sources	Define sunified specifications for devices to monitor air emission pollutants from the sources, and establishes communication networks that link devices that process data from the source of pollution	Air pollutants' data includes ten parameters. Online air monitoring system will add value to the monitoring of emissions 24/7.		Working on the IT infrastructure to enforce.
2	Ministerial Order No. 8 of 2002 concerning the standards for pollutants and materials emitted from vehicles or their exhausts and their inspection	Control and inspect the pollutants emitted from vehicles or their exhausts.	Adopt clean technology Monitor ambient air quality.	3.9, 9.4, 11.6, 12.4, & 13	This edict has been assigned to the Traffic Department.
3	Ministerial Order No.2 of 2021 concerning the Environmental Standards for Air	Apply to projects at all stages, its annexures determine the air emission standards from various sources and air quality standards.	Allow utilizing measurements methods approved internationally.		Supportive legislation for SDG 13
4	Ministerial Order No.3 of 2021 concerning the Environmental Standards for Water	Apply to projects at all stages, its annexure determine standards of the waste water discharge to the sea.	Conserve marine environment	3.9, 6.3, 6.5, 6.a, 12.4, & 14	Supportive legislation for SDG 6 & 14

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a significant challenge in their implementation.[84] Therefore, there is a need to harmonise the nexus among the national environmental legal tools and the SDGs. The main task in assessing the environmental legal tools is to find the gaps and inadequacies and strengthen its implementation. In this context, the role of assessments is to identify the significant issues that policymakers should focus on to achieve the SDGs[85] because they still face the challenge of translating the 2030 agenda into workable development policies.[86]

The following tables depict the existing set of environmental legal tools and a brief description of them, in addition to identifying the issues related to the SDGs sorting the SDGs associated with each legal tool.

Table 1 presents the legal tools pertaining to air and water; after more than 20 years, the legislation (No. 10 of 1999) on air and water, and its amendment (No. 2 of 2001), this Order was rescinded on 8 April 2021 and replaced with two separate Orders, which are Order No.2 of 2021 concerning the environmental standards for air, and Order No.3 of 2021 concerning the environmental standards for water. Article 7 of Order 2 allows the use of other measurements methods -not listed in legislative- approved by environmental international agencies and organizations. The environment authority has a favourable opportunity to amend this Article to align it with the SDG 13 requirement. Further, Article 15 of Order 2 and Article 9 of Order 3 stipulates that the projects are obligated to conduct quarterly analysis and measurements and whenever requested. The environment authority

84 See, note 4

85 Amin-Salem, H., El-Maghrabi, M. H., Rodarte, I. O., & Verbeek, J. (2018). *Sustainable development goal diagnostics: the case of the Arab Republic of Egypt*. Policy research working paper no. WPS 8463. Washington, D.C.: World Bank Group.

86 El-Maghrabi, M. H., Gable, S., Rodarte, I. O., & Verbeek, J. (2018). *Sustainable development goals diagnostics: An application of network theory and complexity measures to set country priorities*. Policy research working paper no. WPS 8481. Washington, D.C.: World Bank Group.

Table 2
Environmental impact assessment legislations and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 1 of 1998 on the environmental assessment of projects	Requests EIA studies for all projects, outlines the mechanism of EIA, & lists the related categories of development	Article 9 defines thirteen of the factors and impacts that must be included in the environmental impact report that may result from the project.	11.a 13.2 13.b 17.15	This article covers the main issues of most SDGs
2	Ministerial Order No. 3 of 2000 on approving consultation offices specialized in the environmental assessment of projects and environmental studies	Lists the criteria adopted by the environmental authority for the registration of environmental consultants and their responsibilities	This order opened the way for consulting offices that have experience in preparing environmental reports by working with the private sector.		This edict helps raise the efficiency of research and development.
3	Ministerial Order No. 4 of 2014 concerning the approval and regulation of the work of environmental consultancy offices	Aims to approve the work of environmental consultancy offices working in the field of studies and especially environmental assessment studies for projects	This legislation classifies the registration of environmental consultancy offices; and evaluating the environmental impact study.	9.5	This legislation enhances and integrates Legislation No. 3 of 2000

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has a favourable opportunity to amend this article to fulfil the SDGs' requirement. It is interesting to note from annexures that the Orders on air and water standards reflected in the SDGs 3, 6, 9, 11, 13, and 14. Besides the edicts, Bahrain employs the provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) as a basis for national legislation on marine oil spill, and the National Oil Spill Contingency Plan that intends to preserve the marine environment was adopted in 1993.[87] Further, approximately 90% of industrial wastewater is treated before being discharged into the marine environment, and it is mandatory to obtain disposal permit by law. These efforts meet the requirements of SDG 6 and 14.[88]

Table 2 presents EIA's legal tools; Article 8 of Edict 1 of 1998 specify the EIA report should contain elements that represent comprehensive requirements; specifically, this article offer's a great opportunity to add sustainability dimension. In the same edict, Article 9 complements the requirements of Article 8 by identifying the project impacts, which must be considered to avoid any adverse impacts on the environment. The edict on EIA is reflected in SDGs 9, 11, 12, and 15, and the extent of the impact assessment system will increase the number of SDGs covered by the impact assessment process. Naser stated that the EIA process generally lacks environmental guidelines.[89] As a case in point, in the comparative study on EIA systems among the Gulf Cooperation Council states, the EIA system in the gulf states lack sectoral procedures, specific technical guidelines, and monitoring and implementation.[90] In this regard, the comparative analysis of countries' regulations provides important support for policymakers to improve them.[91] Literature shows the EIA is an

87 Marzooq, H., Naser, H. A., & Elkanzi, E. M. (2019). Quantifying exposure levels of coastal facilities to oil spills in Bahrain, Arabian Gulf. *Environmental monitoring and assessment, 191*(3), 1–16.

88 Al-Noaimi, M. A. (2020). SDG goal 6 monitoring in the Kingdom of Bahrain. *Desalination and Water Treatment, 176*, 406–427.

89 see, note 75

90 Al Azri, N., Al Busiadi, R., & Sulaiman, H. (2013). Evaluation of Environmental Impact Assessment (EIA) systems in GCC States through performance criteria. *APCBEE Procedia*, *5*, 296–305.

91 Suwanteep, K., Murayama, T., & Nishikizawa, S. (2016). Environmental impact assessment system in Thailand and its comparison with those in China and Japan. *Environmental impact assessment review*, *58*, 12–24.

Table 3
Legislations on chemicals management and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 1 of 1999 concerns the control on substances that deplete the ozone layer	Support protection of the ozone layer from substances that cause depletion	The import of devices, equipment, and materials harmful to the ozone layer was stopped, and set a schedule for the disposal of that substances	3.9 6.3 12.4 13	Attention was given to chemicals' management since the passing of the legislation.
2	Ministerial Order No. 7 of 2002 regarding the control on the import and use of banned and severely restricted chemicals	Control import and usage of banned and restricted chemicals	Classified chemicals, and encouraged the use of safe alternatives		Need to update lists of banned and severely restricted chemicals
3	Ministerial Order No. 4 of 2006 on hazardous chemicals' management, and its amendments	Control hazardous chemical materials listed in Order No. 7 of 2002	Protect human health in the work environment from chemicals' impacts	3.9 6.3 12.4	Almost covered the whole chemicals' management supply chain

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essential tool in the planning of sustainable development, while still there is a lack of studies into whether the EIA system leads to a reduction in environmental impacts and how to measure it.[92]

Table 3 illustrates the set of chemicals management legal tools. After examining them, it was observed that they were designed basis on the precaution and prevention principles to reduce their exposure risk and adverse health impacts. Additionally, it covered the management aspects including the licensing, uses, storage, handling, and transportation. The proposed addition is regulating chemical uses and prevent import in bulk quantities to avoid the expiration and generation of chemical waste.

Table 4 mentions the set of waste management legal tools; it is found that the legislations on waste management are comprehensive and integrated, covering all aspects of the waste management issue.

Concerning the legal tools pertaining to waste and chemicals, as mentioned in Tables 3 and 4, there needs more focus on the environmental impacts, and sustainable consumption policies must be adopted. Moreover, there is a need for extended producer and importer responsibilities towards controlling the quantity of chemicals imported to avoid expiration or the remaining of excessive quantities, consequently avoiding waste chemicals' generation. Given the importance of the issue of waste and chemicals, the sound management of chemicals and waste is one of the significant drivers for attaining the SDGs.[93] In addition, the Inter-Organization Programme for the Sound Management of Chemicals (IOMC)[94] mentioned that the management of chemicals and waste are included clearly in several SDGs, such as 3, 6, 11 and 12.

Table 5 presents the set of work environment legislations. These regulations are aimed at ensuring a safe and healthy work environment for workers in workplaces. Besides this set of legislations, there are two Orders issued by the Ministry of Labour, which are directly related to the Orders issued by the SCE. From the viewpoint of policy, this is an advantageous opportunity as it opens a pathway for the legal coordination and integration among government parties.

92 Loomis, J. J., & Dziedzic, M. (2018). Evaluating EIA systems' effectiveness: A state of the art. *Environmental Impact Assessment Review*, *68*, 29–37.

93 Syeda, S. R. (2020). Framework for sound management of chemicals: Toward a sustainable chemicals industry in Bangladesh. *ACS Chemical Health & Safety*, *27*(5), 288–298.

94 IOMC's vision is to shapes a sustainable future through coordinated global act on to achieve the sound lifecycle management of chemicals and waste for healthy lives and the environment.

Table 4
Legislations on waste management and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 4 of 1999 on licensing work in the maintenance of equipment and buildings containing asbestos, and removing and transporting their waste	Control disposal, handling, and treatment of asbestos	Precautions in the work environment and the safe disposal	11.6 12.1, 12.4, 12.5, 12.6	Covered work environment and waste management
2	Ministerial Order No. 3 of 2020 on the management of hazardous healthcare waste	Controlling the entire hazardous medical wastes management	Avoid health hazards impacts and improve treatment processes	3.d, 11.6 12.1, 12.4, 12.5, 12.6	Ministerial Order No. 1 of 2001 was rescinded
3	Ministerial Order No. 4 of 2005 on the management of used oils	Controlling the entire used oil management	Soil, water, and marine protection, and the adoption of recycling, and environmentally sound technologies		The legislation's articles refer to the edicts on EIA, and air and water. They also refer to Basel Convention.
4	Ministerial Order No. 3 of 2006 concerning hazardous waste management and its amendments	Controlling the entire hazardous waste management		11.6 12.1, 12.4, 12.5, 12.6	
5	Resolution No.2 of 2019 concerning the ban on the import of all kinds plastic waste	Bans the import of all kinds plastic waste	Waste management	12.1, 12.4, 12.5, 12.6	Implement Basel Convention's provisions.

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4. Discussions

With regard to the SDGs' era, Gore[95] identified some critical weaknesses that may limit the transformative possibility of the SDGs; there is a dearth of coherent fundamental policy frameworks, and attaining the novel global goals will require novel global rules in return. In line with this, Galli argued that including the SDGs within the national context entails a long-term evident vision propped by novel aims and the updated national policy.[96] Across 16 thematic goals, 42 targets concentrate on the 'means of implementation', and there is necessity to reform policies and institutions if a transformational development is to occur.[97]

The review revealed that Bahrain's environmental legislation is a combination of information request and management request, which is reflected almost in all resolutions. Further, the regulations are consistent in their overall strictness and the compliance requirements, in addition to being based on penalties and fines dictated

95 Gore, C. (2015). The post-2015 moment: Towards Sustainable Development Goals and a new global development paradigm. *Journal of International Development*, *27*(6), 717–732.

96 Galli, A., Đurović, G., Hanscom, L., & Knežević, J. (2018). Think globally, act locally: Implementing the sustainable development goals in Montenegro. *Environmental science & policy*, *84*, 159–169.

97 Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N.,... & O'Connell, D. (2017). Integration: The key to implementing the Sustainable Development Goals. *Sustainability Science*, *12*(6), 911–919.

Table 5
Legislations on work environment and their relation to the SDGs

#	Environmental legal tools	Brief description	Issues related to SDGs	Relation to SDGs	Notes
1	Ministerial Order No. 2 of 2001 concerns the procedures of environmental inspection	Outlines the procedures and requirements of environmental inspection	Enforce regulations	17.14	Supports all legislations by ensuring compliance
2	Ministerial Order No.3 of 2005 on the environmental requirements and standards in worksites	Dictates the regulations for protecting workers from environmental and occupational risks	Safe work environment and protect workers	8.8	This order should be integrated with the two Orders No. 15 and 38 of 2014, issued by the Ministry of Labour
3	Ministerial Order No. 5 of 2005 pertains to environmental conditions required in service activity sites	classification the service activities in service areas and streets	Infrastructure planning	11.a	Classifying the areas to avoid any impacts on domestic areas in the future.
4	Ministerial Order No. 15 of 2014 on protecting workers from the dangers of flammable chemicals, gases and liquids in facilities and worksites	Describes the regulations of proper handling of dangerous flammable chemicals			Issued by the Ministry of Labour
5	Ministerial Order No. 38 of 2014 on determining the conditions and precautions necessary to protect workers from mechanical hazards in the work environment	Outlines the conditions and precautions necessary to protect workers from mechanical hazards	Safe work environment and protect workers	8.8	Supports Legislation No. 3 of 2005

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by the environment Law. Although the necessary requirements to improving national laws should be realized to implement environmental policies, the cooperation among government institutions is also required to compile their efforts to enforce and strengthen environmental legislation. Given the complexity of the policy evaluation process, it should be accelerated by facilitating the consultations among the concerned stakeholders.

Furthermore, from the viewpoint of policy, Bahrain must foster additional effective policies and measures to improve the current environmental state and adapt to future challenges and emerging social and economic needs to achieve sustainable development.[98] The challenges faced by the environment and development can neither be resolved via laws nor overseas development assistance solely. There is a need to raise the extent of integration among the environmental and economic policies, which could assist in resolving those challenges. Further, an innovative combination of policies, economy tools, and market-based standards are needed, which leads to changes in the production and consumption patterns.[99] In this regard, there is a shared view among the majority of the companies in Bahrain that accounting regulations need enforcement to obligate companies' reporting on environmental accounting;[100] for instance, the EIA system in Bahrain is still facing challenges, and

98 See, note 44.

99 See, note 48.

100 Gibbon, J., & Joshi, P. L. (1999). A survey of environmental accounting and reporting in Bahrain. *Journal of Applied Accounting Research*, *5*(1), 4.

to strengthen it, the improvements are critically needed for integrating all EIA system aspects,[101, 102] and oil and gas are two of the large industrial sectors and that their projects consumed high energy.[103] Order No. 1 of 1998 requires that the EIA report include a description of any potential increase in non-renewable resources' demand; however, there is no legal condition that binds the project owner to submit an energy management plan. This gap could be narrowed by amending the legislation and placing guidelines to ensure the efficient consumption of non-renewable resources. Notably, in some developed projects, the impacts are low but cumulative, so one should consider that any development will generate environmental impacts, which need to be reflected in the EIA legislation's provisions.

There is an opportunity to add sustainability as a requirement in the EIA report, especially the issue of resource efficiency aspect that is related to SDGs 8, 11, and 12. Recently, consulting companies around the world have started qualifying specialised expertise to study the challenges of sustainable development and provide solutions.[104] Another legal suggestion is that environmental auditing tool should have adopted in the compliance with the regulations, and added to the private consultation offices' duties. Environmental audit is a significant factor for sustainable development, because it plays a crucial role in updating laws to create a legal frame for sustainable development.[105] In addition, it is an essential policy tool for the assessment and development of environmental policies and plans' performance,[106] and some of its benefits lead to compliance with environmental regulations and sustainable development.[107]

The SDGs did not directly refer to air, although it is indicated clearly in two targets: Target 3.9, which is related to air pollution as a single mechanism harming human health, and Target 11.6, pertaining to an element of the environmental impact of cities. Also, the issue of air is included indirectly in some goals such as SDG 13. In this context, Bahrain has taken earnest actions to commit to the global efforts to fight climate change by signing the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, and the 2015 Paris Agreement. Adding to those efforts, the air quality standards were monitored since 1999, and plans have been developed to raise the number of air portable-monitoring stations. Moreover, the SCE mandated to formulate a National Air Quality Strategy to assess the current challenges.[108]

The legislations on chemicals lack a mandatory annual inventory request. The UNITAR and SCE's chemicals assessment report recommends that an effective chemicals management mechanism must be established between the key stakeholders to avoid any unlawful trade and breach of national legislations.[109] In addition, the management of chemicals and waste is one of the primary challenges that should be tackled by adopting and implementing legal tools that determine the liabilities of the public and private sectors for monitoring and improving legislation systems. With regard to the issue of waste, Bahrain employed the provisions of Basel Convention as a basis for national legislation pertaining to hazardous waste management until issuing the legislative on hazardous waste management.

The matter of human health, which most environmental legal tools referred to in their master aim, is considered an important indicator that reflects the extent of a sound environment. It is covered in Goal 3 that indirectly meets with the requirements of SDGs. The aspects of occupational health and safety cannot be separated from the environmental aspect as both complement each other. It is also committed to conducting inspections of workplaces, and providing information and guidance for employers. This intersects with the work environment decisions issued by the SCE, thereby confirming the necessity of integration from a legal standpoint.

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101 See, note 75.

102 See, note 76.

103 See, note 77.

104 Hannemann, L. (2019). Sustainability consultancies and their contribution to sustainable development. In *Advances in consulting research* (pp. 229–249). Cham: Springer.

105 Hakim, W., & Yunus, A. (2017). Environmental audit as instrument for environmental protection and management. *The Business & Management Review*, *9*(2), 228–232.

106 Cook, W., van Bommel, S., & Turnhout, E. (2016). Inside environmental auditing: Effectiveness, objectivity, and transparency. *Current Opinion in Environmental Sustainability*, *18*, 33–39.

107 Asalos, N. (2019). Environmental auditing – An organization management tool. *Ecoforum Journal*, *8*(1).

108 See, note 48.

109 See, note 44.



Fig. 3. The author's proposed framework of actions for reviewing the environmental legal tools.

With reference to the concerns and recommendations of Bahrain's MDGs reports, the second MDGs report raised an important question on how Bahrain can achieve sustainable development, and how the economic growth can void the environmental considerations.[110] In this regard, the third MDGs report reveals that 'the national strategies and government policies have not succeeded in controlling economic activities, particularly real estate activities, major construction projects and sea reclamation within a manageable and sustainable level consistent with Bahrain's environmental capacity'.[111] On a positive note, the 2015 MDGs endpoint report notes that significant national actions have been taken since the previous MDGs reports by including the national environmental priorities in the State Strategic Plan 2014 –2016, namely health and the environment, energy and climate change, and urban growth and weak land-use planning.[112] As a reflection, the Government Action Plan (2015–2018) is a short-term national development programme with goals and priorities in line with the SDGs, for example, SDG 6 Targets 6.1, 6.4, and 6.5 are included in the infrastructure, urban development, and environment pillars. Continuous progress, one of the priorities of the Government Action Plan (2019–2022), is facilitating an enabling environment for sustainable development, and section 6 prescribes regulating environmental protection and sustainability. This priority is focused on keeping up with international legislations and agreements considering the best environmental practices, and developing national strategies to protect the environment as well as promote and activate environmental awareness.[113]

Based on the assessment outcomes, study recommendations, and the literature review findings, the author's proposed framework (see Fig. 3) consist of five actions for reviewing the environmental legal tools by cooperating with the government authorities and other stakeholders to fill the gaps, tackle deficiencies, and provide proposals. The first action is the preparation of a second state of environment (SOE) report to study the current environmental situation to get perspicacity into various issues of environmental priority, the pressures underlying the environmental changes and its impacts. Also, such a report is required to evaluate the current legal tools and proposed policy actions. The second action has to do with the updating of the National Environment Strategy based on the outcomes and recommendations of the second SOE report and including the SDGs. Environment strategy sets out the vision and goals, ranks the environmental priorities concerning the current state, and endeavours to recognise actions that enhance the efficiency of resources and attain various benefits in the context of the SDGs. Actions three and four entail updating and proposing amendments that should translate the outcomes of the strategy. The last action is to set up environment action plan, including indicators to monitor the progress in the first three actions.

110 See, note 44.
111 See, note 44.
112 See, note 44.
113 See, note 44.

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5. Conclusion and Environmental Policy's Embodiment

The continuous impacts of human activities in various sectors warn the destruction of the developmental progress of decades. Therefore, more than ever, there is an urgent need for the activation of the 2030 Agenda's vision and its SDGs via an earnest action to foster the policy coherence starting from the national level. Further, environmental policies should not be formulated in an isolated manner regarding the global environmental changes and challenges, and they must reflect the environmental obligations explicitly and systematically. Sustainability can be accomplished by amalgamating the legal policy aspects of the environmental, technical, economical, institutional, and socio-cultural dimensions. More specifically, the SDGs are a strong support point for the integration among the national legal tools, because it is not possible to deal with each goal individually and must be approached as a set.

To carry out the current legislations and make it more effective in Bahrain; there is a need to continuously enhance the legal and institutional capacity to cope with the emerging issues affecting the environment. The government should strategically recognize that the SDGs era will end-up in 2030 and the remaining period is 10 years. Therefore, there is a necessity to place long-term plans for the environmental legal tools and strategies beyond 2030, and it should be subjected to periodic reviewing and updating via creating a participatory mechanism among the key stakeholders. The extent of concern for the environment is clear from the government action plans, therefore, it should take a step forward to study, identify, and address the inadequacies of the existing environmental legal tools.

For the successful implementation of the SDGs, the national strategies and plans need to be strengthened by effective environmental legal tools, and this is a significant pillar in the field of sustainable development law and in the aim of Principle 10 of the Rio Declaration. Against this background, it is essential to highlight the significance of reviewing and scrutinising the current environment legal tools to eliminate the gaps, deficiencies, contradictions, and repetitions, which will strengthen the capabilities crucial for the successful implementation and enforcement of these legal tools.

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Towards Effective Environmental Sustainability Reporting in the Large Industrial Sector of Bahrain

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Abstract: The industrial sector plays a vital role in economic development; therefore, there is a necessity to integrate sustainability into industrial development to maintain the economy and avoid any degradation impacts on the environment, and thereafter on society. Thus, do Bahraini companies have sustainability reports and if so, are these reports based on GRI guidelines? Has the status of their sustainability reports been analyzed? This research aims to examine the sustainability reports of companies by analyzing the status of sustainability aspects in their materiality matrices to assist in identifying and prioritizing the most significant sustainability issues for advancement in their future reporting and to improve their environmental performance. This study employs a content analysis approach and analyzes 11 reports from the period 2016–2020 for three companies in Bahrain's large industrial sector. The study reveals that the companies using materiality analysis in their reporting benefit from better monitoring and measuring of their environmental performance, and from implementing SDGs. Furthermore, the study indicates that the utilization of a materiality matrix as a reporting tool can define and improve report contents by considering stakeholders' views, consequently, improving the quality of the sustainability reports. The study concludes by proposing a set of recommendations.

Keywords: sustainability matrix; reporting tools; GRI; materiality analysis; content analysis

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1. Introduction

The industrial sector is a major part of the business sector, and it is more inclined to have negative sustainability effects due to its direct or indirect impact on the environment. This raises concerns about attaining environmental sustainability for industrial-based development; therefore, it is essential to develop strategies based on an industrial perspective for enhancing the performance and implementation of the sharing economy [1–3]. Accordingly, conflicts have arisen between the economic consequences that have led to industrialization and the dangerous negative impacts of the devastation and consumption of natural resources and severe pollution [4,5]. In this regard, Kopnina stated that when economic gains are placed above environmental protection, economic development goals are likely to outweigh environmental concerns [6]. Barbier pointed out that there is agreement that ecosystems should be considered as economic assets, as they provide the economy with necessary goods and services [7]. In the same context, Dahlmann et al. showed that the "purpose ecosystem" consists of various actors seeking to broadly improve private sector aims and encourage the sector to shift from seeing sustainability as a side issue, being part of "business as usual" and profitability, to focusing on including sustainability considerations in their business strategies [8].

Linking industry with the environment is an essential part of industrial enterprise performance [9]; thus, the industrial sector is an important area for the development of sustainability towards a better future [10,11], and it is imperative to observe the related

transitions in this sector from the perspective of sustainability science [12]. The industrial trend towards sustainable development clearly occurs through an improvement in the production operations that rely on the technologies that utilize resources more efficiently, generate minimal waste [13], and recognize air emissions as parameters for environmental sustainability [9]. In addition, Oliveira et al. reported that, in the early 1990s, the concerned companies focused on environmental impacts resulting from their production operations by applying the end-of-pipe treatment principle and recycling practices as a preventive and proactive process [14]. Since that time, sustainability assessment has increasingly grown as a significant new evaluation approach for assisting both decision-making and policy-making on a wide range of sustainability components in various sectors globally [15], such as energy, transport, industry, infrastructure, finance, and land. In addition, more consideration has been given to the industrial sector and, specifically, the most carbon-intensive industries [16].

Industrialization is a dynamic economic process that creates income and employment, enhances businesses, and uses resources efficiently [17]. The United Nations 2030 Agenda for Sustainable Development promotes "sustainable industrialization" under Goal 9, which means "building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" [18]. Industrial development is considered to be a key driver of economic growth because the opportunities for major economies and technology are multiplied [1]. The sustainable manufacturing notion emanates from sustainable development concepts [19,20], and is one of the environmental initiatives [21] and an essential notion that must be adopted to reach full sustainable development [22]. This can be achieved through production operations with minimal environmental impact by employing the product lifecycle concept and environmentally integrated strategies within the management of manufacturing processes [19]. In addition, globally, several industries have recognized the significant economic and environmental benefits of sustainable manufacturing practices [23]. For instance, progressing concerns about environmental issues from greenhouse gas emissions, natural resource shortages, toxic waste production, and rising stresses on sustainable and clean energy has led to the development of a green manufacturing paradigm to minimize the degradation and harmful environmental impacts affecting the planet [24].

In the 1970s and 1980s, environmental legislation became more robust by requesting companies to prove their compliance; hence, the environmental and social impacts of companies have become increasingly important [25]. Consequently, the concept of sustainability compliance has provided further opportunities for research [26]. Different features of the industrial sector influence the reporting practices concerning sustainable development goals (SDGs), though the existing monitoring and management practices of the SDGs are still far from achieving an optimality level both nationally and globally [27,28]. For instance, Bakardjieva claimed that the inability of most companies to attain SDGs is due to a failure to employ sustainable practices, e.g., remanufacturing, reusing, and recycling [29]. Jiang et al. concluded that there is a large gap in the sustainability reporting of companies, and the majority of the reports recommended taking actions to improve sustainability performance [2]. Therefore, measuring, assessing, and developing an industrial sustainability performance is a critical issue [30–32]. Usually, developing countries faces problems when implementing new strategies, particularly with sustainable benefits, due to a lack of regulations, awareness, and knowledge [3].

Based on the survey of the literature that follows, this article reviews sustainability reporting and its tools, along with SDG reporting, and examines the relationship between the materiality matrix and sustainability reporting. Moreover, it focuses on the industrial sector in Bahrain and its sustainable reporting. The methodology employed in reviewing the sustainability reports of the Bahrain industrial sector, a discussion of the results, and a conclusion with several recommendations are included in this article.

This study contributes to the literature and, -to the best of our knowledge- is the first to examine whether Bahraini companies have sustainability reports. If so, are these reports

based on GRI guidelines? Has the status of their sustainability reports been analyzed? Aimed at attaining a deep and broad understanding of the status of SDG reporting among the large industrial sector in BahrainThe result of this study and analysis will assist in identifying and prioritizing the significant issues of sustainability to advance their future reporting for better environmental performance, and to encourage other companies that did not establish sustainability reports to follow suit.

2. Sustainability Reporting Tools and SDG Reporting

In 1987, after the publication of the Brundtland Report (*Our Common Future*), companies reporting content focused more on particular environmental issues, such as air pollution, wastewater, and water management, with a continuing incorporation of social issues in the reports. From 2016 onward, company sustainability reports have focused on the SDGs of the UN 2030 Agenda [27]. As companies vary in their activities, they differ in their contributions to the implementation of SDGs [33]. Therefore, the content of sustainability reports differs among companies in terms of environmental aspects and reporting quality, and presents substantial sustainability issues and practices [34]. Significantly, however, SDGs can play an essential role in the promotion of sustainability reporting [35], and the complete achievement of all 17 SDGs requires companies to contribute greatly to the organizational, administrative, and reporting aspects [36]. In this regard, van Zanten and van Tulder noted that if companies can improve their ability to include all SDGs, their sustainability strategies will be more successful [33]. Further, PwC stated that the innovative characteristics of the SDGs can broaden the reporting quality concept [37]. According to Acuti et al., the starting point of action to achieve SDGs lies in more attention given to reporting the effects of companies on resilience [38]. To be sustainability efficient, Engert et al. observed that sustainability reporting should be harmonized and components incorporated into the company strategy [39]. In the same context, Haywood and Boihang highlighted that companies need to demonstrate their obligation to SDGs via reporting the alignment of their strategies, programs, actions, or initiatives with specific goals and targets, and how they integrate those goals within their business plans and strategies [40]. Furthermore, Stewart et al. reported that companies need to proactively manage environmental issues associated with their activities and incorporate them into their environmental sustainability strategies [34]. In addition, SDGs afford a framework for sustainable and resilient business growth strategy [41].

During the period 1979 to 1989, the world witnessed unmatched environmental disasters; thus, the obligation of the private sectors in the localization of sustainable development issues became highly crucial [42] (p. 193). Industrial development and urban growth are usually associated with severe pollution and resource consumption [5], which have increased environmental degradation and severely affected the quality of life [43,44]. Consequently, the formulation of appropriate corporate reporting systems that address company performance rather than their financial performance are crucial [45]. A case in point, in 1989, the Coalition for Environmentally Responsible Economies (CERES) issued a set of 10 principles, extending from common environmental concepts to specific disclosures, aimed at creating a framework for the information flow needed to assess company performance based on historical context and societal norms. Those principles represent a milestone in shaping a unified environmental reporting system that companies can voluntarily comply with, and led to the birth of the Global Reporting Initiative (GRI) in 1997, which combined the reporting standards of governance, economics, and corporate social responsibility (CSR) into a unified sustainability reporting framework for the global marketplace [46]. As such, the GRI Standards guidelines have become a voluntary reporting reference widely adopted by companies globally [34,37,47,48]. The first effort to incorporate SDGs through nonfinancial indicators was developed via a collaborative initiative among the United Nations, the Global Reporting Initiative (GRI), and the World Business Council for Sustainable Development (WBCSD), providing the SDG Compass to support companies in tailoring strategies, and in managing and measuring their contributions to SDGs [49]. Recently, the European Union

displaced the misguided "nonfinancial" concept with "sustainability" by issuing a new proposed Directive on Corporate Sustainability Reporting that could involve around 50,000 European companies [50]. Historically, the evolution of corporate sustainability can be classified into three essential periods: the first period (1950–1990) marks the era of corporate social responsibility (CSR); the second period (1990–2005) presents a noteworthy evolution of CSR and the emergence of the triple bottom line (TBL) concept (economic prosperity, environmental quality, and social equity); and the third period (2005–2020) describes the development of modern corporate sustainability as a result of several novel concepts that have become commonplace, such as ESG (environmental, social, and governance) [51] (p. 66). Table 1 summarizes the sustainability reporting tools.

Table 1. Sustainability reporting tools: frameworks, indices, and standards.

#	Framework/Index/Standard	Developer/Founder	Year Established	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	References
1	SIGMA project	Motorola by Bill Smith	1986	All companies	Yes	Quality improvement, reduce waste, improve processes, and increase customer satisfaction	9, 12, 13	[52]
2	ISO 9001 standard	International Organization for Standardization (ISO)	1987	All companies	Yes	Quality management system	1–16	[53–55]
3	DPSIR framework	Organization for Economic Co-operation and Development (OECD)	Late 1990s	All companies	No	D: driving forces (economic sectors, human activities) P: pressures (emissions, waste) S: states (physical, chemical, and biological) I: impacts on (ecosystems, human health, and functions) R: responses (prioritization, target setting, and indicators)	All	[56,57]
4	Greenhouse Gas Protocol (GHG Protocol)	World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD)	Late 1990s	Large companies	No	Greenhouse gas (GHG) emissions	13	[58,59]
5	Eco Management and Audit Scheme (EMAS)	European Commission	1993	All companies	Yes	Environmental management system	6, 7, 11, 12, 13, 14, and 15	[60]
6	Triple Bottom Line (TBL)	John Elkington	1994	All companies	No	Economic prosperity, environmental quality, and social equity	All	[61]
7	World Business Council for Sustainable Development (WBCSD)	CEO-led organization	1995	All companies	No	Circular economy, cities and mobility, climate and energy, food and nature, people and society	All	[62,63]
8	ISO 14001 standard	International Organization for Standardization (ISO)	1996	All companies	Yes	Environmental management system	6, 7, 8, 9, 12, 13, 14, and 15	[53,55,64,65]

Table 1. *Cont.*

#	Framework/Index/Standard	Developer/Founder	Year Established	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	References
9	Global Reporting Initiative (GRI)	Global Sustainability Standards Board (GSSB)	1997	All companies	No	Environment, social, and governance	All	[66]
10	The UN Global Compact	Member of the United Nations Sustainable Stock Exchanges (SSE) initiative	2000	All companies	No	Stating 10 principles in the areas of human rights, labor, environment, and anticorruption	All	[67]
11	Carbon Disclosure Project (CDP)	Founder Paul Dickinson	2000	Large companies, cities, countries, regions	No	Environment and governance	6, 7, 11.b, 12.2, 12.6- 12.8, 12.a, 13.1–13.3, 13.a, 15.1- 15.3, 15.5, 15.7, 15.b	[68,69]
12	Competitive Industrial Performance (CIP) index	UNIDO	2003	All companies	No	• Manufacturing value added (MVA) per capita • Manufactured exports per capita • Industrialization intensity • Export quality	9	[70]
13	ISO 4040 standard	International Organization for Standardization (ISO)	2009	All companies	Yes	• Lifecycle assessment	9	[71]
14	The International Integrated Reporting Council (IIRC)	Founders Robert Eccles and Mike Krzus	2010	All companies		Environment, social, and governance	All	[72,73]
15	ISO 26000 standard	International Organization for Standardization (ISO)	2010	All companies	Yes	Guidance on social responsibility	All	[55,64,74]
16	The Sustainability Accounting Standards Board (SASB)	Founder Jean Rogers	2012	Large companies	Yes	Environment, social, and governance	All	[69,75]

Table 1. *Cont.*

#	Framework/Index/Standard	Developer/Founder	Year Established	Reporting Sectors	Cost	Key Areas of Reporting	Related SDGs	References
17	Green Industrial Performance (GIP) index	UNIDO	2014	All companies	No	• Capacity to produce and export green manufacturers • The role of green manufacturers • Social and environmental aspects of green manufacturers	9	[76–78]
18	SDG Industry Matrix: Industrial Manufacturing	United Nations Global Compact and KPMG	2016	All companies	No	• Opportunities for shared value • Good practice principles, standards, and tools • Multiple stakeholder partnerships and collaborations	All	[79,80]
19	Task Force on Climate-related Financial Disclosures (TCFD)	Financial Stability Board (FSB)	2017	All companies	No	Environment and governance	7,9,12,13	[69,81]
20	ISO 45001	International Organization for Standardization (ISO)	2018	All companies	Yes	Replaced BS OHSAS 18001 (the Occupational Health and Safety Assessment Specification) standard	3,5,8,9,10,11,16	[53,55,82]
21	SDG Impact Standards for Enterprises	UNDP	2020	All companies	No	Strategy, management approach, transparency, and governance	All	[83]
22	SDG Impact Assessment Tool	Gothenburg Centre for Sustainable Development (GMV)	2020	All companies	No	Assessing the SDGs for direct and indirect impacts	All	[58,84]

Sustainability reporting is a significant driver of, and catalyst for, the sustainability of companies [85,86], including environmental and social aspects [87], and acts as an incentive to integrate SDGs within the business model [35,88]. In addition, sustainability reporting assists companies to understand, measure, communicate, and lead efforts towards setting SDGs, clarifying internal aims, and leading the shift towards further sustainable development [89]. Adding to that, sustainability reporting and its disclosure tools are the key methods for external communication with stakeholders [39] to keep, gain, or improve the reputation of the company [90], and to satisfy the stakeholders' requirements for greater transparency on sustainability issues [85]. Furthermore, presentation of the information and transparency are the basic principles of the quality of a report [91]. Corporate sustainability reporting is defined as "a robust incentive and strategic tool for a company to disclose their contribution practices to the SDGs, and assists in engaging the stakeholders, supporting the sustainable decision-making process on all levels, forming the business strategy, leading innovations, best performances, better value creation, and brings investments" [92,93]. A recent study by García-Sánchez et al. found that environmental performance plays a mediating factor in the positive relationship between environmental innovation and integrated environmental disclosure [94]. Another study conducted by Gerged et al. in the Gulf Cooperation Council countries (GCC) region reported that corporate environmental disclosure is significantly and positively related to a company's value [95]. Thus, sustainability reporting is the disclosure of both the impacts and the progress of a company's environmental, economic, and social policies in the context of SDGs.

SDGs are significant drivers for sustainability in many fields, including the industrial sector and the green economy [11,96]. There are some factors that may affect the quality of the disclosure on SDGs, such as the listing status, industry size and type, certification of corporate social responsibility (CSR), external confirmation of sustainability reporting [27], environmental sensitivity, corporate governance, ownership structure, stakeholder pressure, environmental performance, board characteristics [94], and board size and independence [97]. The industrial sector is considered to encompass factors that can influence the reporting practices that companies adopt concerning SDGs, because of the various characteristics of each industrial sector and their level of impact on sustainability dimensions [27]. Currently, many companies have started an investigation into SDGs [98], and there has been an increase in the number of international companies disclosing their environmental and social performances in their annual reports [99]. Empirically, it has been reported that very few companies mention SDGs in their reports [98,100], but a high level of SDG reporting can be found in the larger companies [25,47,100]. For instance, a study conducted by KPMG revealed that only 40% of the top world companies documented SDGs in their annual reports, and of these, 84% identified the most relevant SDGs to their business [101]. Although SDGs are important to the industrial sector, there are few studies on this subject, thus there is a need to study this sector in different countries, especially on a national scale [11]. The reporting of SDGs is still under investigation [35], and existing monitoring and management of SDGs at both national and global levels are still far from being at an optimal level. Furthermore, there is a dearth of studies on the interactions and interlinkages among SDG indicators for the industrial development and protection of the environment [5,28]. However, few companies know how to implement SDGs in their practices and report on their achievements [102].

3. Sustainability Reporting and Materiality Matrix

In 2013, the GRI launched the G4 guidelines, which present a materiality matrix (see Figure 1) for the identification of the related topics between a company and their related stakeholders. Thus, a report should include concerned stakeholders who are either greatly influenced by the company or who themselves influence the successful implementation of the company objectives and address the related topics [103]. The materiality matrix is the most utilized method to define materiality issues [32,104], and the most important and complex among other standards [105] at the global level [106]. The concept of materiality

is understood as a reporting threshold [107,108], and is the main guideline to reducing the issue of low credibility [109]. In describing materiality, the GRI clarifies that "the report should cover aspects that: reflect the organization's significant economic, environmental and social impacts; or substantively influence the assessments and decisions of stakeholders" [110]. The materiality matrix can also be defined as "a typical tool to report on compliance and dissent of stakeholder and management views in sustainability and integrated reporting" [111]. Further, GRI G4 guidelines focus on a multiple stakeholder approach rather than sustainability reporting standards, and they provide the flexibility to report on the issues that are most significant to the company and its related stakeholders [112]. The guidelines also encourage stakeholder participation in the materiality analysis, meaning that companies can improve their liability to their stakeholders and make sustainability efforts that are greatly effective [113]. In the views of Ortar, there is still a need for research contributions to explore the area of materiality to expand the applications of this methodology [114]. For instance, one of the research issues concerning the definition of materiality is that there is no final definition of materiality in inferential sustainability research or at an institutional level [104]. In addition, Ferrero-Ferrero et al. studied evidence showing that materiality assessment still faces many constraints in sustainability reports [32].

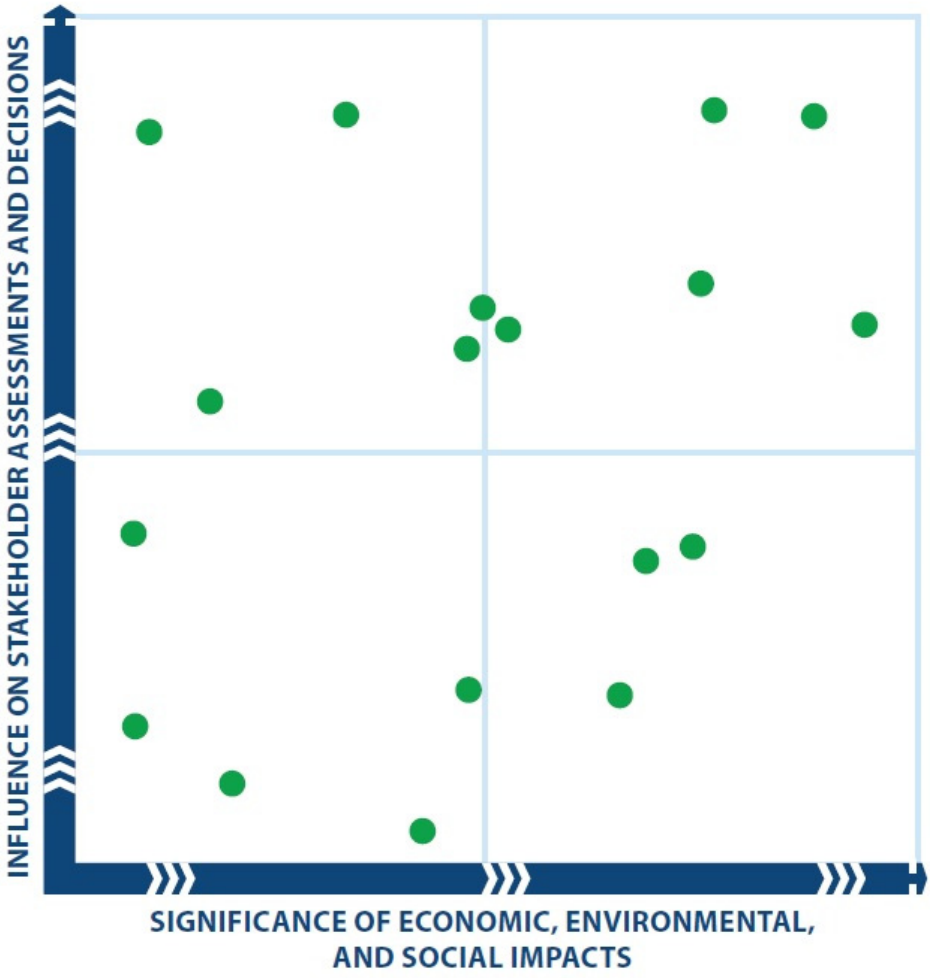


Figure 1. The Global Reporting Initiative (GRI) materiality matrix [107].

The materiality analysis process aims to identify and prioritize pertinent aspects and issues of the company, the result of which is a materiality matrix that designates the company and stakeholder views on the importance of related issues [115]. In the same notion, materiality analysis is perceived as a methodical and strict process that contributes

to identifying important stakeholder-oriented measures of corporate sustainability [113]. Thus, materiality analysis is essential to corporate sustainability because it provides the necessary integrated approach to setting sustainability strategies and preparing sustainability reports [116]. In this regard, some companies have admitted to identifying significant sustainability issues related to stakeholders and reflected these views in formulating strategies and corporate reporting [117]. Remarkably, there has been an increase in the number of large companies seeking to adopt the materiality approach as an integral part of their sustainability reporting [113], and a transitional phase has been observed in sustainability reporting, shifting from being voluntary to something more concrete [114]. Eventually, it is intended that the credible materiality analysis process will overcome the existing shortcomings in the authenticity and completeness of corporate sustainability reporting [118].

4. The Industrial Sector in Bahrain

The Ministry of Industry, Commerce, and Tourism (MICT) commands Bahrain's industrial sector, and its strategy for this sector relies on more development and diversification of the current main industries, such as the aluminum and petrochemicals sectors, and establishing other basic industrial sectors (see Figure 2) with high added value in a bid to increase the manufacturing contribution of the sector to the economy [119]. Bahrain's Economic Vision 2030 focuses on sustainability, and Bahrain has adjusted the portfolio of foreign investments inducing them to reduce the reliance on heavy industries, which depend mainly on gas to generate electricity and may negatively affect air quality [120].

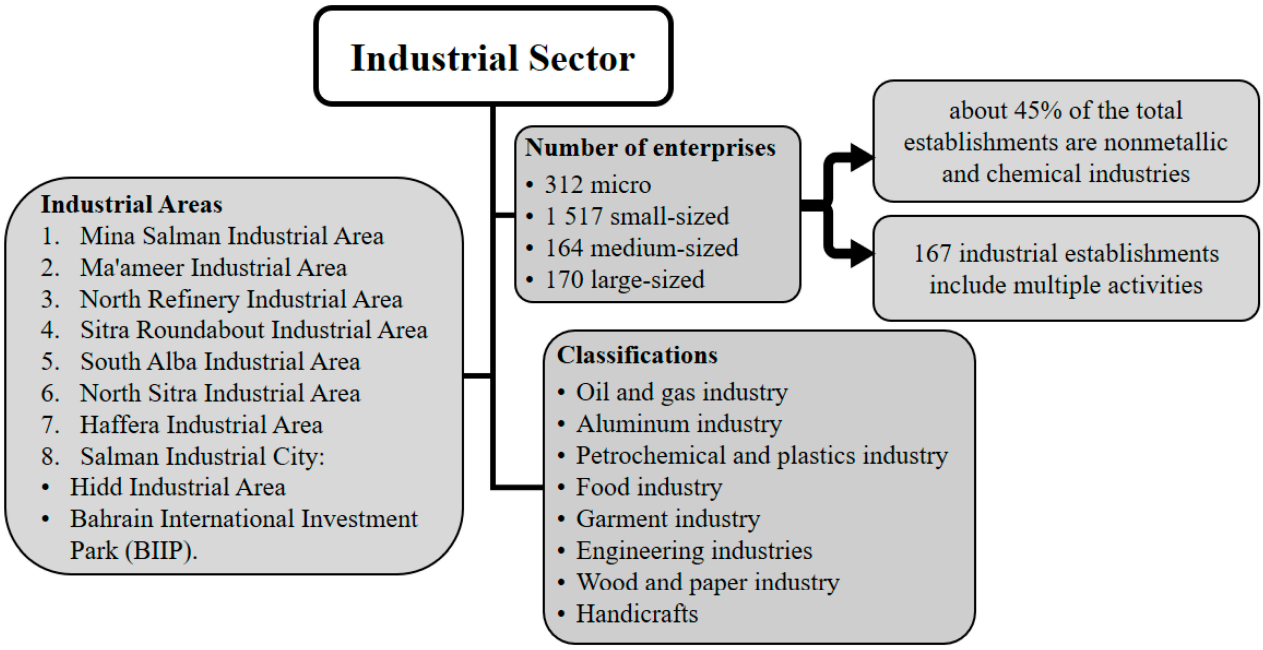


Figure 2. An overview of the components of Bahrain's industrial sector (information and data sources: [121,122]).

Private industries produced 42.22% of the total gross domestic product (GDP) for 2017, and the workforce in this sector was 92,857 [123]. The number of enterprises, based on the 2018 records of the MICT, increased to 2163 compared with 366 industrial establishments in 2015, i.e., the rate of increase grew by 490.9% during the three years [123]. Furthermore, the various industrial areas attracted a range of light exports and medium-sized companies comprising aluminum extrusions and assembly, paper, steel, asphalt plants, wool and wire-mesh, cables manufacturing, plastics, and marine services, with prefabricated furniture and buildings being established [119,121–124]. The major activity classifications of Bahrain's industrial sector (with percentages) are shown in Figure 3.

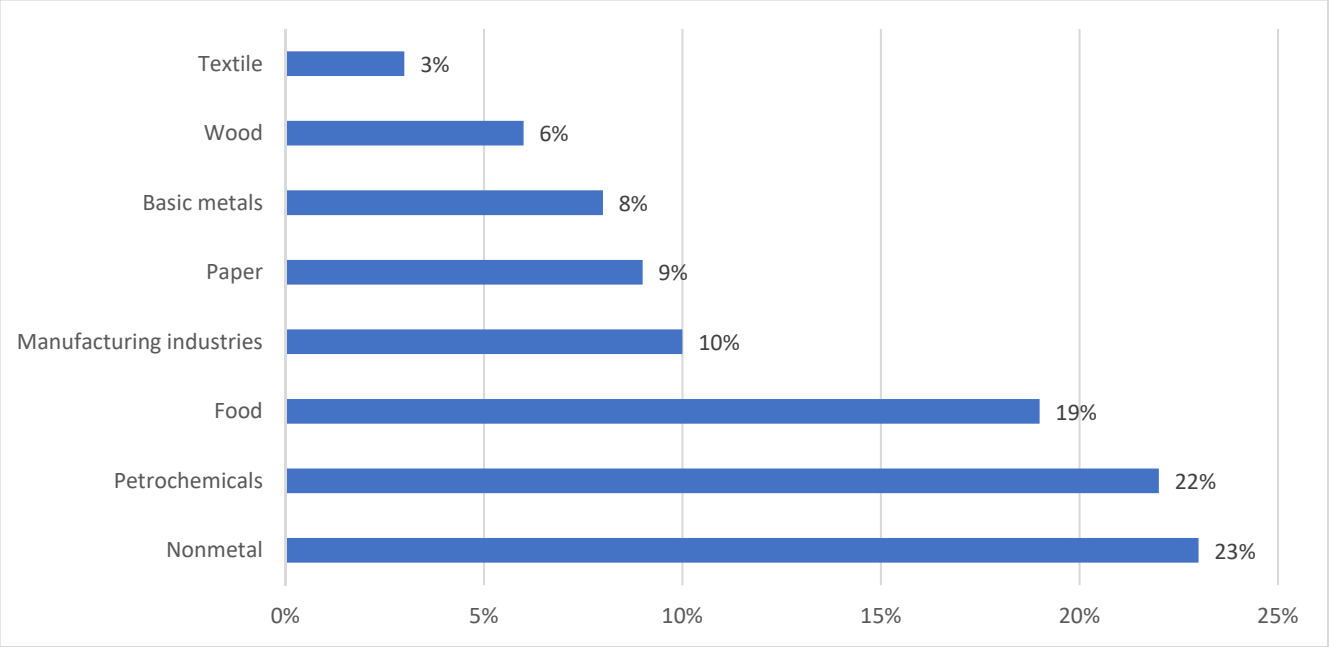


Figure 3. The major activity classifications of Bahrain's industrial sector (data sources: [121,122]).

5. Research Methodology

This study aims to verify the level of SDG implementation in the large industries in Bahrain based on the disclosure documents published on their websites. The methodology used to achieve this objective was based on analysis of annual and sustainability reports from the large industrial sector published between 2016 and 2020. The large industrial sector was selected because it is considered to be the major emitter of various pollutants (the major source of pollution) that create continuous pressures and impacts on the environment. Those pressures and impacts have magnified the significant need for the adoption of sustainability reports to enhance the capability of this sector to comply with the national environmental regulations and benefit from the implementation of SDGs. These reports were used for data and information collection as the annual reports are the most informative, public documents that companies publish on their websites. In addition, there is a positive indication towards the adoption of sustainability reports among this sector.

According to the first National Voluntary Review of the Kingdom of Bahrain on the 2030 Agenda for Sustainable Development, one of the challenges is how Bahrain maintains sustainable economic growth to provide an attractive environment for investment and better and diverse employment opportunities for citizens. Besides that, the new industrial policy in Bahrain concentrates on creating a profitable and environmental friendly sector that creates better economic prosperity and more jobs. Additionally, Bahrain is well positioned to focus on manufacturing opportunities that will benefit its economy and make maximum productive use of the scarce land, water and energy resources, while maintaining its high standards in environmental protection. In this regard, the 2030 Agenda stated that the industrial sector is considered one of the main stakeholders in achieving SDGs because it is the driver of economic growth. Therefore, there is a need to integrate the SDGs in the industrial sector policies to address the environmental problems resulting from this sector to achieve better environmental performance towards attaining sustainable industrial development. To do so, environmental reporting (e.g., GRI) is an efficient tool to measure the environmental commitments and performance of this sector. Figure 4 depicts the current research methodology.

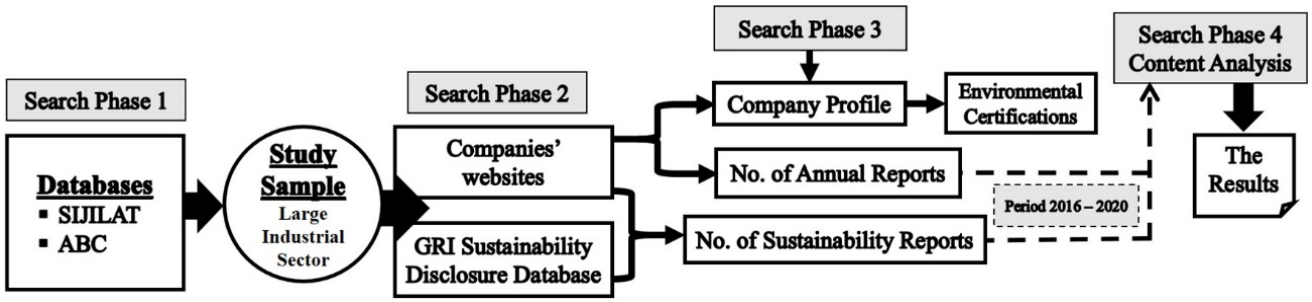


Figure 4. A depiction of the study research methodology.

5.1. Sample and Data

The samples included different large industrial firms that were registered in the Ministry of Industry, Commerce, and Tourism database (Business Licensing System (SIJILAT)), and included approximately 170 companies. In addition, the open database of the Arabian Business Community (ABC) Bahrain and companies' websites were used to collect the required information.

5.2. Content Analysis of Annual and Sustainability Reports

The content analysis method employed is a type of textual analysis [112], and it is a combination of qualitative and quantitative research approaches [125]. This methodology is usually employed in studying CSR and sustainability reports [126,127] to gain insights into the sustainable manufacturing field [128]. The study employed this method to assess the disclosed SDGs and the level of understanding of the SDG requirements. The quantitative content analysis method was then applied to identify the frequency of concepts, such as words or phrases, within the text. The study specified six keywords to use in search queries on the annual and sustainability reports (Table 2).

Table 2. Units (keywords) of the content analysis.

Documents of Analysis	SDGs	Units of Analysis
Annual Reports Sustainability Reports	8, 9, 11, 12, 13, 14, 15, and 17	"SDG", "SDGs", "global goal", "sustainable", "sustainability", and "development"

At the end of the selection process, only 11 sustainability reports from 3 companies were obtained, as depicted in Table 3.

Table 3. The number of sustainability reports published by year.

Year	2016	2017	2018	2019	2020	Total
Number	2	2	3	3	1	11

For the analysis purpose, 13 reporting analysis parameters (see Table 4) were obtained from the recommendations on SDG reporting provided by GRI, UN Global Compact, and the literature.

Table 4. Analysis parameters for evaluation of the sustainability reports.

Analysis Parameters	Gulf Petrochemical Industries Company (GPIC)					Aluminum Bahrain (ALBA)					Bahrain Petroleum Company (BAPCO) *				
	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020	2016	2017	2018	2019	2020
Does the CEO's statement show a reference to the SDGs?	Y	Y	Y	Y	Y	N	N	Y	Y				Y		
Does the report present brief information about the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y				N		
Does the report provide a reference relating the SDGs to the company?	Y	Y	Y	Y	Y	N	N	N	Y				N		
Does the report rank the SDGs as per priority?	Y	Y	Y	Y	Y	N	N	N	N				N		
Does the report refer to stakeholders?	Y	Y	Y	Y	Y	Y	Y	Y	Y				Y		
Does the report mention the method/tool utilized for disclosure of the SDGs?	Y	Y	Y	Y	Y	Y	Y	Y	Y				Y		
Does the report present the materiality assessment?	Y	Y	Y	Y	Y	Y	Y	Y	Y				Y		
Does the report link the company's environmental, economic, and social aspects with the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y				N		
Does the report state that the company's KPIs are based on the SDGs?	Y	Y	Y	Y	Y	Y	Y	Y	Y				Y		
Does the report refer to the inclusion of sustainable development goals in the company's strategy/plan?	Y	Y	Y	Y	Y	N	Y	Y	Y				Y		
Does the report provide the outcomes/benefits of the implemented SDGs?	Y	Y	Y	Y	Y	N	N	N	Y				N		
Does the report mention the current projects/actions for achieving the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y				Y		
Does the report mention the future projects/actions for achieving the SDGs?	Y	Y	Y	Y	Y	N	N	N	Y				Y		

* The report for 2018–2019; Y: yes; N: no.

6. Results and Discussion

The study targeted large industrial companies, examining their annual and sustainability reports that were published on their websites. Based on an internet search, the results showed that 155 (91.2%) of the 170 companies had a website, 22 of the 155 websites not found, and 39 websites were of a poor standard, lacking information and data. The remaining 74 websites provided some useful information and data on local companies, and 20 websites were international, not containing or referencing any information or data about their branch in Bahrain.

The authors collected 29 (i.e., 17%) annual and sustainability reports from the firms' websites: 15 annual reports and 14 sustainability reports. From 15 annual reports, only 7 were focused on Bahrain, while 8 were international corporate reports without any mention of information and data about their branches in Bahrain. As far as sustainability reports are concerned, only three were focused on their environmental efforts and achievements in Bahrain, two were part of an annual report, and one was focused on the financial aspects. Therefore, this study focused on three companies to assess the status and contribution of their sustainability reports to the implementation of SDGs in Bahrain for the period 2016–2020.

Regarding the importance of environmental certifications, the quality, environment, health and safety, and CSR in Bahrain's industrial sector, refer to Section 0.1 (General) of ISO 9001:2015, which states that "the adoption of a quality management system is a strategic decision for an organization that can help to improve its overall performance and provide a sound basis for sustainable development initiatives" [129]. ISO 14000 International Standards series focuses mainly on the environmental pillar of sustainability and ISO 14001 is principally aimed at improving environmental performance and sustainability [130]. ISO 45001, which outlines a proactive approach, was launched in 2018 to replace the Occupational Health and Safety Management standard (OHSAS 18001:2007), aimed at assisting organizations to minimize their occupational health and safety risks by adopting efficient prevention and protection measures. Furthermore, CSR is considered to be a potent tool for strengthening synergies among stakeholders and reshaping their responsibilities, along with enhancing the private sector's role in attaining sustainable development. Moreover, there are thematic overlaps between CSR and SDGs that help to improve the model for sustainability and development growth [131]. A search of company certification profiles revealed that approximately 68 firms were certified with ISO 9001, while 39 were certified with ISO 14001, 31 firms were certified with OHSAS, and 17 with ISO 45001. Regarding CSR, 24 firms published their CSR on their websites. The results of this search do not represent the accuracy status of certification due to a lack of information, as mentioned above. However, the International Organization for Standardization (ISO) surveys recorded notable certification growth in Bahrain between 2000 and 2019 for both ISO 14001 and ISO 9001. Figure 5 shows a significant increase in the issuance of certificates since 2000. The number of certifications with ISO 9001 increased from 33 to 256 between the years 2000 and 2009, and increased to 435 (70%) in 2019. Concerning ISO 14001, the number of certificates that were issued increased from 42 to 141 during the period 2011–2012, and it reached 142 in 2019.

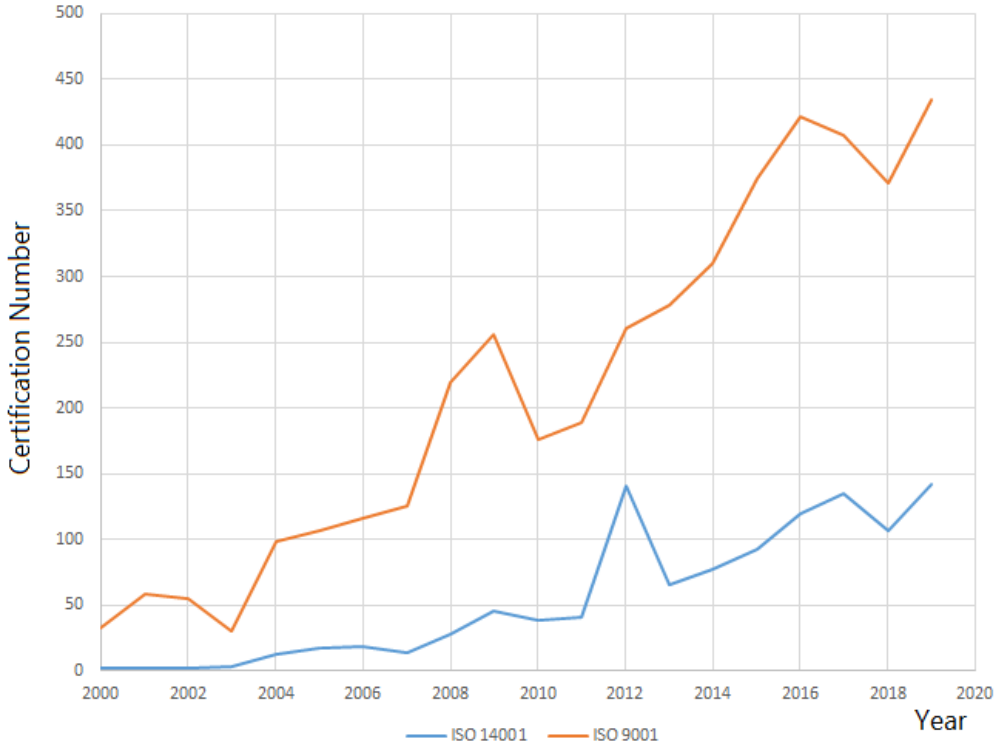


Figure 5. ISO 14001and ISO 9001 certification growth in Bahrain from 2000 to 2019 (data sources [129,132–136]).

Table 5 shows the number of SDG reports for the period 2016–2020 for three companies in Bahrain (Gulf Petrochemical Industries Company (GPIC), Aluminum Bahrain (ALBA), and Bahrain Petroleum Company (BAPCO)). Among all the sustainability reports, only one company referred to SDGs in the CEO's statement (GPIC). Since 2018, companies have started to include SDGs in their reports.

It was noted that the content and quality of the SDG reports were generally good and provided good information on SDGs, and only one company (GPIC) included all the SDGs in detail in its report for the five years. The reports of the other two companies lacked any references to relevant SDGs. Concerning prioritizing SDGs, only the GPIC report linked the priority areas to the SDGs, whereas the ALBA report indicated the priority areas without linking them to SDGs. It is worth mentioning that all the companies studied included their related stakeholders and materiality assessment in their reports. Furthermore, one company (GPIC) linked their environmental, economic, and social aspects with the SDGs in all reports, another company started doing so in 2019, while the third company did not. Concerning the inclusion of SDGs in the company's strategy or plan, only one company (GPIC) had included all SDGs in its strategic plan since 2016, another company included only SDG 12 and 13 in its plan, while the third included without mentioning SDGs in its plans. As shown in Table 2, the last three analysis parameters were presented in the reports of one company (GPIC), another company included them in its reports from 2019, while the third company provide brief information about last two parameters in its reports.

Importantly, according to the reports, all companies employed GRI standards as a method for sustainability reporting; therefore, it can be said that they implicitly refer to the SDGs indirectly. In this regard, the Global Reporting Initiative [137] published a valuable document (Linking the SDGs and the GRI Standards), which linked the 17 SDGs and the GRI standards, and the disclosures that pertain to each standard.

Figure 6 illustrates the materiality matrix compiled for the three companies (ALBA, BAPCO, and GPIC) based on their reports for 2019 and 2020. A report on the materiality matrix is optional for the companies, and the results clearly showed an increase in information on how a company identifies its related stakeholders and how its continuous reporting on

materiality reflects its seriousness in addressing significant aspects by complying with the GRI Standards. The matrix showed that environmental aspects (e.g., waste management and waste water) are highly significant, and most were adequately reported. In addition, the companies varied in rating the importance of environmental aspects because of their different business activities; for example, biodiversity has less impact on companies. For instance, in Jordan, environmental disclosure of companies is still at an early stage, and is related to pollution aspects followed by the financial information aspect related to the environment [97]. Therefore, it is significant to devote the integrated reporting of environmental information by requesting companies to disclose full coverage of all relevant environmental aspects [138].

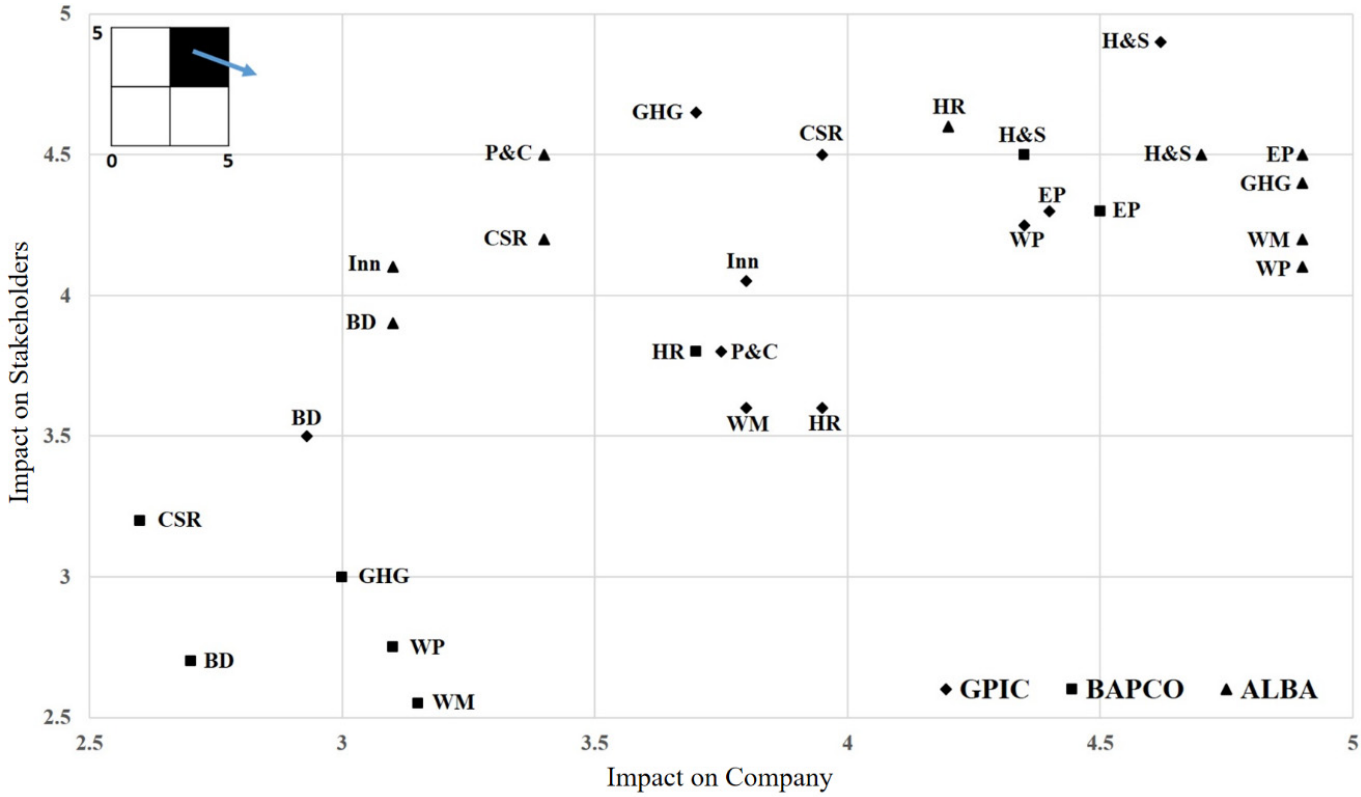
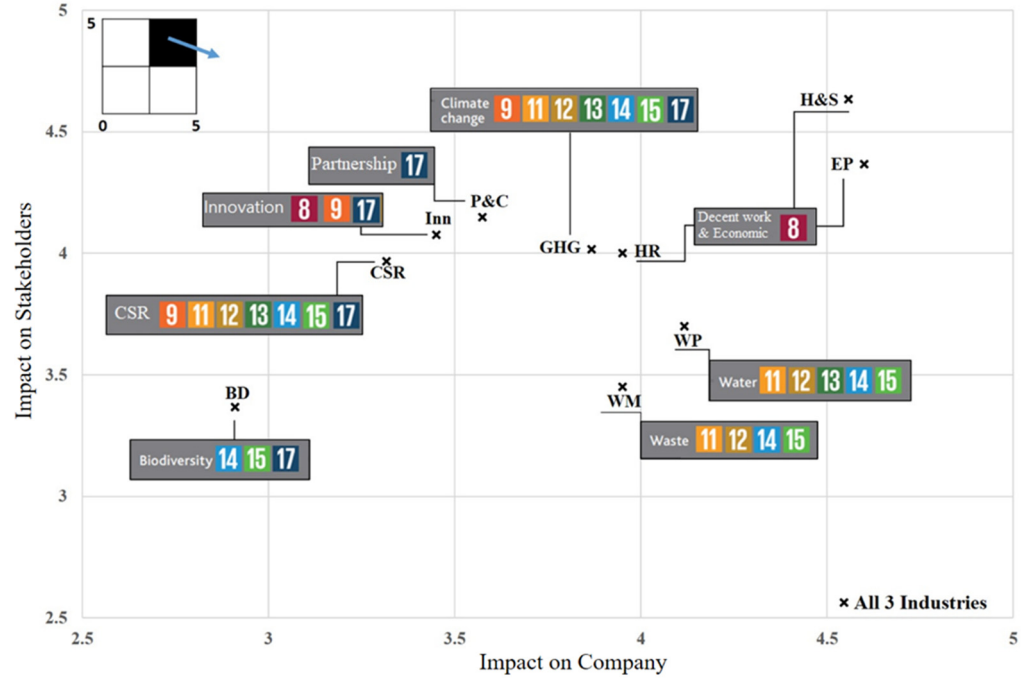


Figure 6. Sustainability materiality matrix compiled for the three companies (data sources [139–141]).

Figure 7 illustrates the mean of the results of the analysis of the three matrices, and each aspect of the matrix is labeled with the related SDGs. The results in the upper right-hand quarter of the figure show that greenhouse gases (GHS), waste management, and water pollution are the most significant sustainability aspects for the companies and their stakeholders. In addition, the matrix shows additional environmental aspects, such as health and safety, economic performance, and corporate social responsibility (CSR). Furthermore, it is interesting to note that the results show that the aspect of human rights is at the forefront of awareness by the industrial sector. The results indicate that the materiality matrix of sustainability reporting provides clear guidelines for the efficient allocation of resources, and therefore should be invested in as strategies and future plans to ensure the achievement of the expectations of stakeholders.



(**a**)

Economic Performance (EP)
Health and Safety (H&S)
GHG Emissions & Climate Change (GHG)
Wastewater/water pollution/effluent (WP)
Corporate Social Responsibility (CSR)
Waste management (WM)
Biodiversity (BD)
Innovation (Inn)
Human rights (HR
Partnership & collaborations (P&C)

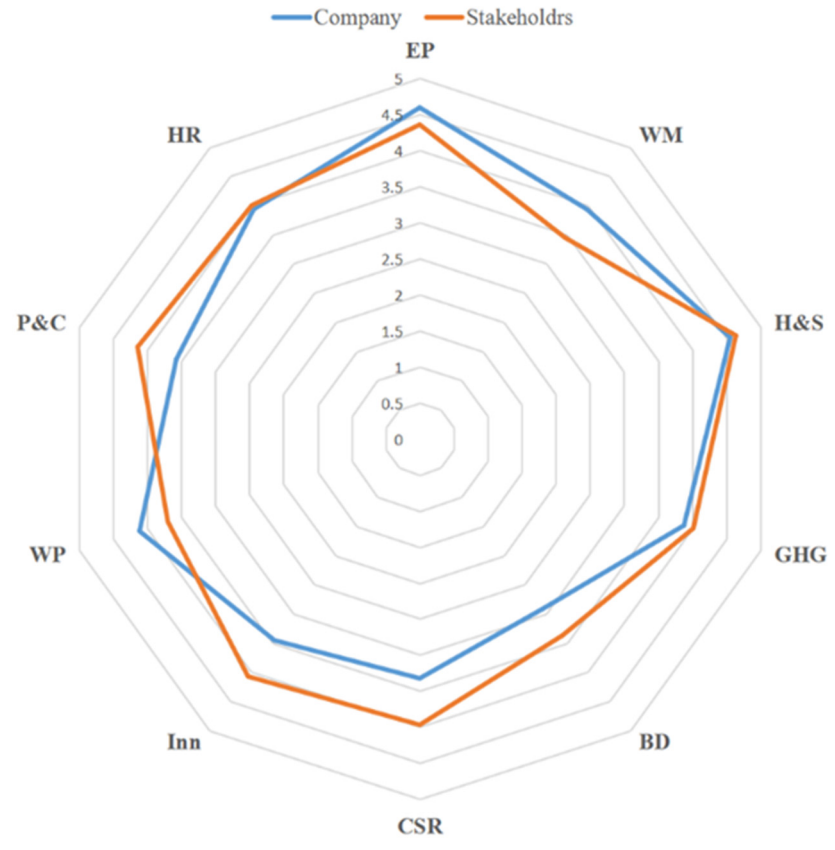
SDGs 9 11 12 13 14 15 17

(**b**)

Figure 7. (**a**) Sustainability materiality matrix, (**b**) Key for figure.

Overall, the position of each sustainability aspect in the two matrices showed the consistency between the effectiveness of corporate sustainability reporting and the strategical importance of each aspect. Generally, this is a good indication, owing to the stakeholders' willingness to provide their views and make a judgment about the adequacy of company disclosures.

Figure 8 illustrates the ranking of the materiality aspects according to the combined materiality matrix. It shows that the companies pay great attention to economic performance (EP) and health and safety (H&S) aspects, whereas the stakeholders pay attention to water pollution (WP) and partnership and collaborations (P&C) aspects. While both similarly rank the health and safety (H&S) and human rights (HR) aspects, the greenhouse gases (GHG) aspect is ranked with minimal difference. In contrast, there is variance in the ranking of most other aspects, such as corporate social responsibility (CSR), waste management (WM), innovation (Inn), biodiversity (BD), and partnership and collaborations (P&C). It is clear that this study encourages companies to use materiality matrix analysis and to develop priority assessment measures to address and minimize the variance.



(**a**)

Economic Performance (EP)	Waste management (WM)
Health and Safety (H&S)	Biodiversity (BD)
GHG Emissions & Climate Change (GHG)	Innovation (Inn)
Wastewater/water pollution/effluent (WP)	Human rights (HR
Corporate Social Responsibility (CSR)	Partnership & collaborations (P&C)

SDGs 9 11 12 13 14 15 17

(**b**)

Figure 8. (**a**) Ranking of materiality according to the combined materiality matrix, (**b**) Key for figure.

Table 5 illustrates the priority of each SDG for each company based on the outcomes of the sustainability reports. Owing to the limited number of sustainability reports, it was difficult to evaluate the contribution of each goal individually, and there is a need for better data to conduct sustainability ratings for the industrial sector. Thus, at this stage, company interest is a positive indication to encourage other companies to start sustainability reporting.

Table 5. The priority of the sustainable development goals (SDGs) related to the industrial sector, according to the sustainability matrix compiled for the period 2019–2020.

SDG	Brief Description	Priority (High, Medium, Low)	Achievements
	Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all	High	• GPIC has injected into the national economy since its inception USD 5.067 billion [139]. • BAPCO Modernization Program (BMP) has created 150 high-skilled permanents jobs [140]. • Aluminum sector represents about 12% of Bahrain GDP and it will increase to 15% with the expansion of the Line 6 project [141].
	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	High	• GPIC won the Mohammed Rashid bin Maktoum Business Innovation Award in 2017 and 2019 [142]. • Bahrain Distributed Solar Energy Pilot has a future target to contribute to the national energy demand by 5% in 2025 and by 10% in 2035 [141].
	Make cities and human settlements inclusive, safe, resilient, and sustainable	High	• The wasted heat generated from calciner plant is used to run a seawater desalination plant to produce potable water (+90%) for the local community [143].
	Ensure sustainable consumption and production patterns	High	• Advocating sustainability reporting as part of target 12.6 [144]. • Recycled 9197 MT of solid wastes, and hazardous waste has decreased by 5% [140]. • Since the launching of the recycling program in February 2017, approximately 123 MT of recyclable materials has been recycled [141].
	Take urgent action to combat climate change and its impacts	High	• Carbon dioxide recovery (CDR) plant captures about 450 MT/day of CO_2 from methanol reformer flue gases and recycles it [145]. • The intensity of GHG emissions has decreased by 3% [140]. • Solar energy consumption has increased to 12 TJ in 2019, compared with 10 TJ in 2018 [141].
	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	High	• Strict compliance with national legal requirements for effluent discharge as the total of sewage effluent that was recycled and reused was 188,510 m^3 [140,146]. • Inauguration of the mangrove nursery was in 2018 [141].
	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss	High	• Several biodiversity projects were established, e.g., bird sanctuary, mangrove plantation, fish farm, and date palm trees [147]. • Establishment of Princess Sabeeka Oasis, which was divided into an aquatic area (lake), a landscaped area, and a vegetable garden [148]. • Establishment of Princess Sabeeka Park which contains around 51,000 plants, 560 palms, and 342 fruit and ornamental trees [141].
	Strengthen the means of implementation and revitalize the global partnership for sustainable development	High	• Ongoing partnerships (e.g., UN Environment, Ministry of Education, InJaz, universities) [139]. • Ongoing partnerships (e.g., InJaz, Green School Award, universities) [141].

7. Conclusions and Recommendations

This research aims to examine the sustainability reports of companies by analyzing the status of sustainability aspects in their materiality matrices to assist in identifying and prioritizing the most significant sustainability issues for advancement in their future reporting and to improve their environmental performance. This study employs a content analysis.

In spite of the reporting concept being acknowledged in the 2030 Agenda and its SDGs, clarifying the role of the private sector in contributing to the implementation of SDGs is not an easy task due to the broad scope of the 17 goals, 169 targets, and more than 230 indicators that address an extensive range of prime challenges at national and global levels. Therefore, there is need for a considerable transformation of business models, plans, and strategies, specifically in terms of how this essential sector controls its operational impacts by creating balance among the sustainability pillars (society, environment, and the economy). After extensive investigation, this study reached a conclusion; among a large sector of Bahraini companies, "Bahrain Petroleum Company "BAPCO", "Gulf Petrochemical Industry Company "GPIC", and Aluminum Bahrain "ALBA" were found to have sustainability reports based on GRI guidelines.

The study of SDG reporting is a new research topic, despite the increased disclosure because of an awareness of the importance of SDGs. The results of this study cannot be generalized to the entire industrial sector in Bahrain because the data were limited to the five years from 2016 to 2020. The result of this study and analysis will assist in identifying and prioritizing the significant issues of sustainability to advance their future reporting for a better environmental performance, and to encourage other companies that did not establish sustainability reports to follow suit. However, the study opens a window to further studies on different business sectors and different types of corporate reports, to investigate the possible consequences of SDG disclosures in terms of environmental, social, and economic impact.

Mentioning SDGs in company reports is an opportunity to measure the implementation of SDGs and to strengthen their disclosure. Despite the limited number of SDG disclosures, it is necessary to study the potential impact of SDG disclosures on corporate performance, and to critically identify the main related stakeholders who are more influential in increasing the number of these disclosures. The results showed that companies have started sustainability reporting; publishing reports on their websites reflect company responsibility towards the environment and society. The subsequent sustainability reports showed tangible changes in the companies in terms of the quality of data presented in the reports, strategies, the role of related stakeholders, and reputation. Furthermore, this study focused on analyzing the sustainability reports to determine whether those companies have contributed to implementation of SDGs goals, targets, and indicators.

Materiality analysis is an essential part of both sustainability and integrated reporting, and it plays an important role in the disclosures. Therefore, a sustainability materiality matrix is used to identify significant related environmental aspects, and outline the report content. The outcomes of the materiality matrix analysis in this study have confirmed the crucial role that the industrial sector plays in the implementation of SDGs. Thus, instead of having short-term goals of limited benefit, SDGs have widened the scope for multiple future expectations concerning what should be developed and sustained, and for how long. Furthermore, the materiality matrix analysis of the reports of all companies revealed a focus on sustainability-related aspects and commitments to stakeholder engagement. The purpose of stakeholder participation in a materiality matrix is to push companies to provide more transparency and better information in their reports. This study recommends that companies use materiality analysis as a tool for reporting to reflect their commitment and to improve the report content by utilizing GRI guidelines.

8. Recommendations

1. The results of this study showed that SDGs are the key to improving corporate reporting to incorporate all environmental aspects, and may lead to a shift to the adoption of sustainability reports instead of annual reports. In addition, building an awareness of the importance of SDGs results in companies becoming more sustainability-oriented. According to Lozano et al., to make companies more sustainability-oriented, it is essential to grasp the comprehensive characteristics of corporate reporting and the synergies among technical, management, and organizational operations across time [86].
2. It is time to adopt sustainability reporting into law. The aim of this article was to study sustainability reports to highlight their importance in enhancing the positive aspects of companies and to bring out the benefits of integrating SDGs into the reports. Banik and Lin stated that enforcement of the regulations on sustainable development is still a major challenge [149]. According to Gibbon and Joshi (1999) that, although there is an absence of environmental accounting for external reporting purposes, Bahrain's companies are aware that environmental issues will affect their practice in the future. Further, this study revealed that about 50% of companies have environmental reporting for internal purposes, and more than 40% believe that their companies will start environmental reporting by 2000 [150]. In this context, Pizzi et al. stated that the presence of SDGs could be beneficial for differentiating compliance reports and identifying the reports aiming to impact sustainable development [49].
3. To prevent the embellishment of a company's positive performance or reputation in order to raise the credibility and authenticity of its reporting, this study recommends proposing and placing a list of the main environmental material aspects for each industrial sector based on local environmental laws and regulations, to ensure that the sustainability reports reflect the actual state of the environment.
4. Due to a lack of technical or vocational knowledge on particular aspects of company performance for some stakeholders, increasing the reporting efficacy and quality of the information in sustainability reports is recommended. In this vein, there is a need to increase the capacity-building of the stakeholders through training and consultation meetings, including effective coordination to agree on a resilience methodology of reporting.
5. It is essential to conduct a continuous evaluation of the company's sustainability efforts that enables the company to establish strategies to overcome resistance to institutional improvements and barriers to change.
6. Since the companies that responded to self-sustainability reporting integrated the national legislation compliance requirements with sustainability reporting, this has given policymakers the opportunity to revise or amend future legislation to ensure compliance with the law through sustainability reporting activities. In this regard, Rashed stated that, at the national level, there is an urgent need for serious action to activate the vision of the 2030 Agenda and its core 17 SDGs by promoting policy coherence by amalgamating the legal policy aspects of the environmental, economical, technical, institutional, and sociocultural dimensions [151].
7. The document "Linking the SDGs and the GRI Standards" assists and facilitates reporting by organizations by employing GRI standards to evaluate how they impact and comply with the SDGs. Therefore, companies should seize this opportunity to modify and improve their sustainability reports for the coming years.
8. Companies should invest in improvements through new initiatives targeting their stakeholders to enhance efficient cooperation and coordination on various matters, and enable identification of those material aspects that are not adequately disclosed.
9. In this regard, the government should take the opportunity to build joint sustainable initiatives to make room for the industrial sector to play its essential part as a key stakeholder at the national level. It is also worth highlighting some companies' achievements regarding each SDG.

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الخلاصة

يهدف اعتماد خطة عام 2030 إلى تعزيز وتنسيق الجهود العالمية نحو الحفاظ على البيئة بالتوازن مع الاحتياجات الاقتصادية والمجتمعية. وتؤكد هذه الخطة بأن القطاع الخاص – القطاع الصناعي هو الجزء الأكبر – من أصحاب المصلحة الرئيسيين في تحقيق أهداف التنمية المستدامة لأن هذا القطاع هو المحرك للاقتصاد، وله تأثيرات مباشرة وغير مباشرة على البيئة. وتهدف هذه الدراسة إلى تقييم مدى مساهمة القطاع الصناع الكبير في البحرين ودوره في تحقيق أهداف التنمية المستدامة. لتحقيق هذا الهدف، تم التحقيق في أحدث النتائج لمجموعة واسعة من الأدبيات الحالية وتحليلها بعمق لتحديد القضايا الرئيسة التي يجب مراعاتها لتحقيق أهداف التنمية المستدامة. وبالتالي، تمت مراجعة الأدوات القانونية البيئية في البحرين لتقييم مدى توافقها مع أهداف التنمية المستدامة ، وأكدت الدراسة أن الاعتراف بالتحديات التي تم إبرازها في خطة عام 2030 وتطوير نهج تنفيذ شامل سيؤدي إلى إدراج ناجح لأهداف التنمية المستدامة في التشريعات البيئية الحالية. بالإضافة إلى ذلك، تم تحليل تقارير الاستدامة المؤسسية التي نشرتها الشركات في البحرين باستخدام مصفوفات الأهمية النسبية لتحديد وترتيب أولويات القضايا الأكثر أهمية التي يجب تحسينها في التقارير المستقبلية وفي الأداء البيئي. من أصل 30 تقريرًا سنويًا وتقريرًا عن الاستدامة، كان هناك 15 تقريرًا عن الاستدامة؛ 3 ركزوا على جهودهم البيئية في البحرين. تم استخدام طريقة تحليل المحتوى لتحليل 11 تقريرًا لثلاث شركات تم نشرها خلال الفترة 2016–2020. أظهرت النتائج أن الشركات التي استخدمت التحليل الماديّ (materiality analysis) في تقاريرها لديها قدرة أفضل على مراقبة وقياس أدائها

البيئي، وبالتالي تنفيذ أهداف التنمية المستدامة. كما كشف تحليل التقارير عن التركيز على الجوانب المتعلقة بالإستدامة والتزامات مشاركة أصحاب المصلحة.

كما تم إجراء مقابلة واستبيان لتحديد حالة القطاع الصناعي في تنفيذ أهداف التنمية المستدامة. وأظهرت النتائج أن القطاع الصناعي لديه عدة مبادرات ومشاريع مستقبلية مستدامة وممارسات مستدامة، وهي أساس حوكمة الاستدامة، لذلك هناك حاجة لتوجيه هذه الجهود في سياق أهداف التنمية المستدامة ودمجها في خطط واستراتيجيات أعمالهم. علاوة على ذلك، أشارت النتائج إلى أن أهداف التنمية المستدامة ذات الأولوية للقطاع الصناعي هي 7،9،13،12 و8 حسب الترتيب، كما تواجه البحرين تحديات كبيرة في تحقيق أهداف التنمية المستدامة 12،11،9 و15. واختتمت الدراسة بعدة توصيات للشركات الصناعية والحكومة لتحسين تنفيذ أهداف التنمية المستدامة.

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برنامج
البيئة والتنمية المستدامة

تقييم شامل لدور القطاع الخاص في تنفيذ أهداف التنمية المستدامة ذات الصلة بالبيئة: دراسة حالة القطاع الصناعي الكبير في البحرين

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