Review of Approaches to Implementing Science-Based Targets for Reducing Carbon Footprint in the ICT Sector

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***Abstract*—This paper analyzes the strategies employed by ICT businesses to decrease their carbon emissions by utilizing the Science-Based Targets Initiative (SBTi). ICT firms may make a substantial contribution to global climate goals by aligning their efforts to reduce carbon emissions with scientifically supported targets. The paper examines the present methods, difficulties, and advantages of implementing SBTs in the ICT industry.**

Keywords—Science-Based Targets, ICT companies, carbon footprint reduction, sustainability, climate change, greenhouse gas emissions

I. Introduction

The Information and Communication Technology (ICT) sector has a substantial impact on the worldwide emissions of greenhouse gases (GHGs). With the increasing demand for digital services, the environmental footprint of ICT firms is growing at a fast pace. The carbon footprint of the sector is significantly impacted by data centers, network infrastructure, and electronic gadgets, requiring immediate measures to reduce these emissions. As a reaction, some ICT businesses are embracing the Science-Based Targets Initiative (SBTi) [1], which offers a distinct and quantifiable structure for decreasing greenhouse gas (GHG) emissions in accordance with the objectives of the Paris Agreement.

The Science-Based Targets Initiative (SBTi) [2] promotes the establishment of ambitious emission reduction goals by enterprises, which are informed by the most up-to-date climate science. This ensures that their actions effectively contribute to the limitation of global warming. This project is vital for the ICT sector, considering its rapid expansion and significant energy usage. ICT firms com The template will number citations consecutively withinmit to making significant reductions in their carbon footprint by setting science-based targets. This commitment drives innovation and operational efficiency, while also aligning with global climate objectives.

The implementation of Science-Based Targets in the ICT sector involves the following steps that are shown in Fig.1 and explained more in detail in Table I.

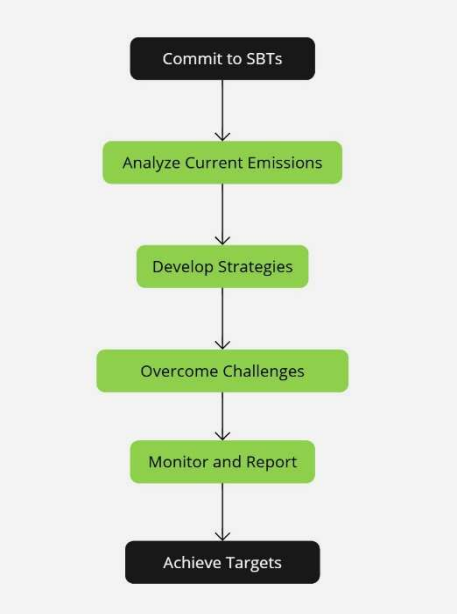

Fig. 1. Step-by-step implementation process of Science-Based Targets in the ICT sector

TABLE I. Detailed Breakdown of the Step-by-Step Implementation Process for Science-Based Targets in the ICT Sector

Step	Description
Commit to SBTs	Align with the Paris Agreement and set ambitious goals based on the latest climate science.
Analyze Emissions	Conduct a thorough analysis of Scope 1, 2, and 3 emissions.
Develop Strategies	Identify and implement strategies such as material efficiency, green computing, renewable energy adoption, and supply chain management.
Overcome Challenges	Address issues like data accuracy, financial and technological barriers, regulatory uncertainties, and organizational change.
Monitor and Report	Regularly track progress, adjust strategies as needed, and transparently report emissions data.
Achieve Targets	Meet or exceed emission reduction targets, contributing to global climate goals and reaping benefits like cost savings and enhanced reputation.

This paper presents a thorough examination of the strategies employed by ICT corporations to incorporate science-based aims. The text explores different approaches, including material efficiency, green computing, adoption of renewable energy, and supply chain management. Each of these methods plays a crucial role in reducing the environmental impact of ICT operations and improving sustainability.

The paper is organized to offer a comprehensive analysis of the strategies employed by ICT businesses in the implementation of Science-Based Targets (SBTs) to decrease their carbon emissions. The document commences with Section I, which outlines the prominent contribution of the ICT industry to worldwide greenhouse gas emissions and the imperative need to embrace Science-Based Targets (SBTs) in accordance with the Paris Agreement.

Section II explores different strategies for reducing the environmental impact of the ICT industry. These aspects encompass material efficiency, green computing, the adoption of renewable energy, and the management of the supply chain. This section provides an overview of the techniques and tactics that ICT companies utilize to improve sustainability.

Section III examines the obstacles that ICT businesses have when implementing SBTs, with a particular emphasis on challenges related to Scope 3 emissions, data precision, financial and technological hurdles, legal and market uncertainty, and organizational transformation. The section thoroughly examines these difficulties, offering valuable insights into the intricacies associated with attaining SBTs.

Section IV examines the advantages of implementing Science-Based Targets (SBTs) for Information and Communication Technology (ICT) companies. The text emphasizes the enhancements in environmental performance, adherence to regulations, operational effectiveness, market prospects, and corporate standing. This section also highlights the wider influence of SBTs on innovation and relationships with stakeholders.

Section V provides a summary of the research findings and offers advice for ICT organizations to successfully adopt SBTs. The document encompasses prospective future strategies for the industry to further diminish its carbon emissions and support global climate objectives.

II. Approaches for Minimizing Carbon Footprint in the ICT Sector

ICT companies are implementing several approaches to minimize their carbon impact by utilizing Science-Based Targets (SBTs). The approaches encompass:

A. Material efficiency

Material efficiency refers to the process of optimizing the use of materials during the entire lifespan of a product in order to minimize its environmental impact, namely its carbon footprint. Material efficiency in ICT firms involves several strategies, such as extending product lifespan, improving recycling and reuse methods, and reducing waste during manufacturing.

Extending the lifespan of ICT devices, such as smartphones and laptops, can greatly reduce their environmental effect in terms of carbon emissions. The manufacturing process of these devices is extremely resource-intensive, involving the extraction and purification of raw materials, which greatly contribute to the release of greenhouse gases (GHGs). By improving the durability and lifespan of items, the frequency of manufacturing new devices is decreased, leading to a reduction in emissions over time. By using material efficiency [3] techniques during the production and consumption stages of cellphones, it is possible to significantly reduce their overall carbon footprint. This can be achieved by optimizing material usage and prolonging the lifespan of the device.

Efficiently recycling and reusing ICT items and materials is crucial for decreasing the environmental impact caused by carbon emissions. Effective recycling protocols guarantee the recovery and reuse of important substances, such as rare earth metals, hence diminishing the need for new raw materials. This method not only preserves resources but also reduces the environmental impact linked to mining and processing. By increasing the rates of material collection [4], improving the efficiency of sorting operations, and introducing alloy-specific sorting techniques for metals, significant reductions in emissions can be achieved during the recycling process. In addition, the implementation of reuse programs, which entail repurposing functional components in new devices, plays a crucial part in advancing a circular economy and efficiently reducing both waste and emissions.

The manufacturing phase of ICT devices makes a substantial contribution to carbon emissions. Employing tactics to mitigate waste in the production process can significantly contribute to reducing the overall carbon footprint. This encompasses improving the efficiency of material usage, optimizing production processes, and using lean manufacturing principles. Advanced manufacturing techniques, such as 3D printing, have the capability to reduce material waste by creating goods with accuracy and minimum surplus. The importance of life cycle assessment (LCA) in assessing the environmental effects of ICT goods [5] is clear, since the application of circular economy principles can enhance material efficiency and reduce emissions.

A concrete demonstration of material efficiency in action is the implementation of Material Flow Cost Accounting (MFCA) in the telecoms sector. The usefulness of MFCA in optimizing energy consumption and lowering carbon emissions inside a prominent telecoms enterprise in India [6] is demonstrated. By prioritizing electricity use and assessing energy inefficiencies, the company effectively pinpointed areas in need of improvement and applied energy-conserving tactics, resulting in reduced operational costs and decreased emissions.

By implementing these material efficiency measures, ICT companies can make substantial progress in decreasing their carbon emissions, thereby supporting global sustainability initiatives and achieving operational advantages.

B. Green computing

Green computing, or green ICT, refers to the utilization of computing resources in a manner that is environmentally sustainable. This strategy involves the streamlined and productive process of designing, producing, using, and disposing of computers, servers, and their related components, such as monitors, printers, storage devices, and networking and communications systems. The primary objective is to reduce or eradicate any adverse effects on the environment.

An essential element of green computing involves the development and utilization of energy-efficient hardware. This entails the creation of computer systems and other information and communication technology (ICT) devices that utilize minimal energy while yet achieving optimal performance. Energy-efficient CPUs and components can greatly diminish power consumption in data centers, infamous for their exorbitant energy usage. By 2030, the IT industry is projected to consume 21% of the world's electricity [7], emphasizing the need to create energy-efficient solutions. Through the implementation of these technologies, energy usage is decreased, the amount of heat produced is diminished, and the requirement for cooling is minimized, resulting in further energy conservation.

Optimizing software for energy efficiency is an essential component of green computing, alongside hardware developments. Energy consumption can be reduced by utilizing efficient algorithms and software programs that need fewer processing resources. This entails optimizing the code to achieve higher efficiency, minimizing the required number of operations, and reducing the resources needed for execution. Developing environmentally-friendly algorithms is crucial for reducing the energy consumption and carbon footprint of computer systems. ICT firms can greatly reduce their environmental impact by deploying energy-efficient software operations.

Virtualization technology is a potent instrument in the field of green computing. Virtualization enables the simultaneous operation of numerous virtual computers on a single physical machine, thereby maximizing the utilization of computing resources and minimizing the requirement for extra hardware. As a result, there is a decrease in energy usage and a decline in electronic waste. Virtualization [8] promotes eco-friendly computing by effectively optimizing resources and maximizing the utilization of IT systems in the public sector. By consolidating workloads onto a smaller number of servers, it is possible to improve data center efficiency and decrease energy usage.

Cloud computing is also essential in the field of green computing. Organizations can achieve cost efficiency and utilize cutting-edge energy-saving technology by delegating their IT infrastructure to cloud service providers. Green cloud computing incorporates ecological sustainability into cloud services, with the goal of minimizing the environmental effects of data centers. Although there is currently a small market need for eco-friendly hosting services, green cloud computing provides sustainable hosting alternatives [9].

The utilization of sustainable energy sources, such as solar and wind power, is an essential element of green computing. Data centers and other ICT facilities can diminish their dependence on fossil fuels and decrease their carbon emissions by embracing renewable energy. Integrating renewable energy sources into the power systems of data centers not only supports environmental sustainability but also improves energy reliability and decreases long-term operational expenses. The incorporation of technologies like as cloud computing, artificial intelligence (AI), and the Internet of Things (IoT) with renewable energy sources has a substantial influence on green supply chain management.

C. Renewable energy adoption

Integrating renewable energy sources is a crucial strategy to reduce the environmental footprint of the ICT industry. Transitioning from fossil fuels to renewable energy sources such as solar, wind, and hydroelectric power can significantly decrease greenhouse gas (GHG) emissions associated with the operation of data centers, networks, and other ICT infrastructure. This section explores the importance of integrating renewable energy into the ICT sector, the strategies employed, and the challenges and benefits of this transition.

The importance of adopting renewable energy cannot be exaggerated. The ICT sector is a significant consumer of electricity due to the substantial energy consumption associated with data centers, network infrastructure, and end-user devices on a global scale. It is essential to emphasize the necessity of integrating digital technologies with renewable energy sources [10]. The integration of renewable energy is essential for bolstering the renewable energy industry and promoting sustainable development. Incorporating renewable energy into ICT operations helps reduce the environmental impact of the business, align with global climate goals, and reduce reliance on non-renewable energy sources.

Different strategies have been utilized to incorporate renewable energy into the ICT industry. An effective approach is the implementation of on-site renewable energy generating. Many ICT companies are dedicating resources to use this approach in order to fuel their operations in a sustainable manner. This involves the implementation of photovoltaic panels and wind turbines at data centers and other facilities. On-site generation reduces dependence on external power sources and enhances energy security and resilience. For example, when analyzing the economic and technological factors of integrating photovoltaic systems into base transceiver stations (BTS) in the telecommunications industry [11], it has been shown that using solar electricity along with battery storage devices can significantly reduce operational costs and carbon emissions. This provides a sustainable solution for remote telecom locations.

ICT firms acquire renewable energy not just by generating it on-site, but also through power purchase agreements (PPAs) and renewable energy certificates (RECs). This strategy allows companies to offset their carbon emissions by devoting resources to renewable energy projects. The ICT sector in the U.S. is increasingly using renewable electricity. [12] By synthesizing existing data and research, we may acquire useful knowledge about the present and future trends of renewable electricity utilization in this sector.

Another novel strategy is the implementation of hybrid energy systems, which combine renewable energy sources with conventional power generation to ensure a reliable and uninterrupted electrical supply. Typically, these systems comprise a blend of solar, wind, and supplementary diesel generators. This presents a complete framework for the extensive incorporation of solar systems in BTS locations. Implementing hybrid systems can significantly reduce dependence on diesel generators and hence lower emissions.

While there are many benefits to using renewable energy in the ICT sector, there are also significant challenges that need to be overcome. A major obstacle is the considerable upfront cost. Deploying renewable energy systems requires a substantial initial investment. The extravagant expenses linked to solar panels, wind turbines, and energy storage

systems can present a substantial barrier for numerous companies.

The process of incorporating technology together also poses a difficulty. Integrating renewable energy with existing ICT infrastructure can provide technological challenges. To ensure compatibility and optimize the performance of hybrid systems, careful design and administration are required. Furthermore, the matter of energy storage continues to be of utmost importance. Renewable energy sources like sun and wind are not always accessible, requiring efficient energy storage solutions to ensure a steady power supply. To resolve this predicament, it is necessary to advance and execute enhanced battery technology.

Regulatory and policy obstacles also have an influence, as variations in regulations and policies across different locations can affect the feasibility and cost-effectiveness of renewable energy initiatives. Effective laws and incentives are essential for encouraging the adoption of renewable energy in the ICT sector [13].

Although there are difficulties, the benefits of integrating renewable energy into the ICT sector are significant. One of the major advantages is the favorable environmental effect. Reducing reliance on fossil fuels decreases the release of greenhouse gases (GHGs), which helps to mitigate climate change and support environmental sustainability.

Another significant benefit is the reduction in costs. Although renewable energy systems require a significant upfront investment, they can lead to significant long-term cost benefits by decreasing energy expenses and reducing operational costs. Additionally, the utilization of on-site renewable energy generation enhances energy security and resilience by protecting ICT activities from power interruptions and changes in energy costs.

The integration of renewable energy improves the standing and perception of a company [14]. Demonstrating a company's commitment to sustainability can enhance its corporate reputation and cultivate trust among stakeholders. Businesses in the ICT sector consider environmental responsibility to be a vital aspect due to its growing importance in today's market.

D. Supply chain management

In the field of information and communication technology (ICT) [15], supply chain management (SCM) encompasses the effective organization and unification of all activities related to the transportation of products and services, commencing from the initial raw materials and concluding with the delivery of the finished product to the ultimate consumer. ICT firms must prioritize efficient supply chain management in order to optimize operational efficiency, reduce costs, and minimize environmental impact. The use of advanced information and communication technologies (ICT) has revolutionized supply chain management (SCM) techniques by enabling immediate data sharing, promoting greater collaboration, and improving decision-making processes.

The importance of Supply Chain Management (SCM) in the Information and Communication Technology (ICT) industry cannot be emphasized enough. The ICT sector is known for its dynamic nature, fueled by rapid technology advancements and intense rivalry. An efficient supply chain management (SCM) is essential for maintaining a competitive edge, guaranteeing timely delivery of products, and meeting the expectations of consumers. By incorporating Information and Communication Technology (ICT) into Supply Chain Management (SCM) procedures, it becomes possible to achieve more effective surveillance of goods, improved control over inventories, and a heightened capacity to meet market requirements. Supply chain financing [16] is essential for enhancing industrial efficiency and promoting innovation in the ICT sector.

An important advantage of integrating ICT into SCM is the ability to share real-time data across the whole supply chain. This promotes improved clarity and openness, allowing stakeholders to closely oversee inventory levels, track shipments, and promptly resolve any issues. ICT technologies [17] are closely linked to enhanced SCM performance by facilitating efficient information exchange and collaboration among supply chain participants.

In addition, information and communication technology (ICT) solutions such as enterprise resource planning (ERP) systems, electronic data exchange (EDI), and cloud-based platforms facilitate enhanced collaboration among suppliers, manufacturers, and distributors. These technologies enhance seamless communication and collaboration, leading to enhanced planning, reduced lead times, and heightened customer satisfaction. The pharmaceutical sector in Jordan [18] exemplifies the importance of strategic supplier relationships and customer contacts, supported by information and communication technology (ICT), in advancing sustainable supply chain management (SCM).

Efficiently managing inventory is a crucial factor in reducing costs and minimizing waste throughout the supply chain. Information and Communication Technology (ICT) solutions, such as automated inventory tracking, demand forecasting, and just-in-time (JIT) inventory systems, improve inventory management by optimizing inventory levels and reducing the risk of stockouts or excessive inventory. The implementation of these technologies in Flextronics Limited, Singapore, resulted in enhanced efficiency and rapid distribution of company data [19].

Advanced information and communication technology (ICT) systems also enable the improvement of supply chain efficiency by utilizing data analytics, machine learning, and artificial intelligence. These technologies have the capability to analyze large quantities of data in order to identify patterns, predict demand, and improve the effectiveness of logistics and distribution networks. By implementing these strategies, ICT enterprises can enhance operational efficiency, decrease costs, and optimize the overall performance of their supply chain.

Nevertheless, the integration of ICT in supply chain management also poses several obstacles. The initial costs associated with implementing advanced ICT solutions can be substantial, including expenditures on hardware, software, and training. Small businesses with little financial resources may perceive this as a hindrance. Concerns regarding data security also emerge when the utilization of digital technologies and the transmission of data within the supply chain increase. Information and Communication Technology (ICT) companies encounter the crucial task of protecting confidential data from cyber risks.

Resistance to change is a significant obstacle, as the adoption of new technology typically requires a fundamental

shift in the culture and operational methods of a company. Employees' and stakeholders' resistance to adopting new processes can hinder the effective use of ICT in supply chain management. Furthermore, the task of guaranteeing the compatibility and smooth incorporation of various information and communication technology (ICT) systems and platforms used by different collaborators throughout the supply chain can be intricate and challenging.

Although there are difficulties, the benefits of integrating ICT in SCM are significant. Integrating ICT to automate and optimize supply chain activities leads to increased efficiency, reduced operational costs, and improved resource utilization. Organizations may make educated decisions and quickly respond to market changes and reduce risks by utilizing current data and advanced analytics.

Improved customer happiness is attained by enhancing visibility, ensuring timely delivery, and optimizing communication, leading to higher levels of satisfaction and more robust customer connections. Furthermore, ICT technologies enhance environmental sustainability through the optimization of resource allocation, waste reduction, and the reduction of the ecological impact of logistics and distribution in supply chain operations.

III. Challenges in Implementing Science-Based Targets

Organizations in the ICT industry face many problems when using Science-Based Targets (SBTs) to achieve their carbon reduction goals. The problems include those related to Scope 3 emissions, data accuracy, financial and technological barriers, legal and market uncertainties, and organizational changes.

One of the major challenges is effectively managing Scope 3 emissions, which encompass the indirect emissions generated by a company's supply chain and the use of its products. Measuring and reducing these emissions can be complex because ICT supply chains are extensive and global in scope. An essential obstacle in digital governance is the requirement to exhibit value and obtain active participation and support from the industry [20]. It is essential yet difficult to include suppliers and customers in emission reduction measures in the ICT sector. Effective monitoring and management of emissions necessitates tight collaboration between companies and their supply chain partners. This requires the establishment of strong data collection and reporting mechanisms.

Accurate data collecting is another crucial factor. Precise and thorough data on greenhouse gas emissions is crucial for setting feasible and achievable Science-Based Targets. Nevertheless, numerous ICT companies face difficulties in collecting and reporting data, specifically when it comes to Scope 3 emissions. This problem is worsened by the absence of clearly established protocols and the intricate nature of overseeing emissions across worldwide supply networks. Insufficient infrastructure [21] and restricted internet access can hinder the smooth incorporation of ICT, especially in terms of efficiently monitoring emissions data. In order to enhance the precision of data, it is imperative to allocate resources towards sophisticated data collection and administration systems, as well as to develop standardized criteria for reporting emissions across the sector.

Financial and technological barriers are also major factors that hinder the implementation of SBTs. Small and medium-sized enterprises (SMEs), specifically, may have significant initial expenses when implementing new technology and methods to reduce emissions. Moreover, the incorporation of innovative technology into current systems can pose technical difficulties. The automobile industry revealed a significant positive link between information and communication technology (ICT) practices and improved performance in supply chain management. Nevertheless, their influence on operational performance is somewhat less substantial. This implies that the financial and technical investments needed may not result in immediate operational advantages, which makes it harder for corporations to justify the spending.

The execution of Science-Based Targets is made more complex by the presence of regulatory and commercial uncertainty. International ICT firms face issues in ensuring compliance with varying carbon emissions requirements and policies across different locations. In addition, the variability of market conditions, such as unpredictable energy prices and changes in consumer demand, might impact the attainability of long-term emission reduction objectives. Charalabidis and Lachana (2020) highlight the crucial importance of a supporting regulatory framework in unlocking the complete capabilities of digital governance and urge the necessity for collaborative endeavors among stakeholders.

Organizational change is a crucial element. Integrating Strategic Business Technologies (SBTs) into corporate strategy necessitates significant commitment from the company and may entail adjustments in business models, processes, and culture. Personnel and stakeholders may impede the successful deployment of SBTs due to their aversion to change. Integrating ICT into biology education presents several hurdles, including significant obstacles such as resistance to change and the requirement for sufficient training [22]. Similarly, in the ICT industry, it is crucial for firms to dedicate resources towards training and capacity-building initiatives to ensure that workers have the essential skills and expertise to allow the successful deployment of SBTs.

Ultimately, the implementation of Science-Based Targets in the ICT sector is crucial for mitigating carbon emissions and advancing sustainability. However, this endeavor is not without its difficulties. To meet their carbon reduction targets, enterprises must take crucial actions such as addressing Scope 3 emissions, assuring data accuracy, overcoming financial and technological challenges, navigating regulatory and market uncertainty, and managing organizational transformation.

IV. Benefits of Science-Based Targets

ICT companies can gain numerous benefits by implementing Science-Based Targets (SBTs), including improved environmental performance, strengthened stakeholder relationships, and financial incentives. By setting and adhering to these objectives, companies align their actions with the objectives of the Paris Agreement, committing to significant reductions in greenhouse gas (GHG) emissions. The following sections explore the main benefits of SBTs in the ICT industry.

One of the primary advantages of utilizing SBTs is the enhancement of environmental efficiency. Companies frequently establish ambitious aims by pledging to reduce their emissions in accordance with the most up-to-date

climate knowledge. This commitment results in the implementation of energy-efficient technologies, the utilization of renewable energy sources, and the improvement of waste management practices. Companies that adopt Science-Based Targets (SBTs) have demonstrated an admirable capacity to efficiently manage their climate impacts [23], often achieving substantial advancements in the reduction of Scope 1 and 2 emissions.

Furthermore, strict compliance with regulations and norms is an essential advantage, in addition to the environmental benefits. ICT enterprises can gain a competitive advantage by matching their efforts to reduce emissions with scientifically established targets. This will help them remain ahead of regulatory requirements. As governments worldwide implement stricter environmental regulations to combat climate change, corporations who take proactive measures to develop and achieve Science-Based Targets (SBTs) showcase their adherence to these standards, potentially avoiding financial penalties and sanctions. Furthermore, these organizations are more equipped to fulfill upcoming legal mandates, as they have already executed multiple programs to decrease their carbon emissions.

From an economic standpoint, the creation and attainment of Science-Based Targets (SBTs) can yield significant and enduring financial advantages, notwithstanding the initial capital outlays involved. Implementing energy efficiency measures, such as optimizing energy usage and eliminating energy waste, along with incorporating renewable energy sources, frequently result in reduced operational expenses. Energy-efficient data centers consume less electricity, leading to reduced energy expenses. Companies that have made investments in renewable electricity have gained financial advantages by lowering expenses and safeguarding themselves against volatility in energy prices.

Moreover, incorporating Sustainable Business Practices (SBTs) improves a company's corporate image, establishing it as a leader in sustainability. Consumers, investors, and other stakeholders are placing greater significance on environmental responsibility and are more likely to support companies that show a dedication to decreasing their carbon footprint. A commendable sustainability profile has the potential to allure environmentally conscious customers and investors, hence enhancing market share and investment prospects. Companies that have a positive previous reputation for successfully handling climate-related effects are more inclined to adopt Science-Based Targets (SBTs).

Implementing ambitious Science-Based Targets (SBTs) also cultivates a culture of innovation within companies. In order to accomplish these goals, ICT companies must create and implement innovative technologies, processes, and business tactics. The focus on innovation can result in the development of cutting-edge products and services, giving a competitive advantage in the market. Companies that demonstrate exceptional performance in sustainability are frequently seen as pioneers in their sector, establishing new patterns and influencing market standards.

Furthermore, science-driven objectives lead to the improvement of interactions with many stakeholders, such as employees, consumers, investors, and regulators. Publicly revealing and measuring tangible advancements towards Science-Based Targets (SBTs) demonstrate a company's commitment to sustainability, fostering trust and dependability. Engaging employees in sustainability initiatives can boost morale and productivity, as they feel a sense of pride in being associated with a company that prioritizes environmental stewardship.

ICT companies contribute to global efforts to restrict temperature rise to below 2°C over pre-industrial levels, as outlined in the Paris Agreement, by adopting SBTs. Collective action is crucial for alleviating the most severe repercussions of climate change and guaranteeing a sustainable future for everyone. The extensive use of SBTs by companies in various sectors can accelerate systemic change and motivate other businesses to do the same.

Furthermore, the implementation of SBTs improves operational efficiency by motivating firms to optimize their operations and reduce inefficiencies. By implementing energy efficiency measures, waste reduction initiatives, and utilizing renewable energy sources, significant financial savings can be achieved. Companies can mitigate operational inefficiencies by emphasizing the reduction of their carbon footprint. Improving operational efficiency can maximize value creation and profitability by decreasing the amount of resources used [24]. This all-encompassing strategy for enhancing productivity not only has positive effects on the environment but also enhances the company's financial performance.

Ultimately, embracing SBTs creates opportunities for business expansion and market growth. Organizations have the potential to take advantage of growing market possibilities and position themselves as frontrunners in sustainability. Consumers and businesses are placing greater importance on environmental responsibility when choosing products and services. Companies that possess strong sustainability credentials have the ability to attract environmentally conscious customers and investors, which can result in an increase in market share and investment. The implementation of Science-Based Targets (SBTs) is linked to heightened endeavors to tackle climate change, leading to market differentiation and a competitive edge. Moreover, businesses that effectively attain their Science-Based Targets (SBTs) can utilize their achievements to gain entry into untapped areas and establish partnerships with other entities that emphasize sustainability.

V. CONCLUSION

It is crucial to adopt Science-Based Targets (SBTs) in the ICT sector to address the industry's substantial environmental footprint. ICT firms may greatly decrease their carbon footprint by using measures such as material efficiency, green computing, adopting renewable energy, and managing their supply chain. To successfully design and achieve Science-Based Targets (SBTs), it is crucial to tackle various issues. These challenges include effectively managing Scope 3 emissions, assuring the accuracy of data, overcoming financial and technological obstacles, navigating uncertainties in regulations, and driving organizational change. These challenges require strong and coordinated efforts.

SBTs offer advantages that go beyond just environmental performance. These benefits include adherence to regulations, cost savings, improved company image, increased operational efficiency, innovation, market prospects, and better relationships with stakeholders. By

aligning their operations with global climate targets, ICT firms not only help reduce greenhouse gas emissions but also enhance long-term corporate success and resilience. The extensive implementation of Sustainable Business Technologies (SBTs) in the Information and Communication Technology (ICT) sector will have a vital impact on attaining a sustainable and environmentally friendly future, establishing a model for other industries to emulate.

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