Integrating the Fifth Dimension of SBSC: SABIC's Strategic Approach to Sustainable Performance

دمج البعد الخامس من بطاقة الأداء المتوازن المستدام :النهج الاستراتيجي لشركة سابك لتحقيق الأداء المستدام

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Abstract:

This study aims to integrate the fifth dimension of the Sustainable Balanced Scorecard (SBSC), which is a key tool for assessing economic, environmental, and social performance. It aligns production and commercial processes with sustainable practices and promotes corporate social responsibility and environmental stewardship.

This study adopts an exploratory, descriptive, and analytical approach, including a comprehensive review of the available literature. An inductive case study methodology was employed to examine the practical application, focusing on SABIC as a global leader in the petrochemical industry. A comprehensive data collection approach was also used, incorporating both qualitative and quantitative measures. These measures include key performance indicators (KPIs) addressing environmental sustainability, social responsibility, economic outcomes, and stakeholder engagement activities. The results demonstrate that SABIC's Sustainability Center effectively promotes SABIC's social and economic responsibilities while ensuring environmental sustainability. The company's sustainability strategy, built on the RAISE framework, demonstrates a sustained commitment to long-term sustainability goals, providing practical evidence of the applicability and value of SABIC's Sustainability Center as a tool to guide sustainable organizational practices.

Keywords: Sustainability; Sustainable Balanced Scorecard; Social Responsibility.

Jel Classification Codes : M14; M41 ; Q56

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Abstract in Arabic:

تهدف هذه الدراسة إلى دمج البعد الخامس من بطاقة الأداء المتوازن المستدام (SBSC)، وهي أداة أساسية لتقييم الأداء الاقتصادي والبيئي والاجتماعي. وهي تعمل على مواءمة العمليات الإنتاجية والتجارية مع الممارسات المستدامة وتعزز المسؤولية الاجتماعية للشركات والإدارة البيئية.

تتبنى هذه الدراسة نهجًا استكشافيًا ووصفيًا وتحليليًا، حيث تم مراجعة شاملة للأدبيات المتوفرة. ، واستُخدمت منهجية دراسة الحالة الاستقرائية لدراسة التطبيق العملي، بالتركيز على سابك كشركة رائدة عالميًا في صناعة البتروكيماويات. كما استُخدم نهج شامل لجمع البيانات، يشمل مقاييس نوعية وكمية. تتضمن هذه المقاييس مؤشرات أداء رئيسية (KPIs) تتناول الحفاظ على البيئة، والمسؤولية الاجتماعية، والنتائج الاقتصادية، وأنشطة إشراك أصحاب المصلحة. تُظهر النتائج أن مركز سابك للاستدامة يُعزز مسؤوليات سابك الاجتماعية والاقتصادية بفعالية مع ضمان الحفاظ على البيئة. وتُظهر استراتيجية الشركة المستدامة، المبنية على إطار عمل RAISE، التزامًا مستمرًا بأهداف الاستدامة طويلة الأجل، مما يُقدم دليلًا عمليًا على قابلية تطبيق مركز سابك للاستدامة وقيمته كأداة لتوجيه الممارسات التنظيمية المستدامة.

Jel Classification Codes : M14; M41 ; Q56

Introduction

Considering current sustainability and climate change trends, organizations are developing environmental and social responsibility (ESR) strategies to ensure long-term sustainability. These strategies involve sustainably managing extraction and production processes to reduce waste emissions, adopting circular economy principles, and increasing the use of renewable energy. In response to these changes, the traditional Balanced Scorecard (BSC) has evolved into the Sustainability Balanced Scorecard (SBSC), which includes a fifth dimension of sustainability. This dimension links financial performance directly to tangible environmental and social indicators, effectively translating sustainability commitments into measurable results. The SBSC fosters environmental innovation by aligning environmental priorities with research and development decisions, product design, increased use of recycled and renewable materials, and support for low-impact production lines. These practices improve lifecycle performance. Furthermore, integrating sustainability into the BSC enhances governance and accountability, clarifies strategic direction, and incorporates environmental and social risks into corporate risk management systems.

This necessity underscores the importance of choosing SABIC as a model. SABIC has formally established sustainability as a core pillar of its corporate strategy. The company is supported by a comprehensive roadmap aimed at reducing its environmental impact and strengthening its commitment to the climate and natural resources. Beyond official

statements, SABIC provides robust, measurable, and publicly available indicators covering energy and water intensity, material losses, greenhouse gas emissions, renewable energy consumption, and circular economy initiatives, such as integrating recycled content and redesigning products. This data establishes a clear empirical link between the fifth dimension of ESG (environmental, social, and governance) and tangible sustainability outcomes, thereby strengthening the internal validity of the study. Furthermore, SABIC's commitment to sustainability is evident through its roadmap to achieve carbon neutrality by 2050, its investments in sustainable technologies, and its transparent ESG disclosures. By aligning internal sustainability metrics with global disclosure frameworks, SABIC's sustainability scorecard improves reporting accuracy, strengthens assurance practices, and enhances disclosure consistency. Therefore, SABIC was selected based on strong alignment between the theoretical development of the balanced scorecard and the company's operational reality, which is characterized by clear strategies, measurable sustainability indicators, corporate transparency, and tangible progress. This enhances the study's credibility and provides a solid foundation for generating valuable, generalizable insights into the sustainable balanced scorecard's effectiveness.

- **Research Problematic:** This study identifies a challenge in the manner by which environmental and social factors exert influence upon decision-making processes within economic institutions. These factors have precipitated a shift towards sustainable production and positive societal impact. In order to address this challenge, SABIC, a leading company in Saudi Arabia, has adopted an environmental strategy that is supported by the Balanced Scorecard framework. The central research question is as follows:

  To what extent does the integration of the Fifth Dimension of the Sustainable Balanced Scorecard (SBSC) lead to improvements in SABIC's sustainability performance and sustainable production practices in alignment with its environmental strategy?

  The following hypotheses are put forth for consideration:

  - Environmental and social factors exert a significant influence on the decision-making processes of economic institutions, including SABIC.
  - The implementation of an environmental strategy at SABIC results in quantifiable improvements in sustainable production practices.

- The integration of the Balanced Scorecard (BSC) framework, particularly the Fifth Pillar, significantly enhances SABIC's capacity to address environmental and social challenges.

- Research Aims

This study employs an exploratory, descriptive, and analytical approach to investigate the integration of the Sustainable Balanced Scorecard (SBSC) within SABIC. The methodology begins with a comprehensive literature review to establish the theoretical foundation of the study. This review explores the Balanced Scorecard (BSC) concept, its adaptation for sustainability, and how it aligns economic, social, and environmental factors with organizational strategies. By examining existing research, the literature review clarifies key concepts and identifies the relationships between sustainable development and the SBSC framework.

To further explore the application of the SBSC, the study adopts an inductive analysis methodology. This approach helps in designing and measuring a set of environmental and social indicators that align with SABIC's sustainability objectives. The focus is on understanding how SABIC integrates sustainable practices into its technical and administrative operations, reflecting the company's broader commitment to sustainable development.

A case study method is utilized to provide in-depth insights into SABIC's sustainability strategy. As a global leader in the petrochemical industry, SABIC serves as an ideal case for evaluating the real-world application of the SBSC. The study examines the company's performance across environmental, social, and economic dimensions, highlighting specific sustainability metrics and initiatives that drive its long-term sustainability goals.

The data collection and analysis process involves both qualitative and quantitative approaches. Key performance indicators (KPIs) related to environmental preservation, social responsibility, and economic performance are evaluated to assess the effectiveness of the SBSC in driving sustainable outcomes. Additionally, the study examines SABIC's stakeholder engagement efforts and the challenges the company faces in balancing its diverse sustainability objectives.

By utilizing exploratory and descriptive techniques, the study aims to understand how SABIC has integrated sustainability into its business operations and strategy. This methodology offers a detailed assessment of the company's current sustainability practices and the effectiveness of its SBSC framework in meeting environmental and social goals, providing valuable insights into the broader application of this tool in other global organizations.

1. Sustainable Development: The integration of sustainability into performance management has gained significant traction in recent years, driven by an evolving understanding of the interconnectedness of economic growth, environmental health, and social equity. This discourse can be traced back to the 1972 report, "The Limits to Growth," which was commissioned by the Club of Rome. The report warned about the potential consequences of unchecked economic expansion within a planet of limited resources, predicting dire global outcomes if changes were not made. In 1987, the Brundtland Commission's report provided a political framework for the concept of sustainability, emphasizing the necessity of development that meets present needs without compromising future generations' ability to meet their own. This foundational text prompted the initiation of global initiatives, culminating in the establishment of the Millennium Development Goals in 2000. These goals set targeted benchmarks for the reduction of poverty and the promotion of sustainable practices. The momentum continued with the introduction of the Sustainable Development Goals (SDGs) in 2015**.** (Fischer, et al., springer, 2023).

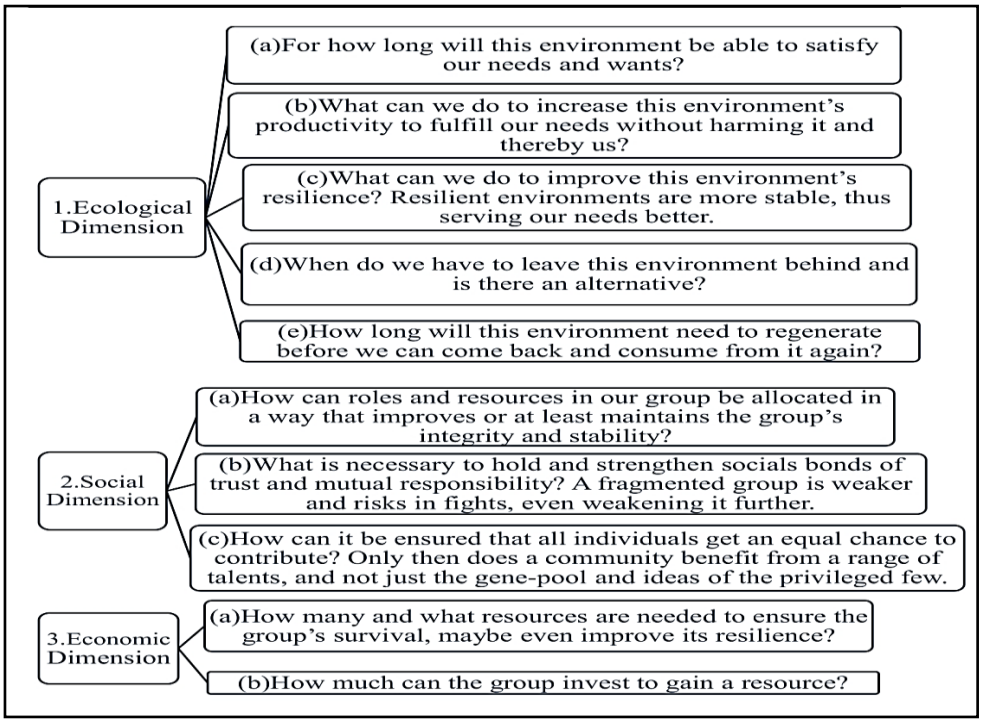
The concept of sustainability encompasses the fair and efficient distribution of resources across generations, while also considering the inherent limitations of our finite ecosystem. This entails guaranteeing that socioeconomic activities are conducted in accordance with these limitations. As Thomas posits, sustainability signifies the capacity of human activities to satisfy human needs and aspirations without exhausting the productive resources at their disposal. The overarching objective of sustainability is to attain equilibrium between society, the economy, and the environment, thereby facilitating the regeneration of the planet's life-supporting ecosystems (Nessraoui & Habbaz, 2022, p. 29).

The concept of sustainable development is open to a variety of interpretations. It can be understood as a process of balancing competing needs against the backdrop of environmental, social, and economic constraints (The Sustainable Development Commission (SDC), 2023).The foundation for leading global and international cooperation is sustainable development. As defined by the Brundtland Commission, sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (The International Institute for Sustainable Development (IISD), 2023).

The concept of sustainable development provides a framework for making more informed decisions regarding issues that have a significant impact on our collective well-being. By integrating health plans into the planning of new communities and identifying more effective strategies for present and future endeavors, it offers a systematic approach to development that strives to reconcile diverse and often competing interests with an understanding of the environmental, social, and economic constraints we face as a society (The Sustainable Development Commission (SDC), 2023).

1.1. Sustainable Development Dimensions: While ecological challenges frequently occupy a prominent position in contemporary discourses, it is imperative to recognize that they are inextricably linked to economic and social challenges. As evidenced by Raworth's Doughnut Economy model, incorporating the social dimension is a crucial step towards achieving sustainable development. Conversely, ecological challenges also have direct economic consequences. The three dimensions of sustainability must accordingly be understood as a system, whereby interrelationships must be considered to make efficient decisions (Fischer, et al., 2023, p. 18). The holistic approach that integrates sustainability considerations refers to a comprehensive and interconnected perspective that takes into account the environmental, social, and economic dimensions of sustainability in a synergistic and balanced manner. This entails recognizing the interdependencies and interconnections between these dimensions and their impact on long-term organizational success, as well as on societal well-being and planetary health (Rabia, 2023, p. 66).

Figure number (1): Sustainable Development Dimensions.



1.2. Sustainable Balanced Scorecard: In the 1990s, Kaplan and Norton introduced the Balanced Scorecard (BSC) methodology, which sought to combine financial and non-financial issues into a unified performance management system. The methodology entails the identification of pivotal operational elements, the establishment of objectives for these elements, and the development of metrics for gauging progress toward their attainment. The BSC employs a four-perspective evaluation approach, encompassing financial, customer, internal, and learning aspects (Tuğçe Kalender & Vayvay, 2016, p. 77) .

The balanced scorecard, initially proposed in the 1992 issue of the Harvard Business Review (HBR), provides executives with a comprehensive framework that transforms a company's strategic objectives into a coherent set of performance measures. This is achieved through the establishment of a strategic map with cause-and-effect links (HELLA, 2023, p. 355). Consequently, the SBSC is a management system that can motivate breakthrough improvements in such critical areas as product, process, customer, and market development (Kaplan & Norton, 2023).

Kaplan and Norton posit that the SBSC is a powerful tool for companies seeking to integrate sustainability into their strategic decision-making processes and to create long-term value for all stakeholders. They further argue that it is a framework that enables companies to translate their sustainability strategies into action. The SBSC builds on the traditional balanced scorecard framework, which has gained widespread acceptance as a tool for communicating and implementing strategy. By expanding the framework to include sustainability performance measures, the SBSC provides a comprehensive view of a company's performance that includes economic, social, and environmental dimensions (Rabia, 2023, p. 70)

The Balanced Scorecard is an appropriate tool for controlling and accounting for sustainability issues for a number of reasons. Firstly, a considerable number of environmental and social issues are not financial in nature. Secondly, the environmental and social consequences of organizational actions are primarily evident over an extended period of time. Ultimately, a multi-dimensional approach would enable managers to address environmental concerns. As demonstrated by (Andrian, 2022). the following table presents a series of indicators pertaining to the environmental and social dimensions.

Table number (1): indicators on the environmental and social dimensions

Energy	• Energy consumption, • Energy use in offices, Energy saved due to implemented improvements, %	**Materials**	• % of non-renewable materials • % of recycled materials used • Product recycling rate, % • %Packaging materials recycling rate,
Water	• Water consumption • % of water recycled • % of water reused	**Social**	• Workplace safety % of innovations that include sustainability goals • % sustainability awareness training penetration

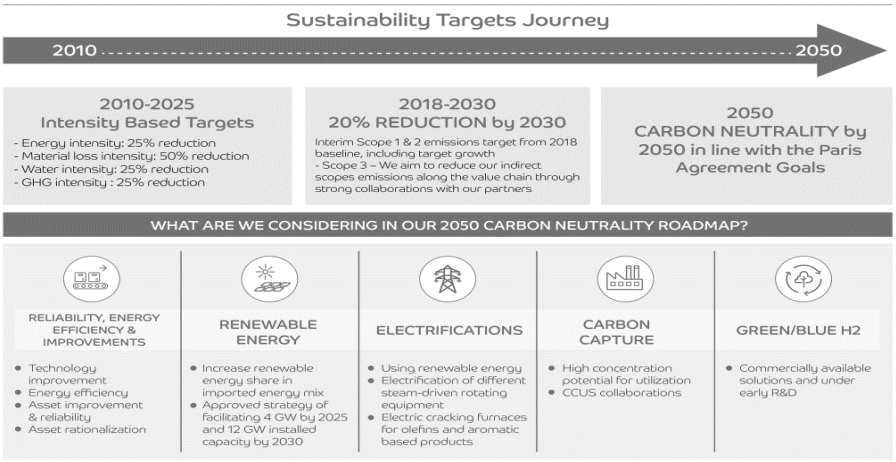
Waste	• Waste by type and disposal method	**Management**	• % of suppliers reviewed in the context of sustainability • % of suppliers that comply with established sustainability strategy
Emission	• Toxic emissions • CO2 emissions direct /CO2 emissions indirect/CO2 emissions from business travel per employee • Nitric oxide emission • Sulfuric oxide emission		

Source: (BSC Design company, 2023)

2. Sustainable Balanced Scorecard building framework SABIC.

- **Vision**: Become the world's leading chemical company
- **Identifying strategies**: The following strategies have been identified: customer focus, market focus, operational excellence, innovation, product package management, transformation, localization engine, and the integration of the environmental, social, and economic dimensions of sustainability into the core business strategy.

Figure number (2): Identifying strategies.



Source: (BSC Design company, 2023)

In 2021, the company made a substantial commitment to sustainability by pledging to achieve carbon neutrality across all of its operations by 2050. This marks a pivotal step in addressing climate change. To facilitate this ambitious goal, the company has developed a comprehensive roadmap that outlines its vision for reaching net zero emissions by 2050. This roadmap also includes a clear interim target of reducing greenhouse gas emissions (specifically scope 1 and 2) by 20% by 2030, based on a 2018 baseline. The roadmap highlights SABIC's sustained commitment to incorporating circular and renewable feedstocks into its processes, while delineating five pivotal pathways for achieving net zero carbon emissions. These pathways include enhancing reliability to ensure consistent operations, boosting energy efficiency through innovative practices and technologies, investing in renewable energy sources, advancing the electrification of systems to reduce reliance on fossil fuels, and implementing carbon capture solutions in conjunction with the utilization of green and blue hydrogen. Collectively, these strategies are designed to establish the company as a leader in sustainability, demonstrate its commitment to environmental stewardship, and enable it to navigate the challenges of the evolving global economy.

2.1 Identifying critical elements for success: SABIC is dedicated to the principles of sustainable development and actively encourages the participation of stakeholders in this endeavour. By pursuing innovative and sustainable solutions, the company aspires to enhance the efficiency of material consumption and facilitate the integration of climate change considerations into mainstream practice.

- **Benchmarking**: In order to achieve its strategic objectives, the company is committed to attaining global financial performance through the implementation of rigorous financial analysis, investment in key markets, and the continuous improvement of profit margins across its product lines. This focus encompasses the identification and exploitation of emerging market trends, as well as the adaptation to competitive pressures through the implementation of innovative and differentiated offerings. Moreover, in order to maintain competitiveness in its markets, the company must engage in strategic partnerships, optimize supply chains, and adopt cutting-edge

technologies that streamline operations. It is imperative that operational flexibility and efficiency are enhanced, necessitating the implementation of agile practices and the utilisation of data analytics to facilitate a swift response to market demands and operational challenges. Concurrently, the company's commitment to reducing its environmental impact aligns with contemporary sustainability standards. This is evidenced by the integrati4on of eco-friendly practices into its manufacturing processes and investment in renewable energy sources to minimize waste and carbon emissions. This comprehensive approach not only ensures the firm's resilience in a rapidly evolving marketplace but also reinforces its dedication to corporate social responsibility and sustainable growth.

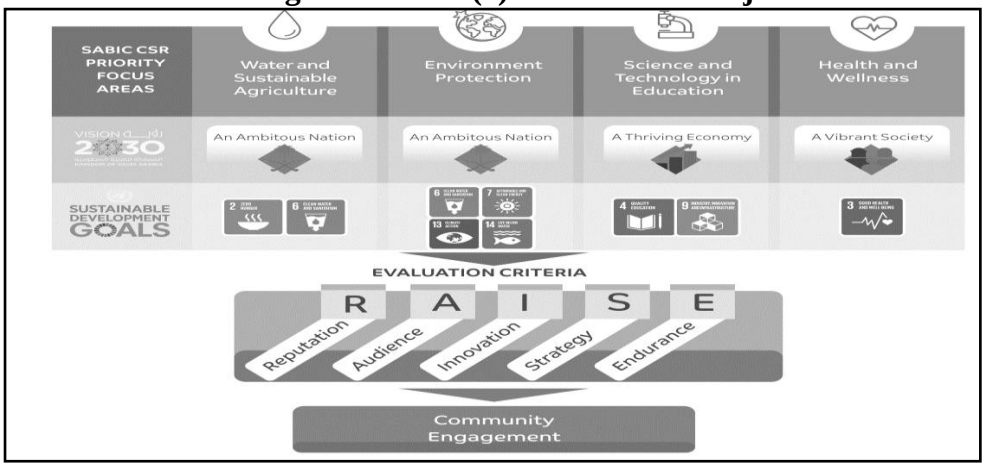
- **Action Plan Definition**: The action plan should prioritize the strategic business units of the petrochemical unit, the specialized products unit, the agricultural nutrient unit, and the mineral products unit. This is to enhance operational efficiency and market responsiveness. By concentrating efforts on these key sectors, the organization can leverage specific strengths, optimize resource allocation, and foster innovation tailored to each unit's unique challenges and opportunities. The petrochemical unit could concentrate on improving production processes and sustainability practices, while the specialized products unit could develop niche products that meet evolving customer demands. Concurrently, the agricultural nutrient unit should aim to advance research in eco-friendly fertilizers, and the mineral products unit could enhance extraction and processing technologies to increase yield and reduce environmental impact. This multifaceted approach ensures a cohesive strategy that aligns with overall business objectives, driving growth and competitiveness in the market.
- **Executive Action Identification**: The identification of executive actions focusing on environmentally supportive products, particularly those that are circular and mechanically recycled, is of vital importance for the company's sustainability strategy. Products designed with a circular economy in mind are intended to be reused, refurbished, or recycled at the end of their useful life. This approach reduces waste and conserves natural resources. It is recommended that the company prioritize the development of such products by integrating sustainable materials and innovative design processes that facilitate easy disassembly and recycling. Furthermore, emphasizing

mechanically recycled products—those created from reclaimed materials through mechanical processes—demonstrates the company's commitment to closing the loop in materials management. By creating a portfolio of environmentally friendly and economically viable products, the company can foster brand loyalty and establish itself as a leader in sustainable practices within its industry.

2.2. Evaluate the impact of the SBSC on sustainable design achievements:

The social responsibility strategy plays a pivotal role in the realisation of Saudi Arabia's Vision 2030 and the objectives of sustainable development set forth by the United Nations. It also aligns with the culture of the company's unwavering commitment to sustainability, which contributes to the achievement of nine United Nations sustainable development goals through the RAISE framework. The figure below illustrates these objectives through RAISE.

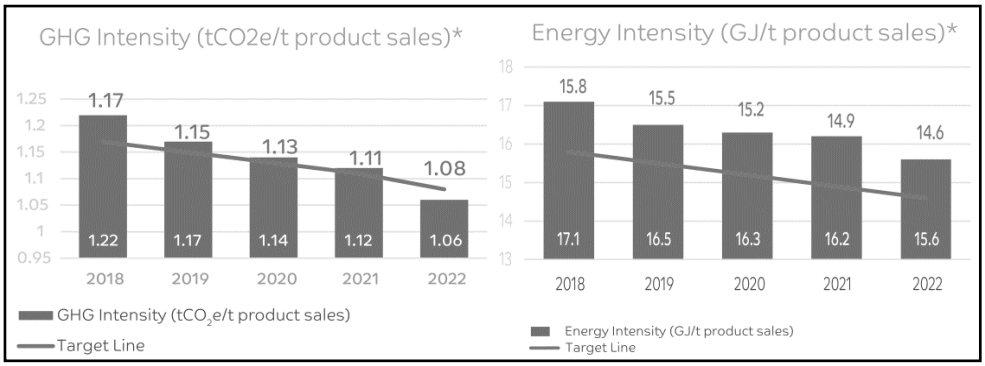
Figure number (3): THE RAISE objectives



Source: (SABIC, 2023, p. 85)

RAISE's mission is to enhance the positive and sustainable impact of corporate social responsibility through the development and implementation of innovative community initiatives in four strategic focus areas: Science & Technology Education, Environmental Protection, Health, and Water & Sustainable Agriculture. The objective is to meet the needs of the most vulnerable communities by 2030 (sabic, 2023) .The figure below shows the decrease in energy intensity and GHG intensity between 2018 and 2022.

Figure number (4): energy intensity and GHG intensity

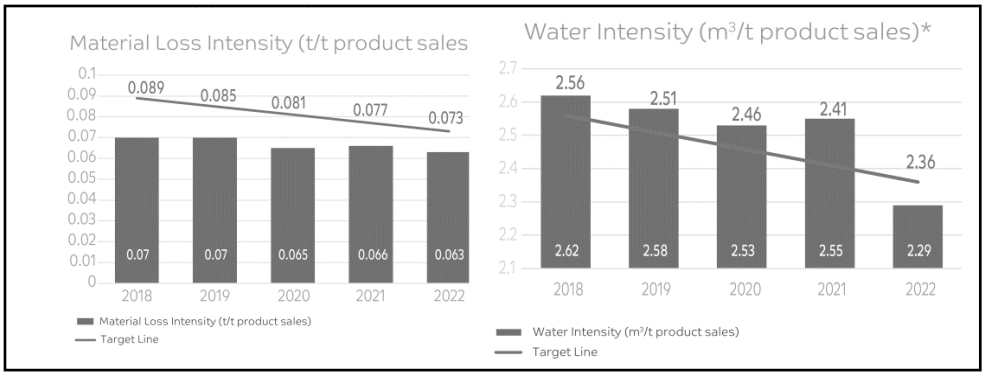


Source: (SABIC, 2023, pp. 50-51)

The considerable increase in sales has had a beneficial impact on the company's energy performance, resulting in a 3.9% reduction in energy intensity in comparison to the previous year, 2021. However, the absolute energy consumption exhibited an increase of 3.5% due to an expansion in production capacities. Notable contributors to this expansion included the GCGV asset and the newly established United EG-3 glycols factory, which is recognized for its exceptional energy efficiency, notably operating without the use of steam. Collectively, these advancements resulted in an overall plant production increase of 8%. Furthermore, the success of the GAS 9 expansion initiative has played a crucial role in supporting this growth trajectory, showcasing the company's commitment to balancing production expansion with sustainable energy practices.

As illustrated in the figure below, there has been a notable decline in both water intensity and material loss intensity between 2018 and 2022.

Figure number (5): The decrease in the water intensity and in the material loss intensity between 2018 and 2022.



Source (SABIC, 2023, pp. 46-49)

In 2022, the company achieved a notable 0.5% reduction in water intensity compared to 2021, accompanied by a significant decrease in absolute water consumption of 4 million m^3, all while experiencing a strong increase in sales. This improvement was primarily the result of several process optimization initiatives at Petrokemya's Butene-1 plants, which are ethylene-based and effectively reduced steam consumption by 0.15 MMBtu per metric tonne, leading to a corresponding 3.5% reduction in the energy intensity of the plants. Furthermore, the company reported a 1.4% reduction in material loss intensity since 2021, although absolute material loss volumes increased by 3.2%. This reflects the substantial growth in sales that occurred during this period. The expansion of production capacity and efficiency was significantly driven by advancements from the GCGV asset, the United EG-3 facility, and the ongoing GAS 9 initiative. This demonstrates the company's commitment to optimizing resource utilization even as production levels rise.

In accordance with its Strategy 2025 initiative, the company has pledged to make substantial reductions in the environmental risks associated with water, renewable energy, and emissions. To this end, it has set forth ambitious targets with the objective of lowering these indicators from their 2010 levels. To monitor progress and enhance transparency, the following table presents a selection of these environmental indicators, which will provide a clear benchmark for measuring the effectiveness of implemented strategies and initiatives. By focusing on these metrics, the company aims to

fulfill its sustainability goals and demonstrate its responsibility towards minimizing its environmental impact and fostering a sustainable future for its operations and the communities it serves. This comprehensive approach underscores the company's dedication to aligning its operational practices with broader environmental standards and commitments.

Figure number (6): Strategy 2025

Dimensions	Target	Base Year	Target Year
Resource efficiency			
Energy intensity GJ/t sales	25% reduction by 2025	2010	2025
Material loss intensity t material loss/t sales	50% reduction by 2025	2010	2025
Absolute waste reduction	% gap to below 2010 by 2025	2010	2025
Flaring	65% reduction	2010	2025
Water Intensity m^3/t sales	25% reduction	2010	2025
Climate			
GHG intensity tCO_2e/t sales	25% reduction by 2025	2010	2025
Renewable energy	4 GW Installed Capacity (12 GW by 2030)		2025
Circular economy			
Sales materials in kt	1,000 kt TRUCIRCLE™ materials (recycled and renewable) per annum		2030

Source: (SABIC, 2023, p. 19)

Goal 02: Zero hunger: mobilize foodstuffs, agro-nutrients.

Goal 06: Clean water and sanitation: pipe solutions rationalize water consumption, focusing on the social responsibility of sustainable water and agriculture, including buildings' insulation materials.

Goal 07: Affordable and clean energy: Rationalize Energy Consumption Renewable Valves, Clean Energy Solutions

Goal 09: Industry, innovation and infrastructure: Research and Development, Benefit Sharing with Local Companies.

Goal 11: Sustainable cities and communities: sustainable solutions for electric vehicles and cities.

Goal 12: Responsible consumption and production: improve natural resource consumption; Circular Economy Opportunities, Sustainable Procurement.

Goal 13: Climate action: reduce climate change risks.

Goal 14: Life below water: collaborate to help solve the problem of marine waste and ocean acidification.

Goal 17: Partnerships for the goals: Global partnerships for sustainable development

3. Discussion:

In light of the three dimensions of sustainability, the materiality results substantiate the significance of climate change and reinforce the necessity for a global approach to this challenge. A new materiality analysis and stakeholder analysis were initiated in 2022 and are scheduled for completion in 2023.

3.1 Human and social dimension: SABIC acknowledges its obligation to facilitate the involvement of relevant parties and to spearhead positive societal transformation. Its initiatives are aligned with four core objectives: enhancing , promoting scientific and technological education, safeguarding the environment, ensuring sustainable water management, and advancing sustainable agriculture. The company's social responsibility endeavors are exemplified by its. A total investment of US $15.6 million was made in several global social responsibility programs, which were developed into six global initiatives. These resulted in 185 programs involving 2,531 SABIC volunteers.

In 2019, the organization strove to alleviate the consequences and ramifications of the global coronavirus pandemic. The organization has allocated over US $39.6 million in funding for 274 programs across the globe, with 204 of these initiatives specifically targeting the mitigation of the pandemic's impact. These programs have reached over 35 million individuals in 34 countries, representing a substantial investment in global health and well-being.

In 2020, a total of $33.56 million was invested in 127 programs in 26 countries worldwide, with the programs benefiting approximately 345,000 individuals. Furthermore, the organization initiated donations in Vietnam, providing financial assistance to secure drinking water, and supported China's flood disaster relief program. In Spain, electric bicycles were provided to a local medical institute with the objective of facilitating mobility for older individuals and those with special needs. The organization initiated the "Kanaf Charitable Association" program, which included the inauguration of the Comprehensive Centre for Autism in Medina. There was a 90% improvement in the rate of accidents related to the environment, health, safety, and security from 2005 to 2021. The total quantity of hazardous chemicals released (in tons) exhibited a

marked decline, with a reduction of 80% observed in 2021 compared to the previous year. Similarly, the occupational disease rate per 200,000 hours demonstrated a notable decrease, with a 37% reduction in 2021 compared to the preceding year.

2022-2023: In general, the initiative has been oriented towards the following objectives:

Goal 02: Eradicate hunger: Mobilize food and agricultural nutrients from the focus areas of social responsibility for water and sustainable agriculture.

Goal 08: Decent Work and Economic Growth. The recruitment of Saudi personnel and the facilitation of knowledge transfer through the exchange of experiences represent significant contributions to local policy development.

3.2 Ecological Dimension:

SABIC's objective is to conserve and protect natural resources from pollution by recycling and utilizing plastic waste, thereby reducing the volume of waste at sea. It has collaborated with the Houston Wild President alliance to mitigate air pollution in coastal plains, forests, wetlands, and waterways surrounding Houston, Viston Bay, and the Gulf of Mexico. The environmental indicators that have been developed can be classified as follows:

• **Agricultural nutrients**: SABIC, a global leader in diversified chemicals, plays a pivotal role in the agricultural sector by developing innovative agricultural nutrients that enhance food supply while minimizing environmental impacts. By employing advanced research and sustainable practices, SABIC develops fertilizers and nutrient solutions designed to optimize crop yield and improve soil health, effectively addressing the growing demands of food production amidst a rapidly changing climate. Their dedication to sustainability is exemplified by the utilisation of environmentally benign raw materials and processes, which not only curtail greenhouse gas emissions but also facilitate the adoption of more resource-efficient agricultural practices by farmers. By promoting the responsible use of agricultural nutrients, SABIC contributes to the development of a more sustainable food system, thereby ensuring food security for the future while protecting the planet's natural resources.

• **Packaging**: SABIC is at the vanguard of a transformative shift in the packaging industry, engaging in close collaboration with its customers and

suppliers to develop cutting-edge plastic packaging solutions that simultaneously address functionality and sustainability. A significant objective of this initiative is the development of premium certified circular polymers, which are produced from chemically recycled mixed plastic waste and renewable resources. This approach markedly reduces reliance on virgin materials and minimizes environmental impact. Furthermore, SABIC has introduced a pioneering two-axis polyethylene polymer, designed for straightforward recyclability, which streamlines waste management and contributes to broader waste reduction objectives. By prioritizing the circular economy, SABIC not only enhances the sustainability profile of packaging materials but also empowers businesses to meet the growing consumer demand for environmentally responsible products. This ultimately drives a positive change in industry while supporting global efforts to mitigate plastic pollution.

- **material science:** The field of material science encompasses the study of the physical and chemical properties of matter, as well as the ways in which these properties can be modified to create new and improved materials. SABIC has made considerable progress in the development of innovative materials designed to produce lightweight porous fabrics that exhibit reduced environmental impacts in comparison to traditional fabric options. These cutting-edge materials are designed not only to be durable and perform well, but also to prioritize sustainability. This is achieved by utilizing renewable resources and minimizing the carbon footprint associated with their production. By prioritizing the principles of circularity, SABIC ensures that these fabrics can be recycled or repurposed at the conclusion of their life cycle, thereby reducing waste and promoting a more sustainable approach to textiles. This advancement in material science positions SABIC as a principal actor in the movement toward eco-friendly fabrics, enabling industries such as fashion, automotive, and construction to adopt greener alternatives without compromising on quality or functionality. Ultimately, SABIC's commitment to innovation in fabric technology reflects a comprehensive approach to addressing environmental challenges while meeting the needs of modern consumers.

SABIC has made a substantial contribution to the advancement of the construction sector with the introduction of innovative household water pipes. These pipes are designed to resist corrosion, thereby enhancing their longevity and performance in a range of applications. This technical superiority has the dual benefit of reducing maintenance costs for homeowners and builders while simultaneously extending the lifespan of the plumbing infrastructure. It is noteworthy that these pipes are produced with a remarkable 77% reduction in CO_2 emissions compared to traditional mineral-based alternatives, which demonstrates SABIC's commitment to sustainability and environmental stewardship. By employing advanced materials and manufacturing processes, SABIC is able to mitigate the carbon footprint associated with construction, thereby making a significant contribution to global efforts to combat climate change. This innovation not only addresses the growing demand for sustainable building materials but also exemplifies SABIC's role as a leader in providing efficient, eco-friendly solutions that benefit both consumers and the environment.

- **Clean energy**: SABIC's dedication to clean energy is exemplified by its endeavors to diminish the utilization of bioethylbutyl in energy applications, thereby striving to reduce the reliance on carbon-intensive fossil fuels. By transitioning towards more sustainable alternatives, SABIC plays an active role in reducing CO_2 emissions, which are a significant driver of climate change and are typically associated with the combustion of fossil fuels. This transition is not only crucial for reducing the overall carbon footprint of energy production but also aligns with global initiatives aimed at promoting the use of cleaner energy sources. SABIC's innovative solutions and materials play a pivotal role in enabling industries to adopt cleaner technologies and practices, thereby facilitating a more sustainable energy landscape. Through these endeavors, SABIC is paving the way for a greener future, ensuring that the energy sector can meet the growing demand for power while simultaneously addressing environmental concerns and fostering a transition towards a low-carbon economy.

Transport: SABIC has made noteworthy progress in the field of transportation by developing innovative materials that prioritize weight reduction, a crucial aspect in improving fuel efficiency and reducing CO_2 emissions in transportation. By employing advanced lightweight polymers

and composites, SABIC's materials are designed to supplant heavier traditional materials, thereby facilitating the production of lighter vehicles, aircraft, and shipping containers. This reduction in weight is directly correlated with a decrease in fuel consumption, as lighter vehicles require less energy to operate, which markedly reduces the greenhouse gas emissions associated with transportation. Moreover, these materials contribute to the development of a more sustainable transport system, while also enhancing performance and safety, as they often exhibit superior strength and durability. SABIC's dedication to the advancement of these efficient materials establishes the company as a pivotal contributor to the transportation industry's transition towards a more sustainable future. This commitment aligns with the global objectives of reducing the environmental impact of logistics and mobility.

The following sustainable development goals have been achieved: SABIC is firmly dedicated to confronting global challenges pertaining to water, energy, urban sustainability, and marine conservation through the implementation of strategic objectives that are in alignment with the Sustainable Development Goals (SDGs). With regard to Goal 06, SABIC is committed to the implementation of innovative pipe solutions that will not only enhance water efficiency but also promote responsible water use in agriculture. This will ensure that communities have access to clean water while supporting sustainable practices. In pursuing Goal 07, the company is focused on rationalizing energy consumption, integrating renewable energy technologies, and developing clean energy solutions that make energy more accessible and affordable. This is done with the intention of fostering a cleaner future. In pursuit of Goal 11, SABIC endeavors to facilitate the transition to sustainable urban environments through the implementation of solutions for electric vehicles and the promotion of green infrastructures in cities. This is expected to result in a reduction of pollution and an enhancement of the quality of life. In conclusion, with regard to Goal 14, SABIC is dedicated to collaboration and joint action with regard to marine and underwater ecosystem issues, acknowledging the significance of healthy oceans for biodiversity and climate regulation. By pursuing these diverse avenues of action, SABIC not only consolidates its position as a frontrunner

in sustainability but also makes a tangible contribution to the development of a more resilient and sustainable world for future generations.

3.3 Technical and management dimension: This is evidenced by the company's emphasis on a transition to cleaner, more efficient technologies that utilize minimal energy and resources. The company's primary objective is the development of innovative processes that will substantially reduce harmful emissions and adhere to the strictest industry standards to enhance operational efficiency and reduce environmental impact. By investing in advanced manufacturing techniques and optimizing resource inputs, SABIC aims to reduce its carbon footprint and promote a circular economy through waste reduction and internal recycling. Additionally, the company places importance on supporting natural ecosystems, which guides its operational practices and product lifecycle management, ensuring that its activities positively contribute to the environment and society. Through these comprehensive strategies, SABIC seeks to lead the chemical industry toward a sustainable and responsible future.

The following sustainable development goals have been achieved SABIC proactively aligns its operations with several Sustainable Development Goals (SDGs), with a particular emphasis on Goal 13: Climate Action. The company is dedicated to reducing climate change risks through various initiatives aimed at minimizing greenhouse gas emissions and enhancing energy efficiency across its production processes. To this end, SABIC has implemented comprehensive strategies under Goal 12: Responsible Consumption and Production. These strategies focus on improving the efficiency of natural resource consumption by promoting circular economy opportunities and sustainable procurement practices that prioritize the use of renewable resources and minimize waste generation. Moreover, in the context of Goal 09: Industry, Innovation, and Infrastructure, SABIC places significant emphasis on research and development (R&D) activities that facilitate collaboration with local companies. This approach ensures that innovations are not only effective but also accessible to regional stakeholders, thereby promoting economic growth and enhancing infrastructure. Through these integrated strategies, SABIC not only mitigates its environmental impact but also contributes to the development of resilient and sustainable industry practices that benefit society at large.

3.4 Testing the hypotheses:

SABIC has effectively integrated the fifth dimension of the balanced scorecard into its operations, which plays a crucial role in advancing sustainable development while operationalizing its sustainability strategy. This dimension serves as a comprehensive framework that connects sustainability goals with tangible actions and performance outcomes, thereby enabling the company to conduct a systematic evaluation of its progress. SABIC utilizes a multitude of sustainability performance metrics, including energy intensity, water consumption, and raw materials efficiency, in conjunction with the monitoring of adverse emissions rates to assess the environmental impact. Moreover, the company places a premium on health and safety protocols and monitors the average number of training days per employee, with the objective of ensuring the well-being of its personnel and facilitating their professional development. Other critical indicators include the number of environmental violations, the rate of increase in renewable energy utilization, and the percentage of environmentally friendly manufacturing processes adopted. Additionally, SABIC recognizes that financial health is integral to sustainability, as demonstrated by monitoring sales growth rates and investing in employee training. This multifaceted approach ensures accountability and transparency in SABIC's sustainability efforts and fosters continuous improvement, reinforcing its commitment to responsible business practices and positive societal impact.

Hypothesis1: which postulates that environmental and social factors impact the decision-making processes of economic institutions, including SABIC, is presented herewith. By integrating sustainability into its fundamental operations, SABIC illustrates that these factors are not merely incidental considerations; rather, they are integral to strategic decision-making. The company's dedication to sustainability demonstrates an awareness that environmental and social concerns have a direct impact on operational efficiency, regulatory compliance, and long-term viability.

Hypothesis 2: posits that the implementation of SABIC's environmental strategy has resulted in quantifiable enhancements in sustainable production practices. The BSC framework enables the company to establish a connection between sustainability objectives and concrete actions and

performance outcomes. SABIC monitors a range of sustainability performance indicators, including energy intensity, water consumption, and raw materials efficiency. By monitoring and assessing adverse emissions rates, SABIC is able to evaluate its environmental impact in a rigorous manner. These metrics serve as indicators of the effectiveness of the environmental strategy, demonstrating how targeted actions have resulted in notable operational improvements.

Hypothesis 3: Hypothesis 3 posits that the incorporation of the BSC framework, particularly the Fifth Pillar, markedly enhances SABIC's capacity to confront environmental and social challenges. By employing critical indicators such as the number of environmental violations, the rate of increase in renewable energy utilization, and the percentage of environmentally friendly manufacturing processes adopted, SABIC establishes a comprehensive approach to sustainability. The BSC provides a structured methodology for the evaluation of these dimensions, thereby ensuring that SABIC is able to respond proactively to environmental challenges while simultaneously fostering social responsibility. Furthermore, SABIC acknowledges the significance of financial stability in the context of sustainability, monitoring sales growth rates and allocating resources towards employee training as part of a comprehensive strategy. This interconnection between financial and environmental performance guarantees accountability and transparency in SABIC's sustainability endeavors. By cultivating a culture of continuous improvement, SABIC strengthens its dedication to responsible business practices, ultimately creating a positive societal impact and enhancing its reputation as a leader in sustainable industry practices. Through these endeavors, SABIC not only addresses its immediate operational challenges but also positions itself as a forward-thinking institution responsive to the evolving expectations of stakeholders in a sustainable economy.

Conclusion:

The integration of environmental and social responsibility is a critical component of achieving general strategic visions within industrial institutions. This integration facilitates tracking and continuous improvement of these visions, thereby enhancing the effectiveness and sustainability of industrial operations. The study makes a significant contribution to advancing scientific understanding of the role of sustainable

balanced scorecards in activating the role of institutions toward achieving sustainability and climate change and highlights its importance as an advanced reference in improving institutional performance in highly competitive industrial environments. This assertion is corroborated by SABIC's analysis, which substantiates that this integration enhances the capacity to quantify environmental and social impact, in addition to establishing a management approach that is congruent with the requirements of environmental sustainability and climate change. The provision of an effective tool enables organizations to direct their strategic decisions towards innovation, responsibility, and commitment to sustainable development.

The findings yielded the following results:

- A sustainable balanced scorecard contributes to sustainability management. It also contributed to SABIC's sustainable strategy by focusing on new environmentally supportive products, including certified renewable products, circular products, and recycled products.
- the sustainable balanced scorecard contributed to the achievement of the three dimensions of sustainable development. This was achieved by drawing on the following indicators: renewable energy indicators, water conservation indicators, material loss reduction indicators, emission reduction indicators, and social and human well-being indicators
- SABIC's operations focused on designing innovative solutions. This was done by including sustainability in its operations, working according to the circular economy, and promoting engagement among stakeholders to achieve sustainable development. By means of innovative and sustainable solutions, a sustained commitment to sustainability, effective material consumption, and the integration of climate change into mainstream thinking.

It is recommended that the following points be given consideration:

- Emphasize the adoption of sustainability-oriented production processes that minimize environmental impact and optimize resource use.
- Develop predictive sustainability models linked to SBSC
- indicators to support proactive strategic decision-making.
- Align SBSC performance measures with global disclosure frameworks such as IFRS S1, IFRS S2, SASB, and GRI to improve transparency and international comparability.

- Develop a digital sustainability dashboard powered by real-time data analytics, artificial intelligence, and IoT to strengthen the monitoring and evaluation of key environmental and social indicators.
- Expand the evaluation of social impact using structured Social Impact Assessment (SIA) tools to measure the effectiveness and reach of community-focused initiatives.
- Extend the SBSC framework to assess sustainable supply-chain performance, including supplier compliance with environmental standards, circularity practices, and transparency across the value chain.
- Strengthen the integration between the SBSC and sustainability-related risk management to anticipate environmental and social disruptions and mitigate sustainability-linked operational risks.

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