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ESG-based Public Financial Management and Sustainable Regional Development: An Islamic Economic Perspective

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Abstract

This study examines the relationship between ESG-Based Public Financial Management (ESG-PFM) and Sustainable Regional Development (SRD), with Social SDGs Achievement (SSA) as a mediator and Regional Fiscal Capacity Level (RFCL) as a moderator. Using a quantitative explanatory approach, the study analyzes 340 observations from 34 Indonesian provinces (2015–2024). Composite indices are constructed using Principal Component Analysis (PCA), followed by panel data regression and Partial Least Squares Structural Equation Modeling (PLS-SEM) for robustness assessment. The findings reveal significant relationships among ESG-PFM, SSA, and SRD, with SSA serving as a mediating mechanism and RFCL significantly moderating the SSA–SRD relationship. Theoretically, this study contributes to Islamic public finance by integrating amanah (responsible stewardship), maslahah (public welfare), and maqasid al-Shariah into sustainability-oriented fiscal governance. It advances a value-based perspective linking fiscal accountability, ethical resource allocation, distributive justice, and sustainable public welfare.

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Introduction

Sustainable development has increasingly become a defining objective of contemporary public governance. Yet achieving this objective is far from straightforward, as governments must respond to a growing range of financial and nonfinancial challenges simultaneously. Under these conditions, development can no longer be judged simply by the pace of economic growth. Greater emphasis is now placed on the ability of governments to promote economic prosperity while, at the same time, improving social well-being and safeguarding environmental sustainability (Cavalheiro et al., 2025; Takano et al., 2023). Thus, this broader notion of development has in the course of time contributed to changes in the policy agenda, enabling the introduction of the ideas of sustainability at all stages of the public decision-making process, including those related to the management of public finances. Accordingly, public money is becoming more and more recognized as a means not merely for the distribution of revenues and expenditures but as an important policy tool for creating public value in the long term and for present and future generations as a whole.

This transition in the public governance sector has taken place in parallel with the emergence of the concept of Environmental, Social, and Governance (ESG). ESG was created to measure the efforts of companies in the area of sustainability and then transformed into a necessary tool for making investment decisions. However, with the increasing complexity of sustainability problems, the role of ESG has grown out of the business sphere. Currently, public sector institutions are required to implement ESG-related principles in their public policies, development initiatives, and financial decisions. In this context, governments are expected to pursue more than efficiency and accountability. Public policies are increasingly judged by the extent to which they contribute to environmental protection, strengthen social well-being, and reinforce sound public governance (Hazemba & Halog, 2021; Polzer & Seiwald, 2023). Consequently, ESG has emerged as an important framework for guiding sustainability-oriented governance while supporting the achievement of long-term development goals within the public sector.

Even with these advancements, Public Financial Management (PFM) in several countries still takes the approach of traditional methods that are focused mainly on fiscal discipline, efficiency of budgets, adherence to the regulatory framework and accountability in financial matters (Cangiano et al., 2013). These principles remain essential for preserving fiscal stability and strengthening transparency in the management of public resources. Even so, improvements in fiscal management do not necessarily produce comparable progress in broader development outcomes. Strong financial performance, for example, may coexist with persistent environmental degradation, widening social disparities, or only modest improvements in public welfare (Douglas & Overmans, 2020; Nakpodia et al., 2024). The present evidence indicates that though fiscal management is important, it alone cannot help achieve sustainable development. A broader public finance management framework is necessary that can relate fiscal performance to creating economic, social, and environmental value.

These changes indicate that it is time to revisit the approach to PFM. Instead of focusing only on efficiency, accountability, and financial discipline, public finance management should also aim to achieve economic, social, and environmental value at the same time (Douglas & Overmans, 2020; Kuroki & Motokawa, 2022). In this context, it would be misleading to evaluate fiscal policy only through indicators like the absorption of public funding or the realization of expenditures. Fiscal effectiveness should be assessed through the ability of fiscal interventions to improve people's quality of life, reduce social and economic inequality, and achieve environmental sustainability. Thus, the introduction of the ESG values into fiscal

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policy management is not simply a question of administrative reform. It formalizes a shift in the function of fiscal policy from an administrative tool to a strategic sure for inclusive sustainable development.

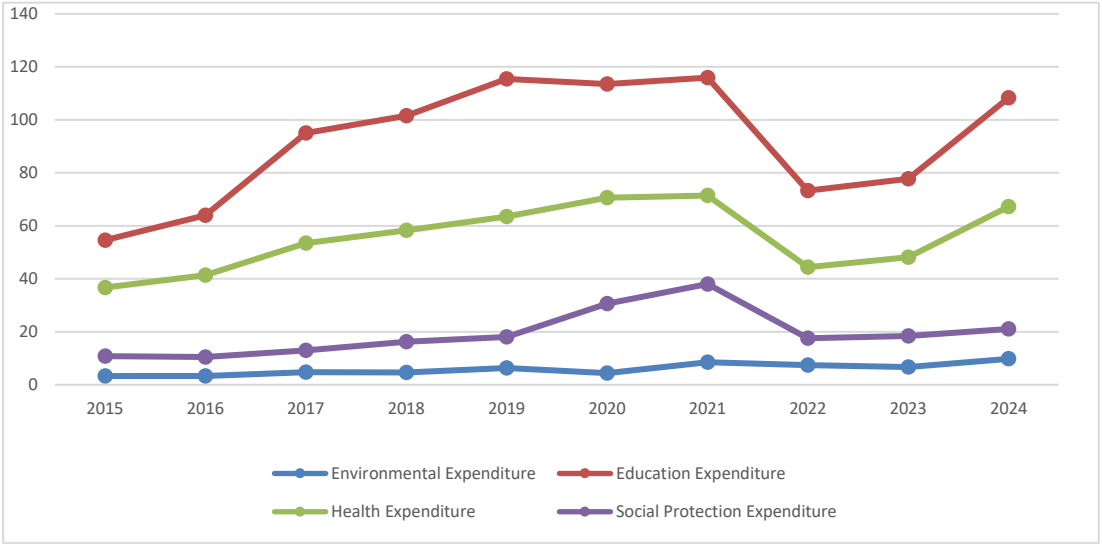


Figure 1. Local Government Expenditure in Indonesia, 2015–2024 (Trillion Rupiah)

Indonesia offers a particularly relevant context for examining this transformation because of its decentralized fiscal system. Regional autonomy provides provincial governments with considerable authority to determine development priorities according to their own socioeconomic conditions and local needs (Wiryawan & Otchia, 2022). In recent years, there has been a significant rise in spending by local authorities along with a notable improvement in the quality of public financial management as proven by the increasing number of local bodies receiving positive auditing results. Nevertheless, such developments have not led to systematic outcomes. Indeed, socio-economic, environmental, and other indicators show sizable disparities across the country. Hence, it is safe to say that the presence of a good fiscal base and quality financial regulation alone is not going to be sufficient for achieving consistency of developmental results across regions.

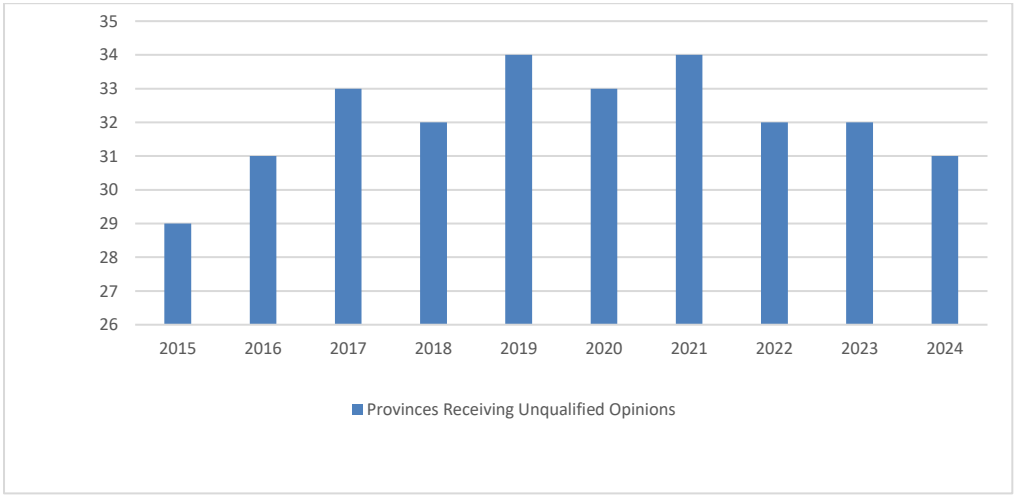


Figure 2. Trends in Provincial Government Audit Opinions in Indonesia 2015-2024

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Among the many issues surrounding public sector governance in Indonesia, one of the most striking is the contrast between improvements in public financial management and the uneven pattern of development achieved across provinces. Over the past several years, local governments have strengthened their financial management capacity, reflected in larger allocations of public expenditure to strategic development sectors as well as the increasing number of local governments receiving unqualified audit opinions (*Wajar Tanpa Pengecualian* or WTP) for their financial statements (Wiryawan & Otchia, 2022). These developments indicate meaningful progress in fiscal governance and financial accountability.

Nevertheless, similar progress has not been achieved consistently across regional development outcomes. Some provinces have been successful in achieving rapid economic growth while ensuring satisfactory social conditions and reasonable environmental performance. Conversely, some areas remain mired in poverty, have poor quality environment and do not have effective housing. It should be noted that the coexistence of good fiscal governance and persisting regional differences creates an interesting paradox, which implies that improvements in financial management, although necessary, are not enough to ensure good and sustainable development throughout Indonesia.

Table 1. Development Disparities Among Provinces in Indonesia (2024)

Indicator	Highest Province	Value	Lowest Province	Value
Human Development Index (HDI)	DKI Jakarta	84.15	Papua Pegunungan	54.43
Poverty Rate (PR)	Papua Pegunungan	31.31	Bali	3.9
Gini Ratio (GR)	DKI Jakarta	0.431	Kepulauan Bangka Belitung	0.235
Economic Growth (EG)	Papua Barat	20.8	Kepulauan Bangka Belitung	0.77
Adequate Housing (AH)	DI Yogyakarta	86.68	Papua Pegunungan	4.44
Environmental Quality Index (EQI)	Papua Barat	83.75	DKI Jakarta	56.39

Source: Statistics Indonesia (BPS), 2026.

This paradox indicates that enhanced fiscal capacity and governance quality may not lead to sustainable regional development. It can be argued that this anomaly is linked to the way public finance is approached, considering fiscal tools as separate policy instruments, rather than parts of an integrated system. In practice, expenditures on environmental protection, education, healthcare, and social protection are usually planned and evaluated separately. At the same time, governance quality is frequently treated as an administrative concern instead of being embedded within broader development policy (Drama et al., 2025; Polzer & Seiwald, 2023). Such fragmentation can weaken coordination across policy areas and reduce the ability of fiscal interventions to generate lasting development outcomes. These circumstances point to the need for a more holistic perspective that considers how fiscal policies collectively create sustainable public value.

From an Islamic perspective, the management of public resources is also closely related to the principle of *amanah*, which emphasizes that public resources are a trust that must be managed responsibly for the benefit of society. Government financial decisions therefore carry not only administrative and fiscal responsibilities but also ethical responsibilities to ensure that public resources generate meaningful benefits for the community. This perspective is consistent with the broader objective of sustainable development, in which public

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expenditure is expected to contribute to social welfare, environmental protection, and long-term development. In this sense, sustainability-oriented public financial management can also be understood as an effort to realize *maslahah*, or public benefit, by ensuring that government resources are directed toward outcomes that improve societal well-being while preserving resources for future generations.

A similar pattern is reflected in the existing literature. Previous studies have typically explored environmental expenditure in relation to environmental quality, education expenditure in relation to human development, healthcare expenditure in relation to social welfare, social protection expenditure in relation to poverty reduction, and governance quality in relation to government performance as separate research streams (Drama et al., 2025; Le et al., 2025; Torre et al., 2024). Although these studies supply useful empirical information, they only present a limited perspective on public financial management because rarely do we investigate the interdependence of these fiscal instruments within the same analytical framework. Therefore, the comprehensive role of public financial management in promoting sustainable development is still partially understood, primarily in respect to its environmental, social, and governance aspects working together.

In this context it seems that ESG adoption in the public sector can be interpreted as a holistic public financial management concept rather than a set of disconnected policy measures. Evaluating ESG implementation should therefore involve more than measuring expenditure within individual sectors or assessing governance quality independently. Greater attention needs to be directed toward how fiscal policies operate collectively as an integrated system capable of producing economic, social, and environmental value simultaneously (Berg & Olsson, 2023; Douglas & Overmans, 2020). In this regard, the notion serves as the theoretical basis for creating ESG Public Financial Management (ESG-PFM), a structure for managing municipal finances, favourably impacting sustainable development.

Following this perspective, the study puts forth the idea of ESG-PFM as a construct made up of different dimensions, encompassing the inclusion of environmental, social, and governance principles in public financial management. In terms of the environmental aspect, the variable takes into account environmental expenditures, while the social component entails the spending on education, health care, and social services by the government. Governance, for its part, is represented by audit conclusions of local authorities' financial statements. The study is unlike the majority of previous studies, as it treats each of the indicated variables as parts of the single construct rather than analyzing them separately. Framing these dimensions as an integrated system allows the study not only to examine relationships among variables but also to advance a broader conceptual understanding of public financial management in the context of sustainable development.

Consistent with the principles of sustainable development, this study argues that regional development performance cannot be adequately assessed through economic growth alone (Cavalheiro et al., 2025; Takano et al., 2023). The concept of sustainable development needs progress in the spheres of economy, society, and environment, as the three dimensions mutually support and contribute to each other. Thus, Sustainable Regional Development can serve as the dependent construct employed while analyzing regional development from a multidimensional perspective as far as economic growth is used to represent the economic dimension, while the ratio of households with satisfactory housing indicates the social dimension, and Environmental Quality Index serves to characterize the environmental dimension (Handoyo, 2024; Tjahjadi et al., 2021). In contrast to traditional methods that utilize mainly economic indicators, this multi-faceted framework provides a wider version of the sustainable regional development concept.

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Meanwhile, the analysis argues that the effect of ESG-PFM on sustainable regional development will not occur promptly via the direct channel. Instead, it will be gradually realized through the accumulation of changes in social conditions over time. Financial policies that employ the principles of environmental, social, and governance fields will develop human potential, alleviate poverty, and reduce income inequality prior to the results of regional development (Douglas & Overmans, 2020; Nakpodia et al., 2024). On this basis, Social SDGs Achievement (SSA) is incorporated as the mediating construct representing progress in the social dimension of the Sustainable Development Goals. In order to make sense of SSA, it is made operational by means of HDI or human development index, poverty rate, and Gini coefficient. By introducing this mediation mechanism in the study, a clearer understanding of the relationship between ESG-oriented public finance management and sustainable development at the regional level can be provided through progressive improvements in social development.

Table 2. Comparison of Average Development Indicators by Regional Fiscal Capacity Level

Variable	Low RFCL	High RFCL	High - Low
Average HDI	69.94	73.21	3.27
Average PR	11.80	9.39	-2.41
Average GR	0.36	0.35	-0.01
Average EG	4.24	5.07	0.83
Average AH	69.07	71.27	2.20
Average EQI	75.65	69.75	-5.90

Source: Statistics Indonesia (BPS), 2026.

Local governments can convert gains in human development, reduction in poverty, and equitable distribution of income into inclusive economic growth, better environmental performance, and greater social welfare, depending highly on their fiscal capacity. Governments that have higher fiscal capacity tend to have a larger degree of budget flexibility that allows them to support social programs, increase public investments, and implement a long-term development policy more often than governments that face strict limitations (Kuzemko & Britton, 2020). Consequently, the positive influence of SSA on SRD is expected to be stronger in regions characterized by a higher Regional Fiscal Capacity Level (RFCL). To account for these differences in fiscal conditions, RFCL is incorporated as a moderating variable to examine whether stronger fiscal capacity reinforces the contribution of SSA to sustainable regional development.

This research hopes to make a contribution to academic knowledge and public policy for several key reasons. To begin with, it presents ESG-PFM as a theoretical idea combining environmental, social, and governance aspects into one public financial management approach. Secondly, it adds to previous research by describing the impact of ESG-PFM on Sustainable Regional Development in terms of the SSA theory, showing that the relationship between public financial management and sustainability consists not only of direct effects but also of indirect influence via social development improvements. Thirdly, by adding RFCL as a moderation variable, the research points out the role of fiscal capacity in the effectiveness of sustainability-focused public financial management. This angle allows understanding how institutional and fiscal factors affect local authorities' ability to implement ESG-based financial policies into sustainable regional development. Together these contributions offer

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evidence to be used by practitioners for creating public finance management systems more aligned with sustainability goals.

Drawing on the arguments presented above, this study addresses the following three research questions:

1) To what extent does ESG PFM influence SRD?
2) Does SSA serve as a mediating mechanism in the relationship between ESG PFM and SRD?
3) To what extent does SSA influence SRD?
4) Does RFCL strengthen the relationship between SSA and SRD?

Literature Review

Fiscal Sustainability Theory (FST)

Fiscal Sustainability Theory (FST) provides a theoretical lens for understanding how governments can manage public finances in ways that remain financially sound and sustainable over time. From this standpoint, fiscal sustainability refers not only to achieving a balance of revenues and expenditures but also to the ability of the government to ensure the stability of the macroeconomic environment while providing important public services. The foundations of this theory can be traced to Sargent & Wallace (1981), who showed that persistent fiscal deficits may undermine macroeconomic stability by generating inflationary pressures. Building on this argument, Hamilton & Flavin (1986) contended that fiscal policy can be considered sustainable when governments possess sufficient fiscal capacity to meet their long-term financial commitments.

The theory was further refined by Bohn (1998) through the Fiscal Reaction Function, which argues that governments should respond to mounting fiscal pressures by adjusting fiscal policy, for example by improving primary surpluses or strengthening revenue generation. Burnside (2005) later broadened the discussion by emphasizing that fiscal sustainability is not solely a matter of prudent debt management. The governmental capacity to maintain fiscal capacity is also vital for accomplishing long-term objectives. In this regard, the concept of FST is key to understanding ESG-PFM. In this context, utilizing ESG-PFM indicates the importance of public finance management to ensure fiscal capability and at the same time, the sustainability of local development.

Institutional Theory (IT)

According to Institutional Theory (IT), organizational behavior and practices are mainly shaped by the institutional context of the organization. This context encompasses formal regulations, social norms, and collective values along with wider societal expectations that affect the decisions and behaviors of the organization. It should be noted that IT suggests that the goal of the organization is not only the economic efficiency but the institutional legitimacy as well, which is achieved by the conformity of the organization's structure and processes to the outer stakeholder's expectations. The theoretical foundations of this perspective were established by Meyer & Rowan (1977), who argued that organizations are inclined to adopt practices that are widely regarded as legitimate within their institutional setting. DiMaggio & Powell (1983) subsequently expanded this view through the concept of institutional isomorphism, explaining that organizations gradually become more similar as they respond to coercive, normative, and mimetic pressures originating from the institutional environment.

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Recent trends suggest that the requirement for sustainability, accountability, and transparency is becoming increasingly significant for institutions. Eitrem et al., (2024) believe that organizations are integrated in a complex system of institutional norms, laws, and practices, which implies the need for ongoing adjustments to the pressures of law and culture to ensure legitimacy and stability. Within the context of this study, IT provides the theoretical rationale for why local governments are encouraged to adopt ESG-PFM in response to growing institutional expectations associated with SDG implementation, good governance, and stronger accountability in public financial management. From this perspective, the adoption of ESG-PFM can be understood as an institutional adaptation to a policy environment in which sustainable development has become an increasingly important objective of the public sector.

Public Value Theory (PVT)

The premise of the Public Value Theory (PVT) is that the fundamental aim of public organizations revolves around producing the value in the interest of society as a whole by means of efficient public policy, the provision of quality services and good governance. Unlike private enterprises that have as their primary aim maximizing profit, public organizations are responsible for bringing value to society in a broader sense, enhancing the conditions of living, achieving social justice, improving public welfare, and promoting public trust towards governmental institutions. This perspective was first introduced by Moore (1995) in Creating Public Value, where he argued that the success of public organizations should be evaluated not only in terms of budgetary efficiency but also by the tangible benefits they produce for citizens as the ultimate recipients of public services.

The concept of public value was subsequently refined by Kelly et al., (2002), who emphasized that its creation depends on the quality of public services, citizens' trust in government, and the government's capacity to respond effectively to societal needs. Stoker (2009) later broadened this perspective through the Public Value Management approach, highlighting collaboration among governments, citizens, and other stakeholders as a key mechanism for generating sustainable public value. Moore (2013) further reinforced this argument by reaffirming that the performance of public sector organizations should ultimately be assessed according to the value and benefits they create for society. In the context of the present study, PVT provides the theoretical foundation for explaining how the implementation of ESG-PFM is expected to enhance SSA, which subsequently contributes to SRD as an expression of public value generated through sustainability-oriented public financial management.

Islamic Perspective on Public Financial Management and Sustainable Development

Islamic principles provide an additional ethical perspective for understanding sustainability-oriented public financial management. In Islam, public resources can be viewed as an *amanah*, meaning a trust that must be managed responsibly and directed toward the welfare of society. Accordingly, government accountability is not limited to compliance with financial regulations but also concerns the extent to which public resources are utilized to generate beneficial and sustainable outcomes for the community. This perspective is closely associated with the concept of *maslahah*, which refers to the realization of public benefit and societal welfare. Within public financial management, *maslahah* provides an ethical basis for directing public expenditure toward activities that improve people's quality of life, including education, healthcare, social protection, environmental protection, and other development programs. These areas are also reflected in the ESG-PFM construct of this study through environmental

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expenditure, education expenditure, healthcare expenditure, social protection expenditure, and audit opinion.

The Islamic perspective further relates to the broader objectives of *Maqasid al-Shariah*, particularly the protection and improvement of human welfare. From this perspective, sustainable regional development should not be understood merely as economic growth, but as a multidimensional process that promotes social welfare, protects the environment, and ensures that development benefits are distributed across society. Therefore, the integration of environmental, social, and governance considerations into public financial management can be viewed as being consistent with the Islamic orientation toward responsible resource management and the realization of public benefit. In this study, the Islamic perspective does not replace the existing theoretical foundations of Fiscal Sustainability Theory, Institutional Theory, and Public Value Theory. Instead, it complements these perspectives by providing an ethical and value-based interpretation of why public resources should be managed to generate sustainable benefits for society. While Public Value Theory emphasizes the creation of value for society, the Islamic perspective adds the principles of *amanah* and *maslahah* as ethical foundations for ensuring that such value is directed toward broader and sustainable societal welfare.

Environmental, Social, and Governance - Public Financial Management (ESG-PFM)

Environmental, Social, and Governance - Public Financial Management (ESG-PFM) demonstrates a novel process regarding public financial management that consists of integrating Environmental, Social, and Governance (ESG) principles in all steps of fiscal planning, budgeting, budget implementation, and financial accountability of local governments. Unlike traditional public financial management (PFM) that usually prioritizes efficiency, effectiveness, and discipline, ESG-PFM focuses on generating economic, social, and environmental value in fiscal governance. From the perspective of FST, governments are expected not only to preserve fiscal sustainability but also to ensure that public expenditure supports development outcomes that remain sustainable over the long term. This perspective is complemented by IT, which explains that the adoption of ESG-PFM reflects an institutional response to changing regulatory expectations, increasing demands for good governance, and global policy initiatives such as the SDGs, together with the broader diffusion of ESG principles throughout the public sector (Nakpodia et al., 2024).

Among the theoretical perspectives employed in this study, PVT serves as the primary foundation for conceptualizing ESG-PFM. From this viewpoint, the ultimate purpose of public financial management is to generate public value through policies and public services that enhance societal well-being. Drawing on the complementary insights of FST, IT, and PVT, this study operationalizes ESG-PFM using five indicators: environmental expenditure, education expenditure, healthcare expenditure, social protection expenditure, and audit opinion (Furqan et al., 2020; Nakpodia et al., 2024). Environmental expenditure reflects the government's commitment to environmental sustainability and represents the environmental dimension of public value. The volume of the expenditure on education, health, and social security is used for determining government spending in terms of social development and represents the social dimension.

At the same time, the audit opinion serves as the governance measure because it indicates the level of transparency, accountability, and integrity regarding the local public finance management. Hence, the above indicators contribute to the analysis of the implementation of ESG principles in the management of public finances at the local level. Accordingly, ESG-PFM is measured using the ESG-PFM Index, a composite index

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constructed through PCA based on environmental expenditure, education expenditure, healthcare expenditure, social protection expenditure, and audit opinion. By integrating these dimensions into a single measure, the index provides a more comprehensive assessment of ESG implementation within public financial management and captures the combined contribution of its environmental, social, and governance components (Rossi et al., 2025). To the best of the author's knowledge, this integrated operationalization remains relatively uncommon in the public sector literature and therefore offers a meaningful contribution to the ongoing conceptual development of ESG-PFM.

Sustainable Regional Development (SRD)

Sustainable Regional Development (SRD) is a term used to describe a form of regional development that aims to create an equilibrium whereby the three domains of economic development, social development and environmental sustainability are all progressing evenly over time. Sustainable Regional Development is based upon the broader principle of sustainable development, which is a position that states human progress should not be gauged solely based on its contributions to economic development but also on its impact on quality of life and conservation of natural resources (Cavalheiro et al., 2025; Takano et al., 2023). From the perspective of PVT, regional development is considered successful when public policies generate meaningful public value by enhancing societal well-being, improving environmental quality, and promoting a more equitable distribution of development benefits (Mutiarani & Siswantoro, 2020). Accordingly, SRD is conceptualized as an outcome of public value created through government policies that are oriented toward the long-term interests of society.

Guided primarily by PVT and complemented by FST, this study operationalizes SRD through three interrelated dimensions. The economic dimension is represented by EG, the social dimension by AH, and the environmental dimension by EQI (Mutiarani & Siswantoro, 2020; Nakpodia et al., 2024). EG reflects a region's ability to generate sustainable economic value, whereas AH captures the extent to which development improves living conditions and promotes social well-being. On the other hand, the EQI indicates the capacity of the government to preserve the environmental quality, and this is generally deemed to be one of the conditions for ensuring sustainability in the long run. In this regard, all three indicators together provide a multi-dimensional view of SRD, acknowledging that regional development encompasses not only economic advancement but also the development of social and environmental sustainability. This conceptualization is consistent with the broader objective of generating public value through ESG-PFM.

Social SDGs Achievement (SSA)

Social SDGs Achievement (SSA) represents the extent to which governments advance the social dimension of sustainable development by improving human development, reducing poverty, and fostering a more equitable distribution of welfare. Viewed through the lens of PVT, public value emerges when public policies and financial management generate tangible improvements in people's well-being rather than merely fulfilling administrative or budgetary objectives (Huijbregts et al., 2022). From this point of view, the effectiveness of social progress should not solely be measured by the amount of the budget or the quantity of resources shared. More crucially, it should be evaluated based on the way in which the resources impact the people’s life quality.

Building on PVT, this study measures SSA through a composite index constructed using PCA based on three key indicators: HDI, PR, and GR (Trucco et al., 2021). The HDI captures

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progress of nations in three areas: education, health-care, and standard of living. PR shows how effective the government has been in fighting poverty. GR is indicative of the level of equity in a society, which is yet another key aspect of social equity. If studied jointly, these measures give a fuller picture of the ways a society has achieved development. They can be treated as indicators showing the total amount of social public value derived from the sustainable public finance management.

Regional Fiscal Capacity Level (RFCL)

Regional Fiscal Capacity Level (RFCL) represents the capacity of local governments to finance public administration and development activities through the fiscal resources at their disposal. From the perspective of FST, sufficient fiscal capacity is a fundamental condition for maintaining the long-term provision of public services while supporting economic development without creating excessive fiscal pressure (Rossi et al., 2025). Local governments having superior fiscal capacities are typically in a better position to exercise more flexibility in allocating resources across economic, social and environmental priorities. The aforementioned flexibility enables local authorities to transform the social advancements into regional development outcomes better than those local governments which operate under tight fiscal constraints (Mutiarani & Siswantoro, 2020). Accordingly, this study conceptualizes RFCL as a moderating variable that shapes the relationship between social development and sustainable regional development.

For empirical measurement, RFCL is represented by the Regional Fiscal Capacity Ratio published by the Ministry of Finance of the Republic of Indonesia (Menteri Keuangan Republik Indonesia, 2024). According to the classification shown in Table 3, local governments have been divided into one of five fiscal capacity groups (very low, low, moderate, high, and very high). This classification shows how local governments are financially able to meet their development needs. Given these variations, fiscal capacity is expected to influence how strongly SSA contributes to SRD, providing both theoretical justification and empirical support for positioning RFCL as the moderating variable in the proposed research model.

Table 3. Classification of Regional Fiscal Capacity Levels

Regional Fiscal Capacity Ratio	Fiscal Capacity Category
RFCR < 0.905	Very Low
0.905 ≤ RFCR < 1.141	Low
1.141 ≤ RFCR < 1.378	Moderate
1.378 ≤ RFCR < 1.615	High
RFCR ≥ 1.615	Very High

Source: Ministry of Finance of Indonesia (adapted).

ESG-PFM and SSA

The ESG PFM is a public financial management strategy that includes environmental, social, and governance principles throughout the local government financial management cycle, which includes aspects such as planning, budgeting, budget execution, and financial oversight. Unlike other strategies that only focus on financial stability, this approach acknowledges the need for fiscal policy to also create environmental, social, and governance value that facilitates sustainable development (Nakpodia et al., 2024). ESG PFM in local government is seen through the distribution of public resources for environmental protection, education, healthcare, and social protection, accompanied by improved governance practices as shown

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in the audit opinion. This means that local authorities will divert their financial resources according to the strategy of sustainability.

The relationship between ESG PFM and SSA can be explained by drawing on the complementary insights of FST and IT. FST states that fiscal sustainability relies not only on sustaining fiscal balance but also on how well the government can allocate public funds to achieve long-term goals. When taking this viewpoint, it becomes clear that the implementation of ESG principles in the area of public financial management is a crucial tool for increasing the efficiency of public spending (Harris & Lawson, 2023). IT complements this argument by emphasizing that local governments do not adopt ESG PFM in isolation. Instead, they respond to coercive, normative, and mimetic pressures arising from their institutional environment, including the implementation of the SDGs, continuing public financial management reforms, and increasing expectations for transparency and accountability (Nakpodia et al., 2024). As these institutional pressures intensify, governments are expected to strengthen social development outcomes through more systematic and sustainability-oriented fiscal practices.

Prior research supports this claim. Filho et al., (2022) discovered that the integration of sustainability principles into public policies helps to enhance the achievement of SDG goals. Likewise, Sachs et al., (2023) showed that an increase in government funding for education, healthcare, and social protection has an important impact on SDG progress. Consistent with these findings, the OECD (2023) reported that sustainability-oriented budgeting approaches, including green budgeting and SDG budgeting, enhance the effectiveness of public expenditure in promoting more inclusive social development. Building on these theoretical arguments and empirical findings, the following hypothesis is proposed:

H1: ESG-PFM has a significant positive effect on SSA.

The Mediating Role of SSA in the Relationship Between ESG-PFM and SRD

The influence of ESG PFM on SRD is expected to unfold through improvements in social development rather than arise as an immediate direct effect. Based on this reasoning, SSA is positioned in this study as the mediating mechanism through which ESG PFM contributes to sustainable regional development. Investment from the government in education, healthcare, social welfare, and environmental programs does not usually bring about extensive results within a short period of time. These investments are assumed to first boost the social aspect of the Sustainable Development Goals (SDGs) and then ensure the steady improvement of social conditions of the regions.

This mediating relationship is well aligned with PVT, which emphasizes that the performance of public sector organizations should ultimately be evaluated by the public value they create through better public services, greater social equity, and improved societal well-being (Huijbregts et al., 2022). From this perspective of ESG PFM- as a policy tool for local governments- this means that the local authorities can produce public value through improving SSA. The progress in social development can be achieved through improvements in education, healthcare, poverty alleviation, and income equality, which would allow them to bring more consequent benefits to their regions. Accordingly, SSA provides the principal pathway through which ESG PFM is translated into SRD.

This proposed mechanism has been proven by previous research. Filho et al., (2022) indicated that sustainability-driven public policies help attain sustainable development through improved SDG performance. Similarly, Mutiarani & Siswantoro (2020) believed that making progress towards SDGs serves as a significant basis for constructing inclusive and sustainable development. Moreover, Sachs et al., (2023) believed that better achievement of

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SDG indicators causes better economic, social, and environmental development results. Taken together, these theoretical perspectives and empirical findings provide the basis for the following hypothesis.

H2: SSA mediates the relationship between ESG-PFM and SRD.

SSA and SRD

SSA reflects the extent to which local governments advance the social dimension of sustainable development by strengthening human development, reducing poverty, and promoting greater income equality. This research defines the concept of SSA through three measures: HDI, PR and GR. Advancement in these measures is anticipated to improve human and social capital which would lead to a solid basis for inclusive economic development, better quality of life and improved environmental sustainability. From this view, it is important to understand social development as both a vital policy goal and an important driver of SRD.

This relationship can be understood through the complementary perspectives of PVT and FST. PVT maintains that the performance of public sector organizations should ultimately be judged by their ability to generate public value through improvements in societal well-being, the quality of public services, and sustainable development outcomes (Huijbregts et al., 2022). In the framework of this research, progression in human development, reduction of poverty level, and equal distribution of wealth serve as verifiable manifestations of public value. It is expected that these social benefits would lead to more inclusive economic growth, creation of adequate housing, and enhancement of environmental quality. FST reinforces this perspective by arguing that sustainable development depends on the government's ability to maintain sufficient fiscal resources to finance long-term investment in social development (Burnside, 2005). Taken together, these theoretical perspectives suggest that stronger SSA should contribute positively to SRD.

The current academic literature backs this proposition. According to the UN, in the SDG framework, investing in human development, poverty eradication and reducing inequalities is essential for the attainment of economic development and environmental sustainability. In line with this perspective, Sachs et al., (2023) discovered that countries and areas that perform better in the social dimension of the SDGs tend to have better sustainable development results. Moreover, the OECD (2023) found that when human capital and social inclusion improves, it positively affects sustainable growth and quality of life. Based on these theoretical and empirical observations, the current hypothesis is advanced.

H3: SSA has a significant positive effect on SRD.

The Moderating Role of RFCL in the Relationship Between SSA and SRD

The significance of SSA will undoubtedly hinge on the financial capability of the municipalities, without which improvements in social progress will not play any major role in SRD development, as their positive influence cannot be felt without sufficient funding for the program in the long run. RFCL indicates how well local governments are able to generate and use funds to meet their development needs. Local authorities that have better financial capacities usually have more financial opportunity to continue investing in education, healthcare, social protection, and environmental initiatives. Conversely, governments facing tighter fiscal constraints may find it more difficult to sustain the continuity and quality of public services, reducing their ability to translate improvements in social development into broader and more sustainable regional development outcomes.

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This moderating effect can be understood through the perspective of FST, which emphasizes that sufficient fiscal capacity is a fundamental prerequisite for maintaining public policies and preserving the long-term effectiveness of development initiatives (Huijbregts et al., 2022). Local authorities with superior fiscal capabilities are more prone to offer continuous funding for social development initiatives, regardless of harsh financial conditions. Therefore, it is likely that the progress achieved in such areas as human development, poverty alleviation, and income equality will provide a substantial boost to SRD in those regions whose fiscal capabilities are relatively high. Conversely, adverse financial conditions may hinder local governments' capacity to translate the successes in social development into broad and sustainable development benefits.

Earlier research studies confirm that fiscal capacity is crucial contextual factor of the correlation between social and sustainable development. In their study, Vazquez et al. (2020) showed that the higher the fiscal capacity the better equipped local authorities become to convert public policy into effective developments. Similarly, the OECD (2023) reported that governments with greater fiscal capacity tend to be more successful in implementing sustainability-oriented budgeting reforms. Shah (2004) further argued that stronger fiscal capacity improves the effectiveness of public service delivery, enabling the benefits of social development to be translated more fully into societal well-being and sustainable development. Taken together, these theoretical arguments and empirical findings provide the basis for the following hypothesis.

H4: RFCL moderates the relationship between SSA and SRD.

Research Method

Research Design and Data Collection

This study adopts a quantitative approach with an explanatory research design to examine the causal relationships among ESG PFM, SSA, RFCL, and SRD. The empirical examination relies on panel data, which integrate the cross-section with time series data as they provide the opportunity to grasp not only the divergences between provinces but also the transformations that occur over time. The analysis is centered on provincial governments in Indonesia, which are crucial players in managing regional public finances and implementing development policies aimed at sustainability.

The research investigates the period between 2015 and 2024 and looks at the whole population of Indonesian provincial governments. Currently, Indonesia has 38 provinces but only 34 provinces are included in the empirical analysis. Four newly created provinces in Papua Province (namely Papua Selatan, Papua Tengah, Papua Pegunungan, and Papua Barat Daya) do not provide sufficient observation because they were formed after 2022 and do not complete the whole duration of the study. Limiting the sample in this way ensures a balanced panel dataset comprising 340 observations, representing 34 provinces observed consistently over ten years.

The use of provincial-level panel data provides a comprehensive basis for examining how variations in fiscal management, social development, and regional fiscal capacity relate to sustainable development outcomes across different institutional and socioeconomic contexts. By incorporating both spatial and temporal dimensions, this approach allows the study to account for regional heterogeneity and observe changes in fiscal governance and development performance over time. Furthermore, the provincial setting offers a relevant

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context for evaluating sustainability-oriented public financial management from an Islamic economic perspective, particularly in relation to *amanah* (responsible stewardship), *maslahah* (public welfare), and the equitable allocation of public resources.

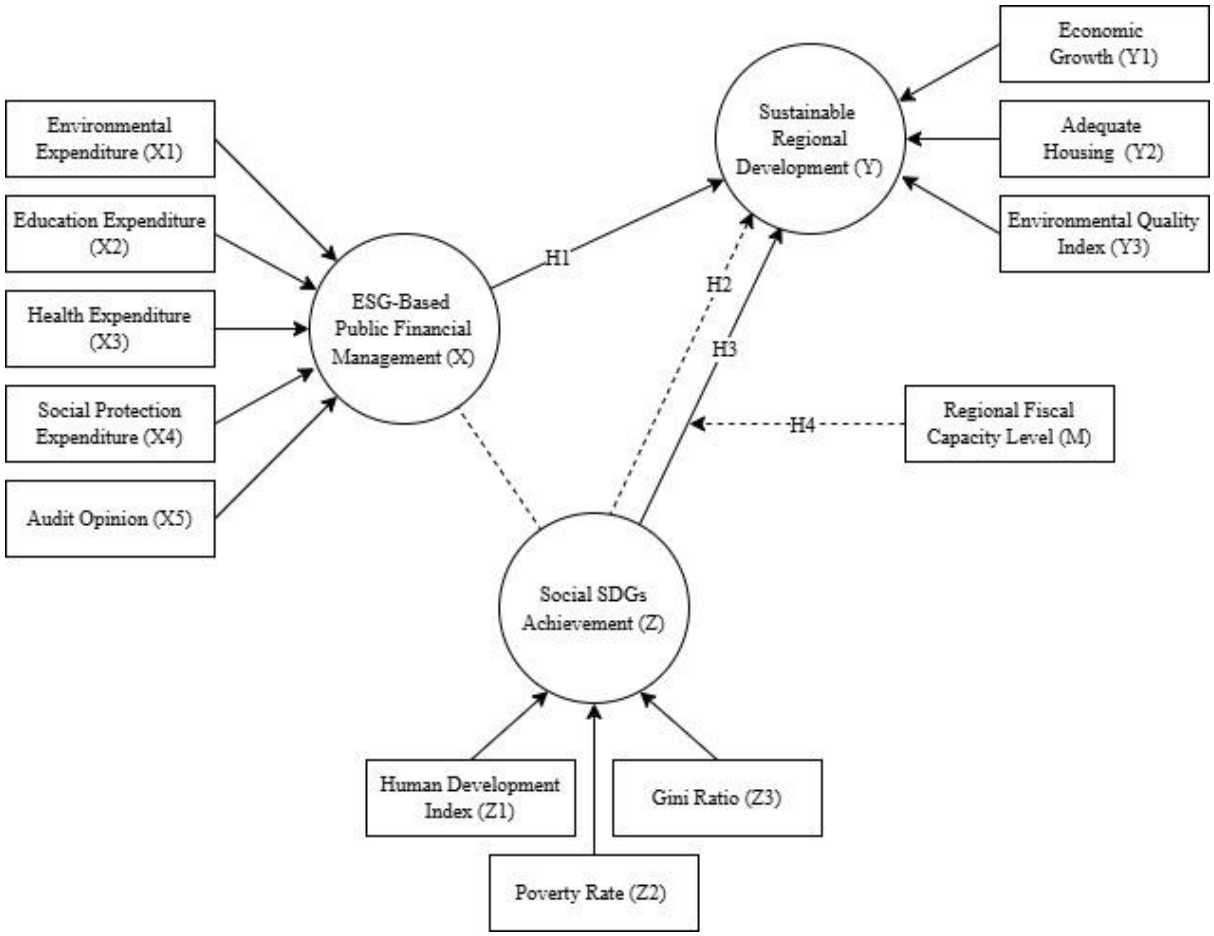


Figure 3. Research Framework

Variable Measurement and Operational Definition

This study investigates four principal variables: ESG PFM as the independent variable, SSA as the mediating variable, SRD as the dependent variable, and RFCL as the moderating variable. ESG PFM, SSA, and SRD are operationalized as composite indices constructed using Principal Component Analysis (PCA), whereas RFCL is measured using the Regional Fiscal Capacity Ratio. The data used to develop these variables were obtained from official government institutions, including the Directorate General of Fiscal Balance (DJPK), the Ministry of Finance of the Republic of Indonesia, Statistics Indonesia (BPS), the Ministry of Environment and Forestry (KLHK), and the Audit Board of the Republic of Indonesia (BPK RI).

Before the composite indices were created, all the indicators were subject to min-max normalization in Excel. This normalization was performed to ensure all indicators have a common scale of measurement, making sure that despite the differences in units used to express the variables, they do not exert undue influence on the PCA method. Following the method proposed by Singh (2004), indicators with a positive expected direction were normalized using the following equation:

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$$\frac{(X - Xmin)}{(Xmax - Xmin)}$$

In contrast, indicators with a negative expected direction, specifically PR and GR, were normalized using the following equation:

$$\frac{(Xmax - X)}{(Xmax - Xmin)}$$

This normalization procedure ensures that higher values consistently indicate better development performance across all indicators, thereby improving the comparability and interpretability of the resulting composite indices. The operational definitions of the variables included in this study are presented in Table 4.

Table 4. Operational Definition of Variables

Variable	Indicator	Measurement	Expected Direction	Source
ESG-Based Public Financial Management (ESG-PFM)	Environmental Expenditure	Annual environmental expenditure (IDR)	+	DJPK, Ministry of Finance
	Education Expenditure	Annual education expenditure (IDR)	+	DJPK, Ministry of Finance
	Health Expenditure	Annual health expenditure (IDR)	+	DJPK, Ministry of Finance
	Social Protection Expenditure	Annual social protection expenditure (IDR)	+	DJPK, Ministry of Finance
	Audit Opinion	Ordinal score: 1 = Disclaimer, 2 = Adverse, 3 = Qualified, 4 = Unqualified	+	BPK RI
Social SDGs Achievement (SSA)	Human Development Index (HDI)	Index	+	BPS
	Poverty Rate (PR)	Percentage of population below the poverty line (%)	−	BPS
	Gini Ratio (GR)	Index	−	BPS
Sustainable Regional Development (SRD)	Economic Growth (EG)	Annual economic growth rate (%)	+	BPS
	Adequate Housing (AH)	Percentage of households with access to adequate housing (%)	+	BPS

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Variable	Indicator	Measurement	Expected Direction	Source
	Environmental Quality Index (EQI)	Index	+	KLHK
Regional Fiscal Capacity Level (RFCL)	Regional Fiscal Capacity Ratio (RFCR)	Fiscal Capacity Ratio Index	Moderator	Ministry of Finance

Source: Compiled by the authors based on data from DJPK, Ministry of Finance, BPS, KLHK, and BPK RI.

Construction of ESG-PFM and SSA Indices Using PCA

This paper builds composite indices for ESG-PFM, SSA and SRD based on PCA. The use of PCA was chosen due to its data-driven and objective property in constructing multidimensional composite sustainability indices, which integrates several correlated indicators with the aim being to preserve as much information as possible. PCA does not require assigning equal contribution among the indicator nor relies on subjective choices as observed in the equal-weighting approach or weighting based on expert judgement (Cartone & Postiglione, 2021). In addition, the use of PCA is more appropriate than Confirmatory Factor Analysis (CFA), because this study does not intend to confirm latent factors but instead aims at developing empirical composite indices representing multidimensional sustainability performance. PCA is also recommended as an option for composite sustainability measurement, where the goal is index construction based on empirical variation rather than theory-driven measure validation making it one of the most widely implemented methods in sustainability, economics and public policy research.

Before the extraction step, all indicators were normalized by min-max normalization to achieve comparability of measurements among variables. Then, the ordinary correlation matrix was used to estimate the eigenvalues, explained variance, component loadings, and the principal component scores using PCA in EViews 14. The first principal component (PC1) was selected to construct the ESG-PFM, SSA and SRD indices as it accounted for the largest proportion of the variation present in each set of indicators. Principal components are empirical latent variables whose direction is determined only by the covariance or correlation structure of the observed data, not by a priori theoretical expectations (Jolliffe & Cadima, 2016). The resulting composite indices thus objectively reflect the statistical patterns prevailing in the data without any a priori assumption regarding the importance or weight of indicators.

A key implication of using PCA is that the direction of the resulting components is mathematically arbitrary, because multiplying all component loadings and scores by −1 yields an identical solution, with no change in the proportion of variance explained, goodness of fit, or statistical relationships among variables (Jolliffe & Cadima, 2016). In this study, we deliberately keep the original empirical ordering that comes out of the PCA algorithm, rather than reversing the direction of the index to be consistent with theoretical expectations. Retaining the original orientation preserves objectivity and reproducibility of composite indices, and prevents post-estimation researcher intervention that might introduce subjective bias. The hypothesis testing of this study underlined the statistical significance of the constructs and the substantial association among the constructs, while the empirical direction of the PCA based indices determined the direction of the regression coefficient. A full set of

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PCA results, including eigenvalues, component loadings and explained variances, is presented in the Results and Discussion.

Econometric Model Specification

In order to better understand the interrelations outlined in the conceptual framework, three panel data regression models have been developed. In the first instance, this model will be used to measure the impact of ESG PFM on SSA, the mediator. The following models will allow us to observe the direct impact of ESG PFM on the SRD, while taking into account the indirect path carrying through the mediating variable of SSA. The third model takes this inquiry a step further to see if the moderator of RFCL affects the relationship between SSA and SRD, allowing for the introduction of an interaction term in the regression equation. Panel data regression will be used to estimate the above-mentioned models. Instead of using the same estimation process and technique for all models, the researcher will take various tests before deciding which estimator will suit each model best as it makes it possible to guarantee that the technique used in estimation corresponds best to the dataset. The empirical models employed in this study are specified as follows:

Model 1:

$$SSAit = \alpha + \beta 1\ ESGPFMit + eit$$

Model 2:

$$SRDit = \alpha + \beta 1\ ESGPFMit + \beta 2\ SSAit + eit$$

Model 3:

$$SRDit = \alpha + \beta 1\ ESGPFMit + \beta 2\ SSAit + \beta 3\ RFCLit + \beta 4\ (SSAit \times RFCLit) + eit$$

Notes:

- $SRDit$ = Sustainable Regional Development in province i at time t;
- $SSAit$ = Social SDGs Achievement;
- $ESGPFMit$ = ESG-Based Public Financial Management;
- $RFCLit$ = Regional Fiscal Capacity Level;
- $SSAit \times RFCLit$ = Interaction term between SSA dan RFCL;
- α = Constant (intercept);
- β = Regression coefficient;
- eit = Error term.

In this research, the concept of moderated mediation has been applied as the basis for developing the methodology. Here, SSA works as the mediator through which ESG PFM influences SRD, while RFCL is the moderator that pertains to the strength of the relationship between SSA and SRD. Hence, the indirect impact from ESG PFM on SRD should differ according to the fiscal capabilities possessed by certain local governments. This methodology permits establishing not only whether ESG PFM contributes to sustainable regional development but also how this relationship works. The mediator role of SSA was outlined and analyzed in terms of the fiscal conditions under which it has more or less influence. Hence, the moderated mediation model contributes to a wider understanding of the impact brought by environmentally sustainable public finance management practices in case we apply different areas of local fiscal capacity.

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Estimation Procedure

The empirical analysis relies on panel data regression because the dataset combines cross-sectional observations from 34 Indonesian provinces with annual observations covering the period from 2015 to 2024. This data structure allows the inclusion of both variances of provinces and time-related alterations within one analysis framework. Panel data regression has important advantages compared to estimating individual cross-sectional or temporal models, such as higher efficiency with regard to parameter estimation, larger effective sample size, and improved ability to deal with issues arising from the unobserved heterogeneous nature of variables. All models were estimated in EViews 14 by means of three different panel data specifications, the Common Effects Model (CEM), Fixed Effects Model (FEM), and Random Effects Model (REM). The most appropriate specification for each model was determined through a sequential model selection procedure based on the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test, ensuring that the final estimator matched the characteristics of the panel dataset.

After having determined the required specification, various diagnostic checks were undertaken to check whether the regression estimators being used were valid. Basuki & Prawoto (2016) argue that while it is common for ordinary least squares (OLS) analysis to require checking of all classical assumptions, this does not apply to the case of panel data regression since the latter framework accommodates certain econometric issues. Thus, the analysis is focused on only two critical diagnostics: multicollinearity and heteroskedasticity. The former test is used to see whether there is too much correlation among explanatory variables and therefore we are able to come up with interpretable and stable coefficient estimates. The latter test is carried out to check if the variance of the residuals is constant over all observations.

Robustness Analysis

In order to validate the empirical results, the author conducts a robustness test through Partial Least Squares Structural Equation Modeling (PLS-SEM) using a bootstrapping procedure in SmartPLS 4. The test conducted is an additional method to verify the main findings using different analytics. Unlike panel data regression, which follows a covariance-based framework, PLS-SEM is variance-based and allows structural relationships to be estimated simultaneously while providing greater flexibility in handling different data characteristics (Hair, 2019). Employing both methods therefore provides an additional basis for assessing whether the study's conclusions are robust rather than being driven by the assumptions of a single estimation technique.

The bootstrapping method resamples the original data on a repeated basis in order to generate estimates of the empirical sampling distribution of the individual path coefficients. This technique provides estimates of standard errors, t-statistics, and p-values independent of any parametric assumptions related to the distribution of the data. The resultant estimates are compared with those derived from regression models in order to assess the robustness of the empirical findings. When comparable patterns emerge from the two types of estimation, it will make it possible to interpret the results with greater confidence (Lindner & Puck, 2022). Full results of the robustness check can be found in the section labeled Results and Discussion.

Carried out in a number of related steps, the research aimed for methodological coherence and for achieving the stated research goals systematically. The study started with the identification of the research problem, a study of relevant theory, formulation of research hypotheses and development of the conceptual framework. Once these preliminary stages had

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been completed, all indicators were normalized using the min max normalization method before composite indices for ESG PFM, SSA, and SRD were constructed through PCA.

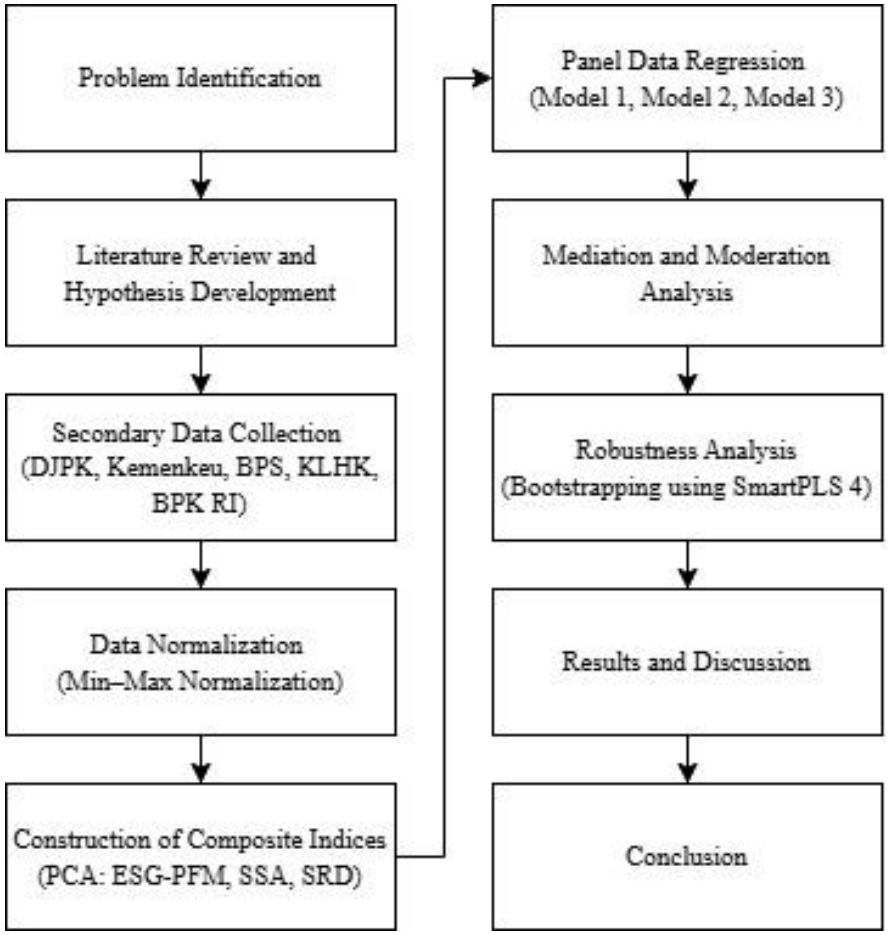


Figure 4. Research Flow

The next stage consisted of estimating the panel data regression models, examining the proposed mediation and moderation relationships, and performing a robustness analysis using the bootstrapping procedure in SmartPLS 4. The complete sequence of the research process is illustrated in Figure 4, which summarizes the methodological framework adopted throughout this study.

Results

Descriptive Statistics

Prior to starting the main empirical analysis, descriptive statistics were looked into initially to gain an understanding of the dataset. As presented in Table 5, the study employs a balanced panel dataset comprising 340 observations from 34 Indonesian provinces over the period 2015–2024. All the variables underwent min max normalization method as a means to provide a common measuring scale and allow comparison of indicators. The descriptive analysis has shown that all the variables studied vary sufficiently, therefore showing sufficient mean

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values, standard deviations, minimums, and maximum values. Such degree of variation represents a difference in different level of fiscal capacity, social conditions and regional development of Indonesian provinces. Such variation provides a suitable empirical foundation for constructing the composite indices through PCA and for estimating the subsequent panel data regression models.

Table 5. Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Environmental Expenditure	0.0286	0.1047	0.0002	1.0000
Education Expenditure	0.1239	0.1616	0.0012	1.0000
Health Expenditure	0.0904	0.1517	0.0063	1.0000
Social Protection Expenditure	0.0306	0.0764	0.0012	1.0000
Audit Opinion	0.9860	0.0575	0.7500	1.0000
Human Development Index	0.8500	0.0511	0.6803	1.0000
Poverty Rate	0.6604	0.1764	0.0909	0.8900
Gini Ratio	0.2180	0.0909	0.0000	0.4666
Economic Growth	0.5269	0.0962	0.0000	1.0000
Adequate Housing	0.7316	0.1951	0.2629	1.0000
Environmental Quality Index	0.7665	0.1094	0.0000	1.0000
Regional Fiscal Capacity Level	1.2172	1.2045	0.1030	9.2500

Source: Authors' calculation using EViews 14.

Construction of Composite Indices Using PCA

Before the research hypotheses were evaluated, composite indices for ESG PFM, SSA, and SRD were constructed using PCA. A summary of the PCA results is presented in Table 6. The analysis indicates that the first principal component (PC1) generated eigenvalues of 3.365 for ESG PFM, 1.701 for SSA, and 1.215 for SRD, accounting for 67.30%, 56.69%, and 40.51% of the total variance in their respective sets of indicators. PC1 has been chosen to represent the measure corresponding to each of the components extracted, and it accounts for the highest amount of variance when compared to the other components. The final scores of PC1 have thus been used in all regression analyses carried out through the use of panel data in this research.

Table 6. Summary of Principal Component Analysis Results

Construct	Number of Indicators	First Eigenvalue	Variance Explained (%)	Selected Component
ESG-PFM	5	3.365	67.30	PC1
SSA	3	1.701	56.69	PC1
SRD	3	1.215	40.51	PC1

Source: Authors' calculation using EViews 14.

Panel Model Selection

The most appropriate panel data regression model was selected through a sequential specification procedure involving the Chow Test, Hausman Test, and Breusch–Pagan LM Test. The complete results are presented in Table 7. For Model 1, the Chow Test rejected the

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CEM in favor of the FEM. However, the Hausman Test produced a probability value of 0.6394, indicating that the REM was the more suitable estimator for the final analysis. Different results were obtained for Models 2 and 3. In both cases, the Chow Test and the Hausman Test produced probability values below the 5% significance level, supporting the use of FEM as the final estimation model. Although the LM Test indicated that REM performed better than CEM across all three models, this result did not alter the final specification because model selection followed the standard sequential testing procedure. Accordingly, the Hausman Test served as the key criterion for determining whether FEM or REM was the most appropriate estimator for each empirical model.

Table 7. Panel Model Selection Results

Model	Chow Test (Prob.)	Hausman Test (Prob.)	LM Test (Prob.)	Selected Model
Model 1 (SSA)	0.0000	0.6394	0.0000	REM
Model 2 (SRD)	0.0000	0.0000	0.0000	FEM
Model 3 (SRD with Moderation)	0.0000	0.0000	0.0000	FEM

Source: Authors' calculation using EViews 14.

Classical Assumption Tests

Prior to performing the hypothesis testing, diagnostic tests for multicollinearity and heteroskedasticity were carried out on the estimated panel data regression models. The correlation matrix was used to measure multicollinearity, while heteroskedasticity was tested using Breusch-Pagan-Godfrey Test (BPGT). The findings of these diagnostic tests have been summarized in Table 8 and 9. The examination of the diagnostic tests reveals that all the models fulfill the necessary assumptions of the panel data estimation. Findings of the tests indicate that independent variables do not suffer from the problem of serious multicollinearity, and also no signs of the heteroskedasticity problem that could affect the reliability of the estimated coefficients were found.

Table 8. Multicollinearity Test Results

Model	Highest Correlation	Decision
Model 1	0.260	No multicollinearity
Model 2	0.262	No multicollinearity
Model 3	0.719	No multicollinearity

Source: Authors' calculation using EViews 14.

The multicollinearity checks indicate that the correlation coefficients are not exceeding the limit of 0.80. The greatest correlation occurs in Model 3 between SSA and the interaction variable, with a coefficient of 0.719. This is indeed the highest correlation observed among the independent variables. Nevertheless, the obtained value is lower than what is considered problematic for the panel data analysis purposes. Thus, the results show that the independent variables are capturing different features of relationships in the data and provide different explanations for the model. Therefore, it can be concluded that the assumption of the absence of serious issues with multicollinearity is fulfilled resulting in the credibility of the obtained regression coefficients.

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Table 9. Heteroskedasticity Test Results

Model	Obs*R-squared	Prob. Chi-Square	Decision
Model 1	0.324	0.5690	No heteroskedasticity detected
Model 2	2.307	0.3155	No heteroskedasticity detected
Model 3	2.701	0.6091	No heteroskedasticity detected

Source: Authors' calculation using EViews 14.

The application of BPGT to conduct the oppositely-skewed heteroskedasticity diagnostic shows that the observed R-square probabilities of all assessed models are higher than the 5% significance threshold. Specifically, the observed R-square probabilities are equal to 0.5690 in Model 1, 0.3155 in Model 2, and 0.6091 in Model 3. Thus, it can be concluded that the null hypothesis of homoskedasticity is adhered to. It follows that the variance of residuals is stable across observed values, implying the absence of any heteroskedasticity factors affecting the stated models. Hence, it may be inferred that the homoskedasticity assumption is proven, which makes panel data estimates valid and adequate for further hypothesis tests.

Hypothesis Testing

Hypothesis testing was conducted using the panel data regression models selected through the model specification procedure. The estimation results for Model 1 indicate that ESG PFM exerts a positive and statistically significant influence on SSA, with a coefficient of 0.139091, a t statistic of 3.223549, and a probability value of 0.0014. Since the probability value is below the 5% significance level, the proposed relationship is supported statistically. These findings suggest that stronger implementation of ESG PFM is associated with improved SSA, indicating that sustainability-oriented public financial management contributes meaningfully to better social development outcomes. Accordingly, H1 is accepted.

Table 10. Estimation Results of Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000	0.207	0.000	1.000
X	0.139	0.043	3.224	0.001

Source: Authors' calculation using EViews 14.

The findings for Model 2 indicate that ESG PFM has a statistically meaningful relationship with SRD, as evidenced by an estimate coefficient of −0.398888 ($p < 0.001$). Also, SSA has a notable relationship with SRD, as demonstrated by a coefficient of −1.122116 ($p < 0.001$). Taken together with the results of Model 1 that prove that ESG PFM has a significant impact on SSA, these findings provide empirical evidence for the mediating impact of SSA on the relationship between ESG PFM and SRD. Therefore, H2 and H3 must be accepted. Since both SSA and SRD were created using PCA, the direction of their indices has to follow the empirical correlation of observed data, not the assumptions based on something theoretical. Consequently, the interpretation of the hypothesis tests focuses primarily on the statistical significance of the estimated relationships, while the direction of the regression coefficients is interpreted with reference to the empirical orientation of the PCA-derived indices.

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Table 11. Estimation Results of Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001	0.041	-0.029	0.977
X	-0.399	0.073	-5.467	0.000
Z	-1.122	0.089	-12.573	0.000

Source: Authors' calculation using EViews 14.

The estimation results of model 3 show that ESG PFM is still significantly related to SRD with the coefficient of $\beta = -0.383429$ ($p < 0.001$). Likewise, SSA is still showing a strong association with SRD, with a coefficient of -1.178220 ($p < 0.001$). In addition, the direct effect of RFCL on SRD is positive and statistically significant, with a coefficient of 0.212476 ($p < 0.001$). Also, the interaction term between SSA and RFCL (SSA × RFCL) is statistically significant, with a coefficient of -0.072618 and a probability value of 0.0409. This finding supports H4 by showing that RFCL does significantly moderate the relationship between SSA and SRD. In line with the proposed conceptual model, the moderation effect is interpreted based on the role of RFCL in altering the strength of the SSA–SRD relationship rather than as an indication of a direct effect between ESG PFM and SRD.

Table 12. Estimation Results of Model 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.228	0.071	-3.208	0.002
X	-0.383	0.071	-5.371	0.000
Z	-1.178	0.094	-12.472	0.000
M	0.212	0.050	4.234	0.000
Z*M	-0.073	0.035	-2.053	0.041

Source: Authors' calculation using EViews 14.

Robustness Analysis

To evaluate the consistency of the empirical results, this study conducts a robustness analysis using an alternative estimation approach, namely Partial Least Squares Structural Equation Modeling (PLS-SEM) with the bootstrapping procedure implemented in SmartPLS 4. While the first analysis uses panel data regression, PLS-SEM is a variance-based estimation approach which allows testing structural relationships without strong distributional assumptions. The bootstrapping provides additional evidence for the stability and reliability of the relationships established in the main empirical model. The results of the robustness analysis are summarized in Table 13.

Table 13. Robustness Analysis Using Bootstrapping

Relationship	Original Sample	t-Statistic	p-value	Decision
ESG-PFM → SSA	0.799	48.157	0.000	Significant
ESG-PFM → SRD	0.586	10.932	0.000	Significant
SSA → SRD	0.733	11.563	0.000	Significant
RFCL → SRD	0.077	2.578	0.010	Significant
SSA × RFCL → SRD	-0.202	2.268	0.024	Significant

Source: Authors' calculation using SmartPLS 4.

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The bootstrapping results indicate that all the structural relationships are statistically significant with the t statistics exceeding 1.96 and p values less than 0.05. The results show that ESG PFM has significant effects on SSA and SRD. At the same time, SSA correlates significantly with SRD. Furthermore, RFCL has a significant direct effect on SRD, and the interaction term between SSA and RFCL (SSA × RFCL) is confirmed as a significant moderating effect. Although the magnitude of the estimated coefficients differs from those obtained through the panel data regression models due to differences in the underlying estimation approaches, the overall direction and significance patterns remain consistent. This consistency provides evidence that the empirical findings are robust and are not dependent on the assumptions of a single analytical method. Hence, the results increase confidence in the reliability and validity of the conclusions drawn from the study.

Discussion

ESG-Based Public Financial Management as a Driver of Social SDGs Achievement

The empirical results show that ESG-PFM has a significant effect on SSA, thus supporting H1. The results show that the implementation of the environmental, social, and governance principles in public financial management enhances the effectiveness of local governments in achieving social development goals. From an IT perspective, public financial management practices are driven by internal fiscal efficiency issues, but also by external institutional pressures from regulatory requirements, implementation of SDGs, demands for good governance, and increased societal demands for transparency and accountability (Eitrem et al., 2024). Therefore, the establishment of ESG-PFM is an institutional adjustment to enhance the legitimacy of the government, and at the same time, it can improve the quantitative results of social development.

The results contribute to our comprehension of the process through which institutional pressures impact better SSA results. Provincial governments in Indonesia are operating in a decentralized fiscal environment where their legitimacy is increasingly dependent on their ability to show quantifiable development outcomes, rather than compliance to administrative rules. Governments are therefore forced by institutional pressures to combine the components of environmental protection, education, health care, social welfare and governance into a coherent budgeting frame to make fiscal decisions consistent with sustainability goals. The integrated approach allows the use of public resources in addressing multiple social challenges simultaneously and allows for fiscal interventions that lead to cumulative improvements in human development, poverty alleviation and income equality rather than isolated sectoral successes.

The dimension of governance is one of the indispensable parts of the mechanism since a audit opining not only compliance with accounting regulations but also the other ways of representation. Through ESG-PFM, audit opinion is not just one of the ways of accounting indicators in which it reflects financial transparency, accountability, and the credibility of the public financial reporting but can also be described as that. A good financial reporting reduces the information asymmetry which, in turn, brings the stakeholders' trust and public confidence in the government's management of public resources. In other words, governance contributes the success of environmental and social expenditures since it guarantees the money allocated for them gets into tangible and useful services rather than getting lost through financial inefficiency or poor monitoring. As a result, this study revealed that governance is a major factor behind public value creation in the case of ESG-oriented financial management.

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The findings further support FST, which argues that fiscal sustainability depends not only on maintaining fiscal balance but also on allocating public resources strategically to achieve long-term development objectives (Burnside, 2005). ESG-PFM facilitates this process by directing government expenditure toward education, healthcare, social protection, and environmental programs that gradually strengthen human capital and improve social welfare. These investments create cumulative rather than immediate benefits because improvements in education and health enhance productivity, poverty reduction increases social inclusion, and better income distribution strengthens social resilience. Accordingly, fiscal sustainability should be evaluated according to governments' capacity to transform financial resources into sustainable social outcomes rather than focusing exclusively on fiscal discipline.

With regard to public sector accounting, the results of this study demonstrate the expansion of the role of PFM by introducing ESG-PFM beyond its traditional scope of being focused on financial stewardship and budgetary control. Information related to financial issues needs to move beyond the idea of demonstrating adherence to regulation or budget implementation to become a tool for determining whether expenditures of government create value to society. This approach supports the shift from financial accountability to performance accountability and emphasizes the use of accounting information for performance measurement systems that consider both financial and nonfinancial measures.

This finding is consistent with existing empirical evidence that highlights the positive impact of efficient public financial management on development outcomes. The main difference between the present research and other literature findings is that previous research focused on evaluating the influence of good governance, public spending, and fiscal capacity on the development performance separately (Rossi et al., 2025). This paper adds to IT by showing that institutional pressure motivates not only the implementation of ESG-oriented public financial management but also improves SSA through the implementation of integrated fiscal governance. The study also enriches the literature on public sector accounting by providing a new conceptualization of ESG-PFM as integrated accounting and performance measurement.

Social SDGs Achievement as the Public Value Creation Mechanism Linking ESG-PFM to Sustainable Regional Development

Results show that SSA acts as an intervening variable between ESG-PFM and SRD, which empirically confirms H2. Results reveal that the contribution of ESG-PFM towards sustainable regional development is achieved indirectly via social transformation rather than directly via fiscal intervention. First, sustainability-driven financial management leads to better human development, eradication of poverty and income inequality, which are later transformed into regional development outcomes. Within the framework of PVT, assessment of public sector efficiency is not limited to financial aspects but needs to consider its capability to create public value via improvement of people's welfare, quality of life and public service provision (Moore, 2013). In this regard, SSA may be considered an early indicator of public value created through ESG-PFM.

The mediation of SSA helps to understand why the relationship between ESG-PFM and sustainable regional development is indirect and why social performance becomes the main transmission channel. The impact of public financial management mainly comes from the efficient use of public finances as opposed to actual developmental results. This means that fiscal actions have to start by enhancing the social conditions necessary for sustainable development. Educational programs build up the level of human capital, while health policies

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increase the productivity of labour, and social policies decrease the vulnerability of disadvantaged social groups. At the same time, effective mechanisms of governance help to make policies more efficient. All of the above contribute to increasing societal capacities and laying the foundation for sustainable development.

This implies that social development is strategically placed in between financial inputs and development outputs. The ESG-PFM affects how governments manage and allocate financial resources. However, sustainable regional development depends on how such financial resources will succeed in improving the state of affairs socially. Without any advancements in human development, poverty alleviation, and equal distribution of income, fiscal measures will not be able to create development advantages. Such social accomplishments, therefore, act as a facilitator that makes economic growth more inclusive, environmental strategies more popular among people, and development policies more effective among vulnerable groups of people. Hence, SSA should not only be seen as a result of policy implementation but rather as a critical process through which sustainable regional development is created by ESG-PFM.

Moreover, the results also fit within the scope of FST because it recognizes the importance of fiscal sustainability not only in terms of achieving fiscal balance but also in terms of making sure that public resources continuously bring benefits to society over a period of time (Burnside, 2005). The integration of environmental, social, and governance considerations into public financial management helps local governments use the public finances wisely on those sectors that can create sustainable social impacts. Not only should the government's fiscal sustainability be assessed based on budgetary balances and expenditure realization, but also on its capability to create sustained benefits in the development of human beings and poverty reduction.

In terms of public sector accounting, this evidence shows that SSA is the intermediary performance result between the effective management of financial resources and the achievement of wider social value. In such circumstances, public financial management goes further than accounting, reporting, and monitoring of the budget implementation process, because it provides the information for assessment of whether there are the social impacts from the public spending. The use of this perspective leads to the move from the financial accountability approach towards the performance accountability one, where financial statements are supplemented with nonfinancial performance indicators of government programs' efficiency. It means that accounting systems should not only trace the usage of public funds but also their social performance effects that will create value for society.

In addition, the results advance PVT by showing that the creation of public value through the public sector involves a process rather than occurring as a result of financial management practices alone. While existing literature on this subject has been largely concerned with establishing the direct relationship between governance, public expenditure, and development, this research highlights how ESG-PFM leads to the creation of public value and sustainable regional development through the same (Huijbregts et al., 2022). Specifically, the current research identifies SSA as the main channel through which sustainability-oriented PFM leads to the creation of sustainable development outcomes. The theoretical contribution here is that social development is seen as a means rather than an end product of public policies in the process of creating public value and sustainable regional development.

Social Performance as a Foundation for Sustainable Regional Development

Findings indicate that SSA significantly impacts SRD. Therefore, it is evident that there is a positive relationship between SSA and SRD. The implication is that improvements in social

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development outcomes play a critical role in the attainment of sustainable regional development outcomes. Economic development, environmental quality, and social development outcomes are not achieved by themselves; rather, they are attained through the improvement of human development levels, poverty reduction, and income equality. Based on PVT, the main objective of the public sector organization is not to manage the public resource effectively but to generate public value through social welfare, high quality of public services, social equity, and trust in the government (Moore, 2013). In this regard, SSA is a critical aspect of government-based public value generation.

This also justifies why social performance is considered as a necessary condition for sustainable regional development. Sustainable development cannot be accomplished only through increasing the government's spending and economic growth since the development process in the long run is determined by the quality of human capital and the inclusiveness of the development outcomes. Education makes the labor force more productive, good health raises productivity, whereas reducing poverty and promoting income equality improves social cohesion and reduces structural weaknesses. All these changes contribute to creating an enabling environment for economic development, strengthening institutions and managing the environment effectively. Thus, SSA is seen as the basic platform for development where governments produce sustainable regional outcomes rather than the ultimate goal of public policy.

Furthermore, the study reinforces the concept put forth by the FST theory, which highlights the importance of the concept of fiscal sustainability, which includes not just the ability to maintain fiscal balance but also the ability of the government to sustain long-term benefits for society from the use of resources allocated to the public domain (Burnside, 2005). Fiscal sustainability will thus depend upon how the expenditure of the government continuously improves human development and resilience rather than just maintaining fiscal balance. The governments that are able to make continuous improvements in education, health, and social equality will thus have better foundations to make sustainable development in their regions since these will yield cumulative gains over the years.

Considering the perspective of public sector accounting, the above research results indicate that SSA needs to be considered a strategic non-financial performance measure which complements traditional financial measures in assessing government performance. The financial statements and budget accomplishment reports offer the proof about the management of public money but do not provide the answer about whether there have been any substantial benefits for the well-being of citizens due to the government spending. The application of SSA in measuring the performance of the public sector allows accounting systems to assess how efficient the government spending was in producing the results for the society.

Additionally, this study further develops the PVT framework by highlighting the role of public value created through government policies to go beyond the initial benefits in terms of betterment of public service provision and social welfare. While previous literature considers social indicators as the ultimate outcomes from public policies, this study shows that SSA acts as a determinant of economic, environmental, and social factors related to sustainable regional development (Nakpodia et al., 2024). It suggests that the relationship is sequential in nature whereby improvement in social performance becomes a means for creating sustainable regional development. Thus, the results expand the scope of PVT by considering social performance as an outcome and a cause of sustainable development.

These results also add to the public sector accounting literature as they stress the necessity of combining financial and non-financial measures in performance measurement and accountability frameworks of governmental entities. Public financial management is not

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effective only on the basis of budgetary achievement, financial efficiency, or adherence to fiscal policies. Instead, improvement in social performance, which will serve as evidence of value creation in the long run, is an important factor in measuring public financial management effectiveness. In terms of practice, local governments must enhance their performance budgeting approach by introducing SSA measures into the planning, budgeting, reporting, and performance evaluation system.

Regional Fiscal Capacity as a Contingent Factor in the Relationship Between Social SDGs Achievement and Sustainable Regional Development

These results show that RFCL serves as an effective moderator of the relationship between SSA and SRD, which means that Hypothesis 4 receives empirical validation. It can be concluded that the impact of the contribution of social development accomplishments to sustainable regional development will depend on the fiscal capability of local governments. Given the methodological framework employed in the current research, the effect of moderation will be understood in terms of its statistical significance since both SSA and SRD have been formed using the technique of PCA indices. Hence, the sign of the coefficient is determined by empirical orientation of the dataset rather than theoretical expectations. Within the context of FST, sufficient fiscal capacity is considered to be a primary prerequisite for development finance sustainability and preservation of social gains obtained via public financial management (Burnside, 2005).

The role of moderating effect helps to clarify why equal amounts of SSA do not guarantee equal sustainable regional development results among provinces. Achieving progress through better human development, reducing poverty, and increasing income equality is an important social accomplishment, but such accomplishments need ongoing financial resources to become the source of further development through economic, environmental, and institutional gains. Provincial authorities with higher levels of fiscal capacity have more freedom to pursue their development strategies regardless of new economic conditions. As a result, provinces have the ability to finance their development programs continuously without lowering quality of provided services and postponing investments.

The results have further highlighted the ways through which fiscal capacity enhances the connection between SSA and SRD via a fiscal sequence. The presence of high levels of fiscal capacity gives governments more flexibility in budgeting whereby they can spend according to new development needs while ensuring the provision of essential public services. Budgeting becomes flexible due to the ability to finance education, health care, environmental conservation and social programs continuously over several fiscal years without facing any interruptions from budget limitations. It becomes possible for social gains to build up over time due to such an approach, thus enhancing the conversion of SSA into resilience, environmental sustainability, and regional development.

Also, the results are in line with the FST theory that suggests fiscal sustainability goes beyond mere balancing of budgets but ensures that governments have adequate fiscal capacity in order to ensure that any developmental gains remain sustainable (Burnside, 2005). The concept of fiscal capacity is therefore about more than just financial strength but about the ability of governments to withstand fiscal shocks and at the same time continue investing in order to enhance social development. The process thus shows that fiscal sustainability not only involves effective fiscal resource management but also requires adequate fiscal space in order to sustain policy consistency.

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In terms of PVT, fiscal capacity is the enabling condition that allows the public value created through social development to be safeguarded and enhanced over time (Moore, 2013). Public value creation is not only dependent on effective implementation of policies but also depends on the capacity of governments to sustain the benefits of their policies for more than one budget cycle. In the context of public sector accounting, the above research findings further underscore the need for incorporating fiscal sustainability in government performance measures. Accordingly, public financial management must include not only budgeting and accounting but also the continual monitoring of fiscal resilience, sustainability of expenditures, and the ability of governments to sustain social results through budgeting and financial management and performance measurement systems.

In addition, the current research expands on FST by arguing that fiscal sustainability is not only about balancing budgets and delivering fiscal commitments but is also an indicator of government capability in sustaining public value created by prior fiscal policies through constant investments in social development. In the same way, the current study enriches PVT with the discovery of RFCL as a context condition required for social accomplishments to be translated into sustainable regional development instead of considering fiscal capacity only as a determining factor of development performance (Rossi et al., 2025). At the same time, this contribution enriches the field of public sector accounting by presenting fiscal capacity as a key element of integrated performance measurement when the effectiveness of ESG-oriented public financial management relies on fiscal resilience, performance-based budgeting, financial accountability, and public value creation.

These findings can also be interpreted from an Islamic perspective through the concepts of *amanah* and *maslahah*. The significant contribution of ESG-PFM to social development suggests that public financial management can serve as a mechanism for transforming public resources into broader societal benefits. Government expenditure on education, healthcare, and social protection can therefore be viewed not merely as fiscal allocations but as instruments for improving human welfare and reducing social vulnerability. In the Islamic perspective, such outcomes are consistent with the principle of *maslahah*, where the management of public resources is expected to produce benefits for society and prevent social harm.

Furthermore, the role of SSA in linking ESG-PFM to sustainable regional development reinforces the importance of placing human welfare at the center of public resource management. This interpretation complements Public Value Theory: while PVT explains the process of creating value for society, the Islamic perspective emphasizes that the creation of such value should be grounded in responsible stewardship (*amanah*) and oriented toward public benefit (*maslahah*). Therefore, sustainability-oriented public financial management can be understood not only as a mechanism for achieving fiscal and development objectives but also as an ethical responsibility to ensure that public resources generate lasting benefits for society.

Conclusions

This study investigates the influence of ESG-PFM on SRD by examining the mediating role of SSA and the moderating role of RFCL among provincial governments in Indonesia during the 2015–2024 period. Based on the analysis using composite indices developed via PCA along with FEM panel data regression as the main method of analysis, it is possible to give an all-round account of how sustainability-based public financial management fosters sustainable regional development. It has been proven that ESG-PFM has a significant impact on SSA,

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SSA acts as the mediator for the relationship between ESG-PFM and SRD, and RFCL has a significant moderating role in the relationship between SSA and SRD. This means that sustainable regional development comes about in stages and relies on local government fiscal capability.

The findings reconceptualize public financial management from a sustainability perspective by positioning ESG-PFM not merely as a mechanism for fiscal discipline, budget execution, or administrative compliance, but as an integrated governance and performance management framework capable of creating long-term public value. In addition to this, this research adds to the Fiscal Sustainability Theory in that fiscal sustainability should be viewed as the capacity of governments to continually convert their public funds into socially sustainable outcomes, instead of only keeping the fiscal balance. Moreover, this research adds to the Institutional Theory in that institutional pressures lead to the adoption of ESG-focused public finance management, which improves the social performance before any sustainable regional development.

Moreover, this study contributes to the theory of public value by highlighting the sequential nature of the process in which SSA is the vehicle of ESG-PFM and the achievement of SRD, whereas RFCL is the contextual condition that determines the sustainability of social accomplishments. Thus, this study adds value to public sector accounting literature by introducing the concept of ESG-PFM as an appropriate model of accounting and governance that combines financial accountability, performance evaluation, budgeting for sustainability, and public value creation. In turn, government performance shall be assessed not only in terms of financial performance and regulatory compliance but also by its ability to achieve sustainable social accomplishments that contribute to regional development.

From an Islamic perspective, the findings also highlight the importance of viewing public financial management as an *amanah* in which government resources should be managed responsibly to generate sustainable public benefits. The integration of ESG considerations into public financial management is consistent with the principle of *maslahah*, as environmental protection, social development, accountability, and sustainable regional development are directed toward improving societal welfare. This perspective complements the existing theoretical foundations by emphasizing that sustainable public financial management is not only a matter of fiscal capacity and institutional governance but also an ethical responsibility to ensure that public resources continuously contribute to the well-being of present and future generations.

Study Implication

This study offers several theoretical implications by extending the understanding of public financial management beyond fiscal control, budget execution, and administrative compliance toward sustainability-oriented governance and public value creation. The findings provide insights into how institutional pressures shape ESG-PFM adoption, how sustainability-oriented financial management generates public value through SSA, and how fiscal capacity influences the sustainability of development outcomes. Accordingly, this study contributes to public sector accounting by advancing an integrated framework encompassing financial accountability, performance measurement, and sustainability-oriented budgeting. From an Islamic economic perspective, the study extends the conceptual discourse on Islamic public finance by linking ESG-based fiscal governance with the principles of *amanah* (responsible stewardship), *maslahah* (public welfare), and *maqasid al-Shariah*. This integration highlights ethical accountability, distributive justice, and sustainable welfare as essential dimensions of

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public financial management, thereby connecting contemporary fiscal governance with the broader objectives of Islamic economics.

The findings also offer practical implications for policymakers and government officials. Integrating ESG principles into fiscal planning, budgeting, implementation, reporting, and performance evaluation can strengthen accountability and align public resource allocation with sustainable development objectives. Enhancing regional fiscal capacity through stronger own-source revenue generation, expenditure efficiency, and long-term fiscal planning can further support sustainable social development. From a public sector accounting perspective, governments should incorporate financial and nonfinancial indicators into performance-based budgeting and accountability systems. Within Islamic economic governance, these measures also reflect the principles of *amanah* and *maslahah* by encouraging transparent, equitable, and welfare-oriented management of public resources for present and future generations.

Study Limitation and Future Research Recommendation

There are several limitations that should be kept in mind when evaluating these results. Firstly, the study is limited to Indonesian provincial authorities only, meaning that the results cannot be generalized to other types of governments (regency, municipal, international) that operate within a different system of institutions and fiscal policy. Secondly, the indicators of ESG-PFM, SSA, and SRD were derived via PCA, meaning that the direction of these indices depends on the covariance structure of the observed data rather than preconceived theories. Lastly, the 2015-2024 observation period may be too short for tracking the dynamics of ESG implementation and sustainability-based PFM.

Future research could expand the scope of data collection by investigating the regency or municipal government or by doing cross-country studies to examine whether the suggested conceptual model still holds in varying institutional contexts. Future research could also improve upon the methodology by considering alternative ways of measuring ESG-PFM by using additional sustainability variables and comparing principal components analysis with alternative methods of developing a composite index, such as benefit-of-the-doubt weighting approach and confirmatory factor analysis. Causality could be further improved by using System GMM, dynamic panel estimation, or other causal methodologies. Further areas of research can be the impact of digital government, green governance, public sector innovation, integrated reporting, and sustainability reporting on ESG-PFM and creating public value.

Author's Contributions (CRediT Taxonomy)

Samsul Huda: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing.
Mirza Avicenna and Mohammad Anis Sumadi: Investigation, Data curation, Resources, Writing – original draft, Writing – review & editing.
Agus Eko Sujianto and Muhammad Abrar bin Bahaman: Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing.

All authors contributed to the literature review, critically reviewed the manuscript, and read and approved the final version for publication.

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Declarations

Ethical considerations
This study is based exclusively on publicly available secondary sources and documentary materials. No human participants were involved; therefore, ethical approval and informed consent were not required.

Use of artificial intelligence (AI)
The authors declare that no generative artificial intelligence (AI) tools were used in the preparation, analysis, or writing of this manuscript.

Conflict of Interest
The authors declare no conflicts of interest.

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