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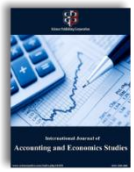

Sustainable Taxation and The Challenges of Achieving Sustainable Development in Developing Countries

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Abstract

This paper explored how modern tax theory conceptualizes the role of taxation in achieving sustainable development through a critical analysis of contemporary tax frameworks, which have remained the subject of considerable academic and policy debate. The paper highlighted the limited capacity of existing sustainable tax systems to make a meaningful contribution to sustainable development initiatives. It also analyzed the problems and challenges confronting tax systems in developing countries, which create additional obstacles beyond those experienced by developed nations.

The paper further examined the specific difficulties that developing countries have encountered in aligning their tax systems with the Sustainable Development Goals. These nations not only shared common global challenges but also grappled with additional, localized obstacles rooted in economic, social, and environmental instability. In response, the paper proposes Voluntary Sustainability Taxes (VSTs) as a potential mechanism for addressing the key barriers that impede sustainable development, particularly within the context of developing economies.

Recognizing the complex crises that had affected these nations, the study argued for the diversification of tax structures to include nontraditional, incentive-based tools. It concluded by analyzing the theoretical and practical justifications for adopting VSTs and evaluating their potential to enhance the responsiveness of tax systems to the imperatives of sustainable development.

Keywords: *Sustainable Taxation Systems; Sustainable Development; Voluntary Sustainability Tax (VSTs); Developing Countries.*

1. Introduction

Some scholars argue that achieving sustainability under modern tax theory remains highly controversial, due to its limitations and potential adverse effects. Concerns persist regarding its effectiveness in fulfilling broader sustainability objectives, as well as the potential for adverse consequences for individuals and the economy (Zotkaj & Aliu, 2024; Apriliani et al., 2024). At the implementation level, sustainable tax systems face significant challenges related to the complexity of design, execution, data collection, analysis, and enforcement mechanisms. Moreover, the concept of sustainable taxation remains largely ambiguous, involves inherent ethical risks, and poses potential threats to both policymakers and taxpayers (Kalendiene & Pukeliene, 2011; Gribnau, 2025).

Sustainability in the tax systems of developing countries has not received sufficient attention. Many tax systems in developing countries still lack the capacity to influence sustainable development programs effectively (Mohamad et al., 2025). This is especially concerning given that the world as a whole—and developing nations in particular—suffers from high levels of pollution, which have reached critical levels in some areas, especially in parts of the developing world (World Health Organization [WHO], 2024), in addition to ongoing economic crises, widespread poverty, rising unemployment, and related social and environmental challenges (International Monetary Fund [IMF], 2025).

This paper focuses on clarifying the scientific and practical foundations of modern tax theory in relation to sustainable development, examining the reasons and challenges that prevent current tax systems from effectively achieving sustainability. The paper also provides a framework for exploring and evaluating the contemporary challenges faced by tax institutions in developing countries, in particular, where these issues are often more visible and acute than in developed nations. The scale and impact of social, economic, and environmental harm are likely to shape both the content and the outcomes of tax policy and practice. In turn, the structure of tax rules directly affects the organization and implementation of tax systems.

Within this context of environmental crises, fiscal pressures, and limited policy options, the paper proposes a framework for the concept of VST—an approach grounded in the essential principles of modern tax theory that highlights the role of taxation in curbing harmful behaviors across social, economic, and environmental domains, thereby contributing to sustainable development. This concept is based on the freedom to choose whether to adopt a particular good, service, or behavior that the government promotes in support of sustainability

objectives. As an alternative, a modest tax is imposed, and its revenues are redistributed to new adopters of the targeted good, service, or behavior that the government aims to scale and normalize. This tax is entirely voluntary and is designed for urgent sustainability purposes, targeting the promotion and adoption of specific goods, services, or behaviors deemed crucial by policymakers to support various dimensions of sustainable development.

The study also explores and analyzes the organizational structures and methods for implementing VSTs, as well as their potential contribution to supporting sustainable development. In its final sections, the paper assesses how VSTs can help address and mitigate the key challenges and structural barriers that tax systems face in developing countries, thereby advancing sustainable development agendas.

Therefore, the research aims to clarify the causes behind the underperformance of sustainability-driven tax systems and to articulate the theoretical and practical foundations of VST, as well as its role in enhancing and supporting sustainable development. This comprehensive and in-depth study offers new insights into existing challenges and available opportunities. Through a broader and deeper understanding, the paper seeks to guide the development of targeted and strategic tax policy frameworks that align with sustainability goals. Paying attention to sustainable taxation is essential for understanding the role of tax institutions in society and for evaluating their capacity to support sustainable development.

Sustainability-based tax systems derive their significance from the far-reaching social, economic, and environmental consequences they produce—not only through their direct effects on community development but also through the broader expansion and legitimacy of tax institutions, the acceptance and trust of taxpayers, and their foundational role in social, economic, and environmental governance.

This paper is structured into seven main sections. The first section provides a framework for the relationship between taxation and sustainable development through the lens of modern tax theory. The second section addresses the significant theoretical challenges confronting modern tax theory in understanding this relationship. The third section examines the specific challenges that tax systems face—particularly in developing countries—in achieving sustainable development. The fourth section presents a conceptual framework for VST and its role in promoting sustainable development. The fifth section outlines the regulatory and organizational dimensions of this tax model. The sixth section examines the justifications for implementing VST and its role in advancing sustainability programs. Finally, the seventh section discusses how this form of taxation interacts with the challenges facing tax systems in developing countries as they strive for sustainable development.

2. Modern Tax Theory and Sustainable Development

Modern tax theory emphasizes the central role of taxation in advancing the objectives of sustainable development. Sustainable tax policies aim to integrate environmental and social considerations into the tax system, promote responsible practices, and enhance long-term economic well-being (Zotkaj & Aliu, 2024). Within this framework, the tax system is viewed as a critical instrument for supporting sustainable development and maintaining the foundational pillars of a country in a manner that meets the needs of the present generation without compromising the capacity of future generations to meet their own needs (Apriliani et al., 2024). This perspective aligns with the core of sustainable development theory, which aims to strike a balance between economic growth, social progress, and environmental protection to ensure a sustainable future for all (Ozili, 2025).

The key principles of the theory are based on the concept of intergenerational equity, which emphasizes that current actions should not diminish the well-being or resource availability for future generations. Additionally, the theory emphasizes pillar integration, acknowledging the interconnectedness of economic, social, and environmental systems, asserting that a truly sustainable approach must account for all three when formulating policy (Schmiel, 2023; Kotlán et al., 2021).

Schratzenstaller (2015) introduces the concept of tax sustainability in alignment with the definition of sustainable development from "Our Common Future". He classifies sustainable tax systems into three types: socially sustainable, economically sustainable, and environmentally sustainable tax systems. A socially sustainable tax system seeks to reduce income and wealth inequality, thereby fostering equal opportunities. A financially sustainable system generates sufficient revenues to fund public activities effectively and efficiently. An environmentally sustainable tax system discourages production and consumption practices that degrade natural ecosystems or worsen climate conditions (IMF, 2025).

Nerudová et al. (2019), as part of the “FairTax” project, propose a theoretical model for sustainable tax systems based on the capacity of fiscal policy to generate adequate revenues to meet social spending needs and financial obligations. A tax system is considered sustainable if it fulfills present economic needs without impairing the long-term functioning of the economy. In this context, tax policy, legislative tools, and fiscal measures contribute to sustainable development across four key dimensions (Apriliani et al., 2024).

- Economic (e.g., innovation, knowledge-based growth, productivity, sustainable consumption and investment, debt sustainability);
- Social (e.g., employment, social cohesion, demographic development);
- Environmental (e.g., greenhouse gas emissions, green innovation, renewable energy, waste management); and
- Institutional (e.g., efficient tax collection, compliance costs, tax morale).

An institutionally sustainable tax system has a direct impact on social, economic, and environmental sustainability through the structural elements that govern the tax system's performance. The effectiveness of tax collection, the administrative burden of compliance, and the structure of tax incentives are fundamental institutional components that shape public trust and taxpayer behavior (Pirlot, 2019).

Kotlán et al. (2021) argue that sustainability taxation is grounded in the principle of collecting sufficient revenue to support the public goods and services that society demands. Similarly, the IMF (2025) highlights the extent to which tax policy design can contribute to advancing the Sustainable Development Goals. Sustainable tax systems are those that offer coherent solutions across economic, environmental, and social pillars without distorting sustainable economic behavior (Van de Vijver et al., 2020).

Several international organizations, including the United Nations, the OECD, the European Union, the UN Principles for Responsible Investment, the Global Reporting Initiative, and the World Economic Forum, recognize the vital role of taxation in promoting sustainable development (UN ESCAP, 2018). At its first global conference, Taxes and the Sustainable Development Goals, held in New York in 2018, the Platform for Collaboration on Tax (PCT) identified four key connections between taxation and the SDGs. Two of these emphasize taxation as (1) a primary source of government financing for sustainability programs and (2) a powerful tool that influences individual behavior and choices. These impacts only materialize when tax revenues are purposefully allocated to fund sustainable development goals or when tax policies are deliberately aligned with these goals (IMF, 2011). Accordingly, the most direct and tangible link between taxation and the SDGs lies in its capacity to mobilize domestic resources for financing these objectives (Ng, 2024).

Governments use several fiscal strategies to support sustainable development initiatives. These include imposing higher tax rates on polluting activities, levying fees for environmental services, and offering tax incentives or exemptions to promote the adoption of environmentally friendly technologies. Taxation and tax reform are increasingly recognized as cost-effective tools for transitioning toward

sustainable economies. Taxes serve as both regulatory instruments and incentives for the development and diffusion of clean technologies (Mohamad et al., 2025).

In the environmental sphere, sustainable environmental taxes target polluters whose economic activities cause ecological harm, either through their products or production processes. The tax rates are often calculated based on estimates of the quantity and severity of pollutants (Musawi & Salmi, 2017). Tax incentives and exemptions are also used to encourage investment in environmentally responsible industries or activities; these may be temporary or permanent (OECD, 2008; Kamal, 2022).

Several arguments support modern sustainability-oriented tax theory, particularly its function as a behavioral tool. Taxes can incentivize sustainable behaviors, such as investment in renewable energy or environmentally conscious practices, while discouraging harmful actions like pollution or resource depletion (Sugihyanty et al., 2024). Mashood (2024) underscores the importance of generating reliable revenue streams to fund sustainability efforts, noting that taxation provides the fiscal foundation for public services and programs that promote sustainable development, including environmental protection, social welfare, and infrastructure development.

Drywa (2024) notes that sustainable tax policies can also promote social justice and redistribution, thereby contributing to the development of more inclusive and equitable societies. Ajeigbe et al. (2023) highlight the alignment between modern tax theory and the United Nations Sustainable Development Goals (SDGs), suggesting that such alignment can contribute to achieving climate action, environmental protection, social well-being, and economic growth. Achieving this alignment requires strengthening tax systems to raise more domestic revenue for the government's sustainability contributions, supported by transparent, accountable, and effective institutions at all levels (Deschutter, 2018).

A wide range of empirical studies affirms the role of tax revenue in fostering sustainable development—particularly in financing the SDGs (Augustine, 2022; Halima & Rahman, 2022; Sealkopf & Bastiaens, 2020; Sarka & Ibrahim, 2019). Tax revenue is directly connected to all SDGs as a fundamental source of financing. Moreover, taxes can influence individual behavior and decision-making, producing broader health, social equity, and environmental benefits (PCT, 2018). For example, taxing harmful or unhealthy products such as alcohol, tobacco, or sugary beverages can reduce consumption, improve public health, and generate public revenue that supports sustainable economic development. Additionally, the redistributive effects of taxation can help reduce income and wealth inequality (Tamarappoo et al., 2016).

Moosavian et al. (2022) find that energy consumption taxes combined with incentives for research and development reduce fossil fuel use and air pollution, thereby promoting environmental goals. Increased tax revenue also enables higher public spending in critical SDG-related areas such as health, education, and social protection. According to a study by the U.S. Agency for International Development, a 10% increase in tax revenue correlates with increases in public health spending of 17% in low-income countries, 14% in lower-middle-income countries, and 3% in upper-middle-income countries (Tamarappoo et al., 2016). Gadenne (2016) also demonstrates that increased tax revenue enhances both the quantity and quality of educational infrastructure.

3. Taxation and The Challenges of Achieving Sustainable Development

Sustainable development is widely regarded as a vision for progress; however, despite its conceptual clarity, its practical realization faces formidable obstacles, rendering its genuine achievement highly challenging (Ajeigbe et al., 2023; Apriliani et al., 2024). Numerous studies affirm that the concept of sustainability within modern tax theory remains contentious (Stancil, 2010; Donald, 2018; Zotkaj & Aliu, 2024; Schmiel, 2023). Critics highlight its limitations and potential adverse effects, expressing ongoing concerns about its effectiveness in achieving broader sustainability goals and its possible negative impacts on individuals and the economy (Sugihyanty et al., 2024). Carnahan (2015) suggests that tax policies may unintentionally lead to detrimental outcomes, such as increased business costs, reduced investment, or unintended job losses—factors that may undermine sustainability efforts. These dynamics make the path toward sustainability complex and resource-intensive, requiring substantial expertise.

Kaleendiene & Pukeliene (2011) emphasize that tax policy alone is insufficient to meet sustainability objectives. Complementary measures—such as technological innovation, regulatory reforms, and behavioral change—are essential. Mohamad et al. (2025) argue that the difficulty of achieving sustainable development stems not from isolated challenges but from systemic contradictions embedded in dominant models of modernity and global political economy. These contradictions reflect the broader struggle to mitigate pervasive pollution and reconcile the logic of capital accumulation with the complex social and cultural values that shape human behavior. The entrenched prioritization of economic expansion over environmental integrity constitutes a fundamental barrier to genuine sustainability (Avi-Yonah, 2000; De Oliveira et al., 2023).

Another crucial dimension involves consumer culture and societal values. De Oliveira et al. (2023) observe that modern societies—particularly in developed countries—are characterized by consumerism: a cultural and economic system that promotes the acquisition of goods and services as primary sources of happiness and social status. This consumerist mindset promotes unsustainable consumption patterns, resulting in substantial amounts of waste and pollution.

Furthermore, deeply rooted values such as individualism and materialism frequently undermine the collective action and environmental consciousness essential to sustainable development. Transforming these cultural values and ingrained consumption habits requires radical shifts in education, media, and social norms. This immense challenge may necessitate systemic transformation, including the adoption of alternative economic models and fundamental changes in power structures (Long & Miller, 2017).

In contrast, some scholars adopt a more optimistic perspective, arguing that sustainable development can be realized within a reformed capitalist framework through strategic policy interventions, technological innovation, and shifts in consumer behavior. They emphasize the potential of market-based mechanisms, green technologies, and corporate social responsibility to drive progress toward sustainability (Harvard Business Review, 2025). Nonetheless, even within this more hopeful paradigm, there is widespread recognition of the need for deep transformations in economic practices, governance structures, and societal values—those shared principles that guide behavior toward the common good (Drywa, 2024).

Tax literature seldom treats sustainability as a framework for meeting the present generation's economic, social, and environmental needs alongside those of future generations. While concepts such as "fair taxation" and "tax equity" are frequently addressed, the dimensions of sustainability often remain underexplored. From an economic perspective, one of the key challenges is securing long-term financing, especially amid heightened international capital mobility, aging populations, ongoing financial system instability, labor market weaknesses, and high unemployment rates (Kalendiene & Pukeliene, 2011). From a social and cultural standpoint, inequality represents a pervasive challenge across numerous countries (Donald, 2018; Kotlán et al., 2021).

Allocating tax revenues to support Sustainable Development Goals (SDGs) while overlooking other essential public expenditure areas underscores the potential for SDGs to reshape how tax revenues are utilized. SDGs also influence the design, implementation, and interpretation of tax policy (Pirlot, 2020), as well as the decision-making processes of tax policymakers (Deschutter, 2018). Tax policy may be

considered aligned with SDGs when it targets those goals, even if other economic dimensions are sidelined (Pirlot, 2019). The effectiveness of sustainable taxes hinges on how revenues are utilized—if poorly recycled, their economic consequences may worsen. The "double dividend" dilemma arises when attempting to achieve both environmental improvements and increased revenue simultaneously—a difficult balance to strike. Continuous monitoring and evaluation of sustainable tax policies are crucial for assessing their effectiveness and making necessary adjustments (Mohamad et al., 2025).

The use of taxation to support SDGs may entail considerable risk. For instance, tax incentives may generate revenue losses that outweigh their benefits. Misuse of tax exemptions can also impair revenue generation. Tax measures may become regressive rather than progressive, exacerbating inequality. Policies that reduce capital gains taxes to attract investment may also exacerbate inequality, as capital investment is often concentrated among the wealthy, thus rendering the tax system regressive (IMF, 2025). Kouam and Asongu (2022) find that excessive taxation on businesses undermines the pursuit of SDGs, aligning with Laffer's (2004) assertion that excessive tax rates can ultimately reduce tax revenue. High tax burdens tend to lower compliance and encourage evasion, diminishing overall revenue. Excessive taxation may also drive businesses to relocate to jurisdictions with lower tax rates, hindering domestic investment and obstructing efforts to ensure decent work and sustained economic growth (Long & Miller, 2017; Ajeigbe et al., 2024).

Firdaus et al. (2024) highlight additional challenges in sustainable tax systems, including the politicization of tax policy. Governments often face difficult choices between increasing revenue and maintaining the scope and quality of public services. Many countries also lack the institutional capacity to implement effective and fair tax collection mechanisms, instead focusing narrowly on revenue generation without regard to appropriate methods. Despite partial reforms, many tax systems remain overly complex, inefficient, and burdened by harmful practices. To restore credibility and functionality, tax systems must prioritize both the reduction of dangerous goods and services and the promotion of beneficial ones, limit evasion, and maintain transparency and simplicity to ensure legitimacy and public acceptance (UNESCAP, 2018).

Mebratu (2024) argues that sustainable taxes are vulnerable, particularly in the short term, to regressive effects on low-income and marginalized groups. The complexity of designing and enforcing effective, sustainable tax policies, coupled with political resistance, hinders widespread adoption. Economically, these taxes may slow short-term growth—especially those targeting environmentally harmful activities, which increase costs for businesses and consumers. Taxes on energy or fuel, for example, disproportionately burden low-income households. Moreover, the revenue from such taxes can fluctuate with economic conditions and consumer behavior, complicating long-term fiscal planning (Mohamad et al., 2025).

Lawton (2024) further asserts that sustainable taxation faces opposition from powerful vested interests—particularly industries heavily affected by environmental taxes. International coordination poses another challenge, as global consensus on sustainability-oriented taxation remains fragmented due to divergent national priorities. Hongler et al. (2023) point to the "implementation gap" in sustainability governance. Despite the proliferation of international agreements and national policies, their practical implementation often lags due to weak institutional capacity, corruption, special-interest pressure, and a lack of political will. Establishing accountable, effective governance structures capable of guiding societies toward sustainability remains a central challenge—particularly in a world marked by diverse political systems and complex power dynamics (Musawi & Salmi, 2017).

While sustainable taxes hold promises for addressing environmental and social challenges, it is essential to recognize and address their potential weaknesses and implementation challenges to ensure their long-term contribution to sustainability without unintended adverse consequences. Tax systems can indeed serve as powerful tools for advancing the SDGs. Still, they must be carefully designed and integrated with broader policy measures to overcome societal dilemmas, systemic contradictions, and implementation barriers. This includes developing and deploying new technologies that aim to reduce environmental impact, enhance resource efficiency, promote community well-being, and drive policy reform.

4. Taxation and The Challenges of Achieving Sustainable Development in Developing Countries

The economic structures of developing countries reflect their unique social and political realities, which significantly influence the design and function of their tax systems. These structures determine the fiscal roles that tax systems perform based on each country's development stage (Kouam & Asongu, 2022). A key distinction lies in the predominance of indirect taxation, often considered more suitable for developing economies due to its alignment with their socio-economic conditions and its compatibility with fiscal policy objectives (Othman, 2000; Augustine et al., 2022).

In general, developing countries exhibit low national income and per capita income levels, which limit the effectiveness of direct taxation on income and wealth. Consequently, these nations rely heavily on indirect taxes to finance developmental efforts, control excessive consumption, and promote national savings. From a development economics perspective, indirect taxation serves to mobilize investment resources, absorb surplus purchasing power, and redirect consumption toward productive sectors. Governments, therefore, implement mechanisms to transfer resources and purchasing power from the private to the public sector and from consumer-oriented industries to those producing capital goods (Kamal, 2022).

Customs duties also play a pivotal role in the tax structures of developing countries, particularly due to their dependence on primary commodity exports. The economic reliance on a single export commodity often leads to a disproportionately high share of customs duties in total revenue. This form of taxation is flexible, as it adjusts with price fluctuations and can support industrial development by shielding domestic producers from foreign competition through selective exemptions (Tanzi & Zee, 2001).

However, tax collection remains a critical weakness. Many developing nations experience chronically low tax-to-GDP ratios, severely limiting their capacity for developmental financing. Establishing a robust and efficient tax system is essential for achieving inclusive and sustainable economic growth (Carnahan, 2015). An ideal approach involves increasing domestic revenue fairly while minimizing economic distortions. Yet, in many developing countries, tax policy objectives extend beyond revenue generation, leading to complex systems burdened by numerous incentives and exemptions intended to attract foreign investment (Amzuica & Mititelu, 2022).

The International Monetary Fund and World Bank regard domestic resource mobilization through taxation as the most underutilized funding source for development (Long & Miller, 2017). Achieving a tax-to-GDP ratio of at least 15% is crucial to ensure the provision of basic public services (Gaspar et al., 2016). Nevertheless, most developing countries remain below this threshold due to their reliance on volatile revenues from natural resources. In resource-rich economies, poor transparency and corruption often render these revenues unreliable for sustainable development financing (Ajeigbe et al., 2023).

Institutional weaknesses—such as limited administrative capacity, large informal economies, tax evasion, and base erosion—compound the challenges of implementing sustainable tax systems (Occhiali, 2024). In these contexts, tax policy often reflects pragmatic limitations rather than optimal theoretical frameworks (Mankiw et al., 2009). The informal sector, difficult to tax effectively, contributes to persistent

revenue shortfalls (Partap & Quintin, 2006). Furthermore, multinational corporations frequently engage in profit shifting and base erosion to reduce tax liabilities, depriving these countries of essential revenue (Mittra, 2024; Adeeb & Al Shujairi, 2025).

Generous tax incentives aimed at attracting investment often erode the tax base (Massadour, 2010). While foreign aid and grants provide supplementary funding, they cannot match the long-term revenue potential of well-structured taxation systems. Aid effectiveness is also hindered by governance weaknesses and corruption (Chukwuemeka et al., 2014; Pirlot, 2020).

Administrative deficiencies further obstruct effective taxation. Weak enforcement, inefficiency, and a lack of skilled personnel undermine tax compliance and equity (Kouam & Asongu, 2022). These conditions led the United Nations Financing for Development Task Force to advocate for institutional strengthening and knowledge transfer from developed to developing countries. Expanding the tax base, improving compliance, and reducing inflation are essential for poverty alleviation and inclusive growth (PCT, 2018; Carnahan, 2015).

Due to limited borrowing capacity and high debt-to-GDP ratios—often exceeding 70%—resource mobilization remains the only sustainable strategy for financing public investments (Amzuica & Mititelu, 2022). Moreover, environmental degradation presents a significant fiscal challenge. Low environmental performance scores, coupled with disproportionate impacts on marginalized populations, necessitate urgent implementation of ecological or "green" taxes (Hassan El-Sayed, 2024). However, fragmented institutional responsibilities over environmental revenues often lead to misaligned incentives and ineffective conservation efforts (Avi-Yonah, 2000).

Infrastructure limitations and technological dependence further hinder sustainable development. Many energies, transport, and industrial systems remain heavily reliant on fossil fuels. Transitioning to cleaner alternatives demands large-scale investments, innovation, and workforce development. These transformations are hampered by systemic inequalities that marginalize vulnerable communities and limit political will (Mohamad et al., 2025).

International cooperation is essential but complex. Developed countries—historically responsible for the bulk of environmental degradation—now expect developing nations to adopt sustainability commitments. This disparity exacerbates global tensions and complicates climate negotiations (Halima & Rahman, 2022). Genuine solutions require both financial and technological support, along with acknowledgment of diverse developmental trajectories and responsibilities (Occhiali, 2024).

Ultimately, entrenched economic models that prioritize short-term profitability over long-term welfare pose structural barriers to sustainable development. In developing countries, this challenge is intensified by weak infrastructure, political resistance, and the influence of polluting industries. Addressing these issues requires coordinated reforms, inclusive governance, and bold policy shifts that strike a balance between environmental, economic, and social priorities.

5. VSTs and Sustainable Development

This section introduces the concept of VSTs, grounded in sustainability principles, within the framework of modern tax theory. It emphasizes the role of taxes in encouraging sustainable behaviors and discouraging unsustainable activities. One of the key links between taxation and achieving sustainable development goals lies in the influence of taxes on individuals' behavior and choices (Avi-Yonah, 2006). Taxes can promote sustainable development in three distinct ways. First, they provide governments with revenues to pay for all types of public goods and services, thus serving as an essential tool for income and wealth redistribution. The third function, which is increasingly relevant, involves using taxes to encourage individuals and entities to behave in ways deemed desirable by the state while financially discouraging other types of behavior (Gribnau, 2019; Lawton, 2024). The concept of VST focuses precisely on this third function, employing an innovative approach that can stimulate relevant sustainable development programs.

The tax system is among the most vital instruments of economic and social policy, contributing to societal objectives, and serves as a means to address economic, social, and environmental challenges faced by any society, regardless of its financial or political system (Al-Hallaq & Al-Hardan, 2004). Governments cannot achieve sustainable development without the broad cooperation of society. Therefore, it is a shared responsibility that cannot be realized without cooperation among governments and other stakeholders to establish a sustainable tax system (Gribnau, 2025).

Taxation is a foremost policy tool to confront harmful economic, social, and environmental behaviors (Mashood, 2024). Taxes play two closely linked roles in the context of sustainable development. On the one hand, they are the primary source of state revenue used to fund development programs. On the other hand, taxes can serve as a political tool to steer societal and business conduct toward more sustainable practices (IMF, 2025). There is thus a need for an innovative tax type that aims to reduce certain harmful behaviors or encourage beneficial ones, without relying on general tax revenues to address these issues or resorting solely to incentives, tax exemptions, or legal mandates to curb harmful behaviors or promote beneficial ones.

This does not imply abandoning these traditional approaches; rather, VSTs complement them, especially when the risks associated with these behaviors increase. For example, encouraging drip irrigation to conserve scarce water resources, promoting clean energy to reduce pollution from fossil fuel use, supporting public transportation to reduce pollution and noise, and incentivizing the use of electric vehicles, among many other behaviors that have both economic and environmental impacts.

The principle underpinning the imposition of VSTs does not rest on the "polluter pays" principle derived from Pigouvian theory. Instead, a VST is a supportive and incentivizing tax for innovative behaviors, goods, or services that reduce harm compared to existing harmful alternatives—whether economic, social, or environmental. This tax operates on the principle that those who do not adopt the desirable behavior pay the tax. At the same time, adopters receive a tax return as a stimulus to embrace alternatives that cause no harm, thereby steering behavior away from damaging activities.

Achieving sustainable development goals often involves economically, socially, or environmentally incentivizing desirable behaviors by promoting widespread use of goods, services, or behaviors that support sustainability and reduce harmful or polluting behaviors. This aligns with the primary objective of policymakers to help the economy, enhance more productive technologies, and reduce pollution and energy consumption (Ng, 2024).

Piana (2008), the pioneer of this tax concept, emphasizes that this tax is low-cost for policymakers and does not abandon market logic. It leaves individuals free to decide, is simple in design, and distributes revenues to new users of the good, service, or behavior the government aims to expand. It is directly linked to sustainable development programs and goals. Importantly, it is voluntary—targeted individuals or entities choose between two alternatives: comply with the behavior or pay the tax. The concept draws on evolutionary economics, which provides a deep analysis of innovation and its diffusion. Psychologically, it relies on probability theory, which underscores the importance of clear reference points for decision-making, aiming to strongly incentivize the adoption of beneficial behavior or an alternative by taxing non-adopters to promote behavior change or reduce harmful conduct. This idea also supports social innovation (Schmiel, 2023).

Individuals or entities must decide between two options: non-adoption with payment of a fixed tax representing a small fraction of the cost of the behavior, or adoption with a reasonable price, or adoption and receipt of a substantial portion of the cost. Tax revenue is equally

distributed to new adopters who can prove their adoption within a specified timeframe. Adoption remains voluntary. The tax is imposed periodically multiple times until voluntary adoption is achieved. However, the tax revenues collected in each period are paid only once to the new adopters during that period.

The rationale is that the adoption burden (entirely or largely) is borne by non-adopters, who not only pay the tax but also do not receive the tax revenues or benefits of using the good or engaging in the behavior (Piana, 2008). This tax also alleviates government expenditure burdens on sustainable development projects, which often lack adequate funding and suffer from weak implementation, resulting in economic, social, or environmental risks.

Piana (2008) further notes that in the early phases of tax imposition, when adopters are few, tax revenues are very high, as nearly all targets remain non-adopters. Few adopters receive a significant sum, possibly covering the full cost, effectively resulting in free adoption.

Strong media coverage, funded from tax revenues as part of the program, should accompany the project to promote imitation in adoption. In subsequent periods, the tax is collected again from non-adopters as part of the cost, prompting further adoption to avoid paying. Early adopters continue to receive payments equal to the price because non-adopters remain the majority. Over time, as the number of adopters increases and the number of non-adopters declines, the payment amount for adopters decreases proportionally to the total tax revenue collected. If adoption is significantly delayed, the plan changes to offer revenues as loans to late adopters who commit to adopting. Repayment with interest is required if commitments are not fulfilled. Because few commit, loans approach the cost of goods. As non-adopters shrink, tax rates increase, raising revenues and encouraging faster joining. If non-adopters become a tiny minority, tax elimination or indefinite loan structuring may be considered.

The goal of the VST is to achieve rapid adoption and mitigate the accelerating harmful effects. The implicit assumption is that wealthier individuals can bear adoption costs but may delay due to cultural inertia. For example, taxing owners of high-pollution luxury vehicles while rewarding owners of environmentally friendly electric cars motivates individuals to sell their gasoline cars and purchase efficient electric vehicles, creating a financially neutral transition that benefits all.

Overall, the VST is highly flexible and applicable in many contexts, particularly when the broad dissemination of a technology or behavior is beneficial. Its main advantages include relying entirely on individuals' or entities' voluntary decisions, leaving people free to adopt or not; imposing tax burdens only on targeted non-adopters; accommodating widespread initial refusal that diminishes over time, especially if complementary tools (e.g., alternatives, materials, and supplies) are made widely accessible. The tax amount can be small in absolute terms or relative to the cost of the good or behavior. Vendors' responses improve if state incentives are provided, as they maintain stable net prices due to uncertain adopter numbers. Unlike direct incentives, which often result in higher vendor profits without price changes, this tax system maintains market stability (Mebratu, 2024).

In turn, the smoother dynamics fostered by VST support gradual improvements in innovation, such as solar panels becoming more efficient over time, as early production profits are reinvested in research and development, thereby fostering competition and providing consumers with time to compare various offerings.

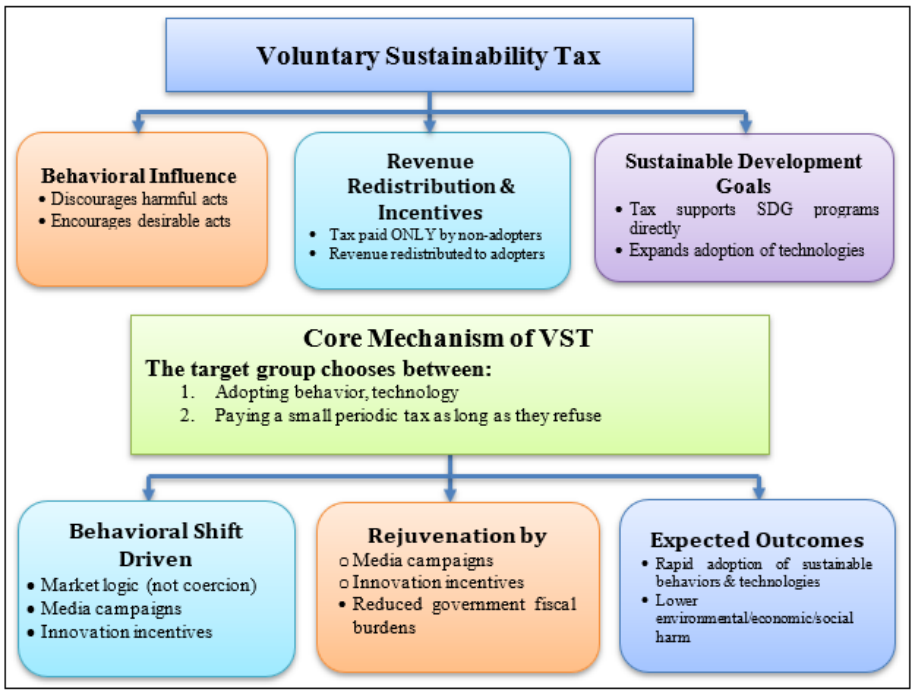

Fig. 1: VSTs: Concept and Mechanism.

1) Aviation and Travel Sector. This sector represents the most widespread application of voluntary sustainability contributions. Passengers may choose to pay an additional amount to compensate for emissions generated by their flights. During the ticket-booking process, they are typically presented with an "Add Carbon Offset" option, with the resulting funds allocated to reforestation or clean-energy projects (ATAG, 2023).
2) Tourism and Destination Management. Several countries and cities apply voluntary fees to support environmental conservation initiatives. These are often presented as "entry contributions" that visitors may voluntarily pay to support specific programs. For example, New Zealand implements the International Visitor Conservation and Tourism Levy (IVL), originally conceptualized as a voluntary contribution to conservation efforts (New Zealand Ministry for the Environment, 2020). Similarly, Venice, Italy, imposes an Access Fee to mitigate over-tourism. This fee can be avoided by visiting during non-peak hours, thus functioning as a behavioral steering instrument (OECD, 2024).
3) Voluntary Carbon Markets (VCM). Voluntary carbon markets enable companies and countries to purchase carbon credits to achieve net-zero commitments without regulatory obligation (World Bank, 2023). In Saudi Arabia, the Regional Voluntary Carbon Market

Company (RVCMC) was established to facilitate the voluntary acquisition of carbon credits by major firms, such as Aramco and the Saudi Electricity Company. Singapore also operates Climate Impact X, a carbon-credit exchange platform that allows firms to purchase offsets as a voluntary sustainable contribution.

4) Retail and Consumer Goods (Avoidable Taxes). This domain reflects a pure "Pay or Avoid" model, closely resembling an avoidable tax. Examples include the Plastic Bag Levy and the Latte Levy on disposable cups. Countries such as Ireland, the United Kingdom, and South Africa are global leaders in implementing these mechanisms. Consumers may either adopt sustainable behaviors, such as using reusable bags, or pay a small surcharge. These policies have led to a reduction of more than 90% in plastic bag usage (IEA, 2022).
5) Internal Carbon Pricing (ICP) within Corporations. Many multinational corporations apply internal carbon fees to their business units, using the generated revenues to finance sustainability initiatives. Microsoft and Disney are notable adopters of such models, which are considered voluntary because they are not mandated by government regulation.

Table 1: Summary of Global Applications

Sector	Country / Example	Mechanism	Objective
Tourism	Palau	Behavioral pledge	Marine and reef conservation
Aviation	Germany (Lufthansa)	Voluntary offset	SAF funding & afforestation
Financial Markets	Saudi Arabia (RVCMC)	Voluntary carbon market	Climate projects in MENA
Consumption	Ireland (Plastic Tax)	Avoidable levy	Eliminating plastic waste
Corporations	USA (Microsoft)	Internal carbon pricing	Funding internal green innovation

Other key areas of application include the following:

1) Electric Vehicles (EVs). France implements the Bonus–Malus System to reallocate revenue within the automobile market, consistent with the "Polluter Pays for the Sustainable User" principle. Purchasers of high-emission vehicles pay a malus surcharge, and the resulting revenues finance bonus grants ranging from EUR 4,000 to 7,000 for EV buyers. The malus increases exponentially with CO_2 emissions and, in the case of luxury SUVs, can exceed EUR 60,000.

Financial flow logic: Polluting SUV buyer → Government transition fund → EV buyer.

In the United Kingdom, London implements Ultra-Low Emission Zone (ULEZ) Charges. A daily charge of £12.50 is imposed on non-compliant vehicles entering the city center. Drivers may choose to (a) continue driving and pay the fee or (b) adopt cleaner behavior by switching to EVs or using public transport. Generated revenues are reinvested in improving public transport infrastructure (European Commission, 2023).

2) Climate Change and the Industrial Sector. The European Union Emissions Trading System (ETS) establishes a progressively declining Emissions Cap. Firms that exceed their allocated emissions must purchase additional allowances, whereas low-emission firms with surplus permits may sell them (European Commission, 2023).
3) Financial flow: Inefficient firm (payer) → Carbon market → Efficient firm (seller).
4) Switzerland imposes a levy on fossil heating fuels of approximately CHF 120 per ton of CO_2. Two-thirds of the collected revenue is redistributed to residents through health-insurance bill credits, while the remaining one-third finances green building retrofits.
5) Effect: Heavy polluters incur a net financial loss, while low emitters experience a net fiscal gain (Torné & Trutnevyte, 2024). Italy employs a White Certificates system in which energy distributors are required to meet annual efficiency targets. Companies that exceed these targets earn white certificates that can be sold to under-performing firms, transferring funds from non-compliant to compliant actors (IEA, 2023).

Table 2: Financial Flow

System	Payer	Conversion Mechanism	Receiver
Bonus-Malus (France)	Polluting vehicle buyers	Government transition fund	EV buyers
Cap-and-Trade	Firms exceeding emission limits	Carbon market	Low-emission firms
Carbon Dividend (Switzerland)	Fossil-fuel users	Redistribution and grants	Citizens + building-retrofit programs

A VST may face criticism for being redistributive, from the poor to the rich. To address this, people with low incomes can access loans to adopt the good and receive tax revenue shares (Piana, 2008). This approach opens up adoption opportunities even to those who are unable to afford it. A more significant environmental critique is that this tax incentivizes purchasing rather than promoting a better quality of life. It assumes people have needs, and specific technologies are necessary to fulfill them. The tax thus encourages people to adopt environmentally friendlier technologies. If one can define "correct environmental behavior," the tax could be oriented to support those who pursue it, not necessarily through owning or using specific technologies (Sugihyanty et al., 2024; Van de Vijver et al., 2020).

Previous studies agree that voluntary taxes face two major economic challenges: the free-rider problem and regressive risks, both of which limit their effectiveness as a substitute for mandatory taxation (Nguyen, 2022; Usen, 2025). The free-rider problem represents the most significant economic challenge confronting any voluntary financing mechanism for public or quasi-public goods. This issue arises when individuals or entities benefit from a public good or service without contributing to the cost of producing or maintaining it (Chin, 2021). As a result, a rational economic agent is incentivized to "free-ride," recognizing that they can benefit from sustainability projects—such as cleaner environments or improved infrastructure—financed by others without incurring any cost. When many individuals adopt this behavior, total voluntary contributions fall far below the optimal level required for efficient financing, resulting in the under-provision of the public good (Lipi et al., 2024).

This problem stems from the inherent characteristics of public goods, specifically non-excludability, which makes it difficult or impossible to prevent non-payers from benefiting from the good—such as clean air or national security—as well as non-rivalry, meaning that one individual's consumption does not reduce its availability to others.

Recent studies on voluntary contributions show that even when ethical or social motivations exist, individuals contribute at levels substantially lower than the efficient optimum. Research on voluntary tax compliance similarly indicates that tax evasion is fundamentally a free-rider problem, where individuals seek to benefit from public services without paying their fair share. Consequently, evidence shows that voluntary mechanisms often generate insufficient funding, necessitating strong coordination mechanisms—such as incentives or social pressures—to address this shortfall. Non-tax mechanisms must therefore be integrated to mitigate the free-rider problem (Usen, 2025). These include partial exclusion mechanisms that transform the public good into a club good by introducing forms of restriction or exclusivity (e.g., sustainability certificates or labels for voluntary contributors, or competitive advantages granted to them). Indirect incentives

may also be used, such as offering mandatory tax benefits—including deductions or exemptions—to voluntary contributors, thereby linking voluntary participation to guaranteed financial advantages. Additionally, social-pressure or information-based mechanisms may be employed, such as publicly disclosing contributors ("naming and shaming") to reinforce social norms and enhance transparency (Chari & Jones, 2000).

Regressive risks constitute another main challenge in the design of environmental taxes and have become even more pronounced in voluntary mechanisms. Regressivity in voluntary taxation arises from reliance on goodwill, as voluntary taxes often depend on altruism or corporate social responsibility (Mebratu, 2024). The actual tax incidence also plays a critical role. Individuals and medium-income firms may participate voluntarily due to ethical motivations and social pressures, while wealthy individuals or large corporations may be less inclined to contribute in the absence of legal obligations. As a result, the tax base becomes weak. Because contributions are not mandatory, they do not include all individuals according to their ability to pay, thereby violating the principles of horizontal and vertical equity. This implies that less affluent individuals may end up financing a disproportionate share of the total cost, making the tax burden regressive in its overall effect on income distribution.

Carbon taxes and other environmental taxes are often described as regressive because they represent a higher proportion of income for low-income households, who allocate a larger share of their income to essential energy consumption. However, this assumption may be less applicable in developing countries, where fossil fuel and electricity consumption are often concentrated among wealthier households. To mitigate regressive risks, voluntary contribution schemes can be designed as a percentage of income or profit to ensure proportionality with financial capacity, even when contributions remain voluntary. Compensation mechanisms can also be adopted by allocating a portion of the voluntary revenues to programs that directly target low-income groups or areas disproportionately affected by environmental degradation (Pangesti et al., 2023).

Recent research supports the view that voluntary mechanisms should be structured as positive incentives rather than negative penalties. Behavioral interventions through positive incentives have demonstrated notable effectiveness. Recent experimental studies show that subsidies promoting sustainable behavior are significantly more effective than punitive taxes in influencing consumer preferences toward sustainable products, particularly among low-income groups.

6. An Analytical-Organizational Framework for Adopting VSTs

Taxes function as regulatory tools; tax incentives may be introduced to promote access to clean energy and environmentally friendly technologies. Similarly, disincentive taxes also represent regulatory options, as exemplified in the field of environmental sustainability taxes. Governments may also complement taxation with regulatory measures to enforce behaviors that support sustainable development. This may include laws and regulations that mandate productive, social, or environmental practices and standards, as well as the adoption of innovative types of taxes (Sugihyanty et al., 2024).

In this context, the VST aims to strike a balance between economic, compliance, and administrative costs while collecting sufficient tax revenues to ensure compliance with the desired behavior. These costs vary across countries' tax systems. When assessing administrative costs, three aspects must be considered: the number of transactions, the complexity of each transaction, and whether a natural or convenient point of transaction exists. In other words, does the nature of the required activity lead to natural interaction and acceptance by taxpayers with the tax administration, or is interaction driven by taxpayers or proactive on the administration's part? Because the harm targeted by VSTs generally relates to specific behaviors, goods, or services used, it is often appropriate to specify these taxes proportionally based on the value or price of the product or service. It is also important to regularly update these rates to prevent erosion of their real value—even under moderate inflation rates (Gribnau, 2025).

This necessity aligns with Bhartia's (2009) theory of tax appropriateness, which emphasizes that the only consideration when designing tax measures or policy is their practical applicability. That is, whether the tax policy can be implemented effectively. This theory is well-suited here because feasibility is a key criterion for tax evaluation, allowing for the rapid adjustment of tax structures to meet changing economic and fiscal requirements.

Table 3: An Analytical-Organizational Framework for VSTs

Dimension	Core Aspect	Standard Context / Challenge	VST Mechanism & Solution	Key Outcome
Administrative Efficiency	Revenue & Cost	Traditional taxes aim to generate state revenue, often involving high administrative overhead.	Revenue Neutrality: Redistribution within the sector. Uses existing tech (banking/email) to minimize costs.	Zero net state revenue; Self-funding system with minimal friction.
	Enforcement	Continuous, expensive monitoring is required.	Targeted Verification: Verification only upon suspicious data. Whistleblower incentives funded by fines.	Low enforcement costs with high compliance pressure.
Allocation & Incentives	Cost Distribution	Adoption costs are often assumed to be fixed or observable.	Variable/Private Costs: Addresses unobservable costs via self-declaration (minimizing payouts).	Vertical Differentiation: Targets higher quality/tech, not just volume.
	Payout Timing	Subsidies are often given as reimbursements (post-purchase).	Loan-to-Grant Model: Funds distributed as loans; forgiven upon adoption, otherwise repaid.	Mitigates Information Asymmetry and opportunistic behavior.
Financial Logic	Cost Structure	High CAPEX (purchase cost), Low OPEX (savings). Long payback periods.	Tax Intervention: Directly reduces purchase costs (CAPEX), not ongoing costs.	Increases Net Present Value (NPV) and Internal Rate of Return (IRR).
	Discounting	High market interest rates discourage adoption (low PV of future savings).	Rate Adjustment: Tax effectively increases the "feasible discount rate" for investors.	Makes projects viable even under high-interest-rate environments.
Technology Neutrality	Policy Certainty	Policymakers are picking specific "winning" technologies.	Threshold-Based: It targets an efficiency level rather than a specific device.	Redistribution Flow: Tax from inefficient agents to Efficient agents.

Comparing the economic costs or economic efficiency of different taxes can be a more complex process. Generally, VSTs do not generate state revenues beyond covering the administrative costs of managing the plan; instead, they represent a redistribution within the sector or society, where some pay, and others receive. Imposing such taxes entails minimal administrative costs due to the ability to leverage existing technology—such as a bank account for taxpayers to pay taxes and an email confirmation that they have adopted the targeted good, service,

or behavior, thereby qualifying for a share of the tax revenues in their accounts. Monitoring and enforcement costs can be minimized through empowered oversight. When adoption information is questionable, verification is initiated; confirmed violations incur substantial fines, part of which is awarded to whistleblowers. Many monitoring systems can be innovated, but simplicity and low costs must be prioritized.

Regarding the adoption costs of the targeted good, service, or behavior under the VST, such fees may vary. If adoption costs are not fixed but follow a distribution across the population, payments to new adopters may be adjusted accordingly. This is especially relevant when adoption involves vertically differentiated goods, and policymakers aim to influence not only adoption incidence but also "quality" and favor "better" technologies. In the extreme case where adoption costs vary widely and are unobservable externally (i.e., private information of adopters), policymakers may request agents to declare their cost estimates, allowing for some opportunistic behavior, and set tax amounts accordingly. This yields a minimal total payout to achieve adoption, divided among non-adopters and fixed by the tax revenue collected from them. Revenues are distributed as loans to individuals who commit to adopting within the coming period. If they adopt, the loans are forgiven; otherwise, repayment is required.

Many technologies incur not only purchase costs but ongoing costs such as maintenance and fuel. Typically, higher purchase prices are offset by lower variable costs over time (e.g., efficient engines with lower fuel consumption, solar panels). Adoption decisions, therefore, involve low discount rates and acceptable long payback periods, where investors compare the present value of future savings to higher initial investment costs. Technologies may also generate revenue streams. Discounting is a standard method for making adoption decisions; thus, prevailing market interest rates primarily determine adoption, and very high interest rates discourage the diffusion of innovation. Taxes adjust purchase costs but not ongoing costs or revenues, thereby increasing the maximum feasible discount rate and reducing payback periods, significantly facilitating adoption among investors. Technically, the tax rises both the net present value and the internal rate of return, making the investment more attractive to a larger group.

Sometimes policymakers do not know precisely which technology will achieve their goals (e.g., reducing greenhouse gas emissions or improving industrial competitiveness). In other cases, existing technologies compete (e.g., satellite internet providers), and policymakers do not want to favor one over the others. Here, the tax can target agents who fail to meet a minimum efficiency threshold, with tax revenues redistributed to those whose energy efficiency exceeds that threshold (Piana, 2008).

7. Justifications for VSTs in Supporting Sustainable Development

Taxes are a fundamental component of public finance, yet they extend beyond mere revenue generation. Tax policies serve as effective instruments to shape economic behavior, redistribute wealth, and address societal challenges. Taxes can influence the conduct of individuals and businesses. Governments may impose targeted taxes to address specific social or environmental issues. For instance, carbon emission taxes internalize the ecological costs of activities contributing to climate change by discouraging behaviors that harm the environment. Incentives such as tax exemptions for renewable energy investments or penalties for environmentally damaging practices can steer economic activities toward socially responsible outcomes (Avi-Yonah, 2006).

Typically, governments employ three main policy tools to influence behavior, mitigate risks, and reduce harmful activities. The first consists of incentives through public expenditure that lower the cost of adopting goods, services, or behaviors, thereby promoting wider diffusion. The second involves tax exemptions, which reduce the tax burden on users of these goods, services, or behaviors but correspondingly reduce tax revenues for policymakers. The third tool is legislation, which is manifested through laws and regulations that mandate the use of certain goods or services, restrict or encourage specific behaviors, or impose binding future deadlines for compliance. However, relying on incentives or tax exemptions generally entails high economic costs, particularly in structurally challenged economies. Legislation, by contrast, abandons market logic and enforces usage, imposing substantial adaptation costs on targets, which may provoke strong opposition and delay political and social approval (Piana, 2008).

This situation necessitates innovative strategies to systematically mitigate pollution, waste, loss, and climate change, while also promoting adaptation through new behaviors, consumer goods, and production technologies. VSTs offer a distinctive role by focusing on addressing harmful behaviors without resorting to incentives, tax exemptions, or mandatory legal adoption. (WHO, 2024).

7.1. Social justifications for VSTs

Debates persist about the interaction between social responsibility and taxation, questioning whether positive social contributions should be voluntary or mandated by legislation. Some argue that companies and individuals should voluntarily adopt social responsibility practices without additional taxes. Voluntary initiatives offer flexibility and creativity, allowing institutions to tailor their efforts to specific social or environmental challenges (Harvard Business Review, 2025). Conversely, proponents of legislative measures argue that mandatory frameworks are crucial for creating a level playing field and ensuring fair contributions from all individuals and entities to societal welfare. Strategically applied taxes can address market failures, correct externalities, and foster collective action toward common goals (Kouam & Asongu, 2022). This calls for the development of policies and regulations that motivate or compel alignment with social responsibility practices. When governments utilize taxes effectively, they can address social issues, promote responsible behavior, and finance vital programs (Ajeigbe et al., 2024).

The VST is grounded in the goal of promoting social welfare through shared responsibility among individuals and entities to support behaviors, goods, or services that do not cause harm to society. This tax targets a specific harmful behavior and directs the collected revenues to those who have adopted the preferred behavior. The clarity of this relationship can motivate individuals and entities to recognize surrounding risks and their responsibilities toward society at large (Lawton, 2004). Contributions are directed toward defined projects or broader goals aligned with sustainable development objectives and can be implemented at various administrative levels (national, provincial, municipal, or community) with relatively rapid, visible results. Fast and sustainable diffusion is key to effectiveness, requiring coordinated planning and effort from countries seeking tangible impact.

7.2. Economic justifications for VSTs

An efficient revenue system is essential for robust, sustainable, and inclusive economic development. Revenues fund public spending on physical, social, and administrative infrastructure. There is a broad consensus regarding the fundamental public benefits necessary for economic growth (Ajeigbe et al., 2024). To accelerate economic growth, governments must proactively create an enabling environment by providing infrastructure and ensuring inclusive participation in the economic transformation process (Amzuica & Mititelu, 2022).

Revenue shortfalls are among the most significant obstacles governments face in achieving sustainable development programs. VSTs can contribute substantially to the funding of sustainable development initiatives without relying on general government revenues.

This tax model fosters self-financing to reduce polluting activities and harmful behaviors. Effective regulation, competent management, and awareness campaigns are critical to the success of these targeted tax plans. The tax operates by giving individuals or companies the option to adopt the desired behavior and receive tax revenues, or refrain from adopting it and pay the tax, which then funds the capacities of the adopters through a dedicated mechanism (Gadenne, 2016).

The incentivizing nature of the VST, by granting revenues to adopters, can significantly influence behavior by aligning self-interest with the benefits of free adoption, in addition to the private benefits of the good, service, or behavior, and its broader environmental or social implications. Consequently, this tax has the potential to support particular sustainable development initiatives without draining core government revenues. It also raises awareness of ecological and social issues, encourages more conscious consumer choices, and fosters shared responsibility and community engagement in sustainable development.

7.3. Environmental justifications for VSTs

PCT (2018) identifies two approaches to addressing environmental problems: command-and-control regulations that use standards, and market-based instruments that impose taxes, fees, and fines. Regarding market-based tools, the economic foundations of ecological sustainability taxes derive from seminal theories. First is Arthur Pigou's theory of pollution cost internalization, which recognizes that many economic activities cause negative externalities by exploiting natural resources, impacting human welfare, without these costs being reflected in production cost functions. The second foundation is the "polluter pays" principle, endorsed by the OECD and embedded in environmental laws worldwide (Talbi, 2012; WHO, 2024).

Pirlot (2019) notes that market-based tools can lead to pollution rights, where the cost of pollution abatement exceeds the polluter's benefits, without necessarily improving the environment. Environmental regulations can be discriminatory and regressive, disregarding the ability to pay. Excessively harsh laws may prompt relocation to countries with lower environmental standards, causing revenue loss and economic downturn.

In the strained conditions of developing countries, new environmental taxes, despite their limited revenue potential, remain valuable for their ecological benefits. They may warrant consideration even if administrative costs exceed additional revenue. Environmental taxes can be effective and equitable tax forms, though revenue generation is not their primary objective; social benefits may be substantial despite modest revenues. The marginal cost of increasing revenue justifies lowering environmental taxes (Garba & Gunawardana, 2015).

Within this context, VSTs represent a market-based instrument distinct from Pigouvian pollution cost internalization taxes, which create a potentially endless cycle of taxing to fund pollution damage remediation. Instead, they embody a proactive approach when applied continuously, reducing the purchase or adoption of environmentally, economically, or socially harmful goods or behaviors. The tax applies only when individuals or entities continue harmful behaviors or maintain the use of damaging goods without switching to approved alternatives. It serves as an incentive to abandon such practices by allowing them to receive a portion of the tax revenue equivalent to all or most of the substitution cost.

This structure minimizes tax avoidance, evasion, and discrimination among taxpayers. Economically, adoption costs present a relatively favorable long-term comparison to the tax costs of non-adoption and the lost benefits of adopting innovative goods, assets, or services. Consequently, the tax generates shared societal benefits that exceed the costs borne by individuals, entities, and governments alike.

8. VSTs and Challenges of Sustainable Development in Developing Countries

8.1. VSTs and the issue of tax revenues

Livelihoods in many developing countries are closely tied to natural assets and environmental conditions compared to those in advanced economies. Natural capital—such as agriculture, fossil fuel extraction, and other depletable resources—constitutes nearly half of the national wealth in low-income countries, raising significant local environmental concerns. Water supplies are often severely limited. Many of these challenges have immediate and substantial impacts in low-income countries, rendering them particularly vulnerable to adverse ecological shocks. Yet, their control largely depends on how they respond to increasing environmental risks and broader developments, a situation marked by a significant tax policy gap requiring urgent attention (Firdaus et al., 2024; Massadour, 2010).

Despite inter-country differences among developing nations, tax ratios remain persistently low, averaging around 15% to 17%. In about half of these countries, tax revenues fall below 15%, considered the minimum necessary to meet urgent needs and progress toward sustainable growth. These revenues primarily fund non-environmentally Sustainable Development Goals (SDGs), such as health and education, thereby failing to cover diverse spending needs (Mashood, 2024). Low tax collection rates compound this due to diminished national income and per capita income, as well as poor income and wealth distribution (Othman, 2000).

Weak tax collection can also stem from factors such as a limited tax base, with few individuals and entities subject to taxation, and a high volume of exemptions relative to average incomes. Tax evasion through income concealment results from weak fiscal authority and low taxpayer awareness. Low-income levels in developing countries significantly affect economic, social, and environmental policies, especially regarding "ability to pay" for addressing these challenges. It is widely accepted that the poorest populations and countries suffer the most severe impacts of climate change, making developing countries particularly vulnerable to natural disasters whose frequency and intensity are linked to climate change (IMF, 2025).

Tax systems must play an effective role in diversifying participation by individuals and entities to mitigate these effects. VSTs can contribute to this goal by accelerating sustainable development without relying on scarce or insufficient general tax revenues—a chronic problem in developing countries. These taxes can also help reduce tax evasion and curb the informal economy by targeting specific behaviors or activities, facilitating easier monitoring. Their successful implementation requires considering available behavioral or product alternatives and employing technological innovations to enhance effectiveness. Moreover, a comprehensive tax toolkit is essential to prevent adverse behavioral reactions, such as consumers switching to untaxed options, which could undermine the intended benefits. For example, taxing gasoline and cooking fuels might encourage poorer consumers to switch to less environmentally friendly energy sources.

8.2. VSTs and the problem of aggressive tax practices

Tax evasion harms state budgets by reducing overall revenues, often prompting governments to increase tax rates or introduce new taxes to compensate, thus escalating taxpayer burdens. Aggressive tax practices diminish governments' capacity to achieve sustainable development goals and shift the tax burden onto other societal members (Mittra, 2024). While VSTs have the potential to support long-term sustainable development objectives, problematic institutional conditions—such as high levels of corruption—can significantly impede their effectiveness. Nonetheless, due to their design, socioeconomic dimensions, and direct benefits for adopters, these taxes may reduce aggressive tax behavior and enhance compliance.

When paired with straightforward communication campaigns outlining goals, projects, and societal benefits, VSTs can mitigate corruption and informality by boosting motivation among individuals and entities, thereby discouraging harmful behaviors. In contrast, high rates and types of conventional taxes often have negative impacts on corruption in the economy. Systemic corruption can hinder the implementation of sustainable development policies. Efficient tax systems encourage compliance, improve enforcement, reduce avoidance and aggressive evasion, and broaden the tax base. The International Chamber of Commerce emphasizes the importance of fair, efficient enforcement mechanisms to advance sustainable development tax plans (Kotlan et al., 2021).

8.3. VSTs and the issue of incentives and tax exemptions

Tax incentives offer preferential treatment to specific taxpayers, promoting desired activities or beneficial objectives (Mohamad et al., 2025). However, they carry two risks: undermining tax revenues and distorting behavior without yielding compensating social benefits, as well as governance issues, including exploitation and corruption (OECD, 2008). Tax exemptions serve as government financial incentives aimed at promoting socially and economically valuable activities, thereby reducing overall tax payments effectively. Proper tax administration can improve government-citizen relations and enhance tax compliance rates (IMF, 2011).

Tax incentives for local and foreign investments in renewable energy foster a secure environment by stimulating growth and strengthening related economic sectors (Stancil, 2010). Tax policies that promote eco-friendly projects can drive innovation, propelling economies toward their sustainable development goals. Research and development incentives similarly encourage innovation (Kouam & Asongu, 2022).

However, incentives and exemptions cause governments to lose substantial revenue urgently needed to fund critical development programs—especially in developing countries. VSTs offer an innovative alternative, enabling policymakers to design new incentive forms that achieve economic, social, or environmental gains while avoiding drawbacks of traditional incentives and exemptions, such as revenue sacrifice and exploitation. These taxes do not require government resources for implementation. They are less susceptible to abuse, underscoring the importance of careful design, practical implementation, and precise targeting to build a robust and actionable framework.

8.4. VSTs and the informal sector challenge

The informal sector poses a significant challenge to tax systems in developing countries, as many activities remain unregistered and untaxed (Pratap & Quintin, 2006). Tax evasion by informal individuals and firms deprives governments of the revenues needed to fund public services, such as education, health, and infrastructure. Informality also creates unfair competition for formal businesses that bear tax burdens, negatively affecting the formal economy (Adeeb & Alshujairi, 2025).

Due to its nature, the size and scope of the informal sector are difficult for authorities to measure, which complicates the formulation and enforcement of effective tax policy. This can exacerbate social inequality, as informal operators may benefit from tax advantages while others bear the tax burden (Amzuica & Mititelu, 2022).

VSTs help address informal sector tax issues by targeting harmful behaviors wherever they occur. They apply regardless of formal or informal status, encompassing both individuals and entities. This is facilitated by multi-agency oversight and public participation, where plans and goals are transparent and scientifically promoted, with clear economic, social, or environmental benefits for society. Being excise taxes, VSTs generally apply to specific goods, services, or behaviors linked to adverse economic, social, or environmental impacts, making them among the simplest taxes to administer. Often, they are highly efficient due to relatively inelastic demand for targeted goods or services. Nonetheless, concerns about equity persist if lower-income populations spend a disproportionate share of their income on these taxed goods or services (Tanzi & Zee, 2001).

8.5. VSTs and weak tax administration

One major cause of weak tax revenues in many developing countries is the inefficiency of their tax administrations. This reflects weaknesses not only in operations and procedures, including the use of technology, but also in governance arrangements, where corruption remains a serious concern, along with inadequate quantities and quality of resources (Adeeb & Al Shujairi, 2025).

Tax systems in developing countries often exhibit rigidity, failing to generate tax revenue in proportion to national income growth. Despite financial challenges necessitating flexible administrations capable of capturing larger output increases, these systems underperform, hindering their fundamental role in economic development. This is partly attributed to economic stagnation and partly to poor administration, inefficiency, and low taxpayer awareness (Carnahan, 2015).

Moreover, the scope of the tax system is often narrow in terms of individual and corporate participation, with a high presence in the informal sector confounding this measurement. Some taxpayers are exempt due to their size or poverty, while others, who are formally subject to tax, fail to comply, whether deliberately or due to administrative shortcomings (Pratap & Quintin, 2006). Awareness of tax obligations, clarity of commitments, access to information, and efficient appeal systems are crucial but often lacking in developing countries (Othman, 2000).

VSTs can play a crucial motivational role by coupling tax programs with awareness campaigns that highlight individual and societal benefits. They also require simplified administrative and oversight systems to reduce complexity. Effective revenue administration depends on taxpayers knowing, assessing, and fulfilling their obligations (Mebratu, 2024).

VSTs can play a prominent role in curbing corruption, primarily because they do not directly handle tax revenues that are subsequently redistributed to those adopting the desired behaviors under the plan. Instead, the tax levied on non-compliant parties is tied to a specific amount or proportion of the cost of the good, service, or behavior targeted for adoption. This amount is generally well known to all stakeholders. Consequently, this underscores the imperative to develop administrative capacities and establish comprehensive, robust governance frameworks to ensure the successful realization of the plan’s objectives (Chukwuemeka et al., 2014).

Therefore, voluntary taxes—or taxes levied on specific economic, environmental, or social behaviors—constitute a fundamental pillar for supporting the revenue base. When combined with traditional taxes, they play an integrated role in advancing the strategic objectives of sustainable development. Voluntary taxes target particular behaviors that conventional taxes fail to influence effectively, through selective taxation programs.

Hence, it can be asserted that VSTs are economically less efficient compared to traditional taxes because they apply only to specific categories of goods or particular social or environmental behaviors (Van de Vijver et al., 2020). The degree of relative inefficiency is directly correlated with their limited coverage. Voluntary taxes focus narrowly on certain harmful or consumptive behaviors and do not encompass the full spectrum of goods, services, or behaviors. Due to this selective coverage, voluntary taxes are administratively less complex—they involve fewer taxpayers, making them easier to implement, particularly in developing countries with limited infrastructure.

9. Summary and conclusions

This paper conducts a comprehensive review of the interactions between taxation and sustainable development within the framework of modern tax thought. Initially, it explores the dynamic relationship between taxes as a revenue source and the attainment of sustainable development, noting that contemporary tax theory primarily emphasizes the supply side of revenue generation while largely neglecting the demand side of the tax equation. The paper argues that mobilizing domestic tax revenues constitutes the cornerstone of modern tax theories aimed at achieving sustainable development goals. Furthermore, it highlights the pivotal role of tax incentives and exemptions in promoting sustainable development.

Secondly, the study examines the challenges and obstacles that have rendered sustainability-based tax systems largely ineffective in fulfilling sustainable development objectives under modern tax paradigms. It further addresses the specific problems and constraints faced by developing countries in this regard. The paper posits that more robust achievement of sustainable development goals and the establishment of a positive nexus between tax systems and sustainability require the augmentation of tax frameworks with additional tax instruments that align with rapidly evolving economic, social, and environmental disruptions. The concept of VSTs and their relationship with sustainable development is introduced as an innovative approach to sustainable development.

Thirdly, the paper provides an institutional and regulatory analysis of VSTs. Finally, it discusses and evaluates the justifications for implementing such taxes in advancing sustainable development, emphasizing their potential to mitigate the challenges impeding sustainable development efforts, particularly in developing nations.

The primary focus underscores that the pursuit of sustainable development under modern tax theory faces substantial and critical challenges, resulting in underperformance relative to the intended goals. Escalating environmental pollution, fragile sustainable social programs, and weak international coordination in the field evidence this. Compounding these are country-specific challenges in developing economies, such as the prevalence of informal sectors, widespread tax evasion, corruption, and poor tax administration, which have diluted the substantive impact of sustainable development initiatives.

In light of these challenges, the paper advocates that VSTs can partially address environmental, social, and economic risks without resorting to unsustainable reliance on incentives and exemptions that diminish tax revenues and limit government capacity to support sustainable development programs. Additionally, these taxes contribute to curbing aggressive tax practices by precisely targeting relevant sectors, activities, and entities. These taxes are characterized by relatively low administrative demands and management costs when carefully designed, supported by appropriate programs and technologies. When implemented transparently with sound governance and accompanied by targeted awareness campaigns, VSTs can also reduce corruption and administrative inefficiencies. By focusing on key areas of waste, loss, and pollution with clear societal impact, these taxes foster a strong incentive structure that can propel their success in other vital domains.

Therefore, tax policies must remain flexible to respond effectively to changes in external social, economic, and environmental factors. Achieving this flexibility necessitates the establishment of efficient and competent tax administration institutions overall, with particular emphasis on developing a robust tax system and administrative framework for VSTs in developing countries.

Moreover, the limited capacity of tax authorities to enforce fundamental tax rules, alongside taxpayers' compliance challenges, underscores the need to design tax systems that prioritize both economic efficiency and simplicity. Although taxation inherently introduces complexity, sustainable taxation frameworks should focus on a relatively narrow set of taxes with substantial impact and straightforward implementation. For instance, a gasoline tax may not perfectly address externalities related to congestion and accidents, but it represents a pragmatic and viable alternative.

Regarding policy instrument selection, it is not the absolute weakness of tax administration that matters most, but its relative strength or weakness compared to alternative regulatory bodies. Regulatory agencies may face comparable limitations or corruption risks to those of tax officials; similarly, legislative bodies are equally susceptible to capture by vested interests in both regulatory and tax matters. Furthermore, the effectiveness of responsibility-based approaches to environmental issues may be undermined by slow and unreliable judicial processes.

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